The role of infrastructure for economic development in an airport metropolis' region

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The Role of Infrastructure for Economic Development in an Airport Metropolis’ Region

A thesis submitted to the School of Tourism & Hospitality Management of Southern Cross University in fulfilment of the requirements for the degree of Doctor of Philosophy

January 2014
Thesis Declaration

I certify that the work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text, and that the material has not been submitted, either in whole or in part, for a degree at this or any other university.

I acknowledge that I have read and understood the University’s rules, requirements, procedures and policy relating to my higher degree research award and to my thesis. I certify that I have complied with the rules, requirements, procedures and policy of the University (as they may be changed from time to time).

5th of January 2014

Mirjam Wiedemann
Abstract

This thesis examines the relationship between infrastructure and economic development in airport regions.

In recent decades, income from aviation-related revenues for airports has become more insecure due to deregulation and privatisation. As a result, new business models, such as an Airport City or Aerotropolis, have been developed. As these models include much more than the management of air traffic infrastructure, and extend to embrace regional development, new knowledge such as how to attract companies, is necessary.

Industry location theory suggests that physical infrastructure is a strong pull factor for firms’ decision of location while the creative class theory indirectly acknowledges physical and social infrastructure as an attraction factor for businesses. Nevertheless, academic literature about the influence of both physical and social infrastructure on companies’ location decision is limited. Research shows that the spatial location of infrastructure influences its effect on economic development but research determining the spatial dimension is lacking.

Consequently, this research aims to answer the research question, ‘What is the role of infrastructure in economic development in an Airport Metropolis’ Region’ by examining the following four sub-questions:

(1) What is the role of airports as economic development infrastructure in the Airport Metropolis’ Region?
(2) What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?
(3) What is the role of social infrastructure for economic development in the Airport Metropolis’ Region?
(4) Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?
By applying a multi-method approach and a comparative methodology of four different Airport Metropolis’ Regions in two different countries, airports worldwide were surveyed and interviews were conducted with companies’ decision-makers from three different business sectors and with economic development agencies. Preferences for different infrastructure elements for business location were explored in depth and the desired spatial dimension was analysed by embedding a quantitative data collection in the framework of qualitative interviews.

Results contributed to extending knowledge of the Airport City and Aerotropolis business models, finding that the ‘environment’ is an important location factor for industry in the twenty-first century, and demonstrated that region and culture influence the role of different infrastructure elements for companies’ decision of location. The study advanced location theory by adding new roles to the environment, regional circumstances and cultural background and extended creative class theory by contributing a new understanding of spatial dimension in the choice of location.
I would like to thank many people from the bottom of my heart! Without their help, support and willingness to open their doors for me and share their knowledge, this thesis would not have been possible.

First of all, I would like to thank my supervisors in Australia, Professor Kerry Brown and Professor Neal Ryan, and in Spain, Professor Javier Tafur, for their ongoing support and belief in me and my work. Furthermore, I’m grateful for the financial support of Southern Cross University and Erich-Becker-Stiftung.

This thesis could be conducted only as several people from all over the world were ready to share their knowledge with me by filling in my survey, participating in the interviews, offering private airport tours and sharing insights at many conferences and informal talks. Thank you!

I would also like to thank my family for facilitating my education and supporting me while I was doing research in Berlin and Frankfurt.

An important part of a PhD journey are the people who share it with you. I’m grateful for all my PhD peers in Australia and Spain and for our fruitful discussions about methodology, research design and theory. In particular, I would like to thank Sabine Muschter, Monica Torland and Fatemeh Aminzadeh for their ongoing friendship and support. I’m also in debt to all my other friends who encouraged me in the last few months of my PhD with a lot of understanding and a cheerful ‘Just keep going, girl! You are so close!’ Also, I would like to thank the staff at the university cafeterias at the Gold Coast and in Madrid for their ability to serve the coffee always with an encouraging smile and chat.

Last but not least, I’m grateful for this wonderful life, the ongoing journey and the opportunities I’m coming across on the way.
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<th>Description</th>
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<tbody>
<tr>
<td>ACCC</td>
<td>Australian Competition and Consumer Commission</td>
</tr>
<tr>
<td>ACSA</td>
<td>Airports Company of South Africa Limited</td>
</tr>
<tr>
<td>ADAC</td>
<td>Abu Dhabi Airports Company</td>
</tr>
<tr>
<td>ATM</td>
<td>Automatic Teller Machine</td>
</tr>
<tr>
<td>AUH</td>
<td>IATA code for Abu Dhabi Airport</td>
</tr>
<tr>
<td>BAA</td>
<td>BAA Airports Limited (name was untangled in solely airport names in 2012)</td>
</tr>
<tr>
<td>BER</td>
<td>IATA code for new Berlin Airport</td>
</tr>
<tr>
<td>BRD</td>
<td>Bundesrepublik Deutschland</td>
</tr>
<tr>
<td>BRICS</td>
<td>Brazil, Russia, India, China, South Africa</td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>DDR</td>
<td>Deutsche Demokratische Republik</td>
</tr>
<tr>
<td>DWC</td>
<td>Dubai World Central</td>
</tr>
<tr>
<td>DXB</td>
<td>Dubai International Airport</td>
</tr>
<tr>
<td>DoT</td>
<td>Department of Transport</td>
</tr>
<tr>
<td>EZB</td>
<td>Europäische Zentralbank (European Central Bank)</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>FAC</td>
<td>Frankfurt Airport Center</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>FRT</td>
<td>Freight Rapid Transit</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>HH</td>
<td>His Highness</td>
</tr>
<tr>
<td>HP</td>
<td>Hewlett-Packard</td>
</tr>
<tr>
<td>IRENA</td>
<td>International Renewable Energy Agency</td>
</tr>
<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
</tr>
<tr>
<td>IP</td>
<td>Intellectual Property</td>
</tr>
<tr>
<td>JIT</td>
<td>Just-in-time</td>
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<tr>
<td>KISA</td>
<td>Knowledge-intensive service activities</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>LCC</td>
<td>Low cost carriers</td>
</tr>
<tr>
<td>MAC</td>
<td>Main Airport Center</td>
</tr>
<tr>
<td>MENA</td>
<td>Middle East and North Africa</td>
</tr>
<tr>
<td>MRO</td>
<td>Maintenance, Repair &amp; Overhaul</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>OLS</td>
<td>Ordinary Least Squares (statistics)</td>
</tr>
<tr>
<td>PPP</td>
<td>Public-private partnership</td>
</tr>
<tr>
<td>PRT</td>
<td>Personal Rapid Transit</td>
</tr>
<tr>
<td>RTA</td>
<td>Dubai Roads and Transport Authority</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Product and Service Solutions (IBM software)</td>
</tr>
<tr>
<td>SWOT</td>
<td>Strength-Weakness-Opportunities-Threats</td>
</tr>
<tr>
<td>UAE</td>
<td>United Arab Emirates</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>VoIP</td>
<td>Voice over Internet Protocol</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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1 Introduction

The airport city and its broader aerotropolis are still in their earliest stages of evolution. Management, planning and development strategies are just beginning to catch up to what has largely been an organic process. The challenge now becomes to design and implement future airport city and aerotropolis development in a manner that brings about the greatest returns to the airport, its users, business and the larger community it serves.

(Kasarda, 2008e, 55)

1.1 Research Problem

Airport functions, design and economic impacts have changed dramatically over the last few decades. Globalisation has resulted in air traffic becoming crucial for both the global and regional economies whereby products are produced, assembled and distributed at different locations over the world and need to be delivered ‘just in time’ (Nunn, 2005, Green, 2007, Janic, 2008, Kasarda, 2008d, Freestone, 2009, Kasarda and Lindsay, 2011). Furthermore, people, especially a highly qualified workforce, have become very mobile and can travel from one country to another for their work. Deregulation, or rather liberalisation, of the air carrier sector has resulted in airports openly competing with each other to attract air traffic and create as many connections as possible as air carriers are no longer tied to certain locations (Dennis, 1994, Bowen, 2000, Button, 2002, Janic, 2008, Freestone, 2009, Costa et al., 2010). Importantly, as government budgets worldwide became more constrained, governments instigated privatisation of airports (among many other state assets), and consequently airports have had to become profitable in their own right and are no longer supported by their traditional connection with their host city or region and its government (Baker and Freestone, 2008, Janic, 2008, Freestone, 2009, Stevens et al., 2010). The results of all these upheavals and developments are significant: airports have transformed from air traffic infrastructure providers to
profit-oriented enterprises, are physically different and importantly have had to adapt at a managerial level in order to cope with all these changes.

The most significant way that airports globally have adapted to these changes is by reaching out to the non-aviation sector to gain revenues and be profitable in a world of insecure aviation-related revenues. This leap into the non-aviation sector has initiated large-scale commercialisation. Airports now are engaging in retail, real estate and urban and economic planning activities, and this has resulted directly in the formation of the so-called *Airport City*, where commercial development takes place both inside and outside the airport terminal, and *Aerotropolis*, where the airport and the Airport City comprise the core of a highly commercial area of retail, residential, leisure and office complexes (Kasarda, 2008b, Kasarda, 2009, Kasarda and Lindsay, 2011). Airport managers/owners have become highly successful at applying these new business models, as demonstrated by rising revenues from the non-aviation sector for airports worldwide (Graham, 2009). Nevertheless, with more and more airports adopting these new business models, competition between different Airport Cities and Aerotropoli worldwide is increasing as well.

Traditionally, airport management was concerned with the management of air traffic and air traffic infrastructure, but with the rise of these new business models airport managements have had to greatly adapt their skills. Indeed, airport managements need to apply a large set of new skills – skills not usually available in typical airport management groups. For instance, the looser ties between the airport and the host city and region, as mentioned above, and the penetration of the airport in regional space involve difficulties of sustainable economic and urban planning as the Airport City can develop to become a competitor to the commercial centres of the region (Freestone, 2009). One result of this transformation is that economic development in the airport precinct\(^1\) has become a widely discussed topic among both airport planners and managers and city, regional, economic and urban

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1 ‘Precinct’ refers to ‘an area...that is designed or reserved for a particular purpose’ (Dictionary.com, 2014, 1). If not further specified, ‘precinct’, ‘airport precinct’, ‘Airport City precinct’ and ‘Airport Metropolis precinct’ are used interchangeably in this thesis and refer to the area of airport-centred urban development in the surroundings of the airport.
planners. A central theme of this discussion is the twofold challenge of facilitating an integrative approach to this development and avoiding creating unsustainable economic ‘islands’.

Historically, huge areas around airports were left fallow or were used agriculturally for safety reasons and noise issues (Bednarek, 2000). With the emergence of the Airport City and Aerotropolis business models, these areas were discovered as potential major real estate developments by the airports (Global Airport Cities, 2011). Airports no longer plan only aviation-related operations inside the airport boundaries but also plan for typical city elements such as office, retail, residential and leisure districts outside the airport fence (Güller and Güller, 2001, Kasarda, 2010). As airports began to commercially develop land outside the airport fence (‘landside’), new urban forms came into being (Freestone, 2009). As a consequence, the often undeveloped corridor between the airport and the host city has become a contested area for industry, residential and commercial development. It is assumed that economic and urban development in the corridor is often badly planned because an integrated planning approach between airport and city planners has become rare (Güller and Güller, 2001, Kasarda, 2008e, Appold and Kasarda, 2009). Due to a lack of urban planning, the corridor (see Figure 1) between the Airport City and the host city can become a fragmented area without sustainable economic and urban prospects. Following the findings by Güller and Güller (2001), Freestone (2009) and Appold and Kasarda (2009), it is argued that these areas should become integrated parts of the region, that is the Airport Metropolis’ Region\(^2\), as integration may bring greater prosperity for both the airport and the host city. Nevertheless, the relationships and dynamics for this new regional approach are not well understood.

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\(^2\) The terms for the new airport-centred urban developments are not yet settled. The most common ones are airport corridor, Airport City and Aerotropolis. The term ‘Airport Metropolis’ Region’ in this thesis refers to all of these terms and encompasses the Airport City, the host city and the airport corridor in the wider Aerotropolis. Note that a distinction is made between ‘airport metropolis region’ and ‘Airport Metropolis’ Region’ in this thesis. For a discussion of the different terms refer to Chapter 3.
In light of the transformation of airports outlined above, it is this space, the corridor(s) between the airport and the surrounding city/cities and regional commercial centres, that is the focal point of this thesis. In particular, the thesis is interested in the role of infrastructure in developing this corridor and the Airport City in a more sustainable economic way. This thesis thus examines the relationship between infrastructure provision and economic development. It raises the question of whether the provision of the ‘right’ infrastructure elements at the ‘right’ location can pull businesses to the Airport Metropolis’ Region and result in economic prosperity through the location or relocation of businesses to the airport precinct and the corridors (see Figure 2).
To illustrate the massive changes in the air traffic industry in the last two decades, the next section will describe in more detail the changed relationship of the airport with the host city and regional development influenced by deregulation, business models such as hub-and-spoke systems and the emergence of the Airport City and Aerotropolis business models.

1.1.1 Airports: Historical background

Although only around a hundred years old, airports have developed rapidly from simple landing facilities to important transportation hubs for people and goods (Wells and Young, 2004). More dramatically, in recent decades airports have developed more and more from a piece of infrastructure for a transport facility to commercial centres and finally to Airport Cities and Aerotropoli as airports are developing into profit-oriented enterprises, in which aeronautical revenues form only one part of the airport business (Baker and Freestone, 2011).

An airport is defined by its function, size and location. In the first 50 years of airport history, airport planning approaches were reflected in the debates about the proper structure of the city. Nearly all city planners of that period pointed out the importance of the connection between the airport and the ground transportation
system (Bednarek, 2000). Bednarek (2000) examined the relationship between city planning and airports and found that even as far back as 1927 the question of the ‘right’ airport model was considered. Bednarek pointed out that airports were seen in a regional context, and only later as part of a national transportation system. Nowadays, by applying new business models, airports are engaging in commercial development outside of the terminal, for instance developing business parks in front of the terminal building or constructing or facilitating whole new urban districts such as entertainment, office or medical quarters on airport land or in the airport precinct. Indeed, the airport’s interaction with the region has changed. Common planning between the airport and the city/region, for example in relation to infrastructure, is no longer necessarily in existence and interdependencies or sustainable economic development between the two commercial poles of the city centre and the airport are less considered than they were previously (Stevens et al., 2010). This development influences not only the way airports are managed, including the development of management skills, but also the dynamics for sustainable economic development in the region embracing the airport.

One reason for engaging in these new business models of the Airport City and Aerotropolis lies in the insecurity of aviation-related revenues. Before liberalisation and deregulation, the opening of the air traffic sector to different non-national carriers, in the USA (1978), Southeast Asia (1979–1997) and Europe (1987–1997), point-to-point connections by the domestic airline mainly existed in these countries and guaranteed a steady stream of revenues for airports (Dennis, 1994, Button, 2002, Costa et al., 2010). Aeroplanes earn revenues only as long as they are in the air. On the ground, they cost a huge amount of money with every passing minute. Hence, airlines look to optimise the time in the air for each aeroplane. With a hub-and-spoke system airlines can shorten the time of aeroplanes spend on the ground. Hub-and-spoke systems ‘entail consolidating traffic from a diverse range of origins and are destined to a diverse range of final destinations at large, hub airports’ (Button, 2002, 177). In the hub-and-spoke system, all aeroplanes of the same carrier or alliance arrive and leave in the same time window (Button, 2002). Therefore the hub-and-spoke system became established as the dominant form worldwide (Janic,
As a consequence, established hub airports were making good profits while other airports started to struggle as a result of losing air traffic. Furthermore, airline mergers and alliances occurred after the opening of the skies (Button, 2002). The advantage of airline mergers and alliances lies in economies of scale and the international connections each airline can offer its customers through the partner airlines (Button, 2002). This situation has further reduced aviation-related revenues for many airports as connections now are often served by larger aeroplanes through codeshare agreements. In summary, today many uncertainties in airport planning occur; these are economic or financial (e.g. airline bankruptcy), industrial (e.g. airline mergers), political (e.g. new open sky agreements), or technical (e.g. the launch of a new aircraft) or stem from other aspects such as war or terrorism (Freathy, 2004, De Neufville, 2008). Additionally, other reasons for declining revenues exist; for example, when a major airline chooses to close or relocate its hub. In the USA, the effect is well-known as the Southwest-effect (De Neufville, 2008). Because of these uncertainties in air traffic, airports have to consider new business models that are less reliant on air traffic (Baker and Freestone, 2011).

The business models of the Airport City and Aerotropolis, in which available space both inside and outside of the terminal is used for commercial development, help to increase revenues from non-aviation related sources and therefore make airports more independent from aviation-related revenues. The commercial development can encompass a whole set of developments, from offering more retail, food and beverage options to building hotel and office complexes, medical and wellness centres, education facilities and entertainment and theme parks on airport land. Another reason for the change of the business model lies in the change of ownership, or rather privatisation (Graham, 2009).

1.1.2 Changed business model forced by privatisation

Privatisation is the change in management and/or ownership from a public entity to a private company (Nichol, 2007, Freestone, 2009). The privatisation of airports has spread over developed countries since the early 1980s and more recently also
through the developing world as a result of economic growth, increasing trade rates, public funding constraints in the developed world, and a rising middle class in the developing world that results in growing air traffic numbers. Privatisation is seen as an instrument to increase funds to build or upgrade the necessary air traffic infrastructure (Cullinane et al., 2011). Hence, airports in more than 50 countries have been privatised since the beginning of the 1990s (Janic, 2008).

To understand the relevance of the research problem, it is important to understand that the privatisation of airports is a worldwide phenomenon (Table 1). Nevertheless, privatisation is executed in many different forms in different parts of the world. Privatisation models range from inviting private investors for the maintenance and operation of terminals (e.g. USA) to temporary concessions or leases (e.g. Australia) to public-private partnerships (e.g. the Philippines) to full or partial privatisation in the form of selling stocks at the stock exchange (e.g. Germany).

All over Europe, governments decided to withdraw fully or partly from their airport assets ownership due to funding constraints. In many European countries, airports are nowadays fully or partially in private hands, although government bodies often hold large shares, such as in Germany. Airport privatisation started with the privatisation of the British Airport Authority (BAA) in 1987 and was followed in the middle of the 1990s by airports in, for example, Germany, Italy, France, Greece, Austria and Switzerland (Barrett, 2000). Similarly, Russian airports are privatised either fully, like Domodedovo airport, or partly, like Vnukovo airport where the state holds a minority of 25% (Hammond, 2003).

The trend exists outside Europe as well. New Zealand follows this model as the two gateway airports, Auckland and Wellington, have been mainly private since the late 1990s (Gillen, 2011) but high public shares still exist in privatised airports in New Zealand (Cullinane et al., 2011). Other examples are South America, where many airports are partially privatised, or have a public majority such as in Chile and Colombia (Gillen, 2011) and China where airports have been publicly listed since the
late 1990s (Cullinane et al., 2011). A slightly different privatisation model is used by Malaysia and Abu Dhabi, where airports are publicly listed but are operated by a single government-controlled holding (Abu Dhabi Airports Company (ADAC), 2010a, Cullinane et al., 2011). Similarly, in South Africa, government-owned airports were sold to Airports Company of South Africa Limited (ACSA) in 1993 and first shares were sold in 2005 (ICAO, 2013b).

A different possibility for privatisation is to give temporary concessions or leases for airport assets to private investors – sometimes under a public-private partnership (ppp) agreement. This model is used in many parts of the world such as Australia, India, South America, Africa and the Caribbean. For example, public-private partnerships to build and operate airports are becoming more common in India. Several private companies like Aero Ports and Infrastructure Projects Pvt. Ltd. recently proposed to build airports in remote areas all over India (Bhat, 2010, Gillen, 2011) and concessions have been given to private companies for the large airports in Ahmedabad, Mumbai, Delhi, Bangalore, Hyderabad and Cochin (Al Amri, 2010, Raghunath, 2010, Andrew, 2012).

Similarly, in South America concession agreements are in place for the three main airports in Bolivia and most of the Argentinian airports (Al Amri, 2010, Thompson, 2012a). Luis Munoz Marin International Airport, the busiest Caribbean airport, was recently leased for 40 years under a public-private partnership agreement (Welling, 2012b). In Australia, the ground is leased to private companies for 50 years with a 49-year extension option. For Senegal’s new Dakar airport, which is currently under construction, a 25-year concession was given to a private consortium (ICAO, 2013a) while for Nigeria, laws were relaxed recently and public-private partnerships and concessions are under development (Etomi, 2011).

In contrast to the above-mentioned countries, airport privatisation started in the USA in 1977 with deregulation of interstate cargo air traffic (Gillen, 2011). At the end of the 1990s, the USA was the country with the most privatised airports in the world as private investors or private terminals were more common than elsewhere.
Nevertheless, airports in the USA are today still public entities (Nichol, 2007, CAPA Centre for Aviation, 2012). In 1996, a pilot program for full privatisation in the form of ownership change was introduced, but the uptake was very small. However, as it is common practice in the USA to contract out services, many parts of airport management are in private hands. Furthermore, wide participation of airlines in airport management is common as airlines lease full terminals or concourses and have a say in the capital or long-term investment plans of the airport (Gillen, 2011).

In summary, privatisation, in its various forms, took place all over the globe in the last 25 years, or is currently under consideration (Table 1). As private companies, airports need to be profitable. As seen earlier, aviation-related revenues have become more and more insecure in recent decades. As a result, airports all over the world are looking to increase their non-aviation revenues and implement business models such as the Airport City or Aerotropolis.
<table>
<thead>
<tr>
<th>Country</th>
<th>Privatisation started</th>
<th>Current state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abu Dhabi</td>
<td>2006</td>
<td>Privatised</td>
</tr>
<tr>
<td>Australia</td>
<td>1996–1997</td>
<td>21 major airports are privatised</td>
</tr>
<tr>
<td>Austria</td>
<td>Middle 1990s</td>
<td>Partially private with the majority of shares in private hands</td>
</tr>
<tr>
<td>Canada</td>
<td>Early 1990s</td>
<td>Not-for-profit approach, airport authorities manage airports for a period of 60 years</td>
</tr>
<tr>
<td>Caribbean</td>
<td>Just starting</td>
<td>Developing of PPP</td>
</tr>
<tr>
<td>China</td>
<td>Late 1990s</td>
<td>Airports are publicly listed at stock exchanges but the majority of shares are still held by government</td>
</tr>
<tr>
<td>Denmark</td>
<td>Middle 1990s</td>
<td>Partially private with the majority of shares in private hands</td>
</tr>
<tr>
<td>Dubai</td>
<td>Starting</td>
<td>Privatised but widely under the control of the royal family</td>
</tr>
<tr>
<td>Finland</td>
<td>Middle 1990s</td>
<td>Managed by a single central entity</td>
</tr>
<tr>
<td>France</td>
<td>Middle 1990s</td>
<td>Partially private with the majority of shares in public hands</td>
</tr>
<tr>
<td>Germany</td>
<td>Middle 1990s</td>
<td>Partially private with the majority of shares in public hands</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>Plans exist</td>
<td>Airports are government-owned and controlled</td>
</tr>
<tr>
<td>India</td>
<td>Starting</td>
<td>Concessions and PPPs</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Not started yet</td>
<td>Mainly publicly-owned and operated</td>
</tr>
<tr>
<td>Japan</td>
<td>Plans exist</td>
<td>Airports are government-owned and controlled</td>
</tr>
<tr>
<td>Kenya</td>
<td>1991</td>
<td>Managed by a single central entity</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Starting</td>
<td>Airports are publicly listed at stock exchanges but operated by a single government controlled holding</td>
</tr>
<tr>
<td>Nigeria</td>
<td>Starting</td>
<td>PPPs and concessions are under development</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Late 1990s</td>
<td>Some airport assets are fully privatised, but there are high public shares in private airports</td>
</tr>
<tr>
<td>Norway</td>
<td>Middle 1990s</td>
<td>Managed by a single central entity</td>
</tr>
<tr>
<td>Russia</td>
<td>1994</td>
<td>Most airports are fully or partly privatised</td>
</tr>
<tr>
<td>Senegal</td>
<td>2008</td>
<td>Airports are managed by a financially autonomous agency; 25-year concession for the new Dakar airport</td>
</tr>
<tr>
<td>Singapore</td>
<td>Privatisation plans exist</td>
<td>Airports are government-owned and controlled</td>
</tr>
<tr>
<td>South Africa</td>
<td>1993</td>
<td>Airports Company of South Africa Limited owns and operates the airports, but 20% of shares are in private hands</td>
</tr>
<tr>
<td>South America</td>
<td>Starting</td>
<td>Partially privatised with public majority/concessions</td>
</tr>
<tr>
<td>South Korea</td>
<td>Privatisation plans exist</td>
<td>Airports are government-owned and controlled</td>
</tr>
<tr>
<td>Spain</td>
<td>Middle 1990s</td>
<td>Managed by a single central entity</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Middle 1990s</td>
<td>Partially private with the majority of shares in private hands</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Privatisation plans exist</td>
<td>Airports are government-owned and controlled</td>
</tr>
<tr>
<td>Thailand</td>
<td>Not started yet</td>
<td>Mainly publicly owned and operated</td>
</tr>
<tr>
<td>UK</td>
<td>1987</td>
<td>Airports and land sold to private companies</td>
</tr>
<tr>
<td>USA</td>
<td>1977</td>
<td>Private investors are common, most airports are public entities</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Not started yet</td>
<td>Mainly publicly owned and operated</td>
</tr>
</tbody>
</table>

1.1.3 Changed business model forced by the need to generate revenues

In general, airports have to generate revenues to finance expenses and capital needs. Capital is also needed to finance the construction of expanding facilities because of traffic growth or modification as a result of changing technology (Nichol, 2007), such as the launch of the A380 aeroplane. Before deregulation, airports provided the infrastructure for an international transport system that made revenues predictable. After deregulation, the airport world changed. Airports became much more dependent on airlines and their airport choice. The development of hub-and-spoke systems left the hub airports with rapid growth and others with declining passenger and revenue numbers. Furthermore, aviation revenues declined because of airline bankruptcies, economic downturns and unpredictable fuel costs (De Neufville, 2008, Kramer and (Kramer Aerotek Inc.), 2010). With privatisation, airports focus more and more on generating revenues, not only to fulfil the above-mentioned needs, but also to attract shareholders and other investors (American Planning Association, 2006, Janic, 2008). It is argued that making profit becomes the number one aim (Janic, 2008).

Revenues can become generated on the airside, such as through landing fees, or on the landside through, for example, retailing or catering (Thompson, 2007). A more common distinction is the one between aeronautical (or aviation) and non-aeronautical (or non-aviation) revenues. Aeronautical revenues are revenues derived from activities on the airfield or in the terminal that are related to airlines. Landing fees, airline terminal rentals, apron charges, ground-handling fees and hangar rentals are examples of aeronautical revenues. Non-aeronautical revenues are revenues from all other activities, such as rent on land and non-terminal facilities and fees for activities or services on airport property. Conventionally, airport parking revenues, rental car revenues and revenues from terminal concessions for shops and restaurants comprised the non-aeronautical revenues.

3 ‘Airside’ refers to the area of an airport that is behind the security checks inside the terminal. ‘Landside’ refers to all other areas of the terminal and to the airport land outside of the security fence.
Parking is traditionally the number-one means of generating non-aviation related revenues. For example in 2008–2009, the five big Australian airports – Adelaide, Brisbane, Melbourne, Perth and Sydney – generated approximately 12 per cent of their revenues through parking fees (The Australian Competition and Consumer Commission (ACCC), 2010).

As airports have to find further income sources, new, creative, non-aeronautical areas are developing. A common trend is the development of non-aviation related commercial and retail areas. For instance, the global airport retail market has grown 78% between 2001 and 2006. London’s Heathrow Airport has 46,000 m² of retail space, the size of a regional mall (Thompson, 2007). One of the first airports that expanded its retail area in the USA was Pittsburgh International Airport, with the opening of the ‘Air Mall’ in 1992 (Kramer and (Kramer Aerotek Inc.), 2010). In 2006, South Korea’s Incheon International Airport had US$900 million in retail revenues and plans to increase it to US$3 billion by 2015. In comparison, Dubai International Airport made US$712 million in 2006 (Kasarda, 2008e) and generated US$1.6 billion in 2012 (Shroff, 2013). Further possibilities to generate non-aeronautical revenues include advertising programs, the development of health clinics and drug stores, industry and business parks in front of the airport, shopping malls, supermarkets, entertainment centres on landside or on airside, recreational facilities like golf courses, swimming pools and bike riding and running trails or exploration of mineral commodities or producing of renewable energy (Nichol, 2007, Kramer and (Kramer Aerotek Inc.), 2010, Stevens, 2010). Such development around airports has become known as an Airport City or Aerotropolis. El Paso International Airport, located in Texas close to the Mexican border, has, for example, two industrial parks, a foreign trade zone, a golf club, an Air Cargo Centre, and seven hotels on airport land. Revenues are generated up to 40% from aeronautical activities and 60% from non-aeronautical revenues. Oakland International Airport and the new Berlin-Brandenburg International Airport produce renewable energies on airport land (Kramer and (Kramer Aerotek Inc.), 2010). Well-known examples of Airport Cities or
Aerotropoli include, among many others, Dubai, Singapore and Frankfurt (Kasarda, 2011a).

In summary, the business model of airports has changed and with it the sources of revenue. Airports generate today much more revenue from non-aeronautical activities than two decades ago. When Singapore’s Changi Airport opened, 60% of all revenues were generated by aviation-linked businesses, whereas today 60% are non-aeronautical revenues (Lohmann et al., 2009). Likewise, the former British Airports Authority (BAA), until recently owner of six large airports in the UK, generated in 2006 42% of its revenues by non-aviation related businesses (Thompson, 2007).

![Figure 3: Non-aeronautical revenues (£m) at BAA UK airports in 2006 (Thompson, 2007, 208)](image)

As discussed above, the use of the Airport City or Aerotropolis concepts as a business model is becoming more and more common across the world. Although this is rarely explored in academic research, the concepts are used widely in industry circles and the yearly Airport Cities Conference and the new Aerotropolis Conference are regularly attracting hundreds of delegates from all over the globe. Therefore, the next section will introduce some well-known Airport City and Aerotropolis examples discussed in widely read newspaper and magazine articles and written by practitioners. The widespread discussion in this kind of literature...
demonstrates the importance of the topic of Airport Cities and Aerotropoli and gives a good insight into the current stage of development worldwide.

1.1.4 Airport City and Aerotropolis: insights from global practices

Airports and regions worldwide instigated Airport City and Aerotropolis developments to position their airports as critical infrastructure for their regions to compete with each other and to attract investments (Kasarda, 2009). Twenty-four Aerotropoli and 16 Airport Cities are currently operational and a further 31 Aerotropoli and 20 Airport Cities are under development worldwide (Kasarda, 2011a). Many large consortiums or airport operators are developing or holding stakes in Airport Cities and Aerotropoli, like Aéroports de Paris, Changi Airports International or Malaysia Airports Holding Berhad (Bates, 2011). Industry magazines are reporting on the rise of the new business models with headlines like: ‘The rise of the Aerotropolis’ (Donahue, 2010), ‘Moscow Domodedovo to build $3.5bn Aerotropolis’ (Global Airport Cities, 2011i) or ‘Taipei outlines $ 1.4bn Airport City development plan’ (Welling, 2012g). In the following section, a few widely discussed examples are introduced. Frankfurt in Germany and Schiphol, Amsterdam, in the Netherlands are recognised as pioneers of airport-centred urban development (Global Airport Cities, 2011l). Hong Kong, Dubai in the United Arab Emirates (UAE) and Incheon, Seoul, in South Korea are well-known as fully developed Aerotropoli while Memphis is considered the USA’s first Aerotropolis (Donahue, 2010).

Being the busiest cargo airport in the world, heavily dependent on FedEx and Delta Air Lines (Kjelgaard, 2011) and only a passenger airport since 1995 (Bruns, 2010), the effects of Memphis Aerotropolis span as far as 100 km from the airport (Bruns, 2010). Sixteen logistics and distribution companies moved to the precinct in 2008/2009, investing millions of US dollars (Bruns, 2010). As the Aerotropolis became crucial for the whole region, ‘the metropolitan area has officially declared itself ‘America’s Aerotropolis’ and made the concept an integral part of the Memphis Fast Forward Initiative, its key economic development master plan.
(Kjelgaard, 2011, 10). Other widely discussed North American examples are Dallas/Fort Worth (Arend et al., 2004), Detroit (Donahue, 2010), Atlanta (Global Airport Cities, 2011l) Indianapolis (Kasarda, 2011b) and Denver (Coxon, 2011, Meyer, 2011). Nevertheless, the two most common North American Aerotropolis examples, Memphis and Dallas, were also two airports that discovered extremely high airport real estate vacancy rates following the global economic downturn (Clark, 2010d). This result is in stark contrast to the idea of the Airport City or Aerotropolis as an economic engine. A possible explanation could be the oversupply of real estate at these planned Aerotropoli during the worldwide financial crisis. As these examples show, much more research is necessary to establish economically sustainable Airport Metropolis’ Regions.

Around 65 km South of Seoul, one of the biggest Asian and best-known Aerotropoli was created and is still in the making since 2001. The plans for Incheon International Airport’s Aerotropolis were established with the aim to set up a place for international businesses following the example of Singapore. Being already a shopping destination and with developments underway for various leisure facilities, like casinos, theme parks, a Formula One track, marinas, golf courses, the largest building in the world and residential and office complexes, the Aerotropolis establishes itself as a destination in its own right (Global Airport Cities, 2011j, Kasarda and Lindsay, 2011, Welling, 2012e, Dinardo, 2013). Likewise, Singapore’s Changi Airport is a well-known Aerotropolis – known as a shopping mall and for giving travellers a positive experience. Changi offers its 50 million passengers (2012) cinemas, saunas, a rooftop swimming pool, a butterfly garden, a gymnasium, spas and more than 330 shops (Global Airport Cities, 2011l, Bates, 2013a) – and a new retail complex is planned to attract tourists and residents alike (Evans, 2013).

A good European example is Amsterdam. Schiphol Airport is well recognised as one of the first Aerotropoli. With around 40 million passengers, inter-modal links, shopping malls and meeting facilities, it attracts more than 580 aviation-related and international companies that need a high connectivity level to its Airport City (Donahue, 2010, Global Airport Cities, 2011a, Global Airport Cities, 2011f). Another
European example is Frankfurt International Airport with around 50 million passengers annually and more than 500 companies in its precinct. Well connected by air traffic and ground transportation, Frankfurt’s Airport City has more than 166 shops and numerous business parks and office complexes, like Airport City West, Gateway Gardens or the Squaire, directly located over the long-distance train station (Dietrich and Hommerich, 2007). Frankfurt’s strategic goal is: ‘To develop an Airport City that systematically leverages the advantages of an airport and is frequented by transnational business clients’ (Dietrich and Hommerich, 2007, 8). The second German hub, Munich International Airport, is considered an Airport City as well (Kasarda, 2011a). Having a shopping mall at landside and organising already since 1999 an annual Christmas Market, the Airport City attracts large crowds of travellers and locals (Thompson, 2012b). With around 35 million passengers each year and good air connectivity, the Airport City has around 550 companies and public-sector entities (Clark, 2011c). Success factors to attract the companies from a wide range of sectors, like information technology, media and biotechnology, are argued to be connectivity, intermodal links, direct flights to origin of the companies and an excellent image of the airport and region (Clark, 2011c).

The Middle Eastern hub, Dubai International Airport, increases yearly its duty free sales and has more than 300 companies in its Airport City. The new development around Al Maktoum International Airport, Dubai World Central, is planned as a greenfield Aerotropolis (Donahue, 2010) and is one of the study regions of this research.

News about other Airport City or Aerotropolis developments around the world is being reported frequently, such as Taipei in Taiwan (Welling, 2012g) or Guangzhou in China (Donahue, 2010), Belo Horizonte in Brazil (Kasarda, 2007b), Moscow in Russia (Global Airport Cities, 2011i), Hyderabad (Kasarda, 2007a), Delhi, Mumbai, Bangalore, Durgapur, Cochin, Chandigarh, Kannur and Jaipur in India (Clark, 2011b), Brisbane in Australia (Global Airport Cities, 2011m), Warsaw in Poland (Maczynska, 2013), Dublin in Ireland (Clark, 2010b), Manchester in the UK (Clark, 2010c, Clark, 2011a) and Jakarta in Indonesia (Global Airport Cities, 2011g). These examples of
Airport City and Aerotropolis developments worldwide demonstrate that these new concepts and business models are of significant importance for airport managements globally. Nevertheless, the understanding of the type and scale of development in an Airport Metropolis’ Region that supports economic prosperity for a region and airport is not well understood.

1.1.5 Importance of companies’ decision of location for the Airport Metropolis’ Region

As discussed in the previous sections, airports were privatised and facing uncertainties in generating aviation-related revenues. No longer publicly owned, airports were pressured to be profitable. Airports often own huge amounts of undeveloped land around the airport infrastructure. With the rise of the Airport City and Aerotropolis business models, airports began engaging in many kinds of real estate development inside and outside of the airport fence. Typical real estate or developer issues, like how to attract companies to a developing site, are becoming important for airport managements. Indeed, large airports recently started to establish their own real estate departments. As that development is taking place outside of the airport fence, it affects the urban and regional planning as well. Therefore, two groups in the Airport Metropolis’ Region may have an interest in the question of how to attract companies to the region: these are, first, the airport itself and, second, urban, economic and regional planners.

As has been argued here, the business model of airports has changed in recent decades. Airports are no longer mere ‘infrastructure ports’ but have become their own small cities near their original host cities (Baker and Freestone, 2008). Airports generate now much more revenue from non-aviation areas than in earlier decades. As a private enterprise that often owns the land that surrounds the airport, the question of how to attract companies to this land has become critical. Furthermore, it is assumed that economic development in the Airport Metropolis’ Region will increase air traffic demand as well, which will increase the aviation-related revenues for the airport (Dennis, 1994). Therefore, airport-centred urban
development will drive the airport and vice versa. Figure 4 depicts the airport’s interest in the decision of location factors.

![Figure 4: Relevance of decision of location for airports](image)

As argued earlier, the traditional ties between airport and city/regional planning are becoming less well defined because of the change from public to private ownership of airports. Nevertheless, studies of companies’ decision of location show that companies prefer a well-integrated area (Flores and Aguilera, 2007, Chen and Yu, 2008). It can be assumed that infrastructure plays a crucial role and that it can boost the economic growth in an Airport Metropolis’ Region and therefore can be a competitive advantage for the Airport City. The task for urban and economic planning departments and airport managements is to develop a highly integrated Airport Metropolis’ Region to prevent fragmentation between the airport and the host city and by doing so avoiding that the Airport City develops as a competitive economic centre to the inner-city centre (Freestone, 2009). It is assumed that integration of these two competitor centres through infrastructure will boost
economic growth in general in the region so that the region and the airport will gain. Figure 5 shows all relationships and interdependences in the Airport Metropolis’ Region.

**Figure 5: Relationships and interdependences in the Airport Metropolis’ Region**

### 1.2 Literature

#### 1.2.1 Airport Metropolis research

The development of the Airport City and Aerotropolis concept is a very recent phenomenon and little academic attention has been focused on it. Nevertheless, a small but global group of researchers have started to analyse this new urban form more closely. Starting from the Kenan-Flagler Institute in the USA (Kasarda, 2008b, Kasarda, 2008a, Appold and Kasarda, 2009, Kasarda, 2009, Appold and Kasarda, 2010, Kasarda, 2010, Kasarda, 2011b, Kasarda and Lindsay, 2011, Appold and Kasarda, 2013), the research extends to Europe (Schlaack, 2010) and over India...
(Bhat, 2010) and to Australia (Freestone, 2010, Stevens et al., 2010, Baker and Freestone, 2011). The research concentrates on the new urban form and its interfaces, but explores only in a limited way the success factors for the commercial developments. This thesis will explore the Airport City concept and its implications for economic development in more depth and will examine the needs of non-aviation related companies to consider the Airport City and wider Aerotropolis region as a future location. Therefore, this research aims to take the state of knowledge significantly beyond the existing understanding by giving researchers and practitioners insight into the underlying dynamics necessary for the economically sustainable development of the Airport Metropolis’ Region.

1.2.2 Economic development research

Economic development research is conducted in different forms such as investigating foreign direct investment, entrepreneurship or industrial location. This research concentrates on industrial location by using industry location theory and creative class theory. The literature review (chapters 2 and 3) and methodology chapter (Chapter 4) establish that investigating the direct connection between different infrastructure elements and firms’ location decision, as well as including in the analysis the built environment of an Airport City, is a fruitful way to disentangle the relationship between infrastructure and economic development. Location theory examines the different factors that influence companies’ decision of location. Different streams of investigation into choice of location have been examined in academia such as the influence of physical infrastructure, e.g. air traffic, roads (e.g. Button et al., 1995, Holl, 2004); social infrastructure, e.g. universities (e.g. Audretsch et al., 2005); agglomerations (e.g. Cohen and Morrison Paul, 2005); entrepreneurship (e.g. Audretsch et al., 2012) and the liveability or dynamic of a place or rather the regional policies that govern it (e.g. Begg, 1999). On the other hand, studies using creative class theory are more concerned with the relationship between social infrastructure and the location of the workforce and only indirectly derive conclusions about companies’ decision of location. While the literature on the relationship between air traffic and economic development is vast,
literature on the relationship of other infrastructure elements and companies’ choice of location is thin. Roads have attracted some substantial academic attention, but the influence of other physical infrastructure and social infrastructure is rarely explored. As mentioned in the previous section, the economically sustainable development of Airport Cities and Aerotropoli found barely any academic attention – there are hardly any studies on the relationship between an Airport City development and firms’ decision of location. This research thus will examine the relationship between the provision of physical and social infrastructure – and particularly that of the Airport City – and companies’ location decision and as such will fill some gaps in the existing body of knowledge in the area of economically sustainable airport-centred urban developments.

1.3 Research Aims and Objectives

As has been argued, as the business model of airports has changed from maintaining a transport facility for a national or international transport system to a private enterprise that aims at generating revenues from all sorts of sources, and as airports have changed from an integrated transport facility to an Airport City or Aerotropolis, new corridor areas around airports are available for urban and economic development. Economic development can be measured in terms of employment, income growth or number of new private investments (Rietveld, 1989, Buurman and Rietveld, 1999).

As uncertainties about aviation-related revenues grew, airport managements began to focus on generating revenues from non-aviation related sources. This occurred first by expanding retail areas on the airside of the terminal area, later in building whole Airport Cities on airside and landside, and finally in advertising huge landmarks in the surrounds of the airport to non-aviation related companies. With this shift, a pure economic development topic – i.e. companies’ decision of location – became interesting for airport managements. This thesis thus combines the field of companies’ decision of location or rather industrial location and creative class
theory with the emerging concept of Airport City and Aerotropolis to investigate the research problem of economically sustainable Airport Metropolis’ Regions.

By addressing the overarching question of ‘What is the role of infrastructure in economic development?’ a sub-question of ‘How can economic development be stimulated in the urban area between the Airport City and the host city and inside the Airport City itself?’ can be posed and can contribute to clarifying the influence of infrastructure provision to companies’ location decision and understanding the relevance of the Airport City itself as a pull factor for business. The research aim is to understand the relationship between economic development and physical and social infrastructure provision. To achieve this aim, it is necessary to disentangle the influence of different infrastructure elements and explore the necessary spatial dimensions of infrastructure provision for positive economic development. The overarching question, ‘What is the role of infrastructure for economic development in the Airport Metropolis’ Region?’ will be answered by researching the following four sub-questions:

(1) What is the role of airports as economic development infrastructure in the Airport Metropolis’ Region?
(2) What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?
(3) What is the role of social infrastructure for economic development in the Airport Metropolis’ Region?
(4) Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?

1.3.1 Contribution

Answering these questions will contribute to clarifying how infrastructure can be important for companies’ decision of location. The literature review finds that researchers worldwide tend to concentrate on air traffic as a factor for the choice of location in an airport surrounding, while mostly ignoring the role of other
infrastructure elements. Especially, academic research stops short by exploring the relationship of location theory and social infrastructure. This thesis will examine more closely the necessary infrastructure preconditions in a given region for economic development by using industry location theory and creative class theory. This approach will provide more compelling findings as to the type and location of physical and social infrastructure and their importance to airport regions. Further, the concept of the Airport City or ‘environment’ will be included as one location factor in the study. Finally, the thesis will help airport, urban, city, region and economic planners to better understand the complex relationship of infrastructure provision and economic stimulation.

1.4 Methodology

The way in which companies are attracted to a certain location has become important for airport managements with the rise of the Airport City and Aerotropolis business models. In the literature review and methodology chapter (chapters 2 to 4) it will be shown that a methodology that includes interviews with decision-makers from different business sectors in four different Airport City or Aerotropolis environments has clear advantages over other methods to answer the first three research sub-questions. As sub-question four can best be answered by quantitative data, a mixed methods research design in which quantitative data collection and analysis was embedded in qualitative interviews, was chosen. Furthermore, it was necessary to select the context regions or ‘environments’ and the business sectors under investigation with reference to those airports with Airport City and/or Aerotropolis features or aspirations. While the context regions – Berlin and Frankfurt in Germany and Dubai and Abu Dhabi in the UAE – were found through the literature review, three business sectors were selected by using a survey of airports worldwide. Interviews with economic development agencies and companies’ decision-makers in the four selected cities were conducted.
1.4.1 Scope
Examining only four regions and three industry sectors naturally results in limitations. Nevertheless, taking more study regions or industry sectors into account is beyond the scope of this thesis as redundancy and saturation were reached with the number chosen and substantiated for this study. However, by ‘controlling’ for some context factors by using two distinct countries, namely Germany and the UAE, and including international companies from various different backgrounds, the study provides new insights into the location factors for globally operating firms. Future research should aim to confirm the findings of this study with a worldwide survey conducted in many different Airport City or Aerotropolis ‘environments’ and including many different kinds of business sectors and nationalities and sizes of companies.

The thesis strengthens its practical relevance by adopting a multidisciplinary approach for a complex topic in a complex world as the choice of location for a business in relation to airport-centred urban development is influenced by many technical and business factors. Finally, the researcher wanted to combine the understanding of the Airport City and Aerotropolis concept with the relationship of infrastructure and location decision because the aviation industry confirmed that the topic is one of great interest.

1.5 Structure of the Thesis
The thesis is divided into eight chapters. Following this introduction (see Figure 6), two chapters will review the academic literature. In Chapter 2, location theory and Florida’s creative class theory will be introduced and existing research in the area of physical and social infrastructure and its relationship with economic development reviewed. Chapter 3 will explain comprehensively the concept of airport-centred urban development, clarify the different emerging business models and introduce the current stand of knowledge by reviewing the extant literature. This thesis aims to enhance location theory by taking the ‘environment’ into account. The Airport Metropolis’ Region and the built environment of an Airport City in particular will be
the ‘environment’ under investigation for this research. As airport-centred urban development and the Airport City and Aerotropolis concepts have emerged only very recently, there is little academic research into it. Hence, it was paramount to explain comprehensively the concepts of airport-centred urban development within a separate chapter.

Chapter 4 will concentrate on the methodology and research design used, while Chapter 5 will present the four context regions: Abu Dhabi, UAE; Berlin, Germany; Dubai, UAE; and Frankfurt, Germany. As the literature review will demonstrate that choice of location is not exogenous from the environment, it is important to understand the characteristics of the four cities, their historical background, their culture, their existing infrastructure network and their respective Airport City or Aerotropolis built environments before reading the outcomes of the study.

