Spatial Planning Strategies for the Urban Integration of the Development Driven by Amsterdam Schiphol Airport.

Emilia Machedon - MSc Urbanism Thesis Report
MSc Thesis Report
Graduation Track Urbanism

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Your Home's Check-In Gate.
Spatial Planning Strategies for the Urban Integration of Development Driven by Amsterdam Schiphol Airport.
September 2011 - June 2012

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Emilia Machedon
To Mama, Macu and Hendrik,
for your love and unconditional support.
Preface

This report is the synthesis of nine months of research and design work towards the completion of my graduation thesis in urbanism.

My interest for the airport-driven urban development topic was triggered by the debates on the Aerotropolis book published in the spring of 2011. Later on during the year I had the opportunity to learn about the Dutch case of Amsterdam Schiphol Airport during my internship with the Lola Landscape Architecture office.

With this topic and case I initiated the graduation thesis, putting the pieces of the puzzle together towards a coherent thesis plan and proposal and I decided to join the Complex Cities graduation studio. There were several important moments and meetings towards finding the relevant topics to tackle:

In the first semester I had discussions with the studio staff members who helped me define the research methodology and understand the regional context: Diego, Francisco, Verena, Qu Lei and Stephen.

In February 2012 I participated in the Making Zuidas Winter School within the TU Delft student group. The main challenge we faced was to develop strategies through which Amsterdam’s financial business districts, Zuidas, could become a modern city centre for living, recreation, international trade and knowledge. The Winter School helped me understand what are relevant issues today for the business area as well as its relations with Schiphol.

Throughout the year I conducted interviews with professionals involved in the spatial development plans for Schiphol Airport’s region. I had interviews with the managing director of the GROUNDS, the Schiphol Airport innovation platform with a focus on sustainability, Jonas van Stekelenburg; the Schiphol account manager in the Rijnland Water Board, Erik Schuilenburg, as well as the strategic advisor at the municipality of Haarlemmermeer, Jan Jaap Kolpa. They helped me better understand the Dutch planning system and the airport region’s characteristics and development challenges.

In the spring of 2012 I found out about the Better Airport Regions research project which was going to start in June 2012. Thanks to this project being prepared to start I met Christian Salewski, member of the Airports and Cities research platform at ETH Zurich, who supported me with recommendations in order to better define my research focus.

I want to thank all the people who had the patience and time to answer my questions as well as to the students and staff of the Complex Cities studio for creating such a great working environment. Special thanks to Angela and Tanja for your help, patience and contagious humour.

I want to thank my two mentors at the TU Delft, Roberto and Daan, for helping me create a coherent story line within my area of interest. Special thanks to Roberto for your optimism and for sharing your knowledge with me. Special thanks to Daan for your enthusiasm and for the inspirational advices you gave me.
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1. Thesis Plan

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1. Thesis Plan

1.1. Introduction

This chapter explains the main issues that are tackled later on in the thesis. The problem field of airport driven urban development as well as the Amsterdam Metropolitan Area and Schiphol Airport context were the elements with which I initiated this thesis. In order to define a more precise focus for the research and design phases I consulted several research and practice documents and I conducted interviews with people involved in the spatial planning process (see figure 1). The story line that I composed according to these readings and ideas is explained below and outlined on the opposite page (see figure 2).

The chapter begins with a zoom in from world scale to the local scale. The global scale is necessary in order to define the main trends which support the definition of the airport driven urban development problem field. The most relevant scale within which to study this phenomena related to Schiphol Airport is the Amsterdam Metropolitan Area, which is therefore briefly introduced in this chapter. The local scale refers to the problem areas of the airport related business parks.

The chapter ends with two important statements: the problem definition and the thesis aim. Although the challenges are defined on an urban block scale the processes emerge from the larger metropolitan and world scales therefore a multi-scalar approach will be used throughout the thesis. Moreover the framework within which I will work further on, network urbanism, is presented in the concluding section.

Figure 1. Thesis Plan Main Question. This diagram explains the main methods and sources that I used in order to put together the thesis plan as well as the expected answer. (Author’s own)
<table>
<thead>
<tr>
<th>Topic</th>
<th>Scale</th>
<th>Content</th>
</tr>
</thead>
</table>
| trends & problem field        | World                        | - world accessibility by air travel  
- trends in world economy  
- the airport driven urban development problem field |
| context & study area          | Amsterdam Metropolitan Area  | - administrative context  
- economic overview  
- demographic overview |
| study area                    | Amsterdam Schiphol Airport   | - administration  
- historical evolution  
- regional economic impact |
| problem areas                 | Airport Related Business Parks| - urban integration problem                                                                                                              |
| problem statement & thesis aim| Problem Statement            | - urban integration problem  
- spatial planning process |
| thesis structure              | Thesis Aim                   | - spatial planning strategies for the urban integration of airport related business parks                                                  |
|                               | Network Urbanism Approach    | - framework for research and design                                                                                                       |

Figure 2. Thesis Plan Story Line. This table presents the main story line elements which compose the thesis plan. (Author’s own)
1.2. World Scale Accessibility by Air Travel

The starting point for this project is the influence of air travel on world accessibility.

Air Travel versus Land Travel Accessibility

The expansion of air travel has an important impact on the accessibility and development of cities and city regions around the world. The type of accessibility enhanced by air transport is different from land and water transport accessibility. Air transport creates faster connections between very distanced cities around the world whereas land and water transport provide shorter distances within the city region for the same travel time. Air travel influences the flows of both people and goods which consequently supports new urban development trends in airport regions across the world.

The travel time to major cities map (see figure 4) illustrates land and water based accessibility in city regions around the world. The map shows the travel time in hours and days to the nearest city with at least 50,000 people. However when comparing this map with the travel time around the world from Amsterdam Schiphol Airport (see figure 5) it becomes clear that airplanes bring cities around the world within faster reach of each other in the same way that roads or rail connect cities with their hinterland. For example the travel time between Amsterdam and Berlin by airplane is the same as the travel time between Amsterdam and Rotterdam by sprinter train. The two maps use the same colour legend.

Developing Airport Regions Around the World

The world aerotropolis map shows the location of the most dynamic developing airport regions across the world (see figure 3). The aerotropolis is one of the normative models with a main focus on the local economic development triggered by air travel speed and connectivity. The author proposes an organization model which provides maximum accessibility for activities dependent on their close relationship with the airport. Although the spatial organization model as well as the unlimited growth views promoted by Kasarda are largely challenged by spatial planning researchers (Charles et al., 2007, Schlaak, 2009, Salewski et al., 2012) his study offers one of the most comprehensive inventories of worldwide urban development trends linked to air travel.

![Aerotropolis Map](image-url)
Figure 4. Travel time to major cities. A global map of accessibility. The map shows the travel time to the nearest city with at least 50,000 people by land and water. (Source: Nelson, 2008a. Edited by the author.)

Figure 5. This map shows the flight times of airplanes departing to and from Amsterdam Schiphol Airport. (Author's own with data from Schiphol Group)
1.3. Trends in World Economy

There are three main trends that air travel supports in the world economy and that are relevant for this study. The first two are connected to the competitive advantage provided by high speed connectivity for specific business models. The last one is related to the world spread of labour market.

**The Speed Competitive Advantage**

The first trend refers to the advantages of cargo transport by high speed air transport. ‘The survival of the fastest’ (Toffler, 1990 in Kasarda, 2000) has been described as the indisputable law that would determine competitive advantage in the 21st century. According to Toffler speed would become an imperative in the manufacturing world in terms of development cycles, production flexibility and delivery time. This phenomenon is visible for example in the case of companies that have a globally spread customer base, that source parts globally and that aim to minimize their inventories. High speed transportation infrastructure such as air travel is vital for this business model.

Time based competition is also supported by the rise of internet and e-commerce which has exploded in the past years. In this context airports with extensive flight networks are attracting distribution centres in their proximity. These distribution centres are specialised in the shipment of perishables, just-in-time supply chains or emergency parts. Time sensitive good processing and distribution facilities are heavily dependent on fast access to air travel (Kasarda, 2000).

The second trend refers to passenger transport for business related purposes. Business people, employees, clients or congress attendants are increasingly relying on fast mobility. International congress centres hosting attendants from around the world rely on an easy connection with airports with extensive flight networks. The service sector is also drawn to this location in order to easily send staff to customers’ sites or bring customers to their office (Kasarda, 2000).

**World Spread Labour Market**

The third trend relevant for this study refers to the global mobility of high skilled employees. Cities across the world are engaged in a competition to attract high skilled workers and new investors. In order to provide expats with overviews of the best locations in the world for living and working or establishing new business several institutions and publications publish yearly rankings. The factors used to create the rankings are different among the institutions. Some of these are the Economist Intelligence Unit City Liveability Ranking (see figure 7), the Mercer Quality of Living ranking or Mercer’s most liveable cities ranking.
Figure 7. These columns illustrate the growing interest for the business travel world. The top illustration shows the expats’ decision complexity of finding a suitable location (Source: economist, 2012; EIU, 2011)
1.4. The Airport-Driven Urban Development Problem Field

As a consequence of the previously mentioned trends airport surroundings are becoming attractive locations for business development. Within spatial planning these dynamics are enclosed in the notion of airport-driven urban development. The main characteristics of this notion are introduced further on.

**Definition**

A relatively recent phenomenon, civil aviation emerged as a public means of transport in the XXth century. Since then air transport has been expanding both its passenger and cargo target groups. Moreover airports have broadened their scope from transportation agents to passenger service and leisure providers. This transformation is often enclosed in the airport city concept which mainly applies to the territory within the airports’ fences.

Furthermore airport surroundings have become attractive business locations for reasons such as proximity to air transportation routes, the availability of land for transportation networks or the benefits of economies of agglomeration (Guller and Guller, 2003, Warffemius et al., 2008). Airports have been typically located outside urban areas due to safety and pollution restrictions. However thanks to incentives such as the ones mentioned above, airports have started attracting built environment development within their surroundings.

The notion of airport-driven urban development encompasses the role of airports as both ‘users and producers of urban space’ (Knuppenberger, 2010: p.210). The relation between airports and urban uses can be characterised as being ambivalent because ‘they exert both push and pull forces on urbanization’ (Salewski et al., 2012: p.6). On one hand airports attract in their proximity warehouses, headquarters or offices of activities such as just-in-time logistics, services and knowledge industries relatively dependent on air transport. On the other hand airports push away emission sensitive urban uses such as residential areas (Salewski et al., 2012, Knuppenberger, 2010).

**Spatial Planning Models**

A review of current literature on spatial planning models and critiques has shown that no integral conceptual model of airport-driven urban development has been developed yet (see figure 8). Most planning models so far have focused on the economic-functional dimension of airport-driven urban development. However the implications for spatial planning are numerous, regarding not only economic but also social, environmental and governance dimensions (Freestone and Baker, 2011, Salewski et al., 2012).

The existing spatial planning models have a very diverse character. They are either normative models: the airport corridor, the aerotropolis, or analytical models: the airea. Moreover their authors have very different backgrounds in sociology, economics or urban planning and they represent different authorities: the spatial planning profession and academia or airport management.

**Challenges**

The review has also shown that a regional perspective is recommended for the planners dealing with airport area development as well as ‘the alignment of airport master planning and broader urban and regional plans’ (Freestone and Baker, 2011: p.263). Main research conclusions show that airports are becoming new centralities within their urban regions. Therefore the urban regional integration of airports and cities is prescribed as a way of increasing the performance of urban regional systems and airport systems (Salewski et al., 2012). Multiple authors indicate the need for the development of new conceptual frameworks that would help better understand the complex urban interactions triggered by airports on a regional scale (Freestone and Baker, 2011, Salewski et al., 2012, Schaafsma, 2009, Schlaak, 2009, Knuppenberger, 2010).

**Emerging Awareness**

The interest for this problem field has been increasing in the past years in both the spatial planning research and practice fields. For example in the academic world research initiatives such as the Airport Metropolis Project hosted by the Queensland University of Technology in Australia or the Better Airport Regions research programme funded by the Netherlands Organisation for Scientific Research (De Nederlandse Organisatie voor Wetenschappelijk Onderzoek - NWO) are currently emerging. The public’s curiosity has also been triggered by the international bestseller Aerotropolis The Way We’ll Live Next (Kasarda and Lindsay, 2011).
### Airport Corridor
- Coordinated provision of infrastructure and commercial development.
- Airport CBD axis
- Private developer and public infrastructure authorities
- Schaaufsm et al., 2008
- Schiphol Airport
- Mix of densities suited to location
- Mutual airport city development strategies
- Potential welfare strategies
- Public private cooperation

### Aerotropolis
- Time sensitive metropolitan scatter of airport oriented uses.
- Airport-centered metro
- Private market
- Dallas Forth Worth Airport
- Low density spread city
- Building competitive advantage into urban form
- Business orientation
- Mixed jurisdiction for planned versus unplanned

### Airea
- Discrete spatial cluster of airport related uses.
- Metropolitan subregion
- Private market
- Denver
- Polycentric urban form
- Multiplicity of economic development and marketing nodes
- Business orientation
- Regional planning

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**Figure 8.** The table shows an overview of the main characteristics of three spatial planning models of airport-driven urban development: the airport corridor, the aerotropolis and the airea. (Source: Data from Freestone and Baker, 2011 and Schlaak, 2010)
1.5. The Amsterdam Metropolitan Area Context

The study area within which I chose to investigate this problem field is the Amsterdam Metropolitan Area in the Netherlands which hosts the International Airport Schiphol. A brief overview of the area’s and of the airport’s important characteristics will permit to situate Schiphol in its metropolitan context.

Introduction

The Amsterdam Metropolitan Area (Metropoolregio Amsterdam) is the urbanized area situated in the northern half of the Randstad agglomeration. The metropolitan area has a population of roughly 2,313,403 people and it covers 1,276 km² of land surface, 970 km² of water surface and 334 km² of grassland (Gemeente Amsterdam, 2011). It is therefore one of the most densely populated city regions within Europe with 1,813 inh/km². Moreover it is also one of the wealthiest city regions ranking 6th within Europe in terms of GVA per capita (City of Helsinki Urban Facts, 2009). The region’s diverse economy has internationally competitive sectors such as business services, ICT, tourism or logistics. It is both physically and virtually well linked with the rest of the world through its port, hub airport and internet exchange points (Regiegroep Noordvleugel 2040, 2008).

Governance

The Amsterdam Metropolitan Area also stands for the administrative partnership established between local and provincial governance structures as a successor to the North Wing partnership (Noordvleugel). It consists of 36 municipalities, two provinces, North Holland and Flevoland, as well as the Amsterdam City Region (Stadsregio Amsterdam) (see figure 9). Their areas of cooperation include traffic and transportation, economy, urbanization, landscape and sustainability (Gemeente Amsterdam, 2011).

