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Research Paper

M.Sc. Architecture

A Scenario-Based Investigation
of the Countryside's Role
in a Post-Industrial Future

How to Ru-ral.

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Abstract

Although the hinterland needs to be maintained for the function of the city, the countryside lacks qualities and is out of the scope of most spatial practitioners. Furthermore, the countryside holds the potential of being an alternative habitat to the dense city.

An investigation of the European Countryside led this research to an Eastern German context located around the localities of Schwedt and Angermünde. The analysis of the local commuting behaviour indicated the area's liveability. With a focus on the past two decades, the development led to three scenarios expounding possible futures for the investigation area. The scenario of the Safari Hinterland marks an intensification of the current trend resulting in a commuting society. The overcoming of location specificity on the basis of increased mobile efficiency creates a unified space of city and countryside in the scenario of the Scatter City. With a focus on digitalisation, the countryside remains its distinctiveness constituting reinterpretations of villages based on local acting informed by global exchange according to the Glocal Village scenario.

Taking the liveability in the form of time spent on commuting and the related emissions representing the environmental tolerability as indicators, the Glocal Village resulted as the most desirable future and the basis of the subsequent design work.

Habitat as an Indication for Living Qualities

Current progressions in the city suggest a development in the outskirts through a process of '*post-urbanisation*'[1]. While adjoining villages in the satellite sprawl experienced popularity among young families early, the core city remained as the main habitat for various institutions. People commuted mainly into the city. However, with the current developments, industry, education, and cultural facilities move to the suburbs. New centres outside of the core city arise.[2] These extensions seem to lack qualities of traditional core cities like their diverse supply or compared to their individual characteristics.

Lefebvre[3] comments on the development of the city at the peak of a typological change in 1968. With the urbanisation, cities transformed into hubs of production. However, society should have the authority to utilise the city. People should have '*the right to the city*'[4]. The utilisation is expressed in a spectrum of principles including liberty and the individual contribution to the society. Further, citizens must be able to dwell and occupy in the city.

Many social movements use Lefebvre's claims as the starting point of their protest against the changes of post-urbanisation processes in a neighbourhood or a city. However, the theory cannot be determined in a specific area. Lefebvre was concerned with the common consequences of the urbanisation for the city as a general typology. By applying the right in a specific context, the term is profoundly misused.[5]

The city, including its outskirts, seems to remain the centre for the post-industrial society and the basis of Lefebvre's right to the city. However, the theory did not mean the city in its traditional meaning. The misapplication of the phrase and its exclusive adaptation in a city's context appears to be connected to the strong terminology. Nonetheless, the traditional definition of the city cannot be adapted in a literal sense. The preindustrial boundary of the space in the form of city walls does not exist anymore (see Figure I). The city is a concept and created by its inhabitants and their rights. Therefore, the right to the city might be also applied in areas that are commonly associated as rural.[6]

1 Axel Borsdorf, Oliver Bender, and Andreas Haller, "Urbanisierungs-, Suburbanisierungs- Und Postsuburbanisierungsprozesse" [Urbanisation, Sub-Urbanisation and Post-Urbanisation Processes], in *Dorf: Ein Interdisziplinäres Handbuch*, eds. Werner Nell and Marc Weiland (Berlin, Germany: J.B. Metzler, 2019), 137, https://doi.org/10.1007/978-3-476-05449-4_20.

2 Ibid.

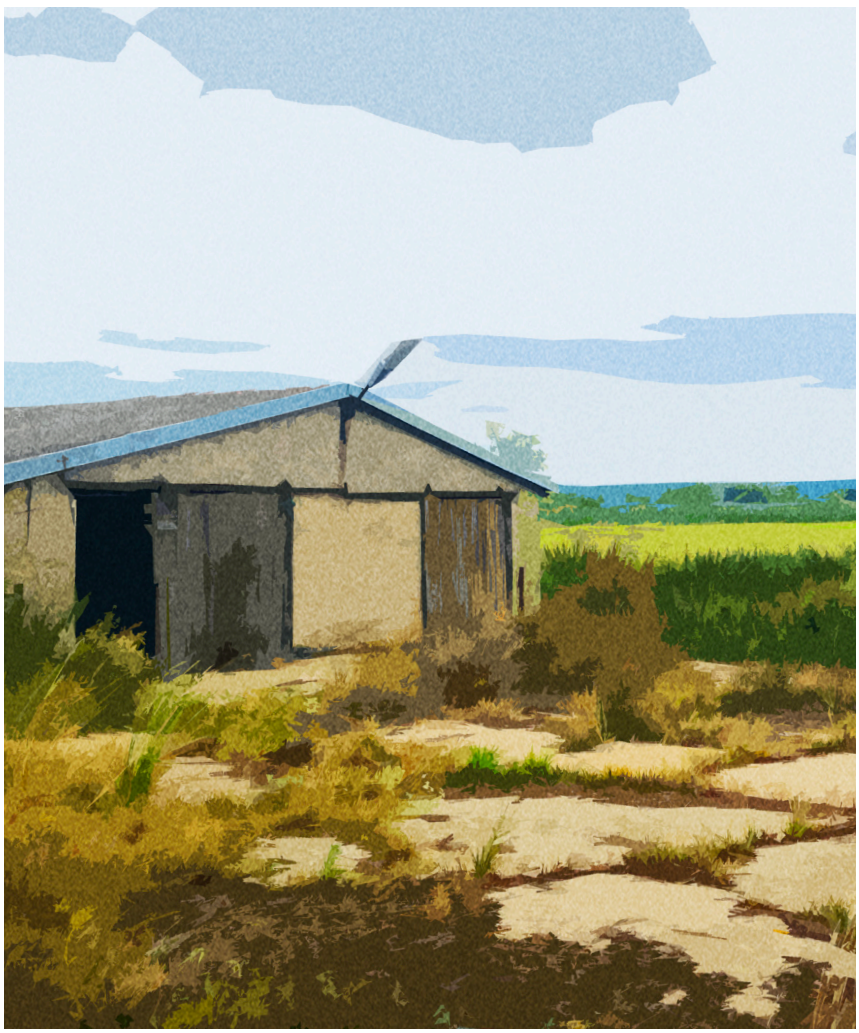
3 Henri Lefebvre, "The Right to the City," in *Writings on Cities*, eds. and trans. Eleonore Kofman and Elizabeth Lebas (Oxford, the United Kingdom: Blackwell, 1996), 61–181.

4 Ibid., 173–74.

5 Justus Uitermark, Walter Nicholls, and Maarten Loopmans, "Cities and Social Movements: Theorizing Beyond The Right to the City," *Environment and Planning A* 44, no. 11 (2012): 2546–54, https://doi.org/10.1068/a44301.

6 Laura Barraclough, "Is There Also a Right to the Countryside?," *Antipode* 45, no. 5 (2013): 1047–49, https://doi.org/10.1111/anti.12040.

I Rural Realm: The boundary between the city and the space outside of it vanishes.



II Vacant Barn: Due to a progressing societal shift, built structures in the countryside become abandoned.

As Schumacher[7] argues in 2016, architects conduct an urban practice and should not operate in the countryside. The focus on that context seems unnecessary since it affects only a small number of people. Further, he claims, buildings outside of the city are mostly functional and can be, therefore, planned by engineers. However, the space outside of the city cannot be characterised as rural in the Global North. Urbanisation is a universal process and living patterns in the countryside align with the ones in the city. The current development of the countryside promotes social differences which can be tackled by architects as well.[8]

In that sense, this research acknowledges the countryside and explores its role in a post-industrial future with the claim for equal rights to people in the city and outside of it. Nevertheless, the countryside is too broad and diverse to be analysed on a global scale. A case example was, therefore, declared to abstract life patterns of the countryside in a specific context and derive conclusions for a universal scope.

As a case example, the region around Schwedt and Angermünde in Eastern Germany was chosen, being a representative of villages without major facilities of daily needs. The Eastern German context, further, takes the role of a precursor due to its past. The population in the countryside decreased with the divide of Germany after the Second World War as well as after its reunification in 1989. These developments led to vacancies (see Figure II) that different interest groups occupied partially in recent times.[9]

Further, the living conditions and rights of people living in the countryside needed to be clarified considering the extent of this research. The differences regarding the life patterns between the city and the countryside differ mainly in the distribution of facilities and opportunities in cultural and professional fulfilment. People are dependent on commuting and the car due to the low availability of public transportation resulting from the low density. The countryside as a regular habitat is due to these limitations not available to all people and, therefore, the basis right for this research.

With the technological progression and the shift towards a society centred around service work, people seem to change their life patterns. A balanced relation between work and personal life appears to be increasingly relevant among young professionals. Automated production processes replace more and more manual labour and also the COVID-19 pandemic demonstrates, among all harms, advantages as well as limitations of remote working in an extensive trial.

Recognizing the countryside as a potential and liveable alternative to living in the dense city in a post-industrial future, this research introduces three scenarios that explore the future of the countryside towards which society might be heading and their evaluation based on liveability and environmental tolerability.

7 Patrik Schumacher, "Don't Waste Your Time in the Countryside," *Architectural Design* 86, no. 4 (2016): 130–35.

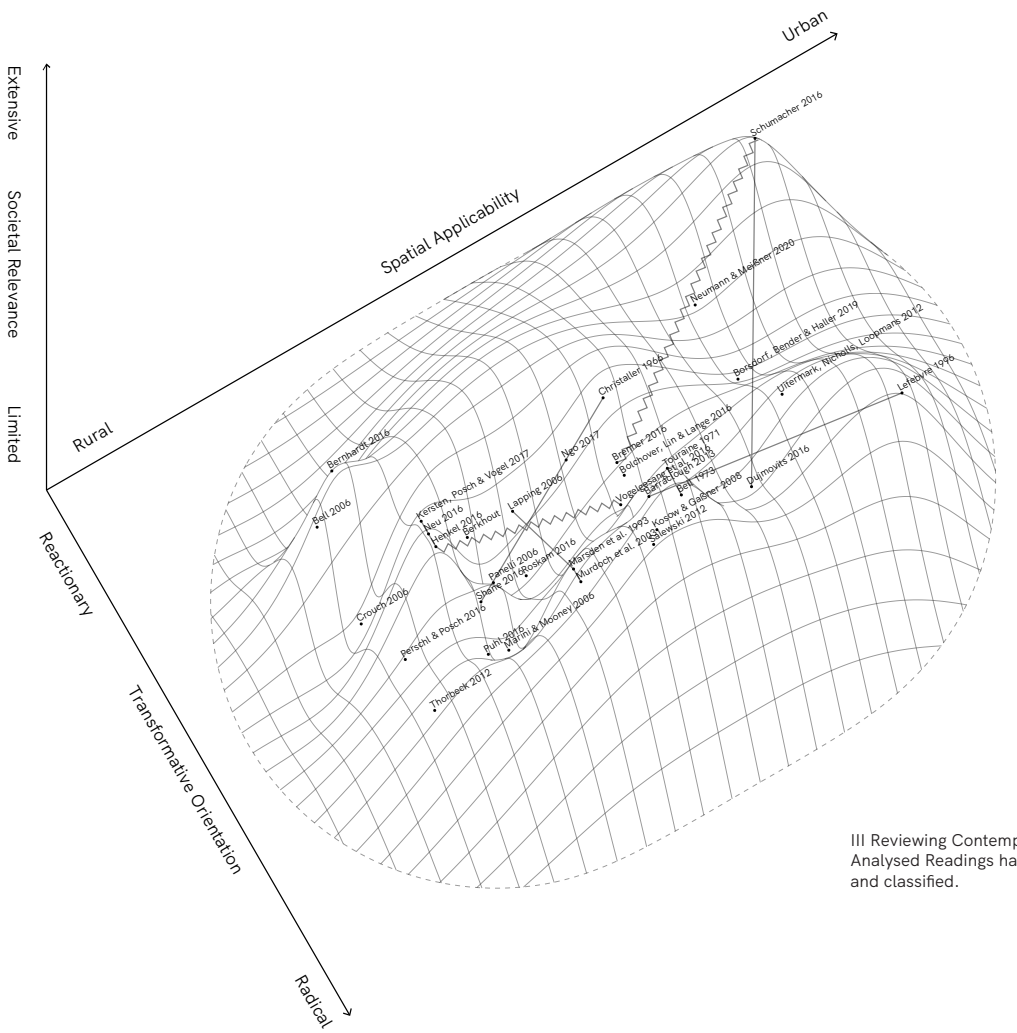
8 Joshua Bolchover, John Lin, and Christiane Lange, "Introduction: Where Is the Rural in an Urban World?," *Architectural Design*86, no. 4 (2016): 8–15; Neil Brenner, "The Hinterland, Urbanised?," *Architectural Design* 86, no. 4 (2016): 120–29.

9 Mathias Burke et al., *Ländliche Verheissung: Arbeits- Und Lebensprojekte Rund Um Berlin" [Rural Forecast: Working and Living Projects Around Berlin]* (Berlin, Germany: Ruby Press, 2019).

Understanding the Contemporary Countryside

To generate an overview of generally relevant and recent findings regarding the live qualities in the countryside and their future, an extensive literature review was conducted. Due to the limited research in spatial professions on this topic, the scope was extended to findings from other fields. Keywords for the literature review were *rural, countryside, agriculture, European Union, development, and scenario* paired with field-related filters. This investigation led to a variety of theories and research countering or complementing each other in a societal, spatial and transformative framework as seen in Figure III.

After a short overview of past rural foci from spatial disciplines and explaining societal changes, this chapter aims to illustrate work from sociological, political, and geographical research on the countryside's living conditions to conclude in current problems and the need for discourse among spatial planners.



III Reviewing Contemporary Literature: Analysed Readings have been compared and classified.

_Historical Background

During the industrialisation in the 19th century, manufacturing facilities agglomerated in the city. This central intensification of the production sector put rural areas into an opposing position and the perception of the countryside as a remaining space shifted.[10] Charles Fourier's Phalanstère or Robert Owen's New Harmony are architectural expressions of the socialist thinking countering the city's productivism. The countryside preserved its position as a space for utopian thinking in the 20th century. Frank Lloyd Wright proposed the Broadacre City in 1932 as the space for a community that lives independently regarding their good production. Le Corbusier worked on the countryside as well during the 20th century. The Ferme Radieuse and Village Radieux stated the family-maintained food production as France's future. Although both focused on rural agriculture, Wright criticised the aggravating class structure more intensively like his predecessors. After the Second World War, interest in the countryside declined due to the destruction and economic growth in cities.[11]

Despite these problems, the agricultural sector shrank while production industries increasingly emerged in the countryside.[12] Fabrication moved from the city to the hinterland. Globalisation differentiated the rural economy further from the 1980s onwards.[13] Therefore, the economy cannot be generally characterised on a global scale, but it became more dependent on regional impacts. Historical factors influenced the current state of a specific rural area.

Touraine[14] remarks in 1969 that the society is changing again and the economic sector of service is growing while the production and agricultural sector is declining. This development promotes knowledge and creativity as the main driving forces for economic growth. The knowledge-centric development results in a greater responsibility to every individual. Every person has the ability to change their life progress. This expertise implies the break of the social class system which holds back these possibilities. With the full implementation of such characteristics, humankind arrives in the state of a '*post-industrial society*'[15].

This theory was further shaped by other sociologists. According to Daniel Bell's[16] work from 1973, the shift is already evolving in industrial countries like the United States. He states various distinctions to an industrial society like the relevance of academic professions since innovation is henceforth built-up on theoretical knowledge. These predominantly technical innovations are, further, thoughtfully considered before their introduction. Technology promotes and catalyses the economic shift.

_Current Transdisciplinary Progressions

These ambivalent developments also had an impact on rural sciences and resulted in a '*cultural turn*'[17]. The countryside could not be

10 Cole Roskam, "Inventing the Rural: A Brief History of Modern Architecture in the Countryside," *Architectural Design* 86, no. 4 (2016): 16–21.

11 Ibid.

12 David Grahame Shane, "Notes on Villages as a Global Condition," *Architectural Design* 86, no. 4 (2016): 50–59.

13 Matteo B. Marini and Patrick H. Mooney, "Rural Economies," in *The Handbook of Rural Studies*, eds. Paul Clorke, Terry Marsden, and Patrick Mooney (London, the United Kingdom: Sage, 2006), 104–22.

