AMA DIFFUSED

REORGANISING THE BUILT ENVIRONMENT IN AN EMERGING KNOWLEDGE ECONOMY

ABSTRACT

The AMA is characterized by its strong performing economy and its high liveability standards, making the region an attractive place to live and work in. However, the AMA's spatial structure and social geography have come under increased pressure. Unprecedented population growth as well as economic activity is concentrated within the AMA's epicentre, and dichotomies in the social fabric are becoming more evident. Simultaneously, the region's natural landscape is under threat due to fragmentation of green space, and an increase of the built-up environment, especially in Amsterdam. In order to relieve pressure from the AMA's epicentre while preserving the original landscape, flows of working and living environments need to be redistributed, and new ways of arranging the local economy and the built environment need to be uncovered. To achieve this, this report suggests a more polycentric structure for the AMA, while also drawing upon the knowledge economy as an economic system that is more inclusive and may facilitate the dispersion of population and economic pressure on the region's epicentre. In order to accommodate the AMA's growing population, this report suggests the implementation of the 'built environment as a service', a more circular approach of utilizing (existing) space. Additionally, an in-depth analysis of Almere is presented in which location-specific strategies are articulated to make the region more economically competitive, resource efficient, and liveable.
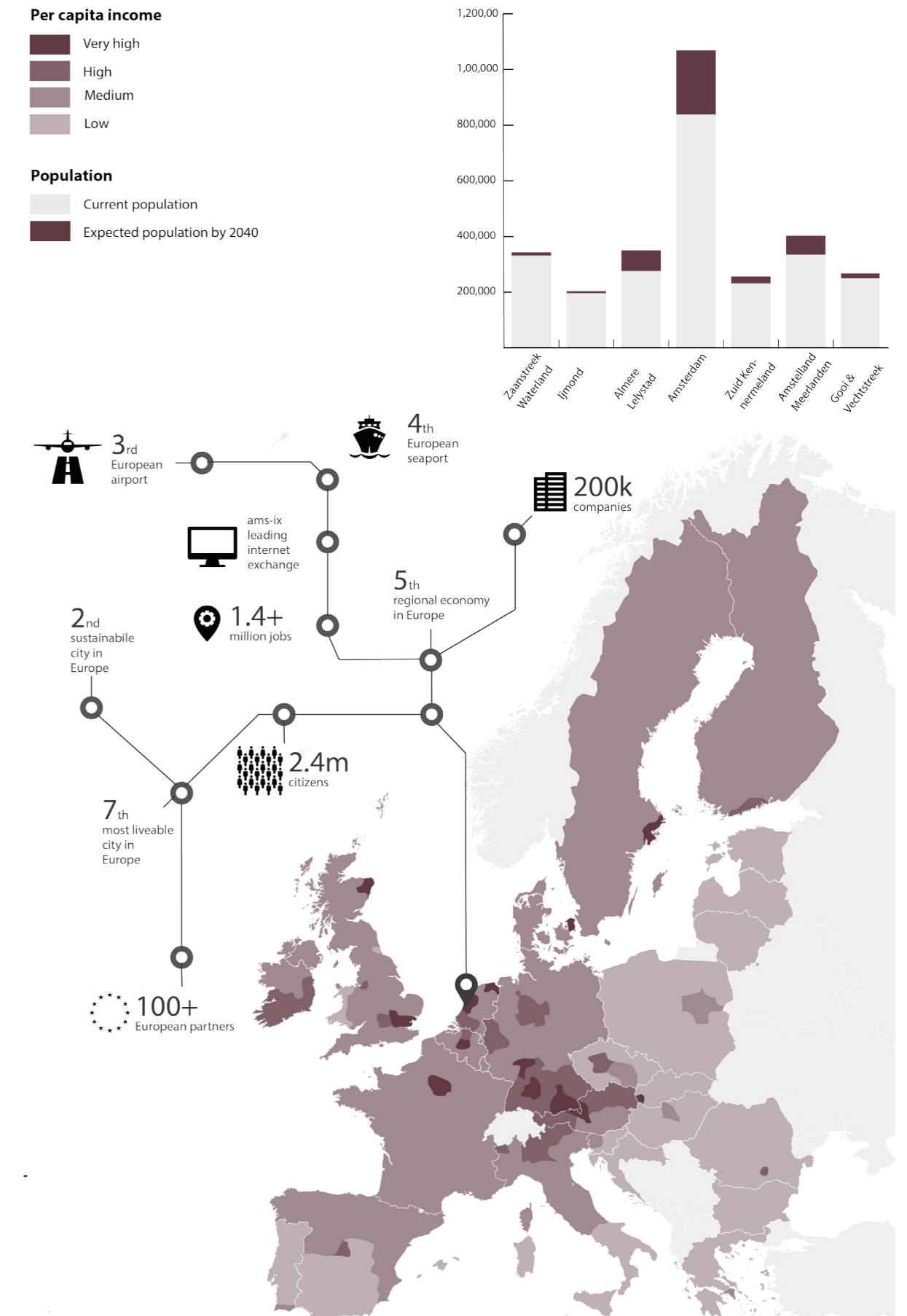
CONTENTS

INTRODUCTION

A more complex spatial reality has emerged in which a more interdependent relation between urban areas and surrounding municipalities has replaced the traditional core-periphery framework: the metropolitan area. With their ability to drive economic growth, foster innovation, and shape social networks, metropolitan areas are engaged in the global world. In this regard, with populations, wealth, and talent increasingly being concentrated in metropolitan areas, coordination between and within administrative boundaries is becoming increasingly important. This requires agendas, visions, and strategies that respond to the challenges metropolitan areas face. Ensuring sufficient housing, equality, a competitive economy, as well as a clean and safe environment are necessary for a striving metropolitan area. Hence, innovative measures are necessary to accommodate different social groups, to provide accessibility to and opportunities for employment, and to transition towards renewable energy practices. Simultaneously, local identities and their strengths need to be preserved in order to maintain high liveable working and living environments. This vision report displays the case of the Metropolitan Area of Amsterdam (AMA), presenting an outlook on the region for 2040. Central to this vision report are the following three themes: housing, spatial justice, and circularity. Various questions are addressed in order to grasp what the current state of the AMA is, and how it can move forward. These include among many: How can the AMA accommodate its growing population? How can pressure from Amsterdam be relieved? How can space within the AMA be used more sustainably? Through the presented strategies, this report aims to foster an AMA that is more socio-economically diverse, more inclusive and accessible, and more resilient.

CHAPTER 1

BACKGROUND

INTRODUCTION, CONTEXT, PROBLEM STATEMENT, METHODOLOGY

CONTEXT

The AMA is at the heart of the Dutch economy and is among the five strongest regional economies in Europe (United Nations, 2017). Its competitive business climate, its strategic geographical location, its favourable physical and digital connectivity, as well as its appeal for international talent, make the AMA an attractive location for European headquarters of multinational corporations. In addition to having a strong performing economy, the AMA is widely regarded as metropolitan area with a high quality of life. A recently published study by the United Nations, ranks the AMA as the seventh most liveable area in Europe, while the Mercer 2018 Quality of Living Ranking of Living Ranking states that the Amsterdam is the world's best performing city with regard to the work-life balance (United Nations, 2108; Mercer, 2018). It's precisely this balance which makes it increasingly attractive for people from the Netherlands and outside to live and work in the AMA.

Per capita income
- Very high
- High
- Medium
- Low

Population
- Current population
- Expected population by 2040

3rd European airport

4th European seaport

ams-ix leading internet exchange

200k companies

5th regional economy in Europe

2nd sustainabile city in Europe

1.4+ million jobs

2.4m citizens

7th most liveable city in Europe

100+ European partners

Source: Flinke stijging aantal inwoners MRA, 2017; Lammarino, Rodriguez-Pose & Storper, 2018; Stuurgroep Economische Verkenning MRA, 2018

Figure 1.0.1.

PROBLEM STATEMENT

The aforementioned characteristics of the AMA are contributing to an unprecedented population growth in the region, with Amsterdam as top destination (CBS, 2017). This is in turn resulting in an intensified pressure on the capital's housing market. Literature on the AMA's city-regional housing and spatial dynamics is articulating a growing core-periphery divide which is underlining a dichotomy in the social fabric (Savini, Boterman, Van Gent, Majoor, 2016). Moreover, the AMA's social geography may witness more asymmetries as the region is increasingly reliant on Amsterdam, as well as its industry and energy intensive port, and airport, as engines to its strong performing economy, resulting in more concentrated population flows to the its epicenter. In addition, the region's concentrated population and economic growth may result in negative externalities on its natural environment. Giezen and colleagues (2018) find that there is a significant fragmentation of green space, as its availability decreases due to an increase of the built-up environment, especially in Amsterdam (Giezen, Balikci, Arundel, 2018). In order to relieve pressure from the AMA's epicentre while preserving the original landscape, flows of working and living environments need to be redistributed, and new ways of arranging the local economy and the built environment need to be uncovered.

population growth

core - periphery divide

core economic engines

environmental effects
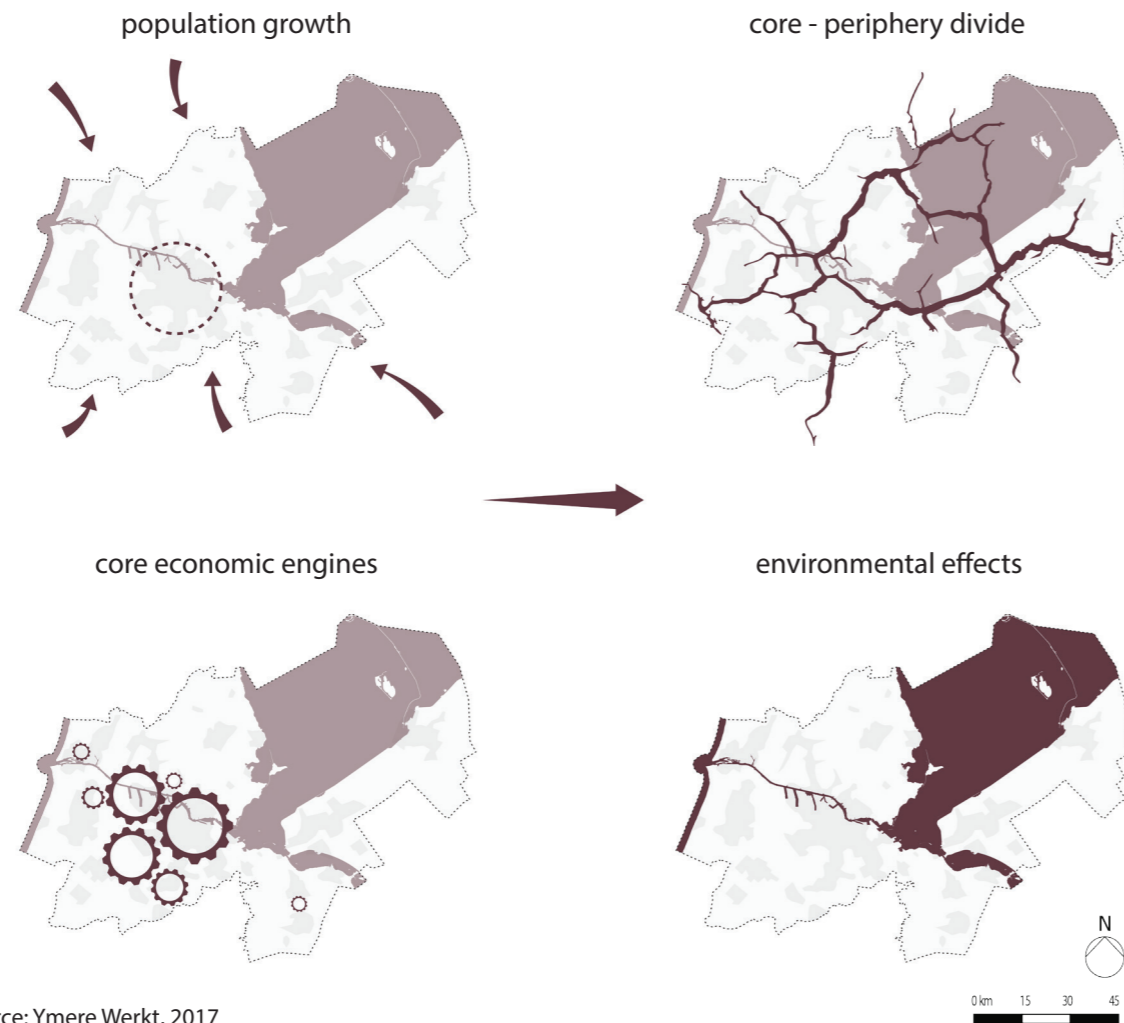
Source: Ymere Werkt, 2017
Figure 1.0.2.

RESEARCH QUESTION

What are the social and environmental implications of the AMA's strong performing economy?

Space: Our built and natural environment
Place: How one identifies with the built and natural environment

To what extent does the AMA perform as a monocentric or a polycentric system?

Space and **place** in a growing metropolitan area:

How can economic **pressure** be relieved from the AMA's epicentre in order to mitigate **environmental externalities and social polarities** by rethinking the driving forces of the region's **economy** and the way it utilizes its **built environment**?

How can the built environment respond to the living and working demands of the

Figure 1.0.3.

To what extent does the AMA already perform as a knowledge economy?

METHODOLOGY

Components of the report
- Conceptual framework
- Analyses
- Future interventions

Problem statement → Research question → Conceptual framework

Polycentricity → Polycentricity AMA
Knowledge economy → Knowledge in AMA
Liveability → Negative effects
Built environment as a service → AMA's structure

→ Diagnosis → Vision → Strategy → Evaluation

Strategic principles
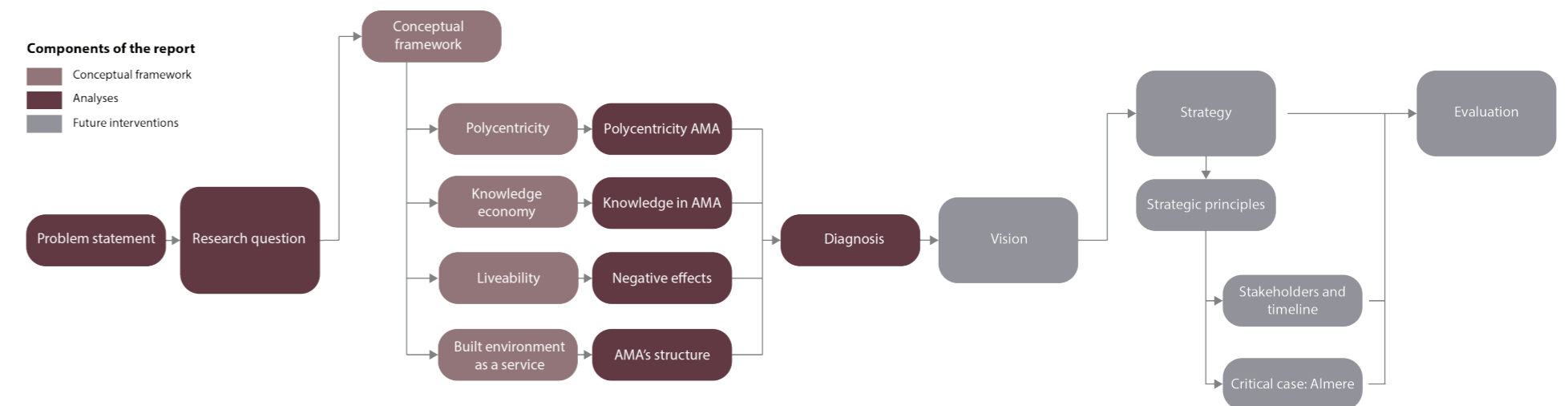
Stakeholders and timeline

Critical case: Almere

Figure 1.0.4.

CHAPTER 2

ANALYSIS

CONCEPTUAL FRAMEWORK AND ANALYSIS

CONCEPTUAL FRAMEWORK

A comprehensive understanding of urban spatial organization is imperative for effective regional policy making. In OECD countries, the polycentric spatial model has become the dominant hallmark for metropolitan development (Brezzi and Veneri, 2014). Polycentric spatial configurations are increasingly being implemented in an attempt to mitigate the growing pressure of urbanization on metropolitan centres (see Kloosterman and Musterd, 2001; Parr, 2004; Hall and Pain, 2006). Additionally, the polycentric model is widely implemented as a tool to strengthen local economies within metropolitan areas and contracting regional disparities (Meijers and Burger, 2010; Hoyler and Kloosterman, 2014). In their search of competitiveness, and redistributing populations and flows, metropolitan areas are progressively evolving from monocentric structures into more integrated polycentric systems with highly connected centres and sub-centres. In part, the research presented in this report aims to determine whether a more polycentric structure is indeed necessary for the AMA in order to mitigate the pressure on its epicenter and to strengthen the economic position of its peri-urban regions.

Polycentricity

Facilitate one another

Knowledge Economy

Possible solution

Depressurised environment enhances

A well performing KE enhances

Pressure

Liveability

Possible solution

Optimal utilization of the BE enhances
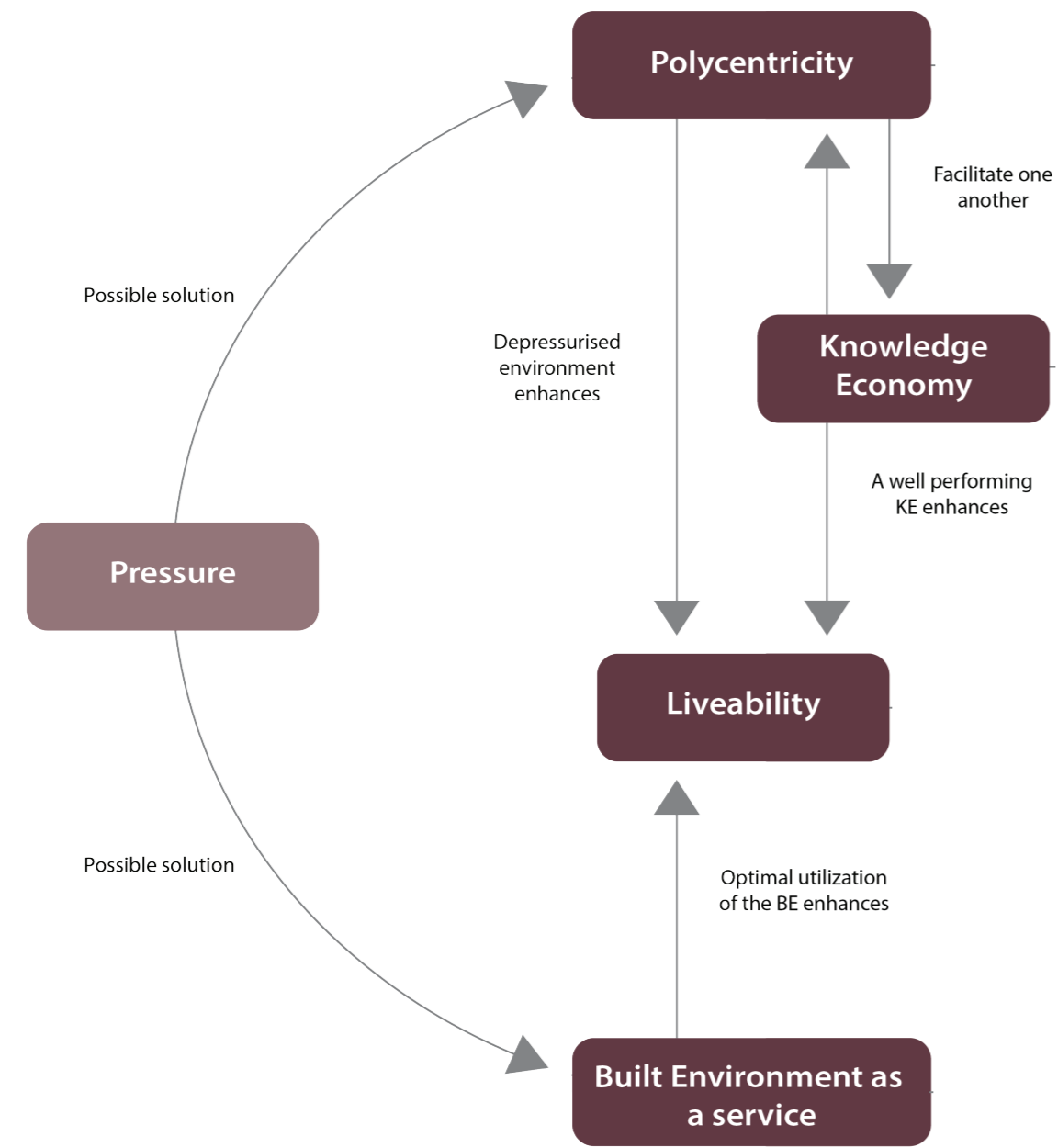
Built Environment as a service

Figure 2.0.1.

With changing metropolitan spatial structures come opportunities for new economic practices. The unprecedented growth of intellectual capital is enabling a wide range of economic opportunities that may fuel the urban economy. An 'innovation-arbitrated production' economy is emerging in which value creation, growth, and productivity are derived from knowledge (Brezzi and Veneri, 2014). The success of the businesses and organizations participating in the knowledge economy depends on their ability to effectively create, gather, diffuse, and implement knowledge (Muntean, Nister, Manea, 2009). Hence, capitalizing on knowledge through enhanced relations between academia and business is necessary to yield economic gain from research. Spatially, the knowledge economy is strengthened through the clustering of talent. The co-location of similar businesses and organizations enhances information sharing networks, decreases costs, increases benefits, and yields knowledge spillovers (Evers, Gerke, I Menkhoff, 2010). Similarly, shared physicaenvironments, may facilitate networking and information exchanging opportunities. This report investigates whether AMA's current spatial model is providing opportunities for the knowledge economy and, subsequently, whether this economic model may serve as tools to achieve enhanced polycentricity.

In addition to the sharing of information and ideas, the knowledge economy has also popularized the concept of sharing space. While the former can be enforced through the latter in the form of knowledge spillovers, sharing the built environment is also important to ensure that the utilization of living and working space is efficient and sustainable. In this regard, the built environment should be understood through the product-as-service business model. According to this concept providing performance through service rather than end products resources utilization is minimized and efficiency maximized. By shifting towards a new mindset based on the notion of "built environment-as-service", living and working in densely populated metropolitan areas can become more sustainable and more cost-effective. In addition to space sharing, the concept of the built environment-as-service introduces other innovative measures to achieve optimal utilization of the built environment. These include multi-configuration modular building and vacancy mitigation through function conversion of office and industry space.

While the former facilitates the deconstruction and recomposition of the built environment, the latter helps meet the growing housing demand by recreating housing stock. This report assesses the implications of the built environment as a service and determines whether the measures presented by this concept are suitable for implementation in the AMA. (Jochemsene, Kouloumpi, Russell, de Wit, Douma, Friedl, 2018).

Changing spatial configurations as well as shifts in economic systems have important implications on the liveabilty of urban areas. In the realm of policy-making the concept of liveability has gained importance and has widely been used to quantify long term objectives. There have been many approaches in the way that liveability or 'quality of life' have been used in the field of planning. While the definitions differ in terms of the priority given to certain aspects of the concept, one can conclude that liveability is key in creating a spatially just and sustainable region, as it indicates the distribution of good quality living environments within the region. Liveability is immediate and tangible, directly affecting the social well-being of communities (Ruth & Franklin, 2013). It is therefore a step towards social sustainability. The leefbaarometer is a tool used to assess liveability. Through the assessment of subjective and objective qualities of the environment, the instrument measures five dimensions – housing, demographics, safety, facilities, and physical environment (Leidelmeijer, Marlet, Ponds, 2015). This report assesses the implications of the aforementioned spatial configurations and economic systems on liveability levels within the AMA and determines what alterations are necessary to enhance the quality of life in the region.

2.1.

To what extent does the AMA perform as a monocentric or a polycentric system?

LITERATURE REVIEW

A comprehensive understanding of urban spatial organization is imperative for effective regional policy making. In recent years a growing consensus has formed about the spatial structure of functional urban areas in developed societies becoming increasingly polycentric (see Kloosterman and Musterd, 2001; Parr, 2004; Hall and Pain, 2006). While populations in urban areas of distinct sizes is continuing to grow at unprecedented rates, the concentrations of people as well as businesses in dense urban centres in Western societies have begun to abate in recent decades (OECD, 2014). With the development of transport and communication networks, urban centres are becoming increasingly interlinked with their surrounding urban areas. Subsequent to this shift urban areas are progressively evolving from monocentric structures into more integrated polycentric systems with highly connected centres and sub-centres. This shift is affecting people's accessibility to work, education, housing, amenities, as well as to a safe and clean environment, and has thereby a significant impact on economic and social prosperity not only on micro levels but on macro levels as well (OECD, 2014).

In order to answer the research question at hand a clear definition of polycentricity and a theoretical framework to assess it is necessary. Polycentricity refers the relationships between urban areas and centres of such regions in terms of commuting flows, industrial and business relationships, forms of co-operation and the division of labour (Randstad 2040 Structure Vision, 2008). On the one hand, polycentricity is defined by the distribution of population and employment in space, and is thus, a 'morphological' concept. However, it should also be pointed out that polycentricity, in addition to having a morphological dimension, also has a 'functional' one. The functional dimension refers to the functions carried out by cities (political, financial, scientific, etc.), as well as the connections between them which can be both physical and intangible (commuting flows, knowledge flows, etc.). Both dimensions are integral to understanding how urban centres are distributed across space and how these centres organize the rest of the territory. Lastly, a strategic dimension is necessary to fully assess polycentricity.

