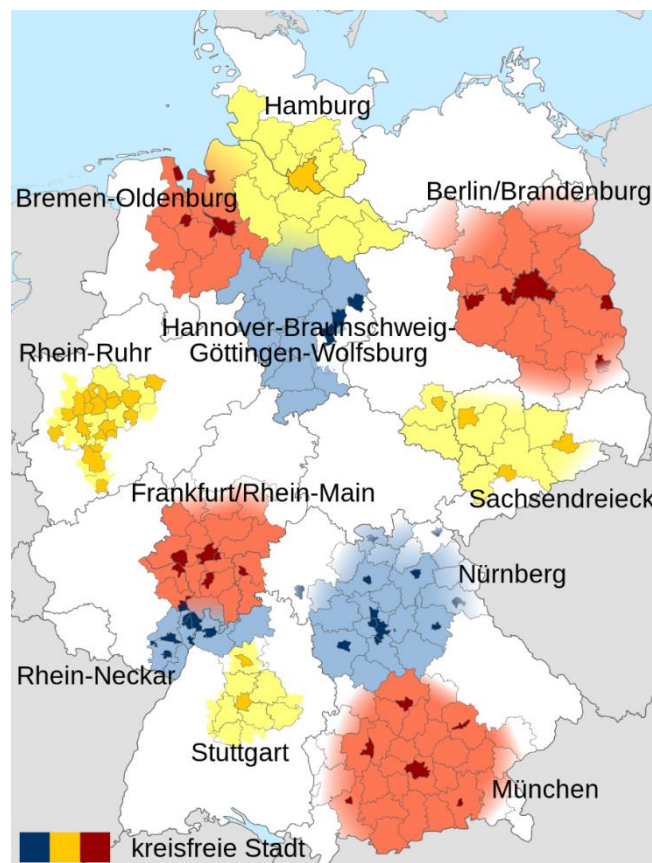

How Small- and Medium-Sized Towns Contribute the Sustainability of Metro Regions

The Comparison of Berlin-Brandenburg Metropolitan Region and Hanover–
Braunschweig–Göttingen–Wolfsburg Metropolitan Region in Germany



PFE – Research Project 2019-2020

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15th January 2020

Table of Contents

Abbreviation/ List of Tables/ List of Figures/ Abstract/ Keywords

1 Introduction	4
2 Literature Review	6
2.1 Definition of SMSTs	6
2.2 Metropolitan Region	7
3 Indicators to evaluate the contributions	8
3.1 Evolution of sustainable models	8
3.2 Attractiveness of SMSTs	8
3.3 Components and indicators	9
3.4 The five-pillar-based model of indicators	11
4 Case studies	13
4.1 Case selections	13
1) Berlin-Brandenburg Metropolitan Region	14
2) Hanover-Braunschweig-Göttingen-Wolfsburg Metropolitan Region	14
4.2 SMSTs in Berlin-Brandenburg Metro Region	15
1) Hennigsdorf	16
2) Lübbenau	18
3) Wunstermark	19
4) Bernau	21
5) Summary	23
4.3 SMSTs in Hanover-Braunschweig-Göttingen-Wolfsburg Metropolitan Region	24
1) Wernigerode	25
2) Goslar	27
3) Peine	29
4) Uelzen	30
5) Summary	32
5 Conclusion	34
5.1 Preventing the metropolitans from urban sprawl	34
5.2 Bringing new possibilities for regional development	34
5.3 Benefiting to the interregional and international networks	35

Bibliography

Declaration of academic integrity

Abbreviation

ESPON -- Inspire Policy Making with Territorial Evidence

GDR – German Democratic Republic

IKM -- Initiativkreis Europäische Metropolregionen in Deutschland

(ENG: Initiative European Metropolitan in Germany)

SDGs -- Sustainable Development Goals

SMST -- Small- and Medium-sized Town

UNA --New Urban Agenda

UNESCO – United Nations Educational Scientific and Cultural Organization

List of Tables

Table 1 SMST typologies based on three population classes

Table 2 The four dimensions of attractiveness

Table 3 Components of attractiveness and examples of indicators

Table 4 The main characteristics of the socio-economic profiles of SMSTs

Table 5 The five-pillar-based model of indicators

Table 6 Chosen SMSTs in the Berlin-Brandenburg Metropolitan Region

Table 7 Chosen SMSTs in Hanover-Braunschweig–Göttingen–Wolfsburg Metropolitan Region

List of Figures

Figure 1 Models for spatial structures of metropolitan areas

Figure 2 Sustainability Mandala

Figure 3 Metropolitan Regions in Germany

Figure 4 Locations of case study in Berlin-Brandenburg Metro Region

Figure 5 Locations of case study in Hanover-Braunschweig–Göttingen–Wolfsburg Metropolitan Region

Abstract

Since the urbanisation phenomena make capitalisation in the new era, the metropolitan regions agglomerating is seen as a critical form of economy. As all regional development should consider sustainability, it turns to be the goal and one of the evaluation measures for metro region plans. The essay sets a hypothesis that small-and medium-sized towns contribute to the sustainability of metropolitan regions by their diversity and potentials. By the two case studies of metropolitan regions in Germany, this paper aims to figure out how the mechanism works and make comments for further developments.

Keywords

small- and medium-sized towns (SMSTs), metro region, Berlin-Brandenburg, Braunschweig–Göttingen–Wolfsburg, sustainability

1 Introduction

In the Eurostat regional yearbook 2013, Chapter 13 addressed the metro regions as a new typology of functional dimension in territorial development. Playing a more and more important role of sustainability in regional development strategy among states and areas, the expression of this conception in the action plan is still evolving. All United Nations Member States adopted the seventeen SDGs (Sustainable Development Goals) in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030 (UNDP, 2015). The main areas of the New Urban Agenda (NUA) refer to specific targets of the SDG's goal No. 11 which are: "to make cities and human settlements inclusive, safe, resilient and sustainable" (ibid.). The NUA aligns with the key SDGs related to urban development, quality of life and social equity should be expanded to cover the specific conditions that prevail in functional and metropolitan areas (Okraszewska et al., 2018).

Due to the missing link between metro regions and the urban-rural regional typology (Eurostat regional yearbook, 2013), the recent development requires effective integrated management of city services, infrastructure, and communication networks at a metropolitan level (Raffaele Carli, 2018). Since small- and medium-sized towns (SMSTs) can play a crucial role at the regional level, policy efforts should contribute to reducing the strong territorial polarisation of economic performance (Territorial Agenda of the European Union 2020, 2011). However, if the SMSTs contribute to the sustainability of metropolitans, what roles they play for the metro regions, should be clarified, and this is the main research objective of this paper.

Berlin-Brandenburg Metropolitan Region and Hanover–Braunschweig–Göttingen-Wolfsburg Metropolitan Region are both recognised metropolitans by IKM (Initiativkreis Europäische Metropolregionen in Deutschland, ENG: Initiative European Metropolitan in Germany) (IKM, 2001). For they standing on the relevant position of geography, politics, economy as well as culture, the paper aims to find out the identified functions of small- and medium-sized towns (SMSTs) refer to these two metropolitans, to improve the planning-making and effectiveness of decision-making term.