14 Alain Touraine, *The Post-Industrial Society*, trans. Leonard F. X. Mayhew (New York, the United States: Random House, 1971).

15 Ibid., 4–5.

16 Daniel Bell, *The Coming of Post-Industrial Society* (New York, the United States: Basic Books, 1973).

17 Ruth Panelli, "Rural Society," in *The Handbook of Rural Studies*, eds. Paul Clorke, Terry Marsden, and Patrick Mooney (London, the United Kingdom: Sage, 2006), 81.

captured in a singular development and different impulses shape the politics, economy, and society. Even though global tendencies can be determined, these developments do not claim general accuracy. Rurality became dependent on locality and time. Therefore, there are different types of rural areas on a global scale.[18]

The increasing diffusivity between rural and urban characteristics complicates the definition of the countryside as a space. The terminology suggests that there is a difference between the city and the '*non-city*'[19]. However, the urbanisation proceeds outside of the city and unifies living models regardless of the localisation. Already the '*central-place*'[20] theory suggested a connecting network between villages and the city. Depending on available facilities, localities form connections and hierarchies which make a distinction of the rural space impossible. Informed by Lefebvre's space theory, Halfacree suggests in 2006 that the production of rural space derives from people's routines, abstractions like maps, and physical places.[21]

This space model demonstrates the complexity of the current characteristics of the countryside. Nevertheless, its contemporary perception is mostly based on romantic associations and the longing for simplicity. The wrong idea of the rural idyll is mainly informed by marketing and produced by tourism.[22]

Today, villages are in a transformative process. The population outside of cities increasingly works in the service sector and the share of production industries declines. However, the workplaces are often centralised. A commuter society is on the rise.[23] Further, people from the city move to the countryside and carry their urban aspirations. Anonymity opposes traditional rural life patterns. Therefore, communities with the characteristics of the pre-industrial countryside do not exist anymore.[24] The scattered and insufficient number of facilities, as well as the lack of mobility, creates a strong reliance on the car.[25]

For that reason, an equal life quality compared to the city cannot be guaranteed in every village.[26]However, it is a prerequisite of a modern society. Regardless of the small influx of different actors into the countryside and the trend of rural living propagated by media, the countryside is mostly left by itself. New arriving inhabitants look for their personal well-being and the village does not become a space of inclusiveness. Moreover, the rural exodus remains predominant in peripheral settings.

It is a challenge of the 21st century to overcome the differences in living quality which are still depending on personal circumstances. Regardless of the location, people should have the same opportunities. Thereby, the focus should not be restricted to maintain a minimum, but the liveability should be the same in the city as well as outside of it.[27]

In the Global North, policies to tackle these inequalities slowly started to occur on the agenda during the last two decades. Rural de-

18 Terry Marsden et al., *Constructing the Countryside* (London, the United Kingdom: UCL Press Limited, 1993); Jonathan Murdoch et al., *The Differentiated Countryside* (London, the United Kingdom: Routledge, 2003).

19 Brenner, "The Hinterland, Urbanised?," 125.

20 Walter Christaller, *Central Places in Southern Germany*, trans. Carlisle W. Baskin (London, the United Kingdom: Prentice-Hall, 1966); Shane, "Notes on Villages as a Global Condition."

21 Keith Halfacree, "Rural Space: Constructing a Three-Fold Architecture," in *The Handbook of Rural Studies*, eds. Paul Clorke, Terry Marsden, and Patrick Mooney (London, the United Kingdom: Sage, 2006), 44-62.

22 David Crouch, "Tourism, Consumption and Rurality," in *The Handbook of Rural Studies*, eds. Paul Clorke, Terry Marsden, and Patrick Mooney (London, the United Kingdom: Sage, 2006), 355-64.

23 Gerhard Henkel, "Geschichte Und Gegenwart Des Dorfes" [History and Presence of the Village], *Aus Politik Und Zeitgeschichte*66, no. 46-47 (2016): 10-16, https://www.bpb.de/apuz/236824/land-und-laendlichkeit.

24 Waldemar Vogelgesang et al., "Städtische Lebensformen Im Dörflichen Kontext: Urbane Döfer" [Urban Ways of Living in the Village Context: Urban Villages], *Aus Politik Und Zeitgeschichte* 66, no. 46-47 (2016): 35-40, https://www.bpb.de/apuz/236824/land-und-laendlichkeit.

25 Fritz Bernhardt, "Verkehrsinfrastrukturen Und Mobilitätsverhalten: Analyse Des Mobilitätsverhaltens Und Der Verkehrsinfrastrukturen in Ländlichen Räumen Unter Dem Aspekt Des Regionalen, Demografischen Und Sozialen Wandels Am Beispiel Der Steiermark" [Traffic Infrastructure and Mobility Behaviour: Analysis of the Mobility Behaviour and the Traffic Infrastructure in Rural Areas Considering the Regional, Demographic, and Social Change Using the Example of the Steiermark], in *Lebensentwürfe Im Ländlichen Raum*, eds. Rudolf Egger and Alfred Posch (Wiesbaden, Germany: Springer VS, 2016), 203-42; Magdalena Perschl and Alfred Posch, "Carsharing – Ein Mobilitätsansatz Auch Für Den Ländlichen Raum?" [Carsharing – A Mobility Approach Also for Rural Areas?], in *Lebensentwürfe Im Ländlichen Raum*, eds. Rudolf Egger and Alfred Posch (Wiesbaden, Germany: Springer VS, 2016), 243-68.

26 Jens Kersten, Claudia Neu, and Berthold Vogel, "Gleichwertige Lebensverhältnisse: Mindeststandard Alleine Genügen Nicht" [Equal Living Conditions: Only Minimum Standards Are Not Enough], *Arch+* 50, no. 228 (2017): 188-91; Claudia Neu, "Neue Ländlichkeit: Eine Kritische Betrachtung" [New Rurality: A Critical Reflection], *Aus Politik Und Zeitgeschichte* 66, no. 46-47 (2016): 4-9, https://www.bpb.de/apuz/236824/land-und-laendlichkeit.

27 Kersten, Neu, and Vogel, "Gleichwertige Lebensverhältnisse: Mindeststandard Alleine Genügen Nicht" [Equal Living Conditions: Only Minimum Standards Are Not Enough].

velopment strategies used to be widely focused on agriculture. After both World Wars, the depression required an efficient way of farming.[28] In the European context, the *Common Agricultural Policy* [CAP] suggests rural development policies in exchange for financial support. The aims are then individually adapted by the member states in their policymaking. The CAP was no exception in a primarily agricultural focus of development strategies. However, the scope of the European Union diversified. The current CAP promotes equal conditions in agriculture, controls sustainable resource and climate handling, and compensates for uneven developments.[29]

For financial support, the *European Agricultural Fund for Rural Development* [EAFRD] was introduced which manages the distribution of aid. It is divided into economic, environmental, socio-economic, and community-led measures which have to be applied to a certain extent. Especially the last intervention seems to be the most efficient and increasingly gains importance within the EU.[30] In Germany, for example, the rural development policy for Brandenburg and Berlin intends the greatest expands for bottom-up measures and promotion of equal live quality. Still, agricultural measures remain an important factor.[31]

Thus, the focus on the future outside of the city is mostly driven by compensation of uneven live quality. However, exclusive rural development based on external financial support is not sustainable. Strategies have to focus on location-specific solutions and promote individual assets. These measures can be based on a region's resources or a location-independent specialisation.[32]

Current trends towards a life in the countryside are mostly informed by the common idea of a rural idyll. This thinking derives from the constant differentiation of the city and rural areas. Further, shrinking regions experience a decline in everyday facilities and the arriving people seek for a personal habitat. These developments make the choice to live outside of the city inefficient. Solutions apart from the rural idyll and individual motivation are needed. Sharing practices in living, mobility, work, and agriculture could be introduced in the countryside.[33]

Designers, working in a profession driven by problem-solving, could take a part in the resolution of uneven living conditions. Although the focus of most spatial practitioners remains on the city, recent architectural discourse turned onto the countryside.[34] The simultaneous urbanisation of the city and the non-city, however, distinguishes the current development from former fascinations. Furthermore, agricultural automation in the countryside could be even a forecast for the digitalisation of cities.[35]

Spatial planners have to acknowledge the differences to the city. Working in the countryside, they have to find solutions to problems of rural communities which could result from the predominant

28 Mark B. Lapping, "Rural Policy and Planning," in *The Handbook of Rural Studies*, eds. Paul Clorke, Terry Marsden, and Patrick Mooney (London, the United Kingdom: Sage, 2006), 104–22.

29 Petra Berkhout, Kaley Hart, and Tuomas Kuhmonen, "EU Rural Development Policies: Present and Future," in *EU Bioeconomy Economics and Policies: Volume II*, eds. Liesbeth Dries et al., vol. II (Cham, Switzerland: Palgrave Macmillan, 2019), 213–41, https://doi.org/10.1007/978-3-030-28642-2.

30 Ibid.

31 Ministerium für Ländliche Entwicklung Umwelt und Landwirtschaft des Landes Brandenburg and Verwaltungsbehörde ELER Brandenburg und Berlin, "Entwicklungsprogramm Für Den Ländlichen Raum Brandenburgs Und Berlins 2014-2020" [Development Programme for the Ruaral Area of Brandenburg and Berlin 2014-2020]" (Ministerium für Landwirtschaft, Umwelt und Klimaschutz, 2020), 164–67, https://eler.brandenburg.de/sixcms/media.php/9/EPLR%202014-2020%20-%205.%20Änderung.pdf.

32 Rudolf Dujmovits, "Regionale Entwicklungsstrategien: Theoretische Und Empirische Begründungen Und Ihre Implikationen" [Regional Development Strategies: Theoretical and Empirical Explanations and Their Implications], in *Lebensentwürfe Im Ländlichen Raum*, eds. Rudolf Egger and Alfred Posch (Wiesbaden, Germany: Springer VS, 2016), 29–56; Bibiane Puhl, "Den Ländlichen Raum Zukunftsorientiert Und Wirkungsorientiert Gestalten" [Developing the Rural Area Future-Orientated and Impact-Orientated], in *Lebensentwürfe Im Ländlichen Raum*, eds. Rudolf Egger and Alfred Posch (Wiesbaden, Germany: Springer VS, 2016), 73–90.

33 David Bell, "Variations on the Rural Idyll," in *The Handbook of Rural Studies*, eds. Paul Clorke, Terry Marsden, and Patrick Mooney (London, the United Kingdom: Sage, 2006), 149–60; Matthias Neumann and Michael Meißner, "Nachhaltiges Wohnen Auf Dem Dorf? Kommentar Zu Lisa Vollmer Und Boris Michel „Wohnen in Der Klimakrise. Die Wohnungsfrage Als Ökologische Frage" [Sustainable Living in the Village? A Comment on Lisa Vollmer and Boris Michel "Living in the Climate Crisis. The Housing Question as an Ecological Question"], *Sub|urban* 8, no. 1/2 (2020): 193–98, https://doi.org/10.36900/suburban.v8i1/2.580.

34 Roskam, "Inventing the Rural: A Brief History of Modern Architecture in the Countryside."

35 Anh-Linh Ngo, "Stadtland" [City-Country], *Arch+* 50, no. 228 (2017): 1–3.

focus on the city. These solutions need to be based on individual strengths.[36]

_Divergent Living Qualities of City and Countryside

Towards a post-industrial society, the consequences, as well as potentials of the space outside of the city, are widely unclear. While the growth of cities is almost certain, the programmes of urbanisation in the non-city are open. The countryside cannot be characterized as rural due to the progressing urbanisation in the Global North and life models become increasingly equal to each other in the countering spaces. However, living conditions differ. A person's living circumstances should be the same regardless of the location they live in.

Current architectural discourse is mostly centred around the city. However, the countryside is a part of the network around it. Therefore, concepts for a future life outside of the city are needed. Solutions and ideas apart from the individual fulfilment promoted by the rural idyll and apart from the exclusive living in the city have to be explored. These spatial problems need to be tackled by practitioners of the corresponding fields.

Opposing the uneven living conditions and the necessity of a life in the countryside, this research raises the question: *How can rural life patterns be adapted to substitute qualities of urban density in the countryside?*

36 Dewey Thorbeck, *Rural Design: A New Design Discipline* (Abingdon, the United Kingdom: Routledge, 2012).

A Scenario Approach for Equal Living Conditions

To answer the research question, a quantitative approach was chosen based on the scenario building methodology of the Institute for Future Studies and Technology Assessment [IZT]. It was further adjusted for the purpose of this research. The quantitative procedure assures transparency and imitability of the process. Along with the diversity of actors in the countryside and their possible life patterns, it also proves outcomes based on a wide share of the population rather than looking at selected examples or actors.

Further, the scenario building approach ensures an explorative investigation of the countryside's future. The selected methodology was chosen because of its aspiration to connect different established methodologies considering the absence of a standardised and universal approach.[37]

37 Hannah Kosow and Robert Gaßner, *Methods of Future and Scenario Analysis: Overview, Assessment, and Selection Criteria*(Bonn, Germany: Deutsches Institut für Entwicklungspolitik, 2008).

_Methodology

Following the logic of the IZT approach, the area for the example case needed to be clarified in the first step of the '*Identification of the scenario field*'[38]. The choice of the investigation area was based on the urbanisation data provided by the European Commission. Grounded on Christaller's[39] methodology on central places from 1933, an investigation area in such a rural area was then chosen around a middle centre to maintain a distance to an urban space. The theory was adapted with the addition of *hubs* which were defined as villages with occasional availability of facilities. Both strategies were executed with mappings on a European scale or the scale of Brandenburg. At this point, it is also important to mention that Christaller's theory was strategically used during the Nazi regime[40] and is, therefore, highly biased. The classification in localities with certain functionalities remains valid until today and, therefore, needed to be included in this research paper. Nevertheless, this work is not connected to the ideology in any way.

The '*Identification of key factors*'[41] was set with the research question's aim on equal living qualities in the form of the commuter and transportation data. These insights were observed throughout a time span of two decades focusing on the years 1998, 2008, and 2018. The availability of daily need-covering facilities was complementing the most recent data to draw additional conclusions on the living quality and capture the current state. The results were then visualised in maps locating the facilities and land uses, showing the flows between villages, as well as, enclosing the time spent on travels.

During the '*Analysis of key factors*'[42], the trends of the past two decades were extrapolated until 2040 to estimate the development of the region without any obstacles. The tendency of the transportation means progressed as usual in that case. In the process of the '*Scenario generation*'[43], the trend was then handled based on the progression towards the post-industrial society. Manipulative factors were the rise of new mobility means and new work habits which led to either an increase or decrease in the commuting behaviour.

With the '*Scenario transfer*'[44], the results were assessed considering the time spent on travelling and the related emissions to conclude on the countryside's future life patterns and their viability. These calculations were conducted based on the average travel time in the area and the average emissions produced by a private car or the combination of a train and bus. The results were then, finally, represented in a collage illustrating the volume of released carbon dioxide emissions and an abstraction of the physical connectivity.

The analysis of data was conducted with Microsoft's spreadsheet software Excel. The localisation and interpretation of data were handled with the geographic information system software QGIS by the development team of the same name. The produced maps were then stylised with Adobe's vector graphics editor Illustrator.

38 Ibid., 26.

39 Christaller, *Central Places in Southern Germany*.

40 Shane, "Notes on Villages as a Global Condition."

41 Kosow and Gaßner, *Methods of Future and Scenario Analysis: Overview, Assessment, and Selection Criteria*, 26–27.

42 Ibid., 27.

43 Ibid., 27–29.

44 Ibid., 30.

_Variables and Obstacles

The countryside's expanse, in its evident definition as a space of low population density, being the vast majority of the earth's surface, made the response to the research question difficult. With different characteristics and conditions, the countryside is too broad to be generalised.[45] Therefore, the study area needed to be abstracted in the form of a case example. Conclusions on the countryside on a global scale can only be derived from that investigation.

Further, the rights of the population leaned on Lefebvre's theory within the context of the countryside needed to be validated. These living qualities strongly rely on personal experiences and patterns which cannot be captured in statistics as they are too connected to individual behaviour. They are strongly based on qualitative knowledge. The quantitative approach, however, remained because of the extended validity. Gained knowledge remains accurate throughout a region with this approach. Therefore, the variables of urban qualities and live patterns needed to be abstracted to ensure their measurability.