While the empirical evidence on the relationship

between polycentric urban models and economic growth are not conclusive and vary depending on a wide range of factors including city size and contribution to GDP, conceptual definition of spatial structures, and metrics used to assess polycentricity, there seems to be overall agreement on the importance to explore impacts at higher territorial and political scales beyond the metropolitan one (see Meijers, 2004; Vandermotten et al., 2007; OECD, 2014). The different scales under investigation can be distinguished between the metropolitan scale; the regional scale; and the national scale. Two studies by the OECD distinguishing between scales find compelling results on the relation between polycentricity and economic productivity in OECD countries. Both studies find that metropolitan areas are generally more productive than other urban regions, on average having a 15% higher contribution to GDP with respect to the rest of the national economy. On the other hand, no significant correlation is found between polycentricity on the regional scale. The first finding gives validity to investigating the spatial structure of the AMA and the relationship the region has to the economy. Noteworthy, while on average metropolitan productivity may grow as a result of a more polycentric spatial structure, this does not necessarily hold for all municipalities making up the metropolitan area. Meijers and Burger (2017) find that some municipalities may suffer from 'shadow effects' as surrounding municipalities gain productivity through 'borrowed size'. To mitigate these so-called shadow effects, the authors suggest a higher degree of functional connectivity between municipalities and cities (Meijers and Burger, 2017).
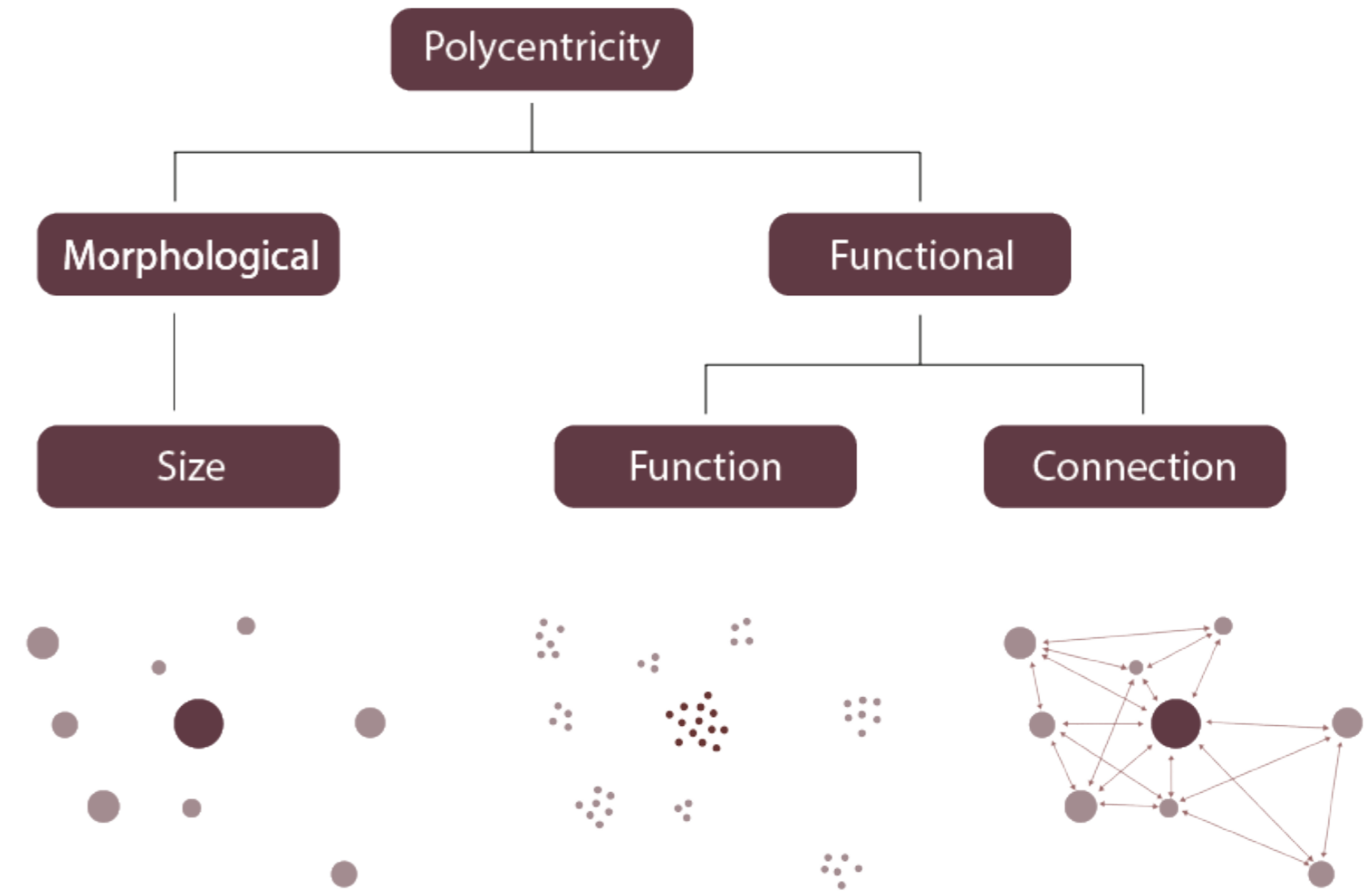
Source: OECD, Giffinger R. & Suitner J. (2015) Polycentric Metropolitan Development: From Structural Assessment to Processual Dimensions

Figure 2.1.1.

ANALYSIS

In the international realm of planning, the Randstad has gained widespread attention (see Lambregts, 2006, 2009; Burger, van der Knaap, Wall, 2016). Once described as a unique regional multicentric model that would be able to compete with Europe's most competitive cities, today the optimism surrounding de Randstad had toned down. Consisting of the largest Dutch cities, Amsterdam, Rotterdam, Utrecht, and The Hague, de Randstad still serves as the country's economic centre and metropolitan function hotspot (Figure 2.1.2.). However, de area has not fulfilled all the promises that were made upon its inception which included accessibility to clean and green environments, and high mobility (Lambregts, 2009). The latter was not achieved as, today, the Randstad qualifies as one of Europe's most congested, and thus, most polluted areas, while the former has turned into a utopia as green space has become increasingly fragmented. Moreover, the functional connectivity between larger and smaller urban centres, peri-urban regions, and rural villages is still lacking, and hence, a coherent multicentric system has not yet materialized. In fact, the Randstad has become a counterexample of the sometimes overly vigorous belief that polycentric configurations are the answer to spatial development challenges.
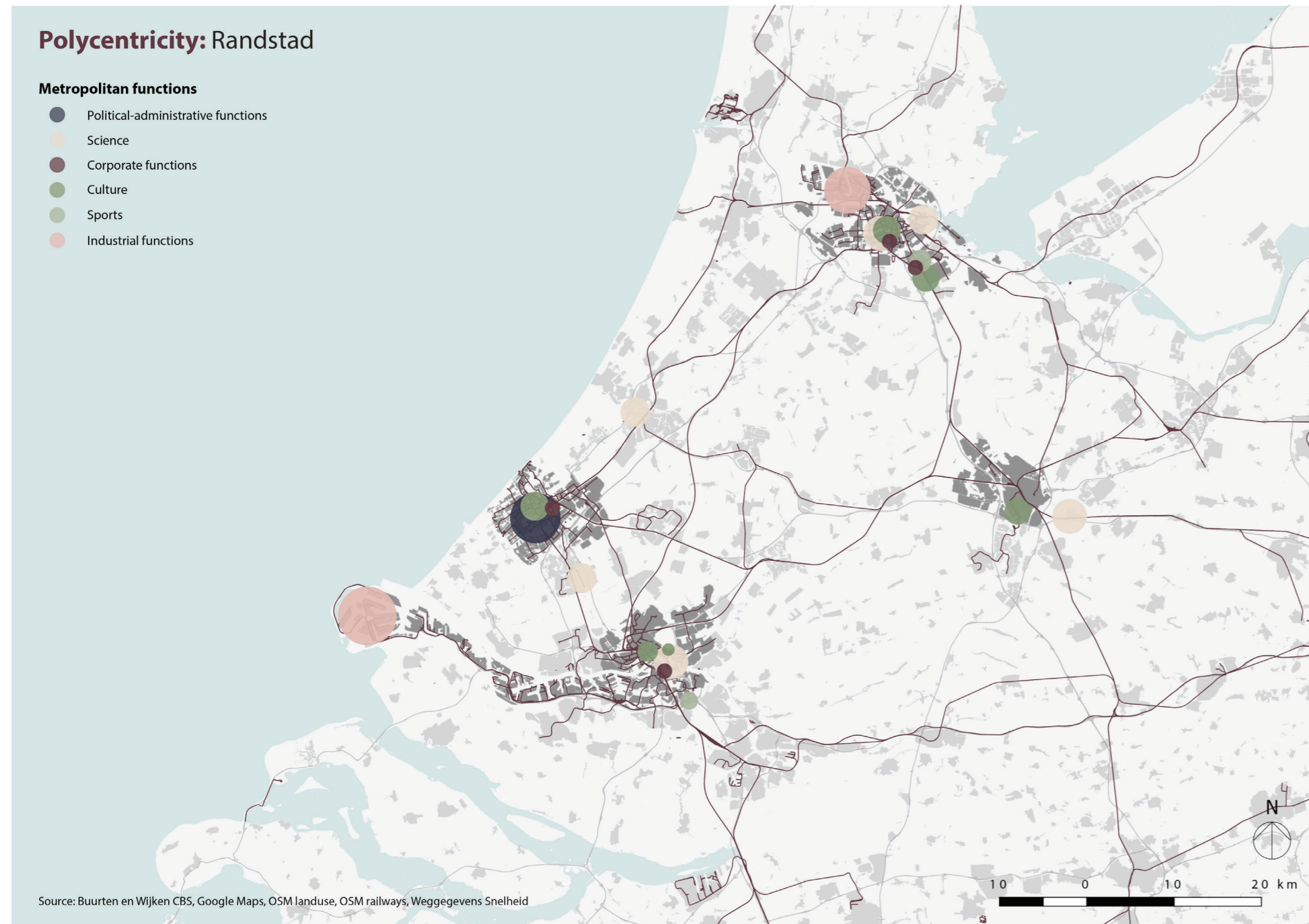
The AMA's sub-centres are all highly densified (Figure 2.1.3.) and it can therefore seem that the area is quite polycentric. However, quite clearly, Amsterdam covers the largest area and has simultaneously both the highest building and population density. In addition to that, the expected growth is the biggest for Amsterdam. Lately, Amsterdam has been growing with 10.000 inhabitants per year and the limit of 1 million inhabitants is expected to be reached by 2034 (MRA, 2017, Flinke stijging aantal inwoners MRA). With respect to employment, Amsterdam, its port, and Schiphol Airport, together forming the AMA's epicentre, function as the region's main economic drivers of the economy. For these reasons, it can be concluded that the AMA performs as a morphological monocentric region.

Polycentricity: Randstad

Metropolitan functions
- Political-administrative functions
- Science
- Corporate functions
- Culture
- Sports
- Industrial functions

Source: Buurten en Wijken CBS, Google Maps, OSM landuse, OSM railways, Weggegevens Snelheid

Figure 2.1.2.

Morphological polycentricity

Economic drivers of the AMA
- Most employees

Most densely built-up areas
- >5000 residents per km²

Population growth in the AMA per subregion until 2040
- 0 - 10 %
- 11 - 20 %
- 21 - 30 %

Source: Buurten en wijken CBS, 2018; Flinke stijging aantal inwoners MRA, 2017; Stuurgroep Economische Verkenningen MRA, 2018; Ymere: Kaarten van de MRA
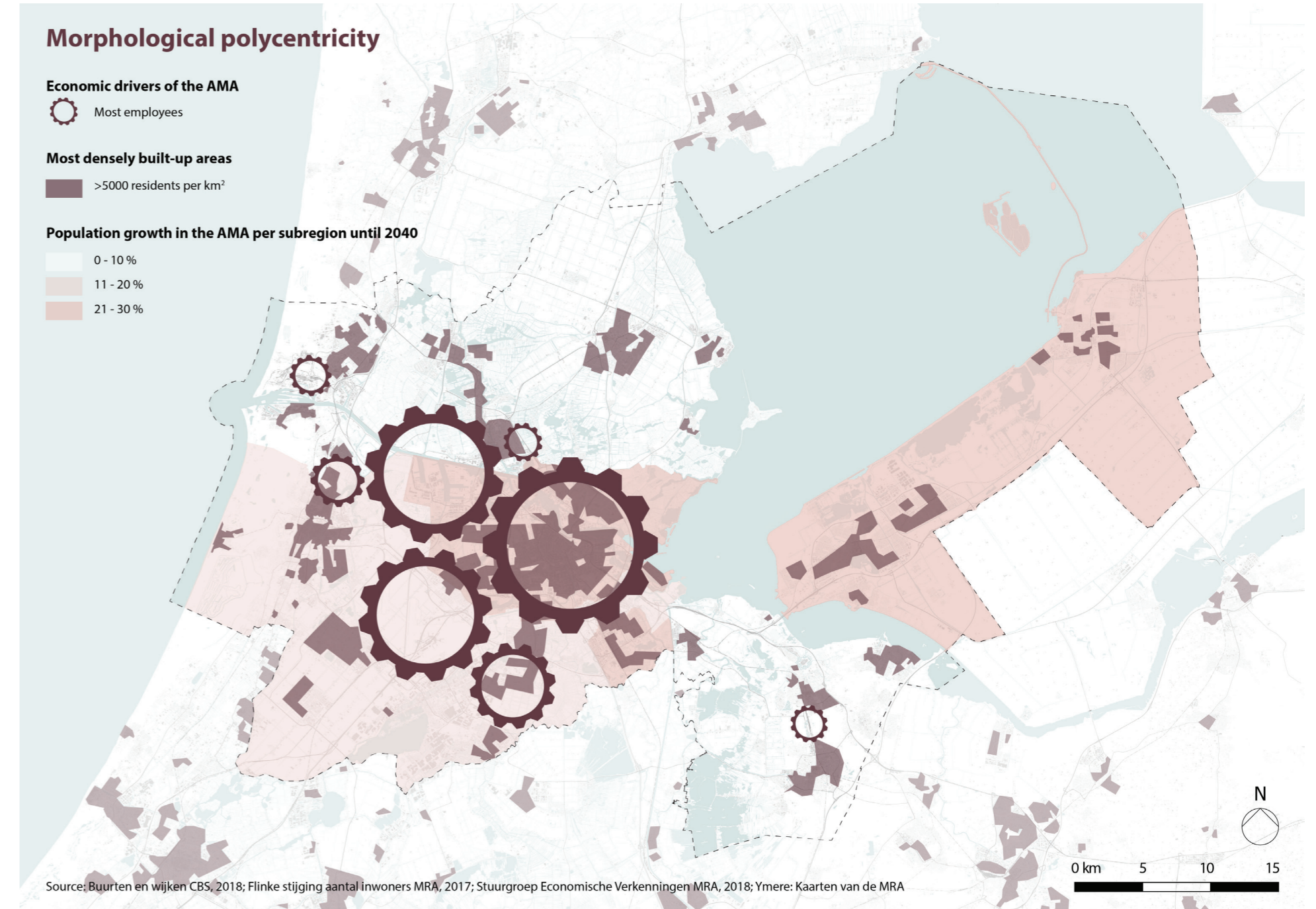
Figure 2.1.3.

The functions that are carried out by the cities are divided into the landuse and the metropolitan functions defined by Evert Meijers and Martijn Burger (2017). These constitute of corporate, and political-administrative functions, as well as scientific, cultural and sportive functions. In addition, industrial functions were added because of their economic relevance to the AMA. At first glance, the AMA seems quite diverse in its functions (Figure 2.1.4.). Although the functions are evenly distributed across the region, the type of functions are unevenly divided. The cities around the epicentre at the utmost only consist of the sectors industry and agriculture. The epicentre and its close surrounding are home to a big mix of different metropolitan functions. Looking at the functions, the AMA is therefore clearly monocentric.
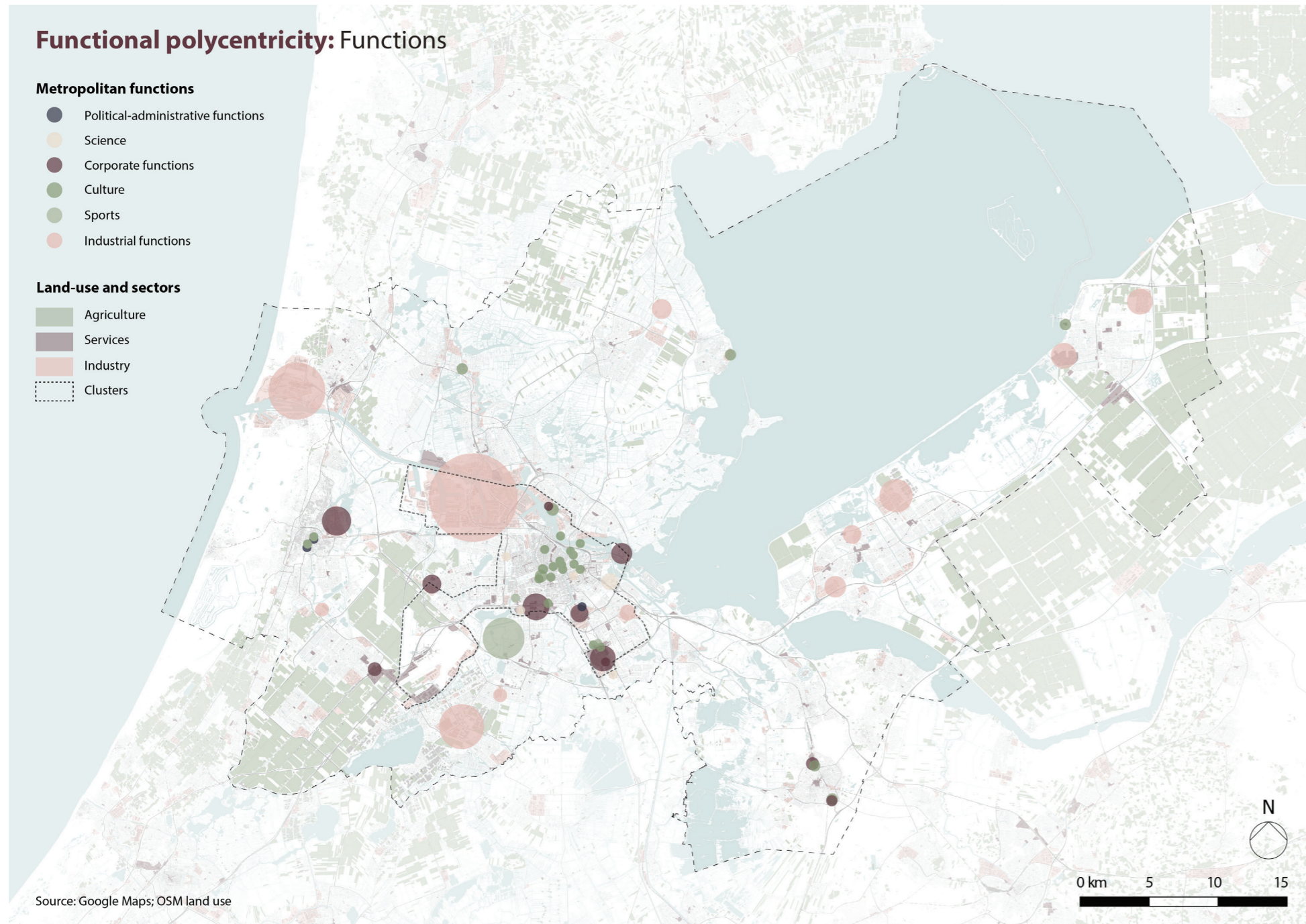
Most sub-centres and towns within the AMA are located within a 30 minute driving distance and a 30 minute travel by train from the centre of Amsterdam (Figure 2.1.5.). The connectivity from Amsterdam is therefore fairly distributed to outer cities. However, when looking into the angular integration, there are some sub-centres such as Almere, Hilversum, and IJmond that are not well-connected to Amsterdam. This opens up the potential of creating an integrated network of multiple centres and sub-centres.Since the success of the AMA's economy, the incoming commuting flow is bigger than the outgoing flow. Most people commute to Amsterdam or Haarlemmermeer. The focus is again on the epicentre and looking into the connections in the AMA again shows a monocentric structure. Concluding from morphological and functional polycentricity, the Amsterdam Metropolitan Area shows micro-agglomerations within a broadly monocentric structure.
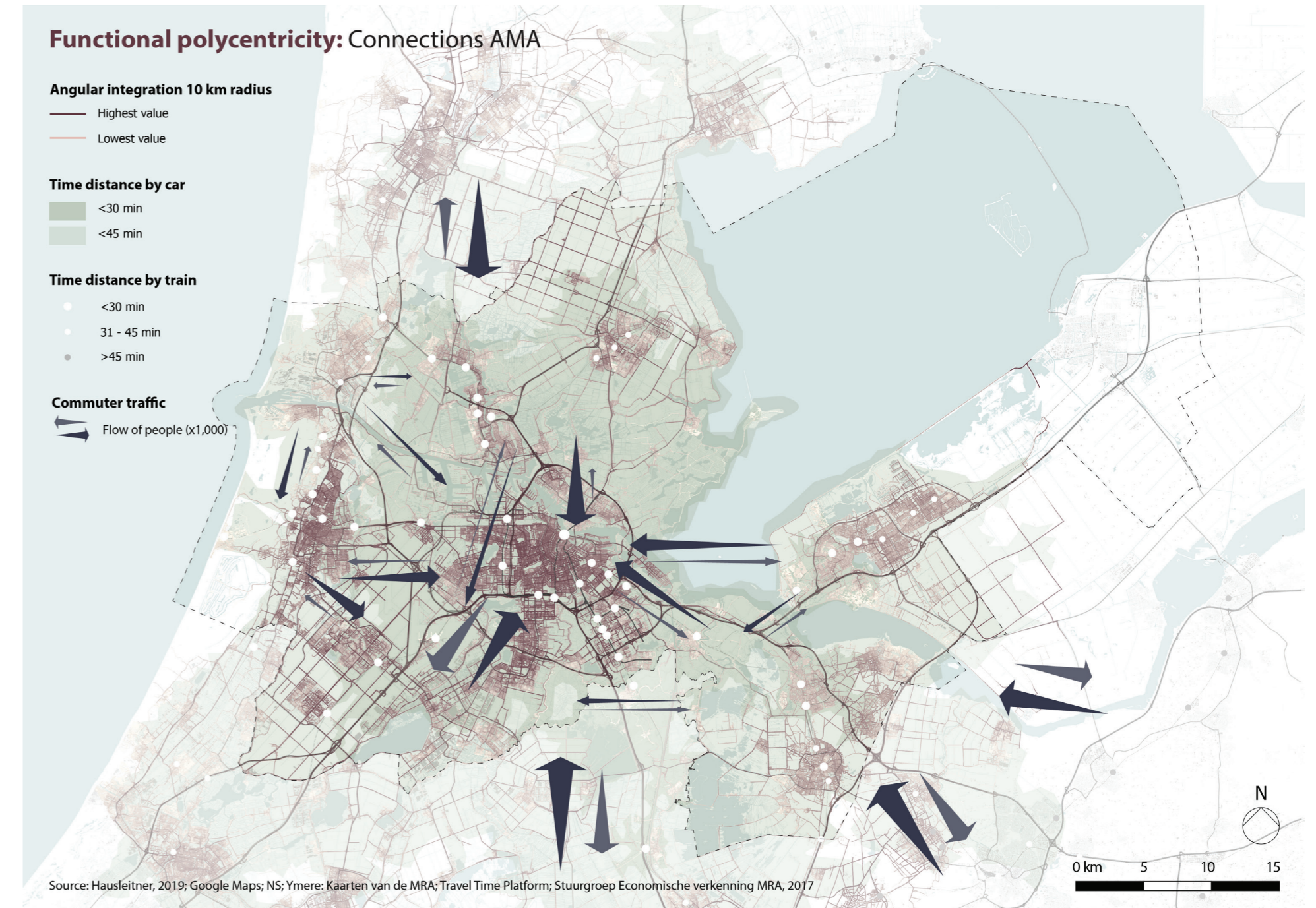

Functional polycentricity: Functions

Metropolitan functions
- Political-administrative functions
- Science
- Corporate functions
- Culture
- Sports
- Industrial functions

Land-use and sectors
- Agriculture
- Services
- Industry
- Clusters

Source: Google Maps; OSM land use

Figure 2.1.4.

Functional polycentricity: Connections AMA

Angular integration 10 km radius
- Highest value
- Lowest value

Time distance by car
- <30 min
- <45 min

Time distance by train
- <30 min
- 31 - 45 min
- >45 min

Commuter traffic
- Flow of people (x1,000)

Source: Hausleitner, 2019; Google Maps; NS; Ymere; Kaarten van de MRA; Travel Time Platform; Stuurgroep Economische verkenning MRA, 2017

Figure 2.1.5.