The resolution to rename the North Wing as the Amsterdam Metropolitan Area was taken in 2007 through the North Wing Development Scenario 2040 (Ontwikkelingsbeeld Noordvleugel 2040). The North Wing Development Scenario contributes to a new approach to spatial planning in the Netherlands instituted by the New Spatial Planning Act (Wet Ruimtelijke Ordening) of 2008. The Act promotes the elaboration of structural visions by government tiers which promote national, provincial or regional level interests (Regiegroep Noordvleugel 2040, 2008).

Economy

The industries which have provided the highest economic growth in the past 15 years in the Amsterdam Metropolitan Area are wholesale trade and transportation (aviation), financial and business services, ICT, telecommunications and health care. The highest average economic growth has taken place in Amsterdam and the municipalities of Haarlemmermeer, the rest of Amstel Meerlanden, Waterland, Almere and Lelystad. These municipalities have the advantages of hosting advantageous industries in areas with high accessibility and necessary space available (Economische Zaken Amsterdam and de Kamer van Koophandel Amsterdam, 2011).

The number of people employed in the area is of roughly 1,258,116. They form a group which is relatively highly educated compared to the national average. However there are contrasts within the area between the north and the south since the higher educated employees are more likely to reside in the south. Moreover the working areas are also located in Amsterdam and in the southern regions in: Haarlemmermeer, the rest of Amstel Meerlanden and in the Gooi and Vechtstreek region. The working areas have a higher number of people commuting to come to work than the number of people departing to work. The residential areas have the opposite commuting pattern and in this context they are: Waterland, Almere, Lelystad, Ijmond, Zaanstreek and Haarlem (Gemeente Amsterdam, 2011, Economische Zaken Amsterdam and de Kamer van Koophandel Amsterdam, 2011).

Population

The municipalities with the highest number of inhabitants in the Amsterdam Metropolitan Area are Amsterdam, Almere, Haarlem and Zaanstad. In the coming 15 years the population is expected to grow through both immigration and natural increase at a higher rate than the rest of the Netherlands. The main growing municipalities in the area are Amsterdam, Almere and Haarlemmermeer. The current migration trends are for families to move outside of Amsterdam and for young single people to move to Amsterdam (Jong and Duin, 2011, Gemeente Amsterdam, 2011).
Figure 9. These maps show the location and the administrative units of the Amsterdam Metropolitan Area within the Netherlands as well as the position within Europe and the world. (Source: author’s own)
Amsterdam Schiphol Airport

The International Amsterdam Airport Schiphol is located in the Schiphol administrative unit within the municipality of Haarlemmermeer. The airport ranks 3rd in Europe and 17th worldwide in terms of cargo and 5th in Europe and 15th worldwide in terms of passengers. Amsterdam Schiphol is a hub airport: it facilitates the transfer between European and intercontinental flights. It offers a very wide variety of worldwide destinations with 301 connections in 99 countries around the world.

Schiphol Group runs the airport operations. It is organised and run as a commercial enterprise. Its shareholders are the state of the Netherlands (69.8%), the municipality of Amsterdam (20.0%), Aéroports de Paris (8.0%) and the municipality of Rotterdam (2%). Schiphol Group is also a partner in several collaborations between private and public authorities which manage development in the airport’s region. The group’s operations are organized into four business areas: Aviation, Consumers, Real Estate and Alliances & Participation (Schiphol Group, 2010).

Schiphol Airport is the home base of KLM Royal Dutch Airlines (Koninklijke Luchtvaart Maatschappij). Air France - KLM is the largest European airline group since the merger of the two airline carriers Air France and KLM in 2004. Both carriers continue to fly under their brand name since their merger. KLM is the oldest airline in the world still operating under its original name. KLM’s headquarters are located in Amstelveen (KLM, 2011).

History

Amsterdam Schiphol Airport’s role in the Netherlands has evolved over time. The airport is the oldest in the world to have remained in its original location. The establishment of the first military airport in the marshy lands of the Haarlemmermeer polder took place in 1916. At the end of the First World War the airport started to also offer civil transportation services. The first civil airport development boost was given by the Olympic Games that were held in Amsterdam in 1928.

During the Second World War the airport was completely destroyed by the German army. Subsequently the Dutch government financed the airport’s reconstruction and in return requested to become a part of a new form of management. The airport was previously run by a municipal department. Luchthaven Schiphol became a privately held company in 1958 in which the Netherlands state acquired a 75.8% share, the Municipality of Amsterdam a 21.8% share and the Municipality of Rotterdam a 2.4% share.

In 1988 the mainport strategy was launched with the purpose to maintain the airport’s position among Europe’s top 5 and to support economic growth. In 2008 following the strategic alliance with Aéroports de Paris, Schiphol Group and ADP each took an 8% share in the other. The alliance helped the airport strengthen its position as one of Europe’s main strategic nodes in comparison with competing airports in Europe and the Middle East (Schiphol Group, 2011).

There are four main stages in the Amsterdam Schiphol Airport’s development:

1. Airport: air transportation infrastructure, since 1920;
2. Mainport: engine for economic growth in the region, since 1980;
3. Airport City: business model for aviation and business development, since 1990 to present;
4. Airport Corridor: positioning the airport in its urban regional setting, since 2001.

Regional Economic Impact

Amsterdam Schiphol Airport contributes to the attractiveness of the Amsterdam Metropolitan Area as a location for international headquarters, convention venues and tourism. Within the region the airport acts as both a transport node and an economic growth pole. The aviation sector is composed of the carriage of passengers and cargo by air and it employed around 20,000 people in 2002. Total employment in and around Schiphol is of around 60,000 people. Studies have shown that the total direct multiplier on direct employment in the Amsterdam Metropolitan Area is 2.0 meaning that for one job created at Schiphol approximately one more job in indirect and induced employment is created within the region (Economische Zaken Amsterdam and de Kamer van Koophandel Amsterdam, 2011, Hakfoort et al., 2001, Schaafsma et al., 2008).
Figure 10. These maps show the intercontinental and continental flight networks of Air France - KLM, the largest European airline group. (Source: KLM, 2012)
XXth century: second industrial revolution
beginning of urban expansion outside the
XVIth century canal girdle

1915 - 1940
expansion of the city southwards and
westwards through the plans of Berlage

Plan Zuid
new types of large housing blocks
contrasting with the existing typologies

Plan West
follows the expansion principles
established through the plan Zuid

1934
collection of the Amsterdamse Bos
started: 200,000 trees were planted and
several lakes were created

1966:
expansion into the Bijlmermeer polder
through a high rise residential area

1990s
initiation of the IJburg expansion through
the creation of new land in the IJ Lake

1999s
opening to the public of Schinkelbos,
a wetland area to the south of the
Amsterdamse Bos

Figure 11. These maps shows the buildings in the metropolitan area by years of construction between 1920 and 2010 correlated with important expansion plans. (Source: GeodanResearch, 2011)
Figure 12. These diagrams show the passenger numbers and the different stages in the airport’s expansion as well as important milestones in the airport’s history. (Source: Gordjin et al., 2009. Edited by the author)

**Airport**

1916
opening of the military airport

1926
Municipality of Amsterdam takes over Schiphol civil airport in order to prepare for the Olympic Games

1930
first intercontinental flight from Schiphol

1940
German Army bombs the airport

1957
tax free shopping

1967
official opening of the reconstructed airport

1978
official opening of train station at Schiphol

**Mainport**

1988
launch of mainport strategy

**Airport City**

1995
official opening of the Schiphol Plaza
1995
Thalys begins its service through Schiphol

**Airport Corridor**
1.6. The Urban Integration Problem

The success of the Schiphol Airport related business parks has been proved by their expansion in the region, their economic performance and their international attractiveness. Moreover airport related business parks are encouraged to grow further on through regional scale strategies. The Airport City strategy promoted by Schiphol Group is restricted to the airport’s territory. The Airport City regional urban node aims to develop a new kind of urbanity and it is based on human interaction rather than on traditional residential urban qualities. The impulse to look beyond the airport fences was first given by the Dutch government in the late 80’s when it decided to develop the country’s two main ports: Rotterdam harbour and Schiphol airport. The public private partnerships which were thus created are currently developing the area around the airport according to the Airport Corridor strategy (Schaafsma, 2009).

There are two main industries which seek to benefit from the advantages of a location in the proximity of Amsterdam Schiphol Airport: one is focused on goods; air transportation dependant logistics companies and the other one is focused on people; international companies dependant on business travel (Schaafsma, 2009). One of the key elements in the airport’s related economy success was the development of innovative cold logistics chains. This facilitated the export of fresh cut flowers and fresh vegetables, prime Dutch exports (Kasarda and Lindsay, 2011). From a spatial distribution perspective the logistics parks are clustered to the south and the business parks are clustered to the north of Schiphol Airport. These areas benefit from the advantages of economies of agglomeration meaning that their clustering of activities facilitates their production. For example the proximity of the flower glasshouses to the flower auction buildings and to the airport’s cargo transportation facilities optimizes the flow of perishable goods.

Office spaces have been built mainly in business parks (see figure 13). The best known example and the most important stop along the airport corridor is Zuidas. Zuidas is the financial and legal service business district which is being built on the strip of land between Amsterdam and Amstelveen on both sides of the A10 ring road. The development’s catalyst was ABN AMRO’s decision in 1994 to build their new international headquarters next to the A10 highway. Their decision’s incentive was the location’s excellent national and international accessibility. The Zuidas coalition of private and public stakeholders formed soon after and in 1998 the Zuidas masterplan was approved by Amsterdam’s city council. Although ever since the initial masterplan there has been the demand to create a multi-functional area Zuidas has until now developed as a rather mono-functional business district (Salet and Majoor, 2005, Zuidas Amsterdam et al., 2009).

Challenges

The current vision for the spatial development of the Schiphol region, the airport corridor, promotes a spatial-economic development perspective (Bestuursforum Schiphol, 2009). The airport corridor spatial planning model advances the coordinated provision of infrastructure and development linking the airport to the metropolitan city centre (see figure 15). From a spatial perspective this expansion model is criticised because it creates barriers to crosswise development hence fuelling further fragmented linear growth (Freestone and Baker, 2011, Schlaak, 2009). Moreover both the airport city and the airport corridor are criticised for being spatial enclaves in their metropolitan region. They have an enclave character because they are not physically and socially connected to their direct environment and because they are mainly transit areas (Schaafsma, 2009).

Furthermore the airport corridor model does not provide an integrated development vision. The model focuses on creating spatial conditions for the economic development of airport related business target groups. It therefore mainly promotes the airport’s interests. The challenge of developing the synergy between the interests of the metropolitan region and the interests of the airport is important (Schaafsma, 2009). This challenge is mostly relevant within a sustainability framework which integrates the social, economic, environment and governance dimensions. Airports play important roles in all these dimensions as they attract, generate and divert ‘large flows of people, goods, and information in the regional context’ (Salewski et al., 2012; p.4). It is recognised that the airport as an integrated centrality within the urban region would provide benefits for both the urban regional systems as well as for the airport systems (Salewski et al., 2012).
Figure 13. This map of the Amsterdam Metropolitan Area shows the existing and future business locations dependent in different degrees on Amsterdam Airport Schiphol. (SADC, 2012, Rocco, 2008. Edited by the author)

Figure 14. Bird’s eye impression of the Schiphol Corridor. (AirportNEXT, 2012)
1.7. Thesis Aim

The aim of this graduation thesis is to tackle the issue of airport-driven urban development from both a theoretical and a practice perspective. From a theoretical perspective the thesis aim is to investigate the current state of research on spatial planning models of airport-driven urban development and to explore alternative approaches within a network urbanism framework. From a practice perspective the thesis aim is to propose a multi-scalar development strategy which aims to solve the local urban integration problem of airport related business parks and to be in line with the regional development challenges of the Amsterdam metropolitan area.

The changing nature of airports in their metropolitan region raises a host of questions for spatial planning. In order to better understand these complex roles and spatial interactions new conceptual frameworks are needed (Stevens et al., 2010, Freestone and Baker, 2011, Salewski et al., 2012). Normative and analytical spatial planning models of airport-driven urban development are currently being developed. These models are not yet complete therefore a critical approach is recommended whenever dealing with any of them. A literature review will therefore explore their present state of elaboration. In order to broaden the debate on possible conceptual frameworks a network urbanism approach will be introduced. In the end I wish to evaluate the fitness of this approach.

The current airport regional development strategy is developed and monitored by Bestuurforum Schiphol, the cooperation between the municipalities of Amsterdam and Haarlemmermeer and the province of North Holland and Schiphol Group as an advisor. I wish to propose an alternative development strategy which aims to tackle the challenges of airport-driven urban development integration on both a local and regional scale according to the challenges identified through the research phase. By comparing the two strategies I can evaluate the advantages and disadvantages of both approaches.

1.8. Research Questions and Thesis Structure

There are two main research questions this thesis aims to answer. The first one is a design oriented question aiming to discover solutions for future development. The second one is a research oriented question aiming to discover potentials and challenges for future development within the study area.

MAIN RESEARCH QUESTIONS:
1. What are spatial planning strategies for the urban integration of airport related business parks within a network urbanism framework?

2. What is the character of the networks connecting airport related business parks located along the Schiphol Airport corridor and their direct urban environment?

SUB-RESEARCH QUESTIONS:
2.1. What are relevant airport related urban networks?

2.2. What is the character of the Schiphol Airport related urban networks on a regional scale?

2.3. What is the character of the airport related business parks urban networks on a local scale?

The scheme on the opposite page (see figure 15) shows the thesis structure: main steps towards reaching the thesis aim and the chapters dealing with each topic.
Figure 15. Thesis Structure. This diagram illustrates the thesis structure: main steps towards reaching the thesis aim and the chapters dealing with every topic. (Source: author’s own)
1.9. Relevance

The topic of this thesis is relevant for both society as well as for current research and practice. Airports influence not only employment opportunities and economic growth on a national scale but also living environment conditions on a local scale. Moreover current initiatives are investigating the problem field through joint efforts of the academic and of the practice worlds.

**Societal Relevance**

Through this thesis I am approaching the regional development issue considering the current societal challenges specific to the Amsterdam Metropolitan Area. Through this approach I want to integrate the specific needs of the metropolitan area’s inhabitants.

Airports and considered locally unwanted land uses, because even if they are useful to society they are objectionable to their neighbours. In this thesis I want to investigate possible areas of cooperation through which the airport’s influence can transform it into a wanted land use. In this sense the topic of integration between airport dynamics and regional dynamics is relevant for society.

**Externality effects** are important to be taken into consideration in airport regions. It is not only through noise emissions that planes affect the quality of life of residents. Decisions that are currently taken with the scope of improving regional economic performance can also influence local living conditions. An approach that also takes into consideration the impact of airport related driven development on their surrounding residential environments is therefore relevant.