Qualities of urban density are represented by the availability of facilities for daily needs. Because of the scattered settlement of localities in the countryside, facilities are centralised, and the local population has to commute for daily needs like procurements or practices. An extensive availability is, therefore, an urban asset related to a high population density. This presence of localities can be captured in a number and be measured.

As the representation for live patterns, the commuting behaviour of local inhabitants was chosen. A person's regularly travelled distance and the invested time for that purpose takes a major role in their daily routine. The localities and their intertwining illustrate the operational space of a person. Thereby, the mean of transport influences the time spent on transit. The distance and time are, therefore, the measurable indicators of rural life patterns in this research.

_Data Collection

The declaration of a case example required a measurable definition of the countryside. For that purpose, the degree of urbanisation according to the European Commission was used because of the accessibly of data and the familiar context. Within their interpretation, rural areas are defined and located based on a population density lower than 300 inhabitants/km2 and a territorial distance.[46]

Further, the availability of facilities for daily needs was derived from the commission for land survey and geographical base information in Brandenburg [GeoBasis-DE/LGB] for the German part of the study area. Because of missing information from official entities, the data for the Polish part was collected from the OpenStreetMap contributors which do not guarantee correctness and consistency. However, the focus of this research remains on Eastern Germany and,

45 Marsden et al., *Constructing the Countryside*; Murdoch et al., *The Differentiated Countryside*.

46 Eurostat, *Eurostat Regional Yearbook 2020*, eds. Mariana Kotzeva, Teodóra Brandmüller, and Åsa Önnerfors (Luxembourg, Luxembourg: Publications Office of the European Union, 2020), https://doi.org/10.2785/98733.

therefore, the input data remains reliable. In general, the focus laid on health, education, supply, culture, and infrastructure facilities.

For the commuter data, the place of residence and the place of work for each employee with the obligation of social insurance in the research area were compared. In the case of the same location for both places, the person is not considered a commuter. In the other case, the person commutes to their workplace regularly. Contemporary data is analysed and published by the German Federal Labour Office. Older datasets can be gathered from archives of the Federal Statistical Offices. The investigated case example lies within the competence of the office for Brandenburg.

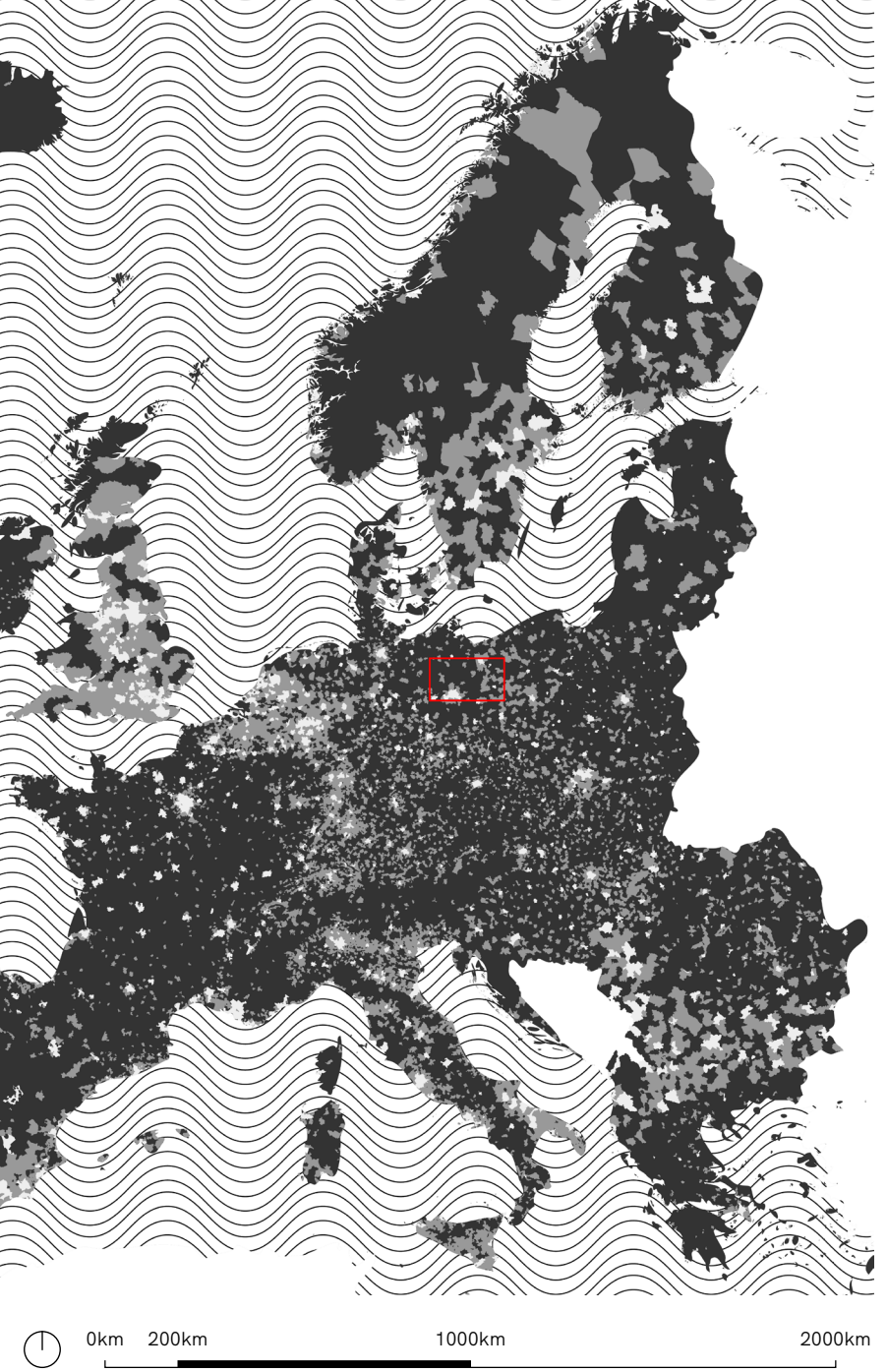
Information on the average travelled distance for commuting purposes was published by the Federal Ministry of the Interior, Building and Community in 2018 for every German municipality. Older data was extrapolated according to the German average derived from calculations by the Institute for Labour Market and Occupational Research of the Federal Labour Office.

Finally, the share of utilised transportation means is acquired from investigations conducted by the University of Applied Sciences Potsdam in 2018. That data is usually determined by interviews or observations of the traffic. Within this research, the data is further analysed with the available road network compiled by HeiGIT's Open Route Service. Older data is estimated from the availability and frequency of public transportation means derived from their timetables gathered from the archive of the local public transportation company [Uckermärkische Verkehrsgesellschaft].

IV Degree of Urbanisation in Europe, 2018 (Adapted from EuroGeographics for the administrative boundaries)

47 Brenner, "The Hinterland, Urbanised?"

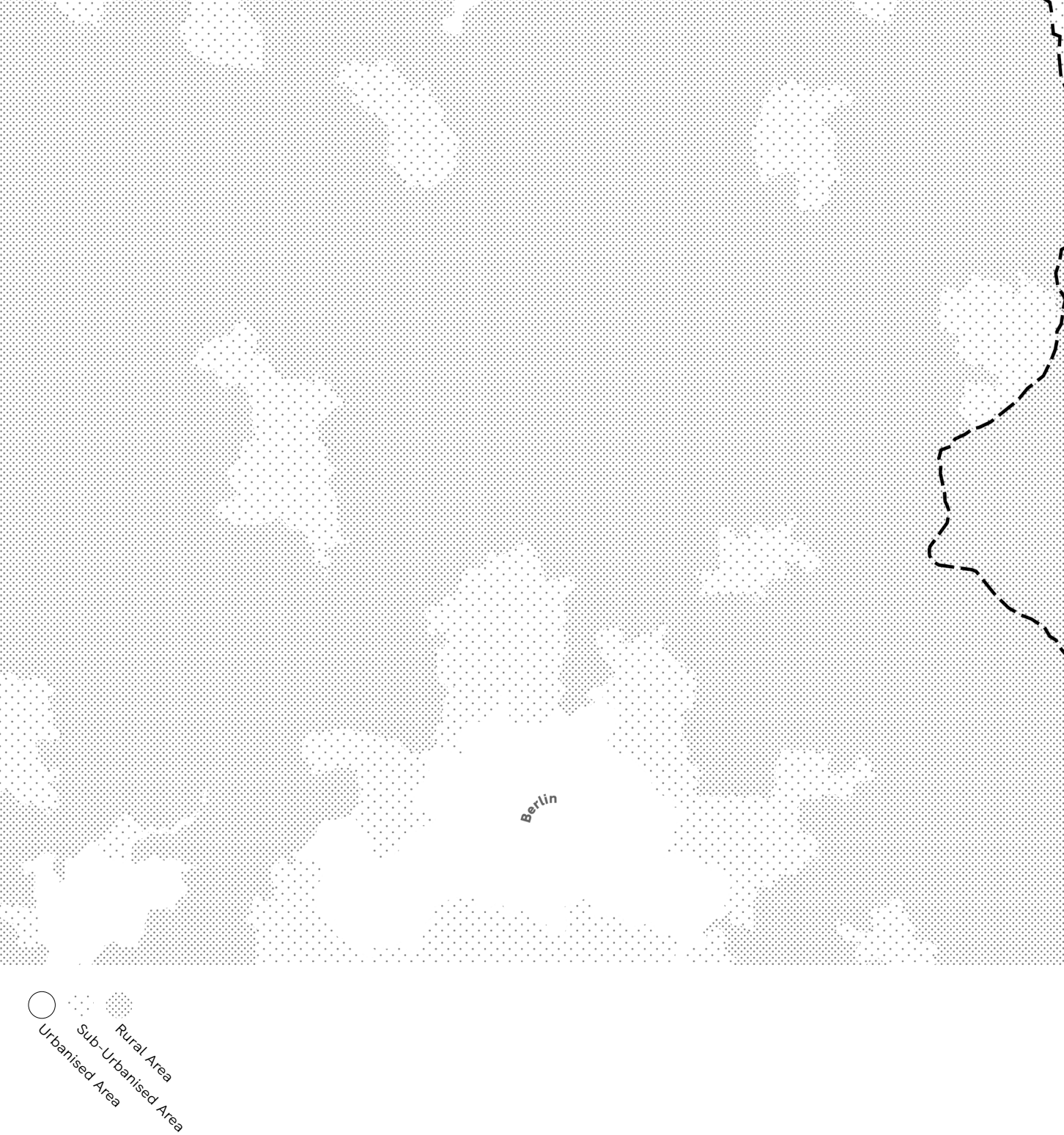
48 Marsden et al., *Constructing the Countryside*; Murdoch et al., *The Differentiated Countryside*.



_Case Example Identification

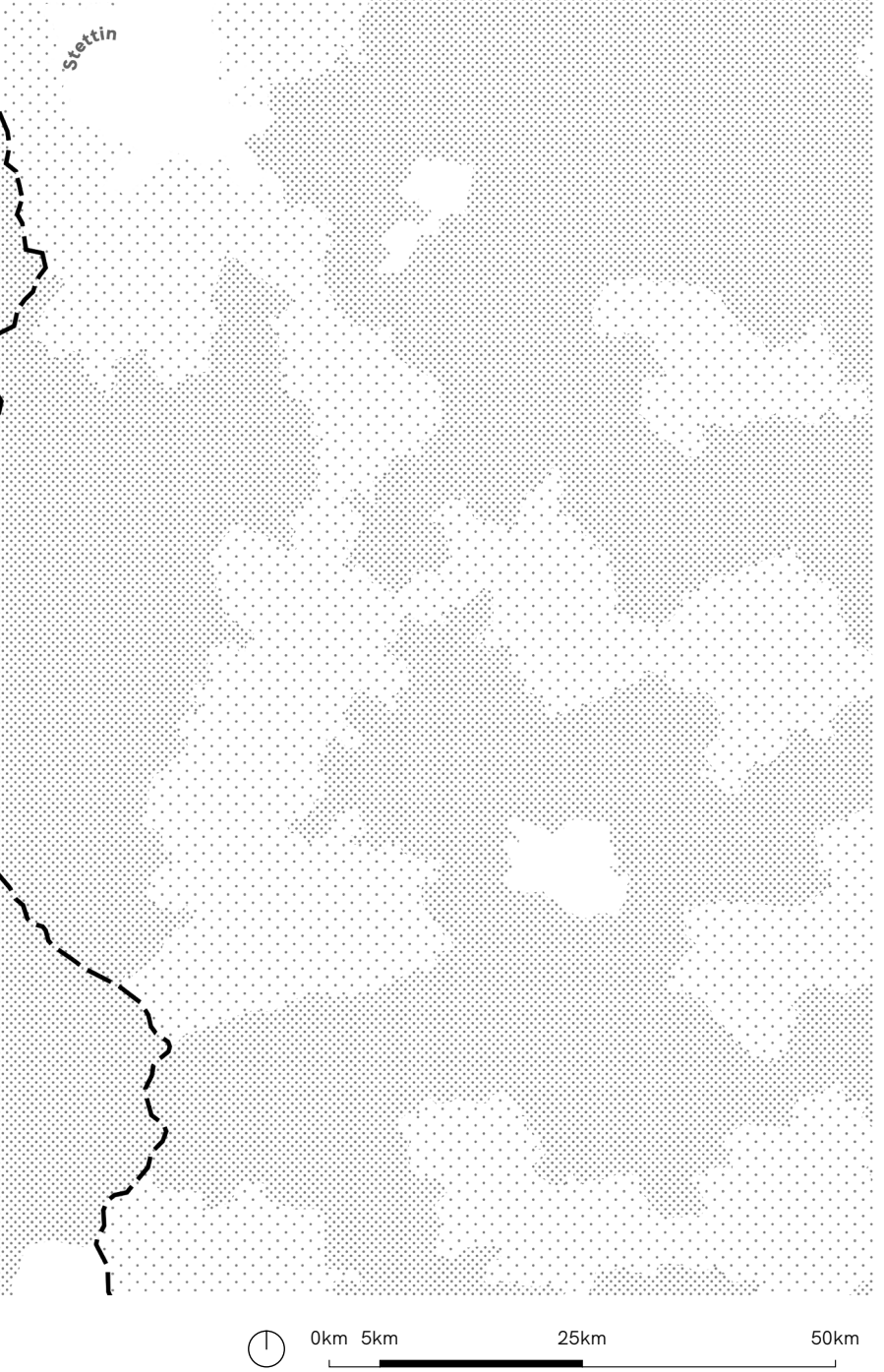
Deriving from Figure IV, Europe is vastly urbanised or sub-urbanised. However, wide ranges of Scandinavia, Ireland, as well as France and Spain are categorised as rural. Here, the population density is low and the connection to urbanised areas is poorly expanded. These conditions could have their origin either in the local history and strategical development or the natural environment. Although the density of urbanised and sub-urbanised areas is higher in central Europe, places categorised as rural also occur. In between the extensive sub-urbanised regions, conditions similar to the ones of Northern or Southern Europe can be found occasionally.

Nevertheless, these areas do not represent certain lifestyles as the classification might suggest. With Europe being a part of the Global North, an urbanisation process regarding the way of living can be observed in the areas which are classified as rural.[47] Still, there are differences in the development and living conditions throughout Europe's Countryside.[48] Therefore, the areas cannot be observed as a whole, but they need to be analysed individually. With a case example, conclusions can be drawn for a wider context. For a representative example, the focus was centred around Eastern Germany due to the extensive outfluxes in its past. The red square represents the area for further observations.