2.2.

To what extent does the AMA perform as knowledge economy?

LITERATURE REVIEW

Our economic system is subject to a paradigm shift. The orthodox production economy, driven by human labour is making place for a knowledge economy driven by intellectual capital. While sectors, including the industrial, agricultural, and service economy, have always relied on knowledge, the degree of its integration in today's economic system is prompting structural changes in the functioning of the world economy and reforming the principles of competitive advantage. The intensification of knowledge, as well as the growing capability of redistributing it, is enhancing its value to all players participating in the economy. The literature distinguishes two defining drivers to the Knowledge Economy: the intensification of knowledge related economic activities, and growing global competition (Uppenberg, 2009; Muntean, Nistor, and Manea, 2013; Hadad, 2017). While the former is driven by the codification and digitalization of information, the latter is driven by economic liberalism as well as technology induced communications revolution (Muntean et al., 2013). The rise of the knowledge economy is causing businesses to rethink their strategies and territorial governments to revise their policies. The way these organizations organize themselves in space is becoming increasingly important to manifest their participation in the knowledge economy.

Essentially, the knowledge economy operates as an interactive network, in which the ability of businesses and organizations to join knowledge- as well as learning intensive ties, determines their economic gain (Vinnychuk, Skrashchuk, and Vinnychuk, 2017). Hence, these players need to develop into learning entities, that rely on flexible management and ingenuity to foster new technologies and the opportunities they bring. In search for interactive learning, businesses and organizations seek relations with external partners to share knowledge and information. In the knowledge economy, universities and research institutions are of crucial importance to shape the strategies of businesses and organizations, and to link research and teaching techniques to the needs of local economies. Joined in a 'triple helix' alliance, academia, business, and government pave ways for innovation and additional economic growth (Leydesdorff, 2018). The clustering of businesses and organizations in space and networks is necessary for a well performing knowledge economy. Businesses operating in close proximity may enjoy knowledge spillovers as the flow of information, skills, and ideas smoothens (Davis, and Dingel, 2012). Places that are attractive to knowledge assets are increasingly fulfilling a critical role in the performance of regional economies.

ANALYSIS

The AMA is home to a wide range of knowledge institutions that include universities, higher professional universities, vocational universities, and research centres. While cities such as Haarlem, Hilversum, and Almere provide degrees in niche fields of study at their educational institutions, Amsterdam provides a broader selection of programmes at different education levels. This specialized education in combination with more wider oriented knowledge base enables the AMA to combine disciplines within the fields of humanities, social sciences, and natural sciences. A major potential force lies in the synergy benefits that cooperation between these fields offers, as innovation emanates from cross-disciplinary thinking. A prerequisite for this is that academia and business are brought together better.

Amsterdam is making big steps in becoming the country's leading knowledge centre. Amsterdam accommodates research hubs and institutions such as Science Park (with nearly 10,000 researchers, students and entrepreneurs), the Shell R&D Lab and the National Aerospace Laboratory, and is simultaneously the home base for IT giants such as Booking.com, Cisco, IBM, and Google. In addition, Amsterdam provides one of the largest internet hubs in the world, AMS-IX, and therefore has an excellent starting position to take a vanguard position in that digital world. In its attempt to achieve this new status, the Dutch capital is increasingly investing in education, science and technology. A recent government-funded initiative is the Amsterdam University of Applied Sciences' 'Digital School'. At this new institution, students of varying academic backgrounds are taught to apply digital technology to address societal challenges (Gemeente Amsterdam, 2015).

At present Amsterdam has the knowledge and infrastructure to actively participate in the knowledge economy. However, the capital can strengthen its triple helix structure further by introducing more initiatives that merge the forces of education, government, and business. Additionally, its knowledge ties with surrounding regions can be enhanced. Cities outside of the epicentre need to capitalize more thoroughly on knowledge. By strengthening knowledge hubs and institutions such as Waarderpolder, Techport, and FlevoCampus in respectively Haarlem, Ijmond, and Almere, local economies can grow.

Investigating the metropolitan functions science and corporate functions in more detail, it can be determined that already quite some cities are home to some higher educations (Figure 2.2.1.). Almere, Hilversum and Haarlem do have higher professional education with each a different specialism. In Amsterdam, a big variety of specialisations is present.

The intellectual capital for a knowledge economy is already present in Amsterdam ranging from vocational education to universities (Figure 2.2.2.). Most institutions are clustered around the universities.
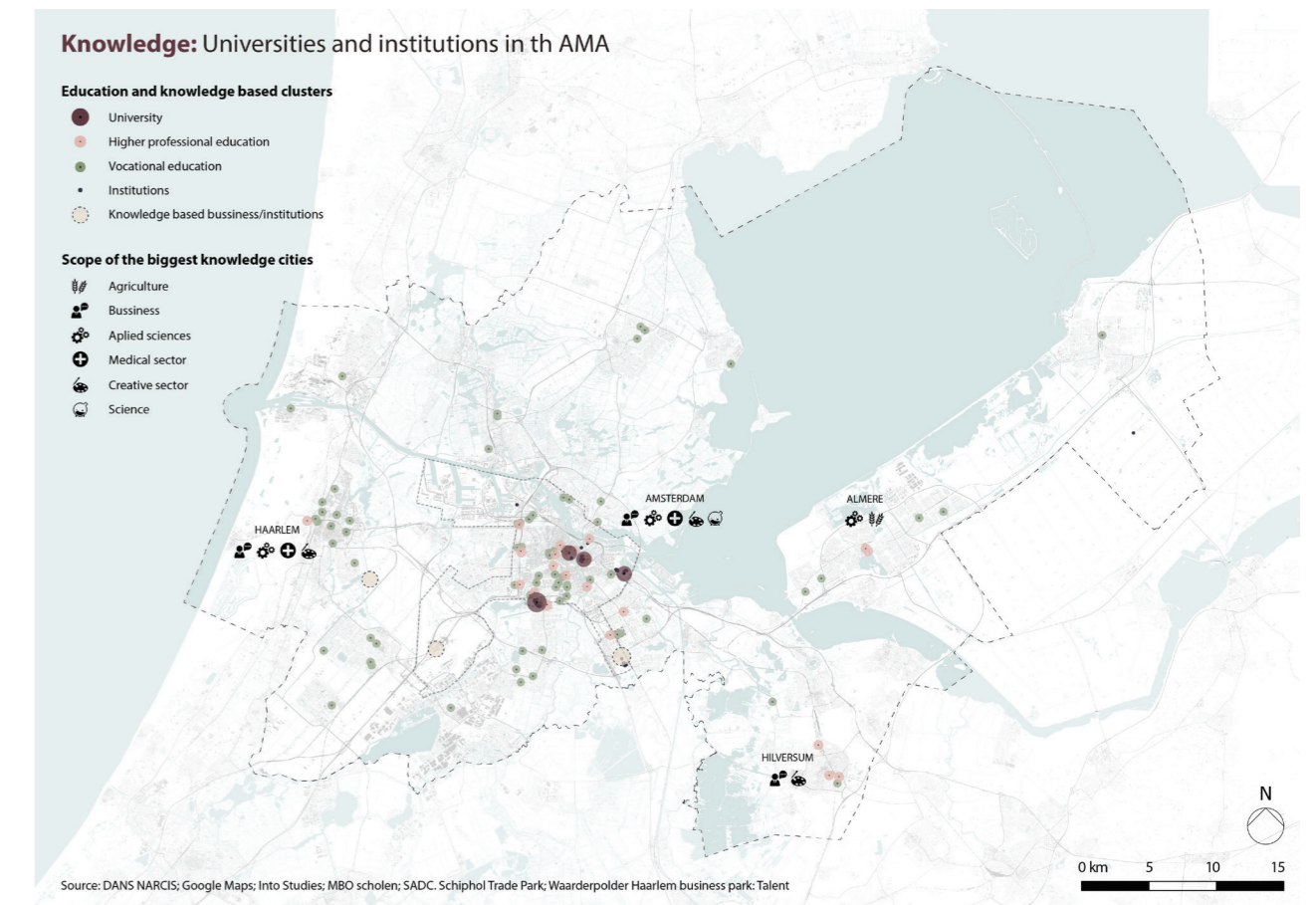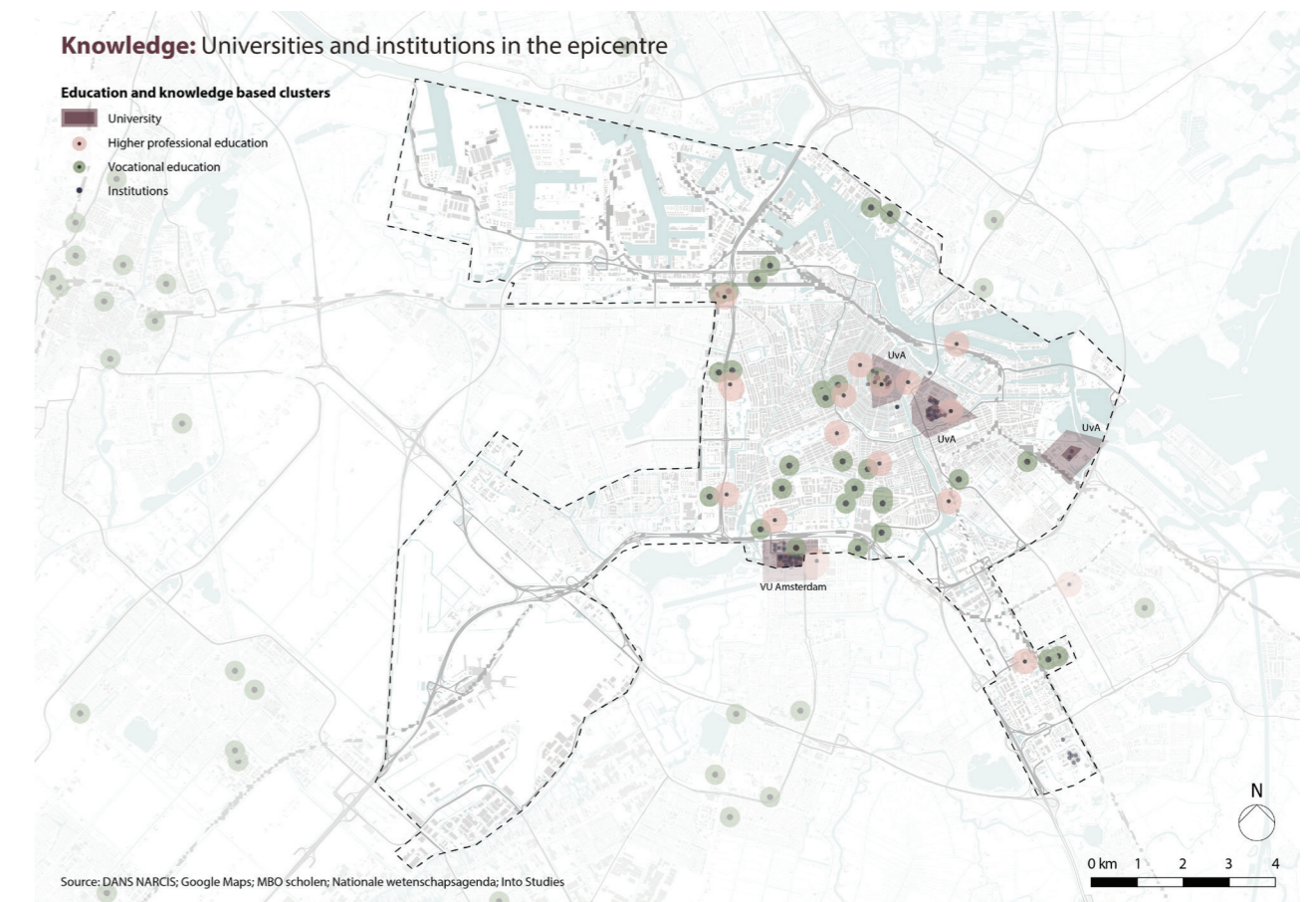

Knowledge: Universities and institutions in th AMA

Source: DANS NARCIS; Google Maps; Into Studies; MBO scholen; SADC. Schiphol Trade Park; Waarderpolder Haarlem business park; Talent

Figure 2.2.1.

Knowledge: Universities and institutions in the epicentre

Source: DANS NARCIS; Google Maps; MBO scholen; Nationale wetenschapsagenda; Into Studies

Figure 2.2.2.

2.3.

What are the social and environmental implications of the AMA's strong performing economy?

LITERATURE REVIEW

Liveability, as a concept, has several definitions. There have been many approaches in the way that liveability or 'quality of life' have been used in the field of planning. Liveability theory places an emphasis on the dependence of subjective appreciation on objective quality of life, meaning that the living conditions determine the happiness of a country (Veenhoven & Ehrhardt, 1995). However, the notion is subjective to locational demands, and those of certain groups of people, and carries different meanings over time, with changing demographics and consumption patterns around the world. In a survey of urban professionals conducted by the Economist Intelligence Unit, almost 60% of respondents cited 'job market and cost of living' as the main factor that makes a city an attractive place to live and work in (The Economist Intelligence Unit, 2010). This relates to the fact that the availability of facilities and access to affordable housing are key in a steady inflow of people to cities. This in turn affects the economic performance of the city. Therefore, the concept of liveability requires a synchrony between two elements - the characteristics of the population and the city's environment (Ruth & Franklin, 2013).

The Leefbaarometer 2.0 is an instrument that is based on the definition that states, "Quality of life is the extent to which the environment meets the demands and requirements that are imposed by humans" (Leidelmeijer, Marlet, Ponds, 2015). The instrument uses two sub-models to predict the quality of life – the first, based on the opinions of the residents about their living environment (subjective), and the second, based on the value of the living environment (objective). Leefbaarometer 2.0 measures this within five dimensions:
- Housing (such as construction period, property type, surface area, retention ratio)
- Demographics (such as income, education, benefits, household composition)
- Safety (nuisance, crime)
- Facilities (proximity to healthcare, retail, education, transport, recreation, catering services)
- Physical environment (such as types of roads, building functions, monuments, green, water, density, noise)

The nine-point scale of results range from 'very insufficient' to 'excellent'.

ANALYSIS

The region shows polarities in the distribution of the social fabric, with respect to income, liveability and ethnic concentrations. The areas with the highest income per capita are also the most liveable areas, while a majority of the region with lower income per capita has the lowest liveability level in the AMA (Figure 2.3.1.). The worst liveability rating in the AMA is a satisfactory+, so the liveability in the AMA is already quite high. However, the best rated areas are not close to major economic activities. Therefore, it can be stated that economy has a negative effect on liveability.

The density of migrant population is higher within Amsterdam, adding to the pressure on the AMA's epicentre. Also, higher concentrations of Non-Western immigrants (CBS, 2018) seem to be marginalised from the epicentre, while a larger concentration of Western-dominant population groups are located within the epicentre (Figure 2.3.2.). This reveals a spatial segregation of different migrant communities, while showing a strongly monocentric migrant structure within the metropolitan region, with smaller concentrations in places like Almere and Lelystad that also have lower income and liveability levels.
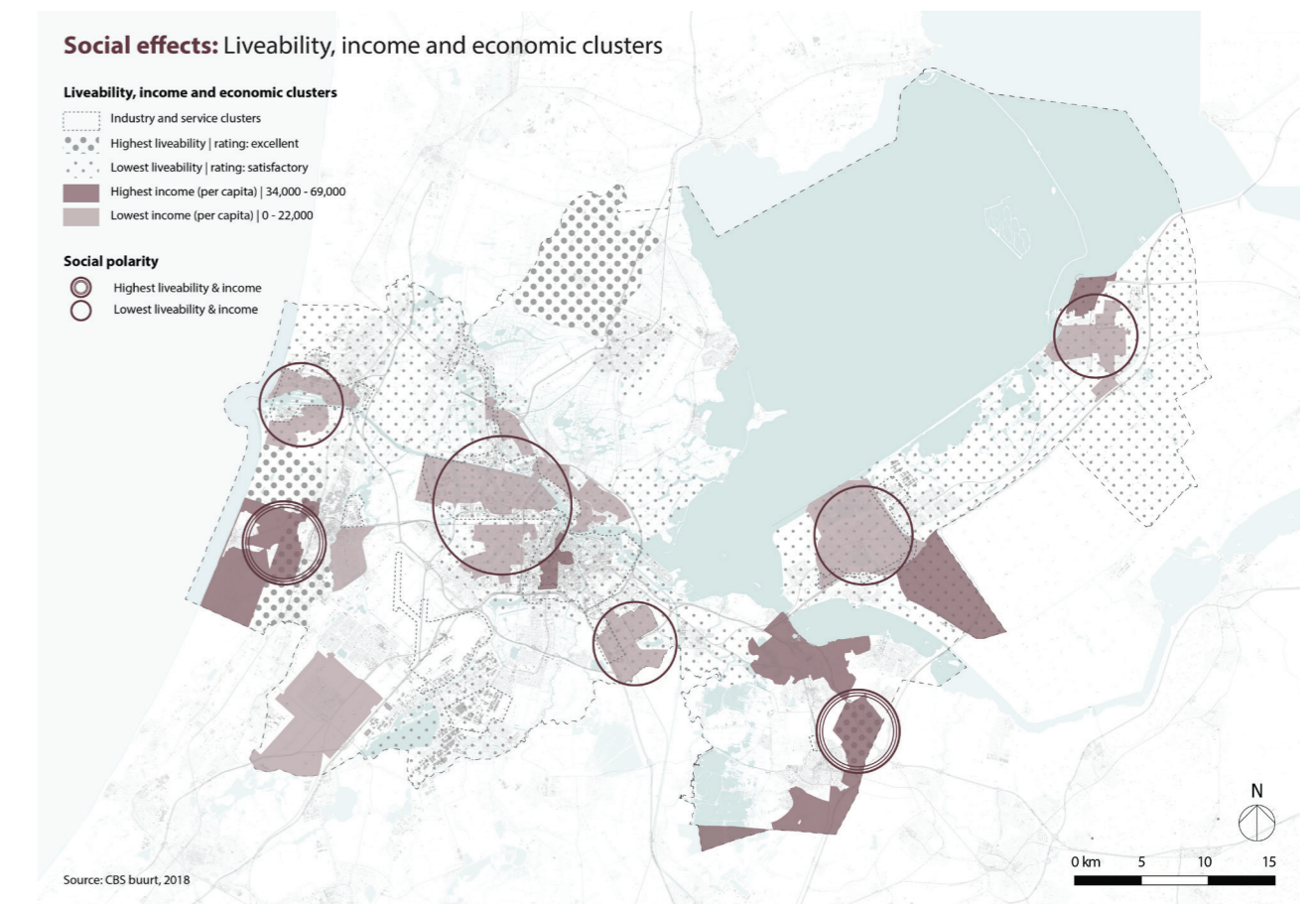

Social effects: Liveability, income and economic clusters

Liveability, income and economic clusters
- Industry and service clusters
- Highest liveability | rating: excellent
- Lowest liveability | rating: satisfactory
- Highest income (per capita) | 34,000 - 69,000
- Lowest income (per capita) | 0 - 22,000

Social polarity
- Highest liveability & income
- Lowest liveability & income

Source: CBS buurt, 2018

Figure 2.3.1.

Social effects: Liveability and ethnicity

Liveability and ethnicity
- Epicentre
- Highest liveability | rating: excellent
- Lowest liveability | rating: satisfactory
- Western population % | >60
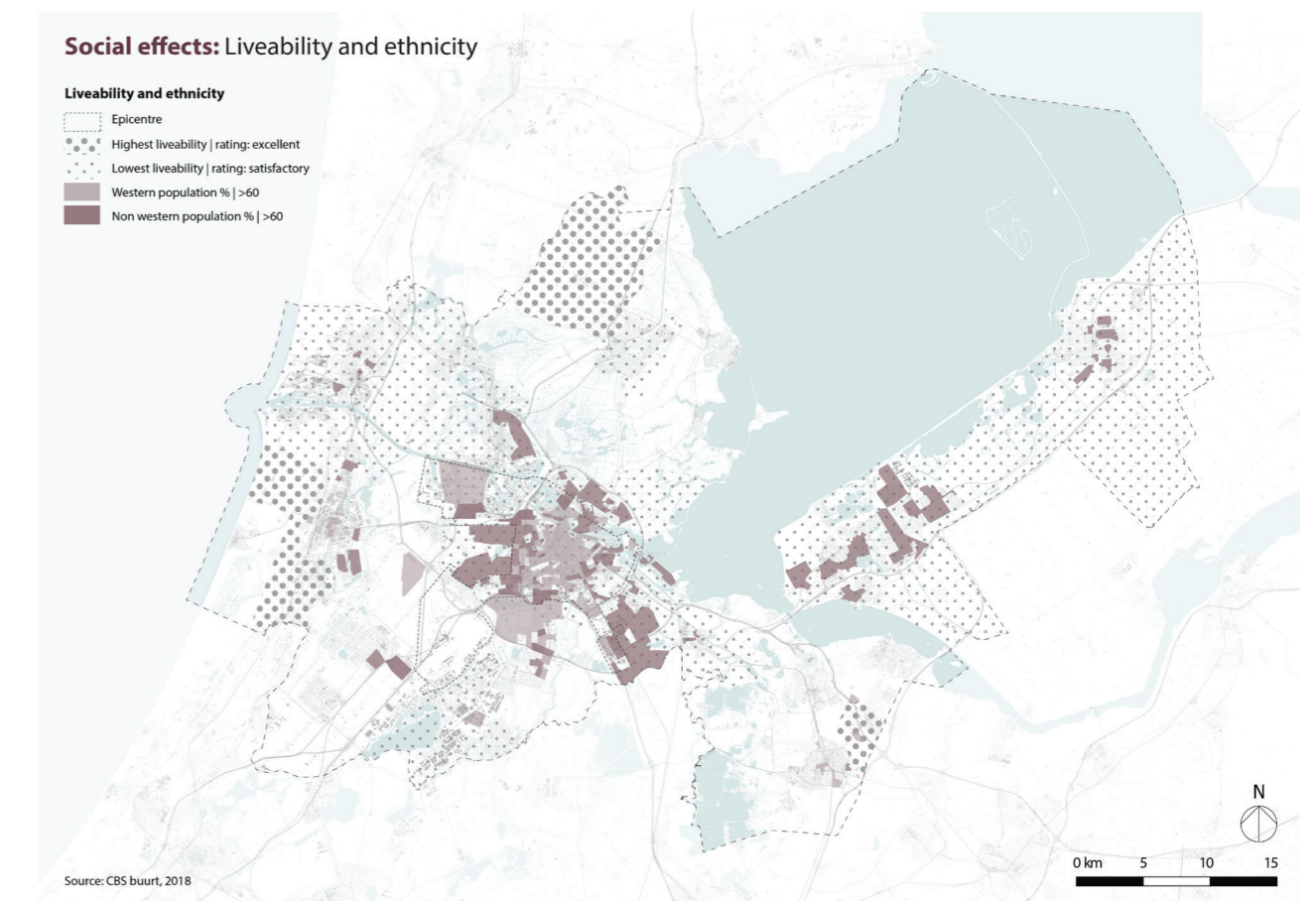- Non western population % | >60

Source: CBS buurt, 2018

Figure 2.3.2.