**Scientific Relevance**

Moreover the more specific topic of regional airport integration is currently being investigated through various research initiatives (see figure 16). Airport-driven urban development is an area of spatial planning that has so far been insufficiently studied in scientific literature (Freestone & Baker, 2011). There is a need to develop new frameworks through which better development models can be proposed.

In this context the Better Airport Regions research project which will take off in June 2012 aims to ‘design a new regional (metropolitan) development for airport regions as the hub for sustainable development based on sustainable mobility, closed material, water and energy cycles’ (tudelft, 2012). The topic is also on the discussion table of Schiphol Group through its Urban Regional Integration seminar held in June 2012 which brings together both researchers and practitioners.

In my thesis I wish to propose a network urbanism framework for explaining and designing future development models. I believe this approach can provide a starting point for future research. Network urbanism theories provide a good framework for understanding relationships, potentials and constraints generated by networked transportation infrastructures. I will evaluate their applicability in the thesis concluding chapter.

‘The central task frequently remains the delicate balancing of local livability and sustainability, national economic interests, and international dynamics’  

‘Regional Urban Integration is a moving target. Scientific insights keep on evolving; we still have to learn a lot.’  
(Schaafsma, 2012)
Figure 16. Regional Urban Integration Seminar Program. This seminar program shows the topics of interest for the seminar held in June 2012 at Schiphol which brought together researchers and practitioners from the field. (Source: airportNEXT, 2012)
## 2. Theoretical Framework

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2. Theoretical Framework

2.1. Introduction

This chapter presents the main spatial planning theories that I used in order to build the analysis and project proposal. It zooms in from the general scope of spatial planning to the framework of network urbanism theories in order to be able to approach the study area. In the end there is a short overview of the current state of elaboration of spatial planning models of airport driven urban development in order to be able to further on build upon existing concepts (see figure 17).

The chapter begins with a general introduction into the field of spatial planning explaining its main scope and complex nature. Moreover it also introduces the need to define a clear framework within which to work. Following this recommendation the chapter explains the theoretical framework within which I chose to develop this thesis. More precisely it presents network urbanism theories chosen for their fitness to understand the study area’s dynamics. Further on the chapter explores three relevant spatial planning theories of airport-driven urban development.

The chapter ends with conclusions regarding the fitness of a network urbanism theory approach as well as potentials and gaps of existing spatial planning models.

Figure 17. Theoretical Framework Main Question. This diagram explains the main methods and sources I used in order to put together the theoretical framework.
2.2. Spatial Planning

Spatial planning refers to **planning with a spatial component** in which the general objective is to provide for a spatial structure of activities (or of land uses) which in some way is better than the pattern existing without planning (Hall, 1992: p.4). The planning activity refers to the creation of a sequence of action that will lead to the stated goals. The sequence of action explanation can be done through a wide range of techniques ranging from written statements to statistical projections. Techniques involving a spatial representation of this sequence of action are characteristic to spatial planning. Urban and regional planning are specific cases of spatial planning (Hall, 1992).

Spatial planning has a very broad multi-disciplinary character requiring skills which cover the ‘whole of human experience’ (Hall, 1992: p.10). For example spatial planning shares knowledge with the domains of economy, sociology, geography and social psychology and it uses skills from cybernetics and statistics. ‘The most the planner can do is to try to reach a decision within a clear and explicit framework’ due to the complexity of his working environment (Hall, 1992: p.11). Moreover the spatial planner needs to define his **framework of action** in order position himself within the varying interests and skills of practitioners from the same field (Hall, 1992).

The complex nature of the spatial planning task does not allow for a scientific base when confronting it. As science has developed to deal with definable problems it cannot be used in the case of problems which cannot be definitively described. Planning problems deal with open societal systems and they are inherently wicked. **Wicked problems** have no definitive formulation as the processes of understanding and formulating the problem are concomitant to each other. Accordingly the process of defining the solution depends on the effort investment and the final solution can be only good or bad, depending on the established criteria (Rittel and Webber, 1973).

Not only does planning deal with creating processes within urban or regional systems but **planning is also a process** in itself. Spatial planning can be explained by using a systems planning approach. A systematic planning process includes both a controlling system and a system which it seeks to control throughout the process. From this perspective the diagram below illustrates the spatial planning process. The diagram clearly differentiates the controlling and controlled systems. It also explains the cyclical nature of the process through the feedback loops (Hall, 1992).

![Figure 18. Spatial Planning Process. This diagram explains the cyclical nature of the spatial planning process through feedback loops within a systems planning approach. (Source: Chadwick in Hall, 1992: p.231)](image-url)
2.3. Network Urbanism

The preliminary analysis conclusions indicate the relevance of the networks in which the area is included, be they physical, economic or social. It becomes therefore appropriate to look at existing theories on possible relations between spatial planning and network approaches. According to Dupuy (2008) the network approach in urbanism breaks off with the orthodox planning concepts of zoning. Although historical figures such as Cerdà or Wright had included network concepts in their work these were generally neglected. Dupuy’s interpretation of the network concept in earlier authors validates the idea and endorses a modern urban network approach.

Not only Dupuy but other contemporary authors such as Castells have approached the topic of the network society and of the spatial transformations that accompany it. Even though both authors recognise the impact of new communication technologies on urban space organisation they conceptualise these processes in different ways. Dupuy writes from the perspective of a scholar of the French school of urban planning. He distinguishes different network levels and their interaction and looks at the role of the urban planner (Dupuy, 2008). Castells is a sociologist active both in the European and American academic environments. He relates key spatial processes to changes in the network society and reflects on the role of the city (Castells, 2002).

According to Castells the transformation of cities happens following function, meaning and form axes. ‘Functionally speaking, the network society is organised around the opposition between the global and the local’ (Castells, 2002) The global networks include the dominant processes ‘in economy, in technology, the media and authority’ (Castells, 2002). Airport regions can be considered as relevant cases of urban areas embedded in global networks of people, goods and information. The theories of these two authors, Dupuy and Castells, will be further on reviewed.


Dupuy (2008) establishes his theories based on the modern notion of the network. After he defines the main criteria characterising networks Dupuy shows that these notions have already been a part of traditional urbanism doctrines. According to this definition he then explains its implications for contemporary urbanism by giving examples and creating a model of city network levels relevant for urban planners. Dupuy’s initial model has further been refined.

According to Dupuy the network is characterised by three criteria: the topological, the kinetic and the adaptive criteria.

The topological criterion refers to the possible relationships between the network points. More specifically in the case of the urban network it reflects in the accessibility of urban space and the possibility of decentralisation (Dupuy, 2008).

The kinetic criterion refers to the movement aspect such as in circulation or communication. The notion of time becomes important when there are specific needs of flows without time losses or interruptions for instance (Dupuy, 2008).

The adaptive criterion refers to the multiplicity of choices in both space and time with regard to connections. ‘The ideal modern network is capable of adapting itself in time evolving by enabling the new connections required by its users, generated by the transformations of the environment of the urban system’ (Dupuy, 2008).

Dupuy also states that unless it reflects upon these realities urbanism cannot fundament its doctrines. The delegation of power is what influences territoriality during the transition from the virtual to the real network. In order to define the network functioning Dupuy founds his theory on other author’s concepts of points (Raffestin, 1981) and project transactions (Claval, 1981).

The points are described as ‘territorial nodalities or points of reference or power’ which have both a social and a geographical substance (Raffestin, 1980 in Dupuy, 2008). The potential link or relationship which can be formed between the points under the initiative of an individual or collective desire is named a project transaction, PT (Claval, 1981 in Dupuy, 2008). According to Dupuy (2008) both the points and projects evolve over time.

Figure 19. Definition of an evolving network This scheme synthesises the relationships between the elements which create the virtual and real networks. (Source: Dupuy, 2008: p.46)
When it comes to specific actors such as individuals, family or industrial establishments, Dupuy (2008) explains that there are clear distinctions between the networks they specialise in. Based on Raffestin’s work (1990) he presents a theoretical model of the **three levels in which urban networks are organised**.

- **Level 1**: Technical networks (mostly related to urban infrastructure).
- **Level 2**: Production and consumption networks
- **Level 3**: Household networks

According to this framework Dupuy (2008) argues that urban planning is perfectly legitimate in a network theory model. In his opinion previous urbanistic models do not question territoriality and they are based exclusively on juridical, historical and cultural boundaries. The network model has a more broad view.

But the role of the urban planner still needs to be clarified. In Dupuy’s interpretation of Bernis there can be critical situations for users in terms of urban public services. Therefore from a systemic point of view (evolution and adaptation) there could be a need for a higher level of coordination in the network hierarchy. This is where urban planning interventions can become relevant if the urban planner is seen as an operator who can act upon the conception and evolution of the network. Although the urban planner’s role is yet to be defined what emerges from this framework is that the urban planner can intervene on the nodes, the relations, the connexions and the regulation processes according to criteria of topology, kinetics and adaptability (Dupuy, 2008).

### Local and Global: Cities in the Network Society, Castells (2002)

In his paper Local and Global: Cities in the Network Society, Castells synthesizes his research on **urban transformations in the network society**. After he explains the key spatial and social processes and more closely looks at the effects on public space Castells (2002) proposes an analytical framework through which this transformation in cities can be organised. The main issue highlighted in the paper is the crisis of the city as a socio-spatial system of cultural communication. In his concluding remarks Castells (2002) explains the challenges of urban life reconstruction and introduces the role of the urban planner in this context.

According to Castells (2002) the three features which interact to constitute the network society are: *the revolution in information technology, the process of globalization and the emergence of networking as the predominant social form*. A new theory of spatial form and processes which can adapt to the new social, technological and spatial context in which we live is therefore needed.

The key spatial processes Castells (2002) identifies emerge from a worldwide urbanisation trend through which more than half of the world’s population lives in cities, predominately concentrated in metropolitan areas. According to the author metropolitan regions are a ‘*mix of cities, countryside, centre, and periphery*’. The drivers of these simultaneous spatial concentrations in huge areas, and thus of centralisation, are advanced telecommunications systems, the internet and fast computerised transportation systems such as air travel. Moreover this new urban geography of networks extends throughout the world, countries, between and within metropolitan areas (Castells, 2002).

In the analytical framework he proposes, Castells (2002) organises the spatial transformation of cities along three axes: **the function, the meaning and the form**.

The functional dimension contains the opposition between the global and the local. In this sense the global networks are created around *dominant processes in economy, technology, the media and authority*. The local networks are shaped by *private life, cultural identity and political participation*. The role of the city as a communication system nowadays is to link these two conflicting logics (Castells, 2002).
The meaning encloses the projects, interests and representations of the individual. In communalism, physical and virtual communities, meaning is based on 'a system of values and beliefs to which all other sources of identity are subordinated' (Castells, 2002). According to Castells the rise of the network society generates a strain between 'personality and culture, between individuals and communes'. This strain also creates a contradictory situation for the city as a communication system.

The functional dimension is characterised by the opposition between the space of flows and the space of places. The space of flows consists of the spaces that are linked through virtual networks of people and activities. These territories are usually geographically distant. The space of places ‘organises experience around locality’ which contradicts the logic of the space of flows which are organised around virtual networks. The challenge for cities in the network society is to restore communication by creating common languages between these contradicting logics according to Castells (2002).

There are three types of protocols which aim at solving the communication contradictions described earlier. The physical protocol acts by introducing symbolic nodes that identify places in the endless sprawl. The social protocol involves the public spaces in which sharing communication and city life can be restored. The communication protocol has two dimensions, the virtual and the face-to-face. Understanding the relationship between these two dimensions is a critical task (Castells, 2002).

In his concluding remarks Castells (2002) identifies key actors involved in the reconstruction of urban life such as politicians, planners and citizen groups. He focuses on the nature of spatial interventions created by urban planners. However he acknowledges the fact that planning initiatives can be successful only if they are backed up by governmental decisions.

‘Restoring functional communication through metropolitan planning, providing spatial meaning through a new symbolic nodality created by innovative spatial projects, and reinstating the city in its urban form through the practice of urban design, focused on the preservation, restoration and construction of public space - these are the critical issues in the new type of urbanism’ (Castells, 2002).

2.4. Spatial Planning Models of Airport-Driven Urban Development

Even though it is recognised that airports influence urban development ‘the planning literature has yet to address the forces and implications of these changes’ (Freestone & Baker, 2011: p.263). The following literature review will explore in a first part three spatial planning models of airport-driven urban development. In a second part it will look into critiques of spatial planning models and airport area planning.

The choice of models that will be explored further on has been made following the review of Freestone and Baker (2011) on spatial planning models of airport-driven urban development (see figure 1). The chosen models are the ones which integrate the airports’ metropolitan context most thoroughly. These are: the aerotropolis (Kasarda, 2000), the airport corridor (Schaafsma et al., 2008) and the aerea (Schlaak, 2010).

The Aerotropolis: Kasarda (2000)

Kasarda is an American academic who is considered the leading developer of the aerotropolis concept. His areas of expertise include ‘aviation infrastructure, logistics, demographics, urban development and commercial real estate issues’ (Kasarda, 2011). One first essay to introduce his concepts was Aerotropolis Airport-Driven Urban Development published in 2000. A long series of scholarly articles and books led to the writing of a more comprehensive book on the subject Aerotropolis The Way We’ll Live Next. The book written together with Lindsay was published in 2011.

According to Kasarda (2000: p. 32) one main argument supporting the pertinence of the aerotropolis concept is a classic transport-oriented development argument: ‘Transportation infrastructure has shaped urban growth and form since the days of the Roman Empire’. Following this historical perspective airports are seen by the author as a 5th wave of drivers of urban development in American history after seaports, the network of rivers and canals, railroads and highways.

The incentives for airport-driven urban development are mainly related to new systems of economic production. In the XXIst century a main economic
Theoretical Framework

The competitiveness factor is speed or ‘survival of the fastest’ (Toffler in Kasarda, 2000: p.33). Therefore the new economic systems rely on reducing production and delivery times. Supply chains, business-to-business (B2B) or just-in-time logistics are therefore at the core of this new system (Kasarda, 2000).

The role of speed helps understand the link between the economic production systems and the urban development process. It is because of fast access to air transportation that distributors seek locations in the vicinity of the airports that have extensive flight networks. Time sensitive good facilities are therefore clustering around airports: ‘perishables (either in the physical or economic sense), just-in-time supply chains and emergency parts provision centres and reverse logistics facilities for the repair and upgrade of high-tech products such as computers and cell phones’ (Kasarda, 2000: p.35).

‘With intellectual capital supplanting physical capital as the primary factor in wealth creation, time has taken on heightened importance for today’s knowledge workers’ (Kasarda, 2000). This reason explains why there is also an important clustering of corporate headquarters, regional offices, professional services and service sector industries in the proximity of airports.