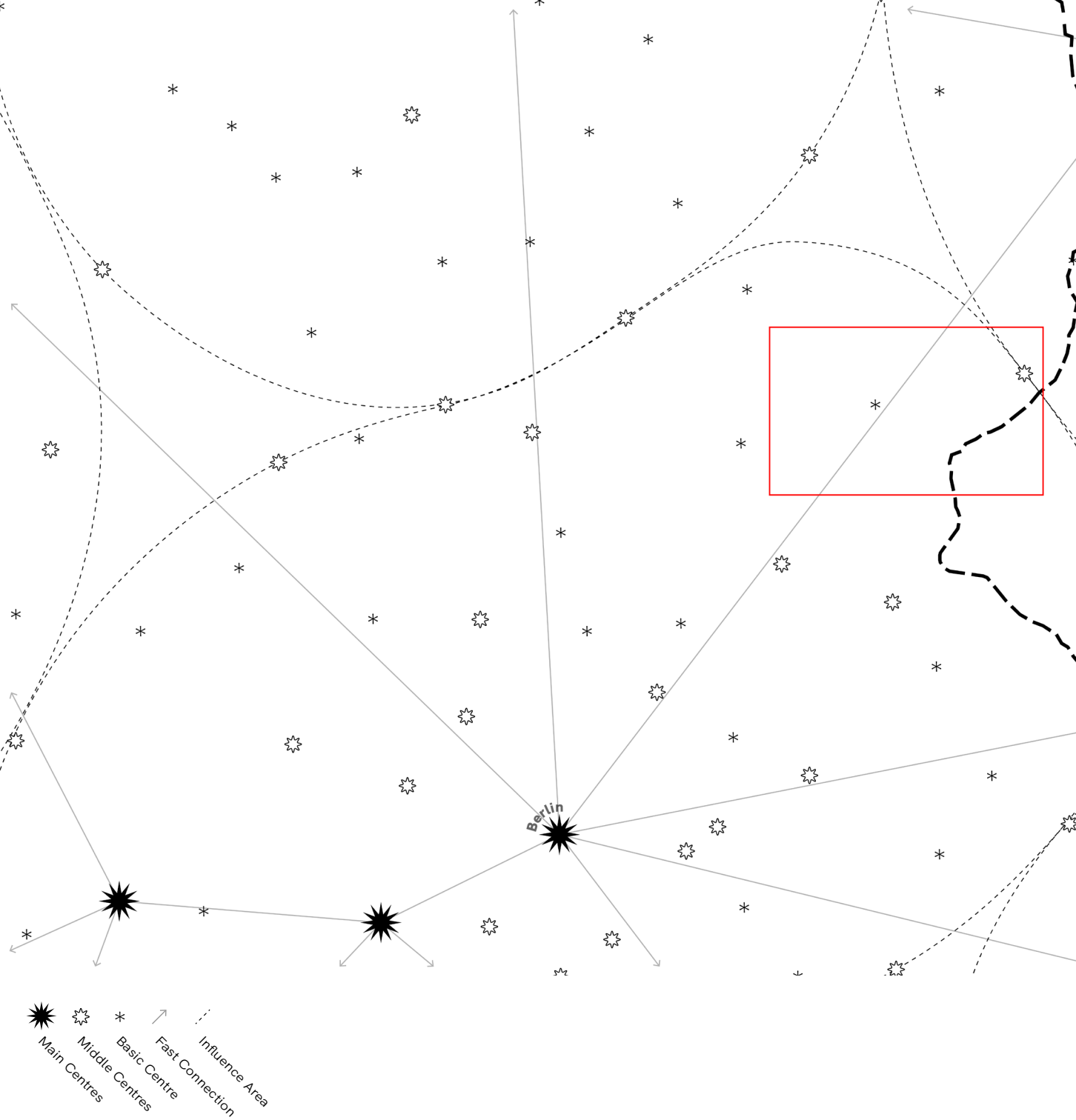
V Degree of Urbanisation at the German-Polish border, 2018 (Adapted from EuroGeographics for the administrative boundaries)

49 Burke et al., *Ländliche Verheissung: Arbeits- Und Lebensprojekte Rund Um Berlin" [Rural Forecast: Working and Living Projects Around Berlin]*.

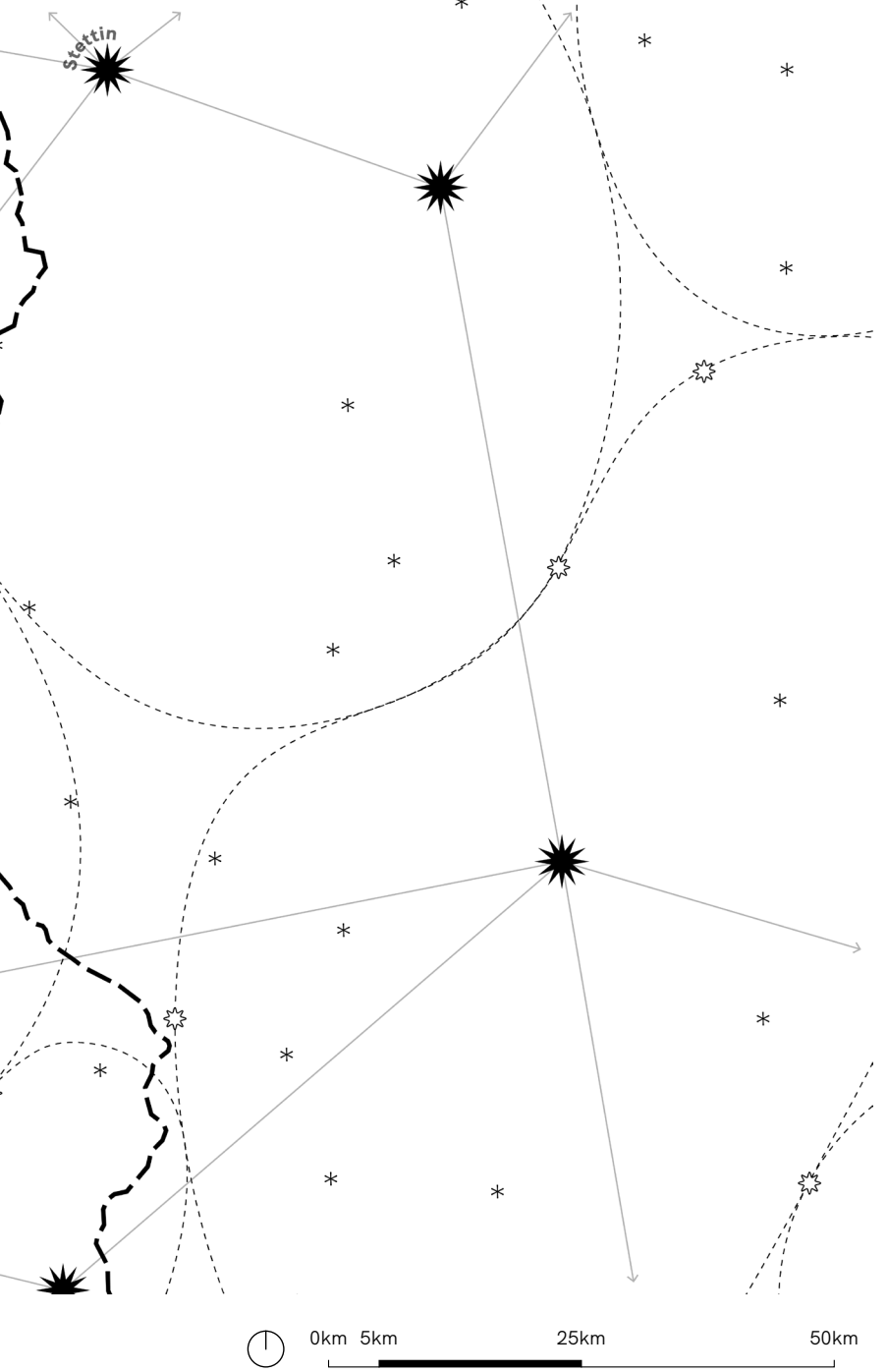


Germany was divided after the Second World War, and many people left the Eastern part which was governed with socialist values. The construction of the Berlin Wall prevented the outflux in 1961. However, with the fall of the border in 1989, the emigration continued. These developments created many vacancies in the region. In Berlin, abandoned buildings attracted a thriving creative scene in the 1990s and the beginning of the 2000s which utilised the potentials to an extent that the city, today, lacks in affordable ground. Recently, the vacancies in Berlin's hinterland experience partial interest of different actors and start to revitalise.[49] This puts the area into a state of upheaval, constituting a precursory role and the characteristics of an example case.

Looking at the context with the lens of the urbanisation degree in Figure V, there is an extensive area with a high amount of people and good infrastructure around Berlin and Stettin. Moreover, occasional urban areas without a large sub-urban surrounding appear. Whereas on the Polish side, coherent patterns of sub-urbanised areas occur, the areas of similar conditions appear more scattered on the German side of the observed section. Because the areas categorised as rural still function as a habitat for a share of the population, it seems that these people are more dependent on adjoining localities.



VI Central Places at the German-Polish border (adapted from the Federal Ministry of the Interior, Building and Community and Google Maps)



As the Christaller representation in Figure VI suggests, main centres like Berlin or Stettin have an extensive sphere of influence. With a diverse range of facilities covering daily needs, as well as more specific purposes like bureaucratic, cultural or educational functions, the centres take a pulling role. People living outside of these cities are forced to commute for certain transactions. These centres are well connected through fast connections in the form of high-speed railway tracks or streets. As the inhabitants of the cities can immediately start long-distance travels, the rest of the population has to pass or first get to the central places for further travels.

However, the distribution of the next in classification middle centres is wider-spread. These locations cover functions similar to the ones of the main centres but do not offer the vast variety of them. Occasionally, they inhabit a faculty of a university or are connected to other centres with good infrastructure. The local population enjoys the benefits of an array of facilities without the diversity. Depending on the aspirations and purposes of an individual, they are forced to take longer journeys to a main centre into account.

Finally, the basic centres do not cover specific needs, like universities or train stations, which still a wide share of the population depends on. Therefore, these localities are further restricted to a certain kind of people. A student for example would be forced to commute to another place for their education. Nevertheless, the middle centres offer all facilities needed on a daily basis for most people including schools and daycare. Therefore, these places seem to experience popularity among families.

VII Towards a Case Example: The investigation area is vastly used for agricultural purposes. Facilities for green energy production appear in between the fields.

For the research, an as rural-categorised region around a middle centre was chosen due to the distance to an urban space. Observations on the inhabitants' life patterns were derived from this area. The red square highlights the chosen investigation region around Schwedt and Angermünde: An area vastly used for agriculture and forestry with scattered villages (see Figure VII).

_Scenarios

To make assumptions about the countryside's future role, the historical development of the investigation area was extrapolated with a focus on the commuter ratio and their travelled distance, as well as, the preferred transportation mean. This trend was manipulated to follow an increasing or decreasing path of commuters towards the future resulting in three scenarios as seen in Figure VIII.

Following the current trend without manipulation, the countryside could turn into a *Safari Hinterland*. The share of people commuting to work grows further. Employers accumulate around main centres, and the employees need to travel to work more extensively. Further, the commuting distance follows the current trend and grows. The car remains the most common way of transportation. Due to the scattered settlements of low density, extensive public transportation is not economical.

Considering the influence of the increasingly efficient mobility, cities could grow together and absorb the countryside virtually.

The space would be obsolete in today's sense, and a *Scatter City* would arise. Commuters and the distance they travel for work purposes increases drastically. However, new mobility enables people to commute on long distances without excessive expenses. Further, the frequency of public transportation is extended as the maintenance becomes more economical. The private car and public options are equally used. These developments enable everyone to live in their desired surrounding and work in an arbitrary field. The location of a settlement becomes irrelevant.

With the ongoing digitalisation, new work conditions could evolve which enable work from a remote place. A new generation of people working remotely in the countryside would transform a locality in the periphery into a *Glocal Village*. Commuting decreases due to independence of living and working space. The separation between these places fades which reduces the commuting distance as well. While living in the countryside, a person could work virtually around the globe. Although the private vehicle remains the main transportation method, settlement in the countryside is possible without a car because of the smaller distances due to the local way of living. The bike gains importance. The new possibilities result in a growing population. This makes even small-scale facilities in isolated villages economical which attracts additional people and generates jobs. Therefore, commuting on behave of daily needs declines as well.

Trend-Manipulation	Ratio of Commuters	Commuting Distance	Transportation Mean
Safari Hinterland	None	Constant	Constant	Private Vehicle
Scatter City	New Mobility	Increase	Increase	Private Vehicle & Public Transport
Glocal Vilage	Digitalisation	Decrease	Decrease	Private Vehicle

VIII Scenario Distinction: Characteristics of the Trend Manipulations

_Calculations

For the comparability of the scenarios, reference indicators needed to be introduced. These numbers illustrate a scenario's liveability and environmental tolerability. Based on the abstracted variables, these indicators are represented by an average resident's time spent on commuting $t_{Average}$ and the related emissions for that purpose $CO_2eq_{Average}$ in the investigation area.

$$t_{PrivateVehicle} = d_{Average} \div \frac{d_{CentreLocality}}{t_{CentreLocality}}$$

$$t_{PublicTransport} = d_{Average} \div \frac{d_{CentreLocality}}{t_{CentreLocality} \cdot a}$$

$$t_{Average} = (t_{PrivateVehicle} \cdot \frac{w_{PrivateVehicle}}{w_{PrivateVehicle} + w_{PublicTransport}} + t_{PublicTransport} \cdot \frac{w_{PublicTransport}}{w_{PrivateVehicle} + w_{PublicTransport}}) \cdot w_{Commuter}$$

$t_{PrivateVehicle}$ = Time spent on commuting by private vehicle

$t_{PublicTransport}$ = Time spent on commuting by public transport

$t_{Average}$ = Time spent on commuting on average

$d_{Average}$ = Distance commuted on average

$d_{CentreLocality}$ = Distance between a reference centre and another locality

$t_{CentreLocality}$ = Travel time between a reference centre and another locality

a = Additional travel time factor

$w_{PrivateVehicle}$ = Ratio of people travelling by private vehicle

$w_{PublicTransport}$ = Ratio of people travelling by public transport

$w_{Commuter}$ = Ratio of people commuting

The average time spent on commuting is calculated with the ratio of people that commute, the ratio of people using a private vehicle or public transport, and the respective time. The travel time for people who are not commuting was not included. An average time of 0.0 hours is, therefore, the best result and marks a scenario's highest liveability.

As the reference to determine the travel speed in the investigation area, the localities Stolzenhagen and Schwedt were chosen as their distance equals approximately the average commuting distance in the area. With the current frequency and availability of public transportation, the travel time by bus and train is twice as long compared to the one with a private vehicle. For the scatter city scenario, this factor was adjusted to match the availability of public transportation in a city. The route between Berlin-Spandau and Berlin-Friedrichshain functioned as a reference. The travel time by public transport is in this example slower by 20 per cent. The reference also matches approximately the average commuting distance in the investigation area around Schwedt and Angermünde. The identification of these numbers was derived from HeiGIT's Open Route Service and the local public transportation company.

$$CO_2eq_{PrivateVehicle} = d_{Average} \cdot m_{Car}$$

$$CO_2eq_{PublicTransport} = d_{Average} \cdot \frac{m_{Bus} + m_{Train}}{2}$$

$$CO_2eq_{Average} = (CO_2eq_{PrivateVehicle} \cdot \frac{w_{PrivateVehicle}}{w_{PrivateVehicle} + w_{PublicTransport}} + CO_2eq_{PublicTransport} \cdot \frac{w_{PublicTransport}}{w_{PrivateVehicle} + w_{PublicTransport}}) \cdot w_{Commuter}$$

$CO_2eq_{PrivateVehicle}$ = Carbon dioxide equivalent released from commuting by private vehicle

$CO_2eq_{PublicTransport}$ = Carbon dioxide equivalent released from commuting by public transport

$CO_2eq_{Average}$ = Carbon dioxide equivalent released from commuting on average

$d_{Average}$ = Distance commuted on average

m_{Car} = Mass of released Carbon dioxide equivalent by a car per km and person

m_{Bus} = Mass of released Carbon dioxide equivalent by a bus per km and person

m_{Train} = Mass of released Carbon dioxide equivalent by a train per km and person

$w_{PrivateVehicle}$ = Ratio of people travelling by private vehicle

$w_{PublicTransport}$ = Ratio of people travelling by public transport

$w_{Commuter}$ = Ratio of people commuting

Based on the commuter ratio, the ratio of utilized transportation means, and the related emissions, the average carbon dioxide equivalent released by a person in the designated area was calculated. A smaller result marks the better environmental tolerability of the scenario.