There are environmental effects of the mounting economic pressure on the epicentre throughout the region. One of the negative effects of this is a higher Urban Heat Island within the epicentre, owing to many reasons such as high density and the presence of industries. There is also a high level of noise from the airport and highway infrastructure that affects the immediate context. The best rated liveable areas are surrounded by nature and do not suffer significantly from the heat stress or the infrastructural noise (Figure 2.3.3.W).
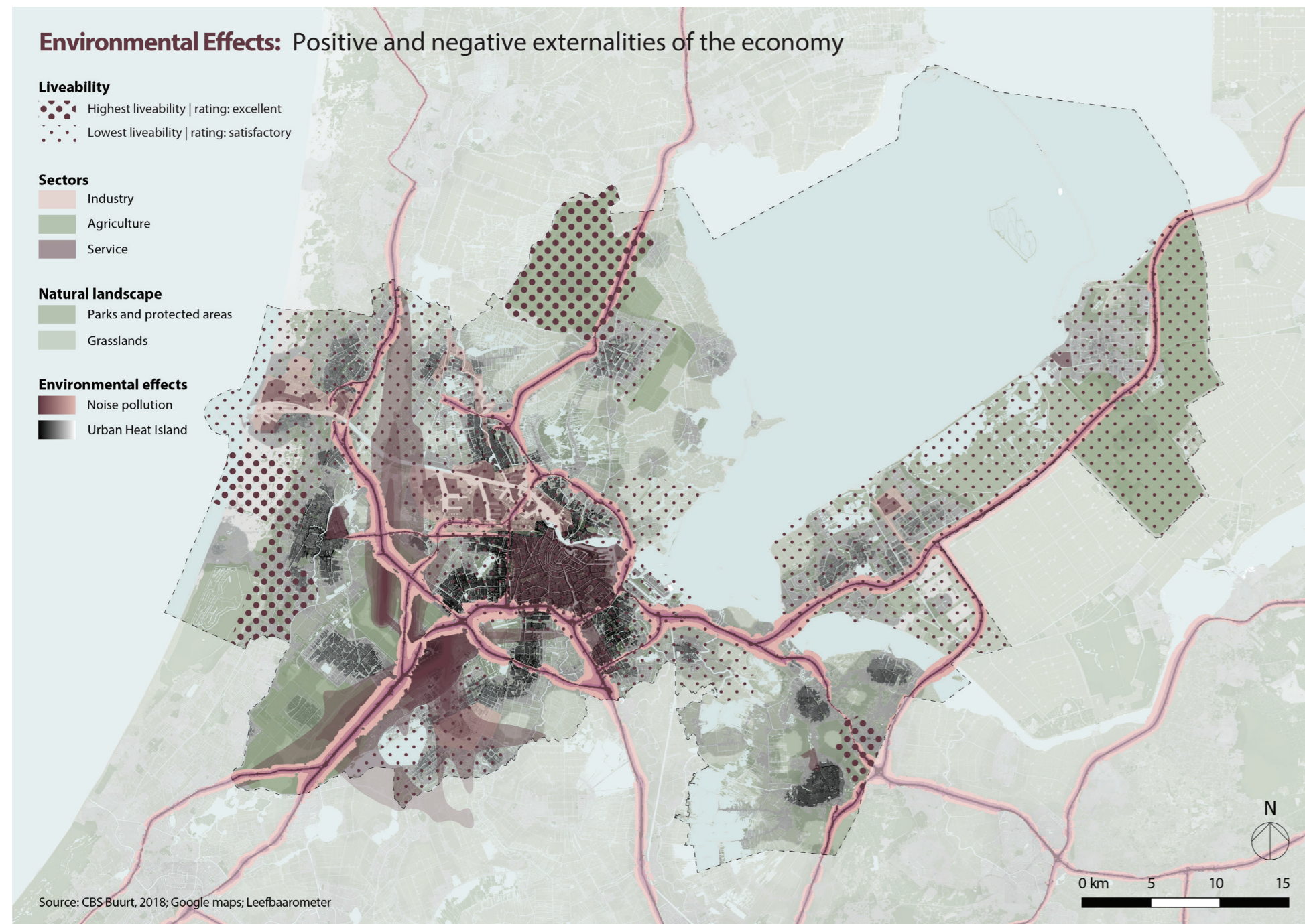
However, over the last decades, the rapid urbanisation within the AMA has consumed a significant amount of the natural landscape, creating an urgency to limit the increase in the footprint of AMA with the fear of an increased heat stress and lower liveability levels in the future (Figure 2.3.4.). Accommodating one million new homes in the country by 2040 comes with the cost of the depletion of landscape.

In conclusion, the pressure on the economy and an increasing population have several effects on the social fabric and the environment of the region, creating spatial injustice within the metropolitan region. It is therefore necessary to address these externalities while housing 150,000 new homes in the AMA.
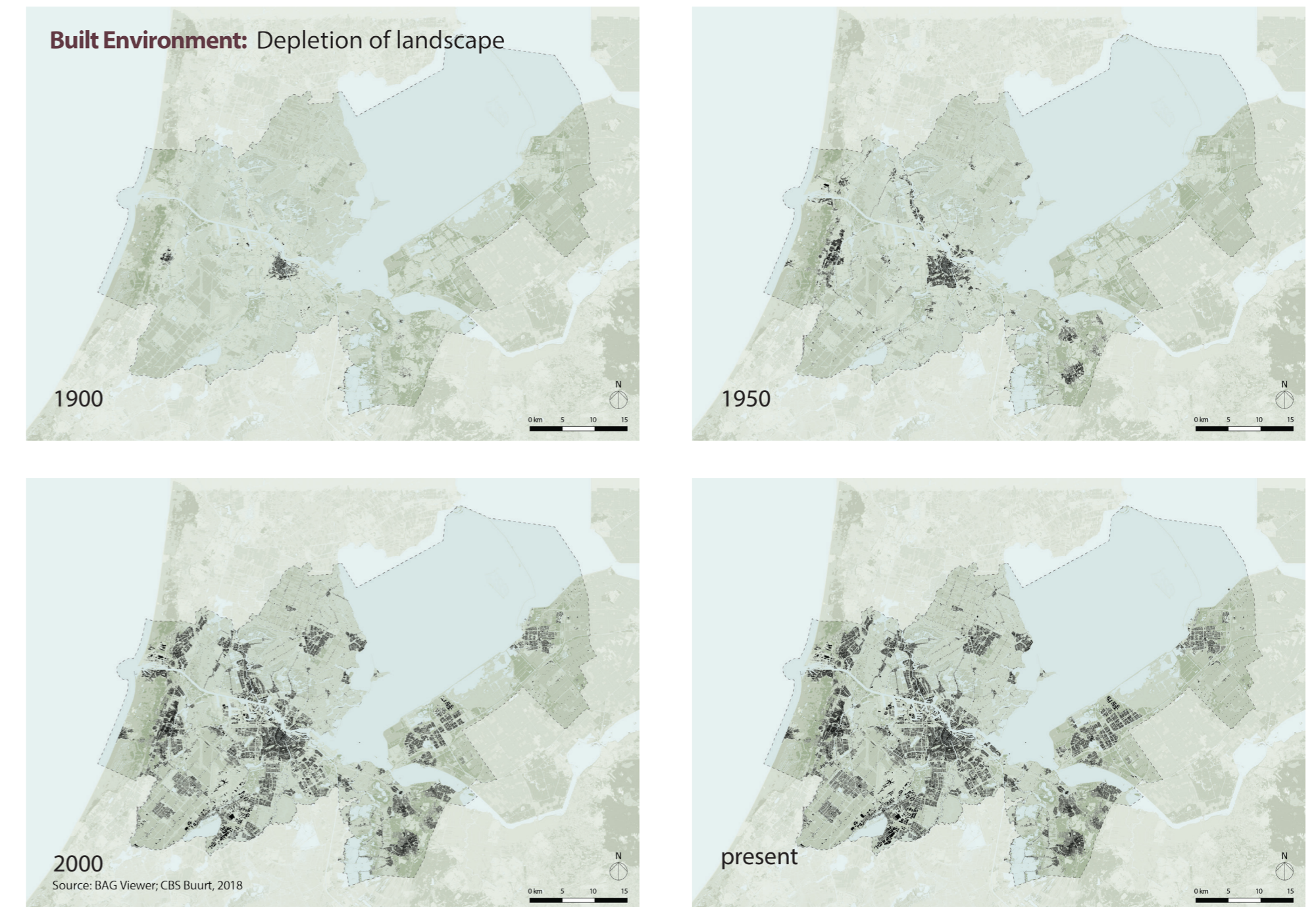
Land use

- Forest
- Arable land
- Grassland
- Built area

Environmental Effects: Positive and negative externalities of the economy

Liveability
- Highest liveability | rating: excellent
- Lowest liveability | rating: satisfactory

Sectors
- Industry
- Agriculture
- Service

Natural landscape
- Parks and protected areas
- Grasslands

Environmental effects
- Noise pollution
- Urban Heat Island

Source: CBS Buurt, 2018; Google maps; Leefbaarometer

0 km   5   10   15

N

Figure 2.3.3.

Built Environment: Depletion of landscape

1900

1950

2000

Source: BAG Viewer; CBS Buurt, 2018

present

Figure 2.3.4.

2.4.

How does the built environment respond to the living and working demands of the growing population?

LITERATURE REVIEW

With the rise of the knowledge economy, a wide range of circular and smart concepts addressing resource efficiency have gained prominence. Product-as-service is a popularized business model in which tangible products and intangible services are jointly supplied to fulfil targeted customer needs (Tukker, 2004). In this regard, the provider retains ownership of the supplied product and manages its performance through design, usage, maintenance, reuse, remanufacture and recycling. Economic benefits of the product-as-service system, include perpetual per-outcome charges rather than single upfront payments, and enhanced product development through closer feedback loops (Kowalkowski, Gebauer, Oliva, 2017). As far as for environmental benefits, the business model enables suppliers to make products upon return available to other consumers, consequently decreasing their production costs. This in turn leads to reduced volume of raw materials, reduced energy usage, and reduced waste generation (Tukker, 2004).

The product-as-service business model can be implemented to the built environment to make the urban areas more sustainable. Understanding the built environment as a service rather than as a product allows for more affordable, sustainable, and efficient housing, working and public environments. Several principles are at the core of this conceptualization of optimal utilization of the built environment. These include the sharing of space, mitigating vacancy, and modularity. With 40% of building space being underutilized (Verstraeten - Jochemsen, Kouloumpi, Russell, de Wit, Douma, Friedl, 2018), as well as unprecedented rises in real estate prices, the idea of shared space has gained widespread popularity. Shared living spaces, such as leisure, working or guest areas, and communal gardens can lead to a significant curtailment of costs and usage of resources. Co-working spaces generate similar benefits and are simultaneously key to the knowledge economy with their ability to yield knowledge spillovers. Moreover, in its quest to achieve optimal utilization of space, the built environment-as-service business model seeks to mitigate vacancy. By reusing and converting vacant offices and industry terrain into dwelling units, building stock is enhanced and consequently prices curtailed. A tool that is increasingly being implemented to prevent vacancy from occurring is modularity.

Multi-configuration modular building enables alterations to and relocation of the building itself and facilitates the deconstruction and reuse of its parts (Potemans, 2017).

ANALYSIS

Based on the theory of space utilisation, the existing conditions for optimal use of space - vacancy mitigation, and space sharing - are explored. The epicentre is home to some shared living and working concepts (Figure 2.4.1.). These include among others Zoku, as smart hotel offering young travellers shared living and working environments as part of their service; Change=, an apartment complex offering micro living environments to young professionals; and Sarphati Plaza, a circular building offering co-working space. These initiatives are very much restricted to Amsterdam and not present in other regions within the AMA. Moreover, the amount of anti-squatting locations in Amsterdam is growing rapidly and is a becoming a larger share of leasing contracts that housing corporations offer. These locations make optimal use of living environments as vacancy is mitigated and space is shared. Noteworthy, a lot of anti-squatting locations are located in Amsterdam, but given their temporary availability, they are rarely mapped. Similar to shared working and living environments, anti-squatting locations are rarely outside of the epicentre.

Built environment: Practises for space optimalisation

Shared space
- Co-living
- Co-working
- Communal squatting locations
- Epicentre of AMA

Amount of anti-squatting locations in Amsterdam (2014-2017)

Contracts of housing corporations in Amsterdam (2014-2017)
House sharing 123
Anti-squatting locations 1027
Other types of contracts 14433

Source: Google Maps; Lammertink, 2018; Regus Locations; Shared living environment; Squatting Europe Kollective; Trajkovska, 2017
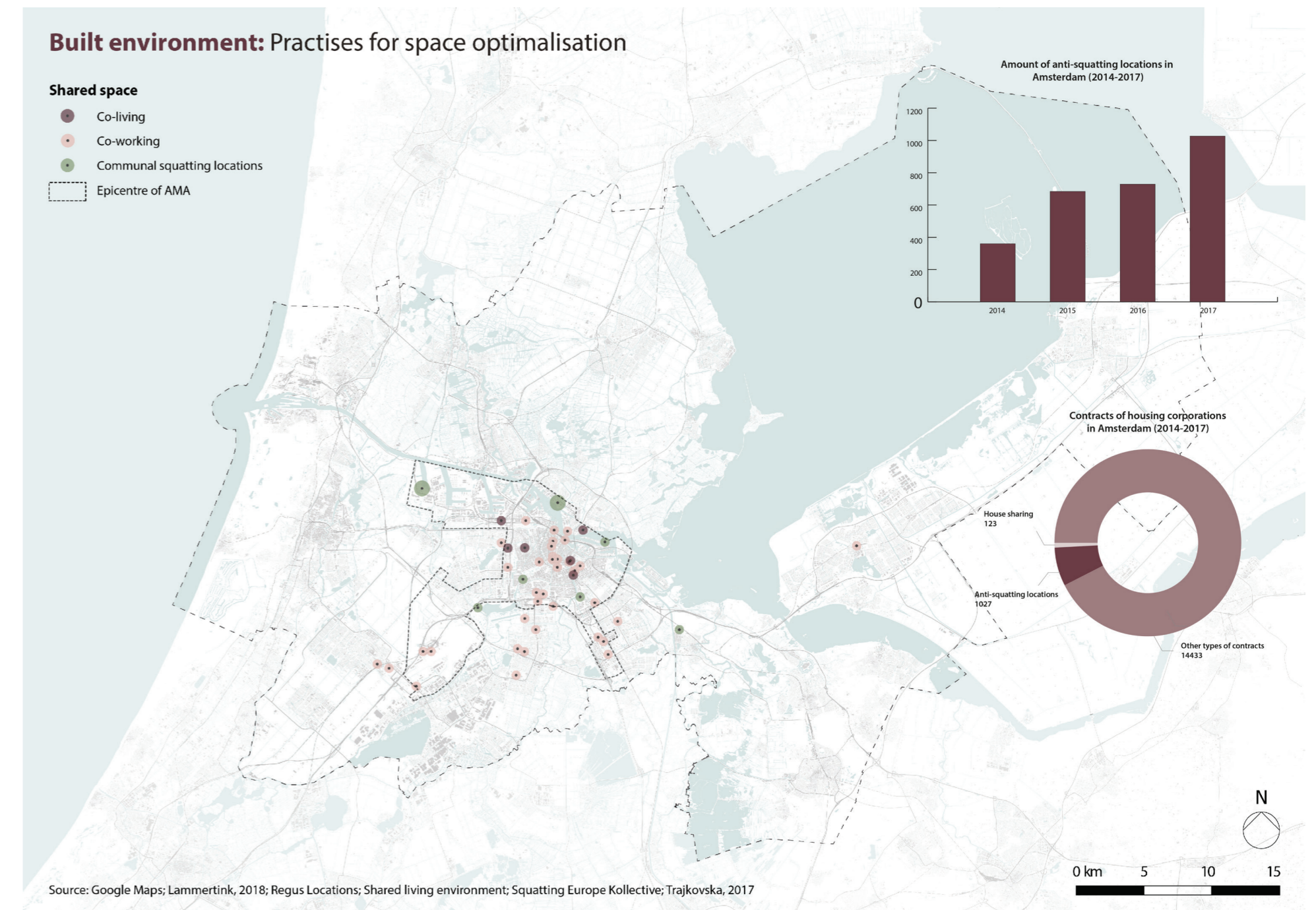
Figure 2.4.1.

The aforementioned initiatives are not providing a permanent solution to the growing vacancy issue the AMA is facing, as an estimated 13% and 12% of respectively offices and industry terrain remain vacant. In some regions, including Almere, this percentages almost reaches 30% while in the epicentre this average is around 8%.

The AMA has vacant office area of 1641000 sqm, out of which 861100 sqm (roughly 52%) is suitable for transformation (Monitor Plabeka, 2017-2018). Assuming that this area can be used to house family units of 120 sqm, reduced from 140 sqm which is the usable floor space per unit (More Connect WP3.1, 2016), and 2-person units of 70 sqm in the ratio 1:2, about 9936 homes could be accommodated in the vacancies, with 6624 two-person houses and 3312 family homes. The 1:2 assumption is made on the basis of the existing ratio of family households to one and two person households in the Netherlands which is predicted to further decrease in the future (Statista, 2019). This amounts up to roughly 6.6% of the 150,000 new homes required in the AMA.

This percentage, given the assumption that multi-households consist of four persons, and two-person households consist of one or two people, 23,184 persons can be accommodated in the AMA by only mitigating office space. The transformation of vacant industry space will further increase the number of houses that can be accommodated in the AMA.
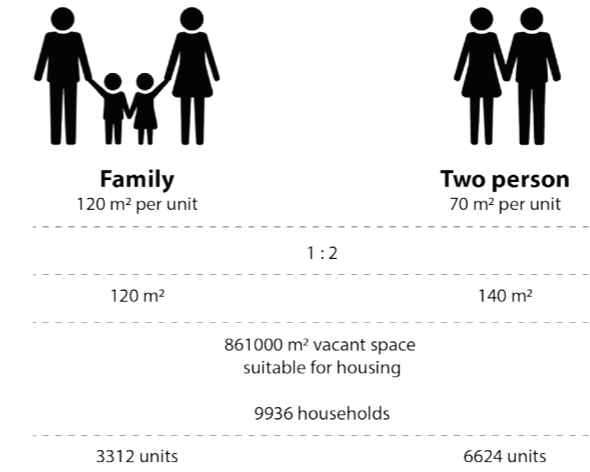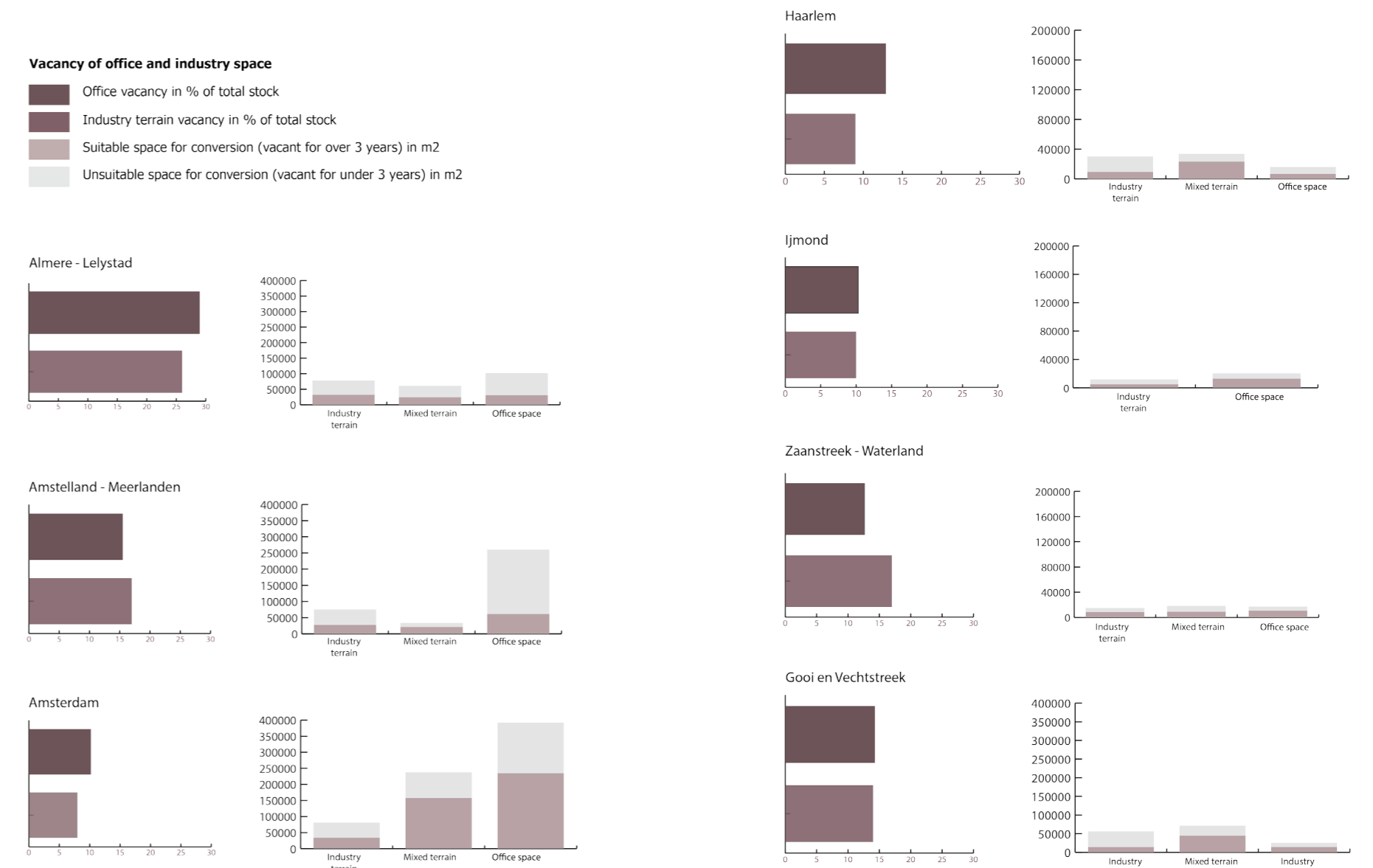

Figure 2.4.3.
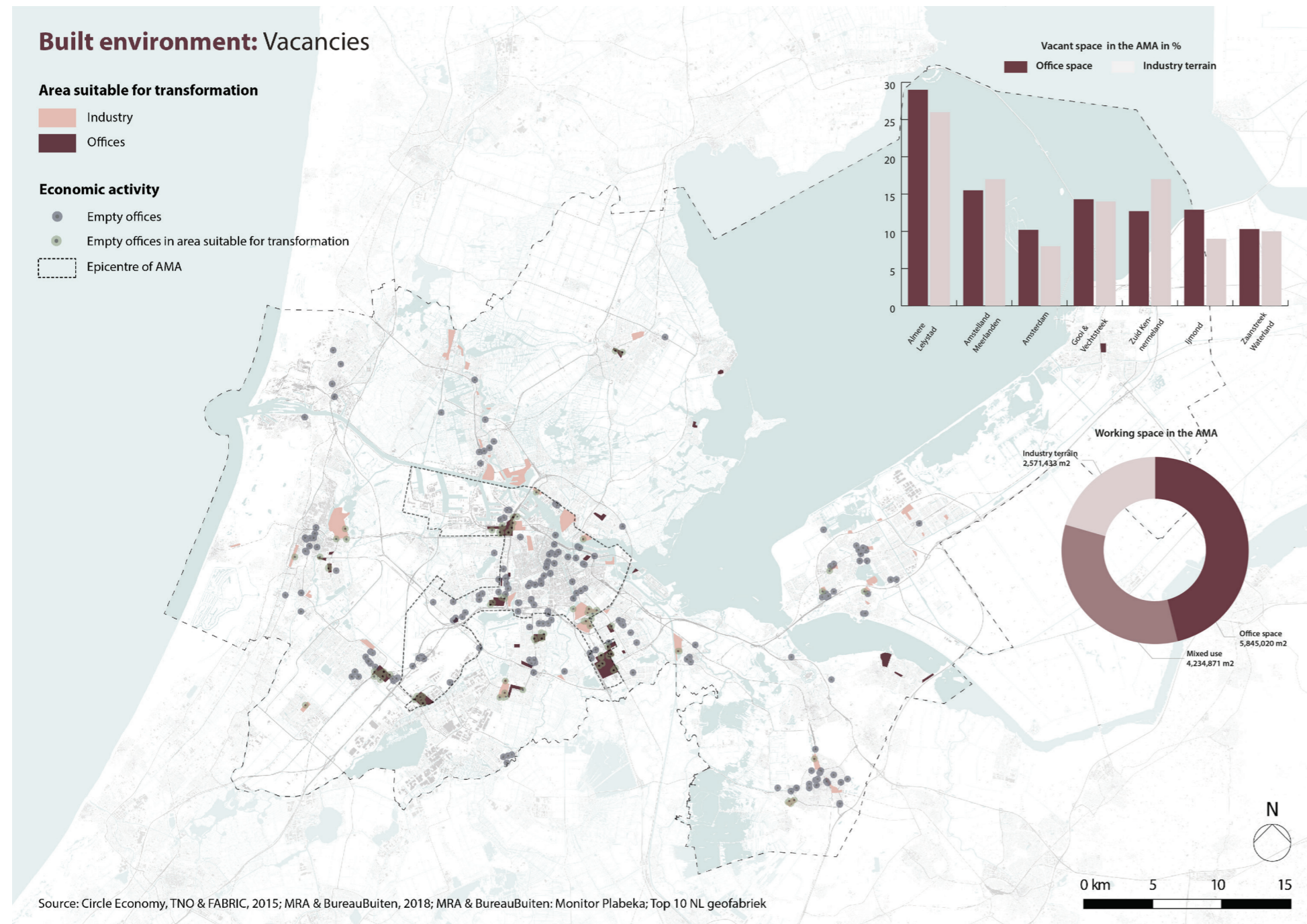
Built environment: Vacant office and industry space, and vacancy suitable for transformation

Source: Monitor Plabeka, 2017-2018

Figure 2.4.4.

Built environment: Vacancies

Source: Circle Economy, TNO & FABRIC, 2015; MRA & BureauBuiten, 2018; MRA & BureauBuiten: Monitor Plabeka; Top 10 NL geofabriek

Figure 2.4.2.