In Aerotropolis The Way We’ll Live Next, Kasarda and Lindsay (2011) present in depth international case studies of airport-led urban development. Some examples focus on effects, such as LA, Washington and Dulles airports, which face limits to their growth without room for further expansion; or the Denver Stapleton Airport, which is hindered by its own success due to the expanding nearby residential developments. Other examples focus on causes such as Amsterdam Schiphol Airport, which grew substantially thanks to the local economy based on cold logistics, or Memphis and Louisville Airports, which owe their wellbeing to important logistics companies such as FedEx and UPS located in their vicinity.

Kasarda also produced a spatially compressed model showing the current and likely future evolution of the aerotropolis (see figure 2). In his opinion existing developments have been ‘organic, spontaneous and haphazard’ (Kasarda, 2011) and he recommends strategic infrastructure and urban planning for future improved development. Among the recommendations he gives there are the need of creating dedicated expressways and express trains, of development with the criteria of time-cost accessibility as well as the need of clustering rather than stripping development or the need of separating goods process activities from white-collar service facilities and airport passenger flows.

Kasarda and Lindsay (2011) also introduce elements of critique of the aerotropolis model. They mainly focus on the issue of sustainability in terms of potential oil price crisis and global warming effects of aviation. The arguments they bring counteract the criticism. The case of the peak whale oil which was solved through the discovery of petroleum is an example of overnight life style changes.
change thanks to substitution. A similar solution is hoped for in the case of peak oil. As far as global warming is concerned the authors claim that housing, food and driving are causing much more environmental damage. They also state that ‘aviation’s contribution to our own well-being are larger and growing more rapidly than its carbon emissions’ or in a more simple way ‘aviation is doing less harm than good’ (Kasarda & Lindsay, 2011: p.338).

The Airport Corridor: Schaafsma, Amkreutz and Güller (2008)

Urban planners with first-hand experience in the field contributed to the development of the airport corridor concept. Amsterdam Airport Schiphol’s main urban planner, Schaafsma, or Güller from the Güller and Güller urbanism office experienced in both research and design of European airports were involved in developing this model.

The airport corridor model evolved from the airport city model in Dutch planning practice and literature. According to Schaafsma (2010) there were four main stages of development between the airport and the airport corridor concept: the airport as basic infrastructure, the airport as main logistics port, the airport city as service provider and the airport corridor as regional and societal point of interest.

Airport-driven urban development captures how airports and cities now ‘melt together spatially and economically’ (Schaafsma et al., 2008: p.125 in Freestone & Baker, 2011: p.274). The airport corridor concerns the area between the central city and the airport with its infrastructure and real estate. From an administrative perspective this area is spread across different administrative units, both locally and regionally. The ambition of this concept is to see the area as an integrated economic zone despite the administrative fragmentation.

There are several factors which contribute to the working of an airport corridor such as the size of the airport, land transportation networks or institutional cooperation. Examples of such spatial organizations are found in regions where major airports are close to the CBD (Sydney), where governance structures are tailored for the purpose (Paris and Zurich) and where there is major public investment in infrastructure (Singapore and Hong Kong) (Schaafsma et al., 2008 in Freestone & Baker, 2011: p.260).

According to Schaafsma (2010) the main challenges of airport corridor development are synergy, spatial integration and governance. Synergy refers to the different stakeholders involved and their possible better performance if they collaborate. Spatial integration acknowledges the fact that airport corridors are spatially segregated from the surrounding areas and that they must be better physically and socially connected to their direct environments. Governance also introduces the importance of the presence of various stakeholders in the development decision making process.

The Airea: Schlaak (2010)

Schlaak is a lecturer at TU Berlin and director and coordinator of the Berlin Brandenburg International Airport City Planning Laboratory. She proposes an analytical model of urban development stimulated by the airport’s presence. The tool should be applicable in any context. ‘The concept of the Airea delivers an approach, a toolkit and a new spatial and functional category to analyse and describe processes of airport related development within the metropolitan region’ (Schlaak, 2010: p.117). The reasons for developing this tool are the limitations and flaws of previous models, the airport city, the aerotropolis, the airport corridor and the airport region (see figure 21). According to the author, the airport city is a marketing product of airport authorities and it is doubtful whether it can really be called an airport city. Similarly the aerotropolis promotes ‘unorganised extensive development and urban sprawl’ (Charles, 2007 in Schlaak, 2010: p.115). The airport corridor, favours fragmentation because it does not allow for crosswise development along the corridor and finally, the airport region, is a ‘shared political planning vision […] stretching around a centrally positioned airport’ (Schlaak, 2010: p.116).

In order to provide a more open analytical research approach in regional sciences and urban planning, the airea tool was developed. The airea refers to the ‘various fragmented islands of development within a certain space of opportunity in relation to the airport’ (Schlaak, 2010). It is also characterised by higher investments than the rest of the metropolitan region and a clear global – local interaction.

There are three main steps which shape the tool. The first is to characterise the airport area as a whole regarding function, form, stakeholders and interrelations. The second step is to define the interactions between the city and the airport and the third step is to give recommendations for the integration of each component in its surroundings. The purpose is to explore and describe processes of airport-driven urban development in metropolitan
areas in order to be able to propose strategic spatial planning concepts for integrating the area in the wider metropolitan region (Schlaak, 2010).

Both the spatial planning models and the urban planning process in airport areas have been criticised.

**Spatial Planning Models of Airport-Driven Urban Development: Freestone & Baker (2011)**

The Airport Metropolis international collaborative research project initiated by the Queensland University of Technology (QUT) seeks to ‘investigate the changing role of city airports to that of airport cities: The Airport Metropolis’ (QUT, 2011). In their literature review two of the research project main investigators look at six spatial planning models of airport-driven urban development and compare them on four sustainability dimensions: economic, environmental, social and governmental. Out of the six reviewed models, three of them are the airport corridor (Schaafsma et al., 2008), the aerotropolis (Kasarda, 2000) and the airea (Schlaak, 2010).

The economic parameter refers to the ‘prospects for enduring employment generation’ (Freestone & Baker, 2011: p.269). All six models present airports as economic growth generators. However it is recognized that it is not only the airport’s presence that matters but there are also other factors involved ranging from physical infrastructure to governance. Moreover the ‘build and growth will come’ optimistic attitude needs some tempering (Freestone & Baker, 2011). Likewise the aerotropolis model is criticised for ‘lacking realistic economic assessments and presenting an unduly optimistic and simplistic outlook in prospects regarding benefits’ (Prosperi, 2007 in Freestone & Baker, 2011). The potential diversion of jobs in the larger economic region demonstrates that there can also be disadvantages of such economies of agglomeration. Moreover the type of economies generated by the fast growing freight transport is highly automated and therefore creates little employment growth.

The environmental dimensions the authors discuss apply to ‘the spatial implications of extensive airport-led development’ (Freestone & Baker, 2011: p.269). Main environmental concerns such as climate change, carbon dioxide emission or peak oil are easily linked to airport-related development by critiques. The urban forms promoted vary between extensive land use, the aerotropolis, linear compaction, the airport corridor and polycentric development, the airea (Freestone & Baker, 2011: p.271). While there is no consensus there also seem to be confusions such as that between the aerotropolis as an analytical model versus the aerotropolis as a normative model (Blau et al., 1983 in Freestone & Baker, 2011: p.271).

The social dimension refers to the ‘redistributional implications of airport-centric development’ (Freestone & Baker, 2011: p.269). The authors evaluate the airport corridor and the airea as having the highest potential to integrate social goals as contrary to the aerotropolis which mainly serves high income people. Case studies also show that social-spatial fragmentation is a worldwide issue

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Figure 22. Models of Airport-Driven Urban Development. Main characteristics. (Source: Freestone & Baker, 2011: p.267)
of airport-driven urban development. One main
division is that between business travellers, top end
tourists and the suburban community (Graham and

**Governance** incorporates the planning
frameworks addressing airport-led development
areas. An airport area challenge is to
accommodate the ambitions of very different actors
such as ‘airport owners and operators, investors
and developers, local authorities, infrastructure
providers, and regional and national agencies’
(Güller & Güller, 2003: p.144 in Freestone & Baker,
2011: p.272). According to the reviewers all models
fail to propose convincing solutions for governance
conflicts. Even the recommendations of the
aerotropolis model seem to lose their power once
the author acknowledges that most airport area
planning frameworks are ‘politically localized and
functionally fragmented’ (Kasarda, 2011).

**2.5. Conclusions and Recommendations**

**Network Urbanism**

Literature review has shown that the need to
work within a **clearly defined framework** is
justified by the complex nature of the spatial
planning task. In this thesis I chose to work within
a network urbanism framework. Network urbanism
approaches offer possibilities to integrate social
and physical issues in complex urban systems
(van Schaik, 2005). Network urbanism theories can
provide a framework for modelling the way that
technical networks connect and facilitate human
activities and human settlements.

Between the models of Castells and Dupuy the
latter is more suitable for interpreting the urban
systems present in airport regions. The model
proposed by Castells concerns mainly power
structures, explaining ‘how dependent aspects of
networks are influenced’ (van Schaik, 2005: p.260).
It is however not clear how the model of spaces of
flows and spaces of places can be applied.

The three levels of urban networks proposed
by Dupuy provide a foundation for representing
urban systems. The interactions within and across
the urban networks are at the core of this model.
Dupuy’s approach is fit for further elaborating an
urban model that can serve to explain and project
the future evolution of the network interactions.

**Spatial Planning Models**

From a spatial planning perspective airport-
driven urban development is a notion raising
many debates. The spatial planning model review
showed that people from either practice or research
fields deal with the topic. The models developed
by them are either normative, the aerotropolis
and the airport corridor, or analytical, the area.
However these models do not yet sufficiently
explain the complex interaction between
airport systems and urban systems. A critical
view is needed whenever using any of them.

The aerotropolis model provides an economic-
functional view on airport region development
(Salewski et al., 2012). The airport corridor is
tailored to the Schiphol situation and it is limited to
the closest sphere of influence of the airport within
its region. The airea provides a broad analytical
framework focused on individual islands spread
across the airport’s region. However it remains
fragmented in its approach towards analysing
individual components.

The critiques review pointed out the wide range
of spatial planning issues concerning airport-
driven urban development. Governance appears
to be one of the most challenging tasks for
both planners and airport authorities (Donnet &
Keast, 2010) especially with regard to the scale
of cooperation, the regional setting (Freestone
&Baker, 2011). Environmental and economic
sustainability are the main dimensions for which
airport-driven urban development is contested
(Charles et al., 2007; Freestone & Baker, 2011).
Socio-spatial fragmentation is also identified as an
issue for this type of development (Freestone &

**Recommendations**

Airport regions are areas of complex interaction
between regional airport systems and regional
urban systems. There is a need to develop new
frameworks through which better development
models can be proposed.

Network urbanism theories can be used to model
these complex interactions between technical
systems and social systems and the model created
by Dupuy fits best this purpose. However within the
foundation provided by Dupuy’s network urbanism
theories it is further on necessary to be more
precise.

It is necessary to explain which are the operators
and which are the relationships that are established
between the operators. It is necessary to explain which are the technical networks that are dealt with, which are the activities that these networks connect and facilitate and which are the urban household groups that are involved in these activities.
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3. Diagnosis

3.1. Introduction

This chapter explains the research process and the main research outcomes. I divided the main research question into sub questions. The sub questions tackle the same issue from the regional scale to the local scale (see figure 23). This zoom in approach is necessary because the phenomena is best characterised in its regional setting but the consequences have an important impact on the local scale.

The chapter begins with an explanation of the way in which I intend to use the previously explored theories on network urbanism. More precisely it will provide a legend for analysis and design that I will later on apply on multiple scales, ranging from the regional to the local scale. On the regional scale the chapter also introduces main trends in spatial, demographic and economic development (see figure 24).

The chapter ends with conclusions highlighting the effects of the regional phenomena on the local scale as well as the relation between the airport driven urban development regional phenomenon and regional dynamics specific to the Amsterdam Metropolitan Area.

Figure 23. Diagnosis Main Question. This diagram explains the division of the main research question into sub research questions as well as main methods that I used in order to answer research questions.
Figure 24. Diagnosis Story Line. This table presents the main story line elements which compose the diagnosis.
3.2. Airport Related Urban Networks Legend

The diagram below illustrates (see figure 25) the legend explaining the most relevant urban networks within the airport region. This scheme is based on Dupuy’s urban networks theory and it is adapted in order to reflect the influence of the airport across the urban households and production consumption networks. The legend of this diagram will be used further on in the research and design phases.

The tables on the opposite page (see figure 26) explain the criteria that was used in order to select the most relevant networks. For example I classified the production consumption activities according to their degree of dependence on a connection to the airport. I based the criteria on a similar classification from Guller & Guller (2003). In the household networks I selected the groups of inhabitants according to their connection with airport related activities. I further on classified them according to their purpose for being in the region.