In the part of literature review, the paper introduced the definition of the SMSTs in this research,

current metropolitan region issues and the chosen indicators that could present the sustainability in metro regions. The next part contained the two case studies of metro regions with the surrounding SMSTs: They supply the data according to the selected indicators to analyse how the SMSTs contribute to sustainability in their metro regions. Based on this analysis, a comparison of the two case metro regions will lead the research to further qualitative analysis for the two German regions, which separately embedded in the east and west of Germany.

2 Literature Review

2.1 Definition of SMSTs

The new ESPON project “TOWN” defined small- and medium-sized towns (SMSTs) as entities with a population density between 300 and 1500 inhabitants/km² and the number of inhabitants between 5000 and 50,000, shown as below Table 1 (Servillo et al., 2014).

		DENSITY (inh. / kmq)		
		< 300	> 300 and < 1.500	> 1.500
POPULATION (inh.)	< 5.000	very small town	very small town	very small town
	> 5.000 < 25.000	sprawling urban region	small town	small town
	> 25.000 < 50.000	sprawling urban region	medium town	medium town
	> 50.000	sprawling urban region	large town	City or large urban area

Table 1 SMST typologies based on three population classes
(ESPON, www.espon.eu)

The Green Book of the European Union on territorial cohesion calls small- and medium-sized towns as “links,” which have all the features that can be expected from basic functions of a town: they provide the basic criteria of living, but at the same time they are also a link between towns and surrounding villages (Horeczki, 2016). As the part of the networks and agglomerations, SMSTs in some cases may make complements for the metropolitans or regional areas as industrial towns, touristic destinations, university towns, gateway towns, peripheral towns within a large city-region and regional service centres, and they also could be important to constate the whole regional function (Hamdouch & Banovac, 2017). Planning for development in small- and medium-sized towns has as many dynamics as there are contexts, which despite attempts by some scholars to distinguish the “European approach” to spatial development and types of European institutional structures and the performance of economic systems (ibid).

2.2 Metropolitan Region

Metropolitan areas include one or more urban areas, as well as satellite cities, towns and intervening rural areas that are socioeconomically tied to the urban core, typically measured by commuting patterns, seen in Figure 1 (Leman & Ltd, 2001). In spatial terms of a metropolitan area is a region consisting of a densely populated urban core and its less-populated surrounding territories, sharing industry, infrastructure and housing (Okraszewska et al., 2019).

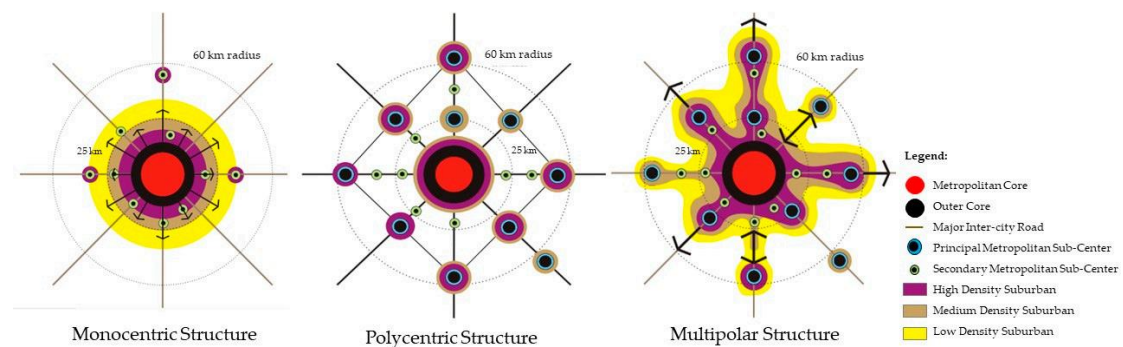


Figure 1 Models for spatial structures of metropolitan areas
(Leman & Ltd, 2001)

The defining scope for metropolitan regions is their spatial dimensions based upon the functional relationships of resource cycles, regional economic systems and formal as well as informal settlement structures (Pearson, 2016). The linkages of metropolitan regions extend beyond administrative and political boundaries and usually include a number of local governments, peri-urban and rural lands as well as neighboring cities (ibid.).

3 Indicators to evaluate the contributions

3.1 Evolution of sustainable models

For the sustainability of human settlement, in 1991, Robert Gilman and Diane Gilman co-authored a germinal study called "Eco-villages and Sustainable Communities" for Gaia Trust, in which the ecological and communitarian themes were brought together (Gilman & Gilman, 1991). The creation of the four-dimension map in 2004 applied the design of individual lifestyles, organisations, intentional communities, traditional villages, urban neighborhoods, regions (ibid.). As the core spirit of sustainable development, the four pillars based on the design of eco-village also influenced people's understanding of sustainability: It's called Sustainability Mandala (seen in Figure 2).



Figure 2 Sustainability Mandala
(Global Ecovillage Network)

Hence, the evaluating index should combine the four-dimension factors, including social, culture, economy and ecology.

3.2 Attractiveness of SMSTs

In fact, small- and medium-sized towns can take part in the competition; attract activities (often through specialisation processes), inhabitants and tourists (even if the diversity of this category is very wide), and the context of higher social demand for quality of life is even good for some of them as they can be promoted as less expensive, less polluted and crowded spaces than metropolises, as places close to nice surrounding and with country feelings in urban spaces (Demazière & Banovac & Hamdouch, 2014).

Attractiveness	Objective (attraction)	Subjective ("appeal", desirability)
Effective (observable flows)	Net migration Investments Evolution of property and land prices	Satisfaction level of inhabitants or economic actors Sense of place...
Potential (tendency to generate flows)	Plan/project to settle or invest "queue effect"...	Wish/intention to settle Image and reputation of the town influence...

Table 2 The four dimensions of attractiveness (Demazière & Banovac & Hamdouch, 2014)

There are the attractiveness objective and subjective from Alexandre et al.'s research published in 2010 (seen in Table 2), and it shows the four dimensions of attractiveness are generally identified through the combination of objective/subjective and effective/potential aspects.

3.3 Components and indicators

The same research summarised the components of attractiveness and examples of indicators in geography and climate amenities, accessibility, demographical trends and economic features, as it is visible in Table 3. Others, like political organisation, urbanism housing, social conditions, infrastructures, culture and heritage, environment and sustainable development policies are more recently analysed (ibid.). Hamdouch and Banovac found the three scenarios for socio-economic development of insight from European small and medium-sized towns: The first is development based on a particular local "milieu", a strong local identity and an entrepreneurial spirit of the population, included agriculture and agro-tourism supporting local endogenous development; The second scenario is development characterized by the leading role of the local authority, which acts as the driving force in creating strategies and partnerships with other private and civil stakeholders; The third scenario is a development guided by a regional or county public authority, once their choice has been made, the regional and county governments (with the help of EU funds) started investing in the region and contributed to a sustainable regeneration of SMSTs (Hamdouch & Banovac, 2017). And the main characteristics of the socio-

economic profiles of SMSTs are shown in the Table 4.

Components of attractiveness	Examples of indicators
Geography and climate amenities	Natural amenities Average hours of sunshine/year
Accessibility	Network density Location
Demographic trends and parameter	Demographic evolution Population features
Political organisation	Decentralisation/role of local authorities
Economy	Employment (evolution and characteristics) Firms and enterprises (evolution and characteristics)
Urbanism	Plans and development projects
Housing	Number and development projects
Social conditions	Shops Security
Infrastructures	Services (quality and quantity)
Culture and heritage	Number of tourists Historical structures and monuments
Environment and sustainable development policies	Pollution index Protected areas (size, evolution...)