Although the vacancy will cover some of the needed houses, still a lot more houses should be built. The future construction plans defined by all the municipalities give insight on the definitive and potential plans (Figure 2.4.5.). If all these plans were going to be built the goal of 150.000 new homes will be reached. Striking is that all these plans are located outside of the highly liveable areas. When building new houses within the AMA, the demographics of the region and current housing stock and typology need to be taken into account.
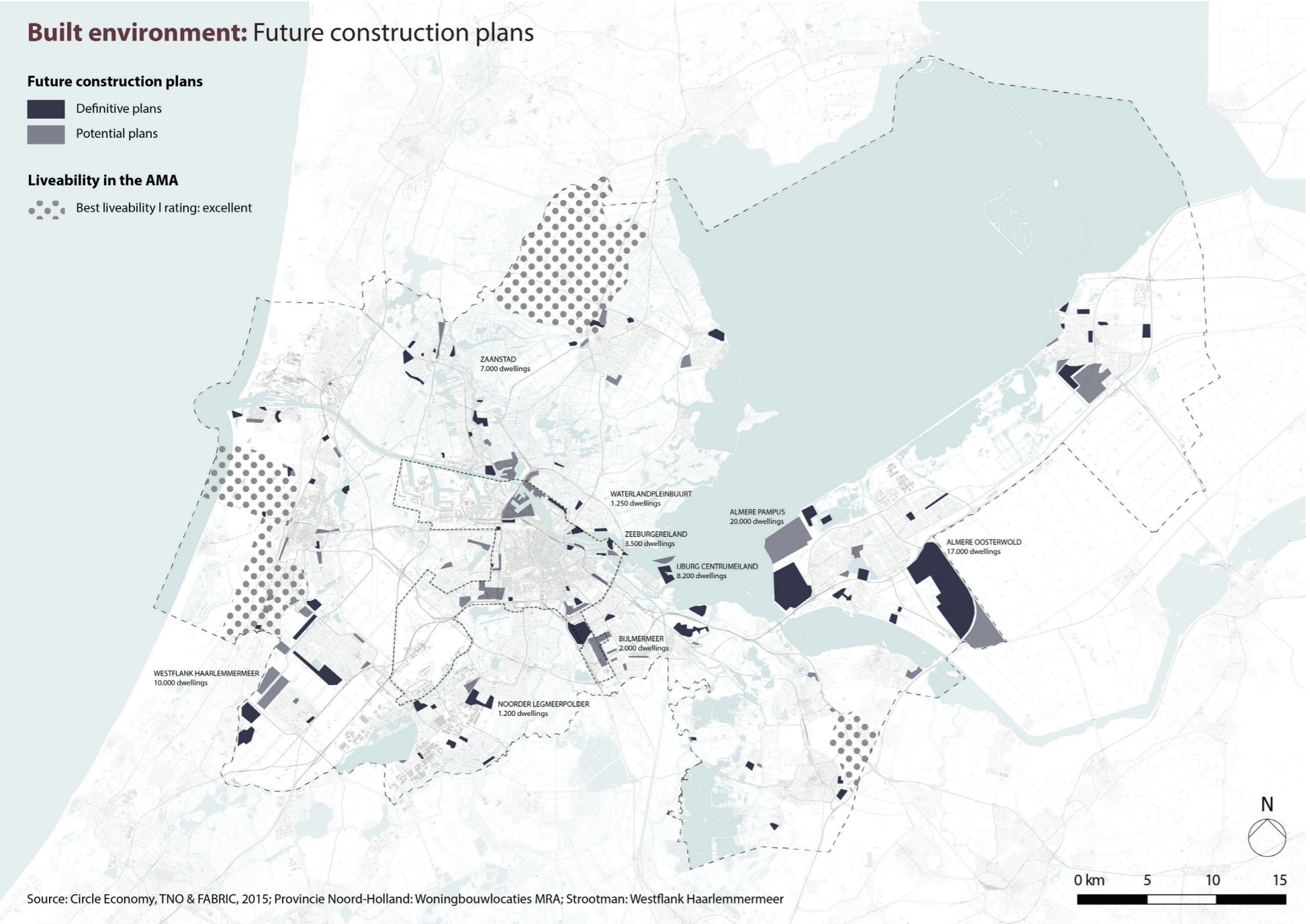
The density within the A10 ring in Amsterdam is significantly higher than the rest of AMA, as it caters to a young demographic mostly housed in apartments. Compared to this, new urban areas like Almere are more space intensive, occupying a larger footprint but relatively small density. The predominant housing typology here is row houses. Meanwhile a majority of the housing in the Gooi region is detached and also has a comparatively low density. These densities are reflected in the social mix of the particular area. The rather homogeneous social fabric in certain areas determines the social gaps, therefore creating a need to target different groups while making optimal use of the built environment in order to respond to the housing demand, but at the same time prevent further depletion of the landscape.
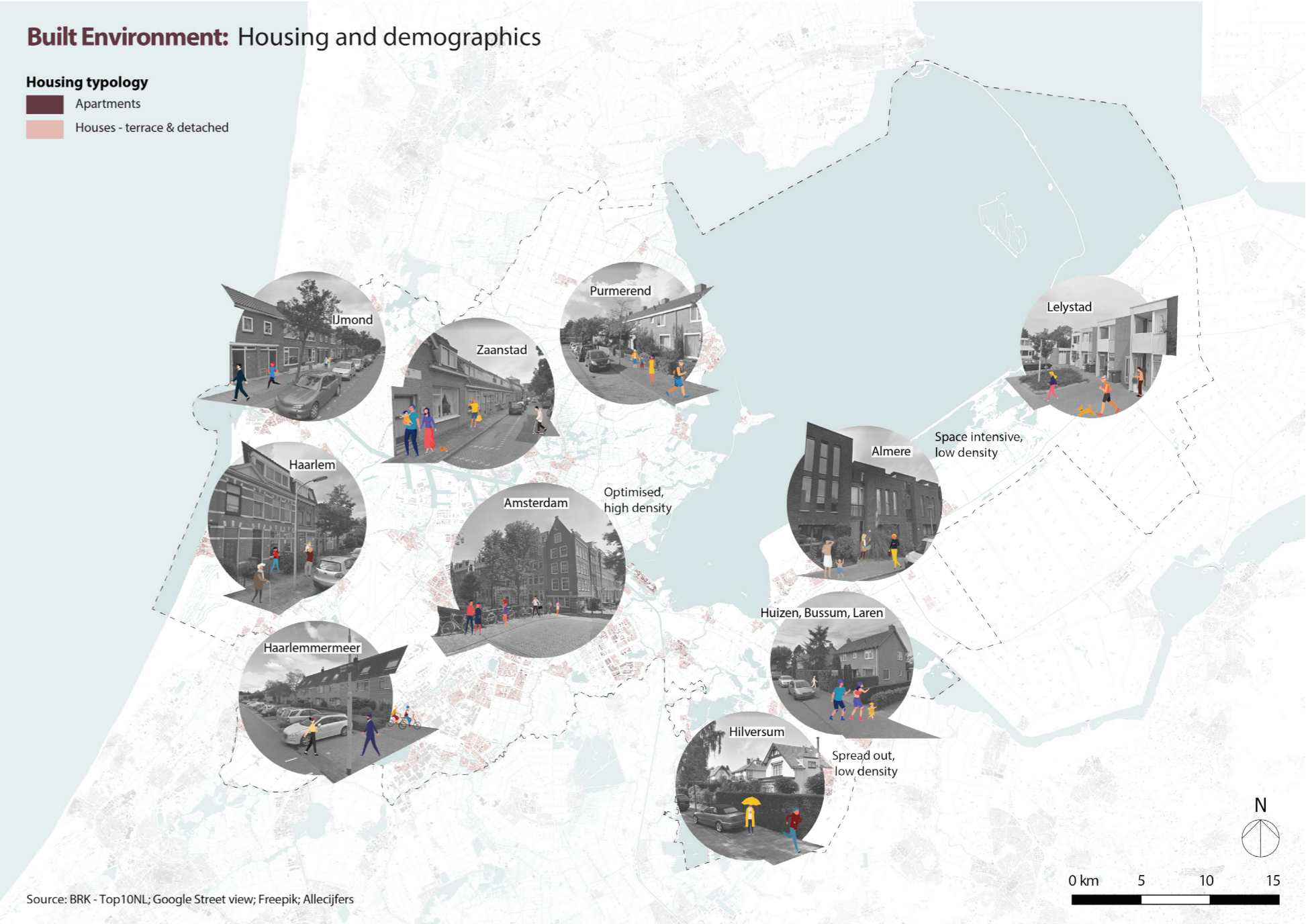
Built environment: Future construction plans

Future construction plans
- Definitive plans
- Potential plans

Liveability in the AMA
- Best liveability l rating: excellent

ZAANSTAD
7.000 dwellings

WATERLANDPLEINBUURT
1.250 dwellings

ZEEBURGEREILAND
3.500 dwellings

IJBURG CENTRUMEILAND
8.200 dwellings

ALMERE PAMPUS
20.000 dwellings

ALMERE OOSTERWOLD
17.000 dwellings

BIJLMERMEER
2.000 dwellings

WESTFLANK HAARLEMMERMEER
10.000 dwellings

NOORDER LEGMEERPOLDER
1.200 dwellings

N

0 km   5   10   15

Source: Circle Economy, TNO & FABRIC, 2015; Provincie Noord-Holland: Woningbouwlocaties MRA; Strootman: Westflank Haarlemmermeer

Figure 2.4.5.

Built Environment: Housing and demographics

Housing typology
- Apartments
- Houses - terrace & detached

IJmond

Purmerend

Zaanstad

Lelystad

Haarlem

Space intensive, low density

Almere

Amsterdam

Optimised, high density

Huizen, Bussum, Laren

Haarlemmermeer

Hilversum

Spread out, low density

N

0 km   5   10   15

Source: BRK - Top10NL; Google Street view; Freepik; Allecijfers

Figure 2.4.6.

CHAPTER 3

VISION

DIAGNOSIS AND VISION

DIAGNOSIS

The rather monocentric structure of the AMA is leading to enhanced pressure on the region's epicenter (Figure 3.0.1.). Networks, flows, and economic activities are centred around Amsterdam, its port, and Schiphol, which is leading to a growing dichotomy between social groups. Lower income households and non-Western migrants are residing at the margins of economic activity and high livability areas.

Moreover, the concentrated service sector in Amsterdam, the heavy industry at the port, and the airport traffic at Schiphol are contributing to an enhanced UHI effect and pollution. Lastly, the inefficient use of the built environment is currently resulting in unsustainable living and working environments. The relatively high proportion of vacant space is becoming a growing problem for an ever growing AMA, where the demand for housing is skyrocketing. Moreover, in addition to mitigating vacancy, sharing living and working environments need to gain prominence within the AMA in order to more optimally utilize existing

space. Concluding, In order to relieve pressure from the AMA's epicentre while preserving the original landscape, flows of working and living environments need to be redistributed, and new ways of arranging the local economy and the built environment need to be uncovered.

Source: Leefbaarometer; MRA & BureauBuiten: Monitor Plabeka; Sources used in previous maps

Figure 3.0.1.

35
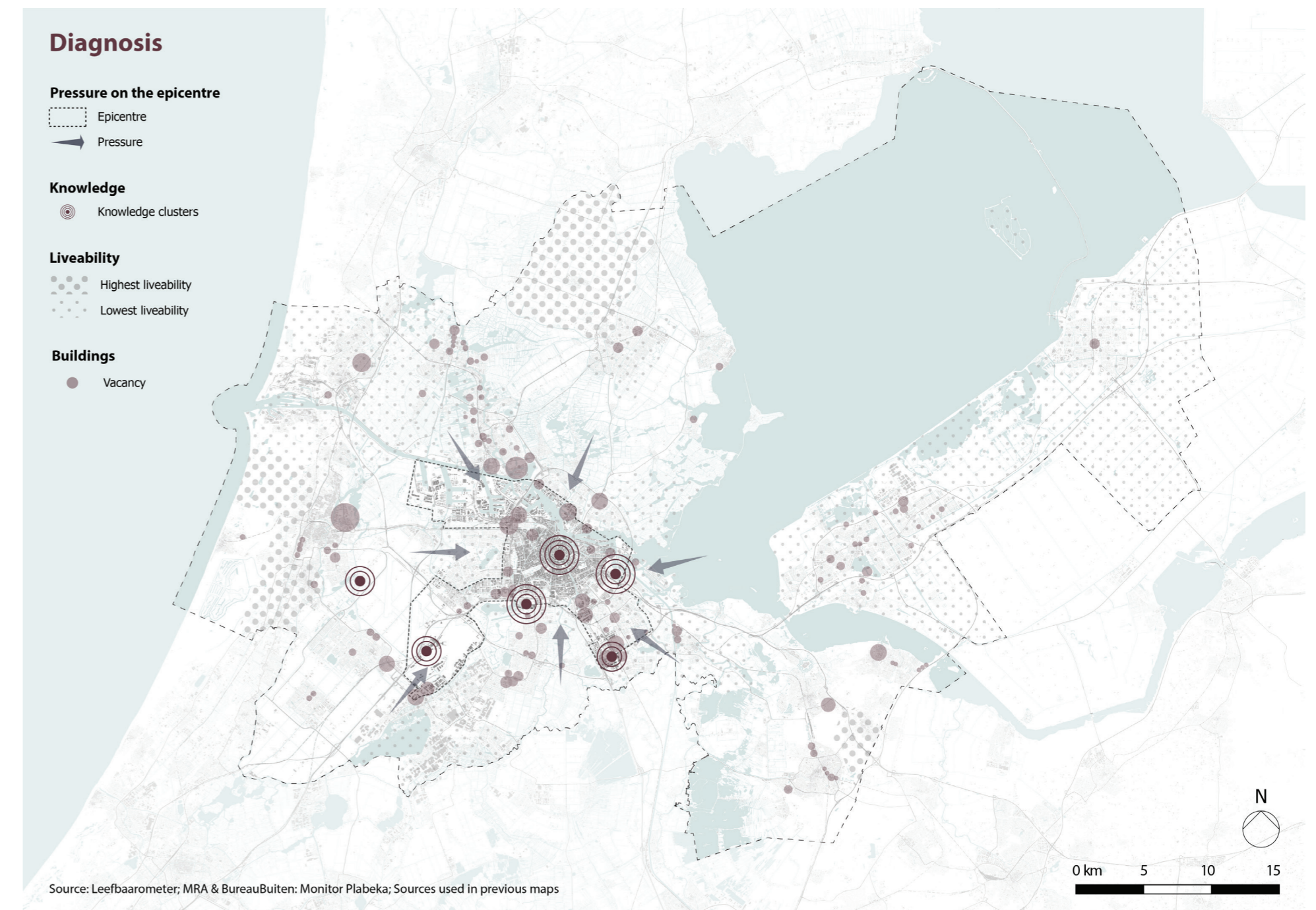
VISION

In order for the AMA to become more inclusive and liveable, the region has to rethink its spatial model as well as the way it organizes its economy and the way it accommodates its residents for working and living purposes. A more polycentric spatial structure is necessary to relieve the pressure from the Amsterdam, its port, and Schiphol. Further, a more spatially flexible economic model in which more of its value creation, growth, and productivity is derived from intellectual capital is necessary. Shifting towards a knowledge economy that is easily adaptable to all regions, including those outside of the AMA's epicentre, will enhance local economies and pave the way for innovation and circularity. Additionally, the built environment should be understood as a service in order to cope with space in the most efficient and sustainable way. In order to optimally utilize the built environment while simultaneously preserving the existing natural landscape, vacancy has to be mitigated, space sharing has to become more prevalent, and modular building practices have to be implemented.

By 2040, the AMA will be more liveable and diverse in its living and working environments, through the optimal utilization of the built fabric and the enhancement of local knowledge-driven economies.

This will be achieved by:

- Reducing socio-economic pressure on the AMA's epicentre through a shift towards a more polycentric structure in which local economies are enforced by the enhancement of knowledge flows between academic institutions and businesses.
- Meeting the demand for housing and accommodating business space for knowledge economies by capitalising on the existing urban landscape and mitigating vacancies.
- Shift to a circular mindset by reinforcing the built environment as a service and integrating adaptable building practices.
- Enhance social mixing and liveability by providing a diverse housing stock, accessible amenities and an interactive environment.

Realising this vision will result in:

"A diverse socio-economic climate that strengthens the local economy."

"An inclusive and accessible living and working environment."

"A resilient urban and natural environment."

Source: SmartCitiesWorld news team, 2018

DIVERSITY   INCLUSIVENESS   RESILIENCE

Figure 3.1.1.

Figure 3.1.2.

The AMA in 2040

⬡ **Reduce pressure on the epicentre**

◉ Knowledge clusters

← Reduce pressure

⌂ **Accommodating the growing population**

● Vacancy

Shift to a circular mindset

● Potential construction plans

◌ Built environment as a service

Enhance liveability
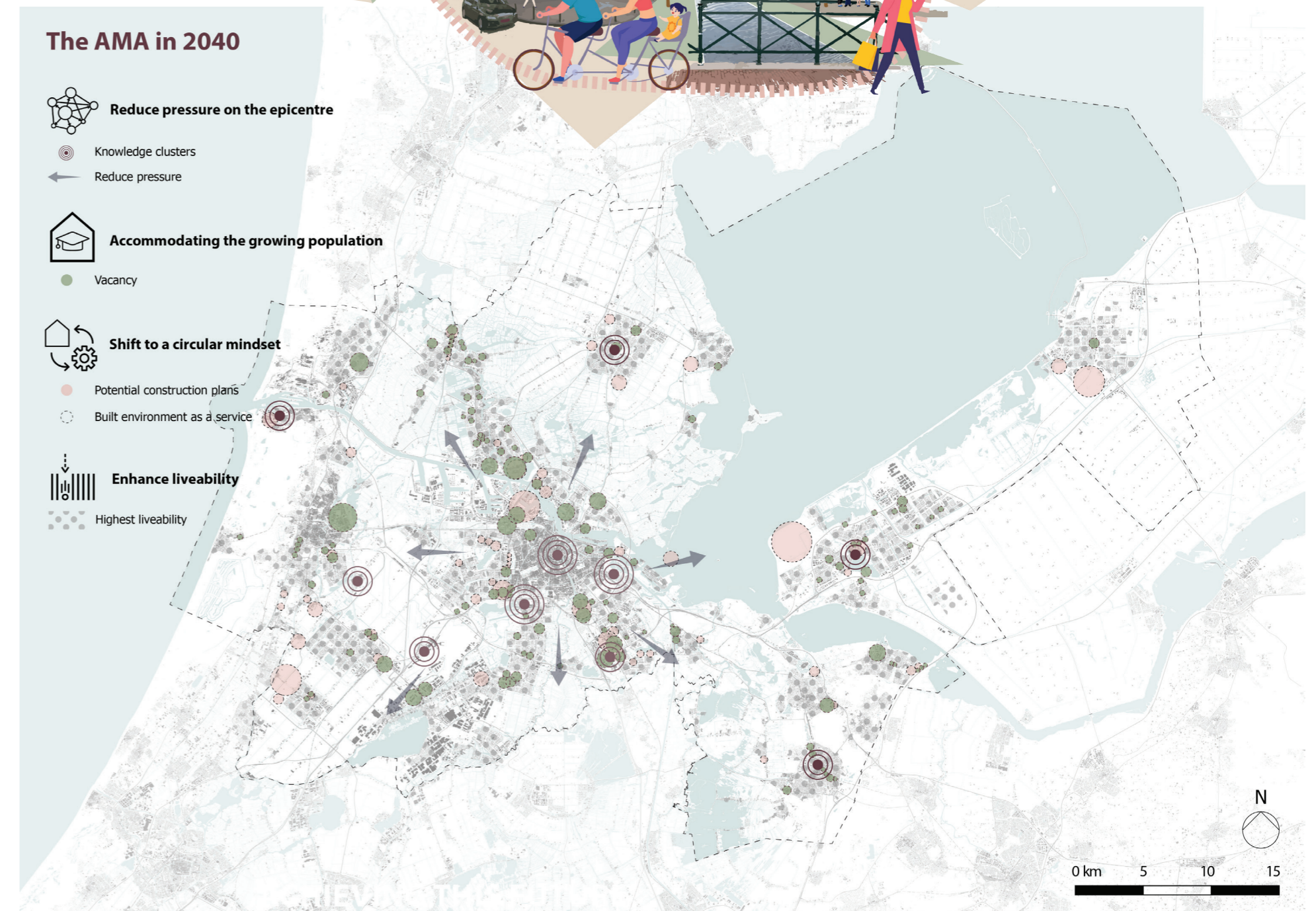
Highest liveability

N

0 km   5   10   15

Figure 3.1.3.

CHAPTER 4

STRATEGY

STRATEGIC PRINCIPLES, STAKEHOLDERS, TIMELINE AND CRITICAL CASE

TOOLBOXES

In order to implement our vision goals, this report proposes several principles and design strategies that refer generally to the whole region. They are separated in three different toolboxes. All of them are based on the conceptual framework of the projects and constitutes an attempt to interprete spatially and apply our vision in the region.

As far as knowledge economy is concerned, our project defines those conditions that can be met through policies within businesses and those spatial interventions that should be implemented in order for the local economies to be enhanced. The second toolbox of principles refers to the built environment as a service, including spatial interventions related to housing, working space, mobility and public space, which are based on the notion of "sharing", our intention to fill the gaps of the urban fabric by transforming the existing

vacant spaces and finally the implementation of modularity in new construction. The last toolbox is about liveability and interpretes spatially the five aspects of liveability as defined by Leefbarometer 2.0. More precisely, it includes strategic actions related to housing, demographics, facilities, the physical environment and finally safety.

Toolbox: Knowledge economy

KNOWLEDGE INTENSITY
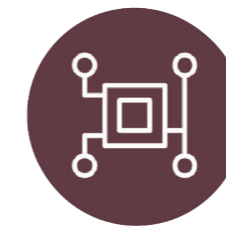
Through enhanced digitalization, open systems standards, development software, and supporting technologies for the application of new computing and communications systems, knowledge can be further intensified, diffused, and implemented.

FLEXIBLE ORGANIZATION
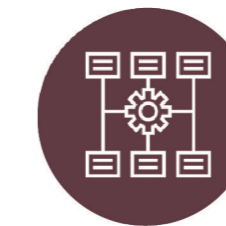
Through multitask job responsibilities, teamwork and job rotation, and by avoiding excessive specialisation and compartmentalization, more flexible organisations increase productivity.

KNOWLEDGE, SKILLS & LEARNING

Through investment in human resources and skills, unique human (tacit) skills - such as conceptual and inter-personal management and communication skills - information and communication technology is complemented.
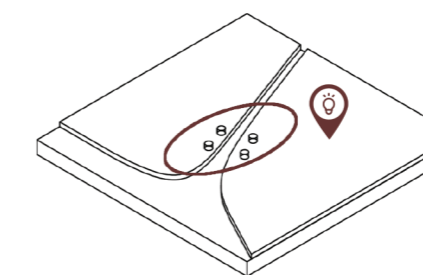
KNOWLEDGE NETWORK

Through interactive learning, the exchange of information, and experimentation with creators, producers, and users, as well as ingenuity to foster new technologies and the opportunities they bring, innovative solutions to the needs of the economy are attained

PHYSICAL HUBS
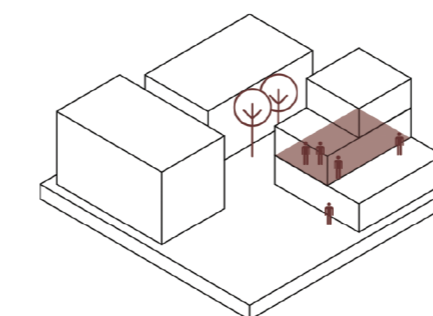
The implementation of co-working spaces where facilities, technology and equipment are shared, facilitates supportive environments with networking and knowledge sharing opportunities.

KNOWLEDGE CLUSTERS

The clustering of businesses and organizations in space and networks yields knowledge spillovers as the flow of information, skills, and ideas smoothens due to proximity.

ACCOMMODATING KNOWLEDGE
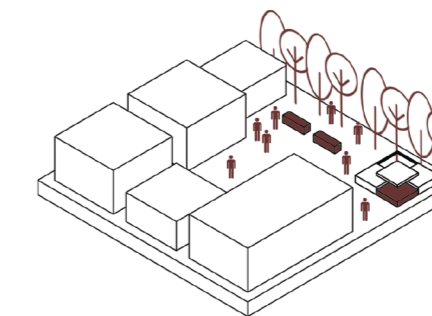
High liveability through access to housing, amenities, and public transport is necessary to accommodate the needs and desires of those employed in the knowledge economy.

LEARNING ORGANIZATIONS
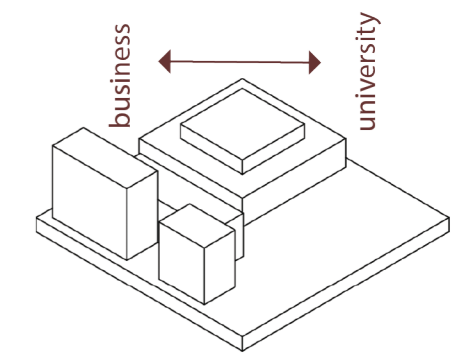
Enhancing information sharing between academic institutions and businesses links research and teaching techniques to the needs of local economies.

Figure 4.0.1.

**Toolbox:** Built environment as a service

SHARED HOUSING

Through micro living environments, complemented by shared common areas and shared services and equipment, housing becomes more resource and energy efficient as well as affordable.

SHARED WORKING SPACE

Similar physical hubs, shared working spaces may facilitate supportive environments with networking and knowledge sharing opportunities and may help mitigate vacancy of offices.

SHARED MOBILITY
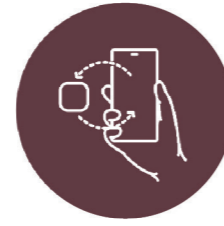
Infrastructure as well as digital platforms that allow for sharing of means of transportation will enable fast and easy commuting as well as more optimal usage of vehicles and bikes.