Chapter 6 will present the qualitative and quantitative results of the interviews and the findings of the email survey of airports worldwide. As qualitative data regularly provides rich data, many emerging themes were found by the thematic analysis that provided an even deeper insight into companies’ decision of location. Chapter 7 will present these findings and develop a number of schemata to give a comprehensive picture of the location-decision process with its numerous influencing factors. The thesis concludes in Chapter 8 by summarising the research findings, describing the theoretical and practical contributions and naming some future research areas.
1.6 Conclusion

This chapter has provided an introduction to the thesis and explained how the role of airports has changed with privatisation, air traffic deregulation and the rise of the Airport City and Aerotropolis business models. It has also explained why companies’ choice of location has become of interest for airport managements. The chapter then introduced the relevant field of literature and gave a short summary of the methodology. It outlined the existing research in the two areas of airport-centred urban development and the relationship between infrastructure and economic development, briefly exploring the deep lack of research in the areas. Finally, some limitations of this study were acknowledged and an overview of the structure of the thesis was provided.

The next chapter will introduce the underpinning theories of this study and the literature review about companies’ decision of location. It will employ location
theory and creative class theory and critically analyse why some infrastructure elements are pull factors for firms’ choice of location and others not. Importantly, it will define the term ‘infrastructure’ and make a distinction between physical and social infrastructure elements.
2 Decision of Location Research

... the impact of geographic characteristics on locational choice is anything but neutral.

(Audretsch et al., 2005, 1114)

2.1 Introduction

Chapter 1 introduced the research problem and the relevant literature, the research aims and objectives, the methodology and the structure of the thesis. It was explained that airports changed from being simple landing or infrastructure facilities to become often privately owned enterprises that need to be profitable. Due to uncertainties of aviation-related revenues, airports began to seek out more revenues from non-aviation business. Key to this process, airports adopted the business models of an Airport City or Aerotropolis. Accordingly, airports started to build commercial, retail and entertainment complexes on airport land. Hence, the chapter discussed the relevance of the research problem of planning economically sustainable Airport Metropolis’ Regions as airports worldwide started to use these emerging business models resulting in the engagement of the airport operator in typically city or urban planner tasks such as economic development. As a result, the topic of ‘companies’ decision of location’ became of interest to airport regions and airport managements – and gradually also to academics.

This thesis focuses on one factor that may play a part in this process of a company’s decision of location: infrastructure. Infrastructure generally plays a role in economic development and it is shown that improved infrastructure can culminate in higher productivity (Rietveld, 1989, Buurman and Rietveld, 1999), higher exports and investments in the form of location decisions (Richaud et al., 1999). To measure the impact of infrastructure on economic growth or development, different approaches have been followed in the literature (see Figure 7). A very common one is the measurement of productivity where infrastructure is a production factor in the
classical production function (Rietveld, 1989, Button et al., 1995, Buurman and Rietveld, 1999). Another approach is to examine the impacts on interregional trade flows (Krugman, 1993). Finally, infrastructure can be modelled as a location factor (Rietveld, 1989).

This last approach – infrastructure modelled as location factor – can be divided in three different approaches to estimate the location choice influence. Firstly, income or employment can increase through enhanced accessibility through infrastructure provision. Secondly, income or employment can increase through reduced transport costs caused by infrastructure investments. The third approach measures the direct link between new investments as a consequence of infrastructure supply (Rietveld, 1989). Of these three approaches, this thesis uses the last one and thus will understand economic development in terms of companies’ decision of location as a result of the pull factor of ‘infrastructure’.

Figure 7: Infrastructure investment models for economic development (based on Rietveld, 1989)
To understand this pull factor, however, and to understand it particularly as it relates to the issue of stimulating economic growth in the corridor between the Airport City and the host city, it is necessary to develop an appropriate theoretical framework. This thesis will examine the topic through the two lenses of location theory (Weber, 1909) and creative class theory (Florida, 2002) (Figure 8).

Location theory can be seen as the founding theory of a wide field of studies, for example cluster or international trade theories (McCann and Sheppard, 2003). As will be explained in Section 2.3, understanding the location decision of firms has become of high interest again in recent years due to massive changes in the economic world (McCann and Sheppard, 2003, Cantwell, 2009). By applying location theory to the environments of ‘Airport Cities’ and ‘Aerotropoli’ this thesis will not only contribute significantly to the understanding of this new urban form but also enhance location theory itself.

Research on companies’ decision of location goes back more than a hundred years to the German economist Alfred Weber, who published his location theory in 1909. Since Weber’s time, the economic world has changed dramatically, and with it the views and approaches to understanding firms’ location decision. In the beginning of the twentieth century, industrial production was the dominant mode and therefore economists emphasised a maximised production output. In contrast, economists today are more concerned with agglomerations and knowledge spillovers, the reasons for foreign investment and more recently with location choice due to a new ‘creative class’, which is a much-needed workforce in the knowledge-intensive industry of the twenty-first century (a fundamental tenet of creative class theory).
Today, researchers from many different disciplines and backgrounds undertake research on companies’ location decision. For instance, air transport planners are interested in the relationship of industry location and airports. Transport planners are concerned with the relationship of all physical or transport infrastructure elements and their relationship with industry location. Economists have in general an interest in economic development and all its facets. Researchers in the field of economic geography research more widely on the spatial dimension of economic matters. Urban and regional planners explore ‘amenities’, or social infrastructure, and their influence on firms’ and people’s location (see Figure 9). Interestingly, the research on airport-centred urban development involves a similar mix of academic fields. Academics coming from backgrounds in urban planning, geography, architecture, transport and economics have investigated this emerging field, as will be discussed in Chapter 3.
In aiming to answer the overarching research question, through the four research sub-questions –

(1) What is the role of airports as economic development infrastructure in the Airport Metropolis' Region?

(2) What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?

(3) What is the role of social infrastructure for economic development in the Airport Metropolis’ Region?

(4) Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?
– two main streams of literature will be reviewed: literature about airport-centred urban development and literature about companies’ decision of location. Literature about the Airport Metropolis’ Region or airport-centred urban development will be outlined and discussed in the next chapter. The current chapter will concentrate on reviewing and assessing the literature about the influence of infrastructure on firms’ decision of location that has been undertaken in various disciplines. It includes literature of the last 25 years only and has a clear focus on literature of the last decade. Older literature is used only where it is of special interest or is considered to be one of the ‘founding’ papers.

This chapter is comprised of six sections. First, the term ‘infrastructure’ will be clarified, as a common definition does not exist. Hence, different definitions will be introduced and the definition used for this thesis put forward. Second, location theory and creative class theory will be introduced to provide a necessary understanding of the theoretical framework of this research. Next, literature on the relationship between companies’ decision of location and infrastructure, divided into physical and social infrastructure, will be identified and analysed. The chapter will distinguish between research on different infrastructure elements. One sub-section will explicitly concentrate on the relationship between airports and air traffic and economic development as research often focuses on this aspect in the context of airport regions.

The literature review aims to clarify the trajectory of research in this field of companies’ decision of location, where the research gaps are located and what methods were used to investigate the influence of each of the infrastructure elements, such as airports, roads and education facilities on the decision of location of companies. Then, several gaps in the existing literature will be identified. The chapter finishes with some concluding remarks about the findings of the literature review (see Figure 10).
2.2 Defining Infrastructure

The public often see infrastructure in terms of transportation. However, infrastructure includes not only physical or hard infrastructure in the form of, for example, roads or railways, but also social infrastructure in terms of education, community activities or affordable housing (Keast et al., 2009). There is also the more subtle concept of overall connectivity – fast communication possibilities and ‘the ability of local firms to develop profitable market relationships with firms or consumers in other regions’ (McCann and Shefer, 2004, 181) – which could also be categorised as infrastructure. Academics and planning professionals differ in their understandings of infrastructure. Indeed, scholars have acknowledged that there is a lack of a common definition and, furthermore, this lack creates problems as infrastructure elements are not always clearly identified and the differentiation between transport or physical infrastructure and soft or social infrastructure often adds to the confusion. Therefore, the risk is high that actually different aspects are analysed and compared if different infrastructure elements and their characteristics are not clearly named and defined (Rietveld, 1989, Button et al., 1995).

To gain a better understanding of the term ‘infrastructure’, different definitions will be briefly summarised. At the end of this section, the definition that is used for this study will be established.
A reading of different accounts of infrastructure reveals definitions that are broad and different. It can include: ‘the tangible capital stock owned by the public sector’ (Wang, 2002, 423), such as protection facilities and equipment, research and development capital and human capital investment; and ‘immovable capital goods for transport’ (Rietveld, 1994, 329) including railway lines and stations, highways, airports, ports and canals; and also a set of attributes such as transportation, communication, energy supply, water supply and health services and so on (Rietveld, 1989). Buurman and Rietveld (1999) add education as another element. Johnson (1996) outlines physical infrastructure as ‘locational fixed assets’, such as airports, bridges, water and sewerage facilities and recreation facilities, but also categorises it in terms of infrastructure that overcomes distance, such as roads or airports, and infrastructure that increases utility or productivity, such as water and electricity, and finally infrastructure that improves access to service such as schools and hospitals. Moreno et al. (1997) make a simple distinction between basic infrastructure, which includes roads, highways and utilities, and social infrastructure which includes the elements ‘health’ and ‘education’.

The World Bank (cited in Wang, 2002) distinguishes between public utilities such as electricity, telecommunications, water and gas supply, and ‘public works’, like roads or dams; and also the transport sector with railways, public transport, ports and airports. Vickerman (1991) takes it even further and includes air traffic control systems and other public utility infrastructures. Fox (1996) includes; in addition to the classical transportation infrastructure, such as airports and roads, information and telecommunication technology and water, sewerage and electricity facilities. Furthermore, he takes a wider approach with a clear economics focus and defines infrastructure as ‘services delivered from the physical capital investments traditionally supported by the public sector to enhance private sector productions’ (Fox, 1996, 68). All these definitions reflect the common understanding of infrastructure mainly as transport facilities but they also include utilities that are taken for granted in the developed world, such as facilities for gas, water and electricity supply. Very few authors included some social infrastructure elements, namely education and health facilities.
While different physical or transport infrastructure elements are frequently identified as the above summaries show, the concept of social infrastructure is much less discussed although some authors included health and education facilities in their definition of infrastructure. Button et al. (1995) define social or soft infrastructure as law, education, business services and defence. In a report on social infrastructure of the City of Frankfurt (Stadt Frankfurt Am Main, 1978), social infrastructure is defined as non-technical infrastructure, like kindergartens, sport facilities and community centres. Fox (1996) defines soft infrastructure as training networks and basic research and development facilities.

Two studies that define infrastructure in the context of the Airport City/Aerotropolis concept, make a distinction between physical/hard/economic infrastructure and soft/social infrastructure (Keast et al., 2009) or business infrastructure (Conventz, 2010). For Keast et al. (2009) physical infrastructure includes:

...large scale installations that connect and service commercial, industrial, residential and cultural nodes of the region. Typical elements are roads, railways, utilities, ports, airports, freight and service interchanges, and of increasing importance, information and communication technology.... (Keast et al., 2009, 92)

On the other hand social or soft infrastructure includes housing, education, health and all kind of support services. In contrast, Conventz (2010) uses the term ‘business infrastructure’ in the context of Airport City development and mentions gyms, hotels and conference facilities.

The above are all definitions of infrastructure but very few scholars create comprehensive definitions. Perhaps the most comprehensive comes from Biehl (1991, 11), who argues that

...infrastructure categories comprise transportation networks; energy supply networks; water supply and sewage systems; education and health facilities; social, sporting, and cultural facilities. Some of them may be offered by
governments or government agencies, others by regulated private or public enterprises, and others by public or private associations.

This definition is useful as it includes physical and social infrastructure alike, and this thesis accordingly will build on it. This study will investigate both physical infrastructure elements – airport and Airport City, road, rail, public transport and parking – as well as social infrastructure, including the elements of community service facilities, education, health, leisure and religious facilities. Housing, another social infrastructure element, will be investigated in the context of Berlin as it is well-known that rents are still very competitive in Berlin in contrast to other large European cities. Furthermore, connectivity as an underlying concept of infrastructure will be investigated by adding a question about physical and digital connectivity into the interview questionnaire. Utilities, like energy, water and sewage supply, will not be included in the study as it is assumed that in modern economies these facilities should be readily available (nevertheless, it was mentioned in at least one case in the interviews in the Middle East that it is still a location factor).

2.3 Theories

2.3.1 Location theory

Location theory goes back to the work of the German economist Alfred Weber who published in 1909 the *Theory of the Location of Industries*⁴ (Weber, 1909). Undoubtedly, the economic world 100 years ago was a very different one than today’s. Weber’s theory that location decision is a function of transport cost, wages and material was developed in a context where Germany’s industrial revolution was well established and more options for distributing firms and material had just become available due to infrastructure developments such as rail transportation and telecommunication. Nevertheless, worldwide trade barriers existed. The theory ‘centres on the location decision of the individual firm in a known locational

⁴ Original title: Über den Standort der Industrie: Reine Theorie des Standorts
environment, where there is no interdependence with the locational decision of other firms’ (Massey, 1973, 33). Weber’s (1909) work can be seen as the starting point (some work in this direction was done in the 19th century but it focused more on land and possible economic rents (Thünen, 1826, Launhardt, 1885) for today’s more researched and discussed topics such as the location of multinational enterprises (e.g. the work of John Dunning (2009)), cluster and agglomeration theories (e.g. the work of Michael Porter (1998)), spillover theories or even Richard Florida’s (2002, 2005, 2010, 2012) more recent work on the creative class as an influential factor for location of knowledge-intensive industries.

Weber’s (1909) theory, however, attracted a lot of criticism and underwent further development and is still being developed today. One major criticism in the early years was that the theory was operating in an idealistic world and the system as a whole was ignored. The geographic location of industry location was, in the first 50 years or so of the theory, only considered in terms of distance and transportation costs, while the context in the form of history, politics and institutions was not included (Massey, 1973). Until the 1960s, basically three streams of location theory were developed: the one where small numbers of firms operate in locational interdependent situations and the market is geographically defined (e.g. the work of Hotelling ‘Stability in competition’, cited in Massey, 1973); a more behavioural approach that acknowledged that perfect knowledge is unrealistic in an non-perfect world (e.g. Cyert and March’s ‘A behavioural theory of the firm’, cited in Massey, 1973); and using the general equilibrium for the theory of market areas (e.g. August Lösch, 1940). All research concentrated more or less on microeconomic location theory in the form of the interrelationship between a production function model and transport costs (McCann and Sheppard, 2003). After the 1960s, research concentrated more on product cycle modelling (e.g. Vernon, 1966), foreign direct investment (FDI) and trade theory (e.g. Krugman, 1991, 1993) and organisation of cross-border operations inside the companies (Cantwell, 2009, Dunning, 2009). After a decline in interest in location theory, interest started to rise again in the 1990s due to dramatic changes in the economic environment. Fundamental changes in the economic world in the last two decades, such as economic
integration, declining trade barriers, emerging economies (e.g. Brazil, Russia, India, China and South Africa (BRICS)), the fall of the Berlin Wall and with it the transition to market-based economies of most central and Eastern European countries, globalisation, greater environmental awareness, technological interventions and the digital revolution have led to renewed interest in location theory from scholars and politicians alike (McCann and Sheppard, 2003, Dunning, 2009). ‘The revival of concern with location has been based in part on major changes in the economic environment, such as the increasing importance of knowledge as the key wealth-creating asset, as well as an increase in the global interconnectedness of activity’ (Cantwell, 2009, 36). As a result, some recent research concentrates on knowledge spillovers in certain locational settings and agglomerations or clusters (e.g. Pickernell et al., 2007, Crawley and Pickernell, 2012). These studies are concerned with the benefits of similar companies being in the same geographical location due to benefits of networking, knowledge transfer, supply-chain enhancement or the availability of large pools of specialised workforce (McCann and Sheppard, 2003, Cantwell, 2009). Although location theory went through numerous changes and advancements and the economic context has changed in the last 100 years, an important question for economic development remains: how do companies choose their location? Increasingly, location theory attracts interest from a wide range of disciplines, such as economics, management science, international business studies, marketing, political economy and economic geography (McCann and Sheppard, 2003, Dunning, 2009).

Most of the recent research on the location of industry is based on cluster research. McCann and Sheppard (2003) acknowledge this and give recommendations for the future development of location theory. First of all, they see it as important that cluster research is becoming more integrated by differentiating between three different forms of cluster: pure agglomeration, industrial complex and social network. It is assumed that all three forms of cluster could emerge in Airport Cities, either as pure agglomeration of different businesses, industrial complexes to enhance the value chain or social networks in the form of ‘face-to-face’ contact in a bounded spatial location ‘Airport City’ or network of Airport Cities with frequent fly-
in and fly-out contact. Some evidence from the US semiconductor industry shows that indeed a one-day round trip for face-to-face meetings defines the spatial location nowadays (McCann and Shefer, 2004).

Secondly, McCann and Sheppard (2003) see a necessity in redefining transaction costs, for in a modern world these are more important than the traditional transportation costs that accrued solely from transportation over distance. New information technology, such as the internet and voice over IP (VoIP), has reduced costs over distance dramatically; but with an enormous increase of quantity, variety and complexity of data, they argue that ‘face-to-face’ contact becomes necessary again. Furthermore, location still matters for transportation costs, as a company may lose opportunities if not centrally located: it may lose business by not being able to deliver products or services ‘just-in-time’ (JIT) or being too far from suppliers and customers. This approach is in line with Kasarda’s and Lindsay’s (Kasarda, 2008d, Kasarda and Lindsay, 2011) idea that Airport Cities or Aerotropoli are ideal locations for businesses to be always well connected and ‘just-in-time’. They suggest economic development through highway linkages between Airport Cities and Aerotropoli to regional city airports. Kasarda (2008d) drew the conclusion that companies up to three hours of trucking time from an airport can be connected to world markets within 24 to 48 hours through gateway airports.

Finally, McCann and Sheppard (2003) discuss a future direction for location research by including ‘the environment’ into location theory:

A third key direction for future location research concerns the issue of the ‘environment’. Here we are referring specifically to the nature of the local, or location-specific environment. The evaluation of the environmental variations has been almost entirely absent within location theory models, yet within real estate and urban economics, environmental valuation is assumed to be a central feature underlying modern consumption and choice behaviour. Moreover, adopting this approach also allows us to consider how such variations and preferences contribute to location choices. Yet, from the perspective of microeconomic location theory, it is necessary to consider how
such environmental variations and pricing outcomes affect the location behaviour of firms. In order to do this, we must consider exactly what is meant by the term ‘environment’; this could refer simply to the local natural environment, or the local built environment; the local business environment, or various combinations of all three definitions. (McCann and Sheppard, 2003, 660f.)

The research for this thesis will enhance location theory mainly in this last aspect by taking the built environment and local business environment in the form of infrastructure elements and the Airport City as a location concept into account. It will provide a better understanding of the environmental conditions in which firms favour one location over another.

A globalised world, with further decreasing trade barriers and a level of telecommunication and air traffic makes distance a much more minor issue than a few decades ago. As Kasarda and Lindsay (2011) argue, in line with the traditional location theory, in a globalised and fast-paced world companies locate where they have access to fast transportation, and these places are the Airport Cities around the world. Nevertheless, if location matters only in the sense that firms have access to frequent air connectivity, then the question arises: which one of the numerous available Airport Cities will a company choose? Therefore, it is contended in this thesis that some macroeconomic or country considerations play their role as well. Or another way of formulating this is: What is the competitive advantage of the Airport City or Aerotropolis?

This research will investigate infrastructure as comprising a competitive advantage for Airport Metropolis’ Regions but it will also include questions about industry clustering and connectivity. Additionally this research will investigate the importance of social infrastructure in line with Florida’s (2002, 2005, 2010, 2012) creative class approach (see Section 2.3.2) as Florida argues that social infrastructure or ‘amenities’ are important in attracting ‘talents’ which are needed in turn to attract companies as they rely on this kind of workforce to be productive.
Furthermore, this research will investigate (research question 4) spatial structure. Spatial structure is important in location theory: Parr (2013), for instance, argues that spatial structure is often historically developed and therefore difficult to change but that an appropriate spatial structure can have a positive impact on the economic development inside the region:

> Although adequate supplies of labour and elements of infrastructure are available within the region, these may exist at inappropriate locations and/or in insufficient quantities to be attractive to domestic or external sources of capital that would otherwise be invested within the region. (Parr, 2013, 5)

This research looks at emerging and ‘man-made’ regions, where the opportunity is unique to influence the spatial structure in an economically favourable way. Therefore, this research concentrates not only on the role of infrastructure for economic development but also on the favourable spatial location to attract companies to the new regions of Airport Cities and Aerotropoli.

### 2.3.2 Creative class theory

Richard Florida, currently a professor for Business and Creativity in Toronto, Canada, is an urban planner with an interest in social and economic theory. He is the author of a number of bestselling books and invented the creative class theory (Florida, 2002).

Like the comments of Cantwell (2009) cited above, Florida (2005) asserts that the world changed rapidly in terms of social and economic context in the last 100 years and it is changing again:

> Roughly a century ago, our economy and society changed from an agricultural to an industrial system. The change we are undergoing today is at least as large as that one, and brings with it sweeping implications for the way we work and live, the way we organize our time, the nature of family and community structures, and the role and function of urban centers. (Florida, 2005, Ch.1)

Furthermore, other authors (Johnson and Rasker, 1995, Kresl, 1995, Musterd, 2006, Kasarda and Lindsay, 2011) argue that companies in the twenty-first century are
more and more footloose as they are dependent not on raw materials but on human capital. In his creative class theory, Florida (2002) argues that with a shift to a more knowledge-based industry, more and more companies need knowledge workers or a workforce of the ‘creative class’, or ‘talents’ as he refers to them. Florida (2002, 2005, 2010, 2012) claims that while all human beings are ‘creative’ only a third of all people are employed in creative jobs – that is, jobs where people need to be creative or innovative or are doing knowledge-based work. The creative sector includes the ‘classical’ creative fields such as the arts, music, culture, design and aesthetics, but also employment in the business sectors of science and engineering, research and development, technology and knowledge-based work in finance, law and healthcare. Consequently, Florida (2010) concludes that companies in the more knowledge-based and footloose industries in the twenty-first century will move where these ‘talents’ are located: this is the most important location factor for them.

By conducting various surveys, interviews and focus groups, Florida and his team are investigating location factors for the ‘creative class’ (Florida, 2005). They found that these ‘talents’ are highly mobile (Florida, 2010) and prefer locations that are highly open to all kinds of cultural backgrounds, and which are diverse and tolerant (Florida, 2005):

The most successful regions welcome all kinds of people. They offer a range of living choices, from nice suburbs with single-family housing to hip urban districts for the unattached. (Florida, 2005, Ch.1)

Furthermore, they found that ‘amenities’ and the ‘environment’ or ‘quality-of-life’ (and also, to a smaller extent, transportation infrastructure) are important pull factors for the location choice of the creative class. Interestingly, they found that ‘talents’ place more value on outdoor recreational activities and lifestyle amenities, such as a vibrant nightlife and music scene, cafes and restaurants, than they do on big sporting events, theatres, museums, and so on. Finally, the creative class is

Footloose is a term widely used in the literature and refers to companies that can literally locate anywhere as they are not tied to a certain location or country due to such factors as the availability of raw materials.

Following this reasoning, research on social infrastructure should become a topic for industry location research, as ‘the most important reason why firm location researchers ignore amenities is that they are hypothesised to attract residents, not firms’ (Gottlieb, 1995, 1414). The research for this thesis will enhance both the creative class theory and industry location theory by asking companies in the Airport Metropolis’ Region how important social infrastructure is for their decision of location. Social infrastructure includes some of the attributes Florida (2005, 2010) defines as important for attracting ‘talents’ to a location. ‘Community service facilities’ includes bars, cafes, restaurants and so on while ‘leisure facilities’ comprises cultural and outdoor recreational activities among other factors.

2.3.3 Application of theories to research

As described above, industry location theory offers a way to predict the location decision of companies as ‘the location of firms is at the very heart of location theory’ (Peh and Low, 2013, 41). When Weber (1909) developed his theory, location theory explained the choice of location by optimising a production function and emphasising transportation costs and costs for material and human capital (i.e. wages). With the changes in the economic world since Weber, location theory began to include considerations of foreign direct investment, agglomerations, trade and spillover effects. It is argued that today more and more companies are footloose and the most important ‘material’ for the production is ‘knowledge’. Furthermore, the literature highlights that ‘knowledge-intensive’ companies seek location in the Airport Metropolis’ Region (see Chapter 3). Although the availability of human capital was in the past often already a location factor, in a more knowledge-oriented world the importance of available labour can become an even more important factor for the decision of location than minimising transport costs. Creative class theory tries to explain the importance of infrastructure for the availability of the ‘right’ workforce by emphasising that the creative class chooses
their working and living location in regard to available infrastructure. It is argued in
the literature that companies as a consequence move to where the knowledge
workers are available as this is a very important ‘production’ factor. Therefore, it
can be assumed that infrastructure plays an important role for companies’ decision
of location for an Airport Metropolis’ Region.

Both location theory and creative class theory are concerned with the ‘role of
infrastructure for economic development’. While location theory attempts to
explain the direct connection between physical infrastructure availability and
companies’ decision for a certain location, creative class theory takes an indirect
approach by linking living choices of the workforce, triggered by available (physical)
and social infrastructure, to the location decision of firms as they are in need of the
availability of the ‘right’ workforce. It is argued both theories need to have a deeper
examination of the spatial dimensions of the regions or the spatial influence of the
provided infrastructure. It is contended that both theories fail to define the
‘influenced’ region or identify the maximum acceptable distance of office location
to infrastructure. This aspect is especially significant for ‘man-made’ or
‘constructed’ regions such as the Airport Metropolis’ Region where the built
environment, including the provision of infrastructure, can be defined often from a
greenfield site and offers a unique opportunity to set the ‘right’ spatial distribution
to attract the creative class and companies alike.

2.4 Companies’ Decision of Location: Existing Research

New or relocating companies bring employment, trade and GDP growth to an area.
Therefore, the attraction factors for companies are of high interest to urban
planners, economists and politicians and, in the context of the Airport City and
Aerotropolis business models, to airport managers as well. Given the competition
between Airport Cities to attract firms to their site, it has to be asked what the
competitive advantage of the Airport Metropolis’ Region is (De Neufville, 2008). It is
contended that the supply of different infrastructure elements could be an
important factor as ‘Infrastructure networks of all kinds determine how a city
functions and how it is defined socially, technically and politically’ (Stevens et al., 2010, 281). As the Airport City in its urban form can be seen as a city in itself, infrastructure will define its functionality. Economists overall agree that infrastructure is important for economic development. Even classical economists, who in general emphasised personal action for economic growth, saw transport infrastructure as a precondition for economic growth (Biehl, 1991). Nevertheless, the real relationship of infrastructure and economic growth is unknown (Kumo, 2012).

It is assumed that air traffic plays an important role in a company’s decision of location in an Airport Metropolis’ Region particularly if the company relies on a global, quick-supply chain. Nevertheless, investigations have shown that not only air traffic plays a role, but also other physical infrastructure elements and human capital as well. In the case of human capital, social infrastructure could have at least the same importance as physical infrastructure (Florida, 2002). Rietveld (1989, 273) claims that ‘models on infrastructure tend to focus on its use for firms’ although infrastructure is an important location factor for households when relocating. He argues that ‘in the long run, this will also have implications for the location behaviour of firms’ as the availability of the right workforce is an important factor for the location decision (Rietveld, 1989, 273). International companies concentrated themselves, for example, around Bangkok and Manila, not only because of air traffic connectivity but also because of available labour, expertise and infrastructure (Bowen, 2000). While the importance of transportation options and human capital is not new, and was already emphasised in Weber’s original work (1909), the weighting seems to change with a shift to more footloose and knowledge-orientated economics. Creative class theory offers an explanation for the relationship between available infrastructure and available workforce and therefore can explain why infrastructure can be an important location factor even if the company is not relying on fast and inexpensive transportation options.

Many studies have tried to disentangle the relationship between infrastructure provision and economic development, but much more research is necessary to
understand this relationship and give political decision-makers the clarity they need in the process of allocating funding to new infrastructure investments (Vickerman, 1991, Johnson, 1996). Numerous studies are focusing on just one infrastructure element or alternatively on all kinds of other location factors. However, it is necessary to define an infrastructure-set that will attract businesses (Johnson, 1996).

This study will begin to fill this gap by developing a ‘master plan’ of necessary infrastructure. Additionally, it is assumed that companies have only a certain tolerance to the distance between the office location and provided infrastructure, or that regional spillover effects, such as locating in the neighbouring region to the offered infrastructure, could occur (Martin and Rogers, 1995, Bruinsma et al., 1997, Richaud et al., 1999, Holl, 2004, Audretsch and Lehmann, 2005, Moreno and López-Bazo, 2007). Hence, it is argued that it is not enough to provide infrastructure elements in the wider metropolitan region; rather, it is necessary also to be clear about what the ‘optimal’ distance is to ensure that companies locate in the location that invests in infrastructure. This is especially important for an Airport Metropolis’ Region where often many different stakeholders are involved in the regional planning. Therefore, this study will also investigate optimal distances of varied infrastructure elements to the office location in the Airport Metropolis’ Region.

The following sections summarise the literature about the influence of infrastructure on economic development and companies’ decision of location. First, studies about physical infrastructure will be discussed. Starting from a wide approach of general consideration and studies about the relationship between infrastructure and decision of location, the discussion narrows down to more specific studies of different location factors. Studies that investigate the relationship between air traffic and airports and location decision will be analysed separately as air traffic plays a crucial role in the Airport Metropolis setting of this study. Second, literature in regard to social infrastructure will be discussed and analysed.
2.4.1 Physical infrastructure

As the discussion in Section 2.3.1 has shown, the connection between transport and location decisions had been investigated first in the nineteenth century by including cost of transportation into firms’ decision of location (Nuzzolo and Coppola, 2010). In Europe, transport infrastructure again has been rising to the attention of political parties since the 1980s (Bruinsma et al., 1997, Holl, 2004) because it is seen as a political instrument to stimulate economic growth (Wang, 2002) and therefore as an instrument to bring parity to regions inside the EU (Rietveld, 1994, Moreno et al., 1997). In this interest the influences on companies’ decision of location is embedded as reasonable transport infrastructure planning needs knowledge of the influence of infrastructure provision on the location decision of companies (Bruinsma et al., 1997, Holl, 2004). Transport infrastructure can make a location attractive to firms and households (Lakshmanan, 2011).

In the early stage of research into infrastructure impacts, research concentrated on productivity enhancement estimations and on social cost-benefit analyses. Productivity enhancement is expected through ease of transport, the provision of power or improved land and labour accessibility. Therefore, economic growth stimulation is expected through better service, not the infrastructure itself (Wang, 2002). Moreno et al. (1997) argue that former studies did not find evidence for improved productivity but that economic growth occurred through more firms locating in the region. Various studies found that infrastructure elements influenced companies’ decision of location. In his comprehensive literature review, Johnson (1996) reported that a study in 1978 found that interstate highways and water transportation have an effect on the location decision of larger firms and another study, one year later, found that transportation, educational, water, sewer and sanitation facilities influence the location process. In 1984 and 1987, studies confirmed that interstate highways have an influence on companies’ decision of location and in 1988 research found influence of rail, road and air transportation, telecommunications, size of hospitals and water and sewer facilities influenced the relocation of businesses (Johnson, 1996). In summarising the literature as well, Holl
(2004) investigated the relationship between transport infrastructure and economic development in the form of companies’ settlement. Findings indicated, first, that transport can make an area more attractive for companies as they gain better access to other markets and second, that ‘transport infrastructure improvements work like market integration’ (Holl, 2004, 343). Transport infrastructure reduces factor and transport costs and economies of scale occur. Therefore, it can be argued that companies in the Airport Metropolis’ Region would get better access to national and international markets through the Airport City and its connectivity by air and road.

Some studies examined the regional location of infrastructure and found intra-regional infrastructure improvements increase the attractiveness for firms but inter-regional development can have the opposite effect as better inter-regional transport takes the competitive advantage of ‘closeness to the market’ away (Rietveld, 1989, Rietveld, 1994, Rietveld, 1995, Holl, 2004). As Martin and Rogers (1995) showed, international infrastructure, such as an international airport, is actually enhances the relocation of firms out of the area. As a result, it should be asked whether transport infrastructure necessarily has a positive influence on the economic development of a region. In regard to these regional spillover effects, it is important to investigate the necessary ‘closeness’ of infrastructure elements to the favoured location and the real intentions for location in the Airport Metropolis’ Region, or rather what other factors need to be provided that will draw companies to locate there. Otherwise, it is possible that the Airport City or Airport Metropolis’ Region invests in all kinds of infrastructure elements but although the firms favour these developments, they locate in a neighbouring location as the critical distance is not large enough or necessary features are missing. This thesis will explicitly investigate the critical distance between different provided infrastructure elements and firms’ location decision.

The direction between the causality of physical infrastructure and companies’ decision of location is questioned regularly. Does infrastructure cause economic development or does economic development cause more transport infrastructure
investment (Rietveld, 1989, Rietveld, 1994, Button et al., 1995, Bruinsma et al., 1997, Wang, 2002, Holl, 2004)? Buurman and Rietveld (1999) could not find any evidence that the infrastructure followed private investment. In contrast, Wang (2002) modelled the infrastructure (water, electricity, gas, transport, storage and communication including sub-sectors) influence for East Asia via a production function and found evidence that infrastructure investment followed economic development or rather that various spillover effects and simultaneous stimulation coexist. An exception was Singapore which used the overprovision of infrastructure as a branding tool. The overprovision emphasised the difference between Singapore and other Asian cities where infrastructure is chronically underdeveloped or is working permanently over its capacity (Bowen, 2000). The question of causality is an important fact to consider if past data is analysed. If the timeline of the different infrastructure developments and the moving in of companies into the region is not clear, it is possible that the causality is mistaken. One could easily interpret the decision to locate in the region as a result of infrastructure investment while in reality infrastructure investment may have been undertaken because of greater numbers of companies and people moving to the area. To make it more complicated, one has to consider that transport infrastructure investments are regularly taking a very long time from the original conception to the completion point (e.g., the new airport in Berlin took approximately 20 years (Appenzeller, 2011)). Therefore, it is possible that companies are moving into an area because of the perception of new infrastructure. In conclusion, it is important to take the environment and the perceptions of decision-makers into account when investigating the relationship between infrastructure and firms’ decision of location. Consequently, this thesis conducts its investigation in a set environment of four different Airport Metropolis’ Regions.

Given the advent of the digital revolution in the last two decades, Holl (2004) asked if due to decreasing transport costs and the increasing importance of non-material flows, transport infrastructure still has an influence on companies’ decision of location. Additionally, it was assumed in the literature (Rietveld, 1989) that investment in ‘new’ infrastructure like telecommunication technique could have a
stronger effect on economic development than further investment in already existing elements like highways. Fox (1996) argued that it is especially important to consider that service industries are now more reliant on telecommunication than transportation. Interestingly, Fox (1996) remarked that while it is likely that telecommunication is becoming more important for service firms, this is expected to be only for a small number of firms. Not even twenty years later, in a world where smartphones, Skype and the internet are integral to the professional and personal life of many people worldwide, the importance of the internet and telecommunication should be obvious. To test this assumption, although telecommunication and the internet will not be added explicitly into the study, participants’ answers of ‘how important connectivity is’ will be explored. In a study undertaken by Röller and Waverman (2001) the influence of telecommunication on economic growth, in the form of GDP growth, was modelled through a structural, simultaneous model, including supply, demand and a production function. The relationship was found positive with a high influence on network externalities. For the positive influence of telecommunication on economic growth a nearly universal level of supply needs to be reached. This is understandable as telecommunication and the various forms of internet communication are useless if not enough participants have access to them – although national differences in regard to telecommunication and internet access exist but are becoming rapidly smaller. Many times the author of this work experienced how people in developing countries who had basically ‘nothing’ were using their mobile phones or accessing the internet, as internet cafes were readily available even in the poorest regions. It can be expected that it will only take a few more years until telecommunication or rather the internet is used on a universal, worldwide level. The findings that a positive network effect for telecommunication exists, for every user – or rather with every physical infrastructure improvement made – is in stark contrast to other transportation network effects.

Transport network effects were investigated by Holl (2004) and Moreno (Moreno et al., 1997, Moreno and López-Bazo, 2007) who found that in areas with a well-established transport network the influence of new transport infrastructure is much
smaller than in regions without infrastructure at all or uncongested transportation facilities. This means that the influence depends heavily on the already existing stock. Rietveld (1989) described this phenomenon as ‘decreasing returns to scale’. Additionally, not only is the provision of infrastructure important but so too is the ‘reliability of transport chains, especially in a multimodal context’ (Buurman and Rietveld, 1999, 54). In general, new infrastructure investments can have implications for future location choices of firms only if the public sector is reliable (Buurman and Rietveld, 1999). This means that, for example, discussions like the ones recently in Berlin where politicians questioned the new airport in the middle of the construction phase, will damage the future economic development of the region. Companies will not locate in areas with new infrastructure under construction if they fear that the projects will not be completed. After much discussion about the necessity of the new airport in general and the fifth delay in the opening, some companies withdrew their planned investment from the Airport City Berlin (Bach, 2013). Similarly, Wang (2002) argued that the management of infrastructure has at least the same importance as the provision itself. For East Asia he found that infrastructure is often not used efficiently and therefore more mature nations benefit more from infrastructure investments. Button et al. (1995) contended that while management is important, the price for using the infrastructure could have at least the same importance as the infrastructure provision itself for the influence of companies’ location decision. Buurman and Rietveld (1999) and Martin and Rogers (1995) considered the possible negative impacts on investment decision of firms if publicly funded infrastructure projects result in an increase of taxes or interest rates.

Button et al. (1995) and Moreno et al. (1997) concluded that previous studies found that transport infrastructure is seen as a necessary but not sufficient criterion for economic development. They argued that more studies on a micro-level are necessary to isolate the role of different infrastructure elements. Rietveld (1995) and Moreno et al. (1997) suggested that more research on the micro-level to estimate the impact of transport infrastructure for firms was required. Furthermore, sectoral differences should be investigated as their impact is likely to
be significant, and spatial dimension should be studied through spillover effects and interregional externalities (Moreno et al., 1997). Prior studies found, for example, that 14 to 18% of growth came through investment in neighbouring regions (Richaud et al., 1999). Another study by Moreno and López-Bazo (2007) revealed negative spillovers for transportation infrastructure but not for local infrastructure in the form of water and sewage facilities and urban structures. It remained unclear what these urban structures were although it can be assumed that some social infrastructure components (such as identified in Section 2.2) were included. Nevertheless, the authors explicitly excluded ‘education and training’. Martin and Rogers (1995) found similar evidence, arguing that domestic infrastructure, which they define as infrastructure that enhances domestic trade, is advantageous for firms’ location decision. These studies clearly indicate that the spatial location of the different infrastructure elements is very important as otherwise it is possible that companies locate close by, but not in, the favoured location due to regional spillover effects. This thesis considers this situation and investigates the favoured distances for the varied infrastructure elements to avoid regional spillovers. By asking explicitly for the maximum acceptable distance of infrastructure elements to the office location, infrastructure can be developed at the ‘right’ location to ensure economic development in the investing Airport Metropolis’ Region and not the neighbouring regions.

Various studies confirmed the influence of the business sector on the location decision, but also suggested that a cultural aspect in the form of the origin of the company could be influential. For instance, strong evidence was found for European firms that market accessibility, interregional and international transport links and telecommunication are important location decision factors (Rietveld, 1994). In contrast, for Japanese firms the availability of labour force, wages, land prices and regional policies were much more important (Rietveld, 1994). This thesis will identify three different sectors for this study by asking airport operators for their preferred industry sectors in airport proximity. Firm origin will be considered as well in the research.
Having gained a good understanding of the common features identified in the relationship between physical infrastructure and firms’ decision of location, in the following, studies that investigated specifically different location factors will be discussed and their methods introduced. Table 2, ordered in regard to the studied infrastructure elements, summarises the findings of this section and the following sub-section and includes the methods used, the authors, the country where the research took place and the results or findings.
<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Author(s)</th>
<th>Method</th>
<th>Country</th>
<th>Results/Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air traffic</td>
<td>Allroggen and Malina (2010)</td>
<td>Two-stage least square estimation</td>
<td>Germany</td>
<td>Positive</td>
</tr>
<tr>
<td>Airports</td>
<td>Robertson (1995)</td>
<td>Discussion</td>
<td>UK</td>
<td>Positive, but airports only one factor</td>
</tr>
<tr>
<td>Airports</td>
<td>Nunn (2005)</td>
<td>Comparative region study</td>
<td>USA</td>
<td>Impact not clear, seems if airports have a positive impact but other factors have at least the same importance</td>
</tr>
<tr>
<td>Air traffic</td>
<td>Braun et al. (2010)</td>
<td>Social Cost-Benefit analyses (Consumer surplus), non-linear inverse demand function</td>
<td>Germany</td>
<td>Positive</td>
</tr>
<tr>
<td>Airports</td>
<td>Arndt et al. (2009)</td>
<td>Survey, Regression framework (Cobb-Douglas production function)</td>
<td>Germany</td>
<td>Positive, but airports only one factor</td>
</tr>
<tr>
<td>Road</td>
<td>Holl (2004)</td>
<td>Modeling number of new manufacturing plants on a micro-level data basis</td>
<td>Spain</td>
<td>Positive, different impacts on different sectors, highest positive impact in the created corridor</td>
</tr>
<tr>
<td>Road (Highway)</td>
<td>Bruinsma et al. (1997)</td>
<td>Regional labour market model, Reference region model, Survey (entrepreneurs)</td>
<td>Netherlands</td>
<td>No clear evidence with regional models, positive influence found by survey</td>
</tr>
<tr>
<td>Roads</td>
<td>Richaud (1999)</td>
<td>Four-equation model</td>
<td>Africa</td>
<td>Positive evidence found but spillover effects for neighbouring regions</td>
</tr>
<tr>
<td>Roads (different spatial characteristics, e.g. highways)</td>
<td>Maoh and Kanaroglou (2009)</td>
<td>Historic Data, multinomial logit model</td>
<td>Hamilton, Canada</td>
<td>Positive</td>
</tr>
<tr>
<td>Physical infrastructure</td>
<td>Duffy-Deno and Eberts (1991)</td>
<td>Production function (per capital personal income)</td>
<td>USA</td>
<td>Positive</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Author(s)</td>
<td>Method</td>
<td>Country</td>
<td>Results/Findings</td>
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<tr>
<td>Physical Infrastructure</td>
<td>Button et al. (1995)</td>
<td>Survey of firms’ decision-makers</td>
<td>Scotland</td>
<td>High influence of road infrastructure and parking possibilities; low impact of public transport, air and rail travel; transport infrastructure only one criterion for location decision; different preferences of sectors for different transport modes</td>
</tr>
<tr>
<td>Physical infrastructure (Roads, Rails &amp; Ports)</td>
<td>Buurman and Rietveld (1999)</td>
<td>Regression Analysis (multivariate)</td>
<td>Thailand</td>
<td>Positive influence of road infrastructure, no influence was found for railroads, transport infrastructure only one criterion for location decision (labour, in this case, the most important factor), different preferences of sectors for different transport modes</td>
</tr>
<tr>
<td>Physical Infrastructure (Water-electricity-gas Transport-storage-communication + sub-sectors)</td>
<td>Wang (2002)</td>
<td>Production function, one-sector model vs. two-sector model</td>
<td>East Asia</td>
<td>Economic growth through public and private investment is a twofold relationship, management of infrastructure is at least same important as provision itself</td>
</tr>
<tr>
<td>Physical and social infrastructure</td>
<td>Moreno et al. (1997)</td>
<td>Cobb-Douglas production function</td>
<td>Spain</td>
<td>Infrastructure is a development factor, but impact is small, impacts relies on many other variables, like sector, network, region, agglomeration</td>
</tr>
<tr>
<td>Physical Infrastructure (transport infrastructure and local infrastructure (water, sewage and urban structures))</td>
<td>Moreno and López-Bazo (2007)</td>
<td>Production function</td>
<td>Spain</td>
<td>Positive for local infrastructure, negative spillovers for transportation Influence of new infrastructure much higher where existing stock is low</td>
</tr>
<tr>
<td>Physical Infrastructure (international (e.g. international airports) and domestic public infrastructure (e.g. regional road and business environment in for of taxes, law and public administration))</td>
<td>Martin and Rogers (1995)</td>
<td>Modelling trade flows</td>
<td>-</td>
<td>Companies locate in countries with good domestic infrastructure, high incomes and large markets</td>
</tr>
</tbody>
</table>

Decision of Location Research

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<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Author(s)</th>
<th>Method</th>
<th>Country</th>
<th>Results/Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Infrastructure (airport, train station, highway interchange; differentiating between industrial and commercial development)</td>
<td>McDonald and McMillen (2000)</td>
<td>Regression Analysis (probit and OLS)</td>
<td>Chicago, USA</td>
<td>Positive impact of airport and highway interchange, negative impact for train station</td>
</tr>
<tr>
<td>All kind of location factors, among others physical infrastructure (parking, airports, roads, public transport)</td>
<td>Kimelberg and Nicoll (2012)</td>
<td>Survey, statistics</td>
<td>Massachusetts, USA</td>
<td>Positive, all factors important, apart from public transport that is only moderately important</td>
</tr>
<tr>
<td>Telecommunication infrastructure</td>
<td>Rölle and Waverman (2001)</td>
<td>Structural model that includes supply and demand and production function</td>
<td>21 OECD countries (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, UK, USA)</td>
<td>Positive, critical mass that reaches nearly universal level is necessary</td>
</tr>
</tbody>
</table>
Many studies investigated the influencing factors for firms’ decision of location in general but not in the context of airport-centred urban developments. For example, Bruinsma et al. (1997) asked 1845 entrepreneurs for a ranking of different infrastructure elements. Roads were ranked highest, followed by telecommunication, public utilities, airports terminals, waterways and railways. Nevertheless, physical infrastructure was not seen as the very first factor for a location decision. More important were factors like ‘expansion capacity’, ‘representativeness of the location’, ‘the price’ and ‘accessibility’. Similarly, Button et al. (1995) asked 2076 firms (response rate of 939) for their location factors. Roads were ranked overall highest, followed by lease and rental costs, building layouts, car parking and access to markets. Other transport infrastructure like bus, air and rail links were ranked in the last third. All in all, Button et al. (1995) found that local transport infrastructure plays a role in companies’ decision of location. Important differences between different transport modes and kind of firm were discovered. For example, larger sized firms had a greater preference for road, rail and air infrastructure than the average of the sample. The preferences for air links were associated with the origin of firm, the location of the parent company and the size of the firm. Furthermore, firms that moved from outside of the region ranked air connectivity significantly higher than other firms. Surprisingly, no evidence was found that preferences for different transport modes were different for different industries. Also, no significant evidence was found that preferences changed with the age of the firm. This study will incorporate the size of firms into the research as it seems to have a significant influence on the preferences for air traffic, airports or a location in an Airport City.

Other survey studies were undertaken by, for example, Fox (1996) and Kimelberg and Nicoll (2012). Fox (1996) surveyed high-technology manufacturing firms and found that transportation is only one factor but proximity to recreation facilities is an important factor as well. Kimelberg and Nicoll (2012) surveyed medical device firms, which are assumed to have similar location preferences as high-technology firms as both have business features of the typical industrial economy and the
knowledge economy. They found ‘on-site parking’, ‘quality/capacity of infrastructure’, ‘access to major highways’ and ‘access to airports’ ranked as important in this order, while public transport was ranked only moderately important. A wealth of other factors were surveyed with ‘availability of appropriate labour’ ranked first. These two studies confirm Florida’s (2002, 2005) creative class theory that knowledge-intensive industries’ and especially the high-technology sector’s first location preference is the availability of the ‘right’ workforce and that therefore quality-of life or amenities are very important location factors.