Table 3 Components of attractiveness and examples of indicators
(Demazière & Banovac & Hamdouch, 2014)

From the previous studies, the contributions of SMSTs to metro regions can be described in “sustainability” and “attractiveness” two concepts, as the “sustainability” shows the main pillars of the regional development, and “attractiveness” supplies the potential linking between the SMSTs. Hence, the new model for the analysis would combine these two concepts and simplify the indicators in order to clarify the emerging of the selected cases.

	Residential	Productive	Knowledge-creative
Target groups	Residents, commuters and tourists	Business actors	Creative class and innovation firms
Factors of attractiveness	Good living environment, heritage, quality of provision of services, culture, health and schools	Competitive business environment, labour skills	Creative environment, quality of provision of services
Characteristics	Diversity of equipment and amenities	Sectoral specialization, concentration of business activities	Innovation systems and knowledge-based activities, concentration of business activities
Policy focus	Culture and tourism, public services, private services to population, transport facilities	Quality of business areas, low taxes, subsidies	Clusters and networks

Table 4 The main characteristics of the socio-economic profiles of SMSTs (Hamdouch & Banovac, 2017)

3.4 The five-pillar-based model of indicators

In terms of the indicators above, according to the “sustainability” concept, the new model for analysis should be divided into Ecological-Social-Political-Economic-Cultural five pillars. For “attractiveness”, the new model would follow the results of the previous studies, using the mentioned different components and indicators. As shown in the five-pillar-based model (seen in Table 5), it is divided into components for qualitative analysis in the left column and indicators for quantitative analysis in the right column.

The components describe the basic condition of the SMSTs, like the natural amenities, pollution and protected areas in Ecological-Pillar. The chosen indicator for this pillar is “landscape attractiveness level”, which can be found in five levels of attractive as the results of ecological indicators (Walza & Stein, 2018). The Social-Pillar contains the location regarding the accessibility, demographic evolution, shops as commercial facility and security. The indicators for this pillar are population density and numbers of the housing and development projects.

Pillars	Components of SMSTs	Chosen indicators
Ecological	<ul style="list-style-type: none"> ➤ Natural amenities ➤ Pollution ➤ Protected areas 	<ul style="list-style-type: none"> • Landscape attractiveness level
Social	<ul style="list-style-type: none"> ➤ Location and accessibility ➤ Demographic evolution ➤ Shops ➤ Security 	<ul style="list-style-type: none"> • Population and density • Numbers of development and housing projects
Political	<ul style="list-style-type: none"> ➤ Decentralisation of local authorities ➤ Quality infrastructures services ➤ Plans and development projects 	
Economic	<ul style="list-style-type: none"> ➤ Evolution and characteristics of firms and enterprises 	<ul style="list-style-type: none"> • GDP • Numbers of employees
Cultural	<ul style="list-style-type: none"> ➤ Historical structures and monuments 	<ul style="list-style-type: none"> • Number of tourists

Table 5 The five-pillar-based model of indicators

There is only qualitative analysis for the Political-Pillar, by the decentralisation of local authorities, quality infrastructures services, plans and development projects three components. The only component for the economy is the description of the evolution and characteristics of firms and enterprises. The GDP and numbers of employees would be the indicators for this pillar. The Cultural-Pillar is now oriented to the historical value and tourism, so the component focuses on the historical structures and monuments and indicators is the number of tourists.

4 Case studies

4.1 Case selections

Berlin-Brandenburg Metropolitan Region and Hanover–Braunschweig–Göttingen-Wolfsburg Metropolitan Region are both metropolises in northern Germany, while Berlin-Brandenburg presents the political capital in the east of Germany, Hanover–Braunschweig–Göttingen-Wolfsburg Metropolitan Region is more like a city cluster in the west (seen in Figure 3). They both developed a number of characteristic SMSTs in the metro regions.

In terms of the indicators above, the selection of the case studies will be as diverse as possible to choose the SMSTs by different socio-economic characters. Through the analysis of the chosen SMSTs in the two regions by the five-pillar-model, the results would benefit from understanding how the SMSTs contribute to the two metro regions, and the final comparison between these two metro regions would show if there are differences according to the two kinds of metro regions, capital metropolitan and city cluster metropolitan.



Figure 3 Metropolitan Regions in Germany
(IKM, www.deutsche-metropolregionen.org/mitglieder/)

1) *Berlin-Brandenburg Metropolitan Region*

The chosen SMSTs in Berlin-Brandenburg are Hennigsdorf, Lübbenau, Wustermark and Bernau. They are two small-sized and two medium-sized towns, within the history from the 1200s-1300s, and in the one-hour traffic circle.

Town	Type	Size		History	Transport	Identity
Hennigsdorf	Industry	26,272	835	1375	Train/Suburban railway <30min	Steel mill Bio-center
	Medium-sized	31.47 km ²	p/km ²			
Lübbenau	Recreation	16,090	120	1315	Train 60min	Spreewald river
	Small-sized	138.78 km ²	p/km ²			
Wustermark	Commerce	9,643	180	1200	Train<30min Suburban railway<60min	Outlet Berlin Elstal
	Small-sized	52.63 km ²	p/km ²			
Bernau	Health	38,825	370	1232	Suburban railway <30 min	Hussite festival Brandenburg clinic
	Medium-sized	103.73 km ²	p/km ²			

Table 6 Chosen SMSTs in Berlin-Brandenburg Metropolitan Region
(Summarised from Google Map and the official websites of the case cities)

As it is visible in the Table 6, more detail, the case studies are identified in types of industry, recreation(tourism), commerce and culture.

2) *Hanover-Braunschweig-Göttingen-Wolfsburg Metropolitan Region*

For the chosen case studies in Hanover-Braunschweig-Göttingen-Wolfsburg, they are all medium-sized towns called Wernigerode, Goslar, Peine and Uelzen, within the population density from 190 p/km² to 420 p/km². Though the oldest one is from 979 and the youngest is from the 1800s.

As it is visible in Table 7, the types are identified in the manufacture, culture, recreation(tourism) and transfer.

Town	Type	Size	History	Transport	Identity	
Wernigerode	Manufacture	32,733	190 p/km ²	1815	Train 60min -90min	Castle Harz mountain Hasseröder lager (Beer)
	Medium-sized	170.03 km ²				
Goslar	Culture	50,753	310 p/km ²	979	Train 60min	UNESCO world heritage site
	Medium-sized	163.71 km ²				
Peine	Recreation	49,952	420 p/km ²	1130	Train <30min	Peiner land
	Medium-sized	119.51 km ²				
Uelzen	Transfer	33,614	250 p/km ²	1250	Suburban railway <120 min Train <60min	Hundertwasser station
	Medium-sized	135.84 km ²				

Table 7 Chosen SMSTs in Hanover-Braunschweig–Göttingen–Wolfsburg Metropolitan Region
(Summarised from Google Map and the official websites of the case cities)

The shown traffic time is an original departure from the city Hanover, though city Göttingen located in the south and is closer to Wernigerode.

4.2 SMSTs in Berlin-Brandenburg Metro Region

As could be seen in Figure 4, three of the four case SMSTs are located in the north of the metro region and included in the half-hour transport circle, which undertake the functions of industry, commerce and culture. Lübbenau in the southern region is already known as a popular recreation destination.