SHARED PUBLIC SPACE

Introducing more inclusive public spaces that provide shared amenities enhances community feeling and fosters interaction.

VACANT HOUSING
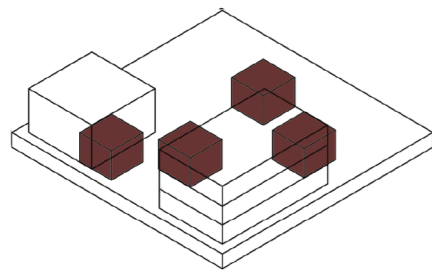
Introducing more anti-squatting contracts helps mitigates the vacancy of housing. Short-term, cheap and flexible leasing contracts are appealing to certain population groups.

VACANT OFFICES
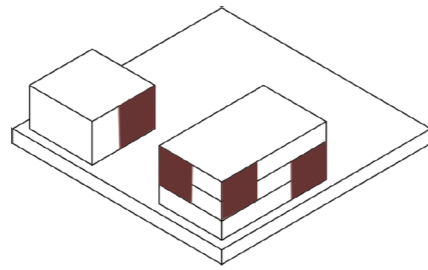
Vacancy of offices can be mitigated through cheap (short-term) leasing contracts for co-working space, or by converting the office space into housing.

VACANT SPACE

The conversion of vacant spaces that are in proximity of public transport stations into storage room for bicycles and cars will facilitate the transfer between means of transportation.

VACANT PUBLIC SPACE
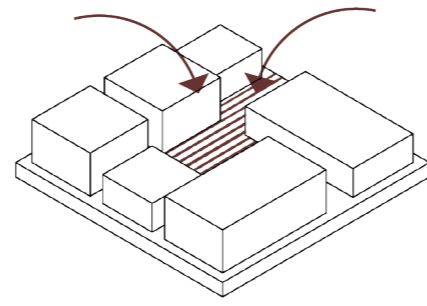
Community feeling as well as interaction between neighbourhoods can be enhanced by converting vacant in-between space into interactive public space.
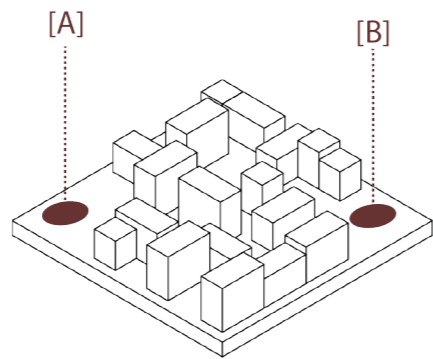
MODULAR CONSTRUCTION
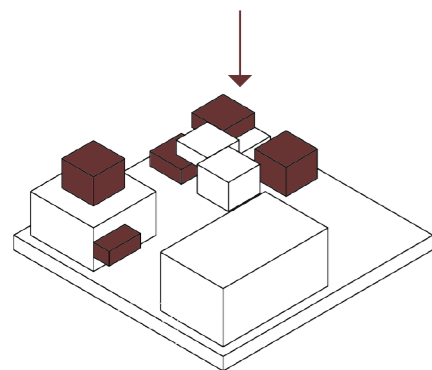
Multi-configuration modular building enables alterations to and relocation of the building itself and facilitates the deconstruction and reuse of its parts. This building practice is suitable for the building/conversion of housing and offices.
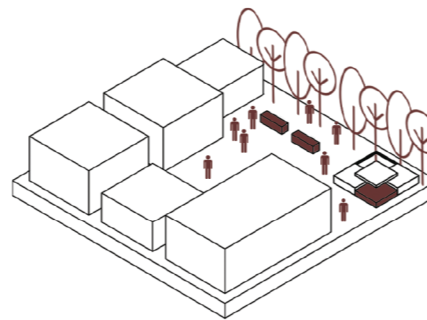
Figure 4.0.2.

MODULAR MOBILITY

[A] [B]

Modular, flexible car parks that can be dismantled and introduced in different locations for shorter time periods. Suitable for temporary vacant spaces.
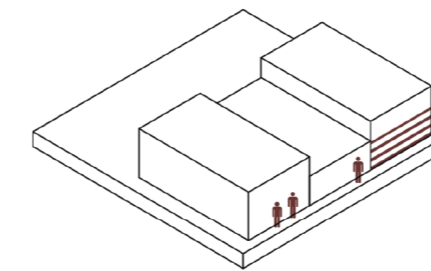
MODULAR PUBLIC SPACE

By introducing modular street furniture such as benches that can be transformed according to the needs of the users, interaction between people can be enhanced.
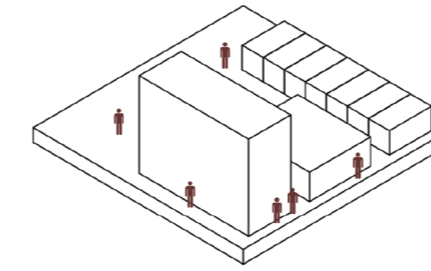
Toolbox: Liveability

HOUSING & DEMOGRAPHICS

social diversity (income, age, educational level)

flexibility in housing configuration according to the wishes of user groups (big house for families and house combined with home-office for smaller households)
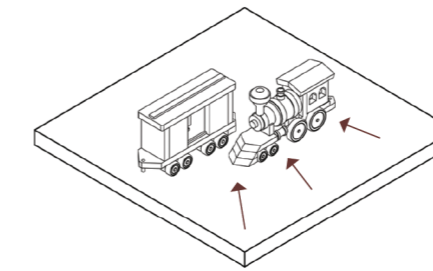
Enhance social mixing by (1) upmarketing private housing in low-income areas and introduce more social housing in more expensive areas, and (2) by providing single, and multiple household units in the same areas to attract young, old, families, and single people, (3) add diverse job markets to areas in order to accommodate highly and less educated populations.

shared space and shared equipment within living environments enhances the sense of place and community
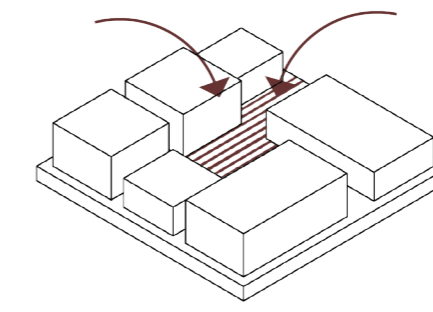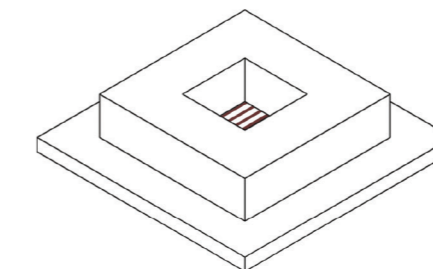
FACILITIES

new facilities to create an attractive living environment

Enhance accessibility by intensifying the public transport network (more trains in evenings, more often)

new amenities in public space such as recreation facilities, and pocket parks invite different social groups to gather and interact with each other
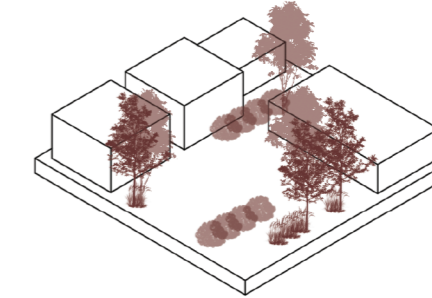
PHYSICAL ENVIRONMENT

healthy neighborhood

enhance diverse green that is accessible to all in order to reduce heat stress and create an inclusive environment
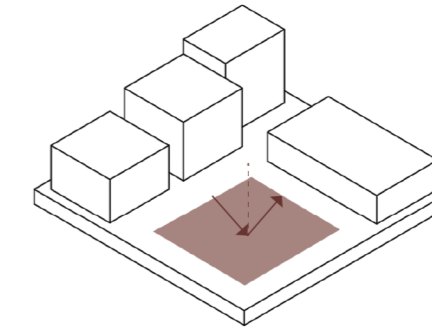
use of materials with high heat capacity, reflective surfaces in order to reduce heat stress and increase the microclimate quality of the neighborhood
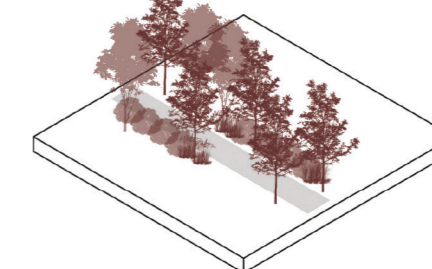
create green barriers in order to mitigate noise pollution from highway infrastructure

SAFETY

public space and equipment for an inclusive and safe environment
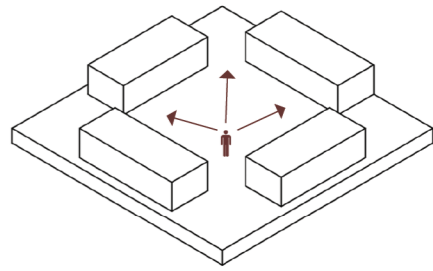
create unobstructed view of public space

add more lighting in public space

increase the visibility of the street to create a safe atmosphere

Figure 4.0.3.

SYSTEMIC SECTIONS

Currently, the built environment of the AMA is not being used optimally, which can be seen in the amount of vacant office and industry space. Also, there are not many strategies to reduce the social and environmental impact that the AMA has already has in place for the built environment. These, in addition to the growing population and housing demand, forces the region to rethink the way that the new and existing built environment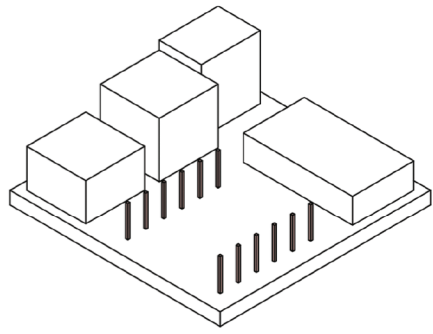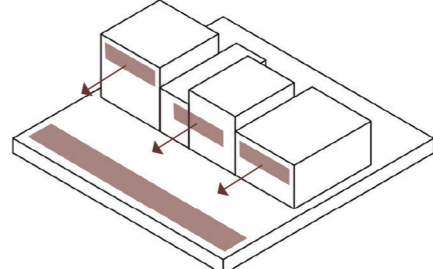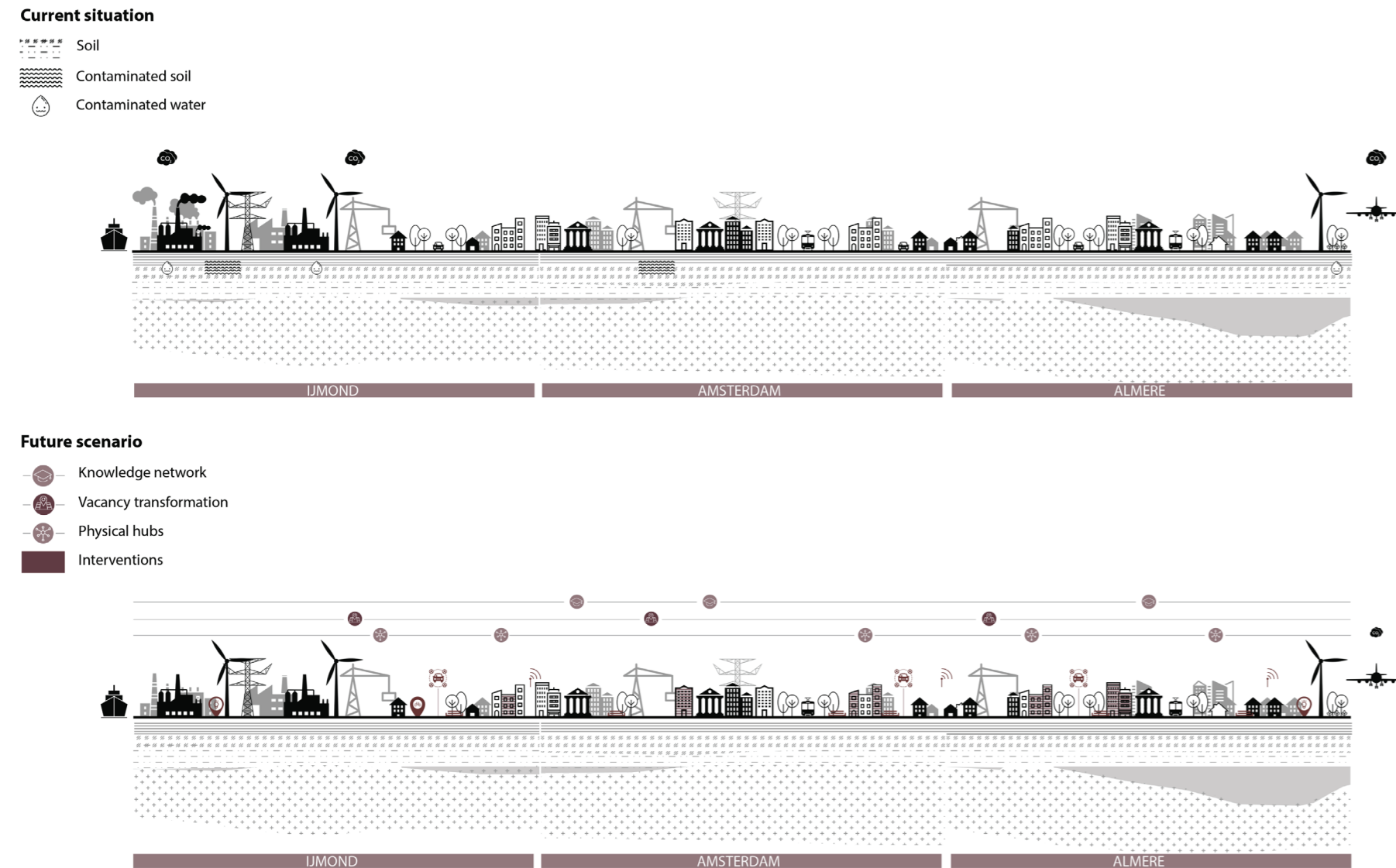 responds to changing demands. The future of AMA will use the vacancies that are suitable for transformation to accommodate a portion of the new housing. The vacancies that are unsuitable for transformation have the potential to foster a network of knowledge and innovation across the different subregions which will be steered by local knowledge. Spatial and non-spatial interventions within the region will help further the idea of the built environment as a service.

Current situation
- ⠿ Soil
- ▤ Contaminated soil
- ⬭ Contaminated water

IJMOND   AMSTERDAM   ALMERE

Future scenario
- ⬤ Knowledge network
- ⬤ Vacancy transformation
- ⬤ Physical hubs
- ▬ Interventions

IJMOND   AMSTERDAM   ALMERE

Source: DINOloket (2018), icons: Noun project

Figure 4.0.4.

ZOOM IN SECTIONS

The built environment as a service is addressed through new living and working areas. Through shared living and working environments, a significant amount of built space is reduced, while promoting interaction and collaboration in high densities. Liveability is increased through enhancing quality of public space and built environment, and introduction of new amenities where lacking, in order to make it more attractive to different user groups.

The knowledge economy is strengthened through the spatial integration of business and academia, by harbouring knowledge spillovers through proximity and sharing, thereby reinforcing the networks between them and creating knowledge clusters.

Future scenario
- ▬ Green space
- ▬ Housing
- ▬ Working environment
- ▬ Public space
- ▬ Other use

sharing - living and working environments

liveability - new amenities

network between business and academia

Figure 4.0.5.

4.1.

Who should be involved and how should the change take place?

STAKEHOLDER ANALYSIS

Create knowledge clusters
The two stakeholders with the most power and interest, the AMA and the municipality, will pay for a big part for the creation of the knowledge clusters. The AMA will benefit since the knowledge clusters contribute to a more polycentric region, while the municipalities have the opportunity to enhance their local economies. The universities and vocational institutions want to grow and therefore are also needed to pay for the costs. This growth will get students interested in studying there. The large businesses located in the area and the ones who can potentially settle in the area, need to be get interested. The start-ups are very interested since they can share knowledge and have the possibility to grow in an innovative district like this. Possible constraining stakeholders are the inhabitants of the future knowledge cluster, who may not be satisfied with this change.
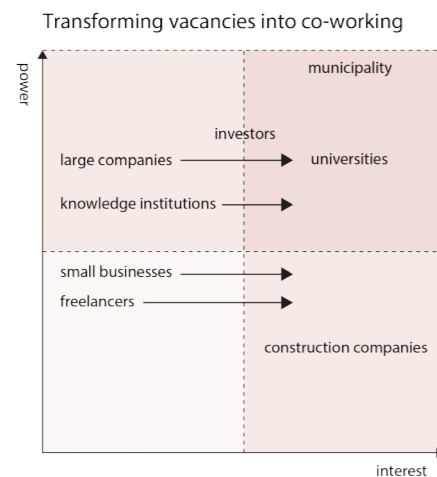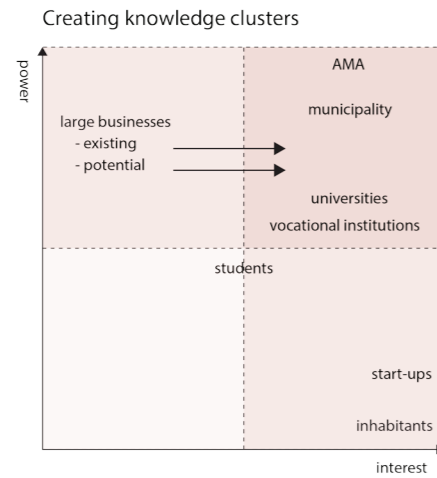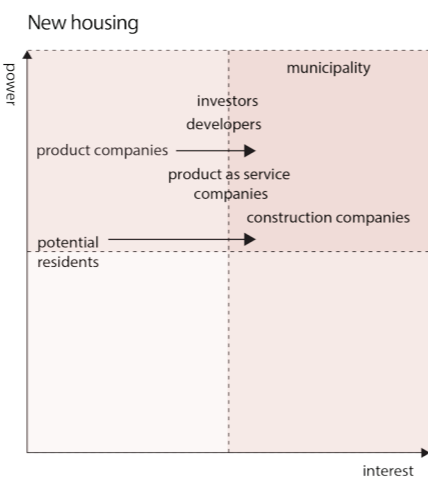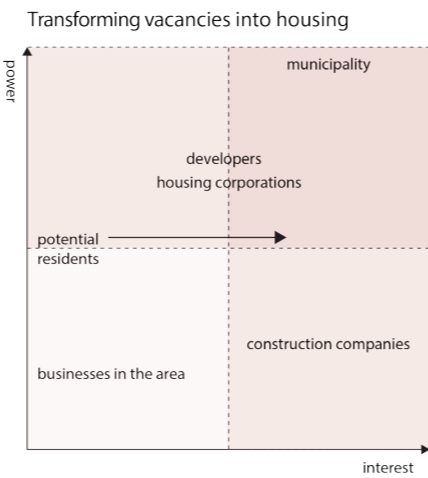
Vacancies into housing
Since most of the vacancies are located in areas with binding zoning plans with the function industry or services, the municipality has a lot of power into the progress of creating flexible zoning plans. In addition, the municipality is also interested in using vacancies and thereby saving money for otherwise newly built houses, by helping (monetary) to develop the public space, which is often not suitable for potential residents. Developers will be attracted since the reactivation of empty offices leads to profit faster than new construction. Construction companies will benefit from transforming an existing building into housing with minimal intervention. Businesses in the area only need to be kept updated since the public space is being transformed.

Vacancies into co - working space
As for converting vacancies into co - working environments, the municipality has the highest influence during the decision making process. It is the stakeholder with the highest amount of power, both financial and social. As a result, attracting its interest and convincing for investment constitutes a significant challenge for the urban planners. The reactivation of the vacant offices can potentially be in favour of their plan to attract a higher part of the creative workforce of the region. Apart from the local authorities, who undoubtedly need to be convinced, this part of the project aims to attract investors such as knowledge companies and knowledge institutions. They have the economic power to help implement the future plans but we need to increase their interest for contribution. Universities are highly interested, since they want to grow, and new co - working environments will potentially attract students and young professionals. As far as small businesses and freelancers are concerned, they will become interested since they will be able to find new, innovative and affordable working environments to flourish. Even if construction companies might not have a lot of power, they will show an intention to take part in the process of transforming the existing vacant areas into creative co - working spaces. Modularity is a new construction method that provides liveable working spaces, thus it is attractive for them to experiment.

New Housing
Potential residents have significant power as stakeholders in customisation of modules (in purchased homes) and towards maintenance of shared spaces while benefiting from lower costs. The municipality has a lot of power in the decision making process and a high interest in increasing the number of homes to attract potential residents. Due to the large number of rented units in the built environment as a service model, investors and developers benefit from quick returns on these units. Construction companies have a lot of power and interest in that they offer speedy construction off-site, with reduced time on-site and reduced environmental impacts. Product as a service companies play an important role in the supply of shared equipment and tools, while the goal is to get product-based companies to make the shift to service-based companies by creating a high demand for the built environment as a service model.
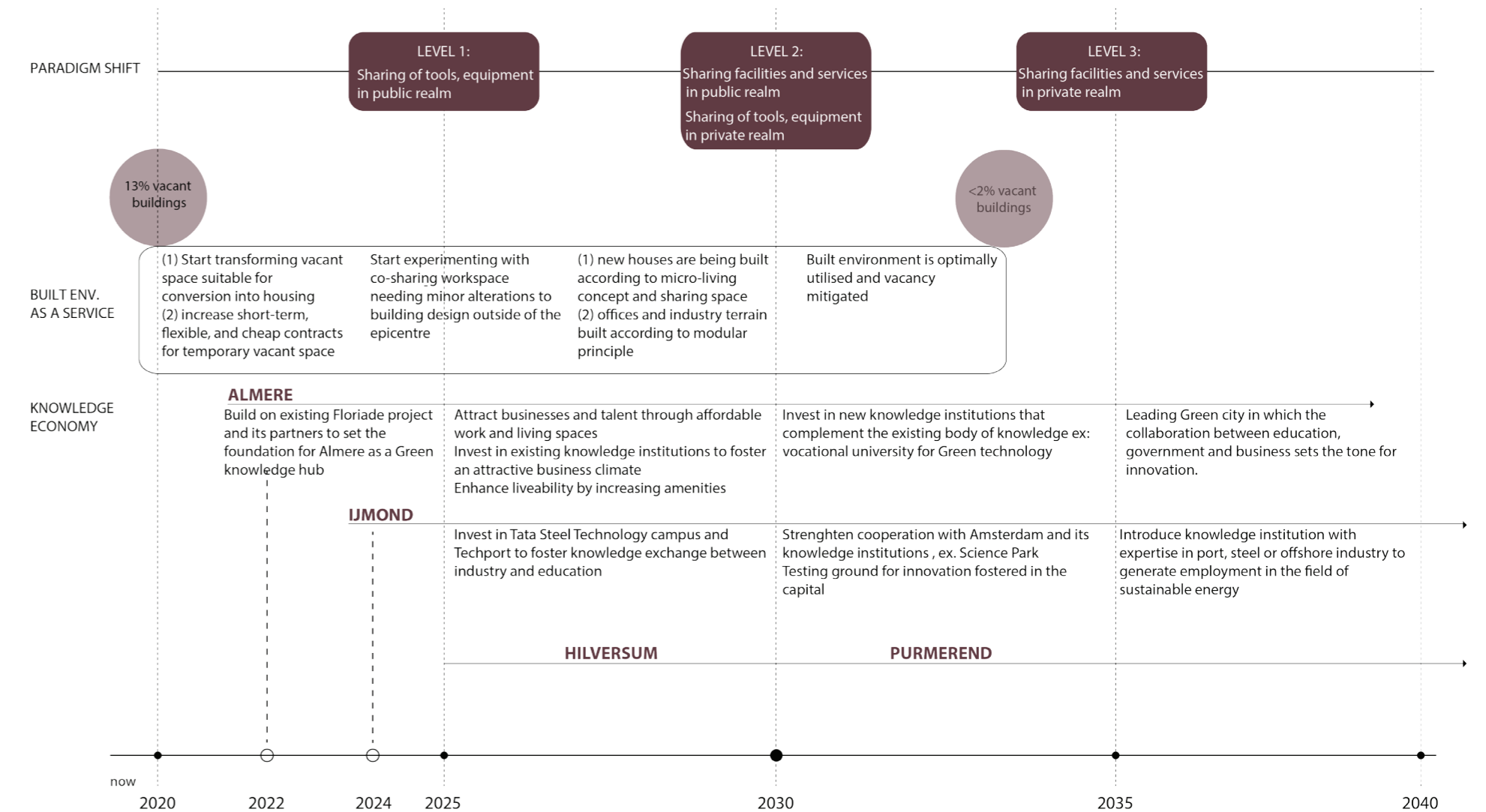

Figure 4.1.1.

Figure 4.1.2.

4.2.

How can the strategic principles be applied in a critical case?