Figure 25. Airport Related Urban Networks. This diagram illustrates the legend of the most relevant airport related urban networks. (Source: Author’s own)
## Diagnosis

### Relevant Urban Household Networks

<table>
<thead>
<tr>
<th>Household Networks</th>
<th>Dutch Citizens</th>
<th>Foreign Work Migrants</th>
<th>Foreign Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Networks</td>
<td>Airport employees, knowledge workers (ICT, legal, financial, medical, advertising, design, R&amp;D); Service workers (horeca, food); Logistics workers</td>
<td>International company knowledge workers (ICT, legal, financial, medical, advertising, design, R&amp;D); University knowledge workers</td>
<td>Clients</td>
</tr>
<tr>
<td>Consumption Networks</td>
<td>Tourists, Service Consumers, Leisure Consumers, Education Consumers</td>
<td>Transfer passengers, Tourists, Congress Attendants</td>
<td></td>
</tr>
</tbody>
</table>

### Core Business vs. Airport Related vs. Airport-Oriented vs. Profiting of the Airport Image

<table>
<thead>
<tr>
<th>Production Network</th>
<th>Core business</th>
<th>Airport related</th>
<th>Airport-oriented</th>
<th>Profiting of the airport image</th>
</tr>
</thead>
<tbody>
<tr>
<td>high value/m²</td>
<td>international logistic headquarters; ground handling; airplane maintenance;</td>
<td>international business activities; (headquarters); WTC (international trade centre);</td>
<td>science park research &amp; development, pharmaceutical industry, high-tech industry, electronic industry, food industry, regional transport &amp; distribution companies;</td>
<td>ICT-business other offices;</td>
</tr>
<tr>
<td>low value/m²</td>
<td>freight centres;</td>
<td>flower-fair, EDC (European distribution centres) parts centre;</td>
<td>value-added logistics (cargo city);</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consumption network</th>
<th>Consumption Network</th>
<th>Terminal services: duty-free, it services, etc.</th>
<th>catering</th>
<th>Business, conference, restaurants, medical care centre, expo centre of regional economy;</th>
<th>Shopping, Entertainment, Education;</th>
</tr>
</thead>
<tbody>
<tr>
<td>high value/m²</td>
<td></td>
<td></td>
<td>hotel;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>low value/m²</td>
<td></td>
<td></td>
<td>large scale, international transport &amp; distribution;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Public Transport Infrastructure Networks

<table>
<thead>
<tr>
<th>Public Transport</th>
<th>High Speed</th>
<th>Medium High Speed</th>
<th>Medium Speed</th>
<th>Medium Low Speed</th>
<th>Low Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Long distance flight ~500-900km/h</td>
<td>Intercity Train ~180km/h</td>
<td>Metro ~70km/h</td>
<td>Tram ~40km/h</td>
<td>Bus ~35km/h</td>
</tr>
<tr>
<td>Rail</td>
<td></td>
<td>HOV Bus ~80km/h</td>
<td></td>
<td></td>
<td>Water Bus ~40km/h</td>
</tr>
<tr>
<td>Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private Transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Road Network

<table>
<thead>
<tr>
<th>Road</th>
<th>Highway 120km/h</th>
<th>Main Road 100km/h</th>
<th>Regional Road 80km/h</th>
<th>Local Road 50km/h</th>
<th>Neighbourhood Street 30km/h</th>
</tr>
</thead>
</table>

### Figure 26. Criteria for Selecting Airport Related Urban Networks. These tables explain the criteria that I used in order to choose the most relevant airport related urban networks. (Source: Author’s own)
3.3. Amsterdam Metropolitan Area Trends

The following section introduces the most relevant urbanization, demographic and economic trends for the Amsterdam Metropolitan Area.

**Urbanization Trends**

The Randstad polycentric urban region in the Netherlands is facing the problem of *expansion space scarcity*. Figure 29 shows the acceleration of the urbanization process in the Randstad in the XXth century. Reasons for a fast paced urbanization process in the Netherlands are the increase in land occupancy per person combined with population growth and life style changes (Uytenhaak, 2008). Through this process the open delta landscape is gradually being replaced with urban land. Moreover finding new ways to accommodate the expected population growth in the Randstad becomes a challenge for the future.

In this context one of the development strategies defined by the Randstad Vision 2040 is the **optimal and safe utilization of space** within urban areas for housing, employment and facilities through transformation, restructuration and intensification (Ministerie van VROM, 2008). Within the North Wing this task has to be achieved while also supporting Schiphol as a main port between the Randstad and the world.

The basic infrastructure of the Randstad map shows the extent to which the *noise contour of Schiphol Airport* stretches in its urban region (see figure 28). Most of the urban areas bordering Schiphol Airport’s noise contour are indicated in the Randstad 2040 vision as areas requiring a more intensive space utilization (see figure 27). Within this specific location the task of locating emission sensitive functions such as housing or schools is particularly difficult due to pollution and safety regulations.

![Figure 27](Your Home’s Check-In Gate)
Figure 28. This map shows the urban areas and the extent of the airport’s noise contour line in the Randstad. (Source: Boeing, 2012. Edited by the author)

Figure 29. This map shows the process of urbanization which took place in the Randstad at a faster pace in the XXth century. (Source: Cavallo, 2008)
Demographic Trends
CBS and PBL realise a Regional Population Forecast every two years in order to determine population and household trends for the Netherlands. The prognosis seeks the most likely future development for the period 2011-2040 but the actual future development may differ. According to the report the population of the Netherlands will continue to grow, especially in the Randstad. One of the causes is foreign immigration triggered by better job opportunities and the presence of other compatriots. Between 2010 and 2025 there will be 300,000 extra foreign immigrants in the Randstad. Moreover the number of households will increase significantly almost everywhere in the Netherlands. As the household numbers increases at a faster rate than the population there will be extra pressure on the housing market demand (Jong and Duin, 2011).

The population in the large towns as well as in their suburbs is growing fast. The most dynamic population dynamics are found in the suburbs of: Haarlemmermeer, Westland, Haarlem, Delft, Zaanstad, Lansingerland, Zuidplas, Pijnacker-Nootdorp, Katwijk, Lelystad and Amstelveen. These municipalities are growing because young families want to settle in newly built residential areas where children can have more space. All these large town suburbs will increase their population by 10 to 20 thousand new inhabitants with the exception of Haarlemmermeer which will grow by over 25 thousand new inhabitants.

In this context the most dynamic municipalities in the Amsterdam Metropolitan Area in terms of immigration are Amsterdam, Haarlemmermeer and Almere (see figures 31 and 32). The municipalities with the highest concentration of international inhabitants are Amsterdam, Almere and Amstelveen. The latter is also housing the most diverse international community in the Netherlands (see figure 30). Moreover trends in the metropolitan area show that families are moving outside of Amsterdam while starters are moving to the city.

Figure 30. Population Profiles of the Most International Communities in the Metropolitan Area. (Source: Author’s own with data from iamsterdam, 2012)
Diagnosis

Figure 31. Expected Population Growth in the Next Fifteen years. (Author’s own with data from CBS, 2011)

Figure 32. Main Demographic Profiles of the Largest Municipalities. (Source: Author’s own with data from CBS, 2011)
**Economic Trends**

A study on the relation between economic activities and infrastructure in the Netherlands has shown that *agglomeration effects* play an important role in the Dutch economy. The study also showed which road improvements would benefit the Dutch economy the most. Conclusions have pointed out that it is more economically beneficial to improve connectivity within the city regions than between the city regions. Moreover the most direct and indirect benefits are to be achieved in the region of Amsterdam and they can benefit the Netherlands as a whole (Thissen et al., 2006).

The work related commuting patterns in the Amsterdam Metropolitan Area map (see figures 33 and 34) show that **Amsterdam Airport Schiphol is a work centrality in the region**. The landside infrastructures connecting the airport to the region are the A4 highways, the train and high-speed train lines and the Zuidtangent dedicated bus route. Except for the Zuidtangent which acts as a regional link both the train and the highway are national importance connections. The commuting patterns map shows that the most intense relationship is the one between Haarlemmermeer and Amsterdam.

The Amsterdam Metropolitan Area is an attractive environment for the location of international business headquarters. However challenges for the its future popularity are the value for money of office space, the cost of staff, the urban transportation facilities and the quality of life. Moreover further development of housing is one of the most important challenges in keeping the Amsterdam Metropolitan Area economic engine (Economische Zaken Amsterdam and de Kamer van Koophandel Amsterdam, 2011).

Although cities in Western Europe score the highest quality of living when compared to other cities in the world Amsterdam has not yet been ranked in the top 10 (Mercer, 2011, Economist Intelligence Unit, 2011). One of the problems identified by the OECD in terms of lack of international competitiveness is the underutilisation of the proximity to urban centres for the labour market. More precisely there is a congested road network within and between city regions and a mismatch between housing demand and housing supply (OECD, 2007). Some of the recommendations for solving transportation and housing demand issues are listed in the table below.

---

*Figure 33. Municipality Profile by Comparing Work Related Commuting Patterns. (Source: author’s own with data from Economische Verkenningen MRA, 2011)*
Figure 34. Work Related Commuting Patterns in the Amsterdam Metropolitan Area in 2009. (Source: author’s own with data from CBS/LISA/adapted by TNO in Economische Zaken Amsterdam en de Kamer van Koophandel Amsterdam, 2011)
3.4. Regional Airport Related Urban Networks

Transportation Infrastructure Networks

There are several types of landside transportation infrastructure networks which connect Schiphol Airport to Western Europe, to the Netherlands and to the Amsterdam Metropolitan Area. An overview of the types of connections these infrastructures facilitate is presented further on.

Four major high speed train lines connect the metropolitan area to Western Europe and three of these also have a stop at Schiphol Airport. In the future the Thalys and ICE lines will stop at the Amsterdam South train station. The high speed networks, either train lines or airlines, connect the global city of Amsterdam to the world.

The A4 which is part of the national highway transportation system also crosses Schiphol Airport. The network links the ring roads of four major cities in the Randstad: Amsterdam, The Hague, Rotterdam and Utrecht. This line is important for the accessibility between city regions.

There are only two regional rapid bus transit lines which connect the airport to the metropolitan region through the South Tangent system. Currently there is no metro lines that reaches the airport. However there are future plans for such a connection to be realised.

Figure 35. High Speed Transportation Networks Passing through Schiphol Airport. Scheme. (Source: author’s own)
Figure 36. Medium Speed Transportation Networks Passing through Schiphol Airport. Scheme. (Source: author’s own)
Figure 37. Lines and Stops of the High Speed Transportation Networks in the Amsterdam Metropolitan Area. Future Situation. This map shows the networks through which the global city of Amsterdam and its emerging international business district, Amsterdam South, are connected to Western Europe and the World. (Source: Author’s own)
Figure 38. Medium High Speed Transportation Networks and Specializations of Business Clusters Related to the Airport. There are multiple clusters of businesses in the metropolitan area that are to a certain extent dependent on a fast connection to the airport provided usually via a highway exit. These clusters are formed thanks to the benefits of economies of agglomeration. (Source: Author’s own)
Figure 39. Population by Nationality. This map shows the population of the municipalities to the south of Amsterdam by number and nationality. Although Amsterdam has the highest number of foreigners as well as the highest diversity of nationalities other municipalities also attract foreign nationals. (Author’s own with data from CBS, 2011)
3.5. Urban Networks in Airport-Driven Business Parks

The metropolitan scale analysis has shown that airport dependant companies cluster in business parks. The following section aims to explain how these business parks are connected to their direct urban environment.

I chose to investigate the parks that are located along the airport corridor as well as other parks which are related to the airport but which are not part of the airport corridor strategy. In this way I can see if there are differences between the two categories. All these parks are situated within walking distance of the Amsterdamse Bos.

The parks that are part of the airport corridor which I will analyse further on are: Zuidas, Badhoevedorp South East, ABP Riekpolder, Oude Haagseweg, Schiphol East and Schiphol North. The parks and business locations which are not part of the airport corridor strategy are: Badhoevedorp North-East, Vliegtug Park, KLM, Amstelveen South and Aalsmeer North (see figure 42).

The first step I took in the analysis was to make an overview of all the locations by looking into their administration, the cooperations to which they belong to, their accessibility as well as the profile of the companies they host. These overviews are shown on the pages 68 to 71.

The second step I took was to look at 6 indicators through which I could compare the business parks to their closest residential neighbourhoods. I chose to represent these qualities through a spider chart with three rings.

There are three groups of indicators I analysed. The first group contains indicators of spatial quality, the second group contains indicators of programmatic profile and the second group contains social indicators.

Within the spatial quality indicators I looked at three criteria: building typology, border accesses and main street accesses. More precisely within the building typology category I distinguished small grain from coarse grain building typologies. The presence of small grain typologies means integration and the presence of coarse grain typologies means poor of integration. Within the border access two points of access from the closest residential neighbourhood mean poor integration and more than four accesses mean very good integration. Within the main street access a street with fine grained building accesses is integrated an a street with coarse grained building accesses if poorly integrated.

Within the program profile indicators I looked at the level of dependency to the airport of the companies present in the parks according to the table explained on page 47. The presence of airport dependant companies means a poor integration with the closest residential neighbourhood, the presence of airport related companies means a fair integration and the presence of companies profiting from the good accessibility means a fair integration.

Within the social indicators I looked at daycare facilities, population density and the availability of public transport. I used data from CBS and I compared the density of daycare facilities in the park’s neighbourhood to the municipalities average density of daycare facilities. A value below average means poor integration and a value above average means a very good integration. With the same method I looked at values of population density by neighbourhood comparing it to the municipality average. Access to local public transport lines means a poor integration, access to regional and national public transport lines means a very good integration.

The third step I took was to draw conclusions by comparing the spider charts and seeing which groups emerge following the analysis. Following
In a fourth step I only analysed the parks along the airport corridor by also looking into their spatial formation process and their relation to the main transportation infrastructure networks. I used historical cadastral maps in order to trace the evolution of the urban tissue in correlation with the transportation lines.

The last step I took was to illustrate my personal perception of the landscape created by these parks along the highway and along their main access roads.

Figure 41. Airport Related Business Parks. This map shows the location and borders of the business parks that I further analysed according to the steps presented on the opposite page. (Source: author’s own)
Business Park Profile
The following maps introduce the business parks that I chose to analyse further on. The text boxes present an overview of all the locations by looking into their administration, the cooperations to which they belong to, their accessibility as well as the profile of the companies they host.

Badhoevedorp South-East
Administrative unit:
Haarlemmermeer Municipality
Neighbourhood:
Badhoevedorp-Oost
1040 inh, 2080 inh/km²
Business cooperations:
n/a
Road Accessibility:
Twenty minutes from central Amsterdam, ten minutes from Amsterdam Airport Schiphol.
Description:
The Badhoevedorp South-West business park is situated next to the junction of the A4 and A9 highways. The companies already located in the district work with electronics: Konica Minolta, Sony; engineering: Nortek Oceanographic Instruments or logistics: Dangerous Goods management.

Badhoevedorp North-East
Administrative unit:
Haarlemmermeer Municipality
Neighbourhood:
Badhoevedorp Antoniushoeve
1150 inh, 2472 inh/km²
Business cooperations:
n/a
Road Accessibility:
Twenty five minutes from central Amsterdam, fifteen minutes from Amsterdam Airport Schiphol.
Description:
The Badhoevedorp North-West office location is situated next to the junction of the A4 and A9 highways. The companies already located in the district work mainly with fitness services and equipment: Power Plate International and Curves, the largest fitness franchise in the world.
**ABP Riekpolder and RID Park**

**Administrative unit:** Amsterdam Municipality  
**Neighbourhood:** Sloten en Riekerpolder; 13185 inh, 2487 inh/km²  
**Business cooperations:** SADC locations, AAA business locations  
**Road Accessibility:** Ten minutes to central Amsterdam and ten minutes to Amsterdam Airport Schiphol.  
**Description:** The business Rieker Business Park consists of two parts: the International Business Park Riekerpolder and RID area. Riekerpolder is an attractive place of business, not only due to its location, but particularly because of its high-quality buildings and public spaces. The expansion of the RID area will take place in the coming years.  

**Oude Haagseweg**

**Administrative unit:** Amsterdam Municipality  
**Neighbourhood:** Sloten en Riekerpolder; 13185 inh, 2487 inh/km²  
**Business cooperations:** SADC locations, AAA business locations  
**Road Accessibility:** Ten minutes to central Amsterdam and ten minutes to Amsterdam Airport Schiphol.  
**Description:** The business Rieker Business Park consists of two parts: the International Business Park Riekerpolder and RID area. Riekerpolder is an attractive place of business, not only due to its location, but particularly because of its high-quality buildings and public spaces. The expansion of the RID area will take place in the coming years.  