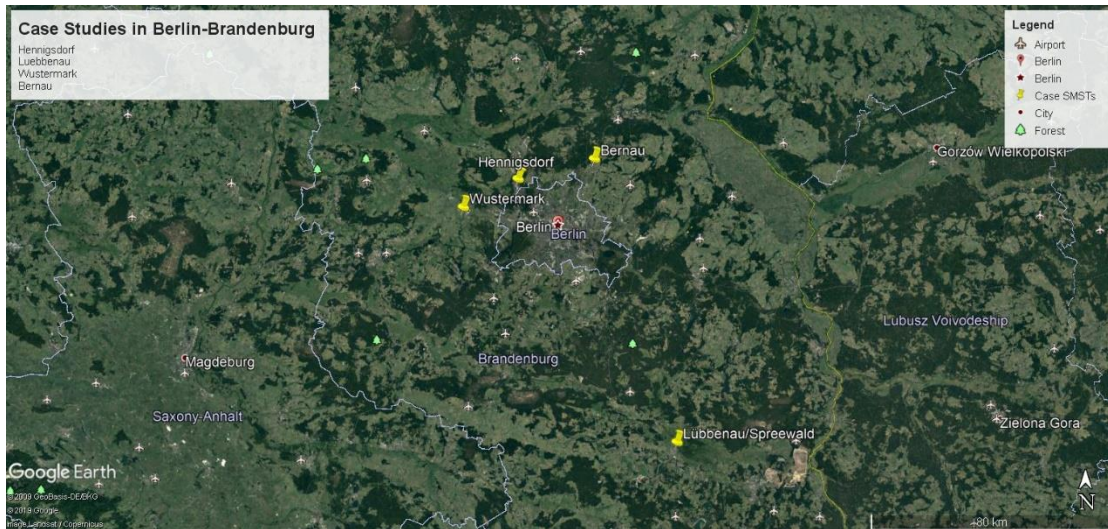


Figure 4 Locations of case study in Berlin-Brandenburg Metro Region
(Google Earth)

Based on the five-pillar-model, the case study for these four SMSTs will follow towns rather other categories as below:

1) *Hennigsdorf*

Over the past 20 years, the city has increasingly transformed into a modern technology location that focuses on transport technology, but whose development is also determined by innovations such as biotechnology and the traditional area of steel production (Stadt Hennigsdorf: www). Now, as the “Door of Berlin”, it should be described as liveable and lovable (ibid.).

Pillars	Components of Hennigsdorf	Chosen indicators
Ecological	The city is working successfully with a stable district heating supply in the long term, on a climate protection program that makes an effective contribution to reducing carbon dioxide and thus against global warming, and such activities are considered exemplary by experts in the national-level.	Landscape attractiveness level - Very attractive (Walza & Stein, 2018)
Social	There is a direct connection to Berlin by railway and the Havel Canal as an important waterway. There are 13,354 female and 12,929 male inhabitants, including 3,960 under 18 years old, 7,781 between 19 and 44 years old, 7,937 between 45 and 64 years old, 7,051 over 65 years old.	Population and density - 26,272 - 800 p/km ² (Stadt Hennigsdorf official website, 2020: www) Numbers of development and housing projects - 7

		(Stadt Hennigsdorf official website, 2020: www)
Political	<p>There are four subject departments under the mayor's management, which oriented to general administration, urban planning, education and citizen service. The executive department is in between.</p> <p>There is a council information system that offers the possibility of meeting calendars and dates, public templates, agendas and resolutions of the various committees. Since 2009, there are some available documents.</p>	
Economic	<p>Taking advantages of Berlin-Brandenburg Metro Region, there is a wide range of well-developed, affordable commercial areas, laboratory, office and production areas as well as a central contact for all investment projects. The former steel and rolling mill should be the industrial foundation of Hennigsdorf. Hennigsdorfer Elektrostahlwerk GmbH has been operating under the leadership of the Italian group of companies Riva for over 20 years. With investments of more than 250 million euros, the Hennigsdorf plant is one of the most modern steel plants in Europe.</p> <p>Around 100 companies from high-tech sectors are currently embedded in the campus-like innovation forum, including over 30 companies with more than 700 employees from the life sciences sector.</p>	<p>GDP</p> <ul style="list-style-type: none"> - Lack of data <p>Numbers of employees</p> <ul style="list-style-type: none"> - 4,210 <p>(Stadt Hennigsdorf official website, 2020: www)</p>
Cultural	<p>Hennigsdorf was first mentioned in 1375 as "Heynekendorf" and remained a fishing and Kossätendorf for a long time. After the Second World War, the two state-owned locomotive engineering and electrical works and the steel and rolling mill determined the life of the city for decades. In 1962, Hennigsdorf was granted the municipal right as the GDR community with the largest population.</p> <p>After the fall of the Berlin Wall, the city of Hennigsdorf developed into a modern business and technology location as well as an attractive place to live with green surroundings and good infrastructure.</p>	<p>Number of tourists</p> <ul style="list-style-type: none"> - Lack of data

Source:

Stadt Hennigsdorf official website.

<https://www.hennigsdorf.de/Rathaus/Politik/Ratsinformationssystem>. Retrieved 06.01.2020.

Thus, the number of employees in Hennigsdorf now is roughly 4,200, and the workable inhabitants are less than 1,400 (ibid.). That means, the city supplies over 1,800 working positions for the out-living workers in the region. By the analysis, the industrial foundation is strong, and it plans to make a transform from the secondary industry to the tertiary industry, involved ecological aspects and housing development. However, there is the demographic shrink, the dynamics of its development and the contributions to the metro region are obvious.

2) Lübbenau

In January 2018, Lübbenau established itself again as a “Q-City” through recertification with 29 participating companies, which is shortened from “Quality City Germany” and firstly took place on the occasion of the Spreewald and Schützenfest in summer 2014 (Top of Spreewald, 2020: www). In this way, the city also lives up to its mission statement "Top of Spreewald" because it is Germany's largest quality community (ibid.).

Pillars	Components of Lübbenau	Chosen indicators
Ecological	<p>One of the greatest challenges for the ecological aspect is to connect the revitalisation of the groundwater by a mining trench system. Within the developing master plan and a management concept for the area, the framework requires further coordination and approval in detail.</p> <p>In 1991, the approximately 480 km² protected area received the recognition of UNESCO and thus became a part of the large-scaled worldwide system for protected areas. At the same time, it is an important part of the Brandenburg network of large protected areas. 20% of the area of the biosphere reserve is designated as a nature reserve, the rest as a landscape reserve.</p> <p>The unique cultural landscape, which characterised by rivers, meadows and lowland forests, is preserved and developed with its typical animal and plant species in Spreewald.</p>	<p>Landscape attractiveness level</p> <ul style="list-style-type: none"> - Particularly attractive (Walza & Stein, 2018)