Different methods to forementioned studies were used in a study by Buurman and Rietveld (1999) who examined the impact of roads, rail and ports on an industrial location in Thailand. They used data from the last 25 years for a multivariate regression analysis. They recognised that no future perceptions were taken into account, but that they would be reasonable for future work. The two most important findings were that ports and roads had a positive, though limited, effect for decision of location. The most important factors for decision of location for the manufacturing sector were the availability of labour and high population densities. Other findings indicated that railroads had no influence at all for the location decision and that different sectors prefer different transport modes. Roads were important for all sectors under investigation, except heavy industry. In contrast, ports were important only for agribusiness and heavy industry.

A similar study was undertaken by McDonald and McMillen (2000) for the Chicago area in the USA for the years 1990 to 1996. They used a regression model to estimate the impact of the airport, highway interchange, employment centres and the nearest commuter train station. They found for industrial (manufacturing, warehousing, distribution) and commercial (retail, shopping centres, auto, business parks, hotels, office, public storage, research, parcel distribution and commercial ‘not elsewhere classified’) development that these developments are positively related to the airport and highway interchange but negatively to commuter train stations. Closeness to employment centres played a much bigger role for commercial development than industrial development.
In contrast, a Cobb-Douglas production function was used to model the influence of roads, highways, water and other urban structures in Spain by Moreno et al. (1997). Interestingly, they included two social infrastructure elements: health and education. They measured the physical infrastructure as stock per square metre for each region and the social infrastructure as stock per person in each region and used an expansion method to model substitutability and complementary relationships between inputs. Additionally, they tested different sectors: agriculture, industry, services and building. The results were manifold. Typically, infrastructure was found as a necessary but not sufficient condition for economic growth. Overall the impact of infrastructure was found to be small. They emphasised that infrastructure alone is not enough for economic stimulation, ‘if it’s not accompanied by measures to improve human and technological capital, among others’ (Moreno et al., 1997, 26). Other factors were: adequate industrial mix, business culture, human capital and connections with dynamic centres. Other influences were the regional, sectoral and network development. These findings indicate that the impact of infrastructure investment depends on pre-existing conditions such as the degree of network congestion, the level of economic development, the level of existing stock, interdependencies among regions and agglomeration economies. It was also found that the impact differs between sectors. This points to the influence of the overall environment where a location decision is taking place. Therefore, a micro-level investigation in a specified location is a fruitful approach. This study will therefore explore location decision factors in an Airport City setting in four different case regions.

Similar to Moreno et al. (1997), a clear sector distinction was made by Holl (2004), who examined manufacturing location and impacts of road transport infrastructure in Spain. Holl used past micro-level data (municipalities) to model the number of new firms. Additionally, she distinguished between ten different sectors as she contended that the influence of road infrastructure is different on firms in different sectors. Furthermore, she included factors like wages and skilled workers. She found clear evidence that new road infrastructure makes an area more attractive
for companies. A fourteen per cent increase of new manufacturing firms was found in a distance of 10 km from the new road. The highest positive impact was found in the created corridor. She also found evidence that influence in different sectors is indeed different. The impact on the ‘paper and printing’ and ‘wood and furniture’ sector was positive if there was a general proximity to firms in the same sector. However, firms in the ‘transport equipment’ sector preferred locations close to centres of production.

Another study that estimated the impact of road infrastructure, undertaken by Bruinsma et al. (1997), used a multi-method approach to examine the impact of the newly constructed A1 highway in the Netherlands. The researchers measured this impact as employment growth and the number of new or relocated firms. As they discovered that different approaches often result in conflicting conclusions, they used three discrete approaches: a reference region method, a regional labour market model and a survey among entrepreneurs. A total of 1845 questionnaires were sent to firms in sectors with non-local orientation of demand, of which 510 responded. To make sure that participants’ answers took into account more than the infrastructure perspective, questions about a broader context like operational and internal factors were included. Through the regional analysis, employment growth could be found only in the transport sector. No other significant results occurred. The survey findings revealed a little more. Most new firms and firms’ relocation could be found in a zone of up to 7.5 km from the highway. Companies’ decision-makers perceived infrastructure but did not rank it highest for a location decision. Nevertheless, after relocation a 28% decrease in the distance to the highway occurred and the highway construction was seen as attractiveness improvement of the location. But two points have to be considered. First, decision-makers did not rank the infrastructure highest in their location decisions. More important were factors such as expansion capacity and representativeness of the area and other factors were mentioned for the decision of location, such as parking possibilities and the price of the location. Additionally, ‘only after entrepreneurs have decided to relocate do they start to attach a role of some importance to road accessibility’ (Bruinsma et al., 1997, 399). Second, a decision of location is also
dependent on the supply of suitable locations. In this case, large industrial sites were built near the highway, so that it was not necessarily the choice of each company to locate near the highway but more a case of one of the urban planners who made the land accessible for firms’ location.

In summary, the spatial dimension, the environment and the size and sector of the firms play an important role in the relationship of infrastructure and investments in relation to location decision. The spatial dimension is particularly important in regard to (negative) spillover effects to neighbouring regions. Several studies found that the size of a company and the business sector substantially influence the importance of different physical infrastructure elements for the decision of location. Therefore, this research will include sectoral differences, record the size of the firms, and will investigate in fixed environmental settings of four different Airport Metropolis’ Regions (see chapters 4 and 5) the importance and spatial dimension of infrastructure provision and its influence on firms’ decision of location.

2.4.1.1 Airports and air traffic

Airports are essential for the world economy and are growth nodes for regional economies. Air service stimulates economic growth as clusters around airports establish as a result of accessibility, speed and mobility at an airport (Kasarda and Lindsay, 2011). In the last decade, airports have become more than aviation infrastructure. They have developed into multimodal businesses where they become urban growth generators. Due to new business models, the airport offers employment, shopping, trading and business opportunities and can develop sometimes from an air hub to a city in its own right (Reiss, 2007, Freestone, 2009).

Globalisation has changed the rules for businesses’ decision of location. The world economy is now reliant on fast connections. Airports thus have become magnets for companies that require fast transportation networks. For example, for 31% of companies in the Munich area in Germany, the airport was the number-one factor for the location decision. Altogether, 80% of manufacturing companies in the
Hamburg region in Germany depend on air traffic (Kasarda, 2008d). Today it is argued that airports are the same driver for economic and urban development as highways were in the 20th, railroads in the 19th and seaports in the 18th centuries (Kasarda, 2008d). It is broadly accepted in the literature that airports, or air traffic in general, stimulate economic development in a region (Robertson, 1995, Van Den Berg et al., 1996, Nunn, 2005, Charles et al., 2007, Green, 2007, Janic, 2008, Freestone, 2010, Stevens et al., 2010). With their transformation into real business entities, airports become ‘pure service providers, intermodal integrators and attractive locations for other mainly high-tech non-aviation related business’ (Janic, 2008, 130).

Air traffic is important in particular for high-technology companies. A study in 1996 found that the employees of these firms fly 1.6 times more than employees in other industries and hub airports are positively correlated with high-technology employment (Bowen, 2000, Button, 2002). Malaysia used the relocation of Kuala Lumpur Airport and its expansion to a hub airport as a tool to develop economic growth by establishing a high-technology cluster between the airport and the city: Malaysia’s Multimedia Supercorridor. Singapore developed its aerospace industry through enhanced air traffic (Bowen, 2000). In 2009, over fifty aerospace firms accounted for about 1.6% of Singapore’s GDP (Oxford Economics, 2011).

Improved air service in the form of better connectivity, for example more direct flights, between two cities makes face-to-face meetings in terms of time and money cheaper for firms (Brueckner, 2003). Some researchers (Brueckner, 2003, Bhat, 2010, Kasarda and Lindsay, 2011) see it also as a possibility to stimulate urban development in a region in terms of connectivity between two regions as complements to inner-city industry clustering. Frequent and convenient air traffic connections attract new firms and promote employment at established firms (Brueckner, 2003). Furthermore, business people in general prefer direct flights which means that companies are more likely to move into a catchment area of a gateway or hub airport than a regional airport (Dennis, 1994).
Numerous studies have investigated the relationship between provided air traffic connectivity and firms’ location decision or rather economic development. Allroggen and Malina (2010) estimated the monetary values of German airport infrastructure by a two-stage least squares estimation. The calculated results are for the ‘influenced’ area. The authors defined the ‘influenced’ area as the area that ‘reaches so far as competitive advantage in comparison to the utilization of other airports arises for the passengers at this airport’ (Allroggen and Malina, 2010, 7). The positive findings are twofold and make a distinction between first- and second-tier airports and third-tier airports. Third-tier airports generate positive effects on the economic growth through their existence as entrepreneurs see the existence of an airport as a signal of economic strength and the airport supply basic air connectivity. Hence, they locate their business there. In contrast, first- and second-tier airports contribute economic growth to the ‘influenced’ area as they offer more and more frequent direct connections which culminates in cost reductions and productivity growth for the companies (Allroggen and Malina, 2010).

Robertson (1995), chose a different approach to find evidence for the link between economic development and air traffic. He asked if the establishment of an airport can revitalise a depressed area. It is recognised that the airport itself is often the largest employer in a region. Nevertheless the number of jobs found in the surrounding area can be two or three times more than the jobs found at the airport. Robertson (1995) reasoned that airports stimulate new investment and good air connectivity can help regions become attractive for potential investors.

Similarly, Smyth et al. (2010) demonstrated that public funding for air traffic and better connectivity increase the economic development and social inclusion in a region. The results of different surveys and quantitative analyses of the numbers showed that funding of low-density routes that are deemed necessary for the purposes of economic and regional development has a positive impact on the total Gross Value Added of the wider economy. Additionally, the findings indicated that new routes help to raise the profile of the airports and regions, so that additional routes develop through attractiveness to airlines. Airports could expand as major
business and tourism travel gateways. Moreover, connectivity was found to be crucial for business in a globalised marketplace and competitiveness of the region could rise through connectivity in the form of integration that airports usually have with the road network (Robertson, 1995). Fox (1996) took this finding further and argued that airports are important for headquarters locations and that good commercial service is needed where companies do not use private jets.

It has to be questioned if airports or air traffic alone are a sufficient precondition for economic development of a region. Arndt et al. (2009) asked 100 companies located in an area surrounding an airport about what factors influenced their investment decision. That study found that air transport was a necessary but not a sufficient criterion for location decisions, and that ‘supply of qualified labour force’ and ‘transport connection via road’ were even more important. Furthermore social factors like ‘quality of the social infrastructure’ and ‘leisure time and regeneration facilities’ were very important as well. Similar results were found by Robertson (1995) and Nunn (2005). Robertson (1995) found that good air traffic can help to stimulate economic growth in a region, but that other factors are complementary: the level of skilled workers, the telecommunication network and the provided education facilities. Nunn (2005) examined aviation investments and economic outputs in different regions in a comparative study and found that airports alone do not guarantee economic success of a region; other assets are more important, like skilled workers and agglomerations of companies in the same business. Actually, Nunn found that some regions are economically successful even though they have shortcomings in aviation infrastructure. These studies show clearly that air connectivity alone is not enough to attract companies in the precinct of the airport or Airport City. Nevertheless, a clear indication about other factors could also not been found.

This thesis thus will also investigate factors other than airports that influence the location decision and will investigate the importance of physical and social infrastructure elements for the companies’ decision of location and the underlying reasons for their importance. For example, it will be asked if airports are important
because of frequent air travel and if companies value social infrastructure as a pull factor for their workforce. Furthermore, the concept of a built environment of an Airport City will be included, as will be further discussed in Chapter 3, as not much research has been conducted on the relationship between the actual environment of an Airport City and decision of location.

2.4.2 Social infrastructure

Because of demographic reasons, many countries in the Western world face a shortage of young professionals. In a knowledge-based world, the most important ‘production’ resource is human capital. Therefore, companies’ decision of location is, and will be even more so in the future, influenced by the preferences of their potential employees (Florida, 2002, Florida, 2012). Surveys have shown that this kind of employee is not only extremely flexible, but that they also attach value to good living standards (Florida, 2005). These standards are defined as affordable housing in an exciting urban surrounding, cultural diversity, high-quality urban development and well-developed social infrastructure in general, like the presence of education facilities and supermarkets. Therefore, a region with affordable housing, for example, has a competitive advantage over other regions (Spars et al., 2009). It can be argued that in a knowledge-based economy, companies rely more and more on skilled workers. Therefore, it can be expected that social infrastructure plays a role in companies’ location decisions.

The literature on the relationship between social infrastructure and location theory is relatively scarce. ‘Indeed, one would have to piece together several different literatures in order to develop a coherent picture of amenity orientation on the part of firms’ (Gottlieb, 1995, 1413). Indeed, by borrowing from other disciplines, some research for all social infrastructure elements under investigation in this study, apart from ‘religious facilities’, was found. While ‘education’ is a more widely researched topic, studies on ‘community service facilities’ or ‘leisure facilities’ hardly exist. Nevertheless, a body of knowledge exists for the importance of social infrastructure for firms’ location decision as it is assumed that high-skilled workers
would not live in areas without these amenities (Florida, 2005, Florida, 2010). As the availability of the ‘right’ workforce is traditionally a location factor (even in Weber’s [1909] location theory it was already a factor in the production function), it is widely assumed that social infrastructure becomes a location factor for companies in a more service-oriented and high-technology world and a less manufacturing-oriented world. Nevertheless, as will be seen, the findings are less convincing than the researchers would claim.

Table 3 summarises some of the issues discussed above and the reviewed studies to provide an overview of the importance of different social infrastructure elements.
Table 3: Social infrastructure studies and their implications

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Author(s)</th>
<th>Method</th>
<th>Country</th>
<th>Results/Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>McNamara and Deaton (1996)</td>
<td>Conceptual paper based on production function</td>
<td>-</td>
<td>Positive as it influences production function and availability of well-educated workforce</td>
</tr>
<tr>
<td>Education, Housing, Leisure facilities</td>
<td>Button et al. (1995)</td>
<td>Survey</td>
<td>Scotland</td>
<td>Low influence, although availability of ‘right’ workforce was acknowledged</td>
</tr>
<tr>
<td>Education, Health</td>
<td>Moreno et al. (1997)</td>
<td>Cobb-Douglas production function</td>
<td>Spain</td>
<td>Ambiguous findings</td>
</tr>
<tr>
<td>Education</td>
<td>Audretsch et al. (2005)</td>
<td>Statistics (descriptive &amp; regression model)</td>
<td>Germany (high-technology start-ups)</td>
<td>Positive</td>
</tr>
<tr>
<td>Education</td>
<td>Audretsch and Stephan (1996)</td>
<td>Quantitative document study, statistics (chi-square, probit model)</td>
<td>USA (Biotechnology sector)</td>
<td>Negative</td>
</tr>
<tr>
<td>Education and leisure facilities</td>
<td>Johnson and Rasker (1995)</td>
<td>Survey and interviews</td>
<td>USA</td>
<td>Negative for education Positive for leisure facilities</td>
</tr>
<tr>
<td>Leisure Facilities</td>
<td>Deller et al. (2001)</td>
<td>Structural Model</td>
<td>USA</td>
<td>Positive</td>
</tr>
<tr>
<td>Community service facilities (shopping centre) and leisure facilities</td>
<td>Van Oort et al. (2003)</td>
<td>Survey and interviews</td>
<td>Netherlands</td>
<td>Negative, but positive for interviewed employees</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Author(s)</td>
<td>Method</td>
<td>Country</td>
<td>Results/Findings</td>
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</tr>
<tr>
<td>Social infrastructure (housing, education, community service facilities, leisure facilities)</td>
<td>Kimelberg and Nicoll (2012)</td>
<td>Survey, statistics</td>
<td>Massachusetts, USA</td>
<td>Costs of housing important Education, community service facilities and leisure facilities moderately important</td>
</tr>
<tr>
<td>Social Infrastructure (different spatial characteristics, e.g. malls (community service facilities) and parks (leisure facilities))</td>
<td>Maoh and Kanaroglou (2009)</td>
<td>Historic Data, multinomial logit model</td>
<td>Hamilton, Canada</td>
<td>Positive for malls Negative for parks</td>
</tr>
<tr>
<td>Social infrastructure</td>
<td>Musterd (2006)</td>
<td>Historic Data, mapping and ranking</td>
<td>European Cities</td>
<td>Positive</td>
</tr>
<tr>
<td>Social infrastructure</td>
<td>Gottlieb (1995)</td>
<td>Regression Analysis</td>
<td>New Jersey, USA</td>
<td>Negative</td>
</tr>
<tr>
<td>Social infrastructure (neighbourhood conditions)</td>
<td>Weterings (2012)</td>
<td>Historic Data, Statistics</td>
<td>Netherlands</td>
<td>Positive impact of community service facilities and neighbourhood conditions in general</td>
</tr>
<tr>
<td>Affordable Housing</td>
<td>Spars et al. (2009)</td>
<td>Quantitative analysis of income and rental differences</td>
<td>Germany and Europe</td>
<td>Positive if it culminates in lower salaries</td>
</tr>
</tbody>
</table>

Decision of Location Research
Many studies did not look at social infrastructure elements but ‘quality-of-life’ as a location factor. The concept ‘quality-of-life’ as a decision factor was researched widely in the 1980s and 1990s (Love and Crompton, 1999). Findings indicated that quality-of-life becomes a growing factor for companies’ decision of location as the ‘right’ workforce is becoming more important for high-technology firms, companies involved in research and development and companies with highly skilled workers in information- or knowledge-based services and production. It is contended that in an area with good quality-of-life it is easier to find the ‘right’ workforce and therefore the companies gain cost savings through lower salaries and recruitment costs. Love and Crompton (1999) investigated ‘quality-of-life’ in what they include, among others, a wide range of social infrastructure elements, such as education and health facilities, living and housing costs and recreation and cultural facilities. With a survey of decision-makers in Colorado in the USA, Love and Crompton (1999) found that in general ‘quality-of-life’ was more important for companies that moved from outside the state of Colorado, had less than 8 employees, were relatively footloose in their location decision as they did not depend on a special location due to needed resources or transportation, had a high proportion of professionals, had a high concern of finding the ‘right’ (professional) workforce and where the decision-maker relocated with the company. These are interesting findings because Eversley (1965) had already claimed that location decisions are highly dependent on the quality-of-life of an area and the preferences of the decision-maker. Eversley also emphasised the attraction of workforce as he argued that no salary increase can compensate for missing social infrastructure in the living and working surrounds of any employee:

We expect that a generation from now the requirements of a weekly wage-earner (if there are any left), will be similar to those of the professional man of today, at least as regards his leisure and recreation, his purchasing patterns, the educational requirements of his children, and his transport demands. (Eversley, 1965, 113)

In line with this argument, in a study by Kimelberg and Nicoll (2012) the highest ranked decision factor was found to be ‘availability of appropriate labour’.
Following Florida’s (2002) creative class theory, in which high-skilled workers are attracted to places with good social infrastructure, it must be asked if companies consider social infrastructure enough in their location decision to attract and retain the ‘right’ workforce. For example, for firms of the service business in Hamilton, Canada, no proximity to parks or recreation facilities was found (Maoh and Kanaroglou, 2009) although one should expect that the firms would value these kinds of facilities in proximity to the location to attract the ‘right’ workforce. Gottlieb (1995) found at least some ‘avoidance of disamenities’ but no evidence for the relationship between amenities and decision of location. Kresl (1995) and Musterd (2006) asserted that in times of globalisation, increased transportation and communication opportunities, companies can locate literally anywhere (i.e. are footloose) and that therefore the competitiveness of locations is becoming more important. Their argument is in line with Florida’s (2005) theory that skilled workers will locate at places with great urban amenities, or rather with social infrastructure.

A few studies have investigated the relationship between different social infrastructure elements and economic development. For instance, Moreno et al. (1997) tested social infrastructure, in the form of health and education, and its influence for economic development. The results were ambiguous. Not always was a positive correlation found. They assumed that social infrastructure multiplies the productivity in regions where there is already a strong private investment as well-educated and healthy workers are more productive. On the other hand, in regions without strong private outcomes, agglomeration and population density, the high investments in social infrastructure would have a low impact on economic development. This could indicate that social infrastructure plays a role in economic productivity or growth but it is not a highly influential factor for companies’ decision of location. Similar ambiguous results were found by Button et al. (1995) in Scotland. ‘Access to required staff’ was ranked relatively high but ‘access to education facilities’, ‘access to executive housing’ and ‘access to recreation facilities’ were found on the last places in firms’ location decision. These results indicate that firms do not seem to be aware of the relationship between the ‘right’ workforce and social infrastructure otherwise these elements should be
interrelated, for according to Florida’s (2002) creative class theory at least high-skilled workers would relocate to areas with access to good social infrastructure. In a study by van Oort et al. (2003) on the information and communication technology sector in the Netherlands, it was found that companies consider the ‘right workforce’ as important but not ‘amenities’. Interestingly, by asking employees, they found that employees do value social infrastructure in the form of cultural, community service facilities and green space. Nevertheless, some other studies found evidence that companies favour locations with good social infrastructure, or rather good leisure/recreation/regeneration facilities (Johnson and Rasker, 1995, Fox, 1996, Granger and Blomquist, 1999, Deller et al., 2001, Arndt et al., 2009).

More light was thrown on some other social infrastructure elements under investigation in the research from Love and Crompton (1999). For example, ‘access to transportation’ and ‘housing costs’ were ‘very important’, while ‘libraries’, ‘foot or bike trails’ and ‘commercial entertainment opportunities’ were found to be only ‘slightly important’. More important (‘somewhat important’) were ‘outdoor recreation opportunities at state or national parks’, ‘education and health facilities’, ‘availability of child care’, ‘quality of the local community parks’, ‘cultural opportunities’ and ‘private recreation opportunities’. A recent study of Kimelberg and Nicoll (2012) confirmed some of these aspects by surveying the medical device industry in Massachusetts, USA. ‘Cost of housing’ was found important, while education, ‘proximity to restaurants and shops in surrounding area’ and ‘availability of cultural sports amenities’ were found to be only ‘moderately important’. ‘Quality of life/amenities/good place to live’ was only mentioned as a decision factor from one-third of the sample. Manufacturing firms put even less importance on education facilities and shops and restaurants nearby as location factors. These findings are similar to those of Granger and Blomquist (1999), who found for manufacturing firms no influence of education on the decision of location but a positive relationship for quality-of-life and conclude that ‘labour-intensive industries are more strongly attracted to high-amenity urban locations’ (Granger and Blomquist, 1999, 1859).
In contrast to studies that focused on other social infrastructure elements, some more research was conducted on the relationship between education facilities and economic development. McNamara and Deaton (1996) argued that in general it can be expected that education influences economic development as it enhances the productivity of the labour force. Furthermore, they expected to find direct investment or location or relocation of companies that are seeking to draw a well-educated workforce to areas with good education facilities. Nevertheless, they acknowledged that the real influence of education on economic development is uncertain and needs much more research. Two further studies found no relationship between ‘education’ and decision of location (Johnson and Rasker, 1995, Granger and Blomquist, 1999). In recent years, research began to concentrate on knowledge spillovers of universities and their influence on firms’ location decision. Knowledge spillovers are externalities towards the firms from the universities without (full) compensation of the universities. Knowledge spillovers reduce the costs for the firms for accessing new knowledge and finding the ‘right’ workforce (Audretsch and Lehmann, 2005). In 1996, Audretsch and Stephan explored the relationship between education institutions and firms for the Biotechnology sector in the USA. By estimating the chi-square and using a probit model, they found that geographic location does not matter much. Nevertheless, it has to be noticed that they did not explore the location decision per se but investigated the spatial relation between scientists, their universities and firms they were working for or were affiliated with. In 2005, Audretsch et al. investigated the university spillovers for high-technology start-ups in Germany to address the ‘locational choice as a strategic decision by firms to knowledge externalities in general and spillovers from universities in special’ (Audretsch et al., 2005, 1114). They explained that

... because university spillovers tend to be spatially bounded, the costs of absorbing spillovers increases with distance from a university. An implication of the geographic distribution of knowledge spillovers is not only that they are partially clustered around universities, but also that the entrepreneurial opportunities to start a new firm are also geographically linked to the spatial distribution of knowledge spillovers. The limited geographic reach of such
channels for the exchange of information and know-how is one of the leading causes of the impact of geographical proximity. (Audretsch et al., 2005, 1115)

Additionally, they argued that younger firms should be more attracted in close proximity to universities as they do not have the resources for their own research and development department. Indeed, they found that 92% of the firms are in a distance of 50 km or less to the next university. Moreover, the median of the whole sample was 7 km. It was also found for universities of the natural sciences that companies tend to locate closer to bigger universities, which indicates the desire to draw on the potentially large workforce (Audretsch et al., 2005). In sum, the influence of ‘education facilities’ on firms’ decision of location is not clear. Nevertheless, under certain circumstances, a positive influence of universities on the location decision was found.

‘Housing’ is a social infrastructure element that is not generally included in this study but will be investigated in the context of Berlin as housing is sometimes mentioned in the literature as one element of social infrastructure. Spars et al. (2009), for instance, investigated housing markets by a quantitative analysis of income and rental differences in Germany and Europe. They put forward a theory that affordable housing is a competitive advantage for a region to attract economic development. Furthermore, they showed that the typical soft factor ‘housing’ can become a hard factor for companies’ decision of location. Accommodation is an essential part of life; companies have to pay higher salaries if accommodation is more expensive and all other conditions are the similar. For example, a company in Munich has to pay a higher salary than a comparable company in Berlin as the Munich rents are approximately double. As a consequence, the soft factor ‘affordable housing’ becomes a hard factor in companies’ decision of location. This is an interesting factor to consider as Holl (2004) proved that higher wages have a negative impact on companies’ decision of location whereas labour qualification has a positive one. This thesis will include the factor ‘affordable housing’ as a location factor in particular in the interviews in Berlin as Berlin has, in the German context and in comparison to other ‘world’ cities, still very low rents.
Recently, researchers have started to look not only at different amenities or infrastructure elements but also at the neighbourhood or locational environment. Weterings (2012) looked at relocation patterns of firms in the Netherlands between 1999 and 2006. She distinguished between different business sectors and found a high influence of ‘community service facilities’ on the relocation pattern of firms of the business and consumer services sector. Furthermore, she found that neighbourhood conditions have a particularly strong influence for the relocation decisions of companies of the consumer services sector. She concluded that the ‘neighbourhood’ or the ‘locational environment’ should be considered in studies of companies’ location decision. This thesis accordingly will explicitly investigate neighbourhoods or environments of Airport Cities.

As with the literature for physical infrastructure, many studies into the social infrastructure emphasised the importance of distinguishing between business sectors if location factors are investigated. For example, Maoh and Kanaroglou (2009) found for Hamilton, Canada, that retail trade firms and retail stores seem to seek proximity to regional malls while communication, transportation and construction companies tend to avoid these locations. Musterd (2006) found some evidence in his study of European cities that businesses of the creative industries such as media, design and entertainment prefer urban places with good social infrastructure:

... there are clear differences in terms of the spatial orientation of different types of firms and different types of workers. There is, indeed, strong support for the argument that both economic activities in the creative sphere and those who are working in these activities show preference for the most urban locations, which are characterised by very high levels of functional and physical – and also some social and cultural – variety; these areas are also the core areas where one can find restaurants, cafes, theatres and other public and lively spaces. (Musterd, 2006, 1134f.)

Consequently, this study will include different business sectors in its investigation of companies’ decision of location.
The literature review has shown that the exploration of social infrastructure in relationship with firms’ decision of location is limited. It seems that there is an underlying perception in academia that social infrastructure should play an important role for companies’ decision of location as a result of those factors identified in Florida’s (2002) creative class theory, but that so far studies are lacking convincing evidence. This research project will therefore include several social infrastructure elements in the study and will investigate the importance of those elements for decision-makers in the Airport Metropolis’ Regions under investigation.

2.5 Gaps in the Existing Literature

Having summarised and analysed the various streams of literature on the relationship between infrastructure and companies’ decision of location, the conclusion can be drawn that not only are there huge gaps in the literature, but that the existing research also is unbalanced in terms of the types of infrastructure elements investigated. Comparatively little research has been undertaken on the involved relationship between social infrastructure and decision of location. Furthermore, regarding physical infrastructure, the influence of roads and airports was researched extensively while all other elements remain largely neglected. Studies concentrated, in the field of transport infrastructure, often only on one mode; while in the field of social infrastructure, studies often investigated a whole set of elements under the rubric ‘quality-of-life’. An exception was ‘education’ which was researched numerous times especially in connection with spillover theories. Very few studies have tried to use a multi-thematic approach, that is one that includes both physical and social infrastructure elements in the same study. Hardly any studies explored spatial relations in a more in-depth way by including a distance component. Investigated distances were found only in very limited numbers for roads and education. Hardly any studies were found that included the origin of companies although it can be expected that in a globalised world this is a relevant factor.
In regard to location theory, studies in recent times concentrated more on factors such as international trade and agglomeration. While these are important factors for the location decision, it can be expected that in a cross-linked, mobile and digital world, where many companies can work literally anywhere, spatial settings are becoming more important again to gain a competitive advantage in attracting companies to a certain location. Furthermore, since the introduction of location theory, the necessary workforce has changed dramatically with the shift from manufacturing to more and more service industries. In consideration of Florida’s creative class theory, the factor ‘labour’ needs to be redefined in location theory. Furthermore, the influence of different transport components and telecommunication and internet provision needs reconsideration. Social infrastructure should be included in some form as well. The literature acknowledges that the environment should be included more in location theory in the future. By applying location theory to the built environment ‘Airport City’ and including a wide range of physical and social infrastructure elements, this study will contribute to a new understanding of location theory in the dramatically changed world of the twenty-first century where fly-in and fly-out cities, the digital revolution and a mobile and global workforce are no longer a fantasy but a reality.

2.6 Conclusions

Although location theory is more than 100 years old, this review has shown that it is important to continue to investigate the relationship of pull factors for companies’ location decision, perhaps today even more than ever before. From focusing initially on factors to enhance the production function, the theory has shifted over time to focus more on macroeconomic aspects and also to explore various forms of transport infrastructure in more depth. The literature review has revealed that the question of firms’ location decision has attracted attention from many different disciplines, but also that gaps in the literature are significant, especially regarding questions concerning social infrastructure.
By analysing the various studies, it is clear that different factors need to be taken into consideration when researching the relationship between infrastructure and decision of location. A number of aspects of the firms, such as industry sector, size and nationality, influence the preferences for features of the location in question. Furthermore, the environment of the location under investigation plays a role, for example because of network effects. Additionally, the distance between the offered infrastructure services and the location is important to control for regional spillover effects. In general it was discovered that the question of causality between infrastructure and economic development is not clear.

Summarising the overall findings for the different infrastructure elements, it can be argued that airports have a positive influence on firms’ location decision, but that many studies found that airports are only one factor and are not able to attract companies without the existence of other features of the environment. Likewise, a positive impact was found for roads and parking possibilities. Only weak evidence could be found for the influence of train service and public transport. The limited studies on telecommunication demonstrated that there is a positive influence if a close to universal use in the group of users exists.

On the question of social infrastructure, it was observed that studies investigate the elements in a group under the term ‘quality-of-life’ and often under city competitiveness aspects. Weak evidence was found for education and health facilities. Many studies exist for education, often in form of investigations into university spillovers. Additionally, weak evidence was found for leisure and community service facilities, while a positive effect was discovered for shopping malls and affordable housing if it culminates in lower asked-for salaries. One study found no influence of parks on firms’ decision of location but another study found that it is a location factor for employees. No study about the importance of the supply of religious facilities for the location decision could be found. By monitoring email alerts of many academic journals, it seems that the interest in the relationship of social infrastructure and decision of location is ramping up. Hence, more research in the field can be expected in the coming years.
As explained earlier, it is important to understand the shortfalls in the Airport City and Aerotropolis literature and the interest of industry in that topic. Chapter 3 will discuss airport-centred urban developments by examining the body of academic literature.
If done well, the commercial development area can add considerable value to an airport asset and over time could become the major source of secure sustainable revenue. Due to its increasing importance to many airports, this is an area that is now becoming a major factor in any airport’s master plan as airports around the world move towards the creation of their own ‘airport cities’.

(Reiss, 2007, 291)

3.1 Introduction

In Chapter 1 it was explained that the new urban forms of Airport City and Aerotropolis are rarely explored and understood, and it was found that even less knowledge exists about economically sustainable development in airport regions. It was assumed that infrastructure could be a competitive advantage for the Airport Metropolis’ Region as it could trigger economic development through long-term location of companies.

In aiming to answer the four research sub-questions –
(1) What is the role of airports as economic development infrastructure in the Airport Metropolis’ Region?
(2) What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?
(3) What is the role of social infrastructure for economic development in the Airport Metropolis’ Region?
(4) Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?

– it is important to understand the context of this research: the Airport Metropolis’ Region. Therefore, this chapter will review the body of knowledge in academia
about airport-centred urban forms and business models such as the Airport City, airport corridor, Aerotropolis and airport metropolis region among some less well-known affiliates by using literature of the fields of Air Transport Management, Transport Management and Urban Planning.

After this introduction, Section 2 will introduce and discuss different concepts and identify the gaps in the existing literature. This chapter will finish with a conclusion, before Chapter 4 will move on to the methodology of this thesis. Figure 11 shows the structure of this chapter.

3.2 Airport-Centred Urban Developments

In recent decades airports have developed from city airports to Airport Cities that are comprised of the airport and all kinds of amenities that one can also find in a ‘real’ city (Wiedemann and Brown, 2010). Airports worldwide can be distinguished
basically between two different forms: city airports and airports in which the airport is the core of an airport-centred urban development. The design of an airport – as for instance a city airport, a cargo airport, an Airport City, a regional gateway, a connecting hub or an Aerotropolis – influences the impact that the airport has on the urban surrounds and vice versa (Wiedemann and Brown, 2010). To understand the concept of the Airport Metropolis’ Region, it is necessary to understand the relevant research, different existing airport models in their urban form and the associated business models such as Airport City, Aerotropolis, airport corridor and so on.

The aeroplane developed in less than a century from a new exotic vehicle used by only a minority, mainly for airmail service and war purposes, to a highly used public transport means. With this rapid transformation, the design and purpose of the airport changed as well. After the first construction of simple necessary landing facilities, airports have developed to become main stations for public transport (Wells and Young, 2004). Historically, the main station ‘airport’ was governed by the federal state or a municipality and planned with the host city and a national transportation system in mind. The ‘traditional’ city airport is usually not highly integrated, but has a good connection to the city centre via rail and/or road (Figure 12).

The Airport City concept compromises a whole new city often with all the amenities of a ‘normal’ city. These developments are often greenfield developments. The connection with the original central business district is usually available, but nevertheless the Airport City stands as a city itself (Charles et al., 2007, Freestone, 2009) (Figure 13).
The Aerotropolis model combines an Airport City and regional integration. The Aerotropolis model developed by Kasarda (2008b) sees the Airport City as the core,
surrounded by areas of businesses and residential developments, optimised by corridor and cluster development. As the Aerotropolis comprises the airport, the host city and the region, it can be said that the Aerotropolis is similar to the Airport Metropolis’ Region.

Figure 14: Aerotropolis schematic by Kasarda (Kasarda, 2013)

Major airport business concepts of airport-centred urban development are Airport Cities, airport corridor, Aerotropolis and the airport metropolis region. To better define and understand the purpose of these concepts, Stevens (2010) clarified that these urban phenomena represent the strategic and integrated expansion of industrial, commercial and retail facilities with the intention of servicing and supporting airport users and the regional community, delivering an engine for regional and national economic growth. (Stevens, 2010, 2)

In this research, the term ‘Airport City/Aerotropolis concept’ is used when referred to the urban development as outlined in Kasarda’s Aerotropolis schematic.
As defined earlier, these different concepts are captured under the term ‘Airport Metropolis’ Region’ in this research. The next sections summarise the state-of-the-art research for the different airport-centred urban forms.

3.2.1 Airport City

Dr John Kasarda from the Kenan-Flagler-Institute in North Carolina (USA) developed over recent years the model of an Airport City and extended this model to the Aerotropolis concept. Airport Cities developed when airports started to pursue commercial development within, and later outside, the terminal buildings (Kasarda, 2008e). The impact of Airport Cities exceeds the airport boundaries, as they take over typical metropolitan functions. Airport Cities not only include luxurious shopping malls, but also incorporate cinemas, wellness areas, museums, hospitals, banks and so on. They can develop to become a ‘city’ in their own right and become an economic competitor to the city centre (Charles et al., 2007, Freestone, 2009). The Airport City model is a relatively new phenomenon and as such has not yet generated a large body of knowledge. Nevertheless, in the last decade, researchers began to investigate the reasons of an airport’s engagement in commerce and real estate and more recently have started to explore the Airport City business model in its urban form.

Early research concentrated on the reasons for the development of the new business model, its application for different airport types, some possible success factors and possible business sectors located in the airport precinct. For example, Freathy (2004) discussed ‘The commercialisation of European airports’ as a result of declining aeronautical revenues, decline of state control, or rather the privatisation of airports, the abolition of duty free on intra EU travel, the WHO framework convention on tobacco, the changing behaviour of consumers due to the rise of low-cost airlines, and threats of a political, terrorist or health nature. Freathy (2004) concluded that airports responded strategically to the change of external conditions with retail enhancement and changes inside the terminal by taking customer segmentation into account and diversification strategy at landside with engagement
in real estate development. At that time, no single strategy of airports as a response to the new circumstances was obvious, but in recent years a clear preference to use the Airport City model as a strategy has become visible. Nevertheless, already in 2004 it was clear that ‘for many airport authorities, commercial activities are central to their future economic viability and are a pre-requisite to growth’ (Freathy, 2004, 197) and that ‘airports may be seen not only as modal interfaces but as leisure attractions and primary destinations in their own right’ (Freathy, 2004, 191). Although Freathy (2004) was not using the term Airport City, he was discussing a business model what would become highly commercialised in the years to come. The term ‘Airport City’ was taking shape in industry circles from 2002 with the first Airport Cities Conference in Orlando, USA. Taking this development into account, it is not surprising that one of the first papers published in an academic journal that mentions the term ‘Airport City’ was written by Brett Reiss, a General Manager for revenue and property development at Northern Territory Airports in Australia. Reiss (2007) acknowledged that globalisation is one of the key factors for business cluster around airports and that

Airports are now much more than aviation infrastructures. They have become multimodal/functional businesses generating considerable commercial development both inside and outside of their leasehold boundaries. They are becoming ‘airport cities’ as land uses such as hotels, offices, leisure, conventions, logistics, trade centres, shopping centres, showrooms/bulky goods etc are becoming prevalent, due to the airports actively pursuing development initiatives as a key business model for de-rising their aviation business. (Reiss, 2007, 284)

Some other researchers affirmed Reiss’ (2007) assumption that the Airport City business model is developing to the preferred business model for airports but others contested this idea. For instance, Kasarda (2008e) maintained that not only are airports becoming commercial destinations and becoming cities by establishing hospitality, entertainment, conference, retail facilities and so on, but also that the Airport City business model is becoming a worldwide phenomenon, or rather a preferred business strategy for airports:
What started out in the early 1990s – a handful of European and U.S. air gateways substantially notching up their duty-free and traditional terminal retail and eateries - has become a world-wide phenomenon of airport commercial expansion and diversification. ... Most major airports are diversifying, expanding and upgrading their retail offerings, with leading gateways in Asia and Europe incorporating shopping streets, gallerias and gourmet and culinary clusters along with arts, entertainment and cultural zones. (Kasarda, 2008e, 50f.)

This same claim was asserted by Graham (2009), who explored how important commercial revenues are for airports and found that commercial revenues count for approximately 50% of the revenues of airports worldwide. Furthermore, Graham (2009) proposed that commercial revenues inside the terminal may decrease as increased security may take away space and travellers are less willing to shop as a result of higher stress levels from lengthening security procedures. To increase commercial revenues in the future, Graham (2009) pointed to the Airport City and Aerotropolis models, and concluded that:

It is probably fair to say that commercial revenues for better profits are more important than ever to today’s airports as the pressures on the sector to improve its financial performance whilst at the same time keeping strict controls on its aeronautical revenues seems set to intensify. However, unlike in the earlier stages of airport development, when the opportunities for growing commercial revenues were plentiful, the more mature industry and then more volatile and competitive trading environment means that successful commercial management at airports is now a much more challenging task. (Graham, 2009, 111)

Kasarda (2008e) described further drivers of Airport City development apart from the need of non-aeronautical revenues creation. He proposed an increasing need of the commercial sector for affordable and accessible land due to increasing economic activity. Furthermore, he argued that an increase of passengers and cargo activity with more connecting expressways between airports and other commercial centres and regional airports will be a catalyst for business development at and around airports. Furthermore, he saw the development of large mixed-use
developments which include accommodation, retail, food, health, entertainment and education facilities in the airport region as a response to the needs of passengers, the airport and business employees. It is debatable whether these drivers will hold up in the future and if they are universally valid. For example, Güller and Güller (2001) conceded that a specific approach is necessary for each airport as a general model does not fit necessarily with different regional preconditions. This is in line with Poungias (2009), who argued that not every airport is suitable for Airport City development and that Airport City development cannot and should not be separated from the aviation business and that Airport City development competes with other real estate developments in the region but that

In this competition, an airport city has one central advantage, and that is the mobility it offers. This is a decisive economic factor which inner-city and other municipal location can often only offer to a limited extent, if at all. This is why airport cities attract, in particular, internationally active companies, which rely on a fast information network, and logistics service providers. (Poungias, 2009, 16)

Furthermore, he argued that residential developments in the Airport City are in conflict with noise emissions at airports and therefore residential developments should not be part of the Airport City development. It has to be noted that the author, Poungias, works and lives in Europe. It can be assumed that in noisy, e.g. Asian, cities, noise emissions of the airport are not in such a stark contrast to residential developments like in mainland Europe. These contextual considerations are important to take into account by studying decision of location factors as location decisions are not exogenous, as was seen in Chapter 2. Hence, it is important to understand the ‘environment’ and culture in which a decision of location is taking place. Therefore, this study will concentrate on two different countries and four different cities (see chapters 4 and 5). Another conclusion that should be drawn from the above discussion is that regional preconditions seem to be important for the question of which business model suits which airport.

The question of possible success factors and long-term planning or sustainability was discussed many times in the early literature. Among others, Reiss (2007) shared
his ideas of sustainable Airport City planning. For example, he highlighted that
master planning and a long-term vision and thinking ahead on how to lease the
facilities are necessary as the pure existence of real estate is not adding value to the
airport. Furthermore, he acknowledged the necessity of upfront investment in
infrastructure and different ways of financing to share risks. He made clear that

Commercial development at and around airports is turning them into urban
growth generators as they become significant employment, shopping, trading
and business destinations. It is important that airport operators understand
this potential and plan their developments accordingly. (Reiss, 2007, 285)

He did not only assert the change of the business model but also listed factors for
successful Airport City development: seamless connectivity to speed up supply
chains and a seamless road connection to and from the airport, defining land use
zones for clustering, infrastructure and the establishing of amenities as

It is important to understand that people want to work in places that provide
an enjoyable environment. The better the amenity, the greater the demand
and the more successful the development (Reiss, 2007, 285).

In sum, Reiss (2007) emphasised a long-term vision for the commercial
development in the airport precinct and the importance of infrastructure supply for
sustainable development. Interestingly, he also highlighted social infrastructure or
amenities for the built environment as he assumed that it would attract the ‘right’
workforce to the place or that it is a positive pull factor for businesses. These
thoughts are in line with Florida’s creative class theory. Similarly, Poungias (2009)
discussed several success factors for Airport City development, including: a strong
regional economy; a mature infrastructure network; developing an Airport City
community; planning in accordance with aviation operation; individually designed
Airport Cities and a consideration of local circumstances; developing of a unique
selling point; a long-term vision and planning; a minimum concession of 50 years for
the airport in the case of privatisation; a management with interdisciplinary skills;
having a successful airport in place as it offers a critical mass in comparison to a
greenfield development; and making airport facilities accessible from landside, for
example building a shopping mall at landside next to the transportation hub. Likewise, Güller and Güller (2001) recommended accessibility, integration of one main train station within the Airport City, developing the airport or Airport City as a hub of regional transportation, regional collaboration and cooperation, appropriate branding and marketing and reservation of land for future aviation-related activities for successful Airport City planning.

Several researchers (e.g. Kasarda, 2008e, Graham, 2009) asserted that the Airport City business model is becoming a preferred business model for airports and Reiss (2007) claimed that this change of business model of airports to the Airport City model has wide implications. Nevertheless, the long-term sustainability of the Airport City model has been contested. Charles et al. (2007) argued that the Airport City absorbs demand from the central business district of the host city. Furthermore, if the airport, as the heart of the new city, for instance becomes a target of a terrorist attack or a flight with highly contagious passengers has left from this airport, the whole Airport City would come to a standstill. Additionally Charles et al. (2007) questioned the issue of sustainability as aviation is dependent on oil, a non-renewable resource. Finally, Charles et al. debated the integration problem of the Airport City. They emphasised that the airport or air traffic in general should not be considered as a substitute but rather as a part of a global transportation network. Interestingly, Charles et al.’s (2007) paper is the only one to this researcher’s knowledge that critically discusses the Airport City model. The concerns raised by Charles et al. (2007) show that much more research is necessary to better understand the Airport City concept and its implications. For example, in 2008 Pargfrieder explored ‘Real Estate at airports’ and admitted that ‘real estate development still is a rather neglected issue at the majority of airports’ (Pargfrieder, 2008, 137) and that ‘airport real estate development research, the intersection of both, is still in its humble beginnings’ (Pargfrieder, 2008, 137). This research will contribute substantially to the knowledge of real estate development as it aims to help Airport City planners to plan the facilities accordingly to the future tenants’ needs to ensure a high long-term occupancy. Also it will concentrate on the necessary developments of ‘amenities’ or social infrastructure to attract companies
to the site because – as discussed in Chapter 2 and by Reiss (2007) above – social infrastructure can be a location factor for companies that rely on knowledge workers.

In line with other research (Appold and Kasarda, 2010, Schlaack, 2010, Wang and Hong, 2011), Reiss (2007) primarily saw the development of an aviation-related business cluster around the airport instead of non-aviation business cluster. Although Appold and Kasarda (2010) acknowledged that Airport Cities attract firstly aviation-related companies, they argued that they can also emerge as full business locations similar to other edge-cities. Today, airports are developing more and more office precincts for all kinds of businesses in the Airport City. This is the reason why this research concentrates on non-aviation related businesses as it is assumed that it is relatively easy to attract aviation-related companies to the airport precinct but that non-aviation businesses would need some other pull factors than the airport. Although, emphasising the existence of aviation-related businesses similar to Reiss (2007), Kasarda (2008e) widened the industry sectors that are locating in the airport precinct to include business services and information and communications technology. This is interesting as this thesis has identified (see Chapter 4) these sectors as two preferred sectors in the airport precinct and interviewed, among others, business leaders of these sectors. Kasarda (2008e) also gave a first insight into why these companies cluster around airports:

> Airport areas have thus become magnets for regional corporate headquarters, conference centers, trade representative offices and information-intensive firms that require executives and staff to undertake frequent long-distance travel. Business travellers benefit considerably from quick access to hub airports, which offer a greater choice of flights and destinations and flexibility and rescheduling as well as often avoiding the costs of overnight stays. (Kasarda, 2008e, 55)

From 2010 on, the academic literature on Airport Cities increased substantially and the concept itself was researched in greater depth. As a result, many more ‘definitions’ and ‘assumptions’ about the appropriate use of the term appeared.
Uber (2010), for example, presented the Airport City as new urban settlement that has developed because of globalisation and mobility. Bucholz (2010), in contrast, described the Airport City in terms of a spatiality and relationship between a centre, the airport, and other infrastructure facilities and business cluster or real estate developments – similar to Schlaack’s (2010) and Kraffczyk’s (2013) approach (see Section 3.2.3.). Appold and Kasarda (2010) suggested that Airport Cities can be used as branding and marketing tools for whole economic regions and can be a competitive advantage for attracting business. Baker and Freestone (2011) acknowledged that ‘Airport City’ is now an airport strategy used worldwide and that it is ‘sold’ in industry circles by a ‘build it and they will come’ approach but Betz (2010) found not less than seven different spatial settings of airports that are all branded as Airport Cities. Nevertheless, Peneda et al. (2011) found elements that seem to define an Airport City: air traffic, ground transportation, public transport, intermodal infrastructure, real estate, cargo and logistics, retail and service to business travellers.