**Vliegtug Park**

**Administrative unit:** Amsterdam Municipality  
**Neighbourhood:** Sloten en Riekerpolder; 13185 inh, 2487 inh/km²  
**Business cooperations:** no cooperation  
**Road Accessibility:** Ten minutes to central Amsterdam and ten minutes to Amsterdam Airport Schiphol.  
**Description:** The business Rieker Business Park consists of two parts: the International Business Park Riekerpolder and RID area. Riekerpolder is an attractive place of business, not only due to its location, but particularly because of its high-quality buildings and public spaces. The expansion of the RID area will take place in the coming years.  
Amstelveen South

Administrative unit: Amstelveen Municipality

Neighbourhood: Bovenkerk en Legmeer; 105 inh, 16 inh/km²

Road Accessibility: Thirty minutes from central Amsterdam, fifteen minutes from Amsterdam Airport Schiphol.

Description: The Amstelveen office location is situated along the N231 national road. It hosts both international electronics companies such as Canon and regional companies such as Baderia.

Zuidas

Administrative unit: Amsterdam Municipality

Neighbourhood: Station-Zuid WTC, 1250 inh; 1041 inh/km²

Business cooperations: AAA business location

Road Accessibility: Ten minutes to Amsterdam Central Station and 15 minutes to Amsterdam Airport Schiphol.

Description: Zuidas is emerging as an international business and research centre. International law firms, major banks and leading consultancies have already made it their ‘home base’ in Europe. Approximately half of the four hundred companies in the district have a foreign parent company. Today, some 30,000 people work here. The household names in the district include AkzoNobel, APG, Tata Steel, ABN AMRO and Google.


KLM headquarters

Administrative unit: Amstelveen municipality

Neighbourhood: Patrimonium; 3030 inh, 2970 inh/km²

Business Cooperations: no cooperation

Road Accessibility: Thirty minutes from central Amsterdam, ten minutes from Amsterdam Airport Schiphol.

Description: The KLM headquarters are located on the outskirts of the Amstelveen municipality next to the A9 highway. KLM is the home flight operator of Amsterdam Schiphol Airport. Air France KLM are the largest European airline group.
Aalsmeer North

Administrative unit: Aalsmeer Municipality
Neighbourhood: NE Boezem, NE Polder Schinkelpolder
5845 inh, 1002 inh/km²

Business cooperations: no business cooperation

Road Accessibility: Thirty minutes from central Amsterdam, twenty minutes from Amsterdam Airport Schiphol.

Description: The Aalsmeer North office location is situated along the N231 national road. It hosts mainly flower greenhouse industries such as Esmerlada or Bartels Roses.

Schiphol East

Administrative unit: Haarlemmermeer Municipality
Neighbourhood: Sloterweg-Zuid, Schiphol
130 inh, 6 inh/km²

Business cooperations: AAA business location

Road Accessibility: Twenty minutes from central Amsterdam, fifteen minutes from Amsterdam Airport Schiphol.

Description: Schiphol-East is the cradle of Dutch aviation. Originally, Amsterdam Airport Schiphol was situated here and until 1967 this was the landing and take-off area for all aircraft. Now this area has been redeveloped into a large-scale business location. The new General Aviation terminal is situated here. The current occupants include Aercap, KLM E&M, Martinair, Transavia.com and Stella Aviation.


Schiphol North

Administrative unit: Haarlemmermeer Municipality
Neighbourhood: Sloterweg-Zuid, Schiphol
130 inh, 6 inh/km²

Business cooperations: AAA business location

Road Accessibility: Twenty one minutes from Amsterdam Centraal, nine minutes from Amsterdam Airport Schiphol.

Description: The Schiphol North business park is strategically situated between Amsterdam and Amsterdam Airport Schiphol. This location is suitable for businesses with airport-related activities (aircraft catering and ground services) and medium-sized commercial enterprises. The proximity of the A4 and A9 motorways ensure good accessibility.

Airport Related Business Parks Integration Character.
These diagrams illustrate the integration of the airport related business parks with their closest residential neighbourhoods according to the criteria explained on page 66.

Badhoevedorp South-East

ABP Riekpolder

Oude Haagseweg

Amstelveen South

Zuidas
Diagnosis

Badhoevedorp North-East

KLM

Vliegtug Park

Schiphol East

Aalsmeer North

Schiphol North
Airport Related Business Parks Character

According to the spider chart analysis it is possible to distinguish a few groups of parks with similar character. The chart above overlaps all the indicators (see figure 42). The red are the parks with the most poor integration character. The orange are the parks with a fair integration character. The green are the parks with the highest integration character (see figure 43).

The parks that have the most indicators situated in the poor integration range are Schiphol East and Schiphol North. These areas are situated in the most immediate vicinity of the airport therefore exposed to noise nuisance and unsuitable for residential use. They are characterised by coarse grain building typologies. They have poor accessibility by public transport and they host companies that are highly dependant on the airport thus not establishing relationships with the surrounding residential neighbourhood.

The parks that have a fair integration value are Badhoevedorp South East, Oude Haagseweg, Riekpolder, Vliegtug and KLM. These parks and business locations are situated on the outskirts of residential environments. Although they have good access to facilities these areas score poor in
terms of accessibility by public transport, building
typology grain and programmatic profile. Although
these areas have a high potential for integration
they fail to achieve it.

The parks that have the highest integration scores
are Aalsmeer North, Amstelveen South and
Zuidas. The first one offers a mixed environment or
residence and green house production area. The
second one offers a mix of services for both locals
as well as international headquarter locations in a
good accessibility environment. The third one offers
a mix of services as well as residential spaces.
However there are still areas of improvement

Figure 43. Airport Related Business Parks Character. This map illustrates the main groups of parks that
have been identified according to the urban integration analysis. (Source: author’s own)
Figure 44. Business Park Street Facades. These street facades illustrate the relationship between the transportation infrastructure dikes and the business park environment they cross. (Source: Author’s own)
Amsterdamse Bos Border Accessibility

The business parks that I analysed are all located within walking distance from the Amsterdamse Bos park. I chose them according to this criteria because I wanted to assess their relationship with a metropolitan scale amenity: the park. In order to do so I mapped the points of access to the park across its surrounding infrastructure lines, as well as landscape heights and highway dikes.

This map presents a conclusion of this analysis and it shows that the lowest level of accessibility is reached along the airport corridor development area. Moreover the access is also lower on the border with the greenhouse area in Aalsmeer. The highest border permeability is reached on the border with Amstelveen meaning that the inhabitants of this community have an easier access by foot to the park.

The street facades on the opposite page illustrate the relationship between the transportation infrastructure dikes and the business park environment they cross (see figure 44).

Figure 45. Amsterdamse Bos Border Accessibility. This map shows the degree of accessibility across the infrastructure limits surrounding the Amsterdamse Bos Park. (Source: Author’s own)
Your Home's Check-In Gate
Figure 46. Riekpolder Park Landscape. This photographic montage illustrates the wideness and emptiness of the main road in the business park. The road is mainly designed for car traffic. (Author’s own)
Figure 47. A4 Highway Landscape. This montage illustrates the scenery that is perceived from the highway: the airport infrastructure as well as buildings that are designed to create an identity that can be perceived from the highway. (Author’s own)
Figure 48. Networks adjacent to the Amsterdamse Bos: Production Networks, Urban Household Networks and Landscape Networks. (Author’s own)
Figure 49. Regional Networks: Urban Household Networks and Landscape Networks. (Author’s own)
3.6. Conclusions

Following the analysis it is possible to explain the nature of the lack of integration of airport related business parks located along the Schiphol Airport Corridor. Moreover the review of trends specific to the Amsterdam Metropolitan Area places the Schiphol Airport driven urban development in its regional context. An overall conclusions links illustrates the relevance of the research results.

Metropolitan Area Trends

There are several urbanization trends that characterise the Amsterdam Metropolitan Area. There is an expansion space scarcity and a need to restructure and transform existing urban areas. Moreover there is a pressure on the housing market in order to be able to accommodate the expected population growth in the coming 15 years. Providing a sufficient supply of housing is also a necessary condition for future economic growth in the metropolitan area.

Airport Related Urban Networks on the Regional and Local Scales

The effects of the world accessibility provided by Schiphol Airport can be identified on both the regional and the local scales. On the regional scale it is possible to identify several airport dependant and airport related business parks. On the local scale the parks located along the Schiphol Airport Corridor have different levels of integration in their surrounding urban environment. The nature of their integration can be correlated to the nature of their spatial formation process.

The clustering of businesses in specialized parks can be explained through the benefits of economies of agglomeration. The proximity of companies with similar production cycles or customer bases support a more efficient and cheap use of resources than in the situation where the companies would be located independently. In the airport region one of the advantages these business clusters seek is an easy connection to the airport. Therefore these clusters organized in business parks are located in the proximity of highway exits or along national and local roads which provide a fast access to the airport.

The business parks that are located on the outskirts of the airport have the lowest local integration levels. These parks are situated on former industrial production sites. Their current production profiles are heavily dependant on Schiphol airport. There are limited possibilities to improve the nature of these relations.

The flower production areas that are located in Aalsmeer have the best integration levels. These areas have developed on former urban settlements through the densification of residential land plots with green houses. They therefore already provide a mixed use environment with potential for further densification.

The business park situated along the A4 highway have a fair integration character due to the proximity of several urban services. These areas have located in the empty space left as reserve between the highway and the residential urban fabric. There are multiple potential points of improvement of the relations with the surrounding residential fabric.

The Zuidas business district situated along the A10 was formed through a similar process. However the district is situated on both sides of the A10 and it connects the Amsterdam and the Amstelveen urban fabrics. The district has a better integration character than the previously mentioned areas. However there are still several points of improvement of its relations to the surrounding urban fabric.

The diagrams on the pages 82 to 84 synthesise the analysis conclusions for the parks located along the A4 and A10 highway. The schemes explain the nature of the urban networks in and around the business areas on the local and regional level. The main conclusion is that the lack of local urban integration can be explained through the formation process of the business parks and the networks within which they function. More precisely they were built in order to benefit from their relation to the highway and airport connection and they have in time established only few connections to the local urban networks.

Airport Related Urban Networks on the Global and Local Scales

An overall conclusion by also integrating the preliminary research presented in the introductory chapter is that airports facilitate relationships across multiple scales (see figure 48). The presence of the international airport with an extensive flight network contributes to the world attractiveness of the Amsterdam Metropolitan Area as a business location for international companies. Within the metropolitan area the influence of the airport driven
The trends that have been identified on the metropolitan scale are also relevant for the region’s world attractiveness. They present missing qualities on metropolitan level which could reinforce Amsterdam’s position in the world competition between cities.

Briefly the lack on urban integration on a local scale and the lack of integration of urbanization trends on a metropolitan scale hinder the metropolitan area’s competitiveness on a world scale.

Figure 51. Spatial Formation Processes. There are three main spatial formation processes which can explain the way these areas developed over time: airport core development built on the airport’s edges, corridor development built on the green reserve areas along the highway and densification of existing urban areas over time. (Author’s own)
Figure 52. Regional Scale High Speed Transportation Networks. On a regional scale the high speed networks provide conditions for the development of coarse grain production areas.

Current Situation
High speed transportation infrastructure networks create conditions for the clustering of global production areas in coarse grain entities.
Current Situation
High speed transportation infrastructure networks create conditions for the areas to be used mainly by the international company employees and clients.

Current Situation
High speed transportation infrastructure networks create conditions for the clustering of global production areas in coarse grain entities.

Current Situation
High speed transportation infrastructure networks facilitate the formation of coarse grain entities that are not connected to their local urban fabric.

Figure 53. Local Scale High Speed Transportation Networks. On a local scale the high speed networks provide conditions for the development of coarse grain production areas that are not integrated in their surrounding residential environments.
Your Home’s Check-In Gate
4. **Spatial Planning Strategies**

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4. **Spatial Planning Strategies**

4.1. **Introduction**

This chapter explains the spatial planning strategies that I propose in order to achieve the urban integration of airport related business parks. The conclusions of the diagnosis chapters are used as anchor points for the elaboration of the planning strategies because they explain the missing links and the unexplored potentials in the intervention areas. In order to identify suitable strategies I used several study cases because they either have comparable urban contexts or because they are the international competitors of the Amsterdam Metropolitan Area (see figure 52).

The chapter begins with the presentation of the three most relevant case studies and the lessons that can be learned from them. Within the previously defined network urbanism approach the chapter subsequently presents the main concepts on which the strategies are based. Further on the regional vision is introduced as well as the spatial planning strategies. In order to better illustrate the spatial impact of the strategies three key intervention areas are further on detailed (see figure 53).

---

**Spatial Planning Strategies**

What are spatial planning strategies for the urban integration of airport related business parks?

It is efficient to implement spatial planning strategies that create links across networks and scales.

**Diagnosis Conclusions**

Airport’s influence across networks and scales:
- missing links
- unexplored potentials

**Case Studies**

- Strategies for business area development used in similar competing airport regions: Helsinki and Zurich.
- Strategies for the integration of the La Defense business district in its suburban environment.
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- competing airport regions  
- comparable urban contexts |
| approach | | Multi-Scalar and Integrative. |
| vision | | Metropolitan Park:  
- metropolitan park with regional public transport connections  
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| spatial planning strategies | | Spatial Planning Strategies:  
- flow generators:  
- flow attractors:  
- land use intensification. |
| key strategic interventions | | Key Interventions:  
- main metro stops:  
- land use intensification principles:  
- exceptional programmatic elements. |

Figure 55. Spatial Planning Strategies Story Line. This table presents the main story line elements which explain the spatial planning strategies.
4.2. Case Studies

The first case study is relevant for this thesis because it concerns a comparable planning task: spatial planning strategies for the regional and local urban integration of a global business district in its suburban residential environment.

**La Defense Seine Arche**

La Defense Seine Arche is one of the leading European business quarters which has a globally recognisable urban identity. La Defense is also one of the first business quarters to be developed in Europe according to modernist urban principles. Future transformations of the area have been established by the French state and the Ile-de-France regional authority. In line with the Greater Paris (Grand Paris) vision, La Defense Seine Arche is meant to accommodate in the future more residents, services and commerce. The urban transformations have the goal to redefine the relationships between the business quarter and its surrounding Parisian western suburbs, Paris as a whole and the world.