Social	<p>The city is connected with Berlin and Brandenburg by the regional public transportation.</p> <p>The population in Lübbenau has decreased from 19,959 of 2000 to 16,090 of 2017, and the number of the male shows more obvious shrinking, from 9,852 to 7, 845.</p> <p>As the saying of the final report of the State Advisory Board (LFB) for health resorts and resorts, "it is a worthy living place that with a high quality of stay and development prospects for the future".</p>	<p>Population and density</p> <ul style="list-style-type: none"> - 16,090 - 120 p/km² <p>(Lübbenau official website, 2020: www)</p> <p>Numbers of development and housing projects</p> <ul style="list-style-type: none"> - 6 <p>(Lübbenau official website, 2020: www)</p>
Political	<p>There are mainly three sectors under the administration of city mayor, which are mayor's office, subject departments of central tax, finance, urban development, and executive department.</p>	
Economic	<p>There are five planned industrial areas in Lübbenau and are connected well by highway, each of them is focusing on developing the service industry, some also involved also logistic, trading or research industry.</p>	<p>GDP</p> <ul style="list-style-type: none"> - Lack of data <p>Numbers of employees</p> <ul style="list-style-type: none"> - Lack of data
Cultural	<p>In 1315, Lübbenau firstly documented as a manor city, after that, the Castle and village Ragow are built.</p> <p>In 1992, under the patronage of the Minister for Urban Development, Housing and Transport of the State of Brandenburg (now the Ministry for Infrastructure and Agriculture), it is one of the cities with the most beautiful city centre to form the "Cities with Historical City Centre".</p>	<p>Number of tourists</p> <ul style="list-style-type: none"> - 1,972,256 over-night stays in Spreewald <p>(Statistic office of Berlin-Brandenburg, 2018: www)</p>
<p>Source: Lübbenau official website. https://www.luebbenau-spreewald.de. Retrieved 07.01.2020.</p>		

In this case, Lübbenau plays not only the role of a recreation or tourism destination in the region, within the irreplaceable cultural and geographic advantages, it aims to be but also a qualified residential area. With the further development of the service industries in the surrounding areas, the city has a bright future to expand.

3) Wunstermark

Nowadays, outlet centre growth is not just happening in rural areas of the country, they are

being developed closer to major cities (Buxton website,2020: www). While premium outlet centres are a major draw for international visitors, developers and retailers have realized that they can diversify their customer base and attract both local and repeat customers, in addition to tourists, and this results in numerous benefits to the local economy – more visitors to the area means more money spent at local businesses/restaurants and ultimately more money to local governments, due to significant boosts in sales tax revenue (ibid.). The Designer Outlet Berlin in Wustermark is the ideal destination for fans of fashion, just 30 minutes from the centre of Berlin (Visit Berlin.de, 2020: www).

Pillars	Components of Wunstermark	Chosen indicators
Ecological	<p>The town area is mainly characterised by meadows and arable land, which are occasionally interrupted by smaller pieces of forest. Along the Havel Canal, there are still many natural areas on the bank.</p> <p>There is a concept development of the Wustermark climate protection concept was funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), it is based on a decision by the German Bundestag. Development of an implementable strategy for the municipal area to reduce CO₂ emissions and energy requirements.</p> <p>In Wustermark, the affects of the federal highway A10 and federal highway B5 are sources of the noise emissions that calculated by the State Office for the Environment in 2017, and the present noise action plan suggests new measures to prevent and reduce noise for key noise hotspots and evaluates them in terms of their relief effect for affected people.</p>	<p>Landscape attractiveness level</p> <ul style="list-style-type: none"> - Less attractive (Walza & Stein, 2018)
Social	<p>Due to its location in the triangle Berlin-Wustermark-Potsdam, the municipality of Wustermark has special location and development advantages. The existing potential in residential and commercial areas, together with the natural landscape of Döberitzer Heide, leads to an almost ideal</p>	<p>Population and density</p> <ul style="list-style-type: none"> - 9,643 - 180 p/km² <p>(Gemeinde Wustermark official website, 2020: www)</p> <p>Numbers of development and</p>

	interaction of living, working and leisure at the gates of the state capital Potsdam and the federal capital Berlin. The population of Wustermark shows steady growth: By the end of 2019, the number of inhabitants is 9,643.	housing projects - 2 (Gemeinde Wustermark official website, 2020: www)
Political	There are four subject departments under the administration of Wustermark, central services and citizens' office, location promotion and infrastructure, building and living environment, and combing and finance. The citizen information system and advice system build an online platform for management.	
Economic	With its special service profile, the commercial area on the western outskirts of Berlin offers all logistical options at a central interface of freight traffic flows as a business location with perspective. Besides the railway logistics, there is also cooperation with certain famous companies, like DHL. And the partnership with some retail companies will lead to more opportunities for potential commercial activities.	GDP - Lack of data Numbers of employees - Lack of data
Cultural	The municipality of Wustermark belongs to the part of the Havelland, which is also called "high Havelland" or "Auf der Heide". In the 12th century, the Havelland was conquered by the Bear of Albrecht. The Ascanians built castles to secure their rule.	Number of tourists - 964,000 over-night stays in Havelland (Tourism in Brandenburg Report, 2018)
Source: Gemeinde Wustermark official website. https://www.wustermark.de . Retrieved 07.01.2020.		

With the new commercial demands of tourists and citizens, though the famous outlet shops mostly know Wustermark by the capital city Berlin, the number of inhabitants here, however steadily growing, what is different from other SMSTs with an emerging demographic shrinking. Based on geographical advantages and empirical industry in logistics, there is no doubt that the outskirts of Berlin will be more attractive to the flows of the productive economy and tourists.

4) Bernau

As it is so near to Berlin, Bernau is especially known for its Hussite Festival. Every year in June,

people will gather in medieval clothes, turning it into a market fair with a tournament. Knights demonstrate their riding skills, while others eagerly peddle their wares. Another medieval spectacle is the annual sword-fight meeting in March, where swordfighters demonstrate the martial arts of different cultures and epochs. (Visit Berlin.de, 2020: www)

Pillars	Components of Bernau	Chosen indicators
Ecological	There is around 20,000 hectares of forest, 76 lakes, 450 kilometres of marked hiking and biking trails. The possibilities for recreation are almost limitless.	Landscape attractiveness level <ul style="list-style-type: none"> - Less attractive (Walza & Stein, 2018)
Social	Bernau is located in Barnim, a historical region in Brandenburg, and it connected well by public transport, which takes just a few minutes by the suburban train from Pankow of Berlin to the town. The city is also connected to the motorway A11 Berlin–Prenzlau–Stettin, which is only a few kilometres away from the the Berlin-Ring A10. The regional train RB 24 and RE 3 are also available. Until the first day of 2019, there are 40,248 citizens, including 19,456 male and 20,156 female persons.	Population and density <ul style="list-style-type: none"> - 40,248 - 370 p/km² (Bernau bei Berlin official website, 2020: www) Numbers of development and housing projects <ul style="list-style-type: none"> - 6 (Bernau bei Berlin official website, 2020: www)
Political	The city council is the supreme body of Bernau. It consists of 36 city councillors and the mayor as a voting member. They elect the chairperson among their members, the deputy chairpersons and form groups. There are also formed committees to prepare the decisions of the city council and to control the administration. Until now, there are four committees, which are committee for general (A1), committee for finance- and economy (A2), committee for nature, urban development and transportation (A3) and committee for education, teenager, culture, society und sport (A4).	
Economic	Bernau as a part of administrative districts Barnim, joins the enterprise information platform, which is established 19 years ago. The free-use service is part of the economic promotion and is intended to promote business cooperation. And now there are 585	GDP <ul style="list-style-type: none"> - Lack of data Numbers of employees <ul style="list-style-type: none"> - Lack of data