CRITICAL CASES

The criteria based on which the critical cases have been selected are driven by the main theories drawn upon in the analysis of the AMA. Areas with relatively low population densities, with potential for enhanced economic activity and knowledge concentration, and with low utilisation of the built environment were selected for further examination. Based on these criteria, the following areas were chosen: Almere, Ijmond, Hilversum and Purmerend. The following chapter presents and in-depth analysis of Almere. Out of the four areas Almere was chosen because of (1) its currently low housing demand and its, perhaps contradictory, expected growth from 188.000 in 2011 to 320.000 inhabitants by 2030 (Janssen-Jansen, 2011); (2) its high office and industry terrain vacancy rates; (3) its growing start-up and innovation climate, characterized by institutions and collaborations such as Aeres Hogeschool, FlevoCampus, and the Floriade; (3) and the relatively low liveability rates. In response, this report provides location-specific strategies to accommodate new residents, mitigate vacancies, foster a knowledge economy, and thereby, improve liveability in the city. The other areas are briefly discussed in the next paragraphs. Given their character, the interventions presented in the aforementioned toolbox are very much applicable to the areas under review. However, further research is necessary to determine the location-specific conditions for these interventions in Ijmond, Hilversum and Purmerend.

Ijmond

The region of IJmond is characterised by its coastline, its port, and its heavy industry. At present, the economic activity defining Ijmond is very resource and energy intensive, and while in recent years, initial measures have been taken to make the region's economy more sustainable, a lot still needs to be done. The newly developed Techport is a good example of the region's ambition to invest in sustainability through knowledge. Techport is a knowledge and craftsmanship institution, that merges the forces of education, government and business (the so-called triple helix). This way, cross-pollination between industry and education can facilitate the exchange of knowledge and practical experience. Similarly, the technology campus on the Tatasteel

site offers the training facilities for such practices. However, a knowledge institution or vocational university that attracts young talent to contribute to the triple helix model, is currently lacking. Introducing one (or both) with an expertise of port, steel and offshore industry will generate new employment in the field of sustainable energy. In order to stimulate Ijmond's emerging knowledge economy, housing has to be tailored to those participating in it. The average age of the population in the area is over 40 years (UrbiStat, 2016). Therefore, a diverse housing stock that attracts young talents is becoming **increasingly important to the region. Thanks to its proximity to Amsterdam, cooperation with its knowledge institutions is also possible, where Ijmond can function as a "testing ground" for the innovation fostered in the capital. To achieve this, enhanced accessibility through fast and smart east-west connections and public transport is key.**

Hilversum

Hilversum, which is known for its media sector, shows strong evidences of spatial segregation of different income levels, accompanied by corresponding liveability levels. This is reflected in the built environment as the areas with high liveability and income have a large concentration of detached homes (low density) while the areas with low liveability and income mostly consist of row houses and apartments (higher density). The Media Park acts as a divider of these different areas, but also has the most potential to be the one that connects them. Hilversum needs to attract a young demographic since the average age is 41 years (UrbiStat, 2016). The Media Park could play a huge role in doing so by providing a collaborative environment for innovation in the creative industry. The multitude of new media outlets influences the way that people work in this sector. The park would attract freelancers, start-ups and companies by providing flexible workspaces (co-working) and areas to interact. The park will attract more students by strengthening links between the existing media section of the ROC college and FYI college within the park and the companies through spaces that facilitate knowledge spill-over, and attractive amenities. The new housing area that will be within a redeveloped Media Park, will provide flexibility to its users by appealing to a younger demographic, while accommodating a higher density and enhancing the interaction between

different social groups. The incoming population will be accommodated also through vacancies, in order to optimise the existing urban area and retain the urban footprint of Hilversum, due to the presence of preserved areas around the city.

Purmerend

Since Purmerend is located within a thirty-minute circle around Schiphol, it provides fertile grounds and cost-effective space for expansion and growth. The area, which already boasts four business parks, is supported by urban (re) development in and around the historic inner city, offering opportunities for recreation and affordable living conditions, which will potentially make it an attractive destination for investors and developers but also for the young and creative workforce. With its recently developed research hub, Purmer Valley, Purmerend is aiming to become a key player in the knowledge economy. Purmer Valley, consisting of entrepreneurs and educational institutions, seeks to improve the IT and start-up climate in the region through digitization training, enriching education and the collaboration with tech businesses. Purmerend has the ambition and the potential to become a front-runner in sustainable development, upgrading much of its natural gas infrastructure to renewable energy sources, such as bioenergy, solar energy, wind power and geothermal power. This trend could result into the establishment of a sustainable collaborative hub, a place for innovation where entrepreneurs, developers, and residents work together. This, combined **with** existing plans that aim to establish Purmerend as a center for healthcare for the greater region and as a tourism hub, will increase livability in the area, since new facilities will attract more people reinforcing interaction and social diversity.

Almere: Existing situation

Built environment
- ⬚ Vacant industry and services
- ▨ Definitive construction plans
- ▨ Potential construction plans
- ⦿ Shared offices
- ○ Trainstop

Knowledge economy
- Vocational education
- Higher proffesional education
- Economic clusters

Liveability
- Highest liveability: excellent
- Lowest liveability: poor

BUITENVAART
flowerindustry

DE VAART
waste processing, cars, production

CENTRUM ALMERE-BUITEN
(home furnishing) mall

MARKERKANT
services, cars, IT, communication

VELUWSEKANT & SALLANDSEKANT
cars, machines, production

HOLLANDSEKANT
stosage, redistribution

GOOISEKANT
IT, services, production
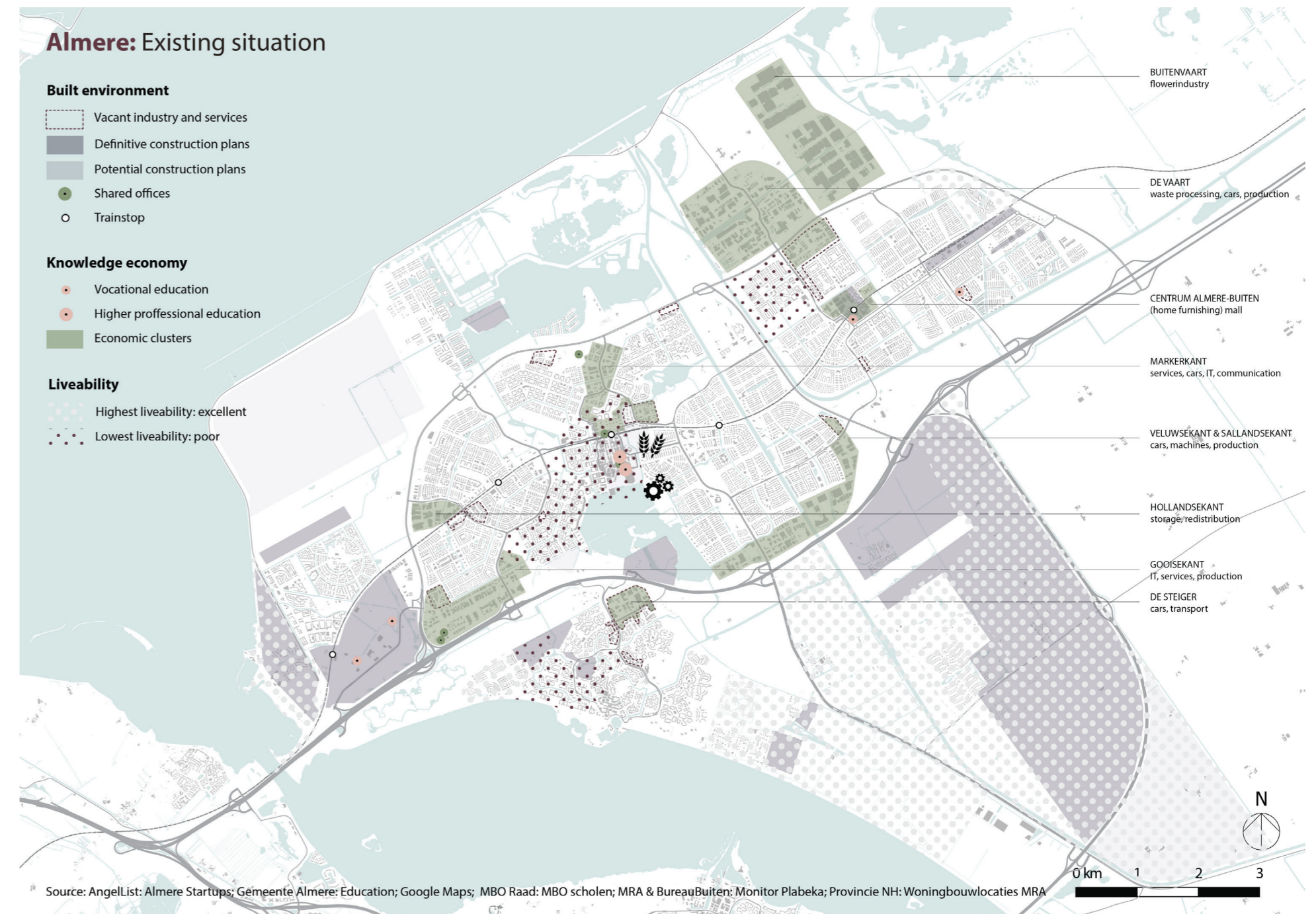
DE STEIGER
cars, transport

N

0 km   1   2   3

Figure 4.2.1.

The existing situation of Almere shows the three considered aspects: built environment, knowledge economy and liveability (Figure 4.2.1.). There are five shared working concepts dispersed over Almere, which is marginal.

The city centre is full of potentials with the higher professional educations and one of the economic clusters located there. It also is home to some problems like a poorly rated liveability and some vacant space.

The aim is to make Almere more sustainable, liveable and competitive (Figure 4.2.2.) by:

• Introducing shared living and working in vacant spaces and potential construction areas
• Creating a knowledge cluster in the city centre to foster innovation through collaboration between existing academic institutions and organisations
• Enhancing Floriades 'green city' concept in the rest of Almere. Intensifying the public transport in order to attract more young people

The major problems and potentials are located in the city centre. This will therefore be the focus of the subsequent sections of the report.

Almere is home to academic and research institutions like the Aeres Hogeschool. The Flevo Campus is a collaboration between the AMS Institute, municipality of Almere, the Aeres Hogeschool and the province of Flevoland. This initiative combines food and urbanisation issues and stands for green city. In 2022, they will host the world exhibition the Floriade in Almere (Flevo Campus, About the Flevo Campus).

In the future, shared offices and possible new academic institutions will be added in Almere (Figure 4.2.3.)
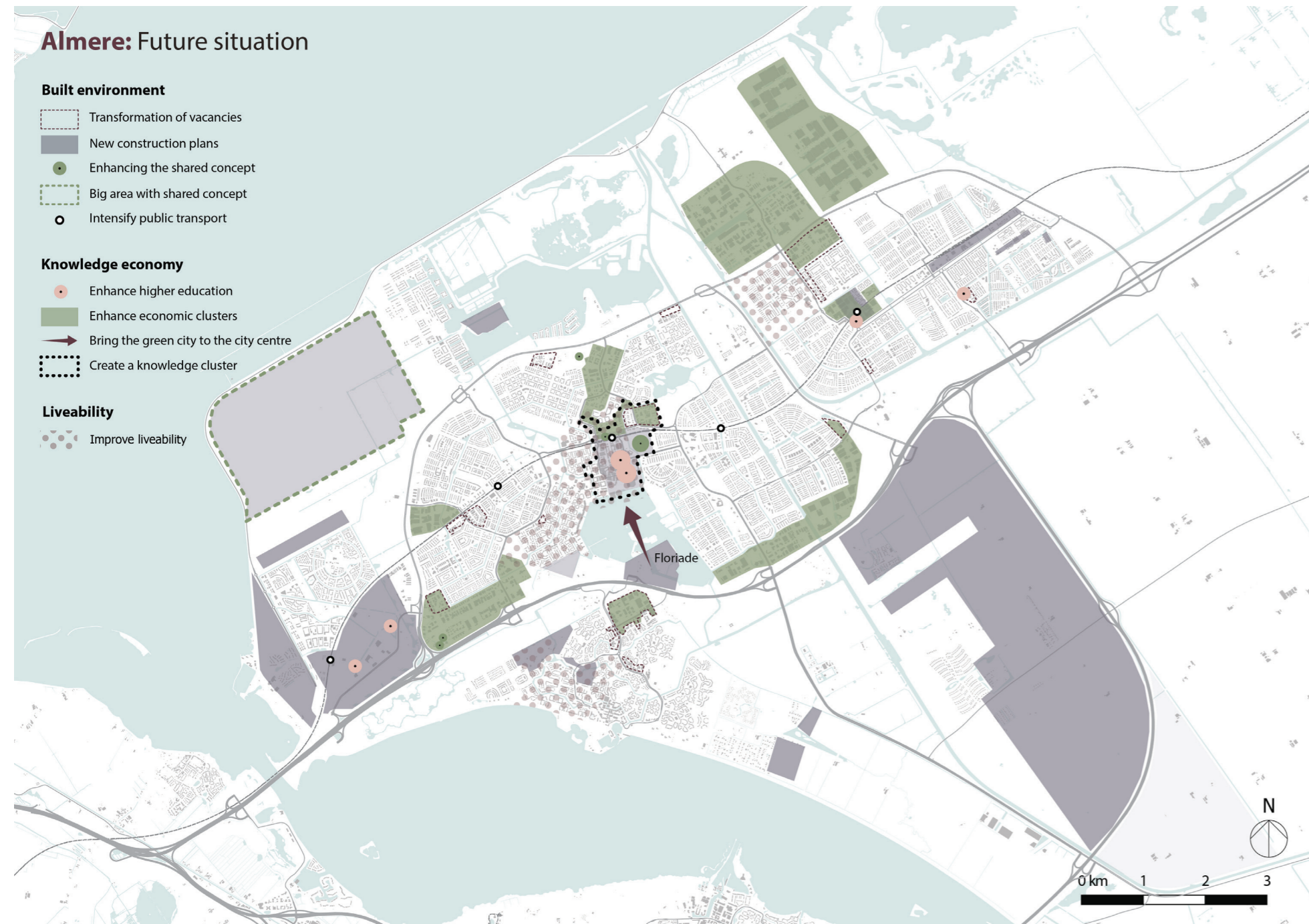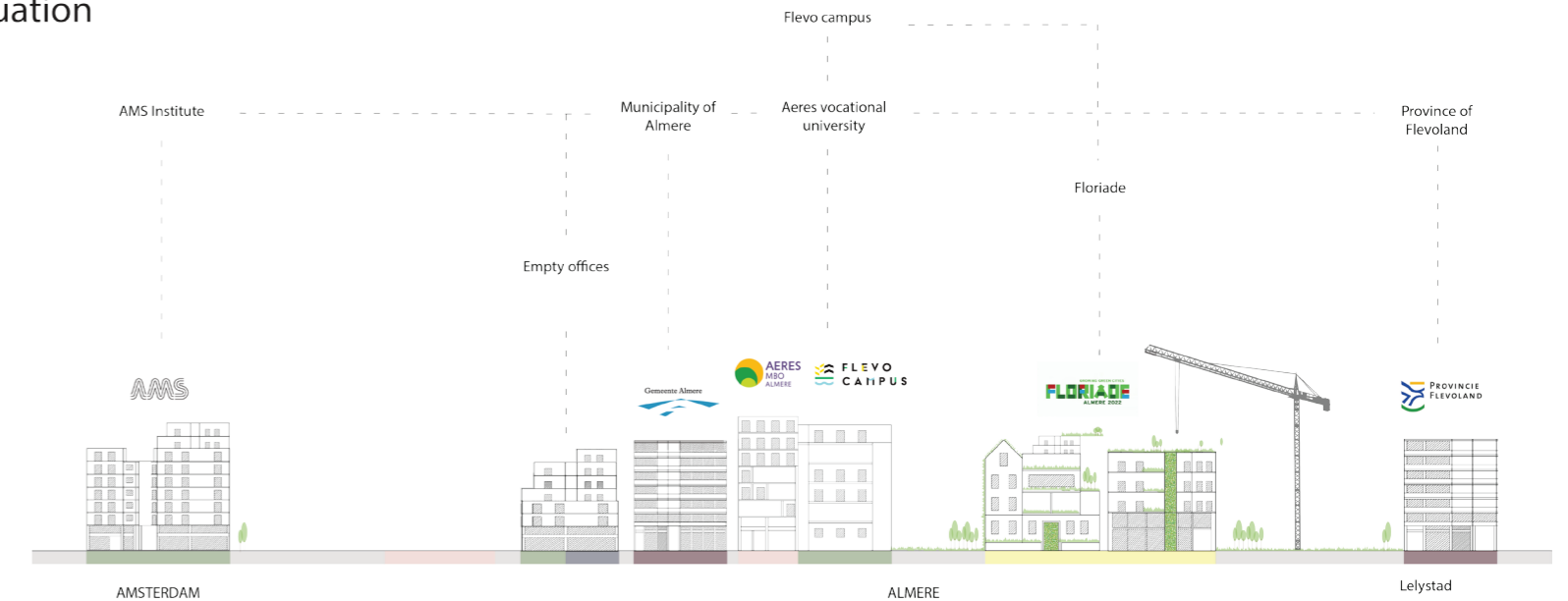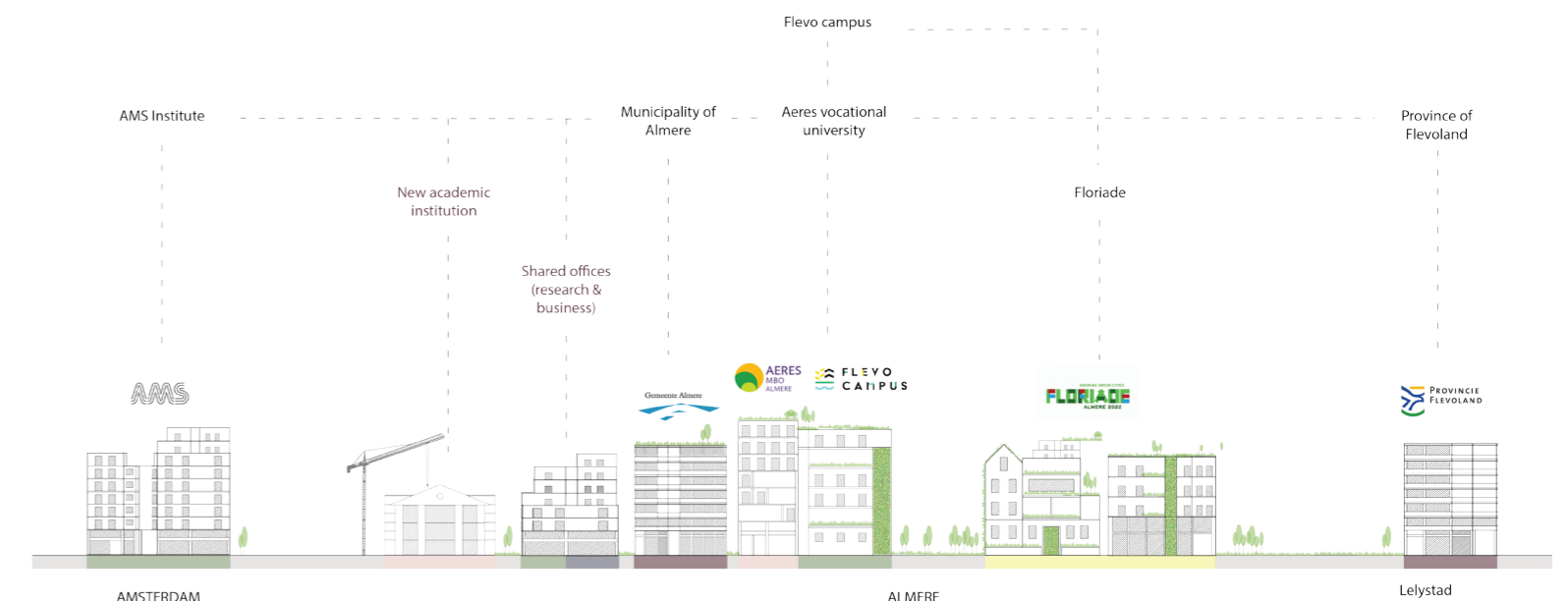

Figure 4.2.2.

Figure 4.2.3.

In the city centre of Almere a knowledge cluster will be settled. A primary school, a secondary school and two higher professional educations are already located in the knowledge cluster. The business terrain suitable for transformation will be turned into a living and working environment. In addition, the opportunity is being tackled to transform the two areas with vacant land. They will be turned into a green cultural and recreative hub and a shared working and living hub.

Almere city centre: Proposed interventions

Transformation
- Industry and offices suitable for transformation
- Vacant land which will be used

Future construction plans
- Potential plans to densify and improve liveabilty

Knowledge
- Primary/secondary school
- Higher proffesional education
- Proposed knowledge cluster

Economy
- Economic clusters

Pedestrian
- Pedestrian routes

railway station

shoppingstreet

restaurants

police station

Aeres Hogeschool

city hall

shopping district

Windesheim

cinema

hospital

theatre

green cultural and recreative hub

shared working and living hub

N

0 m   200   400   600

Source: AngelList: Almere Startups; Gemeente Almere: Education; Google Maps; MBO raad: scholen; MRA & BureauBuiten: Monitor Plabeka; Province NH: Woningbouwlocaties MRA

Figure 4.2.4.

Figure 4.2.5.

Windy and noisy

High quality buildings

Theatre

Cin

The lake and the city centre not connected

Lots of paved surfaces

Green Cultural and Recreative Hub

"Our ambition is to become the country's leading Green City! Let's make the city centre enjoyable for all!"
(municipality)

"We are looking to attract more students to Almere so we want to help make the city more vibrant and enjoyable!" (cultural and recreational hubs)

"Green cities are crucial for a sustainable future. Let's get rid of the concrete and grow green." (Floriade)

"We are working on modular constructions that can be reshaped according to the needs of the users. We are growing and looking to expand our outreach! Can we get involved?"
(startups modulor design related)

"It is in favor of the plans for the GCRH as my theatre will be attracting more visitors as a result of the exposure. I am also very interested in the festival terrain, could we use it for a free outdoor theatre play once a year?"
(theatre owner)

"For us it's really important to have access to a green environment where I can interact with others."
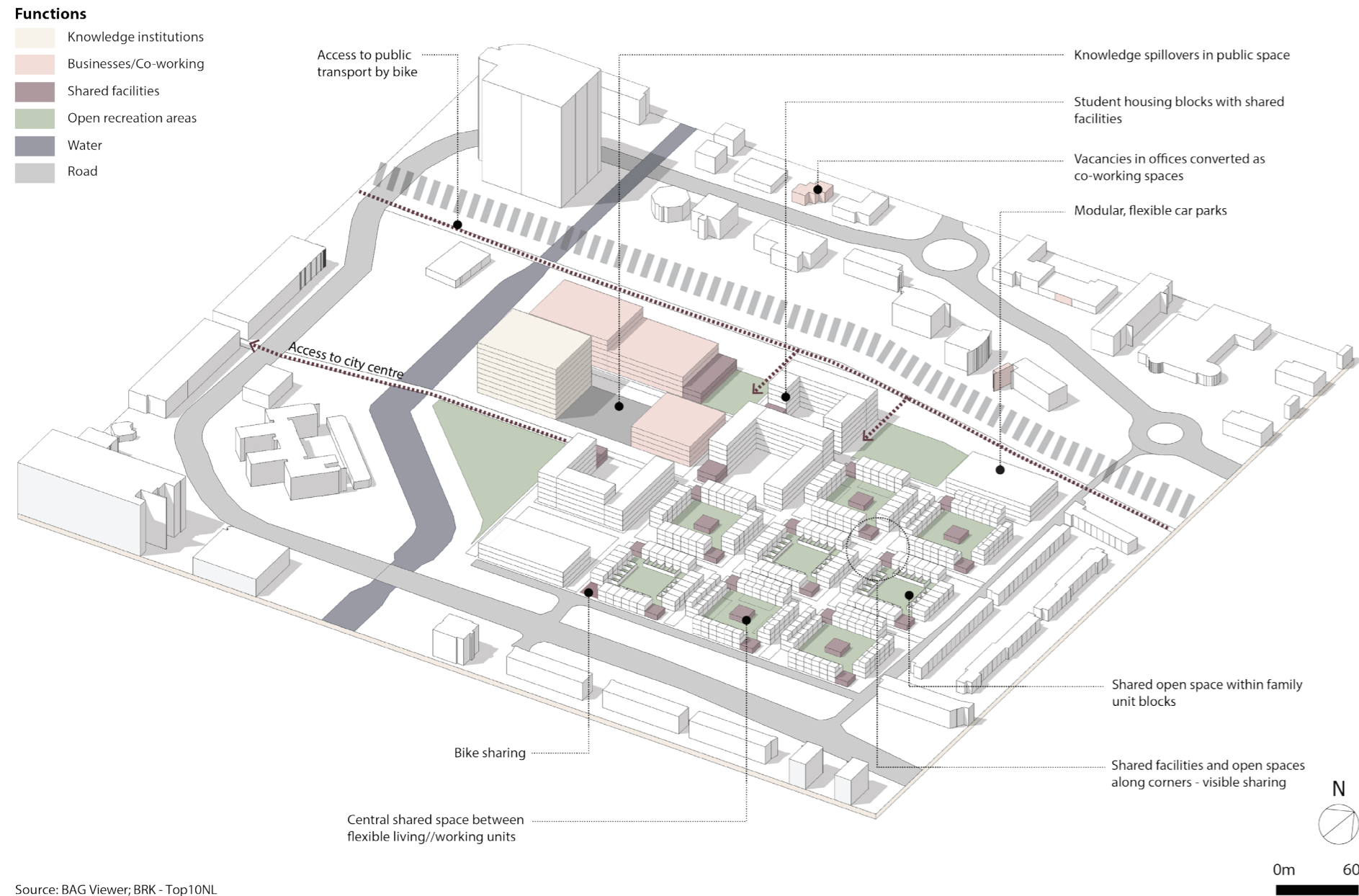(users)

Figure 4.2.6.