Like in academia, no consistent knowledge of the Airport City phenomenon exists among industry leaders. Peneda (2010) found with a key informant survey of industry leaders that the term itself is not clearly defined and that the process towards success is unclear. Urban planners and architects see the Airport City as a new urban form, a ‘spatial manifestation of the interaction between airport-centred commerce, real estate development, and multi-modal transportation’ (Peneda, 2010, 4) with the features of a city. In contrast, airport operators see it as a new business model and strategy and/or marketing tool. On the other hand, economists simply talk about ‘clustering of economic functions at and around the airport’ (Peneda, 2010, 4). Peneda et al. (2011) concluded that

... the airport city is seen by most actors as not much more than the agglomeration of mixed-use property developments in and around airports and that, in fact, the “city” part of the term seems to relate only to the variety of land uses present, which can be typically be seen only in cities. (Peneda et al., 2011, 5)
Similar to earlier studies, numerous researchers tried to pinpoint factors for successful Airport City development. For instance, an essay by Appold and Kasarda (2010) took their earlier considerations a little bit further by not only listing support factors for Airport City strategy like globalisation and a more often polycentric development of growth nodes in regions, increasing numbers of office jobs and increasing urbanisation, but also observing that competition of Airport Cities will increase as more and more airports adopt the strategy, and that successful airports and hub airports will have it easier to establish successful Airport Cities due to supportive air traffic. Peneda (2010) also recommended, like Appold and Kasarda (2010), that hub airports are most suitable for an Airport City strategy, but in contrast saw the Airport City business model also as viable for smaller feeder or regional airports but not for low-cost airports. Appold and Kasarda (2010) further described implementation challenges like planning for efficient and effective operation, political challenges due to public-private partnership agreements, regional governance, finding the right mix of managers and facilitating cooperation between them, developing an Airport City that differentiates itself from others combined with appropriate marketing. Although, they do acknowledged that

A major challenge for the strategic management of Airport Cities will be to improve market intelligence sufficiently to meet as many of the needs of travellers, firms, and shippers as possible not only for financial gain but also in order to boost regional competitiveness (Appold and Kasarda, 2010, 6)

it remains unclear what these needs are. First indications are given by the research of Uber (2010) and Droβ and Thierstein (2011). Uber (2010) described the Airport City as a knowledge hub in a worldwide network. He recommended planning the Airport City according to the needs of the people who are working in these knowledge hubs:

National economies no longer set the cultural and design framework of product configuration. Airport Cities therefore have to create new spaces of specifically devised services that cater directly to the groups of experts who do not leave that realm of knowledge and mobility other than to take a recreational pause after weeks of constant travelling and working. Regions around Airport Cities are best advised if reorganizing their spatial patterns
catering to the mobility and cultural needs of these sophisticated clusters. (Uber, 2010, 189)

Similarly, Droβ and Thierstein (2011) argued that the Airport City Munich attracts knowledge-intensive firms but that social or urban infrastructure and regional integrative and cooperation is necessary for further development. It should be noted that Uber (2010) clearly mentioned that ‘new spaces should be created’ that offer specific services for a special group, indicating that special factors would help to develop the Airport City or rather attract firms to it. Furthermore, Uber’s and Droβ and Thierstein’s thoughts connect with the creative class theory as these researchers talked about knowledge-intensive business clusters they expect will settle at the airport and emphasised that the development should ‘please’ the people who are working there. The thesis will explore some of these factors or services in more detail to develop an economically substantial Airport Metropolis’ Region by disentangling the importance of physical and social infrastructure elements and its spatial dimension. Furthermore, the thesis will explore needs of firms in more detail. Nevertheless, it will be only one small piece of the puzzle and much more research is necessary to disentangle the factors and dependencies of sustainable Airport City and Aerotropolis development in the future.

In addition to the points mentioned above, Appold and Kasarda (2010) acknowledged that regional preconditions have to be taken into account and that regional cooperation and planning coordination are necessary to build more successful Airport Cities in the future. As possible further success factors, they presented a good ground transportation system, cultural attractions nearby, a supportive pattern of urban development, lack of available land in other parts of the region, cooperative regional governance and relationships and building facilities according to industry favoured site and building characteristics. In contrast, Peneda et al. (2011) identified four broader critical though dependent factors for successful Airport City development: economic potential of the hinterland, like a general strong economy; commercial attitude of the airport operator, for example having its own real estate department; connectivity, like being in a central location and having good flight connectivity; and a sustainable development context in the form of...
having the Airport City strategy embedded in a national or regional overall strategy. These success factors seem to prove true as seen at Schiphol Airport, with Schaafsma (2010) revealing available space at the airport, a central location, good ground connectivity and a vibrant economy as some of the factors that made the Airport City development successful. Betz (2010) on the other hand named ‘framework’ like the legal system; appropriate leadership competencies; the planning and development culture; shareholder and stakeholder engagement; available land at the airport; the airport’s function; the infrastructure situation and the shareholder structure as factors influencing the successful implementation of an Airport City. This discussion shows that the successful implementation of the Airport City business model is an emerging theme and more research is necessary to identify sustainable strategies.

Different studies examined a range of case studies to understand the Airport City business model more in depth. For instance, Conventz (2010) made a start looking at real estate at airports by comparing Amsterdam Schiphol and Frankfurt. He found that non-aviation companies are widely found in the Airport City precinct and that both places achieve premium rents. Furthermore, he identified success factors such as multimodal transportation, business infrastructure like gyms and conference facilities and shortage of real estate office supply in the region. Additionally, he named possible threads for successful real estate development at airports: high lease prices if cheaper options are available in the region, noise pollution, underdeveloped infrastructure such as missing lunch options in the German context, shortcomings in the urban design and parking issues. Schubert and Conventz (2011) identified seven German Airport Cities, among others Frankfurt, Berlin and Munich, and found that concepts and definitions are different but all have in common the desire to develop real estate at the airport. They found different business sectors settled in the airport precinct and achieved lease prices up to 35% lower than in the CBD. By conducting interviews, they established success factors such as multimodal transport and connectivity, high-class real estate, image of the airport, 24-hour operation of the airport and urban infrastructure. Furthermore, they saw connectivity by high-speed rail as competitive
advantage. In contrast, Michaeli et al. (2011) looked at Switzerland’s Zurich Airport and concluded that Zurich’s position as third European hub of Star Alliance, industry cluster, tax-incentives, the quality of the airport, supply of high-quality residential and the closeness of the airport to the city, are the success factors for industry locating in the area. Similar leases such as are found in the CBD are achieved in the airport precinct and residential prices rose regardless of noise pollution. Nevertheless, Michaeli et al. (2011) made a plea for regional integrative planning as a divided urban area and public policy hinder further development. From these studies presented here, two main conclusions can be drawn: regional integration is desirable and rents in the Airport City are not always higher than in the CBD.

Other approaches to better understand the Airport City concept were used in the literature as well. Wang and Hong (2011) used different strategic management tools, like SWOT analysis and Porter’s five forces, in combination with interviews and focus groups to develop a strategy for an emerging Airport City: Taoyuan International Airport in Taiwan. They formulated numerous recommendations to enhance connectivity, to build an exhibition, shopping and recreation area next to the airport and to adjust government policies in support of Airport City development. Furthermore, they defined, in line with Peneda et al. (2011) and Appold and Kasarda (2010), six major characteristics or success factors of Airport Cities: air traffic, industrial cluster dependent around or related to air traffic, multi-national corporations in the precinct as global accessibility is necessary for their employees, technology-orientation, smooth and efficient operation to speed up the supply chain and distance of the location of firms depending on the dependency of air traffic. This last criterion points to the spatial location of companies and gives a first hint of where companies may like to locate in the airport precinct.

Like Wang and Hong (2011), Appold and Kasarda (2011) made use of a different strategy tool to disentangle real estate development at Airport Cities. They explored five case studies with the two-sided market strategy and found that an economic prosperous region helps Airport Cities and that ‘air traffic itself does not appear to have a significant effect on seeding regional real estate or employment
development’ (Appold and Kasarda, 2011, 99). They concluded that pricing policy can be an important component of business development strategy because, as per the two-sided market strategy, it is often useful to subsidise one side of the market to get the other side on board. For example, it can be useful to subsidise some air routes if they are required by companies that are willing to locate in the Airport City. Over time the air routes would become profitable as companies located in the Airport City would use them frequently once located there.

Although Halpern et al. (2012) did not draw on the Airport City literature but on the rise of non-aeronautical revenues for airports, they explored a typical Airport City element: meeting facilities at airports. Although they expected to find that these facilities contribute significantly to the non-aeronautical revenues of airports, they found in a worldwide survey that

... few airports provide meeting facilities as a serious commercial venture....
There is no significant difference in the provision of meeting facilities according to airport location, ownership, passenger throughput or purpose of travel, or the nature of air services provided. (Halpern et al., 2012, 58)

Furthermore, they found that meeting facilities were mostly used locally, not many participants fly in and less than one-third of the survey participants agreed that meeting facilities support business and tourism development. This is in stark contrast to the Airport City idea and it would surely be worthwhile to repeat the survey only with Airport City airports to see if they benefit from meeting facilities. This brings up another unexplored question about Airport City development: are all Airport Cities profitable?

The discussion has shown that the research on Airport City or Aerotropolis success factors are far from settled and more research is needed to build an argument as to what preconditions are necessary to implement a successful Airport City or Aerotropolis strategy. Authors began to tap into the issue of ‘place-making’ as a value point to understand the location ‘Airport City’ and acknowledged that all kinds of businesses, including knowledge-intensive firms, are locating in the Airport
City. It was shown that many more factors are important for the success of the Airport City as a business location than air traffic and the Airport City itself as lower rents than in the respective city centres were sometimes achieved. Nevertheless, there is some agreement that a vibrant economy (Schaafsma, 2010, Peneda et al., 2011), regional integrative planning (Appold and Kasarda, 2010, Droß and Thierstein, 2011, Michaeli et al., 2011, Peneda et al., 2011) and a central location with good connectivity (Güller and Güller, 2001, Appold and Kasarda, 2010, Betz, 2010, Schaafsma, 2010, Michaeli et al., 2011, Peneda et al., 2011, Schubert and Conventz, 2011) are helpful.

In sum, the different streams of argument show that the urban forms of Airport City and Aerotropolis require much more research to answer key questions: What type of airport suits an Airport City strategy? What are the success factors of an Airport City? And how can an Airport City strategy be implemented successful? Baker and Freestone (2011) warned that research on this topic often lacks critical analysis and ‘little empirical research has focused on real estate development within airport boundaries’ (Baker and Freestone, 2011, 150). Similarly, Appold and Kasarda (2013) observed that ‘the intrametropolitan spatial impacts [of Airport Cities] are more often asserted than measured, however, and they are not always rooted in theory’ (Appold and Kasarda, 2013, 1241). Therefore, they published in 2013 one paper in which they explored employment around airports in the USA. They found evidence for significant employment numbers at and around airports – approximately half as big as of the corresponding CBD. Furthermore, they observed that employment numbers are even higher when the airport is further away from the city centre and that different business sectors are differently attracted to the airport. For example, wholesale trade, finance and insurance, professional, scientific and technical services, administrative and support services and headquarters are more likely to be found in the airport precinct than manufacturing. Interestingly, accommodation and food services are found only directly at the airport and then not in higher numbers than in the CBD. Appold (2013a, 2013b) further investigated this matter and found that airport areas are urban employment concentration centres for transportation-providing or transportation-supporting business sectors such as accommodation.
and wholesaling. Nevertheless, he found only weak evidence for employment cluster around airports and no indication that the airport is becoming the new CBD. Hardly any evidence was found for knowledge precincts and sectors of frequent air traffic users such as the sector of business services (Appold, 2013a, Appold, 2013b). Appold and Kasarda (2013) admitted that ‘the reasons firms locate near airports are not fully clear’ (Appold and Kasarda, 2013, 1253) and that it is assumed that firms for various reasons, such as available space or frequent use of air travel, agglomerate around airports but that ‘available data are not sufficient to sort out the weights of the various factors in location decision making’ (Appold and Kasarda, 2013, 1253). The thesis will explore the factors for companies to locate in the Airport City or airport corridor and answer the question of whether airports or air traffic is really a pull factor for business location. Peneda (2010) gave an idea for future research:

... it would also be extremely valuable to conduct an extensive survey process to business and industries located in and around airports. This survey would aim at assessing the reasons that determined their decision to locate there, whether those reasons are still valid, and what were the results and impacts of having located in such areas. (Peneda, 2010, 12)

The thesis followed this recommendation and conducted interviews with business leaders at and around airports to explore some factors for the decision of location.

This section made clear that the Airport City phenomenon is highly under-researched and that the factors for successful real estate and attraction of companies to the Airport City only recently started to gain attention in academia. This research will contribute substantially to the understanding of sustainable real estate and business development at and around Airport Cities. Although it is difficult to distinguish clearly between Airport City, Aerotropolis, airport metropolis region and airport corridor, this chapter aims to give a comprehensive view of airport-centred urban development. Therefore, after this broad discussion about research on Airport Cities, the next section will summarise and discuss the literature on the corresponding phenomena of airport corridor, Aerotropolis and airport
The Airport Metropolis’ Region

metropolis region. Following this, a short section will complete the discussion about existing research by introducing some lesser known concepts.

3.2.2 Airport corridor, Aerotropolis and airport metropolis region

Over the years, Kasarda developed the Airport City model towards the Aerotropolis concept. Other widely discussed airport-centred urban models are the airport corridor and airport metropolis region. All models discuss the penetration of airport activity into urban space (see Figure 15). While the Aerotropolis and airport metropolis region encompass wider regions, the airport corridor is a much more defined urban form. The airport corridor is

... planned and integrated real estate development between the city and the airport, manifesting through linear urban development occurring alongside major surface infrastructure, in the (previously) underdeveloped areas between airports and the major cities they serve. (Peneda, 2010, 5)

Peneda et al. (2011) differentiates between highway-oriented (Denver, USA), transit-oriented (Zurich, Switzerland) and city-oriented (Copenhagen, Denmark) airport corridors.

The Aerotropolis model has the Airport City as the core, surrounded by areas of business and residential developments, optimised by corridor and cluster development (Kasarda, 2008b). These developments serve the airport employees, but also the retail demands of the residents. The Aerotropolis is characterised by a business-oriented, low-density spread city under regional governance with numerous stakeholders while the airport corridor is formed by a mix of densities suited to location under public-private coordination and has the potential for community renewal (Airport Metropolis Project, 2012). The airport metropolis is ‘the airport and its surrounding municipal region, where much of the land use discourse is occurring’ (Stevens, 2010, 2).
Figure 15: Comparison of airport corridor, Aerotropolis and airport metropolis region
Peneda (2010) pointed out that Airport City and the aforementioned airport-centred urban forms are connected with each other as an Airport City can develop over time to become an airport corridor and even an Aerotropolis. The Aerotropolis or airport economic region (Appold and Kasarda, 2010, Peneda, 2010) is the model for the airport metropolis region (Baker and Freestone, 2011, Appold, 2013b). Kasarda (2008e) explained that an Aerotropolis can emerge from an Airport City if Airport Cities develop to airport-oriented edge-cities and if these are combined with other commercial activities: ‘Aviation-linked business clusters and associated residential developments radiate outward from the airport city, forming the greater aerotropolis’ (Kasarda, 2008e, 54). Schaafsma (2010) also saw the connection between the models in form of an evolution:

Looking back, four major airport development stages can be recognized: the first one is the airport as a basic infrastructure; the second, the airport as a main port, recognizing its economic role in logistics; the third, the airport as an airport city, shifting from goods to people, from logistics to services and the fourth the airport corridor, positioning the airport more broadly in society and the region as well as making it sustainable. (Schaafsma, 2010, 177)

Airports are seen as powerful economic development tools and it is contended that the Aerotropolis can become a business model for a whole region (Freestone, 2009). According to Kasarda (2009) the economic development influence goes up to 32 km outward from the airport along the corridors.

Research on the Aerotropolis, airport corridor and airport metropolis region started much later than on the Airport City phenomenon. In 2010, Schaafsma explored not only success factors for airport corridor development, like regional cooperation, spatial integration and governance in form of a shared vision of all stakeholders, but also physical and social infrastructure, arguing that ‘airport corridors are to be connected physically and socially to the direct environment, which is also a matter of sustainability’ (Schaafsma, 2010, 177). Similarly, Keast et al. (2009) argued that the airport metropolis needs more than industry clustering and physical infrastructure and concluded that for sustainable development of the airport and
the region social infrastructure and connectivity are indispensable. They acknowledged that

... the movement of the airport from air transport to business hub is not without problems. In particular, an overemphasis on the hard or physical infrastructure does not acknowledge the importance of social infrastructure and connectivity as essential elements to this new identity.... the dynamics between these elements sets a context that defines the sustainability of the airport as critical infrastructure to the metropolis and the surrounding region. (Keast et al., 2009, 92)

Furthermore, they argued that infrastructure projects in the airport metropolis region can influence companies’ decision to locate in the area and that

It is widely accepted that hard or economic infrastructure is a critical tool to leverage economic gains from airports, their associated supporting industries, and surrounding locales. The contribution of social infrastructure has largely been ignored or downplayed. (Keast et al., 2009, 94)

By using Porter’s Shared Value Theory, Schaafsma (2010) also recommended that airport-centred urban development should take place under consideration of ‘good citizenship’ and developments should benefit society as a whole while following the airport’s strategy. He realised that ‘airports and cities face a huge challenge in positioning themselves in the international competition and do what is within their powers to make the interaction between airport and city a sustainable one’ (Schaafsma, 2010, 173). In general, he observed that hub airports and their regions have a major advantage as the high numbers of air traffic are supporting business development at and around the airport. Yigitcanlar et al. (2008) asserted that the airport metropolis is a concept for hub airports but conceded that in general very little research has been done for commercial districts around airports. Similarly, Pargfrieder (2008) investigated different case studies and concluded that real estate development at and around airports has a positive effect on the region but that Kasarda’s Aerotropolis model is better suited for greenfield developments than existing airports that aim to diversify.
Very little research was conducted on the different proposed districts of the Aerotropolis model. One exception is the study of Yigitcanlar et al. (2008). They looked at the knowledge precinct and investigated the establishment of knowledge precincts at airports, because ‘airport metropolis is the latest obsession of global knowledge-based cities that is a home for knowledge workers, knowledge precincts and KISA [knowledge-intensive service activities]’ (Yigitcanlar et al., 2008, 6). They argued that the establishment of a knowledge precinct at the airport could serve as a chance to gain a competitive advantage in attracting highly innovative firms and talented workers to the airport metropolis region. In sum, although a few papers tried to tap into the subject of commercial development around airports, it is widely acknowledged that this topic needs much more exploration. This research will investigate in depth which form of the provision of infrastructure can foster the location of companies in the Airport Metropolis’ Region and the influence of the built environment on sustainable real estate development.

Other possible success factors for Aerotropolis, airport corridor and airport metropolis region are explored in the literature. Many times, regional cooperation and integration were emphasised (Al Amri, 2010, Donnet and Keast, 2010b, Schaafsma, 2010, Stevens et al., 2010). For example, Schaafsma (2010) compared airport corridors in different parts of the world, like Dallas, USA, Helsinki, Finland, and Kuala Lumpur, Malaysia and pointed out that airport corridor development in Asia is often combined with Airport City development, like Kuala Lumpur’s Multi Media Supercorridor. Other discussed success factors were coordinated investment in land use and ground transportation (Appold and Kasarda, 2009) and zoning (Bhat, 2010). Bhat (2010) proposed Mini-Aerotropolises for developing countries, like India, and spanning a network of these economic growth engines. He gave clear recommendations for the zoning around the airport. Aviation-related businesses and facilities should be located in a radius of 4 km from the airport, while residential facilities and social infrastructure should be located in the area between 4 and 6 km from the airport. The outer area between 6 and 8 km should be reserved for medium-scale industry. Additionally, he suggested establishing the airport in a distance of at least 10 km from the city to avoid commercial competition. This is a
good example showing that the noise issue in Asian countries, like India, is not such an obstacle as it is, for example, in Europe. Bhat (2010) saw no problem in locating people in a distance of 4 to 6 km away from the runway.

In the literature, it is undisputed that the Airport Metropolis’ Region needs a good transportation system (Kasarda, 2008e, Kasarda, 2008b, Kasarda, 2009, Keast et al., 2009, De Lange, 2010). Transport infrastructure is responsible for urban growth as it forms a network between population centres and airports (Reiss, 2007). Transportation attracts commercial development and is argued to be the engine of any development (De Lange, 2010). As airports became centres of development or logistical nodes (Nunn, 2005), it is recognised that airports should be active parts in multi-modal projects to connect the airport with other transport modes like car, train and bus (Kramer and Kramer Aerotek Inc.), 2010). This physical or hard infrastructure, in the form of roads or railways, provides crucial access for employees, logistics, travellers and, in a regional context, those who use the Airport as a shopping mall. Good transportation infrastructure guarantees a more synergistic growth node (Keast et al., 2009). De Lange (2010) suggested multimodal transportation in combination with a ground transportation centre to connect the airport with the region and ‘feed the Airport City’ or as Stevens et al. (2010, 281) summarised: ‘Infrastructure networks of all kinds determine how a city functions and how it is defined socially, technically and politically.’ In summary, transportation infrastructure is seen widely as crucial for the Airport Metropolis’ Region but some research, mentioned above, questioned the importance of social infrastructure as well. This thesis will not only determine the influence of different physical infrastructure elements on firms’ decision to locate in the Airport Metropolis’ Region but also explore some social infrastructure elements and their influence.

Apart from possible success factors for airport-centred urban development, a start has been made to explore or at least name possible challenges while developing an Aerotropolis or airport metropolis region. Competing for urban space with the city (Donnet and Keast, 2010b), difficulties of prediction of future needs or
developments (Airport Metropolis Project, 2012), residential development due to noise issues (Donnet and Keast, 2010a), stakeholder engagement (Donnet and Keast, 2010a, Airport Metropolis Project, 2012), adaption of land uses in existing airport surroundings (Al Amri, 2010) and governance difficulties (Appold and Kasarda, 2009, Airport Metropolis Project, 2012) were the widest discussed challenges for Aerotropolis and airport metropolis development. Aerotropolis‘ facilities very often have different owners and multiple government jurisdictions are involved. This culminates in a marked-based development, without a common strategic vision and coordinated planning; the Aerotropolis can fail in terms of long-term efficiency and sustainability (Kasarda, 2009, Baker, 2010). Kasarda (2008b, 2008e, 2009) recommended that sustainable Aerotropolis development should facilitate seamless multimodal ground connectivity among the airport, the city centre and through commercial nodes of the region. Additionally, he suggested creating mixed-used commercial and residential communities to form a worthwhile living environment for airport-employees (Kasarda, 2008c, Kasarda, 2008b, Kasarda, 2008e, Kasarda, 2009).

Very little criticism of the Aerotropolis model has so far occurred. Kasarda (2008c) noted that infrastructure develops very often spontaneously and that in future more strategic planning is necessary. Furthermore, he contended that management and planning strategies for the Airport City and Aerotropolis are just in the beginning phase. As a result, he recommended that airport, urban and business site planners should work together to optimise the outcome for the airport and the region (Kasarda, 2008b). Freestone (2010) went further, and emphasised that the Aerotropolis has to be planned by realistic economic forecast figures and the planning should be fully integrated in the regional urban planning. He emphasised that the model needs closer examination and development to use it as a sustainable planning tool for urban and economic development. He directed attention to critical ‘survival’ factors for the model, like accessibility and competition between airports. Furthermore, he posed the question, ‘In the race to develop airports for regional comparative advantage, the question must be asked as to just how many airport growth poles can be viable?’ (Freestone, 2009, 168). Stevens et al. (2010) indicated
that research on the airport region still heavily focuses on the aeronautical function of airports and introduced therefore a conceptual framework using an interface model (economic development, land use, infrastructure and governance) as they recognised that due to changing ownership and business model the interaction between the airport and the region has changed. Through considering the different interfaces, they argue that criteria like economic efficiency, the environment, coordination, community and security will be taken into account. As part of the research team of the Airport Metropolis Research Project, they developed the model further by embedding the four elements of economic development, land use, infrastructure and spatial analysis, in the themes stakeholders and governance as these themes were considered to encompass all other aspects (Airport Metropolis Project, 2012). It is thus clear that the Aerotropolis concept and its interaction with the region is not well understood yet and requires more research.

This section has shown the evolution from the Airport City model to the airport corridor, Aerotropolis or airport metropolis region. While the Aerotropolis and airport metropolis region include a wider metropolitan area, the airport corridor is a more defined urban form between the airport and the host city. Researchers agree that airports can develop organically from an airport to an Airport City, from an Airport City to an airport corridor and further on to an Aerotropolis or airport metropolis region (Peneda, 2010, Schaafsma, 2010). It is clear, however, that the development of real estate in the airport surrounding is hardly explored and the pull factors remain in the dark. Nevertheless, it is apparent that researchers started to focus more on sustainable criteria of the new concepts of airport-centred urban development (e.g. Kasarda, 2008b, Freestone, 2010, Stevens, 2010). Agreement exists about some form of connectivity inside the region and a good ground transportation network as a necessary condition for the integrated airport region (Kasarda, 2008e, Kasarda, 2008b, Keast et al., 2009, De Lange, 2010, Kramer and (Kramer Aerotek Inc.), 2010, Stevens et al., 2010). Nevertheless, much more research is necessary to develop ‘guidelines’ for economically, environmentally and socially sustainable airport regions.
As airport-centred urban development is an emerging field of study, this chapter aims to give a comprehensive picture of existing research. Therefore, the next part wraps up the frameworks and theories produced in academia. Hence, it will give a quick overview of other, less well-known airport-centred urban models.

### 3.2.3 Other concepts: airea, aeroSCAPE, aviapolis, airfront

Several other terms and terminologies in regard to airport-centred urban developments exist. The most common ones – airea, aeroSCAPE, aviapolis and airfront – will be discussed very briefly in this section.

‘Aviapolis’ and ‘airfront’ are terms used by industry and have received only minor academic attention. While Stevens et al. (2010) saw the aviapolis concept as an airport that is aviation oriented and is an airport-centred business hub, Yigitcanlar et al. (2008) defined the aviapolis as ‘the strategic re-organisation of an existing urban area into an aviation oriented business hub, utilising the anchors which exist within the region and maximising their potential’ (Yigitcanlar et al., 2008, 5). The airfront concept goes a little bit further and refers to clusters of aviation-related industries and services located close to the airport (Stevens et al., 2010); or rather that ‘the airfront is not part of the airport, but of the region and recognised as a location of potential and unrealised opportunity. It supports the airport with an array of services based on industrial clustering’ (Yigitcanlar et al., 2008, 5).

Schlaack (2010) acknowledged that many airports are using terms like Air City, Airport City, Sky City and Aviopolis as a marketing tool for their non-aviation related business developments at the airport but that no universal term exists. Furthermore, she criticised the widely used labels of Airport City, Aerotropolis, airport corridor and airport region as insufficient to understand the complex urban interrelations in the airport precinct. She introduced the ‘airea’: ‘a rather objective term which refers to the various fragmented islands of development within a certain space of opportunity in relation to the airport’ (Schlaack, 2010, 117). She used the concept to understand airport regions by defining airport-related spaces,
such as business parks; she categorised them in terms of physical form, stakeholder relations, function, use and concept, and analysed and described the interactions and interrelations with the airport. Coming from a similar background and discipline lens, Kraffczyk (2013) defined, in line with Schlaack’s airea, the aeroSCAPE as ‘a dispersed network of patches of primarily aviation-related activities (aeromobilities) that are defined by and stand in exchange with the airport’ (Kraffczyk, 2013, 12). Kraffczyk (2013) took the development back to a more traditional few of the airport-centred urban development where the airport is the main infrastructure and engine for an aviation-related industry interrelation. Furthermore, he emphasised that the time that it takes to reach the airport is more important than distance.

These concepts do not aim to develop a new business model for the airport but rather look at spatial development. They aim to understand existing urban patterns and predict business development by enforcing existing aviation-related industry cluster rather than building actively an economic engine for a region. As this research focuses on growth of non-aviation related businesses, the models discussed here are of low relevance for this research but they help to understand the different views and approaches of academia towards the topic of airport-centred urban development.

3.2.4 Gaps in the existing literature

The literature review has shown that airport-centred urban development is an emerging phenomenon that is barely explored and understood. While many studies have given the concept a name – Airport City (Kasarda, 2008e), airea (Schlaack, 2010), airport corridor (Schaafsma, 2010), Aerotropolis (Kasarda, 2008e), aeroSCAPE (Kraffczyk, 2013) or airport metropolis region (Airport Metropolis Project, 2012), to name a few barely any research has explored other factors than the urban form for real estate development around airports. And while some researchers used strategic management tools to better understand the strategic implications of these new airport business models (Schaafsma, 2010, Appold and Kasarda, 2011, Wang and Hong, 2011), others made a start at exploring the
Researchers worldwide have acknowledged that the phenomenon is highly under-researched and that real estate development in the airport precinct is rarely discussed, and they have started to question the sustainability of the new urban form. Nevertheless, some consensus about success factors and possible challenges for sustainable development can be found in the literature. It is widely agreed that regional coordination and cooperation is necessary (Güller and Güller, 2001, Appold and Kasarda, 2010, Donnet and Keast, 2010b, Schaafsma, 2010, Stevens et al., 2010, Peneda et al., 2011) and zoning and clustering is desirable (Reiss, 2007, Kasarda, 2008e, Bhat, 2010). Furthermore, a well-connected ground transportation system is acknowledged as important (Güller and Güller, 2001, Kasarda, 2008e, Kasarda, 2008b, Appold and Kasarda, 2009, Keast et al., 2009, Poungias, 2009, De Lange, 2010, Kramer and (Kramer Aerotek Inc.), 2010, Stevens et al., 2010). Some research has argued that social infrastructure could be at least as important as physical infrastructure (Reiss, 2007, Keast et al., 2009, Bhat, 2010). Other factors mentioned are a hub or well-established airport (Yigitcanlar et al., 2008, Poungias, 2009, Appold and Kasarda, 2010, Schaafsma, 2010), an interdisciplinary management team (Poungias, 2009, Appold and Kasarda, 2010), connectivity (Reiss, 2007, Keast et al., 2009, Peneda et al., 2011), an individual design under consideration of local circumstances (Poungias, 2009, Appold and Kasarda, 2010) and a strong regional economy (Poungias, 2009, Peneda et al., 2011).

Although it is sometimes assumed that companies locate in the airport precinct because of frequent travel requirements, global connectivity or good ground transportation, very few studies (Conventz, 2010, Schubert and Conventz, 2011) have looked at the factors for companies to locate in the precinct of airport-centred urban regions. Hence, the reasons for locating in the airport precinct are widely unknown (Appold and Kasarda, 2013). This research will fill this gap and enhance substantially the literature and the body of knowledge in that aspect. Furthermore, it will give Airport City and Aerotropolis planners a better idea of how to develop
the Airport Metropolis’ Region in a manner such that not only are facilities built but also long-term tenants are found.

3.3 Conclusion

This chapter has explored the various conceptualisations of the airport and its surroundings and presented the development of city airports to Airport Cities, airport corridors and Aerotropoli as well as some of their synonyms and affiliates. Researchers started in the last decade to explore the urban form and some attributes or success factors for implementation of the new business models Airport City and Aerotropolis. Furthermore, some possible challenges such as regional collaboration were identified. Nevertheless, it is also clear that much more research is necessary to understand the emerging forms of airport-centred urban development. Additionally, very few studies have attempted to understand the real estate or commercial development in the airport precinct. While the unanswered questions in regard to airport-centred urban development are plentiful, this research will concentrate on the sustainable real estate development at the airport and in the corridor between the Airport City and the host city. Hence, the research will investigate the influence of the Airport City itself and physical and social infrastructure on firms’ decision of location in the Airport Metropolis’ Region.

After the literature review of firms’ decision of location in the last chapter and the new phenomenon of airport-centred urban development in this chapter, the next two chapters will concentrate on methodological issues. Chapter 4 will discuss the methodology, research design and methods used for this study. In Chapter 5, the four Airport Metropolis’ Regions or the ‘environments’ that present the context for this study, will be introduced.
4 Methodology

The research question and context should dictate the choice of the appropriate research methods.

(Azorín and Cameron, 2010, 104)

4.1 Introduction

The previous chapter introduced and discussed the new urban forms and business models of an Airport City and Aerotropolis and their numerous affiliates. It was clarified that the Airport Metropolis’ Region, the research topic of this thesis, is similar to the Aerotropolis concept and encompasses the Airport City. After the literature review of the last two chapters, this chapter will concentrate on the methodology of this research.

The economic impact of infrastructure has been studied in different ways, for example measurement of different outcomes of employment rate, number of new firms, enhancement of international trade or GDP growth. A multitude of different methods to measure the impact of infrastructure on economic development can be found in the literature as well. Typical measurements are social cost-benefit analyses to measure the consumer surplus, cost-benefit analyses to measure productivity in the form of a production function, modelling of the spatial influence to measure the employment growth, and measurement of the number of new firms (Rietveld, 1989, Rietveld, 1995, Bruinsma et al., 1997). In the case of measurement of new establishments – the relationship between infrastructure and economic development this research concentrates on – models measure the decision of location mainly through accessibility factors and land rents. It is argued that this is a superficial way as many factors play a role in location decision, such as the existing infrastructure stock or network and the perception of the decision-maker (Rietveld, 1994). Hence, the literature review has shown that many studies tried to shed light on the location decision through surveys or interviews of decision-makers.
However, to measure the influence of infrastructure, the chosen design has to separate out the influence of infrastructure from other influencing factors (Rietveld, 1994); it was disputed that the decision for location is not exogenous and the ‘environment’ has to be taken into account (e.g. Biehl, 1991, McCann and Sheppard, 2003, Kimelberg and Nicoll, 2012). Additionally, numerous studies in the literature (Button et al., 1995, Moreno et al., 1997, Buurman and Rietveld, 1999, Holl, 2004, Musterd, 2006, Maoh and Kanaroglou, 2009) found that infrastructure preferences vary with the industry sector. Furthermore, perceptions of decision-makers were a strong factor for location decisions (Rietveld, 1994). Therefore, in a first step, the author of this thesis surveyed airports worldwide in order to identify three different business sectors that are most relevant in the Airport Metropolis’ Region. In a second step, four different environments or regions were chosen as study areas to conduct personal interviews with decision-makers to understand the relationship of infrastructure and companies’ decision of location. To further understand the context regions and the influence factors on interviewees’ responses, interviews with economic development agencies were conducted in all four cities additionally.

In order to answer the overarching research question and four research sub-questions –

(1) What is the role of airports as economic development infrastructure in the Airport Metropolis’ Region?
(2) What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?
(3) What is the role of social infrastructure for economic development in the Airport Metropolis’ Region?
(4) Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?

– it was necessary to collect quantitative and qualitative data. While it could have been argued that a purely quantitative study could have answered the research questions, it was found that many quantitative studies exist but the results are
limited to rank orders and the ‘real’ influence of infrastructure on the location decision remains unclear. Research questions 1 to 3 are also designed to attain a deeper understanding of the importance of the infrastructure elements, as they are asking in a broader sense ‘What is the role of...?’ instead of ‘How important is...?’ Therefore, questions 1 to 3 needed a more qualitative approach while question 4 can be better answered by quantitative data. Furthermore, very limited research exists in the environment of Airport Cities, so that it was important to gain an understanding of the different views of decision-makers in that aspect and explain the concept in a direct contact if necessary. Qualitative research gives insight into a phenomenon from ‘insiders’ and the researcher seeks direct involvement (Lapan et al., 2011). Furthermore, qualitative research takes into account the contextual setting where people make their decisions (Yin, 2010). This is especially important for this study as the literature revealed that the location decision is highly influenced by the contextual settings and this research aims to enhance location theory by taking the built environment ‘Airport City’ into account. Additionally, it was assumed that a purely quantitative data collection could be biased as respondents’ answers would be influenced by perception. That was proved right on numerous occasions. For example, one interviewee stated that ‘parking’ is not important but explained that it is not important because parking is available everywhere in Dubai (see Chapter 6) and therefore he picked ‘not important’ while the real influence on the location decision was in fact ‘very important’. Similarly, numerous times decision-makers in the UAE said that ‘rail’ is ‘not important’ but explained that it is ‘not important’ because rail is not existent in the UAE and would be ‘important’ if available.

To summarise, the research design of this study consists of a multi-method approach, namely an email survey and semi-structured interviews. First, a quantitative email survey was conducted to find relevant industry sectors for the interviews. Second, by using the results of the email survey, an embedded mixed methods design in which a quantitative data collection was embedded in a qualitative interview process (Creswell, 2011) was undertaken.
This chapter will first discuss the chosen methodology and methods by clarifying their underlying theory, epistemology, and ontology, and by explaining the research design and justifying the chosen methods. Afterwards, the research process, including data collection experience, data analysis and data limitations, will be described in detail. The chapter finishes with a summary (see Figure 16).

Figure 16: Overview of Chapter 4

4.2 Methodology and Methods

Many considerations, including the research problem, the research questions, the underlying theory, the decision for qualitative versus quantitative research and epistemology, were taken into account when the methodological approaches for this research were developed. These decisions influenced the robustness and trustworthiness of the results.
The following sections will outline and justify the underlying considerations for this study, and the different methods, the data collection experience, analysis and some pitfalls will be described.

4.2.1 Paradigm and methodology considerations

In a first step, qualitative and quantitative research had to be distinguished. Qualitative research is any kind of research that is not based on quantification or statistical procedures and asks usually for the meaning (Golafshani, 2003, Hesse-Biber and Leavy, 2011). On the other hand, quantitative research concentrates on amounts, measurements, numbers and hard data (Golafshani, 2003, Murray Thomas, 2003). Quantitative data can be used to validate qualitative analysis and to ensure the objectivity, reliability and the ability of generalisation of a study. A further distinction lies in the involvement of the researcher. In quantitative research the researcher is disconnected as much as possible from the research process while in qualitative research the researcher seeks the involvement and an active role within the research (Golafshani, 2003). To answer the four research sub-questions, it was found that both quantitative and qualitative data collection would be necessary. Furthermore, it was found that the direct involvement of the researcher was desirable and necessary to explain any questions regarding the Airport City/Aerotropolis concept as these new urban forms and business models are not widely known.

The necessity of collecting qualitative and quantitative data in the same study led to a mixed methods approach. Following the ‘paradigm wars’ between quantitative and qualitative camps in the 1980s, a third stream of methodology, mixed methods, developed (Cameron, 2009). In mixed methods research, quantitative and qualitative methods are combined in the same study in either one, two or more phases of study, namely while formulating the research questions, collecting data, analysing data or interpreting results based on the data collection (Creswell, 2011). It is important to understand that mixed methods research is a young discipline and its terms and processes are far from settled (Creswell, 2011). Nevertheless,
researchers agree about certain designs such as concurrent, simultaneous, parallel and sequential designs to name a few. Furthermore, the researcher can either give equal priority to both qualitative and quantitative research or emphasise one over the other. Numerous different combinations are possible and mixed methods research is guided by pragmatism, that is the researcher chooses a research design that is best able to answer the research problem and which mixes quantitative and qualitative methods during one or more phases of the research process (Cameron, 2009, Azorín and Cameron, 2010, Creswell, 2011).

After identifying mixed methods as a fruitful approach to answer the four research sub-questions, clarification regarding the paradigm (additional to pragmatism) and purpose of the study was sought as the choice of a certain research design is influenced by the researcher’s worldview or paradigm, the use of theory and the purpose of the study.

Quantitative research is usually based on a positivist or scientific theory, which sees the world as made of quantifiable, measurable facts (Murray Thomas, 2003). In qualitative research three major methodological approaches can be distinguished. The post-positivist theory sees the social world as patterned and is convinced that causal relationships can be tested and discovered via appropriate strategies (Hesse-Biber and Leavy, 2011). The interpretive theory sees the social world as permanently changing because of interrelations and activities of participants (Hesse-Biber and Leavy, 2011). The critical approach draws on the interpretive paradigm but adds an interest in how power is embedded in social society and how individuals can use that to change themselves or society (Lapan et al., 2011). The researcher of this work believes that the world is patterned and can be described by quantifiable facts. Therefore, this research is based on (post-)positivism.

Further, to clarify the paradigm for this research, it is also important to be clear about how the researcher approached the chosen theories. Two different approaches had to be distinguished in regard to using theory: the deductive one, usually used in the post-positivism theory, where a theory or a hypothesis will be
tested against data (Hesse-Biber and Leavy, 2011). And the inductive one, more used with interpretive and criticism theory, where the theory will be generated from the collected data (Hesse-Biber and Leavy, 2011). This research used location theory and creative class theory and a (post-)positivism worldview and followed therefore the deductive approach.

In regard to research purposes one can distinguish between an exploratory approach, which will investigate an under-researched aspect; a descriptive approach, which will describe in-depth an aspect of social life; and an explanatory approach, which will try to explain an aspect of social life. As discussed widely in chapters 2 and 3, airport-centred urban developments are highly under-researched. Furthermore, taking the ‘environment’ into account was hardly explored by using location theory. The relationship between social infrastructure and decision of location needs much more academic attention. Hence, this study follows an exploratory approach.

Drawing on the explanations above, the following statements about the underlying assumptions about epistemology, ontology and the research design for this study can be made. Location theory is the main underpinning theory of this thesis. This thesis is based on (post-)positivism theory and a deductive approach. It uses a multi-method approach with a quantitative email survey and a mixed methods research where quantitative data collection is embedded in a qualitative research. The purpose is to explore the under-researched aspect of the relationship between infrastructure and economic development in the context of the built environment ‘Airport City’.

4.2.2 Research design

Methods are ‘tools that researchers use to collect data’ (Hesse-Biber and Leavy, 2011, 5). The appropriate methods were outlined after the literature review (for a wider discussion see 4.2.3). To answer the four research sub-questions that were identified in Chapter 1, multiple methods were chosen: a short email questionnaire
of Airport CEO and leaders of the real estate departments of airports, semi-structured interviews of companies’ location decision-makers and interviews of economic development agencies. Many researchers emphasised the sector differences in the question of infrastructure importance for economic development (e.g. Holl, 2004). Therefore, Airport CEO and department leaders (real estate) were asked about their sector preferences in the Airport Metropolis’ Region. Hence, the email survey led to the identification of the relevant business sectors for the interviews. Furthermore, the research design combines qualitative and quantitative methods because, as discussed earlier, qualitative data answers better questions 1 to 3 while quantitative data was necessary to answer question 4.

**Research Questions**

1. What is the role of airports as economic development infrastructure in the Airport Metropolis’ Region?

2. What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?

3. What is the role of social infrastructure for economic development in the Airport Metropolis’ Region?

4. Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?

The literature review about airport-centred urban development helped to identify the appropriate study area of four cities and their respective Airport Cities to set the context for the interviews. By combining qualitative and quantitative data collection during the interview process, triangulation and complementarity (Hesse-Biber, 2010, Creswell, 2011) could be reached as qualitative data confirmed or explained the quantitative data and it was found that a much broader understanding about the underlying factors for location decisions were revealed. Furthermore, the interviews with economic development agencies complemented the picture (see Figure 17).
The next section will discuss and justify more deeply the decision for the different methods used in this study by using the findings of the literature and linking the methods directly to the research questions.

4.2.3 Justification for data collection methods

Rietvield (1989) distinguishes three different approaches of modelling the relationship between infrastructure and economic development (see Figure 7 in Chapter 3). Firstly, transportation infrastructure is modelled via its influence on accessibility, which means a reduction of travel time and costs to reach markets or resources. Therefore, labour and capital move to this region. Secondly, transportation infrastructure can be modelled via its influence on marginal transportation costs. The third approach, used in this thesis, is the direct link between investments in infrastructure and private investments.
There are a number of different ways to investigate this direct link between infrastructure investments and firms’ choice of location. A common method is a production function model. The principal logic behind this is that if a lack of infrastructure occurs, the productivity decreases. The productivity should increase due to investment in infrastructure as it causes a reduction of costs for collecting resources and distributing outputs. Furthermore, it makes the labour market more volatile, which culminates in higher labour and private capital productivity (Buurman and Rietveld, 1999). The model takes different factors that influence the location of firms or households into account. Factors can be infrastructure, price of labour, quality of labour, investment subsidies, sectoral structure, urbanisation economics, regional policies and accessibility of market (Rietveld, 1989, Bruinsma et al., 1997). Nevertheless, this logic is limited to physical or rather transport infrastructure (Bruinsma et al., 1997). Rietveld (1989) and Buurman and Rietveld (1999) discussed the problems to model the impact of infrastructure via a production function. First of all, they argued it is not possible to model network effects – especially important in the case of transport infrastructure. The only possible distinction is the one between intraregional, interregional and international transport infrastructure. Secondly, sectoral differences stay often unconsidered. Last but not least, defining boundaries of a region is difficult as especially transport infrastructure affects other regions as well. Wang (2002) emphasised that a multi-equation growth model is more appropriate than a one-sector production function to model the many variables and simultaneous stimulation growth processes that occur in the relationship of public and private investments. A production function model was considered inappropriate for the reasons mentioned above, but also as results would be only as good as the forecasting ability of the model and the danger is high that the model does not reflect reality.

Apart from production functions, other models exist for the estimation of the relationship between infrastructure and economic development. Location models estimate the change in private investment and/or employment (Bruinsma et al.,
1997). In the following, some problems with the use of these models will be discussed.

For example, transport–land use models deal with the spatial distribution, but not with growth modelling (Rietveld, 1994). Urban transport models can be understood as an extension of transport–land use models where the transport system’s influence on travel demand is modelled in different zones (Bruinsma et al., 1997). These models are unsuitable to explain the relationship between infrastructure and economic development, as Rietveld (1994) makes clear:

... the question whether an improvement in transport infrastructure in a metropolitan area makes this area more competitive so that it attracts more investments (in basic sectors) than it would otherwise do cannot be studied with these models. (Rietveld, 1994, 335)

Input-Output analysis equilibrium models model the output regarding a particular input. Partial equilibrium models only model one mode, whereas general equilibrium models show the output of different input factors (Buurman and Rietveld, 1999). Therefore, a general equilibrium model could be adequate to model the research problem. Nevertheless, again any results one gets out of any mathematical models are only as good as the model itself. As Rietveld (1989) argued, infrastructure and other factors are very often modeled in a very superficial way. Therefore, he recommended micro-level studies with interviews of actual and potential users. Or as Kimelberg and Nicoll (2012) recently stated:

Studies that make use of statistical models, for example, are constrained by the available data, which may not include enough microlevel information to be of practical value, or may lack useful measures for some qualitative aspects of the location decision. (Kimelberg and Nicoll, 2012, 44)

The quasi-experimental approach is a non-model approach. Researchers compare the development of a region before and after the improvement of infrastructure (Bruinsma et al., 1997). This approach could be suitable but does not reveal the real causation between decision of location and infrastructure as it is difficult to
estimate if economic development followed infrastructure or vice versa. This is particularly true as infrastructure elements are planned over a long timeframe so that economic development could have happened before the implementation of infrastructure but only because of the perception and knowledge of the decision-makers that infrastructure would be developed in due course.