	<p>registered companies of Bernau.</p> <p>The Brandenburg Clinic and the heart centre is located in Bernau, as the now economic promoting concept from 2008, it aims to become a nationally recognised healthy, touristic and cultural city.</p>	
Cultural	<p>Bernau was founded in the 13th century. The town developed quite a reputation far beyond Brandenburg for its cloth, beer and flourished. The 8-meter city wall that was once taken to protect the city is impressive. When the Bohemian Hussites threatened to take the city in 1432, it helped Bernau win the battle.</p> <p>Many houses in the inner city had been half-timbered buildings from the early 19th century under the post-war East German government. It was decided not to restore the old houses, but instead to tear them down and replace them with modern prefab buildings. So now Bernau is home to a mixture of typical GDR high-rise housing estates and historically significant buildings.</p>	<p>Number of tourists</p> <ul style="list-style-type: none"> - 646,965 over-night stays in Barnim <p>(Sabine Rakitin, 2019: www)</p>
<p>Source: Bernau bei Berlin official website. https://www.bernau-bei-berlin.de/de/stadtporraet.html. Retrieve 08.01.2020.</p>		

Bernau as a medium-sized town near the capital city Berlin, within the legendary history of Hussite and German Democratic Republic (GDR), now it takes an essential responsibility of the regional medical facility by Brandenburg Clinic. The participation of the enterprise information platform and database shows more opportunities in this city making a stronger international network with neighbour countries, which takes the advantages of the historical background and the geographic intimate.

5) Summary

The SMSTs in Berlin-Brandenburg Metro Region are taking advantage of capital accumulation in the aspects of accessibility, economy, reputation and potentials. Though being a “suburban area” or “out-belt “of Berlin could also take disadvantages of the polarisation, that means they would be under the shadow of the primate city and hard to be decentralised, the local public transport policies help with the cross-border worries in this case.

Moreover, the case studies in this region showed the diversity of driving in the SMSTs. The first case Hennigstorf is trying to transform from the secondary industry to the tertiary industry, to strengthen the local economy. The second case Lützenau is a popular destination of recreation engaged in improving the local life quality and driving the awareness to live a qualified lifestyle. It shows the multi-development directions rather than only focusing on the tourism and service industries. While the third case Wustermark is benefited from the logistic-based commercial boom, the fourth case Bernau trends to be the medical service sub-centre and the international network joint by cross-boundary economic cooperation.

Indeed, while the SMSTs characterise themselves to avoid disappearing in capitalisation process, the dispersion could prevent the urban sprawl by strengthening the regional structure. However, for some small surrounding towns are turning to be the sub-service-centre should get around of being swallowed by the capital city. The SMSTs in this metro region are highlighted by the label of “by Berlin” and contribute to regional collaboration.

4.3 SMSTs in Hanover–Braunschweig–Göttingen–Wolfsburg Metropolitan Region

In Figure 5, the locations of the four case SMSTs and the four-city-structural city cluster are shown. Uelzen as the main transferred station between Hamburg and the metro region cities, is located in the north. Peine is located just in between the three northern cities, while the other two are located in the Harz mountain area.



Figure 5 Locations of case study in Hanover-Braunschweig–Göttingen–Wolfsburg Metropolitan Region (Google Earth)

Based on the five-pillar-model, the case study for these four SMSTs will follow towns rather other categories as below:

1) *Wernigerode*

Nature, culture, people - there is hardly another place where can these three factors be reconciled as the same as in Wernigerode, the "colorful city on the Harz". The city is a road and rail junction, tourist centre, and vacation resort (Amy Tikkanen, 2020: www). Goods produced locally include electric motors, gears, aluminum, pharmaceuticals, and alcoholic (ibid.).

Pillars	Components of Wernigerode	Chosen indicators
Ecological	Being located beside the protection area of national park Harz, Wernigerode adopted many projects for promoting sustainable development. There are mainly three topics under the sustainable strategy, which are nature and environment, climate and energy, as well as fair trading and development network. The city of Wernigerode annually awards 1,000 euros to the winner of the “Environmental Award” in recognition of their outstanding achievements in environmental protection.	Landscape attractiveness level - Averagely attractive (Walza & Stein, 2018)
Social	There is a network for the volunteer in Wernigerode, so in return, families or seniors can find help and support through volunteering. Moreover, the regional	Population and density - 34,642 - 190 p/km ² (Wernigerode “the

	<p>association the Harz of People's Solidarity focuses on people in the second half of life, the socially disadvantaged and those who in need, but also children, young people and families. Wernigerode has specially engaged itself in social support for vulnerable groups. For advice and help in problem situations, the social pedagogical staff is available to the children and adolescents. Since 1992 there has been a shelter for women in Wernigerode and an outpatient advice centre for women who are threatened or affected by violence. The district association Wernigerode with its 320 members also offers an ideal association of the community, education and social-political engagement.</p>	<p>colorful city on the Harz” official website, 2020: www)</p> <p>Numbers of development and housing projects</p> <ul style="list-style-type: none"> - 7 <p>(Wernigerode “the colorful city on the Harz” official website, 2020: www)</p>
Political	<p>The associated companies of the city of Wernigerode are an indispensable cornerstone of the municipal range of services. The participation report forms the basis for the overall control by the committees. Through the municipal companies and participation, the local political goal is to achieve the maximum of the economy.</p>	
Economic	<p>North-West business parks, Gießbergweg, Dornbergsweg, Stadtfeld and Am Kupferhammer are the four existing industrial areas in Wernigerode. The first two areas supply over half of the job positions that are oriented to the industry of business and commerce. The well-known resident companies are the Hasseröder brewery, the Wergona Schokoladen GmbH of manufacture, Ascopharm of biotechnology and the automotive supplier KSM Castings GmbH. By the well connected to the motorway A36 and B244, the new industrial area Smatvelde is planned to receive the equipment with empty pipes for fiber optic data lines, for modern and innovative companies in an increasingly globalised world.</p>	<p>GDP</p> <ul style="list-style-type: none"> - Lack of data <p>Numbers of employees</p> <ul style="list-style-type: none"> - 5,670 <p>(Wernigerode “the colorful city on the Harz” official website, 2020: www)</p>
Cultural	<p>Favored by the location of two trade routes across the Harz Mountains - from Goslar to Quedlinburg and from Braunschweig to Erfurt</p>	<p>Number of tourists</p> <ul style="list-style-type: none"> - 2,000,000 <p>(Wernigerode “the colorful</p>

	<p>- artisans and merchants settled in Wernigerode around 900 years ago. Count Adelbertus came to Wernigerode from the early 12th century and built the castle on the Annenberg. In the meantime, trade, commerce, agriculture and forestry drove the development of Wernigerode, so that in 1229, it awarded the city rights.</p> <p>The historic architecture of the curious individual frameworks, like the "Schiefe Haus" and the "Haus Gadenstedt" are popular across the state borders of Saxony-Anhalt.</p>	<p>city on the Harz" official website, 2020: www)</p>
<p>Source: Wernigerode "the colorful city on the Harz" official website. https://www.wernigerode.de/Kurzmen%C3%BC/Startseite. Retrieve 09.01.2020.</p>		

Based on the natural and cultural resources for developing tourism and the strong foundation of manufacture and pharmaceuticals, Wernigerode is also focusing on social support for vulnerable groups. As the limitation of expansion in the area, on the one hand, the city takes measures to further develop the economy and environmental protection, on the other hand, within the decentralised local governance, the life quality will be improved. And the senior centre and family house facility could supply new opportunities for the city to create a new role in the region.