The released emissions of a car and the ones of a combined travelling by bus and train, both scaled back to the emissions per person, functioned as the references. Throughout the scenarios, these variables remained the same as the final result should only represent a comparable number. Future improvements on transportation means regarding the efficiency would have a positive impact on the emissions in every scenario. The emissions of the depicted travel modes were derived from the UK Department for Business, Energy and Industrial Strategy.

_Evaluation

Although the described methodology was carefully considered, it holds possible sources of errors. The definition of rural areas by the European Commission which was adapted to analyse rural life patterns does not consider sociological characteristics of the countryside. The space is, however, constituted by life patterns and ideals of the rural population.[50] Additionally, it is questionable if the traditional idea of rurality exists with the ongoing urbanisation in the Global North.[51] A deepening of the research with qualitative insights to evaluate these characteristics in the form of interviews or field studies would strengthen the results but was not least because of ongoing measures related to the COVID-19 pandemic impossible. To set a starting point for the research and due to the extent of this paper, the European definition was adapted.

Further, Lefebvre's right to the city and Barraclough's adapted thoughts for the countryside are too extensive to be captured in data,

50 Paul Clorke, "Rurality and Otherness," in *The Handbook of Rural Studies*, eds. Paul Clorke, Terry Marsden, and Patrick Mooney (London, the United Kingdom: Sage, 2006), 447-56.

51 Bolchover, Lin, and Lange, "Introduction: Where Is the Rural in an Urban World?"

as well as, in the scope of this paper. Translated into characteristics of urban density, this paper does not consider the abundance of the theory. The qualities are abstracted to the time spent on travelling and the availability of facilities in favour of the paper's extent.

The analysed commuting data lacks, additionally, comprehensiveness due to the focus on people with the obligation of social insurance. Whereas this target guarantees reasonable measurability, it does not consider diverse reasons for commuting than work like school attendance, healthcare appointments or other errands. With the analysis of the distribution of facilities for these means, the data is enhanced but the exact commuting behaviour can only be assumed. The assumption could be validated and extended by interviewing the local population but as mentioned earlier not possible within this research process.

Lastly, both alternative scenarios were informed by one probable megatrend. It is unlikely that that development alone will influence the future as assumed within this research. However, the scenarios represent an extreme situation which enables the valuation of this trend's effects isolated from other developments. In that sense, the methodology allows to assume the impacts and form a basis to plan towards the most liveable future.

_Revision

To answer the research question in a quantitative manner which ensured the inclusivity of various population groups, live patterns and qualities needed to be abstracted to be measurable. Henceforth, the focus lied on the commuting behaviour and the availability of facilities for daily needs in a case example area in the Eastern German countryside.

Further, the explorative approach of a scenario-building process was chosen to cover the future-orientated problem statement. For that purpose, an established methodology was adapted. Despite the weaknesses of this procedure, it was possible to investigate alternative roles of the countryside in a post-industrial future.

Alternative Commuting Patterns

The investigation of rural areas and local history led the research towards the area around Schwedt and Angermünde in Eastern Germany. Vacant buildings in this area experience a revival and local actors start to transform the countryside. However, the area still lacks urban qualities and the population is highly dependent on the car. With a focus on the past two decades, the commuting behaviour of the local population centred around the societal change towards a post-industrial state gives insights into possible futures for the investigation area in the form of three scenarios.

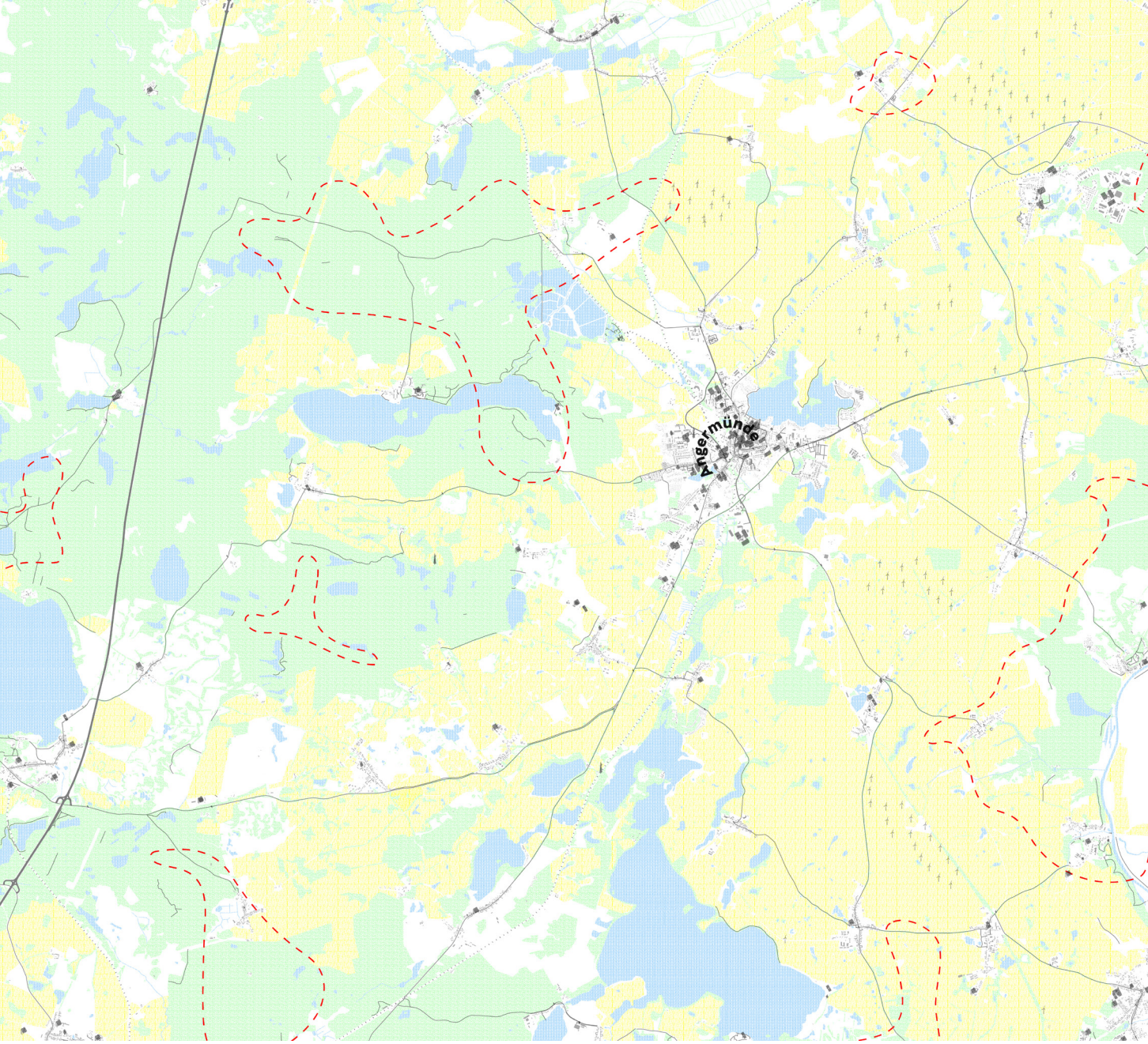
IX Central places around Schwedt and Angermünde (adapted from the Federal Ministry of the Interior, Building and Community and Google Maps)

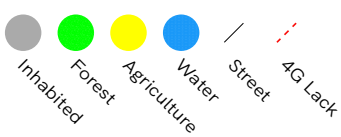
52 Vogelgesang et al., “Städtische Lebensformen Im Dörflichen Kontext: Urbane Döfer” [Urban Ways of Living in the Village Context: Urban Villages].

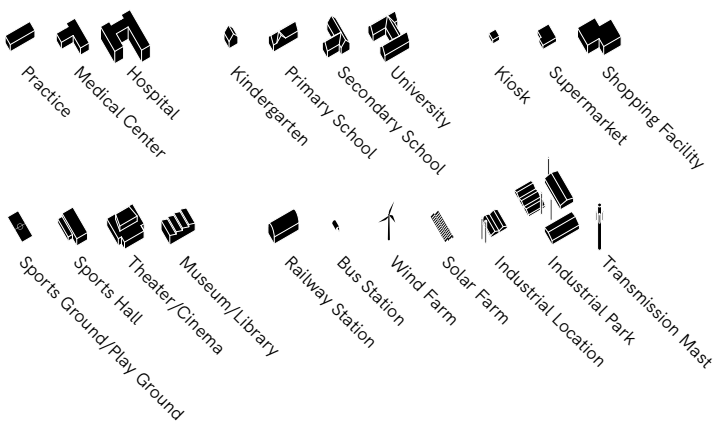
As seen in Figure IX, the area around Schwedt and Angermünde is surrounded by localities without a wide array of functional facilities. Besides the two centres, there are occasionally villages that cover some daily needs like a kindergarten or the shop of a local farm. The inhabitants need to commute for many actions including education, medical treatment or even groceries. Although there is the offer of a mobile medical service, a mobile bakery, and public transport, the car remains the main transportation mean considering the low frequency of these services. The bus schedules seem to be based on the rhythm of a regular working or education day. Additionally, an orderable bus service is available off working days which is commonly used by weekend commuters. The places with these characteristics are classified as hubs as they still have value for surrounding villages but lack the diverse offering of actual centres.

The localities without supplying functions or employing institutions do not have a pulling effect on the adjoining villages and serve an accommodational purpose only. People live here and have to commute on a daily basis for every possible errant. Occasionally, these localities were extended and host new neighbourhoods designed for such a commuter society. The inhabitants of these extensions are socialized with urban characteristics and promote the urbanisation of the countryside.[52] The connectivity of these localities is similar to the one of the hubs and the dependency on the car remains pervasive.

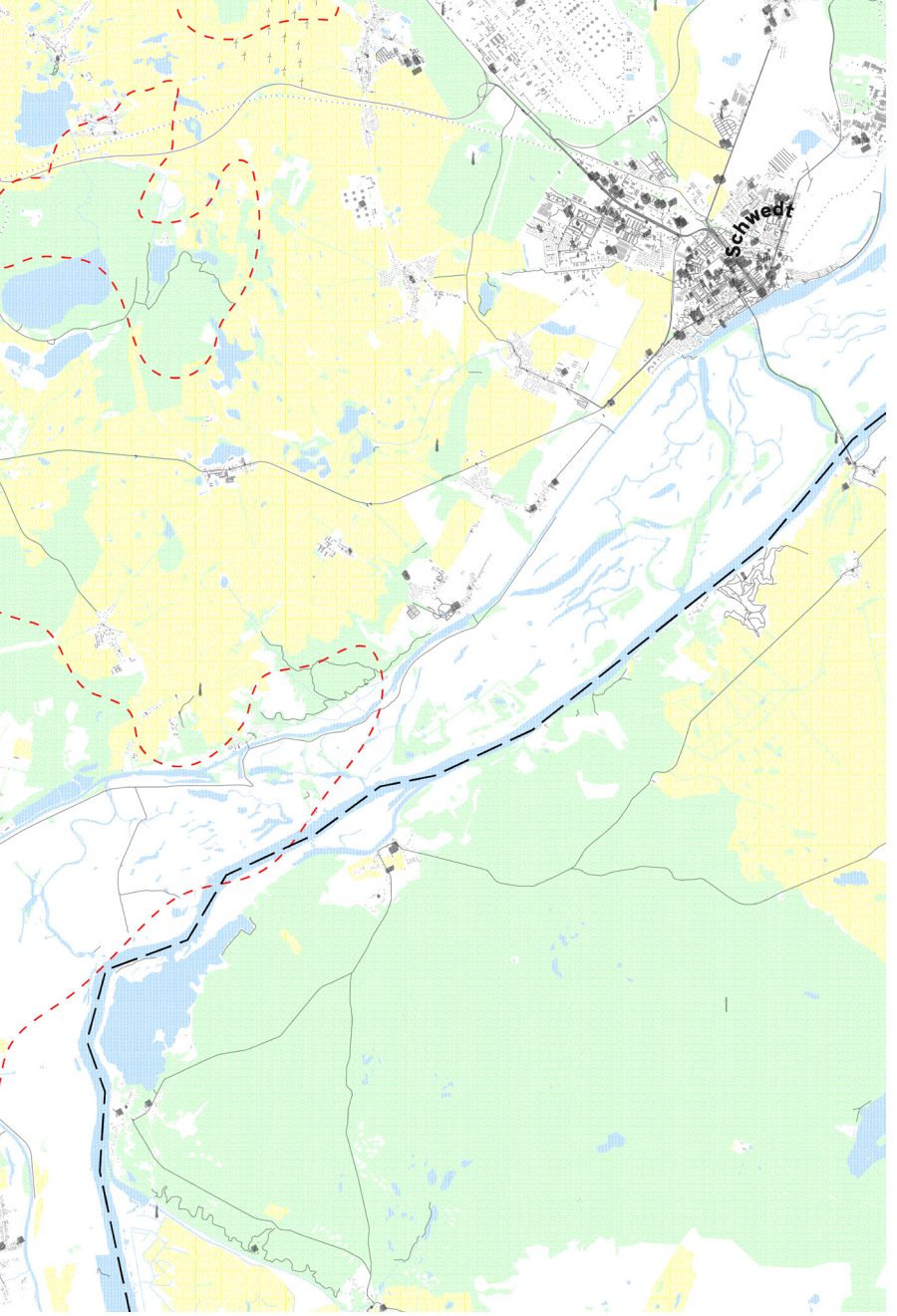
Besides the villages in direct proximity to the centres which would be capable of a lifestyle centred around the bike, a vast number of localities are remote and depend on motorised transportation.







X Land use and facility availability (adapted from GeoBasis-DE/LGB; Open Street Maps contributors and Google Maps)

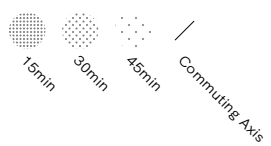


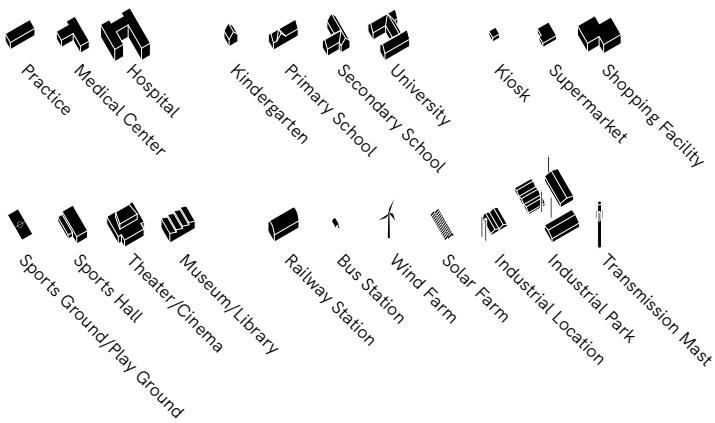
Regarding land use derived from Figure X, the area is widely utilized for agricultural purposes. Although the soil quality is not the most profitable for cultivation, this sector remained throughout the socialist era of Germany. Today, the economy which was collectively performed by agricultural associations is mostly led by a few large-scale businesses. Further, the area is used for forestry which increasingly gains relevance. In-between these areas, the localities are scattered in the region. Their settlement is based on the proximity to arable land and water.

Facilities are mostly located in Angermünde and Schwedt, as the Christaller representation already suggested. Institutions for healthcare, education, local supply and culture are almost exclusively located in these two centres. Although they can be found occasionally in other villages, the lacking diversity suggests that the centres are still the main points of attraction for adjoining localities.

Facilities for infrastruc-tural purposes like wind farms or cell towers are located outside of the centres. Still, the availability of mobile high-speed internet is not guaranteed throughout the region. Although a lack of that connection is common especially outside of localities in Germany, there are some villages in the area that only have fast access to the internet through a cable connection.

Similar to the villages, industrial locations and parks are scattered throughout the region. This suggests, a certain share of the population is working outside of the centres and probably not commuting for work purposes. Nonetheless, the majority of the population is working in the service sector, commuting to one of the centres, or both. This can be derived from the number of commuters in the area.





XI Commuting behaviour and travel time with public transportation around Schwedt and Angermünde (adapted from GeoBasis-DE/LGB; Open Street Maps contributors; Google Maps; openroute-service.org by HeiGIT and Federal Labour Office and mapnificent.net)

Looking at Figure XI, Schwedt and Angermünde are the main attractors regarding the work availability in the region with 5027 and 1880 incoming commuters every day. This means that 48% of the people working in these centres commute to their workplace from another locality.