All in all, to get a deeper understanding of the factors for location decision, it was found that interviews with decision-makers were necessary. As Button et al. (1995) argued, modelling via a production function has its limitations as the causation of infrastructure and economic development stays unclear, infrastructure is not universally defined, and infrastructure as a whole has to be broken down to its various elements (compare the discussion in Chapter 2 section 2.2). Furthermore, the production function would not allow for including the contextual setting. Additionally, Button et al. (1995) debated that studies on a micro-level are necessary but that empirical studies in the past revealed inconsistent findings. They pointed out that a reason for that could be, that

\[ \text{... empirical studies cited also tend to use revealed preference approaches in their analysis and are typified by regression models relating location choices to a set of explanatory variables. This approach while shedding useful insights, can, because of specification problems and interactive effects, sometimes reveal a rather blunt instrument. (Button et al., 1995, 194)} \]

They concluded that direct interviews seem to be the best method to answer the question as to what are the influences on a firm’s location decision (Button et al., 1995). As Rietveld (1994) explained, interviews with entrepreneurs are a common tool to estimate the influence of infrastructure. Various questions about the use of transport, the level of satisfaction, the impacts on future relocation or expansion decisions, bottlenecks and influence in past relocation or expansion decisions, impacts of employment of bottlenecks and future infrastructure improvement and perceptions on the performance of alternative regions – are all samples of questions asked. But he also maintained that questions are often of a subjective nature, results are often biased, answers often simply analysed and that interviewees maybe do not admit that past decisions were wrong and may
overstate bottlenecks to encourage government to improve infrastructure. On the other hand, he recognised that direct interviews are an important method as perceptions are an important factor for location decision and interviews give an insight in the mental steps of location decision (Rietveld, 1994). Surveys and interviews of entrepreneurs or companies’ decision-makers via postal questionnaires, telephone or face-to-face interviews are a systematic way of data collection and help to take perceptions and expectations into account (Teddlie and Tashakkori, 2009). The subjective factors are relevant in measurement of the influence of infrastructure on companies’ decision of location. A model approach ignores this fact (Bruinsma et al., 1997). Therefore, interviews with companies’ decision-makers were picked as the main method to answer the research questions.

As argued above, studies on a micro-level are best suitable to understand firms’ factors for location decision. The traditional case study methodology investigates in depth a single case or a smaller number of related cases. For this thesis, the interest was not in the investigation of one particular example, for instance one Airport City, in depth, but to take the environment, context and individual settings into account. Therefore, a classic case study methodology was not chosen. A case study approach is significantly different from other research methods as it concentrates on particular places (Robson, 2002, Hesse-Biber and Leavy, 2011). Nevertheless, four different cities and their respective Airport City/Aerotropolis define the study area for this research and provide the contextual environment for the interviews as this study seeks to take the built environment into account.

However, the four regions are not completely independent as each two of the cities are located in the same country and in both countries the main hub airport and the capital airport were chosen (compare Figure 18). This offers a form of triangulation (Yin, 2010, Lapan et al., 2011) as data from two cities each – as they are in the same country with similar environments and infrastructure norms – can be checked against each other and, therefore, more country reliance factors for the location decision can be filtered out. For further triangulation, research articles, public announcements and newspaper articles were screened via content analysis (Donley,
Furthermore, to find other proof of companies’ location decision factors, many fieldtrips (direct observation) were undertaken. Additionally, interviews with economic development agencies in all four study areas took place to further strengthen the validity of the research findings on the relationship between infrastructure and decision of location.

A comparative approach allows analysing likenesses and differences, so that the results could be more general (Murray Thomas, 2003). To improve external validity (Yin, 2008) and put the findings in a more global context, two different regions in the world were chosen. This helped not only to get more general valid findings than, for example, in a case study methodology, but also to eliminate other variables that perhaps influence the decision, such as different forms of governance or cultural norms (Wailes, 1999).

Furthermore, different preferences for infrastructure were found for different countries in the literature. For example, infrastructure played an important role for European firms but other factors were more important for Japanese firms (Rietveld, 1994). Therefore, it was decided to ask only companies with at least 50 employees as it was assumed that these companies are more likely to operate more on an international level and, therefore, the preferences should not be so much influenced by country-of-origin factors. Moreover, the nationality of origin was included in the data analysis to control for this ‘cultural’ aspect.

Additionally, firms make a comparison of different regions before deciding on a location (Rietveld, 1994). Therefore, always two airport regions in each country were chosen to shed light on the regional decision.
The questions of the interview guides (see Appendices) for the interviews with companies and economic development agencies were developed in accordance with the literature and the research questions. For instance, academics agree
widely that airports have a positive impact on economic development (Robertson, 1995, Van Den Berg et al., 1996, Green, 2007). And while some researchers argued that they are a pull factor for location decision (e.g. Graham, 2008, Conventz, 2010), the influence of Airport Cities themselves as a pull factor for business remains in the dark. Therefore, questions 8 and 9 of the interviews investigated the importance of airports on the location decision while questions 10 and 10a investigated Airport Cities. These questions aimed to answer the first research question. Question 12 collected the quantitative data and was designed to answer in particular research question 4, divided in different infrastructure elements according to the literature (e.g. Biehl, 1991, Johnson, 1996, Moreno et al., 1997, Buurman and Rietveld, 1999, Keast et al., 2009).

To compare the different respondents in terms of preferences for different infrastructure elements, ordinal Likert-scales were used as the ‘importance’ or ‘weight’ of the different infrastructure elements was of interest (Kumar, 2011). Even scales were employed to prevent the phenomenon of central tendency. Human beings tend to pick the middle to avoid making a decision. With an even scale interviewees were forced to make the general decision ‘important’ or ‘not important’. That approach was proved right as other researchers used an even scale before (Button et al., 1995, Kimelberg and Nicoll, 2012) and one participant mentioned during the interview that it is a pity that he could not pick the middle and therefore not be forced to make a decision. This means that if an uneven scale would have been used such as a five-point scale, this participant would have chosen ‘three’ as that would have been the ‘neutral’ answer between one and two ‘important’ and four and five ‘not important’. By using a four-point scale with one for ‘very important’, two for ‘important’ and three ‘rather unimportant’ and four ‘not important at all’, participants were forced to decide in general for ‘important’ (answer: one or two) or ‘not important’ (answer: three or four).

Question 13 included Florida’s (2002, 2005, 2010, 2012) creative class theory by asking about the importance of social infrastructure for the employees. Other questions were included to further reveal the relationship between infrastructure
and decision of location, such as questions 18 and 19 which took the contextual setting into account. Furthermore, many other questions were asked to get a deeper understanding of the topic, such as the question of the decision-making process (question 11) or who should pay for the provision of infrastructure elements (question 17). The research of the last 100 years has shown that the location decision is rarely as simple as described in Weber’s (1909) original work, so it was also important to include open-ended questions to give the participants the opportunity to shed light on some other location-influencing factors for the Airport Metropolis’ Region.

Table 4 summarises the link between the research questions, methods used and questions asked.

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<th>Methods</th>
<th>Questions</th>
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<td>Semi-structured interviews with embedded quantitative data collection</td>
<td>8, 9, 10, 10a, 12, 19</td>
</tr>
<tr>
<td>2 What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?</td>
<td>Semi-structured interviews with embedded quantitative data collection</td>
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<tr>
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<td>4 Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?</td>
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4.3 Research Process

4.3.1 Ethics

In accordance with Australian law, ethical approval was necessary for the survey and interviews. Ethical approval was granted from Southern Cross’s Human Research Ethics Committee (or rather Human Research Ethics Sub-Committee) and the research was carried out in accordance with the approved methods and procedures.

Original approval was granted on 12 August 2011 under the file number ECN-11-177. After the pilot study, some amendments were necessary and approval for the changes was granted on 9 January 2012.

4.3.2 Survey

The email survey was used to identify the business sectors for the interviews. Airports from all over the world were asked about the business sector preferences in the corridor between the airport and the city. Participants were offered a list of 27 different sectors. They were asked to name or highlight the five most wanted non-aviation related business sectors they would like to attract to the corridor between the airport and the host city and the reasons for it (the survey can be found in the Appendices). Furthermore, they were asked for the name of the airport they were working for, their position and how long they were working for the airport and how long in the current position. In the case of airport authorities or airport group operators, it was possible to fill in the survey separately for different airports. In the case of different participants from the same airport willing to participate (this happened due to some overlaps through social media enquiries and personal contacts), the participant in the higher position inside the organisation was chosen as it was assumed that he or she would be more familiar with the overall strategy of the airport. It was also mentioned in the email that it would be appreciated if the email would be forwarded to a colleague if the person contacted...
would think that another person inside the organisation would be better able to answer the researcher’s questions.

Participants from all five continents, including the four airport authorities of the context regions for the interviews, answered the survey. All participants were assured that their answers would be handled with strict confidentiality and results presented anonymously. The ethics approval number was presented as well. Participants answered by return email direct to the researcher.

4.3.2.1 Data collection experience

For the survey, primary sources were used. Through attendance at numerous premier airport conferences, contacts to airports worldwide were established. The email survey was sent to 69 selected airports in 29 countries where contact persons were either personally known or were contacted previously through social media. Airports from all over the world were selected to guarantee more general findings. A response rate of 54% was achieved.

The data collection took place between August and October 2011. Reminder emails were sent before the due dates. In two cases the answers were recorded at a much later time, but as the answers did not change the results but rather confirmed these results, the answers were included.

4.3.2.2 Data analysis

The analysis was done by descriptive analysis as the aim was to find out business sector preferences. Data was analysed by reading through the answers and mapping and ranking sector choices. Furthermore, the frequencies were determined. Additionally, some analysis was used to identify country differences via cluster analysis. This was necessary as it was discovered that in some countries preferences for a special business sector were clearly dominant in contrast to other countries. Consequently, when this was found to be the case, a comparison with the next highest frequency was made. If the frequency was nearly the same but this
particular sector was picked from more airports from different countries throughout the sample, the business sector with the slightly lower frequency was chosen. This analysis also offered some very interesting findings for future research.

One unexpected problem occurred as numerous participants highlighted either fewer or more than five choices. Nevertheless, after analysing the data, it was found that even after discounting all answers that have picked fewer or more than five sectors, the results were robust enough to stay the same.

Furthermore, it was found that the business sectors ‘Accommodation, Cafes and Restaurants’ and ‘Logistics’ were chosen by a very high number of participants. As these are typical business sectors in direct proximity of a ‘traditional’ airport, these findings were dismissed as it was expected that interviewing decision-makers from these industry sectors would not shed much light on the relationship between the various infrastructure elements and the decision of location. It was anticipated to find that the airport would have been one, if not the only, factor for the location decision. Results would have been biased.

4.3.2.3 Data limitations

Limitations of the airport survey are in the numbers of airports who were contacted or participated. Although attention was paid to elicit answers from airports from very different parts of the world and locations of participated airports were as widespread as Australia, Africa, China, the Caribbean, Europe, Russia and America, the surveyed airports present only a small per centage of airports worldwide. Sixty-nine airports were contacted. More than 40,000 airports worldwide exist. Nevertheless, it can be expected that the survey results reflect the opinion of major airports worldwide as results were robust and saturation was reached.

4.3.3 Interviews

As discussed in 4.2.3, semi-structured interviews with decision-makers were considered appropriate to answer the research sub-questions. It is important to
take the regional preconditions into consideration and record the nationality of the firm, the duration at the location, the size of the firm and the business sector.

Two regions of the world were chosen: Germany and the Middle East. For Germany, Berlin and Frankfurt were selected and in the Middle East Abu Dhabi and Dubai were picked as Frankfurt and Dubai are the hub airports of their respective countries and Berlin and Abu Dhabi the capital airports (see Figure 18).

Companies were selected from the sectors that were identified from the email survey. At first, two business sectors were chosen, but due to difficulties of locating enough participants, a third sector was included to widen the sample. Companies, or where possible, decision-makers were directly contacted via email or phone. As decision-makers, members of the Board of Directors usually were considered or the managing director of the branch in the region. The interviews included, among others, questions about the location-decision process, the importance of an Airport City, preferences for physical and social location factors and some location-specific questions (the interview guide can be found in the Appendices). Most interviews took place at the establishment of the companies in the study regions. Some interviews were conducted in coffee shops at the request of participants.

4.3.3.1 Fieldtrips

Multiple fieldtrips were undertaken to the study areas. In 2010, the researcher visited Berlin Airports and Frankfurt Airport. Several informal meetings with Airport representatives and tours of the airports were organised. Many meetings with representatives from the airport and transport authorities in the UAE and a visit to the site of Dubai World Central took place in 2010 and 2012. In 2011, another visit to Germany was organised. For conducting the interviews, the researcher spent three weeks in Dubai, two weeks in Abu Dhabi and several weeks in Berlin, with two trips to Frankfurt in 2012.
4.3.3.2 Interview environment

The next two sub-sections will give a brief introduction of the four case regions while a more detailed description of the airports, Airport Cities and Aerotropoli can be found in Chapter 5.

4.3.3.2.1 Middle East

Former independent sheikhdoms, the emirates of Abu Dhabi, Dubai, Ajman, Fujairah, Sharjah and Umm al Qaiwain, formed on 2 December 1971 to become the United Arab Emirates. Ra’s al-Khaimah joined shortly after. Bahrain and Qatar were originally also involved in the negotiations, but decided to stay independent. Abu Dhabi’s Sheikh Zayed bin Sultan Al Nahyan had become the UAE’s first President (and stayed so until he died in 2004) and Dubai’s Sheikh Rashid bin Saeed Al Maktoum had become Vice-President (Rashid, 2007). Still today, the ruler of Abu Dhabi is president of the UAE and Sheikh Al Maktoum is Vice-President. In 1962, the first oil was exported from Abu Dhabi and since then oil plays a crucial part in the economy as it brings enormous wealth to the UAE. Before oil was discovered, the area was basically non-developed and the economy was based on pearl diving, fishing and cultivating dates (Rashid, 2001):

When the United Arab Emirates was established on December 2, 1971, few could have predicted what would unfold, or that the fledgling state would, in the space of just three decades, be transformed from virtual barren desert into one of the richest countries in the world, with vast reserves of oil and natural gas and a rapidly diversifying economy. (Rashid, 2001, 3)

Today, the Emirates have a population of 6.8 million people of which two-thirds are living in Dubai or Abu Dhabi. Seventeen per cent of the residents of the Emirates are locals while 42.3% come from India (Aljaibeji, 2010).

While Dubai is well-known for its sparkling developments, Abu Dhabi started more recently to build leisure and entertainment facilities to attract more residents and investment, such as Saadiyat or Yas Island (Reuters, 2010, Masdar City, 2011a).
The distance between Dubai and Abu Dhabi is approximately 170 km. As shown in Figure 19, two airports exist in Dubai and one in Abu Dhabi – all on a more or less straight line with a total distance of 170 km (Dubai International Airport, 2010).

![Map United Arab Emirates](image)

**Figure 19: Map United Arab Emirates (Google, 2011, modified)**

**Abu Dhabi**

The emirate Abu Dhabi is building a new multi-billion US-Dollars development around Abu Dhabi International Airport. All current plans in Abu Dhabi are considered through the Vision 2030 plan of the government. The following urban features are considered desirable:

Organic communities ... with a choice of housing ... premium education and healthcare ... and parks for each neighbourhood ... (Manarat Al Sadiyat - the Saadiyat Story (Exhibition), 2012, Wallpaper)

Around the Airport numerous residential, business and leisure developments are underway. Projects such as Yas Island, Al Raha Beach Development, Golf Walk, Al Reef Village, Al Falah Residential Development, Motor World, ADIA Business &
Logistic Park and Masdar City are either already completed or under construction (for a more detailed discussion of these developments see Chapter 5). Furthermore, a new capital city district is planned, surrounded by three medium-sized cities: Khalifa City A, Khalifa City B and Mohammad Bin Zayed City (The Government of Abu Dhabi, 2008). This development is aimed at becoming the future CBD (UAE Interact, 2011).

**Dubai**

Dubai International Airport (DXB) is only 4 km from Dubai’s old CBD. The new Aerotropolis, Dubai World Central (DWC) with its airport Al Maktoum International Airport, is approximately 40 km south. As Al Maktoum International Airport and Dubai World Central are planned and being built as an Aerotropolis, this airport is in the focus of this research. Dubai World Central is a 140 km² greenfield development. The Aerotropolis with Al Maktoum International Airport in its core, is ‘one of the most important and significant urban city developments’ (His Highness Sheikh Ahmed Bin Saeed Al Maktoum, Chairman, Dubai Aviation City Cooperation Government of Dubai, Dubai World Central, 2011c, 1) with its aim to ‘transform the region into one of the most powerful global centres for logistics, tourism and commerce’ (Dubai World Central, 2011b, 1).

Hence, it aims to support Dubai’s sustainable economic growth with 945,000 people living and working inside its borders. The fully self-sustaining development is estimated to cost US$ 32 billion. Dubai World Central will, once fully completed, consist of six modules: Al Maktoum International Airport, Aviation City, Logistics City, Residential City, Commercial City and Golf City (Dubai World Central, 2011c). Additionally, three free zones will exist inside of Dubai World Central: Dubai Logistics, Aviation City and Jafza. Dubai World Central will be realised in stages. Completion was expected for 2017 but is delayed to 2030 because of the global financial crisis. Nevertheless, Al Maktoum International Airport, the core of the Aerotropolis, started cargo operations on 27 June 2010. Passenger transportation started in October 2013 (Dubai Airports, 2010a, Welling, 2011, Welling, 2013b). The airport has a design capacity of 120 to 160 million passengers and 12 million tonnes
of cargo per year. After completion, it will consist of five runways and four terminals. Furthermore, it will incorporate a maintenance hub, hotels and shopping malls (Dubai Airports, 2010b, Dubai Airports, 2011, Dubai World Central, 2011d). The corridor for economic development, which is the main aspect of this research, is the 40 km corridor between Dubai city and Al Maktoum International Airport and the site of DWC.

4.3.3.2 Germany

After the Second World War, Germany was a divided country, occupied by the three Western Allies (USA, UK and France) and Russia. The country was divided into zones of each Ally. Berlin, the former capital, however, was a special situation. The city itself was divided into four zones while lying in the middle of the Russian zone in the East (Kleßmann, 2006). The Cold War of the Allies culminated in the construction of the Berlin Wall in 1961, separating the Russian zones from the ones of the Western Allies. The Russian part had become the capital of the ‘Deutsche Demokratische Republik (DDR)’ while Bonn had become the capital of the ‘Bundesrepublik Deutschland (BRD)’. After the fall of the Berlin Wall in 1989 and the reuniting of Germany in 1990, Berlin had become again the capital of the whole of Germany (Sethe, 1962, Gaile, 2006a, Gaile, 2006b).

Today, Germany has a population of 80.2 Million (Die Welt, 2013). Berlin is the biggest city with 3.5 million inhabitants (Amt Für Statistik Berlin-Brandenburg, 2013) while Frankfurt a.M.\(^7\) itself has only around 700,000 inhabitants (Frankfurt.De, 2013) but is surrounded by a wide metropolitan area. The following map shows the geographic location of Berlin in the East of Germany and Frankfurt in the south-west.

\(^7\) ‘a.M.’ indicates ‘am Main’ as there is a second city called Frankfurt/Oder in the East of Germany. In this study, ‘Frankfurt’ always refers to Frankfurt a.M. if not otherwise indicated.
Berlin

The new German capital airport Berlin-Brandenburg-International Airport Willy Brandt with a capacity of 27 million passengers should have been opened in June 2012. After several delays and construction problems, the opening is now delayed indefinitely.
This development south of the German capital Berlin, in the state of Brandenburg, is using one runway from the former small airport Berlin-Schönefeld, but apart from that, it is a greenfield development. The owners are the state of Berlin and Brandenburg and the federal government (Zeit Online, 2013).

For the economic development there are three different cores at and around the airport identified: the Airport City, The Business Park at the territory of Berlin and the development in the municipality of Schönefeld in between. The airport is connected via a highway with the city centre of Berlin, the regional S-Bahn arrives directly under the terminal as well as the regional train services. The S-Bahn terminates at the airport and then goes back to the city (Mack, 2011).

In comparison with the United Arab Emirates, the developments in Berlin are of much smaller scope. Furthermore, the growth of the economic development zones in Berlin-Brandenburg will progress piece by piece with growing demand in comparison to the top-down approach in the UAE. Nevertheless, a master plan for the Airport City and corridor development exists.

**Frankfurt**

Frankfurt and its airport is the heart of the prosperous Rhine-Main-Area. The ancient city of Frankfurt, also known as ‘Metropolis at Main’ (Metropole am Main), ‘City of Trades and Banks’ (Handels- und Bankenstadt) or ‘Hub of World Air Traffic’ (Drehscheibe des Weltluftverkehrs) (Aseman, 1963), recovered from the Second World War much more quickly than any other German city and discovered a fulminant economic recovery in the 1950s and 1960s. Nowadays, Frankfurt and the Rhine-Main-Area are a real metropolis (Stadt Frankfurt Am Main, 1988).

The internationally known Frankfurt Airport started its development in 1946 (Bendix, 2002). The Rhine-Main-Area exists in the state of Hessen of Frankfurt am Main, Wiesbaden, Offenbach, Darmstadt and Hanau with their administrative districts. Furthermore, the areas of Mainz, Aschaffenburg and Mannheim have to be considered as part of the economic development. Many well-educated employees
moved over the years outside of the city boundaries and commute every day for work (Stadt Frankfurt Am Main, 1988). Frankfurt International Airport is a globally important hub airport, with its major airline, Lufthansa, and the biggest airport in Germany. Frankfurt Airport has more than 50 million passengers and is the leading cargo hub in Europe (Fraport AG, 2010). The Airport City development around Frankfurt airport comprises numerous office locations and developments, such as Frankfurt Airport Centre 1 and 2, CargoCity South, Air Cargo Center/Airbizz, CargoCity North, Main Airport Center (MAC), the Squaire, Gateway Gardens, Mönchhof and Airport Office Centre (Conventz, 2010). The Airport City is connected with the city of Frankfurt and the surrounding metropolitan area via regional, city and high-speed train, numerous busses and federal and state highways.

4.3.3.2.3 Justification for the choice of the context regions

The four cities were chosen for several reasons. Considerations taken into account in choosing Abu Dhabi, Berlin, Dubai and Frankfurt as context areas for the interviews were, among others, location representedness and airport characteristics.

In regard to economy, Abu Dhabi and Berlin are the capitals of their respective countries while Frankfurt and Dubai are the commercial and air traffic hubs (see Figure 18). Furthermore, differences between culture, government and available infrastructure should be high between Germany and the UAE. While often in comparative methodology it is argued that cases that are most similar to each other should be chosen, some researchers dispute this and argue that it is important to take the socio-economic, cultural context and history into account (Watson, 1994, Wailes, 1999) and that these differences ‘reveal how the common factors manifest themselves differently in different contexts’ (Bergene, 2007, 18f.) For example, while public transport and train usage is very common in Germany, the UAE are widely car-oriented and a regional train system is non-existent. Therefore, the researcher assumed to get a good insight into the factors for the importance of transport infrastructure. For instance, only through these differences could it be revealed that ‘trains’ are in general important as also in the UAE companies stated
that it would be a location factor if rail did indeed exist. In contrast, in Germany the availability of trains was taken for granted.

In addition, a very high connectivity in Frankfurt and high connectivity in Berlin exist and public transport is in general very well developed in Germany. In contrast, for Dubai and Abu Dhabi, sophisticated plans for public transport exist but it will be 2030 at the earliest before they are fully realised. While Dubai has a brand new metro in place, Abu Dhabi stays mainly dependent on automotive transport.

Social infrastructure differences are obvious in regard to the importance of religion. While in Germany, religion plays hardly any role in daily life, the UAE are defined by the importance of Islam. Furthermore, leisure activities should differ to a certain amount. The UAE offer extensive shopping opportunities and it is a common leisure activity to indulge in the various malls. On a more traditional level, camel races are common for entertainment purposes. In contrast, in Germany caring for the home or garden is an important leisure activity.

Furthermore, while the Emirates have numerous restrictions for foreign companies, for example 100% foreign ownership is allowed only in the free zones, and the population has a very high percentage of expatriates who have no chance of residency or citizenship, Germany is an open, democratic economy.

These differences offered an opportunity to discover what factors influence the decision-making preferences of international companies in two very different context regions. Apart from country differences, similarities between the airport regions on a cross-country level and differences inside the countries exist (see Table 5 and Figure 18).

Both Dubai and Frankfurt are the major hub airports in their respective countries, while Abu Dhabi und Berlin are the airports in the capitals of their countries (for a more detailed description of the Airport City/Aerotropolis developments refer to Chapter 5). The sizes of the airports are similar for Dubai and Frankfurt and for
Berlin and Abu Dhabi. Dubai World Central, the development planned around the new Al Maktoum International Airport, is clearly planned as an Aerotropolis and the airport is used as a growth pole for a whole new metropolitan region. Furthermore, there is a clear corridor development between the ‘old’ city centre around the Creek with its suburbs Deira and Bur Dubai along the main highway towards Dubai World Central. As Dubai World Central is only in the making, it was considered a good example to get answers to the question as to what an Airport City would need to offer to locate there. Participants’ perceptions could also be explored.

In Abu Dhabi new developments around the airport are also showing clear elements of Kasarda’s Aerotropolis concept. Through the shift of the new capital district a clear corridor development between the ‘old’ city centre at the Corniche and the airport is taking place. Although the developments are mostly still under construction, first companies moved into, for example, the ‘green’ suburb Masdar City (see Chapter 5). As the developments are new, the period since companies were locating in the area was short so that an active location decision took place a short while ago. This was an advantage as participants remembered well the reasons for the move.

Although Frankfurt is a weak case in terms of corridor development, it was considered a good study region as it is one of the leading examples for Airport City/Aerotropolis development worldwide. Like Dubai, Frankfurt is the most important airport in its country, with similar passenger numbers and also an important economic centre in Germany. Furthermore, the operator of Frankfurt airport was building many real estate parks on airport land in recent years. Therefore, as with Abu Dhabi, interviews could be conducted with companies who had just made a decision of location.

Berlin, like Abu Dhabi, is the capital of its country. And much like Abu Dhabi, Berlin has a much smaller airport than Frankfurt. The new airport, currently still under construction, has a feature ‘Airport City’ and many growth poles for economic
development were identified by the government around the airport. Furthermore, a clear corridor can be recognised between the city centre and the airport.

Due to the choice of more than one airport in every region, it was possible to ask questions like, ‘If Berlin would offer the same air connectivity as Frankfurt, would you prefer Berlin as a location?’ This is an especially important question to determine the importance of the airport and explore other infrastructure requirements. Or in the case of the Middle East, a valuable question was: ‘Why did you decide on Dubai and not Abu Dhabi?’ This question left room to either point to the air connectivity or the better public transport or the higher ‘quality-of-life’ in one or the other city and to discover what participants considered a higher ‘quality-of-life’.

In sum, through the choice of two different airport regions for each country, it was possible to control for country distinctions such as culture, socio-economic factors or history and therefore pin down the infrastructure requirements by comparing similar cases. On the other hand, by picking similar airport regions in two different countries, results could be more universally valid if it were found that the requirements for various infrastructure elements were the same though in very different cultural settings but with similar airports and Airport Cities. Table 5 summarises the most important key facts of the four different case regions in their contextual settings, disregarding the country differences. In Chapter 5, a comparison table of the four Airport Cities or rather Aerotropoli with their different elements will be presented and the airport regions in their cultural and historical settings discussed in more detail.
Table 5: Comparison of the key features of the airport regions

<table>
<thead>
<tr>
<th></th>
<th>Abu Dhabi</th>
<th>Berlin</th>
<th>Dubai</th>
<th>Frankfurt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Type</td>
<td>Capital/Regional Gateway</td>
<td>Capital/Regional Gateway</td>
<td>Hub</td>
<td>Hub</td>
</tr>
<tr>
<td>Size of airport in passengers no</td>
<td>9.2 Million planned for 30 Million</td>
<td>23 Million planned for 27 Million</td>
<td>&gt; 50 Million</td>
<td>&gt; 50 Million</td>
</tr>
<tr>
<td>Airport City/Aerotropolis</td>
<td>emerging</td>
<td>emerging</td>
<td>existent</td>
<td>existent</td>
</tr>
<tr>
<td>Distance to city centre</td>
<td>38 km</td>
<td>20 km</td>
<td>40 km</td>
<td>12 km</td>
</tr>
<tr>
<td>Corridor</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>Not very clear, but identifiable along city train line</td>
</tr>
<tr>
<td>Transport</td>
<td>Road Metro under development</td>
<td>Multimodal, apart from water access</td>
<td>Road Metro</td>
<td>Multimodal, apart from water access</td>
</tr>
</tbody>
</table>

4.3.3.3 Data collection experience

4.3.3.3.1 Pilot-study
The aim was to undertake five pilot-study interviews with companies in Frankfurt via skype in December 2011. Unfortunately, it was not possible to convince five companies to participate as December is traditionally a very busy month for many companies in Germany. Nevertheless, it was possible to conduct one interview. That interview gave valuable insight into the interview process and how questions were perceived. Some amendments were made and a changed ethics application lodged. Approval was granted on 9 January 2012.

4.3.3.3.2 Interviews
The interviews with company decision-makers and economic development agencies took place between January and June 2012. The researcher travelled for this purpose to Dubai, Berlin, Frankfurt and Abu Dhabi. Most interviews were done face to face but a few were conducted via Skype or phone.

First of all, potential participants had to be identified. In the hope that they could provide lists of companies in the required location, economic development and state authorities in the case regions were contacted by email. As the answers did
not bring the needed results, an intensive online search for free accessible online databases was done. Finally, one free database for each country was found.

For Germany the website www.firmenwissen.de (Creditreform, 2011) was detected as a good data source as it was possible to include search criteria such as postal code, choose from different pre-set business sectors and search for companies with equal to or more than 50 employees. Postal codes were determined by screening a map of Berlin and Frankfurt, identifying the corridor with its suburbs and looking up the corresponding postal codes at the website of the German postal service. The website www.firmenwissen.de uses a wide range of different business sectors that are named by a number and name and are arranged into sub-categories. Therefore, it was necessary to identify the ‘right’ sub-business sectors for the intended search of participants for the three industry sectors under investigation. For the business sector of Leisure & Tourism, the sectors 79 and 90–93 were included in the search function. For Frankfurt, five companies were detected, four from the search engine and one from the literature. For Berlin, nine companies were pinpointed in the corridor that belonged to the Leisure & Tourism sector. In the case of Information & Communications Technology, the search sectors 61–63 were incorporated and culminated in 12 potential participants for Berlin and 17 for Frankfurt. For Business & Consumer Services, the categories 45, 47, 69, 70, 73, 74, 77, 78, 80–82, 95, 96 were included in the search. The search results brought 102 companies up for Berlin and 81 for Frankfurt. In general, for Berlin, the business directory of the business park in Adlershof was used additionally to widen the sample.

For the UAE, the website www.zawya.com (Zawya, 2011) was found to be the best data source as it allowed for searching of different sectors and employees. One problem was the allocation to the right place as the only possible location confinement was the country selection. As it was the only free accessible option, the researcher allocated the business manually by using ‘google maps’ and the addresses revealed. Nevertheless, this proved to be challenging as maps in the UAE are changing frequently. At the Zawya website the business sectors were more in line with the researcher’s definition of the business sectors. Therefore for Leisure &
Tourism the sector ‘Leisure and Tourism’ was used with all sub-sectors excluding ‘Lodging’. The search brought 38 results for the UAE. For Information & Communications Technology all sub-sectors of the categories ‘Information/Technology’ and ‘Telecommunication’ were chosen and brought up 194 results. In the sector of Business & Consumer Services, a search in the subsections of ‘Services’ brought up 130 potential interview partners. Additionally, the business park directories for the various existing business parks such as Dubai Internet City or Masdar City were used to complement the sample. Some contacts were made by dropping by, while for another interview in one of the business parks.

The two websites were considered a good source as they provided reliable, easy and accessible information. The following two quotes from these websites illustrate the quality of the provided data.

FirmenWissen is one of the leading providers of reputable companies in the German data network and offers a user-friendly online access to company data from Creditreform, Germany’s largest provider of business information....

Reliability and Citability

FirmenWissen uses as a source of information public records and registers, the trade register in particular, but also the commercial register, the Professional register of cooperatives, register of unions and associations, the list of debtors, the Federal Gazette and the Official Gazette. The data are distributed in approximately 130 regional offices in Germany, as well as researched and prepared by the respective credit country offices on site. The renowned business information file Creditreform has 125 years of experience in dealing with sensitive corporate data....

Timeliness and completeness

Our records are updated weekly. At FirmenWissen you will find all active companies in Germany. 8 (Creditreform, 2011, translated by the author and google translate, original text see footnote)
At Zawya, we believe that business and investment opportunities delivered transparently and effectively will lead to a more progressive MENA. By providing relevant, valuable, and engaging intelligence online, we are empowering nearly 1 million professionals, like you, with a competitive edge to grow, compete, and succeed. Our wide range of unique content and tools include detailed profiles on the top companies and projects in the region, Thomson Reuters and Zawya Dow Jones live news, comprehensive industry and asset class research, as well as an exclusive online network for professionals to build profitable relationships.

Zawya is the preeminent source of Middle East and North Africa business intelligence and is now part of Thomson Reuters, the world's leading source of intelligent information for business and professionals. (Zawya, 2011)

After identifying possible participants, a first contact via email was made. If a positive answer was received an appointment for an interview was scheduled. In the case of no answer, a follow-up via email and/or phone was conducted.

Altogether 34 companies were interviewed. In Abu Dhabi, one participant asked not to include the interview data later due to personal reasons. Therefore, a total of 33 interviews were used for the data analysis. The researcher tried to get similar numbers in every case region for each business sector. While this strategy worked for Dubai, Berlin and Frankfurt, it was impossible for Abu Dhabi.

It was found that Abu Dhabi has an immature business environment and it was very difficult to get any participants. Hence, only one interview was conducted for
Leisure & Tourism and four in the Business & Consumer Services but none for Information & Communications Technology. Apart from the fact that one participant withdrew while being asked for confirmation of the summary, in another case it was discovered during the interview that the business register was not correct and the company only had three instead of 50 employees. As the number of interviews for Abu Dhabi was already very small, it was decided to include the interview data in the analysis nevertheless.

In Germany, some problems occurred in the Leisure & Tourism sector as many companies that were considered in this sector chose their location more than 100 years ago, such as ‘Städelisches Kunstinstitut und Städelische Galerie’ in Frankfurt, or the location was politically influenced as with ‘Tierpark Berlin-Friedrichsfelde’ in Berlin.

Two other considerations were important for the choice of participating firms in the interview process. First of all, it was important that interviews were conducted with decision-makers (Kimelberg and Nicoll, 2012). Therefore, members of the Board of Directors, preferably the CEO, or the General Manager of the branch in the region were always contacted. Interviews were only undertaken with other people in the organisation if referred to by the contacted manager. Furthermore, the aim was to find participants where the firm made the location decision in a time period of not more than five years ago. When asking companies that are not considering relocating, or cannot remember the last relocation process, there is some danger that ‘responses are … superficial, since respondents have had no reason to give the issue thoughtful consideration’ (Love and Crompton, 1999, 213).

Due to the limited sample, it was not possible to follow this recommendation for all participants. Nevertheless, 19 out of 33 interviewed companies moved to the location in the last five years. To control for the possibility of superficial answers, considerable more time was spent on the question of how the decision of location is made and the researcher asked some additional questions about the last decision of location to refresh participants’ memory. Furthermore, as one interview question...
was directed into the future in the form of what the Airport City would need to offer to consider it as the location, participants got the opportunity to reflect on possible future choices and preferences. Additionally, the issue of time since the last relocation, was given some consideration while analysing the data to keep the possibility of biased analysis as low as possible. Table 6 shows the distribution of interviews across the case regions and throughout business sectors.

<table>
<thead>
<tr>
<th>Business Sector</th>
<th>Abu Dhabi</th>
<th>Berlin</th>
<th>Dubai</th>
<th>Frankfurt</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leisure &amp; Tourism</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Information &amp; Communications Technology</td>
<td>-</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Business &amp; Consumer Services</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td>33</td>
</tr>
</tbody>
</table>

Interviews with economic development agencies were used to complement and deepen the understanding of the study regions and confirm companies’ decision of location preferences. An online search brought up the relevant contact details. The contact and follow-up processes were the same as for the company interviews.

### 4.3.3.4 Data Analysis

The semi-structured interviews with open-ended and closed questions were analysed by descriptive and statistical analysis and thematic analysis. For the analysis all data sets were coded to guarantee confidentiality and anonymous reporting of the results.

Descriptive Analysis transforms raw data into a form that will make it easy to understand (Ticehurst and Veal, 2000, Zikmund, 2003). Statistical analysis tests for the causation between variables (Donley, 2012). Frequencies, means, medians, cross-tabulations, contingency tables, calculating rank orders and Kruskal-Wallis t-tests and Mann Whitney U Tests were used to disentangle and display the causation
between the dependent variable, location choice, and the independent variables, that is the infrastructure elements (Ticehurst and Veal, 2000, Zikmund, 2003, Kumar, 2011). The t-tests were done as paired sample tests to compare the means of the different independent variables and as group sample tests to compare the means of the infrastructure elements for the different sub-groups (Middle East, Germany) (Ticehurst and Veal, 2000, Zikmund, 2003, Kumar, 2011).

Before analysis with SPSS (software tool), data needed to be screened for insert mistakes and some decisions had to be made. For example, during the interview process it became clear that many companies today belong to international holdings although they are registered entities in their respective country and often fairly independent. In regard to numbers of employees and nationality, it was decided to choose either the country of the headquarters of the holding as nationality indicator with total employee numbers, or the national entity and its employees’ numbers. The decision was based on ‘where decisions were made’. The question about the location-decision process (see interview guide in the Appendices) gave some good insight into the question. In most cases the answer to the question revealed clearly if the decision-making power was with either the national entity or the foreign headquarters. Furthermore, in cases where nationality and numbers of employees could not be clarified in advance, it was one of the first questions during the interview process and the answers were confirmed or reconsidered after answering the question about the location-decision process.

Another problem was that several participants gave the preferred distance to infrastructure elements not in metric units but in time. These time measures were, after some consideration, transferred into equivalent metric units. If the answer was 10 minutes, the answer was coded 1 in SPSS – which meant less than or equal to 1 km. 15 minutes was categorised 2 in SPSS or more than 1 km but less than or equal to 10 km. And 30 minutes or more was coded 3 or more than or equal to 10 km (see SPSS codebook in the Appendices).
All interviews were summarised by the researcher and sent to the participants for confirmation or amendment. Rarely, some wording of direct quotes was changed and content amendments made, as the participant stated that he or she thought about it again and would therefore need to change it. That was not seen as a problem as the aim of this research was not to get a special opinion at a special moment in time but rather reveal the ‘real’ underlying factors. The summaries also gave the participants a good opportunity to see how the researcher interpreted their words and to reflect on it.

All in all, summaries were seen of greater benefit for the analysis of the research and the participants than transcripts. This is especially true as most parts of the interviews were analysed by thematic analysis as described in Tuckett (2005) and in Braun and Clarke (2006):

> Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail. However, frequently it goes further than this, and interprets various aspects of the research topic. (Braun and Clarke, 2006, 79)

Thematic analysis is a foundational and flexible method for qualitative data analysis that does not depend on any certain theory or paradigm (Braun and Clarke, 2006). By reading through data, coding and organising it, the researcher searches for repeating codes and allocates them to themes or patterns (Tuckett, 2005).

Identifying themes or patterns lies in the judgement of the researcher. One very important step for thematic analysis is the familiarisation of the researcher with the collected data (Braun and Clarke, 2006). By writing summaries and by listening to the recordings repeatedly, the researcher not only familiarised herself deeply with the data but also started to look for patterns and themes. A rich description of the data set is especially useful when ‘investigating an under-researched area, or …. working with participants whose views on the topic are not known’ (Braun and Clarke, 2006, 83). As the concept of airport-centred urban development is highly
under-researched and participants’ views were not known, data was analysed in that way and resulted in additional findings, represented in Chapter 7.

By applying the earlier described paradigms and worldviews, the manually coding was conducted after the researcher familiarised herself with the data by writing the summaries, listening to the recordings, reading through the scripts repeatedly and taking initial notes (Braun and Clarke, 2006). Different emerging codes were highlighted by different colours at clean print-outs of the anonymised interview summaries. Afterwards, codes were written on file cards and semantic themes were searched for (Braun and Clarke, 2006). Themes were written on large file cards as well and themes and codes were displayed on a pin board. After numerous reviews and reading again through the data, themes were defined and named and codes finally accordingly allocated. Data files for themes and codes were established and essential data and quotes extracted and allocated.

Internal validity or investigator triangulation was reached through the involvement of two other researchers (Lapan et al., 2011, Schwartz-Shea and Yanow, 2013). Reliability was ensured through recording of the interviews where the participants agreed (only 3 of the 33 participants disagreed). In all cases, interviews were not transcribed but summarised. Summaries were sent to participants and asked for confirmation or amendments. Hence, even in cases where recording was not permitted by the participants, reliability of the results was ensured by confirmation of the summaries by the participants. Furthermore, all steps of the study from sampling to collecting the data and analysing it were thoroughly documented (Donley, 2012).

Construct or content validity was reached through the personal interviews as the researcher could answer and explain any questions. Furthermore, the pilot study was used to ‘test’ if the questions were the ‘right’ instrument to disentangle the relationship between infrastructure and decision of location (Donley, 2012, Schwartz-Shea and Yanow, 2013). External validity was reached through asking the
same questions in four different regions and asking experts (economic development agencies) additionally (Lapan et al., 2011).

4.3.3.5 Data Limitations

This research aimed to take the context explicitly into account; in fact it is one of the main contributions of this thesis. Nevertheless, by conducting interviews only in four cities, limitations naturally occurred. Although two different countries with two cities each with different airport types and different governance forms were chosen, findings could be different for other regions or countries. On the other hand, as bigger companies are operating globally and airports worldwide are similar, the findings should give a good picture of companies’ location factor preferences in Airport Metropolis’ Regions, taking the context and cultural differences into account.

Another limitation occurs as extraneous variables – such as other influence factors for a location decision, for example, taxes and available land – were mostly unconsidered and not included in the analysis. However, participants were given on many occasions the opportunity to add more location factors. Participants used this opportunity widely and findings led to the advanced decision of location schemata presented in Chapter 7.

4.4 Summary

This chapter has described in detail and justified the research design used for this study. Developed from the literature, qualitative and quantitative methods were used, namely an email survey and semi-structured interviews with an embedded quantitative data collection. A multi-method approach was necessary as the email survey provided the industry sectors for the interviews. A mixed method design (qualitative interview design with embedded quantitative data collection and analysis) was considered the best way to answer the research questions as questions 1 to 3 aimed more for a qualitative approach while question 4 was clearly quantitative-driven.
It was also clarified that this research is based on (post-)positivism theory and uses a deductive approach.

The use of different methods used in the literature was discussed, and the decision for interviews in contextual settings, and limited to certain industry sectors as the main data collection method, was justified.

Furthermore, the decision for the four context regions, drawn from the literature, was examined. First of all, differences between culture, government and infrastructure availability could hardly be higher between two so different countries like Germany and the UAE. Secondly, cross-country similarities between each of the two airport regions exist. While Frankfurt and Dubai have similar-sized hub airports, Berlin and Abu Dhabi are the capital airports of their respective countries. Furthermore, in Dubai and Berlin the Airport Cities are under construction while in Frankfurt and Abu Dhabi the first companies have moved in. Mixing similarities and differences in this way was thought to generate more generalised findings and control for country or cultural specifics (Watson, 1994, Wailes, 1999). On the other hand, this gave a good insight into how these contextual or cultural differences influence the location decision (Bergene, 2007).

Additionally, both methods, the email survey and the interviews, were individually presented with their respective analysis tools and some data limitations described. The email survey questioned airport leaders worldwide about their preferred industry sectors in the Airport Metropolis’ Region. While the sample size was limited, it was emphasised that airports from all parts of the world participated. Using descriptive analysis and controlling for biased answers, three industry sectors were identified.

Interviews with 33 decision-makers of companies in the context regions with 50 employees or more (with the exception of one company in Abu Dhabi) of the identified industry sectors were conducted. Interview questions included a
quantitative part where participants ranked the importance of an infrastructure element and stated their maximum acceptable distance to the location. Similar interviews were done with economic development agencies in all four cities. The quantitative data was analysed by descriptive and statistical analysis while thematic analysis was used for the qualitative data.

After describing and justifying the research design and research process in this chapter, the next chapter is dedicated to a detailed description of the four context regions of the interviews and their respective Airport City and Aerotropolis developments. As decision of location is influenced by the ‘environment’ (Biehl, 1991, McCann and Sheppard, 2003, Kimelberg and Nicoll, 2012) and perceptions of decision-makers (Rietveld, 1994), it is important to develop a good understanding of the four context regions before reading the results and analysis of the interviews in chapters 6 and 7. Furthermore, the discussion in 4.3.3.2.3 has shown significant differences but also similarities between the four airport regions and their respective airports, Airport Cities and Aerotropoli. The next chapter will describe the four cities in detail, will give background information of the countries of Germany and the UAE and emphasise the four different Airport City or Aerotroplis developments with their planned or implemented elements. This is crucial to understanding the research results as some results are clearly influenced by the context while others seem to be more generally valid. Furthermore, the interviews investigated on regional differences by using different questions for questions 18 and 19 (see interview guide in the Appendices) by taking, for example, the airport for private jets in Abu Dhabi or the cheap housing market in Berlin into account.

After describing the study area, the four different cities in Germany and the UAE, more in detail in the next chapter, Chapter 6 will present the results of the qualitative and quantitative data analyses and their respective findings. Chapter 6 follows the logic of the research questions and results are presented to answer the research questions. In Chapter 7, additional findings, arising from the rich qualitative data and emerging from the thematic analysis, will be presented. These
findings and developed schemata give a deep understanding of the decision-making process and its various influencing factors.
5 The Environment: Airport Cities and Aerotropoli in Germany and the United Arab Emirates

A third key direction for future location research concerns the issue of the ‘environment’. Here we are referring specifically to the nature of the local, or location-specific environment. The evaluation of the environmental variations has been almost entirely absent within location theory models, yet within real estate and urban economics, environmental valuation is assumed to be a central feature ...

(McCann and Sheppard, 2003, 660)

5.1 Introduction

Chapter 4 introduced the research design and methods used to conduct this research. Airports worldwide were asked about which industry sectors they would prefer to be located in the corridor between the city centre and the airport. The results were used to identify three business sectors for interviews with companies in four different Airport Metropolis’ Regions. This chapter will present and discuss these four different airport regions and their respective Airport City and Aerotropolis developments: the airports and cities of Dubai and Abu Dhabi in the United Arab Emirates and Berlin and Frankfurt in Germany.

As noted in the literature, decision of location is not completely independent of the region in which the business is located or seeks to locate. Therefore, it is important to develop an understanding of the four different case regions where the interviews were undertaken. Furthermore, as discussed in the last chapter, it is important in comparative methodology to be clear about differences and similarities. In this research, the four regions not only have country-specific similarities and differences but are also similar (Frankfurt and Dubai; Berlin and Abu Dhabi) in regard to their Airport City or Aerotropolis developments (see Table 7).
In the following sub-sections, Dubai in the UAE, Frankfurt in Germany, Abu Dhabi, the capital of the UAE and Berlin, the capital of Germany will be introduced and their respective airports, Airport Cities, Aerotropoli and ground transportation options presented. Afterwards, similarities and differences will be discussed. Figure 21 illustrates the structure of this chapter.