2) Goslar

Goslar is today an economic and tourist centre in the Harz region, which benefits from the diversity of its medium-sized businesses, wholesale and retail trade and an ever-evolving conference business (Goslar official website, 2020: www).

Pillars	Components of Goslar	Chosen indicators
Ecological	<p>With the special natural features of valuable ecological sub-areas, as the oldest dam in the Harz Mountains and the mountain meadows count, there is an important water source. For the reasons of nature conservation and landscape conservation, the Harz portion of the district is as nature and landscape reserve.</p>	<p>Landscape attractiveness level</p> <ul style="list-style-type: none"> - Averagely attractive (Walza & Stein, 2018)

Social	<p>The population of city Goslar is increased from 43,422 in 2004 to over 50,000 citizens until now, but the density is declined from 469 p/km² to 310 p/km², because of the extension of the area.</p> <p>Since a wide range of qualified services is available, the city is well served by the authorities, shopping and schools.</p>	<p>Population and density</p> <ul style="list-style-type: none"> - 51,000 - 310 p/km² <p>(Goslar official website, 2020: www)</p> <p>Numbers of development and housing projects</p> <ul style="list-style-type: none"> - 8 <p>(Goslar official website, 2020: www)</p>
Political	<p>There are four departments for the city administration, which are mayor office, culture and citizen service, building service and working centre.</p> <p>In the Citizens Information System, man can view all of the public meeting templates and get first-hand information about advice topics.</p>	
Economic	<p>The city of Goslar is now a modern industrial location for chemical industry, metal production, metalworking and processing, stone and earth industry, glass, building materials, paper and cardboard, optical, clothing, food and beverage industries.</p> <p>As the northernmost low mountain range, the Harz offers attractive opportunities for winter sports enthusiasts.</p>	<p>GDP</p> <ul style="list-style-type: none"> - Lack of data <p>Numbers of employees</p> <ul style="list-style-type: none"> - 18,300 <p>(Goslar official website, 2020: www)</p>
Cultural	<p>The city started from around 1000 years ago under the rule of the Ottonians. In the 11th and 12th centuries, Goslar was one of the most important places in the Empire. In 1992, as the eleventh German cultural heritage, the Erzbergwerk Rammelsberg and the old town of Goslar were included in the UNESCO World Heritage List. In 2010, the UNESCO World Heritage Committee included the Upper Harz Water Management in the list of cultural and natural heritage as an extension.</p>	<p>Number of tourists</p> <ul style="list-style-type: none"> - 250,000 <p>(Goslar official website, 2020: www)</p>
<p>Source: Goslar official website. https://www.goslar.de/stadt-buerger. Retrieve 09.01.2020. Landkreis Goslar. Statistic office of Niedersachsen. https://www.statistik.niedersachsen.de. Retrieve 09.01.2020.</p>		

The medium-sized town Goslar within the diverse historical and natural source, enriches the culture of the region and continue the development of the traditional industries. The UNESCO

World Heritage helps the city gain international attention. In 2014, the former city of Vienenburg was incorporated into the large, independent city of Goslar (Goslar official website,2020: www), which was the symbol of the expansion.

3) Peine

Peine is a medium-sized centre between the state capital Hanover and the upper centre Braunschweig between Harz and Heide, with the diverse industry of concentrated trade and service industries (Stadt Peine official website,2020: www).

Pillars	Components of Peine	Chosen indicators
Ecological	<p>Within the bathing lakes, stork's nests, the river, the horses and deers, and the blooming rapeseed fields, Peine is in the middle of this nature but located so close to Hanover and Braunschweig.</p> <p>Peine takes advantage particularly of this natural source to organise the owl market, highland gathering, free shooting, street festival, pub crawl, boating tournament or garden party to become the ideal recreation destination in the region.</p>	<p>Landscape attractiveness level</p> <ul style="list-style-type: none"> - Averagely attractive (Walza & Stein, 2018)
Social	<p>The demography of Peine city has increased from 4.285 in 1884 to over 50,000 in 2000, recently decreased to 49,000 in the next ten years, but recovered to 50,000 by the end of 2019, included 25,599 females and 25,191 male persons.</p>	<p>Population and density</p> <ul style="list-style-type: none"> - 50,790 - 420 p/km² (Stadt Peine official website, 2020: www) <p>Numbers of development and housing projects</p> <ul style="list-style-type: none"> - 2 (Stadt Peine official website, 2020: www)
Political	<p>Besides the mayor's office and city council, there are specialist committees to prepare its decisions. These committees cannot make any final decisions. They are the committee for planning and public security, the committee for the school, the committee for junior, senior, culture and society, the committee for sport, the committee for finance.</p> <p>The council information system currently provides information about the composition</p>	

	and activities of the council, its committees and the local councils.	
Economic	Peine is a city of commercial diversity, with the most modern electrical steel plant in Europe, the city is home to numerous companies in the plastics processing industry, stationery manufacturers, companies in telecommunications and entertainment technology. The city is also shaped by agriculture and provided food.	GDP - Lack of data Numbers of employees - Lack of data
Cultural	After the governance of Napoleon and the later English occupiers, the city has been quiet since 1946, and it then belonged to Lower Saxony, firstly in the Hildesheim administrative district (until 1974) and then to the Braunschweig administrative district (until the end of 2004). Because of the successful architecture and integration into the surroundings of the Peine industrial park, the city of Peine was awarded the German Urban Development Prize in 1995.	Number of tourists - Lack of data
Source: Stadt Peine official website. https://www.peine01.de/de/rathaus/ . Retrieve 09.01.2020. Landkreis Peine. Statistic office of Niedersachsen. https://www.statistik.niedersachsen.de . Retrieve 09.01.2020.		

The city Peine may as a good destination for a short break and relax in nature for recreation. Taking the advantages of the location between the city cluster, Peine might be an ideal destination for citizens living in modern cities or as a side trip. Even though the demographic structure shows an obvious aging trend, the increasing of the population may be the new opportunity for development.

4) Uelzen

As the junction station of Hamburg, Hanover, Lüneburg, Celle, Braunschweig, Bremen and Berlin, the train station in Uelzen is the famous Hundertwasserbahnhof, which was renovated for Expo 2000 and planned by the Austrian artist and architect Friedensreich Hundertwasser (Landkreis Uelzen, 2004: www). As an "environmentally, culturally oriented" station, Uelzen station is one of the town's popular tourist attractions (ibid.).