While in Schwedt, a large number of people lives and works in the centre, in Angermünde a majority still commutes out of the locality. This indicates, again, the distinction between the middle and the basic centre. With a differentiated availability in facilities, also the work opportunities are more extensive in Schwedt.

From the two centres, almost every point of the investigation area can be reached within 45 minutes at the longest with the car. Cycling paths are partially well maintained as a tourist attraction but mostly planned for this purpose as they do not follow the shortest and most efficient routes. Further, the average distance of 25.1 km that a commuter in this area travels seems too far to cycle regularly or walk. Public transportation is an alternative to the car considering the distance. Although the availability of public transportation is extensive and many points can be reached with buses or a train, the travel time compared to the one of individual transportation is immense. While commuting between the two centres is possible within 30 minutes, the travel to some villages takes more than 45 minutes depending on the desired destination. The frequency of the transportation mean is very diverse with a connection every 30 minutes between the centres and partially only three bus connection per day to certain villages on working days. During the weekends, some of these connections decrease to a frequency of zero which is then substituted by an orderable bus.

This availability explains the transportation mean usage in the modal split of the wider region of the Uckermark which the investigation area is a part of. More than 80% of the population uses the car for regular commuting. The group of people using public transportation as their mean of choice reaches, with less than 15% of the modal split, the second place. Whereas the bike and walking make the least common way of travelling.[53]

$$t_{PrivateVehicle} = 25.1\text{km} \div \frac{27.4\text{km}}{0.48\text{h}} \approx 0.44\ \text{h}$$

$$t_{PublicTransport} = 25.1\text{km} \div \frac{27.4\text{km}}{0.48\text{h} \cdot 2} \approx 0.88\ \text{h}$$

$$t_{Average} = (0.44\ \text{h} \cdot \frac{0.82}{0.82 + 0.13} + 0.88\ \text{h} \cdot \frac{0.13}{0.82 + 0.13}) \cdot 0.48 \approx 0.24\ \text{h}$$

$$CO_2eq_{Private\ Car} = 25.1\text{km} \cdot 192\ \frac{\text{g}}{\text{km} \cdot \text{person}} \approx 4.82\ \frac{\text{kg}}{\text{person}}$$

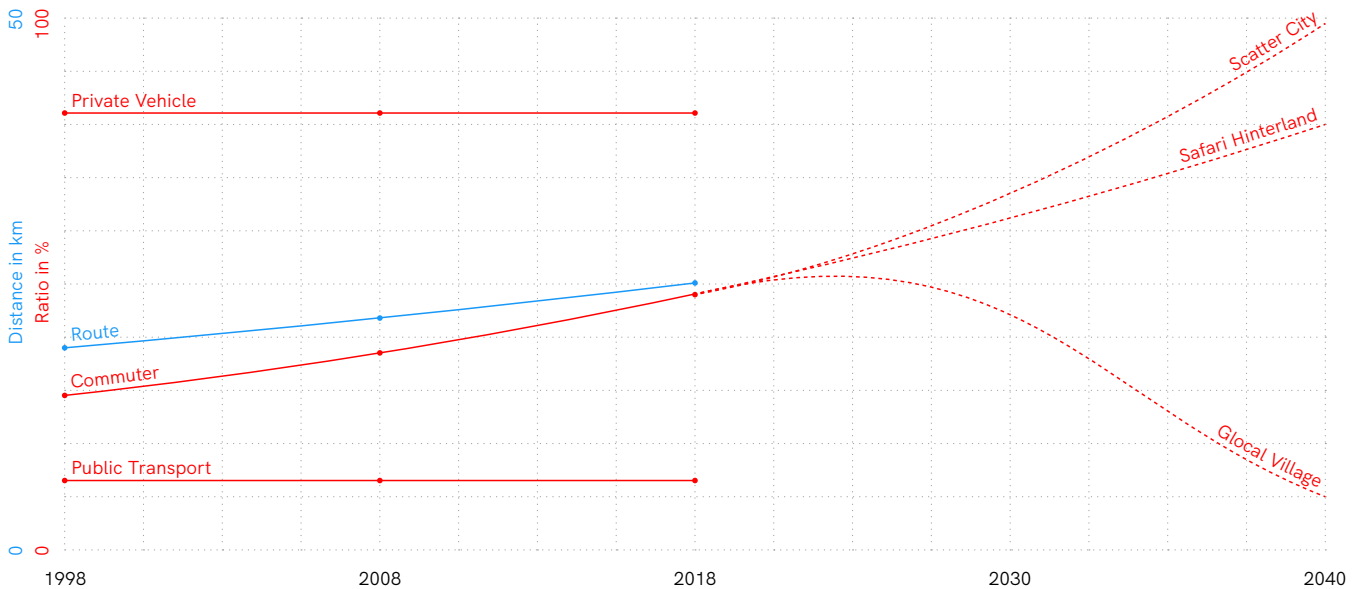
$$CO_2eq_{Public\ Transport} = 25.1\text{km} \cdot \frac{105\ \frac{\text{g}}{\text{km} \cdot \text{person}} + 41\ \frac{\text{g}}{\text{km} \cdot \text{person}}}{2} \approx 1.83\ \frac{\text{kg}}{\text{person}}$$

$$CO_2eq_{Average} = (4.82\ \frac{\text{kg}}{\text{person}} \cdot \frac{0.82}{0.82 + 0.13} + 1.83\ \frac{\text{kg}}{\text{person}} \cdot \frac{0.13}{0.82 + 0.13}) \cdot 0.48 \approx 2.12\ \frac{\text{kg}}{\text{person}}$$

With the current circumstances, the indicator of liveability shows a period of 0.44 hours which means that the average person in the investigation area spends that time commuting. The indicator of environmental tolerability in the form of the Global Warming Potential caused by commuting currently states a CO_2equivalent of 2.12 kg per person. These indicators mark the current state of the investigation area. Both indicators refer to daily numbers.

53 Michael Ortgiese, “E-Mobilität Als Realistische Option Für Die Uckermark? Ausblick Auf Innovative Mobilitätsansätze.” [E-Mobility as a Realistic Option for the Uckermak? Outlook on Innovative Mobility Approaches], 2018, https://www.uckermark.de/PDF/E_Mobilität_als_realistische_Option_für_die_Uckermark_.PDF?ObjSvrID=2203&ObjID=1256&ObjLa=1&Ext=PDF&WTR=1&_ts=1521715664.

XII Scenario Basis: Commuting behaviour and its development (adapted from Ortgiese; Transportation Company Schwedt; Federal Labour Office and Federal Statistical Office Brandenburg)

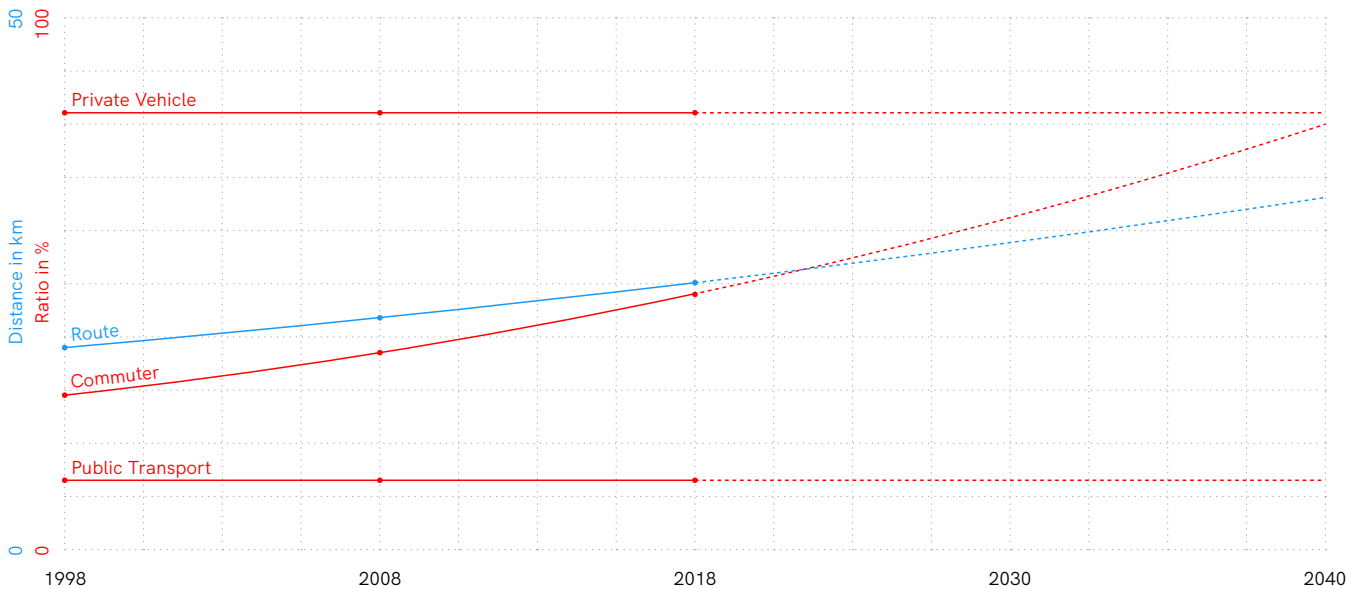


_Scenario Evaluation

In the past two decades, the ratio of people commuting towards Angermünde and Schwedt as well as the route they travel for that purpose increased (see Figure XII). This means that continuously more people live and work in different localities. The transportation mean of choice is unalterably the car. The increasing distance between the workplace and the residence paired with the longer travel time with public transportation and low frequency could be the explanation for this continuity. Change towards the post-industrial society is visible in the investigation area as the primary and secondary sector are declining in favour of the growing service sector.

Taking this change of society for granted an array of possible futures can be depicted. The extrapolation of the current trend would terminate in the state of a Safari Hinterland. Whereas the countryside becomes a Scatter City with the enhancement of the commuting behaviour, the averting from the commuter society concludes in rural localities transforming into a Glocal Village.

The Safari Hinterland scenario represents a development without unexpected changes in the current trend and functions therefore as a reference as indicated in Figure XIII. The gap between the investigation area and the city grows regarding the liveability. While the predominance of the car remains the same as in the last two decades, the number of commuters and their daily travelled distance increases. Therefore, the area remains the habitat for people who can afford it and the exclusivity to a lifestyle centred around the car intensifies. The observed location outside of the centres becomes an exclusive living space for a small number of people. Leisure purposes could arise, enhancing the countryside as a tourist attraction.



XIII Towards Safari Hinterland: Commuting behaviour and its development following the current trend (adapted from Ortgiese, 2018; Transportation Company Schwedt; Federal Labour Office and Federal Statistical Office Brandenburg)

$$t_{PrivateVehicle} = 25.1\text{km} \div \frac{27.4\text{km}}{0.48\text{h}} \approx 0.44\ \text{h}$$

$$t_{PublicTransport} = 25.1\text{km} \div \frac{27.4\text{km}}{0.48\text{h} \cdot 2} \approx 0.88\ \text{h}$$

$$t_{Average} = (0.44\ \text{h} \cdot \frac{0.82}{0.82 + 0.13} + 0.88\ \text{h} \cdot \frac{0.13}{0.82 + 0.13}) \cdot 0.48 \approx 0.24\ \text{h}$$

$$CO_2eq_{Private\ Car} = 25.1\text{km} \cdot 192\ \frac{\text{g}}{\text{km} \cdot \text{person}} \approx 4.82\ \frac{\text{kg}}{\text{person}}$$

$$CO_2eq_{Public\ Transport} = 25.1\text{km} \cdot \frac{105\ \frac{\text{g}}{\text{km} \cdot \text{person}} + 41\ \frac{\text{g}}{\text{km} \cdot \text{person}}}{2} \approx 1.83\ \frac{\text{kg}}{\text{person}}$$

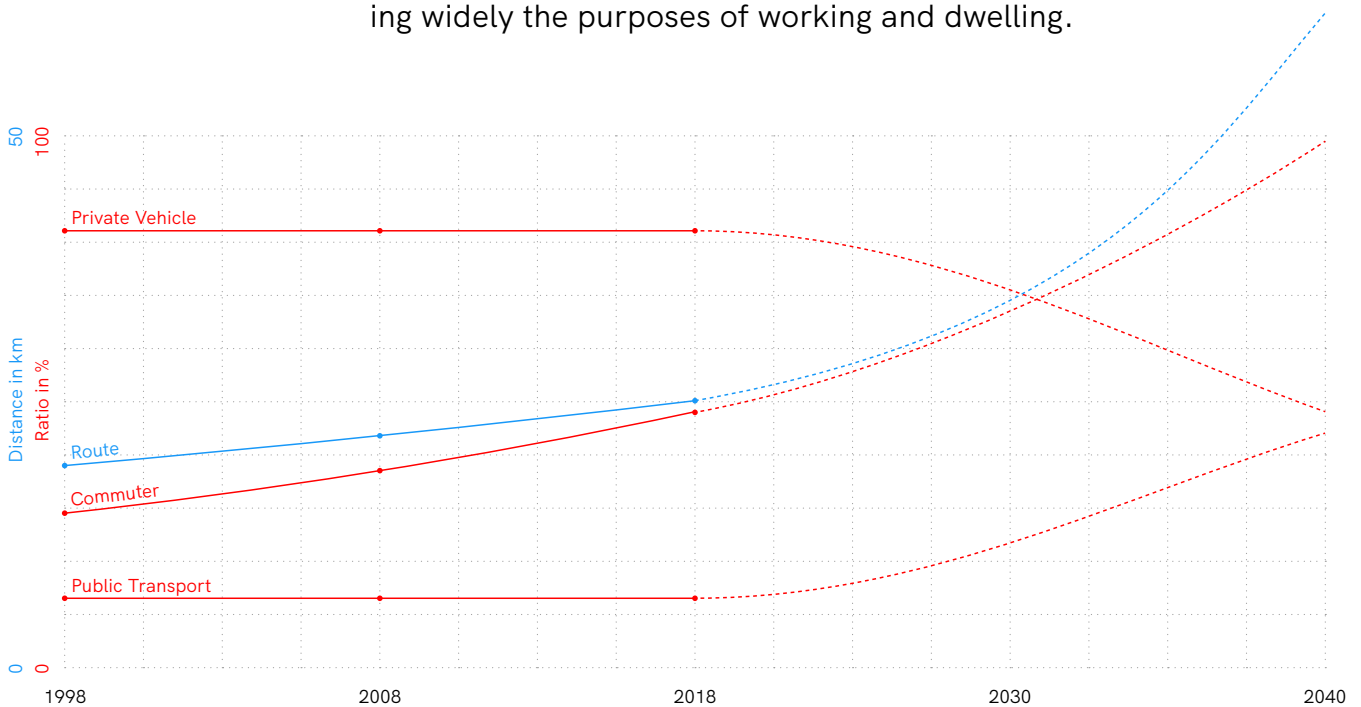
$$CO_2eq_{Average} = (4.82\ \frac{\text{kg}}{\text{person}} \cdot \frac{0.82}{0.82 + 0.13} + 1.83\ \frac{\text{kg}}{\text{person}} \cdot \frac{0.13}{0.82 + 0.13}) \cdot 0.48 \approx 2.12\ \frac{\text{kg}}{\text{person}}$$

XIV Volume of exhausted emissions with the Safari Hinterland and its physical connectivity.

The area's liveability represented by the average travel time of the inhabitants indicates 0.53 hours. An average person in this area would spend this time travelling to work on a daily basis. Considering the high share of people using a private vehicle as well as the smaller respective time illustrates, again, the exclusivity of the scenario which even increased compared to the current state.

Regarding the environmental tolerability of the scenario, the carbon emissions result in 4.66 kilograms per person (see Figure XIV). This number of exhausts is release by the average inhabitant of the area on one travel to their workplace. The private vehicle is in this case the main contributor to the indicator regarding the extensive usage and the high emission rate. Compared to the current state, the scenario implies a deterioration of the environmental tolerability.