Within the Greater Paris vision the Seine Arche quarter will play important roles on four strategy layers. In terms of transportation Seine Arche will be connected by the Grand Paris Express line with the region’s airports and the region’s major urban hubs. In terms of housing it aims to provide a sufficient supply for the demand of present and future residents. In terms of economy Seine Arche aims to develop the finance sector, to encourage the establishment of small and medium-sized “green” industry businesses.

On the scale of the Seine Arche territory the strategy goal is to integrate the Greater Paris strategies with local and national development processes. This new approach in urban development projects extends the view on the territory beyond the administrative boundaries of La Defense and of Seine Arche towards the surrounding municipalities of Courbevoie, La Garenne-Colombes, Nanterre, Puteaux, Rueil Malmaison and Suresnes. Main challenges are to open Seine Arche towards its environment, to remove urban splits, create connections and introduce a mix of uses.

However the end product of this strategy is not an urban design on the territorial scale but a framework and a territorial vision that can be adopted by the concerned actors. On a longer run the aim is to achieve a coherent project through the actions of the various actors. The strategy has both a conceptual and an operational dimension. From a conceptual point of view the strategy is based on a development philosophy supporting the emergence of territorial qualities. From an operational point of view the strategy proposes concrete intervention areas which create connections between the scales (Bazard, 2012).

![Figure 56. Territorial Dialogues. This diagram illustrates the seven territorial entities which intersect in the Le Defense Seine Arche area. (Source: Bazard, 2012)](image-url)
**Territorial Dialogues**

La Defense Seine Arche is a pivot of seven territorial entities with different qualities ranging from administrative to symbolic qualities. The Great Paris territory is an entity developed in terms of economic networks supported by transportation infrastructure connections. The meta-territory is a mental construction of Paris as a global city in which the visibility of the area lies in its proximity to other international business districts. The scenography of the historical Parisian axis which begins at the Louvre incorporates the various urban tissues and landscapes ending in the Saint-Germain forest. The Seine-Aval territory links the inland with the sea through a sequence of various characters of the river. The Northern Arc links various transportation projects creating better airport regional links. The Seine Valley riverfront offers numerous opportunities for development in terms of cultural offer and transportation. The territory of the six municipalities is undergoing a restructuring process through which new links with the close environment are being reinforced.

**Operational Dimension**

The development strategy is based on creating urban activation points, establishing new links and developing the surrounding territories. The urban activation points consist in public transportation infrastructure stops, public space restructuring and exceptional programmatic elements. Within this framework eleven key areas are identified for future intervention. These key areas are categorized as interventions in major public spaces, in major avenues and in neighbourhood connections.

One of the key areas is the Petit Nanterre neighbourhood. In this case two streets are identified as essential for removing the neighbourhood’s spatial enclave character. The strategy is to bring more value to these streets which in the future will lead to new tram stops and the multimodal exchange point in the University’s campus. These intervention axes are meant to create the link between the scales: the neighbourhood and the regional hubs (Bazard, 2012).

**Recommendations**

The strategies that are proposed for the urban integration of the business district are multi-scalar and the basic concept is based formulated on the territorial regional scale. The main scope is to enhance and create links with the existing territorial qualities. The key interventions are formulated on the local scale according to the regional links they enhance.

---

*Figure 57. The Eleven Links. This map illustrates the eleven links which are the key areas for the future transformations. (Source: Bazard, 2012)*
Figure 58. Comparative analysis between the Metropolitan Areas of Amsterdam, Zurich and Helsinki in terms of population and administrative organisation.
spatial context
regional scale: urban areas

commuting patterns
with/without modal split indication

Figure 59. Comparative analysis between the Metropolitan Areas of Amsterdam, Zurich and Helsinki in terms of spatial organization and commuting patterns.
The following case studies are relevant for this thesis because they concern planning strategies applied in competitive airport regions within Europe.

**Amsterdam, Zurich and Helsinki Airport Regions**

The three metropolitan areas are comparable because they have similar spatial organization as well as similar population numbers and densities (see figures 56 and 57). They are organized as polycentric urban regions with one dominant centre, the cities of Amsterdam, Zurich of Helsinki. Within Europe they are also among the urban regions with the highest income in terms of GVA per capita.

Moreover they all have an international airport which has influenced urban development on a regional scale (Guller and Guller, 2003). This influence is concentrated along important transportation lines: the A4 and the A10 in Amsterdam, the S-Bahn in Zurich and the E18 in Helsinki, and it can be described by using the airport corridor concept. The commuting patterns in all three cases show that the Schiphol, Zurich and Helsinki airports are important regional nodes of work related activity.

Within all three metropolitan areas several cooperations have been created in order to facilitate business development in the airport region. However the cooperations are organized differently and there are also differences concerning their more specific scope and the strategies they use.

**Planning Strategies**

In the Zurich agglomeration, the Net Town Glattal is a collaboration of eight communities within the Glatt Valley region. The aim of the collaboration is to develop the region in terms of attractiveness, workplaces and residential estates and to increase the standard of living (Standortförderung, 2011). One of the regional projects, the Glattal City Railway, aims to better connect the local communities to the Zurich public transport system.

In the Helsinki metropolitan area, Aviapolis is a business, retail, entertainment and housing marketing brand area created through the cooperation of municipalities, real estate groups, business parks and national airline. The cooperation aims to strengthen the regional networks in which the airport’s business hub is embedded. Projects include the completion of a ring railway, development of business, retail as well as housing areas.

**Recommendations**

The strategies that are currently being implemented in the airport regions of Zurich and Helsinki address not only business park development but also regional public transportation connections and residential area development. Moreover branding strategies are adopted in order to promote the regions internationally as environments for both business and work.
Figure 60. Impression of the future railway line stops in the Aviapolis development. The Ring Rail line will provide a good regional public transport connection to the airport. (Source: aviapolis.fi, 2011)

Figure 61. Impression of the future railway line stop in the Aviapolis development. The Ring Rail line will provide a good regional public transport connection to the airport. (Source: aviapolis.fi, 2011)
### Development Opportunities

The lack of urban integration of the airport related business parks problem can also be seen as an opportunity for the metropolitan area. These areas benefit from very good accessibility and open spaces available for further expansion. They are therefore suitable to host the land use intensifications required from the metropolitan level.

Moreover these areas are important in order to support the metropolitan area’s economic growth because they are the areas where international companies are likely to locate. In order to keep their international attractiveness the business parks need to provide working and living conditions that can compete with the conditions offered by airport regions across the world.

### Possible Cooperations

There are several metropolitan scale networks that are adjacent to each other in the airport’s proximity. However transportation infrastructure lines are creating barriers between these networks. My approach for the future development of this area is to create relationships across the networks which exist on a metropolitan scale: the urban households and the landscape networks together with the production consumption networks related to the airport’s influence.

---

**Figure 62.** Possible Collaborations Between Networks. These schemes illustrate the approach towards defining a vision for the area. The approach is to create collaborations between networks that are now adjacent and separated by transportation lines. In the future they could work closer together. (Author’s own)
Figure 63. Approach Towards a New Vision for the Area between Schiphol and Amsterdam. The approach is to integrate trends and possible network relationships that have been identified on a metropolitan scale. It becomes therefore possible to respond to the region’s needs as well as to strengthen the metropolitan area’s international competitiveness. (Author’s own)
4.4. Amsterdamse Bos as Metropolitan Park Vision

My vision for the future of the area between Schiphol Airport and Amsterdam is the development of Amsterdamse Bos as a metropolitan park. The vision’s aim is to define the qualities of the future working and living environment adjacent to Schiphol Airport. The park articulates the networks that are related to both Schiphol Airport and the metropolitan area in one cohesive structure. The following maps and illustrations bring forward the park’s most important characteristics and connections.

Figure 64. Amsterdamse Bos as Metropolitan Park. This map illustrates the vision for the future of Amsterdamse Bos as a Metropolitan Park connected to its surrounding urban networks. The park would create a high quality public space in the area between Schiphol Airport and the city of Amsterdam. The park’s environment would provide an attractive working and residential environment. (Author’s own)
Figure 65. Areas of influence in the metropolitan park. This scheme illustrates the three layers of influence defining the park’s use. The global area of influence is defined by the fastest transportation connections to Schiphol Airport. The regional area of influence is defined by the presence of several business and landscape networks. See chapter 3. (Author’s own)
Figure 66. A Regionally and Globally Accessible Park. Amsterdamse Bos should be an area connected to the world and to the metropolitan area through regional public transportation networks. A new metro line connecting the airport to the city centre would benefit both residents and employees within the metro catchment area which need to be connected to their work and residences. (Author’s own)
Spatial Planning Strategies

Figure 67. A Park with Urban Edges. Amsterdamse Bos should be a park with intense urban use along its edges. The intensification of urban uses with mixed use program along the park’s edges would improve the working environment in its perimeter and provide more people with the chance to live in the park’s proximity. (Author’s own)
Figure 68. A Park with a Regional Leisure Network. Amsterdamse Bos should strengthen its relationships to regional and local scale recreation networks. For example, the access to the Green Heart which could be reinforced along the Haarlemmermeer Ringvaart Landscape Structure or the access to the IJ via the Nieuwe Meer water network. (Author’s own)
4.5. Low Speed Network Concept

**Before**
Amsterdam Schiphol Airport as hub airport

**After**
Amsterdam Schiphol Airport as destination airport

*Figure 69. World Scale High Speed Networks. On the world scale the aim is to strengthen the position of Schiphol Airport as a destination airport rather than its current hub airport position. The low speed networks enhance local qualities in the airport’s close vicinity thus attracting more passengers with the purpose to stay. (Author’s own.*)*
Before
High speed networks with two main stops:
- Amsterdam Schiphol Airport
- Amsterdam Central Station.

After
Medium speed network with multiple stops between:
- Amsterdam Schiphol Airport
- Amsterdam South
- Amsterdam Central Station.
The stops connect to regional pedestrian and bike routes.

Figure 70. Regional Scale Low Speed Networks Concept. On the regional scale the aim is to strengthen the connections in the area between Schiphol Airport and the city of Amsterdam. A new regional public transport infrastructure line creates opportunities to easily reach regional amenities as well as opportunities for development between the airport, the city and the region. (Author’s own)
Before
High speed transportation infrastructure networks create borders and barriers for residential development.

After
Medium speed public transportation network creates opportunities for residential development.

Figure 71. Low Speed Networks Impact on Household Network. In the area between the airport and the city the new medium and low speed transportation networks create conditions for residential development on both sides of the main transportation lines. (Author's own)
**Before**
High speed transportation infrastructure networks create conditions for the clustering of global production areas in coarse grain entities.

**After**
Medium and low speed transportation infrastructure networks create conditions for the development of production and consumption activities in fine grain street level entities.

*Figure 72. Low Speed Networks Impact on Production Consumption Network. In the area between the airport and the city the new medium and low speed transportation networks create conditions for fine grain production consumption activities on both sides of the main transportation lines.* (Author's own)
Before
High speed transportation infrastructure networks create conditions for the areas to be used mainly by the international company employees and clients.

After
Medium and low speed transportation infrastructure networks create conditions for residential development and facilitates their use by local residents.

Figure 73. Low Speed Networks Impact on Household Network. In the area between the airport and the city the new medium and low speed transportation networks create conditions for residential development on both sides of the main transportation lines. (Author’s own)
Before
High speed transportation infrastructure networks create conditions for the clustering of global production areas in coarse grain entities.

After
Medium and low speed transportation infrastructure networks create conditions for the development of production and consumption activities in fine grain street level entities.

Figure 74. Low Speed Networks Impact on Household Network. In the area between the airport and the city the new medium and low speed transportation networks create conditions for residential development on both sides of the main transportation lines. (Author’s own)
4.6. Spatial Planning Strategies

Figure 75. Spatial Planning Strategies Map and Legend. This map illustrates the set of spatial planning tools that I propose in order to achieve the Metropolitan Park vision. (Author’s own)
Spatial Planning Strategies
There are three main sets of strategies. One strategy which proposes new transportation networks which generate new types of flows of people. A second set of strategies which proposes several types of recreational networks which attract users. And a third set of strategies which propose areas for future land use intensification.

Regional Public Transport Strategy
The new regional metro line will provide a better accessibility by public transport for the users within the line’s catchment area. On one hand it provides new types of mobility for the employees of these business areas and on the other hand it support a better mobility within the Amsterdam city region. In this way it benefits both the metropolitan public transport networks and the airport business networks.

Figure 76. Regional Public Transport Strategy. The schemes illustrate the new transportation networks that will capture the commuters flows along the Schiphol Amsterdam line. (Author’s own)
**Densification Strategy**
In order to support an intensified use on the park’s edges which would provide benefits for more types of users it is necessary to restructure the airport related business parks. The main aim is to provide a better land use for the provision of housing. The new urban landscape should be oriented towards the creation of street level facilities and it should be connected to its surrounding residential neighbourhood.

**Extension Strategy**
In order to support an intensified use on the park’s edges which would provide benefits for more types of users it is necessary to extend the urban tissue across transportation infrastructure lines. The main aim is to provide a better land use for the provision of housing. The new urban landscape should extend the city tissue to the park’s edge.
Regional Network of Activities: Ringvaart Network
New facilities located along the Ringvaart can create an attractive recreational landscape route. The route links the park to business areas, housing areas and green open areas. It provides facilities such as restaurants or sports clubs.

Regional Network of Activities: Nieuwe Meer Network
New facilities located along the Nieuwe Meer and Schinkel can create attractive recreational routes. The route links the park to the city of Amsterdam and the IJ. It provides facilities such as waterfront restaurants, children centres or clubs for the elderly. It can also facilitate transportation via ferry connections.
Local Network of Activities: Amsterdamse Bos Park
New facilities located within the Amsterdamse Bos can create an attractive and coherent recreational landscape route. The facilities benefit both the local residents as well as visitors and users of the business areas. The park can provide facilities such as children educational clubs, centres for nature preservation associations. It can also offer a more easy orientation structure through observation point follies.

Local Network of Activities: City Street Networks
New facilities located along the accesses to the Amsterdamse Bos can create attractive routes connecting the park to its immediate surroundings. The facilities benefit both the local residents as well as the users of the business areas. The streets can offer facilities such as shops for sports or nature observation equipment.

Figure 79. Networks of Activities Connecting the Amsterdamse Bos with Local Networks. These schemes present the proposed activities which will reinforce the position of the Amsterdamse Bos within its local recreational networks. (Author’s own)
4.7. Strategic Interventions

The hierarchy through which the strategies impact the future development of the area is illustrated below. The vital new transformations are the ones concerning the transportation infrastructures between Schiphol and Amsterdam. By implementing this project further transformations such as the densification and the implementation of activities strategies can be realized.