Pillars	Components of Uelzen	Chosen indicators
Ecological	<p>The district is part of the main natural area of the northwestern German low-lands, the Lüneburg Heide. The climate is subatlantic. The city of Uelzen has set the goal of reducing locally harmful carbon dioxide emissions. In 2014, the implementation of the climate protection concept was decided by the council decision, which includes specific goals and measures to achieve them.</p>	<p>Landscape attractiveness level</p> <ul style="list-style-type: none"> - Averagely attractive (Walza & Stein, 2018)
Social	<p>The number of female inhabitants is 17,316, while the male is 16,288. Among the inhabitants, there are 60% between 25-65 years old and 24% are over 65 years old, which shows the aging demography.</p> <p>By 2015, there are people from 20 different nations living in Uelzen, and the government supplies support through advice centre and institute for both citizens and migrate.</p>	<p>Population and density</p> <ul style="list-style-type: none"> - 33,604 - 245.8 p/km² (Hansestadt Uelzen official website, 2020: www) <p>Numbers of development and housing projects</p> <ul style="list-style-type: none"> - 5 (Hansestadt Uelzen official website, 2020: www)
Political	<p>The administration in Uelzen particularly follows the guideline determined by the council, and responsible to the mayor and two committees. Under the first committee, there are five departments for personal and organisation, finance, regulations, culture and tourism, generation and education. The second committee is administrative for departments for planning and building, environment and green space, individual enterprise.</p> <p>Besides, there are five service offices in Uelzen, as citizen- and registry office, city and tourism information, family service office, senior service office and public relations office.</p>	
Economic	<p>There are not only fields of employment in the administration. Technical and craft occupations and activities are in demand for various areas as well.</p> <p>From all the employees, 1% are working for the agricultural field, 20% are manufacture and craft, 25% are commerce, hospitality and transport, the rest 54% are all in the service</p>	<p>GDP</p> <ul style="list-style-type: none"> - Lack of data <p>Numbers of employees</p> <ul style="list-style-type: none"> - 16,848 (Hansestadt Uelzen official website, 2020: www)

	industry.	
Cultural	<p>The Uelzen city law was issued by Duke Johann von Braunschweig based on the model of the Lüneburg city law of 1247. The original document was probably destroyed 45 years later by the first major city fire in Uelzen in 1315.</p> <p>The protective city wall with its gates and the brick houses in the Gothic style in the core of Uelzen can be literally found in the city relief. This was how it looked in 1646 before the devastating fire destroyed.</p> <p>Now there are many beautiful old buildings in Uelzen, which are a well-preserved row of half-timbered houses that are used as business premises on the ground floor and residential buildings on the upper floors.</p>	<p>Number of tourists</p> <ul style="list-style-type: none"> - Lack of data
<p>Source: Hansestadt Uelzen official website. https://www.hansestadt-uelzen.de. Retrieve 10.01.2020. Landkreis Uelzen. Statistic office of Niedersachsen. https://www.statistik.niedersachsen.de. Retrieve 10.01.2020.</p>		

By the famous train station of Hundertwasser, Uelzen is now an important transfer-station of the railway. In the future, based on the existed and developing service industry here, Uelzen would find more opportunities to reform itself to be the service spots of hospitality and transport in the region.

5) Summary

For the Hanover-Braunschweig–Göttingen–Wolfsburg Metropolitan Region being a city cluster itself, the SMSTs, in this case, are junctions and embedded in the city-network. Thus, they show the independent development based on their revolutions, but fewer competitions of attractiveness compared with large cities by the near, so the four case studies in this metro region are all suffering the aging problem.

The first case Wernigerode should be one of the successful towns which consider of improving its social facility as achieving the goals of the local economy. Goslar as the second case, creates a political pioneer of merging Vienenburg and expended with the high reputation of UNESCO-listed to diverse industries. Peine takes the advantages of natural resources and priority of location to be a recreation destination, and it is the only one in the four with population growth,

even the growth is made by the seniors. That could be a dynamic to develop for senior and health services. The last case Uelzen with its famous station architect playing the important role of rail jointing, which would let the “non-business” commuters have the chance to visit and consume here.

The SMSTs in this metro region are significant because they are content of the city cluster and obtain the unreplaceable cultural value. The decentralisation of each town makes the multi-potentials and spreading space. Some of the SMSTs might be the pilots of the field for innovations, as they are always trying new methods to continue improving themselves. At the same time, they would take the responsibility of functional serving in the region within the marketing self-regulation.

5 Conclusion

5.1 Preventing the metropolitans from urban sprawl

The 11th goal of the SDGs is “sustainable cities and communities”, and reported “Closely related to this trend is that the urban densities of cities have been declining, creating profound repercussions for environmental sustainability at the local, regional and global scale. Better management of urban growth will be crucial in order to guarantee sustainable urbanisation.” (Sustainable Development Goals, 2019: www). The components in metropolitans of household consumption like transport, new types of housing accommodation, tourism and leisure, created by current societal consumption patterns, rely on developed areas to be accommodated. The pressures that these behaviours created are hard to keep up with, and in return, the offer is prone to be unplanned, and of significant duration in the city borders (European Environment Agency, 2006). In the context of sustainability, urban sprawl can lead to conflicts between social development, nature conservation, agricultural use and individual consumer and life-style preferences (European Environment Agency, 2016).

In both case studies, especially for Berlin-Brandenburg, the SMSTs which take the positions to develop as the sub-service-centres in metro regions should be seen as the alternatives to urban sprawl, with the intentional and specific planning. Furthermore, when a stable spatial structure is formed by these certain spots, the diagnoses for the metro region could be clarified. The efficient development near the metropolitans is avoiding fragmented and scattered but with coherence. For example, they could promote the constructive facility of public transportation between the certain spots as well as the new regional commuting policies which benefit cross-border transport. And this priority of using public transportation follows the sustainable development concept, to reduce the usage of private cars.

5.2 Bringing new possibilities for regional development

As the saying by UNESCO, “Culture is who we are and what shapes our identity. No development can be sustainable without including culture.”, it also ensures that the role of culture is recognised quality education, sustainable cities, the environment, economic growth,

sustainable consumption and production patterns, peaceful and inclusive societies, gender equality and food security through a majority of the SDGs (UNESCO, 2019: www). From the case studies of both metro regions, especially Hanover-Braunschweig–Göttingen–Wolfsburg, the SMSTs make complements for the regional cultural renovation and diversity, which particular crucial for keeping the region being attractive, and more potentials to make the economic growth.

Moreover, in the process of some SMSTs looking for new dynamics for growth, the new models of planning strategies, as well as administrative policies, could be found, such as pilot projects. These new models could be, on one hand, making reforms for the industries in the SMSTs; on the other hand, inspiring the metro regions to find the new economic drivers and be more creative. In this way, the diversity of SMSTs is not only contributing to the metro regions with multi-culture but also brings the multi-development of potentials.

5.3 Benefiting to the interregional and international networks

This era belongs to super cities, and most of them are identified as metropolitans. The good governance of sustainability and resilience can only be made after the specific research term. The SMSTs with their characters compose the metro region, which requires the regional decision-makers to view the overall conditions rather than focusing only on the primary cities. Indeed, the regional-level urban analysis and consulting relay on the specific methods.

Since the sustainable development contains the interregional and international cooperation, as the 17th goal of the SDGs (Sustainable Development Goals, 2019: www), the mechanism behind the city-networks should be essential for perfecting the concept of sustainability in the future. The SMSTs could be involved in more and more interregional and international networks, so their existing is important.

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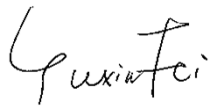
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Declaration of academic integrity

With this statement we declare that we have independently completed the above paper. The thoughts taken directly or indirectly from external sources are properly marked as such. This thesis was not previously submitted to another academic institution and has also not yet been published.

Tours, 17th January 2020

A handwritten signature in black ink, appearing to read 'Yuxin Fei', written in a cursive style.

_____ (signature Yuxin Fei)