Figure 21: Overview of Chapter 5
5.2 Four Airport Metropolis' Regions

5.2.1 Airport Metropolis' Region: Dubai

Before the worldwide financial crisis, Dubai was well-known for its high-level growth. In 2005 it was the fastest growing city worldwide with an annual GDP growth rate of 10%. Although originally built from the income of its oil reserves, it has to be noted that the non-oil–related GDP is now around 94%. After the economic crash of 2008/2009 and a needed bailout from Abu Dhabi, Dubai’s economy is now growing again at rates between 3 and 5% (Dubai World Central, 2010, Dubai World Central, 2011a, Arsenault, 2013, Augustine, 2013). Dubai developed as the regional centre for retail, aviation, leisure, re-export, information technologies and banking (Dubai World Central, 2011e). It was not only the city that experienced massive development over the last four decades; the airport flourished as well.

In 1969, nine airlines served Dubai International Airport with a total of 20 destinations. In 2013, 130 airlines were flying to and from Dubai with 220 destinations and over 6000 weekly flights (Welling, 2012c). In 2005, passenger air traffic grew by 16% (Dubai World Central, 2010), 2010 by 15.4% (Routes News, 2011b) and 13.2% in 2012 (Welling, 2013a). With 57.7 million passengers in 2012, Dubai International (DXB) is the world’s third busiest airport by passenger numbers. 65.4 million passengers were expected for 2013 (Bates, 2013b, Welling, 2013a). The highest numbers of passenger volumes are showing flights to and from Saudi Arabia, the UK, the USA, Pakistan and India (Dubai International Airport, 2012), probably indicating the origin of most of the expat workers. Total cargo is expected to grow over 3 million tonnes by 2015 (Thompson, 2013). Furthermore, it is predicted that Dubai International Airport (DXB) will be the world’s busiest airport by passenger numbers with 100 million passengers per year by 2015. The total air traffic in Dubai is predicted to increase by 7.2% per year for passengers and 6.7% for cargo until 2020 (Dubai Airports, 2011, Welling, 2011). For 2030, 150 million passengers annually are expected for Dubai (Dubai Airports, 2010a). Massive
expansion plans for Dubai International Airport were announced, although a second airport, the new Al Maktoum International Airport, opened in 2010 and with it the Aerotropolis development of Dubai World Central (DWC) that is currently under construction. Between 2011 and 2021, US$7.8 billion will be invested in Dubai International Airport as Emirates and FlyDubai are growing faster in passenger numbers than Al Maktoum International Airport can accommodate more passengers (Attwood, 2011). By 2018, DXB will be able to handle 90 million passengers per year (Dubai Airports, 2011). Dubai Airports own and operate Dubai International Airport and the new Al Maktoum International Airport, which is under development approximately 40 km south of the city centre (Welling, 2011).

Al Maktoum International Airport aims to be the world’s largest passenger and cargo hub and the region’s only maintenance hub for A, B and C checks (different types of required maintenance checks for aeroplanes). Cargo operations started in 2010 and passenger traffic in 2013 (Welling, 2013b). Originally planned as a US$82 billion development with five runways and capacity for 160 million passengers and 12 million tonnes of cargo to be completed by 2017, surrounded by a megamall, office towers, hotels, golf course and residential areas, the development is going now at a much slower pace as the result of the global financial crisis (Kasarda, 2008e, Welling, 2013b). At the moment, the airport has one runway and a capacity of up to 7 million passengers per year (Welling, 2013b). Nevertheless, it is the heart of Dubai World Central that ‘will be a true “city-within-a-city” with all the amenities that make up a world-class residential destination’ (Dubai World Central, 2011b, 1). Recently, the entity responsible for the development of Dubai World Central partnered with Dubai’s Department of Economic Development and Khalifa Al Zaffin, executive chairman of Dubai Aviation City Corporation, notes that this agreement is ‘in line with DWC’s mission to serve as a catalyst for growth and long-term economic and social development in Dubai and across the region’ (Welling, 2012d).
By mapping all elements of Dubai World Central (compare Figure 22), it becomes absolutely clear that all elements of Kasarda’s Aerotropolis model were implemented into the master plan (see Table 7).

**Figure 22: Aerotropolis Dubai**

Dubai **Aviation City** aims to become an international centre for education, training and research in air transport. Furthermore, it will contribute to the economic development of Dubai and aims to become an international centre for multi-modal transport. The 6.7 km² development will consist of a maintenance, repair and overhaul centre (MRO), a heliport zone, an education and academic zone, an industrial zone, office buildings, an area for aircraft component and parts supply, hangars and light industrial zones (Dubai World Central, 2011c, Dubai World Central, 2011e). **Logistics City** will incorporate warehouses, office buildings and up to 16 cargo terminals, each of 30,000 km². As it will operate as a free zone, no customs duties will apply or taxes. Furthermore, it will offer liberal visa policies, free
capital transfer and the possibility of 100% ownership. Additionally it aims to offer qualitative labour at competitive costs, logistics know-how and enough space for expansion (Dubai World Central, 2011e). A staff village will offer quality accommodation for blue-collar workers (Dubai World Central, 2007). Dubai Logistics and Aviation City are operated by DWC, and the third free zone, Jafza, is operated by external company Economic World Zones. Following the aim to develop Dubai as a logistics corridor, the two companies set up an agreement to cooperate in development, customer service, operation and marketing (Dubai World Central, 2009). At Dubai International Airport, a free zone has existed since 1996. Main sectors are aviation and electronics with shares of 14% and 11%, respectively. Other business sectors are engineering, computer, cargo, advisory services and consultancy (Global Airport Cities, 2011c). In 2010, 102 new companies registered. From these, 28% were from Europe, 27% from the Middle East and the Gulf Region and 21% from Asia. American and Japanese companies moved in the free zone as well in 2010 (Global Airport Cities, 2011c). In 2012, 1600 companies from business sectors such as logistics, aviation, information and telecommunications technology, engineering, food and beverages, cosmetics, jewellery and pharmaceutical were located in the free zone attracted by tax and investment incentives, like the possibility of 100% ownership (Welling, 2012c).

**Residential City** aims to host 250,000 people and 20,000 employees. Various apartment buildings with 5 to 10 storeys will be offered. The district will be accessible by road and light rail. Apart from housing, the following facilities will be provided for that part of Dubai World Central: health care centres and hospitals, schools, religious facilities, public and commercial facilities, public libraries, post offices, police stations and civil defence (Dubai World Central, 2011f).

**Commercial City** will act as the business and financial hub of Dubai World Central and will have more than 850 buildings with 1 to 45 storeys. It is expected that up to 150,000 people will be employed in it. Furthermore, the area will provide super-deluxe homes, 25 hotels, shopping malls, schools, hospitals and health care centres.
Plots of land will be sold to private investors for this development (Dubai World Central, 2007, Dubai World Central, 2011f).

**Golf City** will consist of five 9-hole golf courses, a high-end boutique hotel, a spa resort and a variety of over 5000 homes from two-storey villas to 24-storey apartment buildings (Dubai World Central, 2007, Dubai World Central, 2011f).

Two dedicated staff villages will exist in the boundaries of Dubai World Central, one in Residential, and one in Logistics City. Various accommodation options will be offered for up to 43,000 people inside Residential City and 52,000 inside Dubai Logistics City. The staff villages will consist of a central plaza and banks, government offices and a community centre. Additionally, sports facilities, leisure facilities, restaurants and shops will be established. Furthermore, dedicated female accommodation will be available (Dubai World Central, 2011f, Dubai World Central, 2011e).

Since 2009, Dubai has a metro system of 75 km with two lines, the green and the red (Global Airport Cities, 2011b). Dubai Roads and Transport Authority (RTA) set up 39 routes and 456 buses to connect the stations of the green line with surrounding suburbs. The green line has a service frequency of six to eight minutes (Global Airport Cities, 2011d). Both lines connect Dubai International Airport. The green line connects now the airport with major tourist areas, residential and business districts as well as ministry offices (Global Airport Cities, 2011b). Plans exist to expand the metro system in three phases in 2020, 2025 and 2030. After completion, Al Maktoum International Airport will be directly connected with Dubai International Airport and the Etihad Rail network that is planned to connect the Emirate with neighbouring Saudi Arabia and Oman (Al Zarooni, 2013). Inside of Dubai World Central, light rail will operate through Residential City and 100,000 parking slots will be available (Dubai World Central, 2011f).
It is clear that Dubai World Central is planned as a greenfield Aerotropolis and a growth pole for Dubai. Following the growth pole literature (Parr, 1999a, Parr, 1999b) it can be expected that urban development will take place not only at Dubai World Central but also in the corridor between the ‘old’ city centre and Dubai International Airport and Dubai World Central. Already in the last few years, a clear shift of the main business district further south towards this new growth pole following the main transport corridor could be recognised. For this research, companies in that growth corridor were identified and questioned about the importance of airports and in particular the role of Dubai World Central. Dubai is an interesting case as a hub airport with excellent air traffic connectivity already exists with Dubai International Airport. Therefore, it was expected that interviews in Dubai would reveal illuminating insights into the importance of a new Aerotropolis development as a location factor.

5.2.2 Airport Metropolis’ Region: Frankfurt

Today, Frankfurt is the most important financial centre in Europe (Conventz, 2010) and is the heart of the Rhine-Main-Area with numerous entertainment and cultural activities on offer (Dietrich, 2009):

FrankfurtRhineMain, one of Europe’s most prosperous and fastest-growing regions and ideally located at the continent’s heart, exerts a magnetic attraction on business people around the world, as well as on highly qualified people looking to shape the future in success-oriented enterprises. Frankfurt Airport is the center of gravity to which they are all drawn. Embedded in an intermodal transportation network, it ensures optimum accessibility from all directions and first-rate connections to the entire world. (Fraport AG, 2008, 7)

The Rhine-Main-Area is a polycentric development with numerous core and growth nodes (Brake, 2008). Buchholz (2010) describes the Rhine-Main-Area as an Airport Region with Frankfurt Airport City as its core. He draws the boundaries of the Airport City by the highway interchange ‘Frankfurter Kreuz’ in the East, the
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Fraport, the operator of Frankfurt International Airport, classifies Frankfurt itself now as an Airport City or Aerotropolis (see Figure 23) but acknowledges the differences too, for example greenfield developments in Asia or the Middle East in regard to available space and possible residential developments at the airport. In Europe, airports are not yet accepted as living and entertainment locations (Dietrich and Hommerich, 2007).

Furthermore, Frankfurt Airport City developed organically, in contrast to Dubai World Central, and lacks therefore space for further developments. Nevertheless, the space of the Airport City increased from 860 ha in 1946 to 2126 ha today with numerous office locations and a contribution from the non-aeronautical sector of more than 50% of total revenues (Lehn, 2008). Rents at the airport are nearly as high as in the city centre and companies of numerous business sectors, such as transportation, business services, healthcare and information and telecommunication services can be found in the Airport City (Conventz, 2010).

![Figure 23: Self-positioning of Frankfurt Airport in the Airport City/Aerotropolis concept (Dietrich and Hommerich, 2007)](image)
Frankfurt International Airport was established in 1946. In 1968, the first hotel opened and in 1972 a new terminal with wide offerings of food, beverage and retail options was established. In 1977, one of the first Airport City elements opened: the Club ‘Dorian Gray’ with a capacity of 1500 people. The first office building, Frankfurt Airport Center (FAC), was opened 1984 (Lehn, 2008).

Today, Frankfurt’s airport is the biggest airport in Germany with more than 50 million passengers in 2009, making it one of the ten busiest airports worldwide (Fraport AG, 2010g). In 2010, passenger numbers were growing by 4% (Fraport AG, 2010e). For 2020, 88.6 million passengers are predicted (Flottau, 2009). Frankfurt Airport offers approximately 161 connections to destinations inside Europe and 146 destinations outside of Europe (Dietrich and Hommerich, 2007). As a hub airport, approximately 50% of Frankfurt’s passengers are transit passengers (Fraport Markt- und Trendforschung (Mvg-Mf), 2008). Approximately, 71,000 people work at Frankfurt airport; 500 companies are located there and 246 shops, bars and restaurants exist (Fraport AG, 2010d). In the catchment area of Frankfurt Airport (radius of 100 km), 11 million people are residents and 320,000 companies are located (Dietrich and Hommerich, 2007). Over the last few years, Fraport, the facilitator and owner of Frankfurt Airport, has been systematically developing real estate sites inside and outside of the airport fence. Existing and planned facilities will be introduced in the following discussion (Figure 24).
The **Squaire**, formerly known as Airrail Center Frankfurt, is a development occupying 150,000 m$^2$ and is 660 m long and 9 floors high and is situated on top of the long-distance rail station with mixed-use offices, hotels, restaurants, retail, service and leisure activities, such as gyms and halls for exhibitions and other cultural events, education facilities, such as kindergartens, and also medical facilities (Dietrich, 2010, Fraport AG, 2010a, Fraport AG, 2011, Global Airport Cities, 2011e, Global Airport Cities, 2011h). When fully occupied, it is predicted that 7000 people will live and work there. Current tenants are, among others, Hilton Hotel, Hilton Garden Inn Hotel, KPMG, Lufthansa, Starbucks, REWE and Arthur D. Little (Global Airport Cities, 2011k). KPMG merged its two European headquarters from London and Frankfurt as ‘the intermodal connections offered by Frankfurt Airport [are] a key reason for choosing the new location’ (Global Airport Cities, 2011h, 1).

**Frankfurt Airport Center** (FAC) 1 and 2 and **Main Airport Center** offer different office sizes and conference centres (Fraport AG, 2010d).

**Gateway Gardens** is a new suburb of Frankfurt with direct access to the airport and a size of 350,000m$^2$ (35 ha) and 25 ha of net building land. The area is getting
developed until 2016 and is planned to occupy mixed uses of aviation services, hotels, offices, education facilities and a congress and trade centre. Tenants are, for example, Park Inn Hotel, House of Logistics and Mobility and LSG Sky Chefs. Gateway Gardens will have a train station connected to the Frankfurt city train, and the location is linked to Frankfurt’s highway system (Dietrich, 2009, Fraport AG, 2010c, Fraport AG, 2010d, Fraport AG, 2010g).

The Mönchhof area is a 110 ha development, West of Frankfurt Airport, which focuses on logistics, offices and small plots for service and trading companies. When fully occupied by 2016, it is expected that 6500 people will work there. Tenants include, for example, REWE with a 28,000 m$^2$ cold storage food house, and the US-based logistics company Expeditors whose headquarters are located at Mönchhof. The development is connected via highways A3 and A67 and state highway B43. The distance to the airport by road is 10 km (Fraport AG, 2010f, Fraport AG, 2010b, Fraport AG, 2010d).

The Ticona development is a new development next to Mönchhof and was needed for the development of the new runway. So far, only one office building, Bürogebäude Airport City West, is developed at this site. Further development will start in 2014 (Fraport AG, 2010d).

CargoCity North and South concentrate on logistics companies and offer these tailor-made facilities (Fraport AG, 2010g).

Frankfurt airport is connected by rail, road and public transport with the region. Via the high-speed and regional train services, major destinations in Germany and other parts of Europe can be reached in three to four hours. For example, one can go to Berlin in three hours and 35 minutes, while travellers are in Paris in four hours (Dietrich and Hommerich, 2007). Frankfurt Airport City is clearly a place of connectivity with a connection via city train to the city centre, 350,000 cars every day passing through Frankfurter Kreuz, 300,000 travellers every day using the long-
distance train station (located under the Squaire), and around 170,000 travellers are counted every day at the airport (Buchholz, 2010).

As Frankfurt Airport is only 12 minutes by city train away from the city centre of Frankfurt an ongoing discussion about the possible competition between the city centre and Frankfurt Airport City is triggered (Albrecht, 2008).

Frankfurt is, in contrast to Dubai, an organically developed Aerotropolis. Nevertheless, it is recognised by experts as one of the first examples of Airport City or Aerotropolis development. Furthermore, Frankfurt is similar to Dubai in that it is the financial capital of its respective country. Both airports are globally recognised hubs with similar passenger numbers. Frankfurt airport developed many sites of the Airport City in recent years when tenants started to move in 2012. Therefore, Frankfurt was considered a good case for asking companies that (re)located very recently to an Airport City site about what influenced their decision.

5.2.3 Airport Metropolis’ Region: Abu Dhabi

Abu Dhabi is the largest of the seven Emirates. It holds 97% of the United Arab Emirates’ (UAE) oil reserves and incorporates 87% of the land. Thirty-eight per cent of the UAE’s population lives in the Emirate Abu Dhabi. It consists of three administrative regions: the capital city Abu Dhabi, Al Gharbia and Al Ain. Abu Dhabi as the capital of the UAE grows currently at 6% per year, has the highest per capita GDP in the world and one of the lowest crime rates worldwide. Abu Dhabi is the seat of the federal government (Abu Dhabi Airports Company (ADAC), 2008, UAE Interact, 2011).

Although the economy is still mainly oil-driven, the government aims to diversify the economy and develop Abu Dhabi to become a vibrant business centre (Abu Dhabi Airport Business Park, 2007a). It aims to increase the non-oil–related economy sector from 40% in 2011 to 60% (Masdar City, 2011c). Different business sectors for the diversification were identified: education, banking and finance,
tourism, pharmaceuticals, media, aviation and aerospace, transportation and logistics and manufacturing in the fields of aluminum and petrochemicals (Masdar City, 2011c).

Originally located in Al Bateen, the airport started operations at the current location in 1982. The airport is located 38 km outside of the city centre (Welling, 2012a). Today, Abu Dhabi International Airport is the second biggest airport in the United Arab Emirates with 45 airlines, among them the home carrier Etihad, responsible for 9.2 million passengers in 2012 (Fulton, 2012). Strong growth of 14% could be observed in the first three months of 2013 (Abu Dhabi Airports Company (ADAC), 2013). With the expected completion of the new terminal in 2017, Abu Dhabi Airport has a design for up to 30 million passengers (Welling, 2012a). Since 2006, the airport has been owned by Abu Dhabi Airports Company (ADAC), a public joint stock company. The chairman of ADAC, H.E. Khalifa Al Mazrouei, makes clear that ‘Abu Dhabi International Airport is committed to further developing into a leading airport in the region, and a key contributor to the Abu Dhabi 2030 vision of economic diversification’ (Welling, 2012a, 8).

The former airfield in Al Bateen, five kilometres from the CBD, is owned by ADAC as well. Seeing growing demand for commercial business flights, the government changed its plan to redevelop the site into a commercial and residential district. Today, Al Bateen Executive Airport is used for business jets with growing demand (Abu Dhabi Airports Company (ADAC), 2010b, Gale, 2011).

In accordance with Abu Dhabi’s commitment to build a sustainable economy and ensure a balanced social and regional economic development that benefits all residents until 2030 (The Government of Abu Dhabi, 2008), many new urban developments are underway or recently completed. A comprehensive transport plan complements these developments. A major shift from the current CBD at the waterfront ‘Corniche’ to the airport approximately 38 km south-east can be
observed with numerous new developments, including a master planned new capital district South of Masdar City (Figure 25).

Figure 25: Abu Dhabi International Airport Business Park (Abu Dhabi Airport Business Park, 2007b)

The Airport’s **Logistics Park** was opened in 2009 and is expected to be completed by 2015. The area so far has attracted mainly businesses in aviation, logistics and the cargo sector (Sambidge, 2009). Nevertheless, the 12 km$^2$ **Business & Logistics Park** is designed to attract companies from a wide range of industry sectors, such as media, aviation, logistics, electronics, business services, information and communication technology, Pharmaceuticals, cosmetics and food and beverages. The park will also offer its tenants a wide range of social infrastructure in the form of ATMs, dining options, postal and travel services and healthcare facilities (Abu Dhabi Airports Company (ADAC), 2008). The Vice President of Corporate Affairs at ADAC, Mrs Sheikha Al Maskari, clarifies the purpose of the development: ‘The Logistics Park at Abu Dhabi Airport is an intrinsic element of the overall ADAC master plan and aims at promoting diversifies private sector investments into the Emirate and to generate non-aeronautical revenues’ (Ammari, 2009, 5).
Masdar City, South of the airport, is a ‘green city’ that aims to provide a truly sustainable experience for companies and residents. Masdar City was developed under strict ecological terms. For example, even supermarkets in the city have to be organic, that is they have to be committed to a low-carbon emission policy and practice. The development aims to become a magnet for talented employees, financial capital and entrepreneurship in the field of renewable energies. It accommodates renewable energies companies and a research university (Masdar City, 2011c, Masdar City, 2011b). ‘Masdar City is set to become a leading global centre for renewable energy research, development, implementation and investment’ (Masdar City, 2011a, 33) and ‘is a model for sustainable urban development regionally and globally, seeking to be a commercially viable development that delivers the highest quality living and working environment with the lowest possible ecological footprint’ (Masdar City, 2011c, 1).

It is built for 7000 residents and 15,000 commuters (Masdar City, 2011b). By 2015, Masdar City will have 1,000,000 m² gross floor space and in a second development phase 45,000 m² for residential, university, recreation and leisure purposes will be added later on (Masdar City, 2011b).

The city’s stated intention is to attract businesses from sectors such as research and development, finance, business services, retail, education and light industry in the field of renewable energies (Masdar City, 2011a). Masdar City provides all kinds of commercial space from high-quality offices situated over testing facilities and research laboratories to concept and retail stores (Masdar City, 2011a). Numerous business and therefore location incentives exist in Masdar City. For example, no taxes have to be paid; there are no restrictions on capital movements, profits or quotes exist; unlimited foreign ownership is permitted; no currency restrictions are present; help with placement of expatriate staff is provided; and a strong Intellectual Property (IP) protection framework is in place (Masdar City, 2011a). Furthermore, a one-stop shop facilitates the location decision by offering, for instance, easy registration in a maximum of seven days; licensing; government
relation and business services, like translation, insurance, travel and visa help; IT service; housekeeping, and so on (Masdar City, 2011a). Interestingly the website also advertises as a location advantage ‘a high quality of living’ and ‘a community of like-minded students, academics and practitioners’ (Masdar City, 2011a, 1):

By providing a live-work atmosphere that encourages and inspires business growth and creativity, as well as an attractive and exciting place to live and work, organizations and their employees recognize clear benefits to locating here. (Masdar City, 2011b, ‘Built Environment’, 1)

Several international companies are already located in Masdar City, including Siemens, GE, BASF, Bayer MaterialScience, Korea Technopark Association, Mitsubishi Heavy Industries, Schneider Electric, Swiss Village Association and the secretariat of the International Renewable Energy Agency (IRENA).

The conceptual design of the city encourages walking and the use of public transport. Electric buses and cars and a Personal Rapid Transit (PRT) together with a Freight Rapid Transit (FRT) provide transport inside the city (Masdar City, 2011b, Masdar City, 2011c). Abu Dhabi’s light rail and metro lines will connect Masdar City eventually with other parts of Abu Dhabi (Masdar City, 2011c).

In strong contrast to Masdar City, where private cars are not allowed inside, 3063 parking plots are available for 2235 homes in Golf Walk on the other side of the airport. Golf Walk is a residential development with 2235 low-rise units and an 18-hole golf course (Hydra Properties, 2010). In even stronger contrast is the so-called ‘Motor World’ development. Motor World offers residential and mixed-used development and aims to be the one-stop shop in all ‘car matters’. Furthermore, the development incorporates a hotel with a business centre (Aldar, 2011). Apart from financial, insurance companies and car dealers, the area offers residential units, public facilities, food and beverage outlets, parks and other green spaces, a three-star hotel including a business centre and a well-established pedestrian footpaths network (Motor World, 2009). The first phase of this development was opened in 2011 (Kadragic, 2011).
Numerous new residential developments are underway in close proximity to the airport. **Al Reef Villas** is a residential development of around 900,000 m², strategically positioned at the road to Dubai and Al Ain. Residents will need less than one hour by car to travel from Dubai and Al Ain (Al Reef Villas Abu Dhabi, 2011).

**Al Falah** is an even bigger residential development of 12.5 million m² and 4857 villas of 18 different types with three to five bedrooms. Al Falah is located as well in close proximity of the Abu Dhabi–Dubai highway. Al Falah is part of the Emirati Family Housing Program that aims to deliver 13,000 affordable homes to Emirati families in a surrounding of enhanced infrastructure, social and civic facilities. Al Falah will accommodate up to 100,000 residents and consists of five villages with their commercial and social centre plus a town centre with a hospital, shopping mall and many schools (Gerrity, 2011). Each village will have a small centre and its own religious, retail, education and recreational facilities. The villages are planned in a manner that the centres are not further away than ten minutes walk from every residential unit. The town centre has a 65,000 m² shopping mall, 6000 apartments, 50,000 m² of office spaces, a hospital, several clinics a sport and leisure centre and municipal buildings. Al Falah is designed in an urban form of radial residential streets and interconnecting landscaped green spaces (Al Mashni, 2009, Gerrity, 2011, Hypostyle Architects, 2011, Pr Newswire, 2011, Transpo Group, 2011).

**Al Raha Beach Development** is a massive waterfront construction where hotels, marinas, restaurants, parks and other leisure facilities will spread over 5 km² once it is completed by 2018 (Constructionweekonline.com, 2009). The development is strategically located at the main road between Dubai and Abu Dhabi and is expected to house 120,000 to 200,000 residents once completed (Ten Real Estate, 2007, AECOM, 2011). A wide range of public transport, such as bus, light rail and water taxi services, is planned (AECOM, 2011).
The development of the new **capital district** is planned south of Masdar City and between the three new medium-sized cities: Khalifa City A and B and Mohammad Bin Zayed City. Planned under sustainable urban planning principles, numerous physical and social infrastructure elements are planned for Capital City. The heart of the district will be a Federal Precinct (Abu Dhabi Urban Planning Council, 2009):

> The Capital District is planned as a sustainable, compact, mixed-use city, comprised of high-density transit-oriented communities, employment, major universities, hospitals and knowledge-based employment sectors, as well as a lower density Emirati Neighbourhood. (Abu Dhabi Urban Planning Council, 2009, 13)

It is expected that the Capital District will house up to 370,000 residents (Abu Dhabi Urban Planning Council, 2009). Khalifa City A is scheduled to finish by 2020 and will accommodate a population of 175,017. Khalifa City B is scheduled to open 2024 with a population of 175,000. In 2030, Mohammad Bin Zayed City is expected to accommodate 321,117 people. So far, only the basic road network is developed and the area lacks public parks and green areas (UAE Interact, 2011).

**Yas Island** is a 25,000 km² development that serves mainly entertainment and tourist purposes. It incorporates a Formula One racetrack, the Ferrari theme park, a water park, a golf course and numerous hotels, residential, retail and food and beverage developments (Aldar, 2011).

Since 2006/2007 Abu Dhabi has a Department of Transport (DoT). The developed Surface Transport Master Plan facilitates the idea to integrate the airport and the region up to the Emirate of Sharjah by physical infrastructure to keep pace with the growing population and

> to deliver a world class, sustainable transport system that supports Abu Dhabi’s economic, social and cultural and environmental goals. (The Government of Abu Dhabi, 2009, 14)

By 2030, the plan aims to develop a full network of transport options throughout the Emirate, including regional rail, metro, light rail, bus, taxi, park and ride, and
highways (The Government of Abu Dhabi, 2009). The first phase of the metro and tram system is under development and opening is expected for 2016/2017 (Mcginley, 2010, Barnard and Neuhof, 2013). Recently, news about a railway link between ports in Abu Dhabi and Dubai was announced as well (Haider, 2010). Nevertheless, so far transport in Abu Dhabi is highly car-dependent although many bus lines exist.

Abu Dhabi is planning, like Dubai, its Aerotropolis or Airport City development as a new growth pole for the city. Furthermore, similar to Frankfurt, many Airport City ‘suburbs’ such as Masdar City were completed recently, or at least the first tenants have moved in. Therefore it was considered an interesting case, similar to Dubai in that it is planned as a growth pole with a top-down approach and similar to Frankfurt with recent Airport City developments. Companies that recently (re)located to the Airport City could be asked about their preferences and these could be compared with the answers from Frankfurt. Furthermore, although the Airport City ‘suburbs’ are greenfield developments – similar to Dubai – the airport itself has been established at that site for decades – similar to Frankfurt. Additionally, Abu Dhabi is the capital of the UAE as Berlin is the capital of Germany.

5.2.4 Airport Metropolis’ Region: Berlin

Berlin is the capital of Germany and the location of the federal government (Berlin Airports, 2010a). After the Wall came down in 1989, Berlin was left with many instances (or ‘duplicates’) of the same infrastructure elements, like universities and theatres, as a result of the former division between East and West. This was also the case for the airports, with Tegel as city airport in the North, Tempelhof in the middle of the city and Schönefeld in the South. From 1989 until 1996, an intense discussion about a location for a new, big and unified airport took place. Finally, the decision was made to use one existing runway of Schönefeld and build a new airport south of the existing airport (Appenzeller, 2011), and close the other airports. Tempelhof was eventually closed in 2008 and Tegel is expected to close with the opening of the new airport (Berlin Airports, 2009).

BER, which should offer connections to approximately 166 destinations (Gingerich, 2011), was delayed several times (Beria and Scholz, 2010, Berlin Airports, 2010b). The last opening date, in June 2012, was first delayed to October 2013 but is now postponed indefinitely (Airberlin, 2012, Kurpjuweit et al., 2012, Appenzeller et al., 2013, Fröhlich, 2013, Kurpjuweit, 2013b, Kurpjuweit, 2013a, Kurpjuweit and Hoffmann, 2013).

Both big German airlines, Lufthansa and Air Berlin, are using Berlin airport(s) – Air Berlin as a hub. Nevertheless, the new airport is not aimed to compete with the big hubs Frankfurt or Munich, but aims to offer the airlines ‘excellent transfer infrastructure and an exciting vibrant city’ (Routes News, 2011a, 22). Berlin, also known as ‘poor but sexy’, is a state with one of the lowest economic powers in Germany, but is seen as a dynamic, young city with a high rate of students and engineers (Mielke, 2011). The state of Brandenburg has a similar development (Mielke, 2011). The GDP of the catchment area of the new airport is, for example, only 123 bn Euros in comparison to 403 bn Euros in Düsseldorf (Poungias, 2009). Nevertheless, Berlin is well-known for its wide range of cultural offers, abundant options for party-goers and the beautiful nature in the state of Brandenburg that surrounds it (Berlin Partner GmbH, 2009).
The new airport will incorporate around 150 shops inside the terminal and an Airport City for shopping and offices in front of the terminal (Berlin Airports, 2009, Berlin Airports, 2010a). The Airport City ‘forms an exclusive entrée to the airport complex, an urban service centre for everyone using the airport’ (Berlin Airports, 2009, 80). The economic development around the airport is planned for three different growth zones: the Airport City, the Business Park Berlin, and last but not least the development of the municipality Schönefeld in between the two other growth nodes (see Figure 26).

Although the collaboration between Brandenburg and Berlin worked well and regional planning occurred in cooperation (Sperling, 2010), each state or developer is responsible for regional economic development. This means that if an investor or a company would like to move to the airport region, they will have to talk to at least two different institutions: the Airport operator for the Airport City and the Business Park Berlin and the municipality Schönefeld for the Business Park Schönefeld-Kienberg/Waltersdorf. Apart from this, the ground of the development in Schönefeld does not belong to the municipality, but to multiple private investors.

The regional planning is a master plan for the next 20 to 30 years. Predominantly, the business parks like to attract aviation-related companies but also offer space for companies from the information and telecommunication technology and pharmaceutical and biotechnical sectors. While the Airport City is being developed together with the airport, the business parks will be developed in a flexible way by demand from customers (Senatsverwaltung für Stadtentwicklung und Umwelt, 2010).
The Airport City is located in front of the terminal on 16 ha. The Airport City will offer car rental and parking facilities, a Steigenberger four-star hotel and a 24,000 m² office complex. A private developer (Fay Projects) develops the office complex and Deutsche Anlagen-Leasing GmbH & Co. KG facilitates the parking facilities (Clark, 2010a). One hundred and fifty retail units are incorporated into the airport, most of them airside. Nevertheless, 4000 m² are dedicated to retail, food, beverages and services on landside (BBI, 2010).

The Airport City is planned with 87,000 m² space for offices, retail and training facilities. Until the fifth postponement of the opening date, a 1500 m² health centre was proposed as well. The responsible companies, Vivantes and Sana, scrapped the
plans and terminated the lease in January 2013 as a result of the uncertainty of the opening date (Bach, 2013).

North-east of the airport fence, the Business Park Berlin is being created on an area of 109 ha. The business park will house all kinds of businesses, retail outlets and hotels and will be developed flexibly for the needs of the customers (Beria and Scholz, 2010, Berlin Airports, 2010a). A little bit further north, only around 8 km from the airport and directly located in the corridor between the city centre and the airport, the science and technology park Adlershof has existed since 1991. Although the science and technology park, with hundreds of companies, six university institutes and 11 non-university research institutes, is the heart of the business park, numerous other companies of the business and media sectors are located in the 420 ha site. In total 15,000 people and 8438 students work there and more than 950 companies are located there (Adlershof Online, 2013). The economic development site of Schönefeld is being developed by external developers and by demand of the customers (Municipality of Schönefeld, 2008). It is notable that new investments in the municipality of Schönefeld so far are not occurring in the allocated new area but next to the old airport, with new hotel developments and plans for a flight training simulator centre under development. The planned development of the flight training simulator centre is interesting as the company has similar facilities in Schiphol and Dallas, two well-known Aerotropolis areas. Additionally, Air Berlin and Lufthansa are building big hangar facilities at the airport (Schoelkopf, 2010).

The new airport is well connected by road and rail. The airport is connected by a train station for the city train and regional trains, directly located under the terminal. Furthermore, the A113 highway connects the airport with the city centre of Berlin and other locations in the state of Brandenburg (Berlin Partner GmbH, 2009, Berlin Airports, 2010a). From Berlin’s main train station, passengers reach the airport in 30 minutes. From Berlin’s city centre, at least 5 regional trains and 6 city trains depart to the airport every hour, and up to around 20 bus connections exist.
Cities in Brandenburg are connected via regional train to the new airport facilities (Metzner, 2009, BBI, 2011).

While Berlin’s Airport City development is much smaller than for the three other examples, Berlin is an interesting case as it is similar to Abu Dhabi, in that it is the capital of the country and the airport is of similar size. Furthermore, the development is more or less a greenfield development, similar to Dubai, and growth poles, inclusive the labelled Airport City are identified by the government in airport proximity and in the corridor between the city centre and the new airport.

5.2.5 Similarities and differences

As discussed in Chapter 4, by using a comparative methodology, similarities and differences between the cases are important to determine causality of variables (Watson, 1994, Wailes, 1999, Bergene, 2007). In general, two different countries, Germany and the UAE, were chosen to understand how different socio-economic backgrounds, culture and history influence the decision of location. On the other hand, in each of these ‘cultural’ settings, two cities, the host cities of the national hub and capital airport, were selected to compare decisions in similar preconditions. Furthermore, the two cities were picked in a form that guaranteed similarities with an Airport Metropolis’ Region of the other country. Numerous similarities but also differences exist not only between each of the two locations in Germany and the UAE but also between Frankfurt and Dubai and Abu Dhabi and Berlin. By mixing differences and similarities in this way, a deep understanding of the underlying factors of infrastructure preferences for the decision of location could be achieved.

In the following, similarities and differences between the airports and Airport Cities and Aerotropoli will be discussed. In Chapter 4 (see Section 4.3.3.2.3) the macroeconomic context of the four regions was discussed.

The Environment: Airport Cities and Aerotropoli in Germany and the United Arab Emirates
All four airports are serving one major airline – Dubai: Emirates; Frankfurt: Lufthansa; Abu Dhabi: Etihad; and Berlin: Air Berlin – and are providing therefore well-established air connectivity. Dubai and Frankfurt are globally recognised established hubs for passengers and cargo and both have passenger numbers well above 50 million. However, it should be noted that this is true only for Dubai International Airport. Al Maktoum International Airport started passenger travel recently and has currently a capacity of only 7 million passengers. Berlin and Abu Dhabi’s airports have been growing in recent years and are designed for a similar number of air travellers: 25 to 30 million passengers per year.

While Frankfurt’s and Abu Dhabi’s airport and Airport Cities are expanding at existing sites (though Frankfurt with clear space constraints) Dubai’s Aerotropolis and Al Maktoum International Airport is a greenfield development. Berlin is developing a new airport and Airport City at the site of an existing one.

Several distinctions exist for the Airport Cities and Aerotropoli developments. While the government of Dubai develops a clear master-planned Aerotroplis according to the characteristics as set out by Kasarda (2013; see Figure 14 in Chapter 3 and Table 7), Fraport develops different Airport City sites on airport land not embedded in a wider regional plan. Abu Dhabi’s and Dubai’s governments use the airport as a growth pole to develop whole new parts of the city. Nevertheless, the government of Abu Dhabi calls it neither Airport City nor Aerotropolis development, nor does it connect the different developments. It seems much more like a traditional urban planning zoning development. In Berlin, although the airport is publicly owned and the airport is characterised as one economic growth pole for the economic plan of the Berlin-Brandenburg Airport Region, the tiny Airport City in front of the terminal is being developed from the airport while all other developments will be developed piece by piece from the responsible entities or municipalities.

Table 7 shows the different Airport City and Aerotropolis elements of the four Airport Metropolis’ Regions in comparison to Kasarda’s (2013) Aerotropolis
schematic. While aviation-related zones and business parks exist in or are planned for all four Airport Cities/Aerotropoli, ‘Research and Technology Parks’ can be found in three of them, but not in Frankfurt. Furthermore, a ‘true’ Distribution Complex can be identified only in Abu Dhabi with ‘Motor World’. Interestingly, no ‘real’ ‘Exhibition Complex’ is planned for any of the selected examples. Clear country distinctions exist in regard to ‘Residential’ and ‘Medical and Wellness Cluster’. While residential areas are embedded in the Airport City and Aerotropolis plans of Abu Dhabi and Dubai World Central, residential areas are not part of the plans in Frankfurt and Berlin in Germany. This can be a result of a higher sensitivity to noise pollution as the recent discussions in Berlin and Frankfurt have shown or of the closeness of the airports to the city centre and existing residential areas. ‘Medical and Wellness Clusters’ are not mentioned in relationship to the airports in the UAE but are discussed frequently at the German airports. While Frankfurt has an airport clinic and is close to Bad Nauheim, a globally known location for ‘Kneipp-Kuren’, a similar development was planned for the new Berlin Airport but was scrapped because of the construction problems.

A clear corridor development is taking place in Dubai (in between the two airports) and Abu Dhabi (city centre and airport). In Berlin the corridor between the city centre and the new airport was designated for further economic, commercial and residential development. In contrast, Frankfurt or rather the Rhine-Main-Area is a truly polycentric development with the airport as one of the centres.
Table 7: Comparison of the four Airport Metropolis’ Regions with Kasarda’s Aerotropolis schema

<table>
<thead>
<tr>
<th>Kasarda’s Aerotropolis-Model</th>
<th>Aerotropolis Dubai</th>
<th>Aerotropolis Frankfurt</th>
<th>Airport City Abu Dhabi</th>
<th>Airport City Berlin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Cargo, Logistics Park and Free Trade Zone</td>
<td>Logistics City, Aviation City</td>
<td>Cargo City North, Cargo City South</td>
<td>Logistics Park</td>
<td>(Airport BBI)</td>
</tr>
<tr>
<td>Research Technology Park</td>
<td>Aviation City</td>
<td>(Gateway Gardens)</td>
<td>Masdar City</td>
<td>Adlershof, Schönefeld</td>
</tr>
<tr>
<td>Hotel and Entertainment District</td>
<td>Golf City</td>
<td>Steigenberger Hotel, The Square with hotel, Gateway Gardens with hotel</td>
<td>Golf Walk, Yas Island</td>
<td>Steigenberger Hotel</td>
</tr>
<tr>
<td>Distribution Center</td>
<td>-</td>
<td>-</td>
<td>Motor World</td>
<td>-</td>
</tr>
<tr>
<td>Exhibition Complex</td>
<td>-</td>
<td>(The Square, hotels)</td>
<td>(Yas Island hotels)</td>
<td>(Hotel)</td>
</tr>
<tr>
<td>Residential</td>
<td>Residential City</td>
<td>In the nearby metropolitan area</td>
<td>Al Raha Beach Development, Al Reef village, Al Falah Residential Development, Capital District, Khalifa City A and B, Mohammad Bin Zayed City, Yas Island</td>
<td>In the nearby metropolitan area</td>
</tr>
<tr>
<td>Medical &amp; Wellness Cluster</td>
<td>-</td>
<td>(Airport Clinic, in wider metropolitan area)</td>
<td>-</td>
<td>(Was originally planned)</td>
</tr>
<tr>
<td>Business Park</td>
<td>Commercial City</td>
<td>Gateway Gardens, Mönchhof, Ticona, Lufthansa Basis, The Square, FAC 1 and 2, Main Airport Center</td>
<td>Business (&amp; Logistics) Park</td>
<td>Airport City BBI, Business Park Berlin, Schönefeld</td>
</tr>
</tbody>
</table>
5.3 Summary

This chapter described the four Airport Metropolis’ Regions that are providing the ‘environment’ for this study. As the literature review revealed, location decisions are not independent of the corresponding regions in which they take place (Biehl, 1991, McCann and Sheppard, 2003, Kimelberg and Nicoll, 2012). Therefore, it is important to understand the context of the regions before evaluating the different answers of the participants of the interviews. Furthermore, for a comparative methodology, it is paramount to spell out similarities and differences before conducting the analysis (Watson, 1994, Wailes, 1999, Bergene, 2007).

By introducing the four study regions, it was clear that all regions have already an Airport City or Aerotropolis or are aiming to develop one. Similarities and differences were described between all four case regions. The main difference lies in cultural aspects of the UAE and Germany. Similarities were found, for example, in regard to airport size and function and the function of the host city.

The next chapter will present the results of the companies’ interviews of the four cities – Dubai, Frankfurt, Berlin and Abu Dhabi – following the logic of the research sub-questions. Afterwards, Chapter 7 will present more findings that further enhance the understanding of the role of infrastructure for economic development in the Airport Metropolis’ Region, before the thesis concludes in Chapter 8.
6 Research Results: Business Preferences of Airports and the Role of Infrastructure for Economic Development in the Airport Metropolis’ Region

Understanding the role of an assortment of location factors, both extractive and amenity-based, will assist in building a model of community development based on a diversified and sustainable economy.

(Johnson and Rasker, 1995, 414)

6.1 Introduction

Following the literature review chapters that proposed that the ‘environment’ should be considered by using location theory, the previous chapter presented and analysed the four Airport Metropolis’ Regions and their respective Airport City and Aerotropolis developments where the interviews were conducted and provided the context or ‘environment’ for this study. Interviews with companies’ decision-makers were undertaken to determine infrastructure supply and decision of location in the context of the twenty-first century and the new built environment of the Airport City and Aerotropolis. Four context regions were identified in the methodology chapter: Abu Dhabi and Dubai in the United Arab Emirates and Berlin and Frankfurt in Germany. Furthermore, findings of the literature review suggest that the business sector is an important variable to be taken into account for decision of location studies as preferences for different infrastructure elements differ between different business sectors. Hence, in a first step an email survey of airports worldwide helped to identify business sectors that were the preferred choice for the airport precinct and airport corridor. The identified business sectors: Business & Consumer Services, Information & Communications Technology, and Leisure & Tourism were used to identify companies in the four chosen airport regions for the interviews. Semi-structured interviews were conducted with decision-makers at all four study sites. Complementary economic development agencies were approached for in-depth
interviews to get a better understanding of the context regions and to reach triangulation and complementarity, as discussed in Chapter 4.

As discussed in the literature, location theory is more than 100 years old and has transformed from using a maximising production function to research about foreign direct investment, trade and cluster theories, and towards explaining the direct link between infrastructure and companies’ establishments. Researchers worldwide acknowledged that the economic world has changed in recent decades and new approaches are necessary to explain the relationship between infrastructure and decision of location. It was argued that the ‘built and business environment’ should be considered by applying location theory (McCann and Sheppard, 2003). Furthermore, it was theorised that a shift towards knowledge-intensive jobs will determine where companies are locating as they will follow the ‘creative class’, which is mobile and prefers locations with good social infrastructure (Florida, 2002, Florida, 2005, Florida, 2010, Florida, 2012). Moreover, it was assumed that companies in the twenty-first century need to be connected to an efficient transportation network and would therefore prefer locations inside the Airport City or Aerotropolis (Kasarda, 2008d, Kasarda, 2008e; Kasarda and Lindsay, 2011).

Following the literature review, in particular the new or ‘man-made’ built and business environment ‘Airport City’ and the role of the right workforce, or rather ‘creative class’, attracted attention while analysing the results of the interviews. Collected qualitative and quantitative data was analysed by using thematic, statistical and descriptive analysis.

This chapter is divided into eight parts (see Figure 27). After this introduction, the next section presents the results of the email survey, which led to the identification of the business sectors for the company interviews. Afterwards, the importance of physical and social infrastructure will be compared by presenting findings from the interviews by grouping physical and social infrastructure elements. The next four sections (6.4 to 6.7) show and discuss the results of the company interviews,
enhanced by the findings of the interviews with the economic development agencies, structured to answer the four research sub-questions:

(1) What is the role of airports as economic development infrastructure in the Airport Metropolis’ Region?

(2) What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?

(3) What is the role of social infrastructure for economic development in the Airport Metropolis’ Region?

(4) Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?

After answering the four research sub-questions in sections 6.4 (importance of airports), 6.5 (importance of other physical infrastructure elements), 6.6 (importance of social infrastructure) and 6.7 (spatial dimension of infrastructure elements), the chapter concludes, and then Chapter 7 presents additional findings about companies’ decision of location that enhance significantly the understanding of location decisions. Figure 27 gives a graphic overview of this chapter.
6.2 Business Preferences of Airports Worldwide

An important step for the interviews was to identify the business sectors as the literature has shown that infrastructure preferences for the location decision differ between industries. As explained in the methodology chapter (Chapter 4), 69 airports or airport groups from 29 countries were questioned with the aim to include airports from all parts of the world. The response rate was 54%. Thirty-seven airports or airport groups from 18 countries answered, among them the airports from the four regions that were introduced in Chapter 5 and in which the interviews for this research took place. The airports were asked to choose five business sectors from a list of 27 non-aviation related business sectors that they prefer to locate in the corridor between the city and the airport.

Twenty-four airports chose Leisure & Tourism, 23 Logistics, 19 Accommodation, Cafes and Restaurants, 18 Information and Communications Technology, 13...
Business & Consumer Services, directly followed by Education and Training and Renewable Energy, and followed by other sectors with smaller numbers.

‘Logistics’ and ‘Accommodation, Cafes and Restaurants’ were not chosen as it was thought that they are too ‘airport-related’, being the traditional industries that are found in airport proximities around the world. It was assumed that by choosing these airport-related industries, the main answers in terms of infrastructure preferences for the location decision would have been ‘airport’ without any other preferences for other infrastructure elements.

Therefore, companies of the business sectors Leisure & Tourism, Information & Communications Technology, and Business & Consumer Services were selected for the interview process (compare Chapter 4). By interviewing companies of these three business sectors in the four Airport Metropolis’ Regions in Dubai, Frankfurt, Abu Dhabi and Berlin, it was aimed to gain an understanding of the importance of various infrastructure elements for the decision of location of non-aviation related companies in the environment ‘Airport City’ and ‘Aerotropolis’.

6.3 Comparison of the Importance of Physical and Social Infrastructure

The research project sought to understand the importance of physical and social infrastructure elements for companies’ decision of location.

The literature review revealed many studies about the importance of physical or transport infrastructure and much less about the importance of social infrastructure. Nearly all economic development agencies did not consider social infrastructure as a decisive factor for the decision of location; five out of six stated that it has to be available in the wider metropolitan area. In contrast, one development agency expressed that soft factors, that is social infrastructure, are becoming more and more important for the decision of location.
Table 8 shows the overall importance of different infrastructure elements for the questioned companies’ decision-makers. The lower the sum value the more important was the infrastructure element for companies’ decision of location as ‘1’ signified ‘very important’, ‘2’ ‘important’, etc. (see interview guide in the Appendices). The table shows that parking possibilities (48), road access (51) and public transport (56) are the most important factors for decision of location. It is followed by airports (70), community service facilities (73), rail (80) and health access (95). Leisure (103), education (107) and religious facilities (112) were seen as least important for the decision of location.