The shared living and working hub comprises of knowledge institutions and co-working spaces with spaces that can be shared in order to facilitate interaction and aid innovation. It also houses two person apartments, family row house units and two person row house units, all with communal/shared facilities. The entire neighbourhood is punctured by communal gardens that enable interaction and knowledge spillovers, and provide a sense of belonging within a community of various social groups. The area is n close proximity to the station, with a direct bike lane connecting the two. Flexible parking garages are provided at two ends of the site, which can later be converted to additional housing units. A completely pedestrian and bike friendly network connects the whole area.

The housing densities in the surrounding areas are around 3800-3900 households per square kilometer. However, a higher density is needed so close to the city centre. In addition, the shared living and working hub could accommodate more through the implementation of shared spaces and will thereby reduce the dwelling sizes. IJburg, in Amsterdam has a density of 7100 households per square kilometer. The density achieved in the hub is over 7000 households per square kilometer in addition to working space, therefore resulting in a further optimal use of space. The majority of housing proposed is two person households in order to attract a younger demographic (Figure 4.2.8).

Almere City centre: Shared Living and Working Hub

Functions
- Knowledge institutions
- Businesses/Co-working
- Shared facilities
- Open recreation areas
- Water
- Road

Access to public transport by bike
Access to city centre
Knowledge spillovers in public space
Student housing blocks with shared facilities
Vacancies in offices converted as co-working spaces
Modular, flexible car parks
Shared open space within family unit blocks
Bike sharing
Shared facilities and open spaces along corners - visible sharing
Central shared space between flexible living//working units

N

0m   60

Source: BAG Viewer; BRK - Top10NL

Figure 4.2.7.

Almere city centre: Accomodating the economic and population growth

Quantifying
- Areas nearby
- Vacant land with proposed density

288 2 person row houses

96 family row houses

72 2 person row houses combined with home offices

416 2 person apartments

0,12 km² 7000 households/km² 872 households and working space

400 households 3900 households/km²

680 households 3800 households/km²

IJburg Amsterdam 7100 households/km²

Source: Atelier Groen Blauw; IJburg Amsterdam; Biezen, Amsterdam Luchtfoto IJburg Zuid; Google Maps; KadastraleKaart; NounProject

Figure 4.2.8.

There are three proposed housing typologies: two person apartments, two person row houses and family row houses. They all share different tools and amenities with each other according to their demands.

The two person apartments have a big common space to store bikes, a café and space for coworking. They also share facilities like a gym, a big kitchen, printing, washing and tools. Large open spaces in the centre and as rooftop gardens help foster a sense of belonging to a community. The two person row houses share a communal garden and amenities that they require on a regular basis. There is also a possibility of having a home office within the area.

The family row houses have a small private garden, while also collectively share a communal open space that could act as a playground for children but is also considerably safe as it is ini direct visual contact with the houses. The focus of the shared space will be on products as services like games, toys, tools and garden equipment.

On the whole, these shared areas along the periphery of the neighbourhood activate the street corners, while the inner shared areas create a sense of privacy and safety for certain activities. Being modular in nature, these units offer the users flexibility as it offers multiple configurations within the neighbourhood, thereby enhancing the diversity and making it adaptable to the context.

Shared working buildings have a big gathering area with open working spaces and cafes on the ground floor. There is also be a floor with a machinery hall, labs and lecture halls, which are shared between the educational institutions and businesses. Each floor houses shared sanitary, coffee machines and meeting rooms and office space which can be rented for the longer term. Informal and central meeting spaces play an important role in facilitating knowledge spillovers.
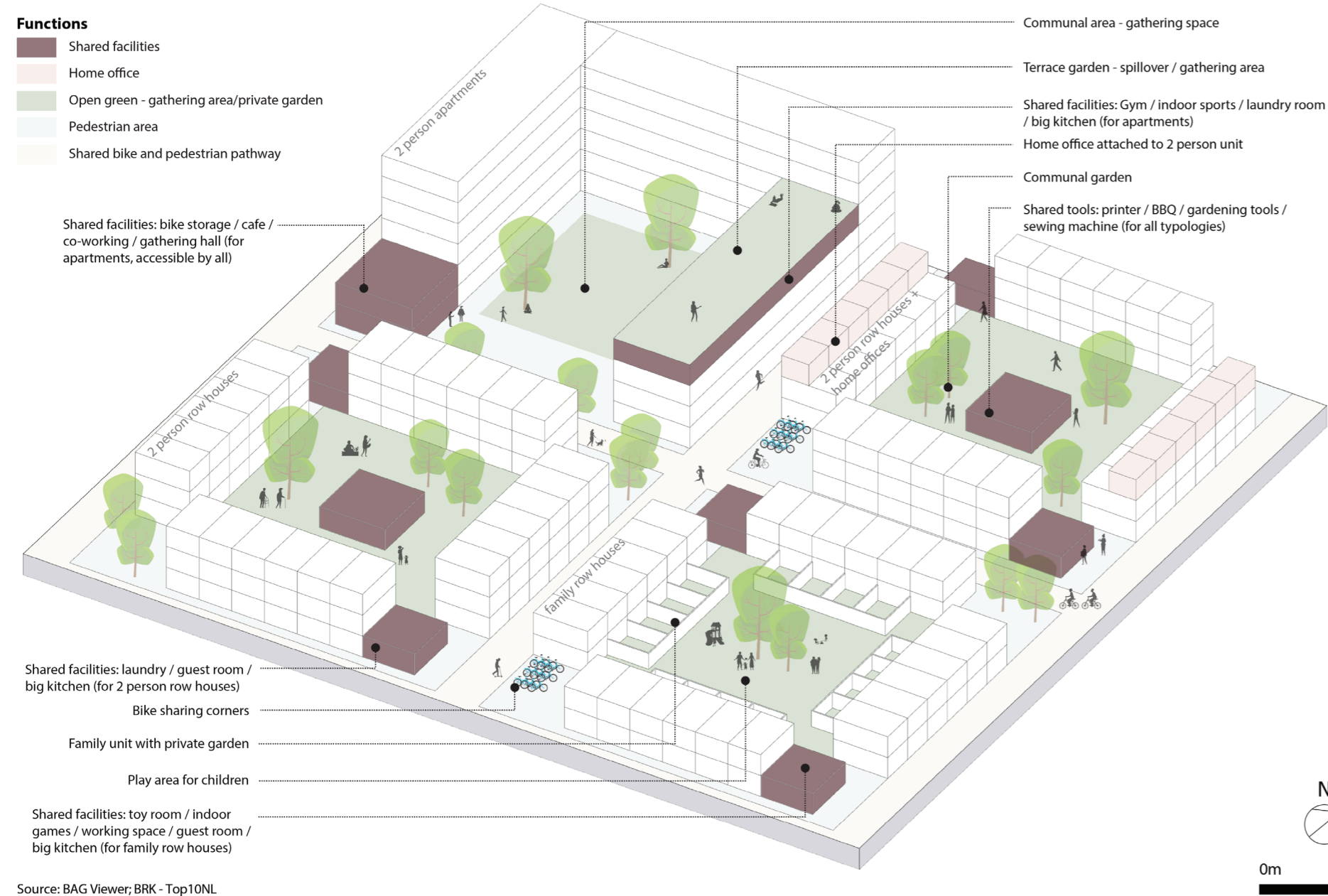
Shared Living and Working Hub: Shared Living

Figure 4.2.9.
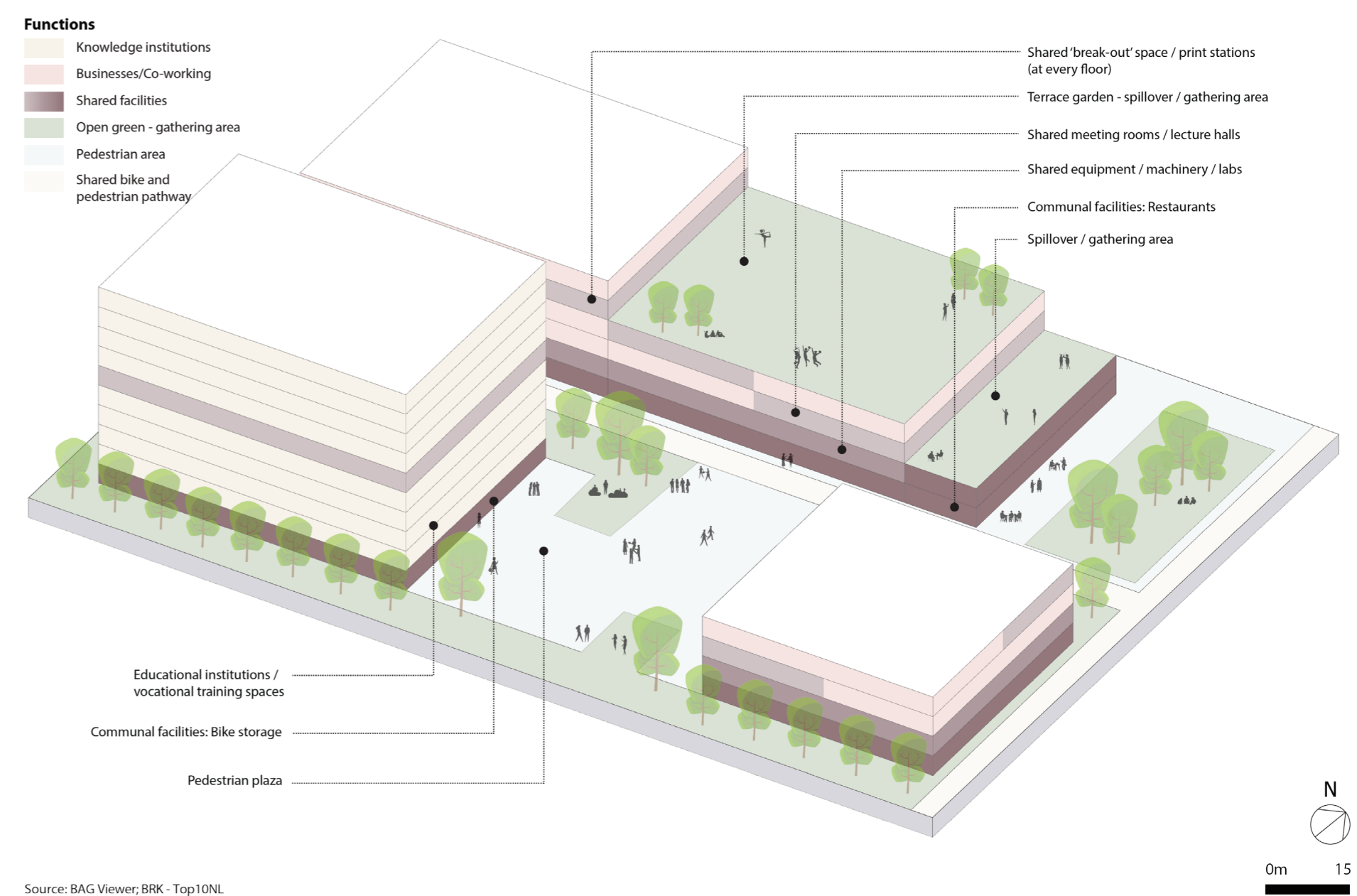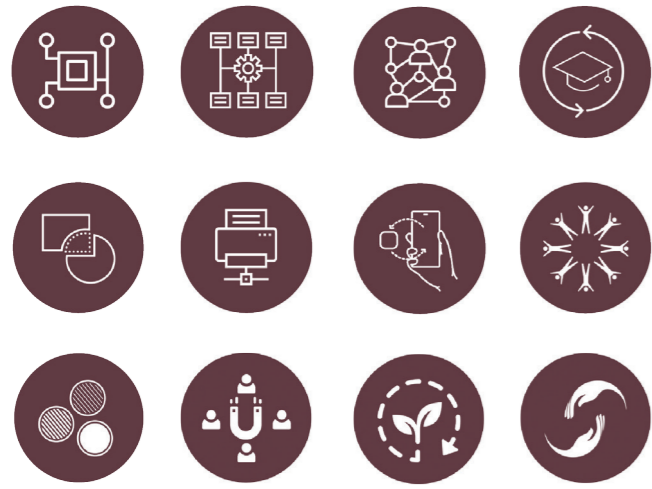
Shared Living and Working Hub: Shared Working

Figure 4.2.10.

Shared Living and Working Hub

"Our ambition is to become an innovative knowledge hub that attracts a lot of people and helps increase economic output!"
(municipality)

"We aim to cultivate a collaborative environment with businesses and provide students with the suitable skills in order to become active and creative members of the society."
(Institutions and universities)

"We want more job opportunities and professional exposure through an exchange of knowledge between universities and companies."
(students)

"I want a creative surrounding with lots of possibilities for spaces to work and possibilities to meet possible people in the same working field."
(freelancers)

"We want an affordable rented workspace with basic inventory and we also want to be able to collaborate with other businesses and have the possibility to meet potential employees that could help us grow."
(businesses and startups)

Figure 4.2.11.

CHAPTER 5

CONCLUSION

OUTCOMES AND EVALUATION

CONCLUSION

At the core of this report are three objectives, namely; meeting the housing demand that the AMA is facing as a result of its increasing population; facilitating the shift towards a more circularly driven regional economy; and ensuring democracy, equality, and the redistribution of spatial benefits and opportunities within the region. The former is addressed by introducing a new understanding on the way we organize our living environment: the built environment as a service rather than a product. Through three key principles, the mitigation of vacancies, the sharing of space, and modular building practices, the AMA can more optimally utilize the existing built environment, while preserving much of its natural landscape, and still accommodate those wanting to live in the region. If the vacancy of office space alone is entirely mitigated through conversion (if suitable) to housing, an estimated 17,222 people can be accommodated within the region. Moreover, this conceptualization of the built environment is also contributing to the circular economy as it significantly decreases resource and energy utilization. This circular approach is not only to be implemented for organizing our living environment but our working environment as well. In addition, this report suggests a shift towards a knowledge economy which may facilitate the transition towards circularity. Lastly, this report suggests polycentric configurations as a spatially just solution to the concentrated structure of the AMA which is showing growing pressure on the regions social fabric.

SUSTAINABLE DEVELOPMENT GOALS

Given the objective to achieve a circular and spatially just AMA, this report assesses the Sustainable Development Goals and evaluates which ones are fulfilled with the presented strategies. The implementation of knowledge economy will improve the quality of education since the institutes are located in knowledge clusters and have the possibility to collaborate with businesses (goal 4). The knowledge in these knowledge clusters is focussed on innovation and sustainability and will therefore help technical progress (goal 9). The knowledge economy is focused on all levels of education, from vocational to universities. It is therefore not exclusive to a small lucky group and inequalities are therefore minimised (goal 10). The triple helix model will enhance collaborations between education, government and businesses and will therefore be favourable for the economy (goal 8 and 17). This report focuses on making optimal use of the built environment with the transformation of vacancies, modularity and 'built environment as a service' and is therefore aiming to achieve sustainable cities and communities (goal 9 and 11). With the concept 'product as a service' the focus is on the quality of the product and therefore responsible consumption and production is advocated (goal 12). Improving liveability helps increasing health and well-being, because of aspects like good air quality and a pleasant green surrounding (goal 3). By accommodating the missing demographics in the new realized housing, inequalities are reduced. This will contribute to spatial justice and will therefore help improving liveability (goal 10).

Knowledge Economy
Optimal use of the built environment
Liveability

SCIENTIFIC CONTRIBUTION

The contribution of this report to the literature and the understanding of the complex region that is the AMA, is multi-fold: First, this report builds on multiple concepts and theories, linking them with one another, in order to provide solutions to the challenges the region faces. For instance, the relation between the built environment as a service and the knowledge economy is underscored. The former, through shared working conditions may facilitate the latter by yielding knowledge spillovers. Additionally, the knowledge economy is presented as a tool to strengthen local economies and thus to achieve a more polycentric spatial structure in which populations as well as economic activity are dispersed. The second contribution is that this report brings to light a multidimensional comprehension of the AMA by overlapping multiple layers related to both infrastructural and social networks. This report concludes that, indeed, the AMA has a monocentric structure as its morphology, functions, and networks, are all centralized at its epicentre. Moreover, social dichotomies and unequal access to livability exist and are very much related to the region's spatial organization.

ETHICAL REFLECTION
AND FURTHER RESEARCH

The report also presents several shortcomings. In order to relieve the pressure from the region's epicentre, the focus within of the report has been on enhancing the knowledge economy in four critical areas namely Almere, and to a lesser extend IJmond, Hilversum and Purmerend. However, research on the last four mentioned regions is necessary in order to articulate more context-specific interventions. Additionally, further elaboration on other regions is necessary to grasp how this newly envisioned polycentric area functions with regard to all the sub-regions within the AMA. Moreover, this report does not provide an indisputable solution to the growing housing problem within the region. While the calculations indicate that an estimated 9936 homes could be accommodated in the region if vacant office space suitable for conversion was transformed into housing, this number is nowhere near the expected growth of the AMA in the next decades. While the conversion of industry terrain into housing would mean another step in the right direction, other measures are needed to accommodate those expected to move to the region. Lastly, the theories drawn upon as solutions have been scrutinized by the international literature and their efficiency questioned. Hence, in-depth evaluation of the spatial and economic alterations to the AMA are necessary to determine their success.

CHAPTER 6

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APPENDIX

INDIVIDUAL REFLECTIONS

INDIVIDUAL REFLECTION

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The project AMA Diffused is an attempt to redistribute the mounting pressure on the epicentre of AMA in a shift towards a more polycentric structure. At the beginning this monocentricity or concentration of social and economic pressure, was what struck me, and it seemed like the obvious thing to do was to shift to a polycentric structure. However, during the process of learning about the concept of polycentricity, I was constantly asking myself what it means for planning. The theory on this subject is extensive and varied, yet does not seem to provide a coherent understanding of how planning policies could enhance such a structure in regions like AMA, which relies on the cooperation between 36 municipalities. One area I struggled with to come to an understanding is how complementarity works and is measured in the regional scale. This seems to be of high importance for the polycentric approach and, in a way, we have addressed that in our project through a focus on enhancing the local economies by fostering innovation from the interaction of academia and practice. We as a group saw that this was the best way to make these peripheral cities attractive, aided by strong transport links between them, and still enhance the prevailing diversity throughout the metropolitan region so as to increase the agglomeration benefits of these areas. What remains to be explored is how much of an impact our approach will have in the distribution of the flows of people and how this structure can be incentivised. In a metropolitan region that is largely held together by its gravitational force i.e. Amsterdam, it will be interesting to see how these local knowledge clusters will facilitate an 'anti-gravitational' movement of people.

While the theory helped us form a goal for the functioning of the metropolitan area, we addressed the implications of a conscious shift to this structure through the built environment as a service. This refers back to the emphasis on sharing and reuse, optimisation and service-centric models as some of the key concepts behind circularity. The concept of built environment as a service questions the way people use space. One of our findings while exploring the social effects of the present structure of AMA, was a correlation between income and liveability levels, which was reflected in the housing pattern in the area. I believe that the flexibility and affordability that comes with the concept of modular construction in the built environment as a service will enable a more just distribution of housing and access to amenities, while emphasising on higher standards in the built environment. This also makes the solution context-specific and user-specific. While new housing areas could potentially tackle these polarities how does one address the existing spatial segregation? I think it is important to reassess the functioning of the social structure in more depth, in order to understand the ground conditions and the root of these polarities. This is an area that I found to be left unexplored in our project which could provide a better understanding of the people that AMA attracts. As an overall theme, both polycentricity and built environment as a service aim to increase mutual dependencies between different actors at different scales and therefore, more importance must be given to understanding these actors involved.

INDIVIDUAL REFLECTION

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In this project, we examined a big pressure on the AMA's epicentre: Schiphol Airport, the city centre of Amsterdam and the port of Amsterdam. The economic output and the demand for housing are high and the predictions indicate that this will continue to grow. Therefore, the aim is to release some pressure from the epicentre and thereby improving liveability in the whole AMA. This is achieved by using two different approaches: a more polycentric area with the knowledge economy as driver and an optimal utilization of the built environment.

In the lecture given by Evert Meijers (2019), it became clear that European metropolitan areas consist of several micro agglomerations. In order to keep up with metropolises in America and Asia, these micro agglomerations should strengthen each other. Since polycentricity is a very complex topic, we focussed by achieving this by enhancing the local economies, especially the knowledge economy. However, it is not possible to state that all the surrounding cities have the opportunity to constitute a knowledge hub. The amount of interventions in those cities is therefore minimal, which can result in negative effects or so-called 'agglomeration shadows'.

The most important concept of the optimal utilization of the built environment is 'product as a service'. This needs a mind shift for consumers and producers. For lots of target groups this can be hard to achieve since people in the Netherlands are being increasingly individualistic and materialistic (Eisinga, Scheepers & Bles, 2012). This mind shift will therefore take a long time, but should especially for this reason be started now. Moreover, the 'built environment as a service' will decrease the amount of consumption and production since the focus of a product is on the quality and the durability. However, this approach doesn't close material loops in order to achieve circularity.

In conclusion, the knowledge economy and the circular mind shift are aligned with future trends. The combination of these theories together with reducing pressure and improving liveability

is in my opinion therefore strong. Pressure is handled in a positive way, since the epicentre can accommodate more people through the optimal use of the built environment and less commuting is needed. In addition, the surrounding cities have the opportunity to flourish from the success of the AMA's epicentre by the enhancement of local (knowledge) economies. These linked theories are generic and could be used for other comparable metropolitan areas with diffused agglomerations. However, I am doubting if the knowledge hubs and the built environment will work out the way we proposed. We promise a lot, but didn't though explicitly about possible setbacks. We therefore didn't really cope with uncertainties like Vincent Nadin in a lecture advised us to.

The most critical case in our project is Almere with problems like a lacking housing demand, a high rate of vacancies and a low liveability. Yet, Almere also has lots of opportunities with the young spirit, the innovative economy, the considerable amount of unused space and the knowledge in different educational institutes. It is therefore uncomplicated to accommodate the 'built environment as a service' and the knowledge economy. Thus, it can be argued whether the interventions in other suggested cities will be as straightforward as Almere.

In the end, our project links interesting topics together and thrives to achieve a liveable AMA for ongoing and future generations. However, more research and more precision is needed to underpin and question the feasibility.

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INDIVIDUAL REFLECTION

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The scope of this project is to envision a future scenario concerning the function of the Amsterdam Metropolitan Area by 2040 and successively its spatial interpretation after developing a set of toolkits consisting of certain strategic principles. "AMA diffused" aims to relieve the pressure from the epicenter of the region and is mainly caused by the population growth and the current function of the main economic engines (OECD, 2015), by improving the performance of the polycentric metropolitan area. This will also result in a more spatially just and livable habitat.

Regarding its scientific relevance, aim of the project is also to facilitate the shift towards a circular driven economy, through redistributing spatial benefits and opportunities within the region. The shift from the existing linear development towards a more sustainable, inclusive, diverse and resilient future will be achieved by defining spatially and enhancing the knowledge driven economies of the periphery, suggesting a more polycentric development model. Also, by introducing a new understanding on the way we organize our living and working environment, focused on the optimal utilization of the existing built environment.

After the research and the thorough analysis of the current state of the AMA, one of the proposed key principles is the (re)activation of the existing vacancies within the urban fabric, and their transformation into co – working and living environments, in a circular way, so as to accommodate the increasing housing and working needs while at the same time mitigating the extension of the footprint of the manmade environment over natural landscape. Apart from vacancies, the demand for new housing will be accommodated through the implementation of modular construction practices, in order to create flexible and adaptable living environments, able to cover the ever changing needs of the increasing population of the AMA.

The proposed knowledge hubs and living environments will function based on the notion of "sharing", which accordingly requires a mind shift from isolation and individualism towards collaboration and communication. This process,

which is embedded with the continuous exchange of knowledge, will start from sharing small everyday items and it will move steadily to more radical spatial and non - spatial practices. As far as the societal relevance of the project is concerned, a new way of life based on interaction, will ensure a more inclusive and democratic future.

However, what is not sufficiently analyzed in the project and needs further investigation is the level up to which a circular economy enables greater livability in cities. Livability is of great importance to local policymakers for attracting people and remaining competitive. Initial indications suggest that a circular economy will influence livability positively, through the reduction of congestion, improved air quality, and the reduction of other forms of pollution (EMF, 2017). Furthermore, taking into account that the circular economy concept is still at a preliminary stage and there in not enough background, development should provide with the quantification in numbers and space needed. Demands are constantly changing and thus an urban planner should be able to foresee and react to those.

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* Lucas Zarzoso will deliver his reflection later

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