With new mobility trends, centres could factually grow together, constituting a Scatter City. The efficiency of electric transportation and the rise of green energy enables the area to increase its availability and frequency of public transportation. As seen in Figure XV, this development results in an increase of users of this service and a decline in the share of people using the private vehicle to commute. While the location of residence and work become more irrelevant, employees settle scattered but mostly near centres as the connection to other centres is the best. The number of commuters and the travelled distance increases, however, because of the good connectivity. The decision of private settlement is taken independently from the one of the workplace. These developments transfer the investigation area outside of the centres into districts for living purposes, separating widely the purposes of working and dwelling.



XV Scatter City: Commuting behaviour and its development considering new mobility (adapted from Ortgiese; Transportation Company Schwedt; Federal Labour Office and Federal Statistical Office Brandenburg)

$$t_{PrivateVehicle} = 71.6\text{km} \div \frac{27.4\text{km}}{0.48\text{h}} \approx 1.25\ \text{h}$$

$$t_{PublicTransport} = 71.6\text{km} \div \frac{27.4\text{km}}{0.48\text{h} \cdot 1.2} \approx 1.51\ \text{h}$$

$$t_{Average} = (1.25\ \text{h} \cdot \frac{0.48}{0.44 + 0.48} + 1.51\ \text{h} \cdot \frac{0.44}{0.13 + 0.82}) \cdot 0.99 \approx 1.36\ \text{h}$$

$$CO_2eq_{Private\ Car} = 71.6\text{km} \cdot 192\ \frac{\text{g}}{\text{km} \cdot \text{person}} \approx 13.75\ \frac{\text{kg}}{\text{person}}$$

$$CO_2eq_{Public\ Transport} = 71.6\text{km} \cdot \frac{105\ \frac{\text{g}}{\text{km} \cdot \text{person}} + 41\ \frac{\text{g}}{\text{km} \cdot \text{person}}}{2} \approx 5.23\ \frac{\text{kg}}{\text{person}}$$

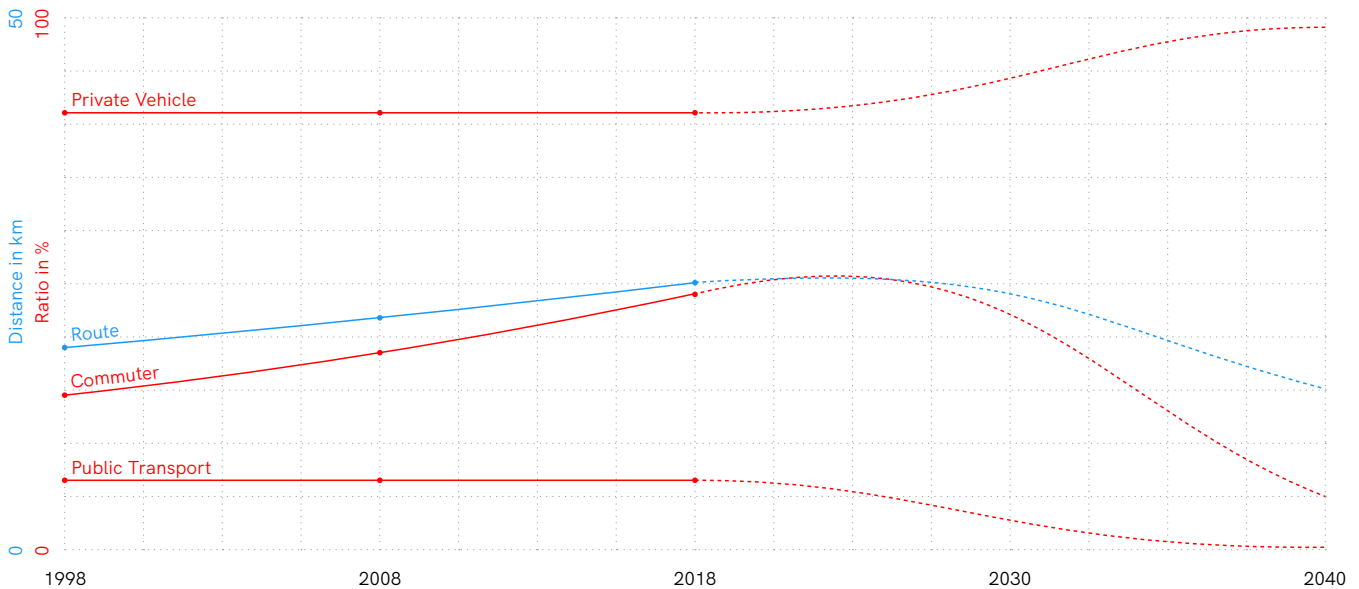
$$CO_2eq_{Average} = (13.75\ \frac{\text{kg}}{\text{person}} \cdot \frac{0.48}{0.44 + 0.48} + 5.23\ \frac{\text{kg}}{\text{person}} \cdot \frac{0.44}{0.44 + 0.48}) \cdot 0.99 \approx 9.58\ \frac{\text{kg}}{\text{person}}$$

XVI Volume of exhausted emissions with the Scatter City and its physical connectivity.

The liveability marks, with a travel time of 1.36 hours, a high average. The time spent on commuting expands drastically with this scenario. Nevertheless, commuting is accessible to a wide array of the population with the increased availability of public transportation. This development comes close to the qualities of an urban settlement because the availability of facilities is guaranteed with accessible transportation.

With average carbon emissions of 9.58 kilogrammes per person, the scenario, however, indicates poor environmental tolerability (see Figure XVI). Although public transportation with better emission rates is widely implemented, the high amount of people commuting to work intensifies the indicator. Considering better efficiency and focus on green energy within the mobility sector, better emissions are expectable. These improvements would also affect the other scenarios, and the calculation remains, therefore, the same for the indicating purpose of this number.

Localities outside of the centres could gain importance with the digitalisation and transform them into Glocal Villages. Remote working enables people to work from these localities without commuting. Communication and trading with the global market develop more digitally. The population works locally but on a global scale. The place of residence and the place of work become the same or move closer to each other. The increased number of local workers enables the settlement of local facilities creating new jobs. Because the vast majority does not commute to their workplace, the availability of public transportation declines. Facilities are available locally in physical or digital form. The part of the population that needs to commute is dependent on the car. However, the share of people commuting declines drastically and the distance of commuting reduces due to the locality and decentralisation as seen in Figure XVII.



XVII Glocal Village: Commuting behaviour and its development considering digitalisation (adapted from Ortgiese; Transportation Company Schwedt; Federal Labour Office and Federal Statistical Office Brandenburg)

$$t_{PrivateVehicle} = 15.0\text{km} \div \frac{27.4\text{km}}{0.48\text{h}} \approx 0.26\ \text{h}$$

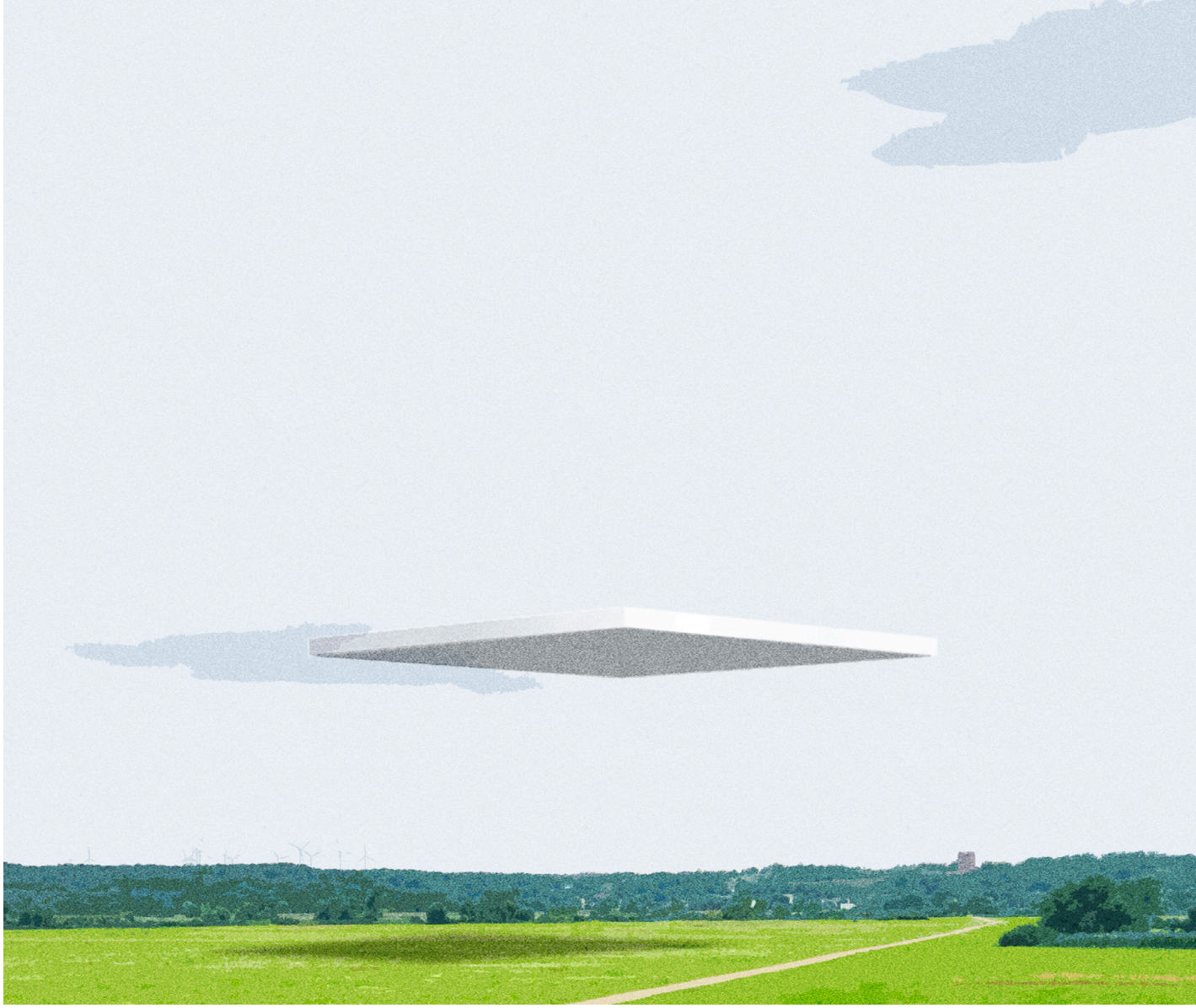
$$t_{PublicTransport} = 15.0\text{km} \div \frac{27.4\text{km}}{0.48\text{h} \cdot 2} \approx 0.53\ \text{h}$$

$$t_{Average} = (0.26\ \text{h} \cdot \frac{0.98}{0.98 + 0.01} + 0.53\ \text{h} \cdot \frac{0.98}{0.98 + 0.01}) \cdot 0.10 \approx 0.08\ \text{h}$$

$$CO_2eq_{Private\ Car} = 15.0\text{km} \cdot 192\ \frac{\text{g}}{\text{km} \cdot \text{person}} \approx 2.88\ \frac{\text{kg}}{\text{person}}$$

$$CO_2eq_{Public\ Transport} = 15.0\text{km} \cdot \frac{105\ \frac{\text{g}}{\text{km} \cdot \text{person}} + 41\ \frac{\text{g}}{\text{km} \cdot \text{person}}}{2} \approx 1.09\ \frac{\text{kg}}{\text{person}}$$

$$CO_2eq_{Average} = (2.88\ \frac{\text{kg}}{\text{person}} \cdot \frac{0.98}{0.98 + 0.01} + 1.09\ \frac{\text{kg}}{\text{person}} \cdot \frac{0.98}{0.98 + 0.01}) \cdot 0.10 \approx 0.28\ \frac{\text{kg}}{\text{person}}$$



XVIII Volume of exhausted emissions with the Glocal Village and its physical connectivity.

Considering the average time of 0.08 hours spent commuting, the liveability in the sense of this research is comparable to the one of a city without commuters. People work and live mostly in the same locality. In that sense, the accessibility to this scenario is guaranteed to a wide array of the population. For occasional purposes, concerning leisure for example, which take place physically, the need to commute might remain. Specifically scheduled public transportation, multifunctional utilisations, or location-changing facilities could be an alternative.

The environmental tolerability with commuting related emissions of 0.28 kilogrammes per person comes close to the indication of a commuter-free city. Even with the public vehicle being the predominant transportation mean, the small number of commuters reduces the average emissions almost entirely (see Figure XVIII). Commuting for work purposes becomes an insignificant influence on the environment within this scenario.

The area around Schwedt and Angermünde is characterised by a high number of commuters. Employees are agglomerated around these centres. Many inhabitants living outside of the centres need to travel to their workplace using foremostly the car as the availability and frequency of public transportation is not sufficient. These conditions seem to be rooted in the low population density and the lacking efficiency of a broad public transportation availability with these circumstances.

With an extrapolation of the current trend, the countryside in the area becomes less and less accessible to the population as a whole and more dependent on private transportation transforming the area into a Safari Hinterland. Alternatively, commuting could become more accessible with the expansion of public transportation on the basis of new mobility means concluding in a Scatter City. Moreover, the area could profit from a focus on locality. The digitalisation could enable to work remotely within the setting of a Glocal Village.

A Path Towards a Liveable Countryside

Evaluating the indicators of the liveability and the environmental tolerability makes a comparison of the scenarios possible. While shorter travel time indicates an improved liveability, low emissions express better environmental tolerability. With these insights, it was possible to conclude on a desirable future role of the countryside and the adaption of rural life patterns towards an approximation to urban qualities.

Regarding the share of commuters, both, the Safari Hinterland and the Scatter City hypothesise an increase. While the first scenario is following the current trend, the second one assumes an enormous intensification due to increasing mobility. Therefore, in both cases, commuting remains a usual practice in the area. The Glocal Village, on the other hand, proposes the averting of commuting. Considering only this parameter, the last scenario seems to be the most favourable future as it enables working and living in the same locality and commuting becomes redundant.

The travel distance is most promising with the Glocal Village. The proximity of living and workplace reduces the travel route to a minimum. The other scenarios that base their life patterns on commuting consequently consider long distances between these two locations. In this comparison, the Scatter City generates the longest routes.

However, with the improved accessibility of the scenario due to the increased public transportation availability, commuting in the sense of the other scenarios does not exist. As the localities grow virtually together with the Scatter City, people commute within this conglomerate. Therefore, commuting is possible for the whole population. Compared to that development, the other scenarios remain the dependency on the private vehicle. The Glocal Village, nonetheless, relies less absolutely on that transportation mean because of the local as well as digital availability of facilities. Sole physical facilities could be enhanced by mobile services like it is currently the practice with nursing care for example.

Opposing the unequal living conditions in the city and the countryside, this research focused on the time spent on commuting as an indicator of the liveability. With this scope, the Glocal Village reaches the best results. The proximity of living and workplace concludes in a short period spend on travelling for work purposes. Only a small

amount of the population is commuting to their work. Apart from the progression of the digitalisation, this is possible due to the increasing dominance of knowledge related work in the post-industrial society. The extrapolated travel time of the Safari Hinterland is rooted in the developments of the past 20 years. Such an increase seems reasonable and might be acceptable to the kind of population that already takes daily commuting into account. The attraction of a new urban population with these conditions could be challenging as the travel time presumably extends the one of a highly densified area. This assumption seems even more apparent with the Scatter City. Although certain accessibility can be guaranteed, the travel time even extends the one that the current trend suggests which puts this scenario in an ambiguous position.

Apart from the travel time as an urban indicator, this research stated the diversity of facilities as known in dense cities as an important factor. This diversity can be estimated the highest with the Scatter City. The consideration of the countryside as one space with localities unlimitedly connected to each other puts the space of the countryside into a concept in no way to the city. Facilities of all kinds are available and accessible to everyone. The Safari Hinterland distinguishes between the city and the countryside. Following this logic, some facilities in the city are not available in the countryside which puts this scenario into a deficient position. The same applies to the Glocal Village identifying the countryside as a different space compared to the city. In both cases, the lack of available facilities has to be substituted to compete with the Safari Hinterland when focusing on this indicator alone.

Nonetheless, a condensed travel time or the availability of multiple facilities is an abstraction of this research and they do not represent the full quality of urban density. Informed by Lefebvre's right to the city, the quality is more concatenated to interpersonal exchange. The liveability, therefore, needs to be observed through multiple lenses which exceed the scope of this research.