### Table 8: Importance of different infrastructure elements

<table>
<thead>
<tr>
<th>Parking</th>
<th>Road</th>
<th>Public Transport</th>
<th>Airport</th>
<th>Community Services</th>
<th>Rail</th>
<th>Health</th>
<th>Leisure</th>
<th>Education</th>
<th>Religious facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum</td>
<td>48</td>
<td>51</td>
<td>56</td>
<td>70</td>
<td>73</td>
<td>80</td>
<td>95</td>
<td>103</td>
<td>107</td>
</tr>
<tr>
<td>Rank Order</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

Grouping the elements in physical and social infrastructure serves to show that physical infrastructure is in general more important than social infrastructure for the decision of location (Table 9).

### Table 9: Importance of physical and social infrastructure

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Infrastructure</td>
<td>33</td>
<td>490</td>
</tr>
<tr>
<td>Physical Infrastructure</td>
<td>33</td>
<td>305</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

Although companies emphasised the importance of physical infrastructure more for the decision of location than social infrastructure, in every location companies said that social infrastructure is important for their employees who are in close
proximity to the office location. In Abu Dhabi, 80% of the companies think that social infrastructure in close proximity to the workplace is important for their employees. In both German locations, 50% of the companies consider social infrastructure in close proximity to the workplace as important for the employees; while in Dubai 37.5% stated that they think it is important for employees. In Dubai and Berlin, companies that thought social infrastructure is not important, often said that the reason for this is that everything is in easy reach whereas Dubai is not large and Berlin is supported by a neighbourhood structure and public transport. Some of the companies that thought social infrastructure overall would not play any role for their employees mentioned the importance of childcare (Frankfurt) and health facilities (Dubai) being close to the office location.

The following sections discuss the importance of different infrastructure elements in more detail. In particular, the meaning in regard to Florida’s (2002) creative class theory and the significance of the context environment are important elements discussed.

6.4 Role of Airports as Economic Development Infrastructure

Kasarda (2011) argued that the Airport City or Aerotropolis is the new key business location – the place every company will choose as a location in the future because of accessibility, connectivity and speed.

All economic development agencies acknowledged the importance of airports for economic development. For the maximum acceptable distance to business location, they most often stated 50 km; or stated that time to reach the airport, depending on traffic jams or fast connection opportunities, is more important than distance. This is interesting as following Kasarda (2009) one could expect that a distance up to 50 km would be unacceptable as he defines the maximum distance for companies to the airport to be 32 km. The economic development agencies saw Airport Cities only as a factor for business location for companies who want to be
close to the airport or use it as a meeting or conference location. This shows that they do not expect that every company would like to be located in the Airport City in the future. One agency also mentioned that Airport Cities could be fascinating as a location for companies as they usually offer well-functioning infrastructure and multi-use areas. Hence, it was acknowledged that Airport Cities need more on offer than an airport and some office locations. The Airport City would

... need to focus on the ecosystem and make sure that provided ecosystem provides the company with the required environment that they are looking for.

... So basically, I would say two main things. The first one is make sure that the ecosystem is available in terms of being up-to-date infrastructure and on the other side providing incentives to all their related export and foreign trade relations. (Economic Development Agency 1, 2012)

Furthermore, it was acknowledged that other factors will be important if the layout of the Airport City and the provision of air traffic are becoming similar either nationally or even globally, as the following quote illustrates:

If the basic conditions of the airports at different locations are the same, then others factors getting more considered. Questions like wage level, employee rights, quality of the road system, availability of qualified employees, location of the competitors and existence of a market are becoming more important.

(Economic Development Agency 6, 2012)

Following the literature (Kasarda, 2008e, Uber, 2010, Kasarda and Lindsay, 2011), it could have been assumed that Airport Cities or business parks would be an exciting factor for the decision of location, but neither the economic development agencies overall nor the decision-makers of the companies agreed about this. Only 33.3% of the participants of the companies interviewed agreed that Airport Cities or proximity to business parks played a role in the decision of location (see interview guide question 10 in the Appendices and Table 10). Furthermore, it was found that the Airport City concept is widely unknown to industry and frequently had to be explained during the interview process. This is of high importance as marketing...
initiatives that are using the Airport City concept to attract non-aviation related companies could fail if the concept is unknown.

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>22</td>
<td>66.7</td>
</tr>
<tr>
<td>yes</td>
<td>11</td>
<td>33.3</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

The most common arguments against the Airport City as a location were higher prices and the assumption that it would be an artificial city without real life. The last argument is important as, following Florida’s (2002) creative class theory, companies would need more than transport infrastructure to decide on a location especially if one expects that companies today have a high percentage of knowledge workers. Following the creative class theory, these workers or ‘talents’ prefer high quality-of-life living and working locations (Florida, 2005, Florida, 2010, Kasarda and Lindsay, 2011, Florida, 2012). Statements of participants in two different environments confirm this argument:

Honestly, not really [considering the Airport City as a location]. The opposite, I know from another company, but that only as a side note, they were considering one location in the Airport City but decided against it. They say rightly, if we like to offer our talents something, then we must be located in real city proximity. An Airport City cannot really offer SOHO-like inspiring environments. This is critical to attract especially creative talent. (FB32/14)

I could imagine [to move there], if someone offers a concept with all kind of connection and living structures – it would be fatal if there would be a concrete city without life – so that employees could go for a coffee … that counts more and more for the quality of work as it fertilises the working

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9 Citations of interviews are displayed with a non-generic code for every interview to ensure anonymity.
process. Therefore, this city should not be sterile with skyscrapers, with towers
... should be lively, should be pleasant. (BL2/12)

These arguments were found often with companies in Germany. In Frankfurt, the Airport City was called repeatedly ‘artificial’ while in Berlin companies emphasised the missing ‘Kiez’ atmosphere, or what is best described as an integrated neighbourhood with all amenities. Findings indicate that companies in Germany follow Florida’s (2002) creative class theory much more than in the Middle East. Companies in Frankfurt that considered Berlin as a location are doing so because of the availability of the ‘right’ employees. Repeatedly, companies in Germany mentioned that Berlin is ‘hip’ and attracts a lot of young creative talents. Furthermore, it was mentioned that it is easier to get new national and international employees to Berlin because of Berlin’s reputation as cheap and hip and a cultural mecca.

In contrast, in the Middle East, companies emphasised more the importance of the location of the business centre at the Airport City to locate to the Airport City. But also in Berlin ‘clusters’ were mentioned as a decision factor for the Airport City. Interestingly, companies clearly distinguished between business agglomeration and cluster in a conventional way. In the Middle East, the business cluster or centre – meaning the agglomeration of business in general – was very important while in Berlin specialised business parks, like the one in Adlershof, were a location factor. Nevertheless, in Frankfurt companies explained that they would not move to Berlin because there business agglomeration is missing. In Dubai, more than half of the companies stated that the business centre would need to move to the Airport City to consider it as a location. Only one company considered Dubai World Central as a potential office location in the future. Similarly, in Berlin, the new airport and its Airport City hardly played any role for future decision of location although air connectivity was stated in general as important. The following statement from a company in Abu Dhabi illustrates the view that the Airport City has to be in a lively surrounding in the form of a business centre during business hours:
If you want to be corporate business only, you can be on the 12th floor on a remote island ... but the walk-ins are bringing the cash money, you need to be close to your clients ... We have one branch in [name of the business park deleted by the author to guarantee anonymity] Park ... after five/six o’clock you don’t find anyone ... During the day, have business going there, there is a niche, there is workers, but in the evening, there is nobody else. But a lot of companies that are there, industrials ... (AT3/28)

Especially in Abu Dhabi an interesting finding was that even for the companies that were already located in the Airport City, ‘Airport City’ was not the decisive factor; instead it was either the ‘free zone’ or they wanted to be part of Masdar City. Masdar City was important for them either because of the image as ‘greentec hub’ or because of cluster considerations as they found it beneficial to be close to other active companies and research centres in the renewable energy sector.

In all four sites, companies mentioned that the rental price would be a factor as to whether or not to move to the Airport City. It was widely assumed that rental prices would be higher than at the current location. The companies were not prepared to pay higher lease prices to be closer to the airport. This aspect is an important finding as many Airport City sites are leased for a premium price, as found in the literature (Conventz, 2010). In conclusion, with growing numbers of Airport Cities, airports have to be aware that non-aviation related companies are not ready to pay premium prices. This seems to manifest itself already as another study found lease prices up to 35% lower at the airport than in the corresponding CBD (Schubert and Conventz, 2011). As the argument for specialised business clusters or free zones shows, it was found that Airport Cities need to offer more or other incentives such as the ones combined with a free zone to attract companies to their precinct.

In Dubai and Frankfurt, companies considered the living place of their employees as important for a location decision. It was pointed out repeatedly that they would not move to an Airport City that is far away or difficult to access from the living places of their current employees. The theme of accessibility and connectivity was found in
all four locations. Companies explained the importance of being well connected physically and electronically. For instance, that Frankfurt is an internet node was mentioned frequently as a location advantage. As in Abu Dhabi, companies that are already located in the Airport City in Frankfurt did not move there because of the Airport City but for other reasons. In Frankfurt, both the combination of good physical and social infrastructure and also accessibility and connectivity were the reasons to locate inside the Airport City. Similar opinions about the importance of connectivity and accessibility were found in all four locations.

As the Airport City/Aerotropolis concept is still very young and as it was found that many participants never heard about the concept, a closer look at the importance of the airport itself is essential. Following the literature (e.g. Fox, 1996, Brueckner, 2003, Kasarda, 2008d), it could have been expected that the availability of air traffic would be an important factor for companies’ decision of location. Indeed, it was found that 72.7% acknowledged airports as either a ‘very important’ or ‘important’ factor for future decision of locations although 57.6% of the interviewed companies said that the airport was not a factor for the current location (Table 11 and Table 12).

Table 11: Influence of airport as factor for current location

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>19</td>
<td>57.6</td>
</tr>
<tr>
<td>yes</td>
<td>14</td>
<td>42.4</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results
Table 12: Airport importance for future decisions of location

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>very important</td>
<td>8</td>
<td>24.2</td>
<td>24.2</td>
</tr>
<tr>
<td>important</td>
<td>16</td>
<td>48.5</td>
<td>72.7</td>
</tr>
<tr>
<td>rather unimportant</td>
<td>6</td>
<td>18.2</td>
<td>90.9</td>
</tr>
<tr>
<td>not considered at all</td>
<td>3</td>
<td>9.1</td>
<td>100.0</td>
</tr>
<tr>
<td>total</td>
<td>33</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

Taking into account that some of the companies had decided a long time ago on their current location, it seems that the perception that airports are an important location factor in our globalised world is confirmed. This argument seems to hold true although in Dubai – the air traffic hub in the Middle East – only for 25% of the companies did the airport play a role for the current location (Table 13). Nevertheless, companies said frequently that the main criterion for a move to Dubai World Central would be the shift of the main air traffic from Dubai International Airport to the new Al Maktoum International Airport. In contrast, for all companies in Frankfurt, the airport had already played a role in the decision for the current location. But there seems to be a time component as well. In Frankfurt, the airport was important for all interviewed companies. In strong contrast, that was only the case for 25% of the companies in Dubai. One explanation would be that Frankfurt Airport has been established as an important airport for more than 50 years where Dubai has become an important hub airport only recently. Furthermore, it seems that Dubai functions as a business hub in general in the region, containing many more advantages than a well-connected airport.
Table 13: Airport as location factor for Abu Dhabi, Berlin, Dubai and Frankfurt

<table>
<thead>
<tr>
<th>Airport factor for location</th>
<th>Abu Dhabi</th>
<th>Berlin</th>
<th>Dubai</th>
<th>Frankfurt</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Count</td>
<td>4</td>
<td>9</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>% within City (study region)</td>
<td></td>
<td>80.0%</td>
<td>90.0%</td>
<td>75.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>yes</td>
<td>Count</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>% within City (study region)</td>
<td></td>
<td>20.0%</td>
<td>10.0%</td>
<td>25.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>5</td>
<td>10</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>% within City (study region)</td>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

It was often assumed in the literature that hub airports attract more companies in their precinct than do regional airports (e.g. Dennis, 1994, Bowen, 2000, Button, 2002). This study found that only for 36.4% of the participants did the role of the airport as a hub (Frankfurt, Dubai) or as a regional airport (Abu Dhabi, Berlin) play a role in the decision of location (Table 14). Nevertheless, it seems that for companies in the precinct of the big hubs Frankfurt and Dubai, airports as a location factor have much higher importance than in the two capitals Abu Dhabi and Berlin (Figure 28). This could indicate that hub airports indeed play a more important role as a pull factor for economic development.

Furthermore, in Abu Dhabi, only 20% of participants stated that the commercial airport was a factor for the location decision. Additionally, it was found that Al Bateen Executive Airport did not play any role for companies’ location decision. In general, it seemed that for companies in all locations it is more important that one airport is available in the region and that they are locally well connected to it instead of valuing a hub airport. For instance, companies in Frankfurt who considered Berlin as a location saw the growing air connectivity in Berlin as a supportive factor but emphasised the importance of connectivity between the city centre and the airport.
Table 14: Influence of airport type as factor for current location

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>21</td>
<td>63.6</td>
</tr>
<tr>
<td>yes</td>
<td>12</td>
<td>36.4</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

Figure 28: Airport importance in Abu Dhabi, Berlin, Dubai and Frankfurt (SPSS results retrieved from research results)
Interviews at three different companies in Berlin, Frankfurt and Abu Dhabi give a deeper insight into why the airport either is or is not an important factor for the decision of location:

If one makes decision of location, then one also has to consider that a company is developing further and then it is in general not a mistake to be close to an airport. If I know that my business is getting more internationally then I will need that at one point. Therefore, I locate somewhere where the company is easy accessible internationally. Company Berlin (BIC14/33)

... it’s [the airport] not the top priority. Much more it is important for us, that it is in general a transport hub and main junction. And therefore, as long-distance train and freeway junction, we have chosen Frankfurt. Company Frankfurt (FB8/32)

The primary factor was the city we are in; Masdar City is a cleantech hub for the region. And if Masdar City were 100 km away from the airport, we moved there. So, airport was not the deciding factor. Company Abu Dhabi (AB9/29)

It was found that the infrastructure element ‘airport’ is more important for bigger companies (Figure 29). Differences regarding the preferences for airports exist between different business sectors and nationalities of companies as well (Table 15). Because of the small sample size(s), results have to be read with caution. For all companies between 10,000 and 30,000 employees, the airport was ‘important’ or ‘very important’ as a decision of location factor (sample size: 7), while that was still found true for 77.7% of the companies with between 1000 and 10,000 employees (sample size: 9). In comparison, for the companies with up to 100 employees only 20% found the airport an important location factor (sample size: 5). This is readily understandable as bigger companies are usually located in different locations worldwide, which makes air connectivity much more crucial than for regional, smaller companies. This is in line with the literature as Button et al. (1995) also
found that bigger companies in general have a higher preference for air travel than smaller ones. Nevertheless, they divided the sample by number of employees in ranges from up to 10, 11 to 50 and larger than 50 while this study (apart from one exception) interviewed companies only with equal to or more than 50 employees.

Nevertheless, two points stand out from the results: Information & Communication Technology companies and American companies value airport infrastructure much more than companies of other business sectors or of different nationality, as in both cases the airport was for 100% of the sample an ‘important’ or ‘very important’ factor for the location decision. Similarly, Button et al. (1995) found that companies whose parent company was outside of the study area value air travel much more than local companies. This could explain the air traffic preference of American companies as the interviews took place in Germany and the UAE. Furthermore, it is
possible that American companies have a higher interest in flight connectivity as the USA is the ‘mother’ of aviation, and train use there, for example, is not as common as in Europe. Nevertheless, these last results should not be given too much weight as the sample size was rather small and a much bigger sample would need to validate these findings in the future. The preference for the airport of the Information & Communication Technology sector is interesting as the sector frequently is mentioned as an occupant of the Airport City (Kasarda, 2008e, Clark, 2011c). As Kasarda and Lindsay (2011) discovered, these are the companies that are heavily reliant on air traffic as they often produce aviation parts in other areas of the world and assemble them at yet another. Furthermore, these goods are usually of high value and are therefore transported more frequently by air than by other modes.

Table 15: Airport importance divided in regions, business sectors and nationalities of companies

<table>
<thead>
<tr>
<th>Airport importance for decision of location</th>
<th>Count</th>
<th>Count</th>
<th>Count</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>very important</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>important</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rather unimportant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>not considered at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>City (case study region)</th>
<th>Abu Dhabi</th>
<th>Berlin</th>
<th>Dubai</th>
<th>Frankfurt</th>
</tr>
</thead>
<tbody>
<tr>
<td>very important</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>important</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>rather unimportant</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>not considered at all</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Business sector</th>
<th>Business &amp; Consumer Services</th>
<th>Information &amp; Communications Technology</th>
<th>Leisure &amp; Tourism</th>
</tr>
</thead>
<tbody>
<tr>
<td>very important</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>important</td>
<td>7</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>rather unimportant</td>
<td></td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>not considered at all</td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nationality of company</th>
<th>American</th>
<th>American/UAE</th>
<th>British/American</th>
<th>Czech</th>
<th>German</th>
<th>German/Danish</th>
<th>Jordanian/UAE</th>
<th>Scandinavian/American</th>
<th>UAE</th>
<th>UAE/British</th>
</tr>
</thead>
<tbody>
<tr>
<td>very important</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>important</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>rather unimportant</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>not considered at all</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results
The economic development agencies assumed that Airport Cities would be an interesting location factor for companies that want to be close to the airport. However, it was found that there is no, or only a minor, relationship between preferences for airports and Airport Cities, as displayed in Table 16.

Table 16: Relationship between Airport Cities or business parks as factor for location and airport importance for decision of location

<table>
<thead>
<tr>
<th>Airport Cities or business parks factor for location</th>
<th>Airport importance for decision of location</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>very important</td>
<td>important</td>
</tr>
<tr>
<td>no</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>yes</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>16</td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

This research started with the hypothesis that airports as a location factor would need to offer more infrastructure elements than air connectivity in their precincts to attract non-aviation related companies. The following cross-tabulation shows the relationship between ‘airport importance’ and importance of the other infrastructure elements under investigation (Table 17). It can be observed that, if the preference is very high for airports, not many other elements are of relevance for the location decision. But if the airport is ‘just’ important, a relatively high importance for all other physical infrastructure elements could be found as well. But while social infrastructure does not seem to be of high importance in most cases, a closer look reveals that at least community service facilities and health facilities have some relevance. If the airport was ‘very important’ or ‘important’, approximately 50% found community service facilities ‘very important’ or ‘important’ as well. For health facilities this holds true for at least more or less 25%.

Research Results: Business Preferences of Airports and the Role of Infrastructure for Economic Development in the Airport Metropolis’ Region 205
Table 17: Relationship between airport importance and other infrastructure elements importance

<table>
<thead>
<tr>
<th>Infrastructure Element</th>
<th>Airport Importance for Decision of Location</th>
<th>Very Important</th>
<th>Count</th>
<th>Important</th>
<th>Count</th>
<th>Rather Unimportant</th>
<th>Count</th>
<th>Not Considered at All</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community service facilities importance for decision of location</td>
<td>very important</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>0</td>
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<td></td>
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<tr>
<td></td>
<td>important</td>
<td>3</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>rather unimportant</td>
<td>4</td>
<td>2</td>
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<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education facilities importance for decision of location</td>
<td>very important</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>0</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>rather unimportant</td>
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<td>0</td>
<td></td>
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<td></td>
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<td>3</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Health facilities importance for decision of location</td>
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<td>1</td>
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<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
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</tr>
<tr>
<td></td>
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<td>3</td>
<td>2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>not considered at all</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leisure facilities importance for decision of location</td>
<td>very important</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td>4</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>6</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>10</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking possibility importance for decision of location</td>
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<td>10</td>
<td>3</td>
<td>2</td>
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</tr>
<tr>
<td></td>
<td>important</td>
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<td>6</td>
<td>3</td>
<td>1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>not considered at all</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public transport importance for decision of location</td>
<td>very important</td>
<td>4</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>important</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>rather unimportant</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>not considered at all</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail importance for decision of location</td>
<td>very important</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>important</td>
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<td>8</td>
<td>2</td>
<td>2</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>rather unimportant</td>
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<td>1</td>
<td>0</td>
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<td></td>
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<td></td>
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<tr>
<td></td>
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<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious facilities importance for decision of location</td>
<td>very important</td>
<td>1</td>
<td>3</td>
<td>1</td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
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<td>4</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>Road access importance for decision of location</td>
<td>very important</td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td></td>
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<td></td>
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<tr>
<td></td>
<td>rather unimportant</td>
<td>1</td>
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<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

In sum, this means that companies whose airport preference is very high would be reasonably easy to attract to the Airport City as availability of air travel is their first priority for the location decision, just as it is for aviation-related companies. On the other hand, if the companies value the possibility of air travel but it is not of paramount importance to them, then other factors can help to attract companies to the precinct of Airport Cities. The next sections will disentangle the relevance of every infrastructure element in more detail.
6.5 Role of other Physical Infrastructure Elements for Companies’ Decision of Location

![Pie charts for physical infrastructure elements importance (SPSS results retrieved from research results)](image)

- Parking Possibilities Importance
- Road Access Importance
- Public Transport Importance
- Railway Access Importance

Figure 30: Pie charts for physical infrastructure elements importance (SPSS results retrieved from research results)
The differences for the importance of physical infrastructure elements for the location decision are displayed in Figure 30. For the whole of the sample, parking possibilities comprised the most important infrastructure element for the decision of location. For 93.9% of the companies parking possibilities are ‘important’ or ‘very important’ for the decision of location (Table 18).

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>very important</td>
<td>21</td>
<td>63.6</td>
<td>63.6</td>
<td>63.6</td>
</tr>
<tr>
<td>important</td>
<td>10</td>
<td>30.3</td>
<td>30.3</td>
<td>93.9</td>
</tr>
<tr>
<td>rather unimportant</td>
<td>1</td>
<td>3.0</td>
<td>3.0</td>
<td>97.0</td>
</tr>
<tr>
<td>not considered at all</td>
<td>1</td>
<td>3.0</td>
<td>3.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

Special attention needs to be given to the answers of ‘rather unimportant’ and ‘not considered at all’. The company that stated that parking is ‘not considered at all’, emphasised the use of the car in the UAE and mentioned that it is not considered as a location factor as every new office location in Dubai needs to offer parking facilities. Hence, if that would not be the case, parking would be an important location decision. This is an important finding reached through the qualitative data as the pure quantitative data would have been easily misinterpreted. Even more thought-provoking is the answer of the company in Berlin that answered that it is ‘rather unimportant’ – parking was not considered important because 95% of the employees were using public transport.

For more than 80% of the interview sample, public transport is ‘important’ or ‘very important’ for the decision of location. The distribution of public transport importance is shown in Table 19. Five of the six companies that have chosen ‘rather unimportant’ or ‘not considered at all’ are companies in the car-oriented United Arab Emirates. As one of the participants stated:

Everybody that I know has a car. (DT7/1)
Other reasons that were mentioned why public transport is not considered important for the location decision were the hot and humid weather, that public transport is not appropriate for Executives, that public transport is a relatively new development in the UAE, and the absence of a network. In Dubai, so far only two metro lines exist, and the participants considered these inappropriate as another transport option would be usually necessary to reach the final destination. In that context, the problem of finding a taxi at peak hours is the reason why people prefer using their own car. One participant made it clear that they would prefer a location with public transport, but as they have chosen Abu Dhabi – because of Masdar City – as office location, it was clear that there would not be an option of a location that offers public transport as it hardly exists in Abu Dhabi. Nevertheless, if a comparable location would have been available with public transport they would have preferred that location. Even more noteworthy is the following statement of a company in Abu Dhabi which sheds some light on why public transport can nevertheless be considered important in a car-oriented country like the UAE:

Some of them [the employees] come to this country and they don’t drive. They don’t know how to drive. They are forced [to use public transport] and they are used to public transport, countries like India or China. (AB15/26)

This is an important argument as it shows that a location factor sometimes not considered important for Executives could be very important in attracting the ‘right’ workforce.

Table 19: Public transport importance for decision of location

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>very important</td>
<td>19</td>
<td>57.6</td>
<td>57.6</td>
<td>57.6</td>
</tr>
<tr>
<td>important</td>
<td>8</td>
<td>24.2</td>
<td>24.2</td>
<td>81.8</td>
</tr>
<tr>
<td>rather unimportant</td>
<td>3</td>
<td>9.1</td>
<td>9.1</td>
<td>90.9</td>
</tr>
<tr>
<td>not considered at all</td>
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<td>9.1</td>
<td>9.1</td>
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</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results
While public transport has a rudimentary existence in the UAE, no regional rail service exists. In contrast, Frankfurt and Berlin are excellently connected by regional and high-speed trains. For more than 60% of the companies, railway access is ‘important’ or ‘very important’ for the decision of location (Table 20). This is a surprising finding especially as no rail network exists in the United Arab Emirates at the moment. This is mirrored in the results as 62.5% of the participants who stated ‘not considered at all’ are from companies located in the Emirates. Nevertheless, two companies in Dubai clarified that access to rail is not considered as important as it is non-existent at the moment. Another company in Abu Dhabi explained that they would expect that the rail station would be well connected by public transport and they therefore would not consider the distance to the rail station itself but to the feeder system, for instance the bus stop. Several German companies answered ‘rather unimportant’ but have chosen a rather small acceptable distance with one participant stating ‘walking distance’ and two others ‘not more than 5 km’. Both types of answers, in the Middle East and in Germany, show that there is an underlying perception that there would be either a feeder system and therefore the train station per se does not play a role for the location (Middle East) or that train stations are comprehensively available (Germany).

Both types of answers put the original answers of the participants that railway access is not important for the location decision in a different light and this could not have been revealed in a purely quantitative study.

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
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<td>7</td>
<td>21.2</td>
<td>21.2</td>
<td>21.2</td>
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<tr>
<td>important</td>
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<tr>
<td>not considered at all</td>
<td>8</td>
<td>24.2</td>
<td>24.2</td>
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<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results
The preferences for public transport and railway access have shown clearly how important it is to consider the environment where the location decision is taking place. For the question of the importance of road access, the question itself had to be slightly modified to consider the environment. In Germany, ‘road access’ meant freeway or highway access, while in the Middle East it also included an ordinary road. This distinction was necessary as ordinary road access in Germany is available everywhere while in Dubai and Abu Dhabi it is common that a new office building or business park will open without proper road access. Nevertheless, for more than 85% of the whole sample, road access was ‘important’ or ‘very important’ for the decision of location (Table 21). Noticeably, all companies that answered ‘rather unimportant’ or ‘not considered at all’ are located in Germany – 75% in Berlin. Similar to what was seen for the answers for the importance of parking possibilities, the importance of the use of the automobile in the United Arab Emirates was obvious. Two opposite statements from Berlin and Abu Dhabi show very clearly the contrasting opinions about the importance of road access:

It’s not really important [road access]. The company emphasises more push bikes and public transport or at least that’s what’s emphasised ...

Company Berlin (BT1/31)

... I have been on this side [of the city] since 2007 – no traffic, parking is available. There are certain things which play a role. You want to avoid traffic, congestion. You want to avoid parking issues ... We have chosen this one as it is convenient for everyone [in the team]. Company Abu Dhabi (AB15/26)
Table 21: Road access importance for decision of location

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
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</thead>
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<tr>
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<td>63.6</td>
<td>63.6</td>
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<tr>
<td>Important</td>
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<td>24.2</td>
<td>24.2</td>
<td>87.9</td>
</tr>
<tr>
<td>rather unimportant</td>
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<td>not considered at all</td>
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<tr>
<td>Total</td>
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<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

In stark contrast to Fox’s (1996) assumption that telecommunication would become a location factor for only a small group of firms, reliable information and telecommunication technology was important for all interviewed firms. Companies in Frankfurt mentioned numerous times the excellent internet connectivity as one reason for Frankfurt as location. In contrast, companies in Berlin and Abu Dhabi mentioned a few times problems with connectivity. The following statement shows the importance of electronic connectivity in the twenty-first century:

It’s very, very important to have the best IT-connections. (AT3/28)
6.6 Role of Social Infrastructure for Companies’ Decision of Location

- Community Service Facilities Importance
- Education Facilities Importance
- Leisure Facilities Importance

- very important
- Important
- rather unimportant
- not considered at all
The differences for the importance of physical infrastructure elements for the location decision are displayed in Figure 31. Community service facilities were the most important social infrastructure element for the decision of location. For 63.3% of the companies, community service facilities are ‘important’ or ‘very important’ for the decision of location (Table 22).
Table 22: Community service facilities importance for decision of location

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>11</td>
<td>33.3</td>
<td>33.3</td>
<td>63.6</td>
</tr>
<tr>
<td>rather unimportant</td>
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<td>21.2</td>
<td>21.2</td>
<td>84.8</td>
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<tr>
<td>not considered at all</td>
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<td>15.2</td>
<td>15.2</td>
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</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

In the group of the 12 companies that stated that community service facilities are ‘rather unimportant’ or ‘not important at all’, Berlin, Dubai and Abu Dhabi are equally included (two companies each), but 50% of the companies are located in Frankfurt. Interestingly, for 33.3% of these companies that stated ‘rather unimportant’, ‘walking distance’ was the preferred distance. This response could be a hint that community service facilities are not a ‘must to have’ but a ‘nice to have’ criterion for the decision of location, similar to what was discussed occasionally in the literature about quality-of-life. A company in Berlin explained that they got used to the availability of community service facilities in close proximity to the office and that therefore it had become a location factor for them:

With that [social infrastructure] it is that if you had it once, then you don’t want to miss it any more. We have here a medical centre with all kind of doctors, ATMs for sure … restaurants are also important, because you don’t want to drive to go for lunch or taking out guests. These are the things if you got used to them, they are becoming very important … by now, it would be impossible for us to move to a location where these things would be worse … The whole culinary field doesn’t work here really so far, but that is, someone told me … because here is no demand for restaurants in the evenings as no one lives here, it is really only a workplace area without residential and that of course, doesn’t attract any very good coffee shops or restaurants … (BIC14/33)

The last statement is interesting as it appears to support a mixed-use Airport City development including residential areas. Nevertheless, the Squaire in Frankfurt and
Dubai’s International Financial City have a wide range of culinary choices even though they are typically business parks without residential areas. The different perception of how to use these culinary options is interesting. In Germany, companies emphasised the importance of food options as lunch options for their employees (confirming the findings of Conventz [2010]), while in the Middle East the importance of food options was also seen as a meeting facility with clients. Weak evidence was found that companies coming more recently to the location have a higher preference for community service facilities than others, confirming the findings of Kimelberg and Nicoll (2012).

Health facilities are the second most important social infrastructure element for the decision of location. Nevertheless, only for 36.4% of the companies health facilities are ‘important’ or ‘very important’ for the decision of location. For more than 40%, they are ‘not considered at all’ for the decision of location (Table 23). This is similar to the findings in the literature where only some weak evidence for the importance of health facilities was found (Moreno et al., 1997, Love and Crompton, 1999).

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Per cent</th>
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<th>Cumulative Per cent</th>
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<tr>
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<td>3.0</td>
</tr>
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<td>6.1</td>
</tr>
<tr>
<td>important</td>
<td>10</td>
<td>30.3</td>
<td>30.3</td>
</tr>
<tr>
<td>rather unimportant</td>
<td>6</td>
<td>18.2</td>
<td>18.2</td>
</tr>
<tr>
<td>not considered at all</td>
<td>14</td>
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<td>33</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

Nevertheless, a closer look at the qualitative data revealed some interesting insights and confirmed once more how important it is to take perception and the environment into account. Several companies mentioned that they do not consider health facilities as important for the location decision as they expect that these are naturally available in a metropolitan area. Especially in Berlin, companies pointed to
the excellent public transport system and the neighbourhood (Kiez) structure of the city while explaining that social infrastructure elements are always in easy reach. Other companies admitted that it would be a ‘nice to have’ and that they think that health facilities in close office proximity are important for their employees. In Dubai, one company mentioned that the workers are all young, healthy expatriates and therefore the availability of health facilities is not of high importance in Dubai.

The insight into the qualitative data shows that the results of the quantitative data are somehow misleading. Health facilities are of much higher importance at the office location than the numbers would indicate. If an Airport City is built outside of an urban centre, health facilities in close proximity would be of high importance. Furthermore, it would be important to ask employees or future employees about their preferences as quite a few companies admitted that they do not consider it as important for the location decision but think that it is important for their employees. Following Florida’s (2002) creative class theory, it would be paramount to satisfy the needs of the creative class in any future Airport City.

Findings for the importance of education facilities are similar to the findings for health facilities’ importance (Table 24). For more than 50% of the companies, education facilities are ‘not considered at all’ for the decision of location but many companies mentioned that they would be naturally available in a metropolitan area, which shows that they value education facilities nevertheless for the location decision to a certain degree.

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>very important</td>
<td>3</td>
<td>9.1</td>
<td>9.1</td>
<td>9.1</td>
</tr>
<tr>
<td>important</td>
<td>4</td>
<td>12.1</td>
<td>12.1</td>
<td>21.2</td>
</tr>
<tr>
<td>rather unimportant</td>
<td>8</td>
<td>24.2</td>
<td>24.2</td>
<td>45.5</td>
</tr>
<tr>
<td>not considered at all</td>
<td>18</td>
<td>54.5</td>
<td>54.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results
This result confirms the literature findings (Moreno et al., 1997, Audretsch et al., 2005, Kimelberg and Nicoll, 2012), as most studies found no influence of education facilities but a positive influence was found for high-technology start-ups and bigger universities. Nevertheless, a few answers of participants who stated ‘not considered at all’ reveal that education facilities are not considered as these participants expect that this element is readily available in the wider metropolitan area. Also, they consider the element more important for their employees and families at the living location. Therefore, in most cases, they consider education facilities more important in proximity to the living location of the employees as not many companies expect that employees would move because of a change of the office location. Nevertheless, some companies stated that they would not relocate to a location that is far away from the living location of their current workforce as they would be afraid to lose them. This shows that companies are aware of the increasing importance of the production factor ‘workforce’. Hence, it is very important for any Airport City set-up to put in place the ‘right’ conditions for this workforce – especially important in countries with full employment or a skills shortage such as Australia or Germany.

For companies that found education facilities important for the location decision, a wide range of reasons was named. Some emphasised the importance for the employees, especially in the form of childcare facilities. One company in Abu Dhabi mentioned that this is a location factor, not because it is important for the company per se but because it allowed them to reach potential clients as they walked by. Some confirmed the importance of being close to a university due to positive spillover effects. The close proximity to a university helps with research and the recruitment of future employees.

For more than 70% of the companies leisure facilities are ‘rather unimportant’ or ‘not considered at all’ for the decision of location (Table 25). This is contrary to the literature as two more recent studies (Maoh and Kanaroglou, 2009, Kimelberg and Nicoll, 2012) found some evidence of the importance of leisure facilities for the
decision of location. A possible explanation is that the two studies were conducted in the USA and therefore perceptions of decision-makers were different. Nevertheless, both studies found only weak evidence for some leisure facilities.

Table 25: Leisure facilities importance for decision of location

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>very important</td>
<td>2</td>
<td>6.1</td>
<td>6.1</td>
<td>6.1</td>
</tr>
<tr>
<td>important</td>
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<td>21.2</td>
<td>21.2</td>
<td>27.3</td>
</tr>
<tr>
<td>rather unimportant</td>
<td>9</td>
<td>27.3</td>
<td>27.3</td>
<td>54.5</td>
</tr>
<tr>
<td>not considered at all</td>
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</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

It is noteworthy that both companies that have chosen ‘very important’ are located in Dubai. One company explained their choice with the following statement.

It is very critical to ensure that colleagues are happy and satisfied. (DLT6/5)

Also in the group of companies that have chosen ‘important’, the argument that leisure facilities are important to attract and hold the right workforce was found several times. One company explained that ‘people do not stay without’ (AB2/17) especially as ‘natural’ leisure activities, like caring for their own house and garden, as a result of the foreign ownership restrictions, are non-existent in the UAE for the big contingent of expatriates. Nevertheless, one company in Abu Dhabi explained the non-importance of leisure facilities also with the argument that the workforce in the UAE are mostly expatriates:

For the employees [it] doesn’t really matter, because we are all expatriates here. Doesn’t affect our life. We are, most of us are here, to do this job, so, you are not here to live. Really, when you see all the labour laws, they are in generally not made for you to come and be comfortable. It’s for you to come and work. I lived in the States before and it is different. I came here and there is a difference. It’s a set-up, like you are an expatriate, you work for 20-30
years and then, they kick you out – finished ... you cannot own an apartment ...
so, you have to go! (AT3/28)

In contrast, some companies acknowledged that entertainment facilities are even
more important in the UAE as environmental infrastructure in form of outdoor
activities is missing. In contrast, one company in Berlin emphasised the beautiful
natural environment of Berlin and its surrounds as a location advantage.

A company in Germany confirmed Florida’s (2002) creative class theory as they
explained that they needed to attract talents and that these people prefer a
working place at a location with all kinds of leisure facilities available:

That is of great significance. That is really very important ... our only capital is
human capital. We need appropriate input or rather opportunities to let off
steam – the one or the other. Hence, the supply must be appropriate.
(FB32/14)

Another German company made an interesting distinction:

A gym would be important ... but movie theatre, culture facilities, theatre, etc.
are different. These can be further away as a separation from work and leisure
time is important. That can be also a spatial separation. (BC9/24)

This quote shows well that Germans prefer in general a greater separation between
working and living location. An Airport City, as in South Korea or Dubai, with
integrated residential areas would be rather unthinkable in a German context. For
instance, one company in Berlin remarked that the inclusion of residential areas at
the airport, how incorporated in Kasarda’s Aerotropolis concept, is in strong
contrast to the air traffic routes and air traffic noise arguments in Berlin in relation
to the construction of the new airport.

In terms of residential areas, the competitive housing market as a location factor for
Berlin was investigated. Results confirmed the findings in the literature that
affordable housing can become a ‘hard’ factor for the location as lower wages can be paid as a consequence (Love and Crompton, 1999; Spars et al., 2009; Kimelberg and Nicoll, 2012). Several companies in Berlin confirmed that the low rental prices were a location factor for locating in Berlin. Therefore, affordable housing would be a location factor for Airport Cities but it would be questionable if in a German context these should be established inside the Airport City as discussed in earlier chapters and above. Generally, Germans are considered much more noise-sensitive than, for example, Asians.

In general, the importance of a gym close by was mentioned several times in all four locations, even when leisure facilities in general were not considered important or not available, as the next quote demonstrates:

> It's very difficult here in Abu Dhabi, just so different ... even down in the city, in the Corniche to the heart of the city, very few people consider that, exercising all that kind of stuff. When I was back in the States, they had, they moved from one location to another where they had gym facilities. A gym would be great. I just see it as a real benefit, if there is a gym close by. (AB9/29)

The importance of taking the environment into account became very obvious for the question of importance of religious facilities. For more than 75% of the companies, religious facilities were ‘not considered at all’ for the decision of location (Table 26). Six of the seven companies that emphasised religious facilities as important were located in the United Arab Emirates. Hence, religious facilities could be an important success factor for the Airport Metropolis’ Region if it aims to attract companies with large groups of worshipping employees.
Table 26: Religious facilities importance for decision of location

<table>
<thead>
<tr>
<th>Valid</th>
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<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>very important</td>
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<td>15.2</td>
<td>15.2</td>
<td>15.2</td>
</tr>
<tr>
<td>important</td>
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<td>6.1</td>
<td>21.2</td>
</tr>
<tr>
<td>rather unimportant</td>
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<td>3.0</td>
<td>3.0</td>
<td>24.2</td>
</tr>
<tr>
<td>not considered at all</td>
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<td>75.8</td>
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<td>Total</td>
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<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

6.7 Spatial Infrastructure Requirements to Stimulate Economic Development in the Airport Metropolis’ Region

One major contribution of this thesis is to define where infrastructure needs to be located to stimulate economic development in the Airport City or Airport Metropolis’ precinct. Very few studies to date have tried to pinpoint the spatial distribution of infrastructure elements.

For this research, companies were asked about the maximum acceptable distance to the office location for each physical or social infrastructure element. Table 27 shows the mean (average), median (numerical value separating the higher half of a sample from the lower half) and mode (value that appears most often) for each infrastructure element.

A closer look at the medians reveals that parking, public transport, religious facilities and community service facilities have to be in walking distance if they are to be considered important for the location decision. For religious facilities it is important to remember that only seven out of 33 companies found religious facilities important at all (compare Section 6.6).

For road access, the median value is a little bit misleading as in the UAE the question was taken to mean any kind of road access (therefore the mode of 100 m) while in Germany it meant freeway or highway access (compare Section 6.5).
Nevertheless, also with an average value of 4.6 km, road access still has to be reasonably close for all locations. Also rail and health facilities should not be further away than 5 km. Education and leisure facilities have to be available but only in a distance of 7.5 or 8.5 km. Airports can be 20 km away, which seems contradictory to the Airport City concept but is in line with the Aerotropolis schema defined by Kasarda (Kasarda, 2009). It also reflects the common answer of 30 minutes (when participants measured the distance in time instead of metric units) as a 20-kilometre drive by car would take approximately 30 minutes.

The finding for education facilities is interesting. Audretsch et. al (2005) found a median of 7 km for the distance between universities and company locations. This thesis confirms these findings as the desired median for education facilities in general is 7.5 km.

To take the ‘environment’ into account, it was tested as to whether there are significant differences between the preferred distances for each infrastructure element between the different context regions. As the main assumption for parametric tests, that is normal distribution, was not given, the researcher used Mann-Whitney U Tests and Kruskal-Wallis t-Tests. The main difference between the two tests is that with the Kruskal-Wallis t-Test three or more groups can be compared and the mean value is used instead of the median, which is used by the Mann-Whitney U Test (Pallant, 2011).

As there is no non-parametric alternative for a multivariate analysis of variance, the relationship between the four different sites and each business sector could not be tested. But as the samples for every business sector in every context region are very small, significant differences would have been interpreted regardless with great caution. These tests would be interesting in future research with large- and normal-distributed sample sizes.
The next sub-sections show in greater detail the frequencies for distances of different infrastructure elements. Significant differences with Mann-Whitney U-Tests and Kruskal-Wallis Tests were found only for ‘road access’ and ‘health facilities’.
Table 27: Acceptable distance of infrastructure elements to location

<table>
<thead>
<tr>
<th>N</th>
<th>Acceptable distance of airports to location</th>
<th>Acceptable distance of community service facilities to location</th>
<th>Acceptable distance of education facilities to location</th>
<th>Acceptable distance of health facilities to location</th>
<th>Acceptable distance of leisure facilities to location</th>
<th>Acceptable distance of parking possibilities to location</th>
<th>Acceptable distance of public transport to location</th>
<th>Acceptable distance of rail station to location</th>
<th>Acceptable distance of religious facilities to location</th>
<th>Acceptable distance of road access to location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
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<td>25</td>
<td>12</td>
<td>16</td>
<td>16</td>
<td>33</td>
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<td>19</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>Missing</td>
<td>10</td>
<td>8</td>
<td>21</td>
<td>17</td>
<td>17</td>
<td>0</td>
<td>6</td>
<td>14</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Median</td>
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<td>7.5000</td>
<td>5.0000</td>
<td>8.5000</td>
<td>.10</td>
<td>1.000</td>
<td>5.0000</td>
<td>.1000</td>
<td>2.5000</td>
</tr>
<tr>
<td>Mode</td>
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<td>1.0000</td>
<td>10.00</td>
<td>5.0000</td>
<td>2.000</td>
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<td>1.000</td>
<td>5.0000</td>
<td>.1000</td>
<td>.1000</td>
</tr>
</tbody>
</table>

a. Multiple modes exist. The smallest value is shown

Source: SPSS results retrieved from research results
In the following, the results for the preferred distance of the different infrastructure elements will be reported in the order of their importance, found in 6.3:

- parking
- road access
- public transport
- airports
- community service facilities
- railway access
- health facilities
- leisure facilities
- education facilities
- religious facilities

The display of the mean, mode and median for the preferred distances of different infrastructure elements revealed interesting differences. While some infrastructure elements such as parking, public transport, religious and community service facilities have to be in walking distance, others can be further away, such as airports. The next sections will have a closer look at each infrastructure element under investigation and its spatial distribution.

6.7.1 Parking possibilities

Parking possibilities are a location factor for all interviewed companies. More than 60% of the companies want parking ‘direct’, either directly in front of the house or in the basement, while 97% want to have it at least in walking distance, i.e. a maximum of 1 km (Table 28 and Figure 32). This is understandable, especially in the context of the hot and humid weather of the United Arab Emirates. Many participants in the UAE emphasised the use of the car because of the weather conditions. Interestingly, one participant in Dubai (of Indian origin) mentioned the importance of good pathways, because

... at least eight months in the year you can walk easily outside. (DB38/10)

In contrast, another interviewee in Dubai, an Emirati national, mentioned that in Dubai people do not have a culture of walking and pathways are often non-existent.
Some German interviewees mentioned the importance of pushbikes and that public transport is more important than access by automobile. Hence, the cultural background of the decision-maker was found to be important for the perception of the importance of different infrastructure elements. It was also found important during the interviewee process to define ‘walking distance’ as for interviewees of American origin, for instance, this usually meant around 100 m while some interviewees of German origin found a distance of 2 km still walkable.

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>.10</td>
<td>20</td>
<td>60.6</td>
<td>60.6</td>
<td>60.6</td>
</tr>
<tr>
<td>.20</td>
<td>1</td>
<td>3.0</td>
<td>3.0</td>
<td>63.6</td>
</tr>
<tr>
<td>.50</td>
<td>7</td>
<td>21.2</td>
<td>21.2</td>
<td>84.8</td>
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</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results
6.7.2 Road access

As described above, the results for ‘road access’ have to take into account that road access meant in the UAE context every kind of road access while in Germany the importance of freeway and/or highway access was investigated. For 50% of the companies, road access has to be in a distance of not more than 2 km (Table 29 and Figure 33). Interestingly, 36% of these companies are located in Germany. One company in Frankfurt chose even for the freeway or highway access a distance of 100 m.
Table 29: Acceptable distance of road access to location

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.10</td>
<td>7</td>
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<tr>
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<td>3.0</td>
<td>3.6</td>
<td>53.6</td>
</tr>
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<td>5.00</td>
<td>6</td>
<td>18.2</td>
<td>21.4</td>
<td>75.0</td>
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<tr>
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<td>78.6</td>
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<td>12.1</td>
<td>14.3</td>
<td>92.9</td>
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<tr>
<td>15.00</td>
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<td>3.0</td>
<td>3.6</td>
<td>96.4</td>
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<td>20.00</td>
<td>1</td>
<td>3.0</td>
<td>3.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
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<td>84.8</td>
<td>100.0</td>
<td></td>
</tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td>no answer or time</td>
<td>3</td>
<td>9.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not applicable as importance answer was not considered at all</td>
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<td>6.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>15.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

Figure 33: Histogram of acceptable distance of road access to location (SPSS results retrieved from research results)
More significant differences between the context regions and their preferences regarding the distance for road access were found with Kruskal-Wallis and Mann-Whitney U tests.