Figure 80. Strategy Implementation Hierarchy. This scheme illustrates the hierarchy through which it is possible to implement the planning strategies. The top strategy is the most important and the lowest strategy in the scheme is the least important. (Author’s own)
Metro Stop: Riekerpolder Business Area
new transportation networks principles

existing networks

future networks

Figure 81. Riekerpolder Existing and Proposed Networks. These illustrations show the existing and proposed transportation networks in the Riekerpolder Business Area. The new metro stop will provide the opportunity to develop a main pedestrian and bike connection between Sierplein and the Amsterdamse Bos. (Author’s own)
Metro Stop: Riekerpolder Business Area
transformation of urban areas principles

existing situation:
highway border
crude building grain
undefined public space

future situation:
park border
fine building grain
well defined public space

Figure 82. Riekerpolder Existing and Proposed Urban Design. These illustrations show the existing and proposed urban design in the area of the future Riekerpolder Metro Stop. More fine grain building blocks will help define the streetscape. The Amsterdam urban tissue can extend towards the Amsterdamse Bos. (Author’s own)
Metro Stop: Sloten Recreation Area
transformation of urban areas principles

**present:**
poor accessibility by public transport
mainly private facilities
highway border

**future:**
accessible by public transport
park border
well connected to the Amsterdamse Bos
and to the Sloten Recreation Area

Figure 83. Sloten Area Existing and Proposed Urban Design. These illustrations show the existing and proposed urban design in the area of the future Sloten Metro Stop. More fine grain building blocks will help define the street scape. The Amsterdam urban tissue can extend towards the Amsterdamse Bos. (Author’s own)
**Metro Stop: Ringvaart Recreation Area**

**transformation of urban areas principles**

**present:**
- poor accessibility by public transport
- mainly private facilities
- few connections to the Amsterdamse Bos

**future:**
- accessible by public transport
- public and private facilities
- well connected to the Amsterdamse Bos

*Figure 84. Ringvaart Recreation Area Existing and Proposed Urban Design. These illustrations show the existing and proposed urban design in the area of the future Ringvaart Metro Stop. More fine grain building blocks will help define the street scape. A new row of polder villas can intensify the use along the canal. (Author’s own)*
Transformation of Urban Blocks Principles. This exploded axonometry illustrates the transformation of urban blocks principles. The main aim is to redefine the public space by creating more human scale streets, through the insertion of new finer grain building blocks. (Author’s own)
Figure 86. Transformation of Urban Blocks Principles. This exploded axonometry illustrates the transformation of business urban block principle. The main aim is to redefine the public space by creating a new facade aligned with the street front. (Author’s own)
Figure 87. Existing Urban Section Through the RID Park. The section of the current situation illustrates the coarse grain building blocks and large undefined urban space. (Author’s own)
Spatial Planning Strategies

Figure 88. Proposed Urban Section Through the RiD Park. The section of the proposed urban design illustrates the smaller grain building blocks and the better defined urban space. (Author’s own)
Your Home’s Check-In Gate
Figure 89. Impression of the Ringvaart after Intervention. Exceptional programmatic elements such as a sports club overlooking the Ringvaart together with waterfront public space elements such as wood decks can bring more activity in the Amsterdamse Bos. (Author’s own)
Amsterdamse Bos as Metropolitan Park

World Scale:
- competitive advantage for the metropolitan area in the world competition between airport regions to attract international companies and high skilled workers

Regional Scale:
- living and working environment in an international context benefitting from local qualities
- recreational amenity for the inhabitants and visitors of the Amsterdam Metropolitan Area

Local Scale:
- a large diversity of attractions and facilities for the local inhabitants and for the business area users
Your Home’s Check-In Gate
5. Evaluation

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5. Evaluation

5.1. Introduction

This chapter presents an evaluation of the proposed strategy through a comparative analysis and a reflection on the graduation process. The chapter begins with an overview of the Airport Corridor development strategy in terms of concepts, goals and governance. Subsequently it compares the proposed development strategy with the Schiphol development strategy. The chapter ends with a set of recommendations for future research as well as a reflection on the overall graduation process.

5.2. Schiphol Airport Corridor Development Strategy

Several stakeholders have taken a position concerning Schiphol Airport’s regional influence by defining the airport corridor strategy. The following section will explore the strategies that are currently proposed.

Spatial Planning Strategies

The airport corridor strategy has been created by the Bestuurforum Schiphol (see figure 90). The first version of the strategy dates from 2001 and the latest version from 2009. It proposes a long term vision for the period between 2009 and 2030. The title of the spatial economic development vision is From Mainport to Metropolis because the current focus has been set on an optimum integration of the airport-related economies in the metropolis.

The strategy is relevant on the scale of the Amsterdam Metropolitan Area for which there is the intention to preserve and expand its international competitiveness. There is therefore the need to create an ‘optimal urban environment in which to live, work and relax’ (Bestuurforum Schiphol, 2009: p.2).

The corridor development follows two main lines: one which links the airport to the Zuidas business district (the airport corridor) and another one which links the airport to the Amsterdam Harbour (the airport greenport corridor). The focus is set on developing the first line, the airport corridor.

One of the key development concepts is the cluster strategy, responding to needs specific for certain business locations that are already in place. In order to promote a new generation of office locations it is necessary to have an approach which considers the market needs, which is more demand-oriented and more focused on networks around companies.

There are several goals which had been formulated in 2001 and which have still not been accomplished. For example the issue of accessibility by public transport within the city region as well as road congestion are still issues to be tackled further on. Moreover there are still deficits in the fields of housing: insufficient differentiation in housing types (expensive / cheap, buy / rent) and living environments (urban, suburban). The housing demand which needs to be met comes from both locals and foreign work migrants.

There are six basic concepts according to which the development strategy is formulated:

- innovation: needed in order to remain internationally competitive.
- sustainability: in terms of land use, quality of life, energy, mobility and climate.
- polycentric network: specialization and differentiation concerning the development of regional centres
- transformation: development of mixed places in existing business locations
- intertwining: better embed the working areas in their urban landscape
- selectivity: the cooperation between public and private stakeholders in decisions for future development

Spatial Planning Strategies

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Figure 90. Schiphol Airport Corridor Strategy for 2030. Long term development strategy for the Schiphol Region. Zoning map and transportation links. (Bestuurforum Schiphol, 2009)
**Governance Networks**

There are multiple public and private stakeholders that play different roles in the activities on and around Amsterdam Airport Schiphol. These stakeholders meet and take decisions for future development actions on several discussion tables. A short review of the activities of this governance arrangement will be presented further on. From an administrative point of view Amsterdam Airport Schiphol is not located in the main municipality of Amsterdam but in the municipality of Haarlemmermeer within the metropolitan area. This context creates more complex situations in terms of governance structures.

**Schiphol Group** runs the airport operations. It is organised and run as a commercial enterprise. Its shareholders are the state of the Netherlands (69.8%), the municipality of Amsterdam (20.0%), Aéroports de Paris (8.0%) and the municipality of Rotterdam (2%). Schiphol Group is also a partner in several collaborations between private and public authorities which manage development in the airport’s region. The group’s operations are organized into four business areas: Aviation, Consumers, Real Estate and Alliances & Participation (Schiphol Group, 2010).

**Bestuurforum Schiphol** is in charge of creating and monitoring Schiphol Airport’s region spatial economic development strategies. Bestuurforum Schiphol is a cooperation between the municipalities of Amsterdam and Haarlemmermeer and the province of North Holland where Schiphol Group acts as an advisor and SADC as a listener. Schiphol Group is authorised to advise the board and the Schiphol Area Development Company is a listener. The board is organised under the flag of the Amsterdam Metropolitan Area with the purpose to strengthen and preserve its international competitiveness (Bestuursforum Schiphol, 2009).

**SADC (Schiphol Area Development Company)** develops international and regional places in the Amsterdam Metropolitan Area with the purpose to create high quality work places and distinctive locations to match market demand. In order to achieve this mission SADC conducts two tasks: business parks development and marketing and acquisition for the Amsterdam Metropolitan Area via Amsterdam Airport Area and site-specific marketing and sales activities (SADC, 2012).

**AAA (Amsterdam Airport Area)** is a public-private association dedicated to the international marketing and promotion of the offices and business locations in the Amsterdam Metropolitan Area (specifically the Schiphol region). AAA aims to develop new solutions to improve this region’s international competitive position. The knowledge gathered by the AAA can be used for marketing purposes and to identify the spatial and business needs of companies wishing to locate in the Amsterdam Metropolitan Area (AAA, 2012).

**QLAIR (Quality of Life in Airport Regions)** is a project initiated by ARC (Airport Regions Conference), an association of regional and local authorities across Europe with an international airport situated within or near its territory. The QLAIR project is addressing the need for ways to improve the quality of life for the citizens most affected by airport activities and airport expansion. Lead actors in this project, the municipality of Haarlemmermeer and the province of North Holland, have created a set of strategic guidelines. These recommendations are endorsed by ARC as a reference to create competitive airport region in ‘which economic development, airport capacity and the improvement of the quality of life are equally balanced’ (Airport Regions, 2012).

**Conclusions and Recommendations**

The diagrams on the opposite page illustrate the relationships between the stakeholders deciding the future of the airport region. The diagram shows that it is actually the same stakeholders meeting on different discussion tables which propose the spatial planning development strategies (see figure 91 on top). Spatial economic development and quality of life are topics discussed under different collaborations. Moreover the local inhabitants are not included in the decision making process. This governance arrangement could be more easily solved by combining topics on a single table. For example Bestuurforum Schiphol could take over more topics in its decision structure by incorporating the Quality of Life in Airport Regions initiative (see figure 91 on bottom). There are also more municipalities which could benefit from joining this structure such as the municipalities of Amstelveen or Aalsmeer. Moreover the local inhabitants can also be integrated in a more participatory oriented planning structure. However this is a complex topic which should be further on investigated with more precision.
Figure 91. Governance Networks in the Schiphol Airport Region. These diagrams show: On top: current situation where stakeholders meet in different discussion tables on the Schiphol Region future. On bottom: alternative situation where the same stakeholders discuss more topics on the same table. (Author’s own)
5.3. Strategy Comparison

The regional strategy proposed in this thesis and the airport corridor regional strategy are different mainly through the way they approach the intervention area and the discourse about the area’s future identity. Nevertheless they are similar in the strategic interventions that they propose.

Approaches

The Schiphol Airport Corridor strategy approaches the region through a spatial economic perspective. The Amsterdamse Bos Network Strategy approaches the area through an integrated perspective combining spatial social and economic dynamics specific to the metropolitan area. The Corridor strategy looks from inside to the outside, from the business parks to the metropolitan area, while the Metropolitan Park strategy looks from the outside to the inside, from the metropolitan area to the business parks.

The advantage of the corridor approach is that it deals with very specific qualities of the areas. The advantage of the park approach is that it offers a wider set of arguments and possible relationships with the surrounding environment. Moreover it also integrates areas that are not located along the A4 A10 but which are in the proximity of the airport and influenced by the airport. It therefore offers a more comprehensive view of the phenomenon.

The way that the strategies are presented are influenced by their approach. The corridor is presented as an ideal target for investors while the park is described as a desirable environment in which to locate your house and business. Through different discourses it is possible to reach different target groups and address different audiences. In this case the relevant target groups are investors versus inhabitants, local employees and expats.

Strategies

There are many similarities between the two strategies regarding mainly the public transportation system, new urban connections across the highway and activity nodes in the park. However the metropolitan park strategy presents a more structured strategy in terms of hierarchy of connections and key interventions and the relationships between the different interventions are more explicit.

Conclusions

The stakeholders involved in the strategy definition have an important role in determining the strategy approach. A more comprehensive network of governance can also support a more integrated future development strategy benefitting both local users and regional and national interests.

Figure 92. Schiphol Corridor Strategy and Metropolitan Park Strategy. Comparison between the approaches of the two regional development strategies. (Source: author’s own)
Figure 93. Bird’s eye impression of the Schiphol Corridor. (Schiphol Group, 2012)

Figure 94. Bird’s eye impression of the Amsterdamse Bos Metropolitan Park. (Source: author’s own)
5.4. Recommendations for Future Research

Although the network urbanism approach does allow to explain relationships across urban network levels there are multiple points of improvement in the model I used.

Current Research Evaluation

During the research phase I found it difficult to integrate and explain the relationships established on the urban household level. Although the presence of certain communities can be linked to the airport’s influence, such as expat communities, there are still other communities for which the residential location is more difficult to discover, such as the airport employees. Nonetheless residential location choice is a far more complex issue and through this research it was merely possible to observe a coincidental proximity between the expat residential areas and the airport.

Moreover I used a simplified set of criteria to determine the relationships of the production consumption networks with the airport’s presence. This approach could be refined further in future research.

Another challenging point was determining which indicators can help to explain the relationships between the business parks networks and their surrounding environment. I believe the model can be a starting point from which to determine if there are other more relevant indicators as well as the overall importance of each indicator in determining a final degree of integration. Although it needs further refinement I believe the spider chart model offers a good way of comparing areas according to multiple criteria.

Finally I found it difficult to integrate the complex nature of the phenomena on the regional scale and I therefore had to isolate one fragment of the entire system. In this sense I think future research should provide a more complete understanding on the regional scale as well as the implications for the local scale.

Network Urbanism Approach Suitability

I believe the network approach and the model proposed by Dupuy are a good starting point for explaining and designing future urban network development. The added value of this model as compared to the other spatial planning models previously analysed, the aerotropolis, the aerea and the airport corridor, is that it allows to both analyse and propose strategic interventions in airport and urban systems.

Moreover this model allows to provide explanations of phenomena on multiple scales. The most important advantage is that the model allows to explain to influence of the airport across urban networks and is therefore fit to understand the interaction between airport and urban systems. Nevertheless the time limit of this project does not allow for a very deep elaboration of this model but an overview of principles.

5.5. Graduation Process Reflection

Following my personal experience during this graduation year I believe that the division between the first semester dedicated to research and the second semester dedicated to project proposal is inefficient and time wasting. The long period of research in the beginning of the year without a design task at hand can very easily lead to work that is irrelevant for the final project.

Design and research are thoroughly linked and it is more appropriate to work with both at the same time in order to be able to choose the relevant research to carry on further. Therefore starting the design immediately after P1 is a much more efficient way of dealing with this thesis.

In this particular project I had a slow pace at reaching conclusions because I was personally not familiar with the region. I only started to learn things about the Netherlands upon my arrival for this Urbanism Masters Course one year before starting the thesis. I am grateful for having had the opportunity to learn so many new things. I believe that dealing with an area that is unfamiliar to me is a situation that can arrive very often in professional life.

Moreover the problem field that I chose to deal with is currently a very dynamic area of interest for both researchers and professionals. Getting in touch with all the initiatives that have appeared along the year have also made me readjust the thesis plan multiple times. Nonetheless I hope I succeed in putting the pieces together in the time frame available for a master thesis.
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