Although the city offers densified living which appears to be the most efficient arrangement, the countryside needs to be maintained for the proper functioning of the city. This needs to be assured with the same qualities. However, the focus needs to be cantered around the environmental tolerability for the feasibility of a solution as well. Following the indicator for this purpose within this research, the released emissions from commuting in the Glocal Village appear as the lowest. With this focus, the condensed distance between the working space and the place of residence has a predominant influence on the indicator. Compared to the other scenarios, the distance is significantly smaller resulting in less released exhausts. Further, the Scatter City generates the most emissions from commuting. Although the share of people travelling by public transportation within the reasoning of this

scenario is the highest, the travel distance simultaneously exceeds the one of the other scenarios substantially. Considering the reduced emissions from the more efficient public transportation, the proximity of locations still has a stronger influence on the environmental tolerability.

This indicator, again, represents an abstraction in favour of this research's scope. Derived from the focus on the travel time, the related carbon emissions were depicted to represent the environmental impact of the respective scenario. However, the suggested developments would have a more extensive array of consequences for the environment as well as sources of carbon emissions. The insistence on private transport for example would promote the excavation of resources for the vehicle production within the Safari Hinterland as almost every inhabitant is dependent on it. Moreover, an increasing population in the area and the related energy consumption or pollution could have an impact on the environment in the Safari Hinterland and Glocal Village. Therefore, the focus on emissions from commuting remains only an indicator for the comparability of the scenarios.

Originating from the data and insights of the investigation area around Schwedt and Angermünde, the described findings are primarily limited to this scope. The countryside as a whole cannot be characterised universally. In accordance with the classification of Marsden et al. from 1993, the analysed area in this research mostly follows the logic of a '*contested countryside*'[54]. It is outside of the commuter scope of a large metropolis as the distance to Berlin or Stettin is too vast for the broad population. The space is, further, characterised by a predominance of agricultural cultivation and influenced by this sector. Other locations with similar conditions could have similar historical backgrounds regarding the commuting behaviour as well as the distribution of facilities and centres. Research on the countryside's possible futures following the presented methodology could result in similar conclusions.

With the current trend, the countryside with such conditions is following the logic of the Safari Hinterland and proceeding towards the role of a space dedicated to living purposes with occasional touristic offers. The settlement of employees outside of the centres remains uneconomic with the persistent importance of localisation. A commuting society rises that needs to travel to their workplace and for other purposes with the dependency to the private vehicle as the predominant mean of transportation. In this sense, the countryside remains exclusive to the population which is able to accept, afford and live with these conditions.

Based on a transition towards increasingly efficient mobility, such countryside could take the role of an alternate city with diverse functionalities following the idea of the Scatter City. This development promotes the independence of localisation. Employers are un-

54 Marsden et al., *Constructing the Countryside*, 188.

limited in their choice of settlement as the connectivity is increased. Employees can settle in the wider periphery. While commuting still remains a predominant practice, the advanced public transportation enables a settlement outside of centres for the whole population based on personal aspirations.

The focus on locality with the inclusion of the digitalisation puts the countryside with the described characteristics into the role of a reinterpretation of the traditional village. The population lives locally but acts globally according to the Glocal Village. With the intensification of the society centred around knowledge and emersion of digital means, work becomes more location independent. Commuting becomes less significant within this development as employees work remotely. The development would open the countryside for a new population.

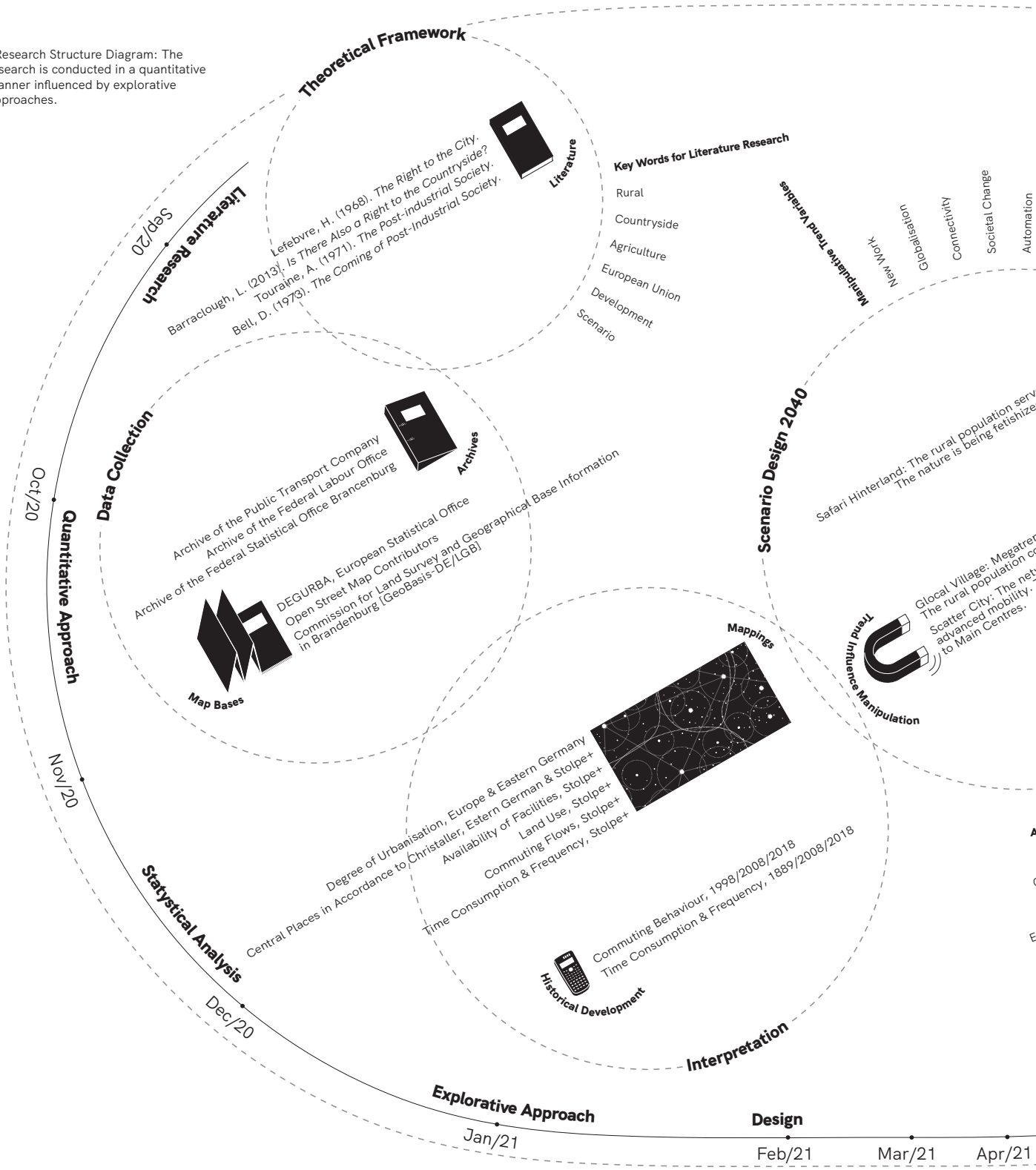
Although the indicators do not claim universal correctness regarding the liveability or environmental tolerability, they are a reference for these concerns. Therefore, the Glocal Village concludes as the most desirable future of the proposed scenarios. The return to a life centred around a locality on a small scale and utilising new technologies to act globally seems most promising regarding the liveability and the environmental tolerability.

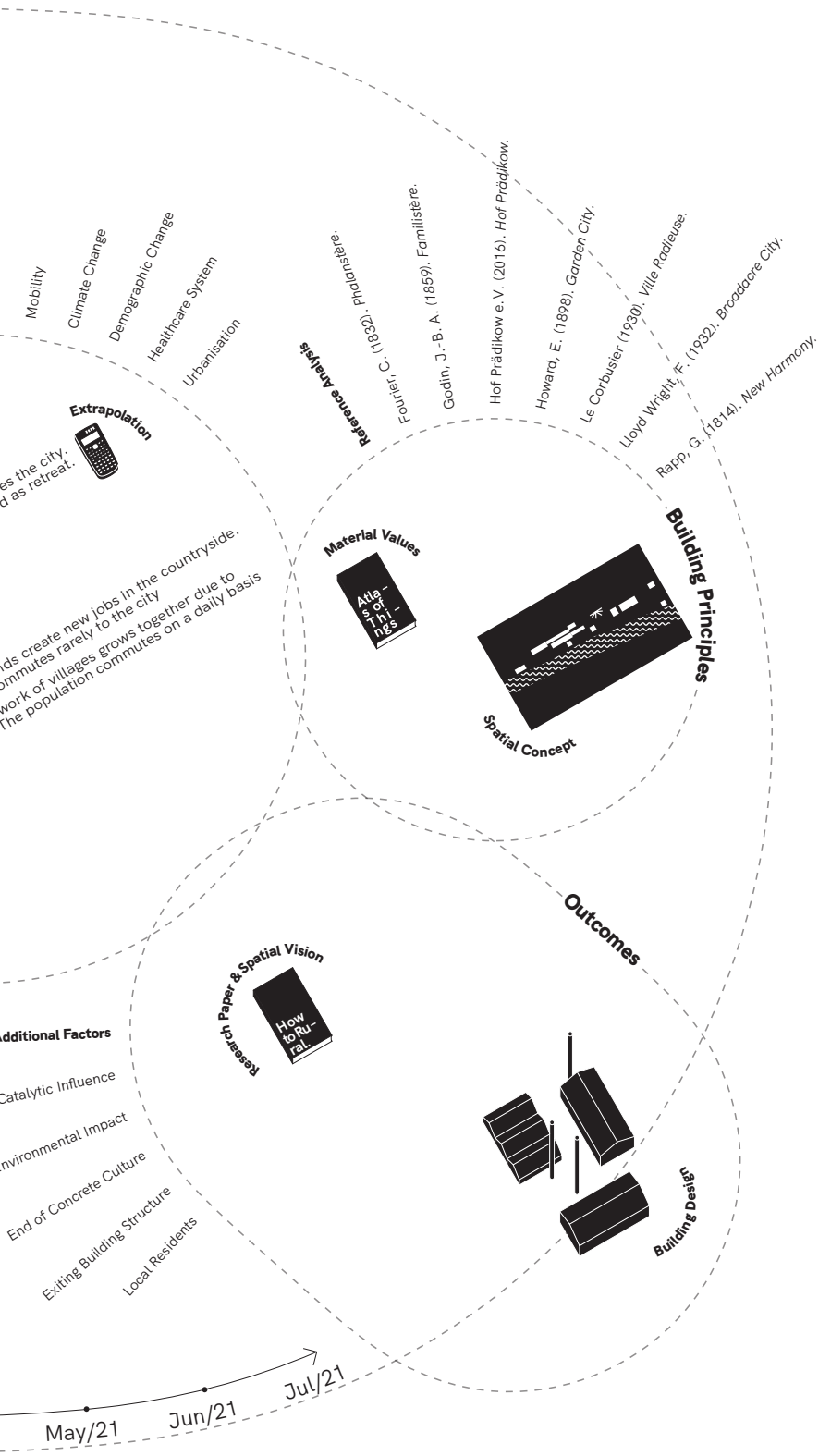
Adapting this conclusion to answer the research question, rural life patterns can profit from the digitalisation which can substitute urban qualities. Within this research, the quality of work and living space proximity was investigated and theoretically proven to be replaceable by technical progression. Evidence of other substitution regarding other urban qualities requires further research. As a deepening investigation, a subsequent design process on the transformation of a former concrete factory explores these qualities within the boundaries of the Glocal Village.

Reflection

The graduation project aimed to investigate the countryside's potentials in an architectural context. Contouring the predominant focus on the city within the spatial professions, the countryside as a habitat and the assets of present circumstances were analysed. The research phase of the graduation resulted in the formulation of a spatial vision for a depicted case example. The design showed the transformative potentials and the value of the materialisation which is embedded within an abandoned building in the countryside.

I Research Structure Diagram: The research is conducted in a quantitative manner influenced by explorative approaches.





The approach of the Explorelab studio gave me the freedom and opportunity to suggest an individual methodology that suited the aim of the graduation the most (see Figure I). In that sense, the process was experimental and not guaranteed to generate proper results. However, it suited my aspiration to investigate the space outside of the city.

As this space constitutes the vast majority of the Earth's surface and is diverse throughout its entire extent, the exploration of the countryside could not be approached on a global scale. Therefore, the research was conducted on a case example in Eastern Germany around the cities of Angermünde and Schwedt. This case was chosen on the basis of its history and the resulting role as a precursor.

With the uncertainties about the countryside's future, a scenario building methodology was adapted from an established approach. The scenarios were generated from quantitative data. This made the scenarios comparable and the methodology transferable to other rural contexts. This resulted in three scenarios for the case example which were compared to each other regarding their liveability and environmental tolerability with one of them being the most desirable. That scenario, namely Glocal Village, was the basis of the subsequent design phase and spatially further developed.

Based on the regional vision, an existing building was depicted to be transformed and reactivated to meet the needs

of the Glocal Village. Considering working as a predominant force for people in the countryside to commute, an office typology within the boundaries of the Glocal Village was adapted for the purpose of remote working with the assets of the digitalisation. The focus laid on the reactivation and transformation of an existing building because of the growing number of abandoned structures in the countryside and the question of their value. The contrast between that abandoned building and the new purpose was emphasised on a variety of scales.

To verify these results and the methodology, discourse with the local population would have been necessary. With such conversations, it would be possible to elaborate more extensively on present needs and validate the outcomes of the research. However, not least because of the ongoing measures of the COVID-19 pandemic and the physical distance to the investigation area, the project lacks in these verifications. Further, a historical analysis of the chosen site and buildings could have an impact on the design process but was limited due to the lack of written sources. The design was, therefore, restricted to the material value of the structure.

The quantitative approach, applied on a case example, successfully resulted in three comparable and distinguishable scenarios. It was also possible to choose a most desirable future secured by that approach and to formulate a spatial vision for the countryside in that context. Further, the existing and abandoned structures in the investigation area could be successfully adapted to serve a new purpose that derives from the spatial vision for the area.

Regarding the social framework, the graduation illustrates an alternative living concept in the countryside with the example of the spatial vision for the investigation area. This relates also to the desire of living outside of the city for a vast portion of the society while conquering the uneven living conditions. Moreover, the need of maintaining a hinterland for the function of the city and therefore the need of a local population is tackled with the aspiration towards a balanced life quality.

In the architectural profession, the project contributes to examinations relating to transformations and reactivations of built structures. The transformation is inspired by alternative climatic renovations opposing the addition of insulating layers hiding the existing structure. It adapts the principles to emphasize the material value of the existing. Typologically it reinterprets the traditional office for remote working which demonstrates the experimental potentials of the countryside due to the low land prices compared to the city.

The thesis also contributes to the scientific discourse at the edge of rural sciences and architecture. While the countryside is a permanently present topic in social sciences, architectural practitioners and researchers vastly lost interest in the topic with the industrialisation and the ongoing focus on the city. This lack of research in

the field changed in the last decade with more spatial planners focusing on the countryside.

My mentoring team advised me and provided references as well as context throughout the whole process of the graduation. During the research phase, I got mainly remarks on the scientific correctness and suggestions regarding the methodology which led the paper towards the specific scenario approach. The proposed readings complemented the theoretical background of the graduation.

The mentoring for the subsequent design work was foremostly centred around the concept formulation and the translation of the spatial vision which resulted from the research into a building design. Focusing on the transformation of selected buildings of an abandoned site for a new usage, the qualities and purpose were questioned which helped me to reconsider and rephrase my thoughts more clearly. Also, conceptionally and regarding the coherence of the transformation principles, the project gained from the mentoring.

Although the master track in Delft is mostly centred around the city, I was able to graduate on a context outside of it and found encouragement from the mentors. Because we live in an urbanised world, the countryside does not follow a different logic regarding the longings of the people. However, the dynamics are different as the density is lower. The context needed different handling than in other studios.

Towards the architect I endeavour to be, the graduation helped me to exacerbate my aspirations for the profession. I believe that architecture is not only about making beautiful and functional buildings, but practitioners can also tackle social inequalities with concepts and research. One of those, I approached with the focus on the unequal living conditions in the countryside and the city.

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