A Kruskal-Wallis Test revealed a statistically significant difference in road access levels across the four different study sites (Gp1, n=5: Abu Dhabi; Gp2, n=9: Berlin; Gp3, n=5: Dubai; Gp3, n=9: Frankfurt), $\chi^2(3, n=28)=13.07$, $p=.004$. The Dubai group recorded a much lower median score (Md=0.1) than Berlin, Frankfurt (Md=5) and Abu Dhabi (Md=2) (Figure 34). While the difference to the German areas is easily explainable by the modified question (ordinary road access vs. freeway and/or highway access), the difference to Abu Dhabi is surprising. It could either mean that direct road access is more valued in Dubai or that problems of missing road connectivity of new office buildings in Dubai are more common than in Abu Dhabi. Furthermore, in Abu Dhabi, a few of the participating companies were located in Masdar City – a greentec development where the use of private vehicles inside the development is forbidden. It is possible that these companies gave a higher acceptable distance due to perception. Future locations in Masdar City will not be directly accessible by private car (at the time of the interviews, companies were located in auxiliary container villages with private parking at the doorstep).

Mann-Whitney U Tests revealed significant differences in road access levels between Berlin (Md=5, n=9) and Abu Dhabi (Md=2, n=5), $U= 5.5$, $z=-2.32$, $p=.020$, $r=0.6$ (large effect) (Figure 35 and Figure 36), between Berlin (Md=5, n=9) and Dubai (Md=0.1, n=5), $U= 0.0$, $z=-3.05$, $p=.002$, $r=0.8$ (large effect) (Figure 35 and Figure 37) and between Frankfurt (Md=5, n=9) and Dubai (Md=0.1, n=5), $U= 4.0$, $z=-2.53$, $p=.011$, $r=0.7$ (large effect) (Figure 35 and Figure 38). These differences are understandable, taking the different emphasis on the question for the Middle East and Germany into account.
<table>
<thead>
<tr>
<th>Acceptable distance of road access to location</th>
<th>Abu Dhabi</th>
<th>Berlin</th>
<th>Dubai</th>
<th>Frankfurt</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td>N</td>
<td>Mean Rank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abu Dhabi</td>
<td>5</td>
<td>10.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berlin</td>
<td>9</td>
<td>19.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dubai</td>
<td>5</td>
<td>5.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frankfurt</td>
<td>9</td>
<td>16.89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Test Statistics**

<table>
<thead>
<tr>
<th>Acceptable distance of road access to location</th>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch. W. Test</td>
<td>13.074</td>
<td>3</td>
<td>.004</td>
</tr>
</tbody>
</table>

a. Kruskal Wallis Test
b. Grouping Variable: City

Figure 34: Results of a Kruskal-Wallis Test of road access between the four case regions (SPSS results retrieved from research results)

<table>
<thead>
<tr>
<th>Acceptable distance of road access to location</th>
<th>City</th>
<th>N</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abu Dhabi</td>
<td>5</td>
<td></td>
<td>2.0000</td>
</tr>
<tr>
<td>Berlin</td>
<td>9</td>
<td></td>
<td>5.0000</td>
</tr>
<tr>
<td>Dubai</td>
<td>5</td>
<td></td>
<td>1.0000</td>
</tr>
<tr>
<td>Frankfurt</td>
<td>9</td>
<td></td>
<td>5.0000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28</strong></td>
<td></td>
<td><strong>2.5000</strong></td>
</tr>
</tbody>
</table>

Figure 35: Report of medians for distance to road access (SPSS results retrieved from research results)
### Test Statistics

<table>
<thead>
<tr>
<th></th>
<th>Acceptable distance of road access to location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>5.500</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>20.500</td>
</tr>
<tr>
<td>Z</td>
<td>-2.324</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.020</td>
</tr>
<tr>
<td>Exact Sig. [2*(1-tailed Sig.)]</td>
<td>.019&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

a. Grouping Variable: City  
b. Not corrected for ties.

**Figure 36: Results of a Mann-Whitney U Test of road access between Berlin and Abu Dhabi (SPSS results retrieved from research results)**

### Test Statistics

<table>
<thead>
<tr>
<th></th>
<th>Acceptable distance of road access to location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>.000</td>
</tr>
<tr>
<td>Wilcoxon W</td>
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</tr>
<tr>
<td>Z</td>
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</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
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</tr>
<tr>
<td>Exact Sig. [2*(1-tailed Sig.)]</td>
<td>.001&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

a. Grouping Variable: City  
b. Not corrected for ties.

**Figure 37: Results of a Mann-Whitney U Test of road access between Berlin and Dubai (SPSS results retrieved from research results)**

### Test Statistics

<table>
<thead>
<tr>
<th></th>
<th>Acceptable distance of road access to location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>4.000</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>19.000</td>
</tr>
<tr>
<td>Z</td>
<td>-2.529</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.011</td>
</tr>
<tr>
<td>Exact Sig. [2*(1-tailed Sig.)]</td>
<td>.012&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

a. Grouping Variable: City  
b. Not corrected for ties.

**Figure 38: Results of a Mann-Whitney U Test of road access between Frankfurt and Dubai (SPSS results retrieved from research results)**
6.7.3 Public transport

More than 85% of the companies need public transport in walking distance or in a maximum distance of 1 km (Table 30 and Figure 39). Nearly 20% of participants found it important even to have the next bus or metro stop no further away than 100 m. These findings have important implications for the built environment of the Airport City. For example, it is not enough to have one metro or bus stop at the entrance of the Airport City, but a well-established network inside the Airport City in close proximity to office locations will be necessary.

Table 30: Acceptable distance of public transport to location

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
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<td>.10</td>
<td>5</td>
<td>15.2</td>
<td>18.5</td>
</tr>
<tr>
<td>.25</td>
<td>1</td>
<td>3.0</td>
<td>3.7</td>
</tr>
<tr>
<td>.50</td>
<td>6</td>
<td>18.2</td>
<td>22.2</td>
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<td>3.7</td>
</tr>
<tr>
<td>1.00</td>
<td>10</td>
<td>30.3</td>
<td>37.0</td>
</tr>
<tr>
<td>2.00</td>
<td>2</td>
<td>6.1</td>
<td>7.4</td>
</tr>
<tr>
<td>5.00</td>
<td>2</td>
<td>6.1</td>
<td>7.4</td>
</tr>
<tr>
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<td>9.1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results
6.7.4 Airports

In the Airport City context, it could have been expected that the airport is an important location factor and that companies would prefer to locate in close proximity. Table 31 and Figure 40 show that the preference for distance of the location to airports is very widespread among the interviewees. Nevertheless, 50 km has the highest frequency, followed by 20 km and 30 km. However, more than 50% of the interviewed companies find unacceptable a distance of more than 20 km to the location. Kasarda (2009) defined the economic development zone for the Aerotropolis in a radius of 20 miles, or 32 km. Indeed, 70% of the questioned firms find a distance up to 30 km to the airport appropriate.
## Table 31: Acceptable distance of airports to location

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
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<tr>
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<td></td>
<td></td>
</tr>
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<td>8.7</td>
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<td>17.4</td>
</tr>
<tr>
<td>15.00</td>
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<td>9.1</td>
<td>13.0</td>
<td>30.4</td>
</tr>
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<td>20.00</td>
<td>5</td>
<td>15.2</td>
<td>21.7</td>
<td>52.2</td>
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<td>30.00</td>
<td>4</td>
<td>12.1</td>
<td>17.4</td>
<td>69.6</td>
</tr>
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<td>50.00</td>
<td>6</td>
<td>18.2</td>
<td>26.1</td>
<td>95.7</td>
</tr>
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<td>3.0</td>
<td>4.3</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>100.0</td>
<td></td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>no answer or time</td>
<td>7</td>
<td></td>
<td>21.2</td>
<td></td>
</tr>
<tr>
<td>not applicable as importance answer was not considered at all</td>
<td>3</td>
<td>9.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10</td>
<td></td>
<td>30.3</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>33</td>
<td></td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

### Figure 40: Histogram of acceptable distance of airports to location (SPSS results retrieved from research results)
6.7.5 Community service facilities

The results for community service facilities present a much clearer picture. Sixty-four per cent of companies prefer community service facilities in walking distance, which means not further away than 1 km (Table 32 and Figure 41). Similar to the findings for public transport, these results indicate that these facilities have to be centrally located inside the Airport City. They only influence firms’ decision of location positively if they are available in the immediate vicinity of the office location.

<table>
<thead>
<tr>
<th>Acceptable distance (km)</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
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<td>6.1</td>
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<td>12.0</td>
</tr>
<tr>
<td>1.00</td>
<td>13</td>
<td>39.4</td>
<td>52.0</td>
<td>64.0</td>
</tr>
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<td>9.1</td>
<td>12.0</td>
<td>76.0</td>
</tr>
<tr>
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<td>3.0</td>
<td>4.0</td>
<td>80.0</td>
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<td>92.0</td>
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<td>10.00</td>
<td>2</td>
<td>6.1</td>
<td>8.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
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<td>75.8</td>
<td>100.0</td>
<td></td>
</tr>
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</table>

<table>
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<th>Frequency</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
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<td>9.1</td>
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<tr>
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<td>5</td>
<td>15.2</td>
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<td>importance answer was</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not considered at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>24.2</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results
6.7.6 Rail access

A train station should be available in a distance of no more than 10 km (Table 33 and Figure 42). However, more than 40% of the participants think that the nearest train station should not be further away than 1 km, that is in walking distance. These findings support the ‘European’ model of an Airport City with a regional or even long-distance train station directly inside the Airport City. Examples are Amsterdam, Frankfurt and Berlin. This can also be a sign for some regional or cultural differences, as only two of the eight companies that prefer the nearest train station in walking distance are located in Abu Dhabi. All others are located in Frankfurt! This can also point to the importance of ‘perception’ as Frankfurt is well-known for its multimodal connectivity and excellent train access.
Table 33: Acceptable distance of rail station to location

<table>
<thead>
<tr>
<th>Acceptable distance</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
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<td>26.3</td>
<td>42.1</td>
</tr>
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<td>1</td>
<td>3.0</td>
<td>5.3</td>
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</tr>
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<td></td>
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<td>was not considered</td>
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<td></td>
</tr>
<tr>
<td>at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>42.4</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
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</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

Figure 42: Histogram of acceptable distance of rail station to location (SPSS results retrieved from research results)
6.7.7 Health facilities

Only for 54.5% of the interviewed companies do health facilities play a role in the decision of location. Of these companies 75% want health facilities within a maximum radius of 5 km (Table 34 and Figure 43). Nevertheless, it should be remembered that companies mentioned frequently that these facilities would be accessible anyway in a metropolitan area. If the Airport City is planned as a new city far away from the host city, health facilities have to be in easy reach – either in walking distance to the office locations or well connected by public transport.

Table 34: Acceptable distance of health facilities to location

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.50</td>
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<td>3.0</td>
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<td>6.1</td>
<td>12.5</td>
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<td>20.00</td>
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<td>3.0</td>
<td>6.3</td>
</tr>
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<td>3.0</td>
<td>6.3</td>
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<td>no answer or time</td>
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<td>51.5</td>
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<td>Total</td>
<td>33</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results
Although no significant difference for health facilities was found with the Kruskal-Wallis Test, a Mann-Whitney U Test revealed a significant difference for health facilities distance levels between Frankfurt (Md=3.5, n=4) and Dubai (Md=10,000, n=4), $U= 1.0$, $z=-2.084$, $p=.037$, $r=0.7$ (large effect) (Figure 44). One explanation could be the different demographics of the workforce. While it is more common in Germany with an ageing population and workforce to see a doctor during lunchbreaks for routine checks, in Dubai it is not expected that young and healthy expats visit a medical facility on a normal workday.
6.7.8 Leisure facilities

For only 55.5% of the interviewed companies do leisure facilities play a role in the decision of location. Of these companies 50% want leisure facilities within a maximum radius of 7 km (Table 35 and Figure 45).
Table 35: Acceptable distance of leisure facilities to location

<table>
<thead>
<tr>
<th>Distance</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
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<td>1</td>
<td>3.0</td>
<td>6.3</td>
<td>6.3</td>
</tr>
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<td>3</td>
<td>9.1</td>
<td>18.8</td>
<td>25.0</td>
</tr>
<tr>
<td>3.00</td>
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<td>3.0</td>
<td>6.3</td>
<td>31.3</td>
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<td>10.00</td>
<td>3</td>
<td>9.1</td>
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<td>100.0</td>
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</tbody>
</table>

Source: SPSS results retrieved from research results

Figure 45: Histogram of acceptable distance of leisure facilities to location (SPSS results retrieved from research results)
These results show that most companies distinguish clearly between working and living location. It is questionable how successful or sustainable a dense Airport City would be, where working and living locations are close by. As half of the sample found either leisure facilities ‘not at all important’ for the location decision, refused to answer the question, or used time as distance measure, it would be worthwhile to explore the meaning of leisure facilities in the boundaries of Airport Cities or Aerotropoli in a future study in more depth. This would be even more important given that many Airport Cities are considering ‘theme parks’ as anchor projects.

6.7.9 Education facilities

For only 55.5% of the interviewed companies do education facilities play a role in the decision of location. Of these companies 75% want education facilities in a maximum radius of 10 km (Table 36 and Figure 46). Nevertheless, taking into account the large group of ‘non-respondents’ and the qualitative data that had shown the diverse preferences for different education facilities (childcare versus universities, compare Section 6.6), the preferred distance to education facilities should be explored more in depth with a larger sample in the future. However, the calculated value for the median of 7.5 km of this study confirmed the findings of the literature (compare Section 6.7).
### Table 36: Acceptable distance of education facilities to location

<table>
<thead>
<tr>
<th>Valid</th>
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<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
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<td>3.0</td>
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<td>54.5</td>
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</tr>
</tbody>
</table>

Source: SPSS results retrieved from research results

**Figure 46: Histogram of acceptable distance of education facilities to location (SPSS results retrieved from research results)**
6.7.10 Religious facilities

For 21.2% of the companies, religious facilities are a location factor. For more than 85% of those for whom it is important, it has to be directly accessible (Table 37 and Figure 47). This answer is highly influenced by the participants in the United Arab Emirates. As Islam is the predominant religion in the UAE, the required five daily prayers should have influenced the desired ‘closeness’ of the facilities. This is supported by the fact that the company that mentioned that religious facilities are ‘very important’ for the location decision, but which chose 10 km as the maximum acceptable distance to the office location, is located in Germany and assumed to be affiliated with a different religion.

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Valid Per cent</th>
<th>Cumulative Per cent</th>
</tr>
</thead>
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<td>18.2</td>
<td>85.7</td>
<td>85.7</td>
</tr>
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<td>10.00</td>
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<td>3.0</td>
<td>14.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
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<table>
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</tr>
</thead>
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<tr>
<td>not applicable as importance answer was not considered at all</td>
<td>25</td>
<td>75.8</td>
<td>100.0</td>
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<td>Total</td>
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<td>78.8</td>
<td></td>
</tr>
<tr>
<td>Total</td>
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</tbody>
</table>

Source: SPSS results retrieved from research results
6.7.11 Summary

By analysing the preferred distances for the different infrastructure elements, it is clear that parking has to be directly available or in a maximum distance of 400 m (MEAN). Furthermore, public transport has to be in walking distance. A mean value of 1.1 km was calculated. If religious facilities are important, either because of a special workforce or the cultural or regional context, they should be accessible in a radius of 1.5 km. Community service facilities should still be able to be reached by foot or be not further away than 2.3 km. Rail access is preferred in a radius of 3.9 km and a good road connector should not be further away than 4.6 km. Health facilities should be quickly accessible in a radius of maximum 6.7 km. Education and leisure facilities were not seen as very important in close proximity to the office location, therefore the mean value for education facilities was 11.4 km and for
leisure facilities 13.6 km. Airports should be reachable in approximately 30 minutes by car or in a distance of 28.5 km.

Figure 48 shows the ‘desired’ spatial distribution of the different physical and social infrastructure elements for economic development at a certain location.

Figure 48: Necessary ‘closeness’ of infrastructure to economic development sites

6.8 Summary and Conclusions

This chapter has presented the results of the airport survey and of the interviews of companies of the three identified business sectors in the context areas of Abu Dhabi, Berlin, Dubai and Frankfurt.

The findings reveal insights into the role of infrastructure in economic development. Interviews gave a clear picture that airports play an important role in economic development but that Airport Cities as an economic development infrastructure
element only play a minor role. Weak evidence was found for the importance of hub airports and the higher preferences for airports of bigger companies, companies of American origin and companies of the Information & Communications Technology sector. Nevertheless, a distance of 20 to 30 km to the airport was seen as sufficient for most of the interviewed firms.

Furthermore, different preferences for physical and social infrastructure elements were revealed. General findings indicate that both physical infrastructure and social infrastructure are needed for economic development, but that overall physical infrastructure is more important. Parking, roads and public transport were found more important as location factors than airports and trains. Community service facilities were found important when in walking distance while education, health and leisure facilities are sufficient in the wider region. If religious facilities are important, they should be in walking distance, at least if the predominant religion is Islam. A clear distinction between childcare facilities and universities is important for education facilities.

The interviews have also shown that infrastructure elements alone are not pushing economic development but that integration, connectivity and accessibility play very important roles. Furthermore, special conditions, like large groups of expatriates in Dubai and Abu Dhabi, cultural differences and backgrounds of the location, the company, the decision-makers and the wider group of employees, need consideration. Not surprisingly, it was widely acknowledged that in the twenty-first century well-working communication facilities are a precondition for every location.

The qualitative data of the interviews revealed much more about the location decision than ‘just’ the importance of physical and social infrastructure elements. The next chapter will discuss these findings of the thematic analysis, where themes such as entrepreneurship, business context and centrality emerged, in more detail. Schemata about the location-decision process, the influencing factors and the spatial distribution will give a much clearer picture of what airport planners will
need to consider to build economically sustainable Airport Cities. Furthermore, it will enhance the understanding of location theory in the twenty-first century more than 100 years after Weber’s (1909) original work as it gives deep insight about how companies are making their decision of location these days.
7 Decision of Location (in an Environment of an Airport City or Aerotropolis)

If the basic conditions of the airports at different locations are the same, then others factors getting more considered. Questions like wage level, employee rights, quality of the road system, availability of qualified employees, location of the competitors and existence of a market are becoming more important.

(Economic Development Agency 6, 2012)

7.1 Introduction

The previous chapter disentangled the relationship between infrastructure and economic development. The results of the interviews with companies’ decision-makers and economic development agencies were presented following the four research sub-questions. Furthermore, the findings of the email survey were described and the choice of the business sectors justified.

The thematic analysis of the interviews revealed insights into the relationship of infrastructure elements and decision of location, such as the importance of airports for the decision of location, but it also offered a deeper understanding of the decision of location process and underlying concepts, ideas and influencing factors. This chapter will present and discuss these findings enhanced by developed schemata that give a clear picture of firms’ decision of location.

In the next section, the decision-making process will be analysed and described in detail. A schema will clarify the different steps. The discussion will help to understand what factors play a role before companies decide on a certain location or site. This is particularly important as numerous preconditions on a country- or regional level are taken into account by decision-makers before the actual decision for a location inside the region is made. An important theme for the location decision is centrality, accessibility and connectivity. Therefore, in Section 7.3, these
aspects will be discussed in detail. Furthermore, it was found that other factors influence the decision of location such as culture, the regional context, the nature of the workforce and entrepreneurship. These themes are discussed in sections 7.4, 7.5, 7.6 and 7.7. The chapter finishes with a summary and a schema that displays all physical and social infrastructure elements and influencing factors of the location decision. Figure 49 shows the structure of the chapter.

![Figure 49: Overview of Chapter 7](image)

### 7.2 Understanding the Decision-Making Process

After analysing the interviews with decision-makers in Germany and the Middle East in depth, it was revealed that it is important to understand the decision-making process not only for a certain location but from a broader perspective such as the decision for a country or certain region. This is even more important as some companies clarified that there is not one decision-making matrix for all locations but the decision of location is influenced by regional circumstances:

There is not one most important factor for us. In the end, we decide very individually for a location. The factors for this location here are different than these for a location in a different country. (BB1/23)

It [the decision of location] really depends on the city itself. It doesn’t really depend on the company. ... At each country, at each location, you look at different factors. (AB11/27)

To set up the environment in the best possible way to attract companies to a special site or Airport City, it is important to really understand the underlying factors that
lead to a location decision. ‘Macro-level’ contextual factors, such as business environment or infrastructure of a city or region, the economic viability and geographic factors like centrality or accessibility, are important to consider. After a decision is made for a city or region, more ‘micro-level’ factors are considered to decide on a certain location inside the region. Geographic factors play again an important role in the form of accessibility from employees’ homes or reaching out to local customers. Findings of the interviews indicate that the built environment or structure in the form of neighbourhoods or business parks plays a key role. Furthermore, it was found that the general business context is considered as well. Additionally, a whole wealth of soft, social, physical and hard factors is taken into account by the interviewed decision-makers before a decision for a certain location is made. The developed concept of the decision-making process is shown in Figure 50.

![Decision-making-process](image)

Figure 50: Decision-making-process
Companies usually decide on an office location in a certain country for strategic reasons. If no business reasons, such as being close to one of their own manufacturing or distribution sites, exist to justify locating in a certain city or region in that country, a decision based on other factors has to be made. The economic environment, the business context and geographic considerations are essential.

It was observed, while conducting the analysis of the interview results, that economic factors – such as the availability of the right employees, cheap housing, rental and living conditions, the image of the place (e.g. Berlin is ‘hip’), future growth perspectives and the availability of an appropriate customer base – are decisive economic factors for the decision of location. Confirming Florida’s (2002) creative class theory, the availability of the right workforce was found connected with the image of the place and quality-of-life, especially in Berlin:

> The city [Berlin] is attractive, especially for young people and talents. Furthermore, also as a multi-cultural location, it has a special attractiveness in comparison with other cities in the country ... It is representative, attractive for young people, it offers a lot of quality of life and a lot of tolerance ... (BC9/24)

The cheap housing market in Berlin was mentioned a few times as a location factor as cheap(er) living costs also mean cheaper operating costs as salaries can be lower. Fifty per cent of the companies stated that this was a factor of which they were well aware; for some companies it was a crucial factor for deciding to locate in Berlin:

> At least it [the cheaper rental prices] is a reason why we did not relocate the headquarter to Hamburg or Frankfurt or Munich. So, not only that the rentals are cheaper here, that one can live here cheaper, but also that the people have to earn here less for the same kind of lifestyle. That’s of course a benefit for the company. (BT1/31)

More important seems to be the image of Berlin as a young, liberal and multi-cultural city.

Companies in Berlin and Frankfurt mentioned a few times that ‘Berlin is hip’ and is a magnet for ‘talents’. Berlin is attractive not only because it is a good location in
which to find the right workforce but also because it transfers a certain image to potential business partners or customers. Firms located in Berlin explained that business partners or colleagues from the parent company are keen to visit Berlin. This is in stark contrast of Kasarda’s (2008d, Kasarda and Lindsay, 2011) idea of fly-in and fly-out business relations supported by a location inside the Airport City. Showing visitors around and giving them time to explore the place seems to be common at least in Berlin. Nevertheless, a company in Frankfurt mentioned that it is convenient to be located inside the Airport City of a hub airport as transit times of potential business partners or customers can be used to schedule business meetings:

... we have realised that – but that was only an additional benefit – a lot of our customers who are travelling widely internationally, often pass through Frankfurt. And if they are passing through, they usually have waiting time either when they arrive or before departure, so that it is possible to combine that with a meeting in our office if we are located at the airport. (FB8/32)

Companies in Frankfurt stated numerous times that they are not located in Berlin or would not relocate to Berlin as the customer base is too small to justify an office location there. The availability of customers or rather future growth is for half of the companies interviewed in Frankfurt a reason to be in Frankfurt. This was also an important factor for the UAE. While it was widely acknowledged that Dubai is the current business hub, Abu Dhabi was a few times referred to as the location with better future perspectives from companies already located in Abu Dhabi:

... it’s good to be in Abu Dhabi. We like it, the way it is. It is a growing city; there is a lot of potential - and money. Dubai just spends all the money. They do a lot of good business, but they don’t have the resources Abu Dhabi has. ... It has all the potential to become [the National City] ... they started the airline years back ... the airport and they are setting plan for the Millennium City. It will become a big attraction. So, I think, it will take some of Dubai’s light – sooner or later. (AT3/28)

Future economic perspectives also played a role in terms of attracting the right workforce. One company in Berlin explained that it is easy to attract people from
outside of Berlin, and even from other places in the world, to Berlin as people acknowledge that the city has more economic potential than other (smaller) cities in Germany:

What I find interesting for employees, that’s something that gets mentioned again and again ... that if one goes to Berlin, means relocate to a new area when looking for a new job, that it is then easier to decide for Berlin than for example Hannover or Bielefeld or a different location as the mistake you can make here, if something goes wrong with the job, something changes in the future ... then you have more possibilities. (BIC14/33)

The distinct differences between two places in the same country can also account for having an office location in both locations. It was expected that companies in the UAE decide for either Dubai or Abu Dhabi. Surprisingly, it was found many times that companies have an office location in both cities although it is less than a two-hour drive between Dubai and Abu Dhabi. The very different customer base in the two cities explains that decision:

I’m the country manager in Abu Dhabi, but we have also a county manager in Dubai ... two completely different entities which have their own PLL and everything. When we started in UAE, we started in Dubai. ... All the other emirates are run from Dubai and they don’t have the separate PLL. Abu Dhabi by itself has a PLL ... Even the government here is completely different than the government in Dubai. The client base is in Abu Dhabi is different than in Dubai. Dubai goes more into the private sector; here it goes more into the government sector. So you treat the customers totally different. So, you can’t have Dubai runs all the show... the mentality is different. ... If you are doing business with the government, you need to have a company in Abu Dhabi ... most business is related with the government. (AB11/27)

The necessity of being close to the government either due to political, image or business-related reasons was a repeated theme for the location choice in Abu Dhabi and Berlin. That is significant, as it shows that sometimes an underlying factor can overshadow all other reasons for a location. If it is pivotal for a firm to be close to
the government, that factor will be such a strong pull factor that no other factor can come close to it. The same was found if companies are tied by contract to be in close proximity to a major client or to a unique anchor project such as Masdar City – this factor eclipsed all others. It shows that business sites or Airport Cities have to be clear about their potential client base to get the set-up ‘right’. On the other hand, the case of Masdar City, a set-up of the ‘environment’ as a specialised business park, shows that one all-encompassing factor can also be a chance to attract business if that factor is offered at the particular location.

The business context or business infrastructure is also important as complicated set-up procedures or policies can be time-consuming. Excellent set-up business parks with good infrastructure were seen as a location advantage for locating in Dubai. Also, companies in Dubai mentioned many times that they have chosen Dubai and not Abu Dhabi as ‘doing business here [in Dubai] was easier’ (DT9/6) and Dubai is more liberal and ‘socially friendly’ (DI3/9). Furthermore, it was recognised that integrated transport infrastructure and social and soft infrastructure are important for ‘easy living’. This was also recognised from one company in Abu Dhabi as the founders had chosen Abu Dhabi due to strategic business reasons, but have decided to live in Dubai:

We drive in to our office and drive back to Dubai. We live in Dubai.

Company Abu Dhabi (AB9/29)

Nevertheless, one company reported that better integrated infrastructure did not play a role as it was a recent development in Dubai. This aspect demonstrates that not only the business context in terms of hard business factors is considered for the location decision but also the social context, which serves to make employees comfortable. This is especially important if a big expat community is expected to work in a very different cultural setting, such as Americans, Britons and Germans in the UAE, as one company with a large group of expatriates explained:

It is very critical to ensure that colleagues are happy and satisfied. (DLT6/5)
The importance of political implications was demonstrated as well. One company in the Leisure & Tourism sector stated that the government of Dubai knows that the future of Dubai relies on tourism and therefore Dubai is seen as a good location for a tourism-related company as it can be expected that government policies support the firm’s aims. Companies also mentioned that uncertainty in public policies in the UAE make doing business more difficult in general. Political stability and safety was also cited a few times as a general factor influencing the decision to locate in a country in a certain a region, such as the UAE inside in the Middle East.

In terms of geographical considerations, air connectivity was a central factor. In general, centrality, connectivity and accessibility ranked high on the agenda for all interviewees. For Frankfurt and Dubai the airport as an international hub airport was decisive. All companies in Dubai stressed the importance of Dubai as the hub of the region and the air connectivity it offered. Interestingly, for both Abu Dhabi and Berlin the closeness to the government was decisive – still a geographical factor but of a very different nature than air connectivity via a hub airport. The importance of centrality, connectivity and accessibility will be investigated in more depth in Section 7.3.

After taking these macro-level factors into account companies decide to locate in a country and region or city; but then micro-level factors are considered for choosing a specific location. Factors such as the structure/image, the business context at a specific location, geographic considerations at a certain place and many different soft, social, hard and physical factors, play their role for choosing a specific location.

Structure refers to the built environment in the form of a highly integrated mixed-use development with cultural attractions and social life at the evening. Companies in Berlin mentioned numerous times the ‘Kiez’ (neighbourhood) structure in Berlin’s suburbs, which they would not like to miss:

That is really interesting, because the Airport City couldn’t really offer us anything as everything would be new and modern. Our decision of location is founded on the background of our general manager, he is from this suburb and
he loves it. And honestly, I think, there is no one in this company who doesn’t like it. Because, I think, everyone enjoys it that you can go out here in the evening for a dinner or drink. That is really the decision of location or decisive for the decision of location. (BT1/31)

Furthermore, in both German locations interviewees mentioned many times that they could not imagine moving to an Airport City that is ‘sterile’ and without ‘life’ or urban atmosphere.

‘Ambience’ and ‘Image’ of a place seem to be important as well, especially for companies of the business services sector. Often representative areas were wanted as either it was expected that current employees would appreciate them or future employees would more likely apply for a job:

It’s something they associate with the company, it’s a subconscious expectation how a headquarters should look like. And furthermore, if they are at the location, they want everything as close as possible. (FB8/32)

One company in Frankfurt even mentioned that it was important to have a Frankfurt address and not one of an unknown smaller town of the surroundings.

In general, companies in Germany mentioned that it is important to be surrounded by like-minded industry. Interestingly, companies in Berlin valued classical cluster in terms of workflow considerations and ideas exchange. Business clustering in the traditional form was a decisive factor, for example for companies in the specialised business park in Berlin-Adlershof. In contrast, traditional cluster played hardly any role for companies in Frankfurt. The close proximity of Frankfurt Airport to the city centre (and therefore business agglomeration) was probably the reason why it was not explicitly mentioned by Frankfurt participants. Nevertheless, companies in both German locations referred widely to the important factor of ‘ambience’ and being surrounded by a like-minded industry at the working location:

That is one of the factors for a business park as you have usually a certain ambience, with other employees who are working in the same park; one has a certain class of people you have contact with. In terms of companies, I think it
is always important and helpful if there is a certain geographically closeness, with the suppliers or the small daily needs like printing service and copy shops, that is of course important. ... Furthermore, we made the experience that something like that is also important for the attraction of potential employees. That is always a topic to be attractive for applicants.

Company Berlin (BIC14/33)

These are people who are doing similar business who have a similar daily routine or sometimes night routines if they have some meetings [coming up] and they need a similar surrounding. And that means that the surrounding is more likely the one you need and it is capable to offer that, like quick food options and also the gourmet ones, there is for sure a dry cleaner. These are things which are just important. Company Frankfurt (FB8/32)

In regard to recruiting the ‘right’ workforce, contradictory statements were found. While one company in Frankfurt mentioned that clusters on a regional level are important for the acquisition of future employees, another company in Berlin mentioned that they are avoiding cluster as they expect that it is more difficult to recruit well-trained employees at a place with a lot of competitors. For companies in Dubai, business agglomerations in the form of business centres played an important role for half of the sample while the other half referred to more traditional business cluster. In Abu Dhabi, 80% of the questioned firms mentioned the importance of clusters.

In sum, the business context at a certain location, in the form of business agglomeration, is a vital factor for the location decision. This means that it is important to attract a critical mass of businesses to the Airport City to make it economically sustainable and attractive for other companies.

Similar to the ‘macro-level’ or country decision, centrality, connectivity and accessibility are also important for the ‘micro-level’ decision. The place has to be
central in the city/region, well connected by public transport, road, rail, pathways and bikeways and has to be easily accessible for employees:

One of the decisive factors to stay at this location was the transport infrastructure ... the whole infrastructure, including the airport, but not the developing Airport City. The infrastructure is brilliant here. The social infrastructure is still a little bit missing but we have companies we are working with in direct proximity ... And that is attractive for us – the concept of a science cluster and the closeness to the airport. (BC9/24)

In Berlin and Abu Dhabi, 80% of interviewed companies found physical connectivity important for the location while in Frankfurt 90% of the companies agreed on the importance of connectivity:

... in the Airport City, you find all the infrastructure we need...dry cleaner, hairdresser, dentist, etc. It’s just a whole infrastructure in very short distance, means walking distance. There is just everything available from parking, hotels to long-distance train station, that is just the decisive factor, an additionally the freeway in direct proximity. That is the best junction.... if someone would have told me ten years ago that you will pay once a lot of money to be in a location where you look at a freeway and in the background noisy airplanes and where you for sure never can open a window [due to the noise] then you would have said ‘you are mad’. But if I look at our daily work routine, then it means that we are travelling a lot ... Company Frankfurt (FB8/32)

In Dubai, companies emphasised the importance of the airport and that Dubai is not big and therefore every site is in easy reach. Nevertheless, companies mentioned that Dubai World Central is not considered as a location as it is too far from the living locations of current employees.

Many soft, social, hard and physical factors – such as communication facilities, food and lunch options in walking distance, a competitive price, sharing facilities with other affiliates, childcare and accommodation facilities in close proximity, gyms in walking distance, the set-up of a free zone, reliable electricity supply, representative office space and meeting, conference and hotels facilities in close proximity – can be pivotal. In general, these preferences depend on each individual company.
Nevertheless, some factors occurred more often throughout the sample than others.

In all four cities, participants mentioned costs as one decisive factor for a move to the Airport City and that higher renting or leasing costs at the Airport City are discouraging. This is in stark contrast to the idea that business development at the airport can be rented out for a premium as it is considered a favourable location for companies.

In Abu Dhabi especially companies mentioned IT, power and water supply, free zones and security as location factors. Similar, firms in Dubai declared communication facilities, free zones, electricity supply, taxis on demand and the price as influencing factors. Restricted ownership rights and regulation serve to explain why ‘free zone’ is a decisive criterion for Airport Cities in the Emirates.

In contrast, in Berlin and Frankfurt, the availability of food and lunch options was a central theme.

This last section shows clearly how different the value of different factors can be as a result of the response to the region. For example, reliable power, water and electricity supply was taken in Germany for granted while in the UAE some companies found it worth mentioning as a location factor. In contrast, in Berlin and Frankfurt, the availability of food and lunch options was a well-documented topic. This mirrors the culture of having the biggest meal of the day at lunchtime in Germany and the common use of staff canteens.

To summarise, Airport City planners need to be aware of what kind of companies they want to attract and also the main nationalities potentially working for these companies. In a globalised world, it cannot be certain any longer that, for instance, only Germans are working in a German company. As will be discussed in Section 7.7, the nationality of the decision-makers is of even higher importance. The influence of the regional context will be more widely discussed in Section 7.5. The next
section concentrates more deeply on the concept of centrality, accessibility and connectivity.

### 7.3 Understanding the Concept of Centrality, Accessibility and Connectivity

One important finding was that centrality, accessibility and connectivity are very important in the regional, national and international context. Companies consider how easily a place can be reached from other parts of the world, how well it is connected inside the country and how accessible the place is from inside the region.

It was found that there are two points of view depending on whether a company has just started to look for the best place in the ‘world’ or if the region is already decided on and only the best place inside the region has to be found. Figure 51 shows these two different approaches, either ‘outside-in’ or ‘inside-out’.

![Figure 51: Understanding the concept of centrality, accessibility and connectivity](image-url)
For the ‘outside-in’ approach, companies start looking for a ‘central’ place in the world or region. For example, companies in the UAE cited the central location, between the ‘East’ and the ‘West’. Companies in Frankfurt mentioned numerous times Frankfurt’s central location in Europe and Germany as a decision factor. Accessibility and connectivity means in the international context in general air connectivity. Nevertheless, the idea that big companies would even use private jets and therefore prefer a location in close proximity to a corporate airport could not get any support in Abu Dhabi where Al Bateen Airport exists.

After finding the country or region, firms are looking for connectivity inside the region. In all four cities, accessibility and connectivity within the region was a ‘must to have’ criterion for the Airport City. Hence, in the national context, other transport options such as rail or road connectivity are becoming more and more important. Nevertheless, not only transport infrastructure was mentioned as a criterion for connectivity, but connectivity in the form of communication infrastructure was stated in nearly all cases as important for the location decision or as a reason to relocate. As defined in the literature, connectivity comprises all processes that enhance and speed up an economy’s supply chain (Reiss, 2007). Especially for Frankfurt, the role as internet and telecommunication hub was mentioned as a decision-making factor many times. Also, particularly in Frankfurt, the intermodality of the Airport City was a more important factor than the provided air connectivity:

> In September, we are moving to the Airport .... It’s a great ambience. So far, we are in a skyscraper in the city with a great view but nevertheless, it’s still a little bit of travelling from the long-distance train station. Our people are working and living all over Germany, so it is important that it is a transport junction, as meeting point, for events we are organising, such as management events, recruiting appointments, meetings with customers. That’s why we are moving to the airport. (FB8/32)

Furthermore, the place has to be accessible from other parts of the city. Companies in all four cities stated that they were considering the location in terms of
accessibility for the employees. In some places that meant to be close to a traffic-jam-free highway (Frankfurt and Abu Dhabi), while in others it meant to be in close proximity to living places (Frankfurt and Dubai), and in others still it meant access to nearby public transport (Berlin):

For us, the location in a business park is more important than if the airport is in a distance of 10 km or in walking distance. What’s important is the climate of a business park....what was here important was the transport connectivity: central – was important ... (BIC14/33)

It was recognised in the literature (Nunn, 2005, De Lange, 2010, Stevens, 2010) that increasing connectivity and intermodality make a place more attractive for economic development. Multimodal facilities act as a transfer point between different transportation modes but serve additionally each mode independently. Available transportation types are (high speed) rail, metro/subway, light rail, tram, taxi, local bus, express bus, limited-stop service bus, bus rapid-transit, intercity bus, private cars, ferries and water taxis. Multimodal transportation not only serves an area with a high population density well, but also attracts business development. Furthermore, these transportation hubs incorporate shopping and entertainment facilities. The Union Station in Washington, DC, USA, for example, accommodates more than 100 shops, bars and restaurants and a movie theatre (American Planning Association, 2006). Therefore, it is suggested that for a vibrant, successful Airport Metropolis’ Region, connectivity between the Airport and its region is extraordinarily important as connectivity contributes to strategic economic development. Another good example is the ground transport hub located across Miami International Airport (Kramer and (Kramer Aerotek Inc.), 2010). The findings of the interviews confirm this view; in particular, companies located in the Squaire in Frankfurt emphasised its connectivity and intermodality as a location advantage.

Companies that were already established inside a city found centrality, accessibility and connectivity also important but emphasised the ‘opposite direction’ (‘inside-out’). These were usually companies that ‘stayed’ at a place because either the founder of the company grew up in or was settled at that area or the company was
deeply rooted in the region because it was situated at that location for a long time. If they need to relocate, for example, as they need more space, they are looking for a location in close proximity to the current one as they do not want to lose the current workforce. As the decision for a region or city is not a question for them, they look for centrality, accessibility and connectivity inside the region and similar amenities as at the former place. Being well connected for the daily business and being at a location easily accessible for clients and employees is more important for them than being well connected by air:

It’s a very central location. The company is easily accessible. (BT1/31)

Nevertheless, companies appreciated a decent airport, especially if they expected to grow internationally:

If one makes decision of location, then one also has to consider that a company is developing further and then it is in general not a mistake to be close to an airport. If I know that my business is getting more internationally then I will need that at one point. Therefore, I locate somewhere where the company is easy accessible internationally. (BIC14/33)

Apart from centrality, accessibility and connectivity, numerous other factors influence the decision-making process. The next section examines the influence of entrepreneurship, followed by the influence of the region, workforce and culture.

7.4 Understanding the Influence of Entrepreneurship

Under some circumstances, the decision for location is not the result of an active decision-making process, or at least not on a country or regional level. Entrepreneurs or business founders very often start their company simply in the city in which they grew up or were already settled in:

It is not that you start from scratch and you are looking for the best location in the country. I grew somehow in here. I’m since 50 years here. So it was never really a question to go somewhere else with the business. (BI8/22)
In all four locations this aspect was present. Many companies stated that they are located in a particular city because the founder or founders are from that city or its region. The following statement demonstrates very clearly what the decision of location was in these cases:

We all live in this region. (FIC5/19)

Interestingly, one company confirmed that the decision of location sometimes is influenced not only by the founder or entrepreneurship but also by the preferences of the general manager. Already in 1965, Eversley discussed the preferences of the general manager and its implications for the decision of location. Although it was not a repeating theme for larger companies, it seems still to have an influence on the decision of location for smaller firms or start-ups. For the development of a greenfield Airport City it could mean that the encouragement of entrepreneurial or start-up activity could be one way to attract businesses to the site. As one participant put it, it can also be a long-term, more sustainable solution for economic development:

If you are looking at where companies are located that is nearly always where the founder is from. ... I believe stimulation of the economy starts with encouragement of people to start their own business, then you also get infrastructure ... If a region wants more companies, one has to support the foundation of companies and not only offering the red carpet for existing companies which would stay three years and then move on ... (BBC3/16)

The relationship between entrepreneurship and location of decision was an emerging theme in this research and it would be worthwhile to explore the possibilities to establish companies at the Airport City site through entrepreneurship in future research. For example, it is possible that from a place like Masdar City in Abu Dhabi and its Research University, companies of the renewable energy sector spin off and the area develops to something similar for the renewable energies sector, which is the San Francisco Bay Area (Silicon Valley) for the electronics sector (Byers et al., 2000, Adams, 2005).
7.5 Understanding the Influence of the Region

The influence of the regional context can be connected with the theme of entrepreneurship. Considering the often asserted opinion that Stanford University was the key for the development of Silicon Valley (Byers et al., 2000, Adams, 2005), it was unexpected to find that numerous companies and economic development agencies stated that ‘education facilities’ are not important for employees in the UAE (and therefore nor for the firm’s decision of location) as expatriates send their children outside the UAE for higher education:

It’s [education facilities] really not important. Because we are all expatriates here. So because we are all expatriates here, somehow we are in a transit...very few people have their children in University in the UAE. Because that was not on a very, very high standard. It has improved a lot, but all of us are at the same time to a certain extent nationalistic. ... because we all believe, wrongly or rightly, that the education system in our own country is better than anywhere else. (DT7/1)

Nevertheless, companies in Masdar City emphasised the importance of the Research University as they are doing research or being active in the sector of renewable energies. A solution for the Airport City could be to establish international schools and high-profile research universities to offer an incentive for companies with large groups of expatriates.

As mentioned earlier, two major distinctions were made for preferred factors at the location A or B – both are closely connected to the regional influence. In the UAE, especially in Dubai, a very important factor for the companies was the existence of a free zone while in Germany no one mentioned that factor. This is easily understood as in the UAE numerous business regulations exist. Companies identified as advantages of a free zone fewer human resources restrictions, possibility of 100% foreign ownership and transparent rules and law based on British law.
A very different recurring factor was food and lunch options for German companies. As discussed earlier, it is common in Germany to eat a cooked lunch with your colleagues, usually at the staff canteen. Companies mentioned that canteens inside the business park or building were a location factor.

Some companies mentioned reliable water, power and telecommunication supply as a location factor in the UAE, especially in Abu Dhabi. During the research process, problems with telecommunications were experienced numerous times in Abu Dhabi. In contrast, in Germany these facilities were taken for granted and therefore not a location factor. Another big difference was found in regard to transport infrastructure. While in the UAE the use of the car was stressed, companies in Germany emphasised in general more public transport. The reasons given for this difference were that the UAE is a luxury place with cheap oil prices and the hot and humid weather makes the use of public transport unpractical.

These examples show clearly that planners or operators of Airport Cities would need to be aware of the regional differences as, for example, in Germany, Airport Cities without staff canteens would not work well while the setting up of a free zone is crucial for the UAE. To summarise, it is important to investigate the regional ‘distinctiveness’ to implement findings into the built or regulation environment. The ‘one size fits all’ approach will most likely lead to economically unsustainable Airport Cities. The influence of the regional context is closely connected with the themes of workforce and culture.

### 7.6 Understanding the Influence of the Workforce

The kind of employees has a high influence on the decision-making process. For instance, in Abu Dhabi and Dubai, employees are mostly expatriates with different needs than an ‘average’ workforce. For example, as restricted by law, they are not allowed to stay inside the country after retirement. Therefore, all leisure activities in the form of caring for their own house/garden do not exist. In contrast, in Germany these are important leisure activities. Furthermore, as expatriates are
usually young and without children or have only small children, education and health facilities in the proximity of the office location were hardly ever a location factor for the companies in the UAE. As explained in Section 7.5, if employees bring their families to the region, they will send their children to their home countries for higher education. In contrast, in Germany, childcare and health facilities played an important role as location factor.

Numerous interviewees explained that people come to Dubai for a limited time to make as much money as possible and leave again after a while. Often, they do not bring their families with them. Hence, leisure facilities play a very minor role for the workforce and therefore also for the decision of location of companies. One company reported that this aspect became very obvious when they changed the working week from five and a half days to five days. Employees were not happy with that decision:

> For the employees doesn’t really matter [social infrastructure in close proximity to the office location], because we are all expatriates here. Doesn’t affect our life. We are, most of us are here, to do this job, so, you are not here to live. (AT3/28)

Some companies explained that they offer accommodation in close proximity to the office location for their expatriate workforce and that therefore social infrastructure in proximity of the office location is desired as it is the living location as well. The opposite was found for Germany where a separation between working and living location generally is desired. People in Germany usually do not change their job very often and settle early in life into their own house or apartment. Even if it is a rental apartment, it is not unusual for people to live in it for 20 years and more. Therefore, companies mentioned often that the current office location would influence the choice for a new office location as it was not expected that employees would move but maybe would look for a new job instead of a long commute every day. Nevertheless, the closeness or convenience for current employees to a considered new office location was also mentioned in the UAE.
The state of the workforce also influenced the importance of transport infrastructure. In cases in the UAE where expatriates would get staff accommodation or be picked up by corporate bus shuttles every morning, public transport availability did not play a role for the decision of location. On the other hand, it was mentioned that public transport could be important as expatriates of Asian background are used to using public transport and often do not have a driving licence. For expatriates in executive positions it was widely agreed that they would use their own car. In stark contrast, in Germany people expected that the whole workforce would use public transport or even pushbikes.

These are very important implications for planning the built environment of an Airport City as, for instance, for companies with a large group of German or Asian nationals, public transport would be paramount, while for firms with large groups of American, Australian and Middle Eastern nationals, access via car only could be adequate.

### 7.7 Understanding the Influence of Culture

Additionally, the background of culture and nationality influences the decision-making process as, for example, exercising as a form of leisure activity is more common in some cultures than in others. One interviewee reported, for example, that in California exercising and going to the gym are very common activities while he found the opposite in Abu Dhabi.

Another obvious difference was found for the importance of religious facilities. Decision-makers coming from a background of a more religious society emphasised the importance of religious facilities much more than those from a secular society, namely Germany. One explanation would be that these facilities are more ‘natural’ to daily life in societies were religion has a higher importance. Certainly, the importance of religious facilities was also influenced by the nature of the workforce. If it was expected that to large numbers of workers who would want to pray five
times a day, as do the majority of workers belonging to the Islamic faith, religious facilities would be an important location factor.

These are important considerations for the built environment as, for example, local planners in the UAE would not emphasise a gym in the precinct of the Airport City but American companies would be unlikely to choose the place as a location as this important social infrastructure element would be missing. Or the other way around, an Airport City set up in a Western context with the aim to attract Middle Eastern companies would make gym facilities available but not prayer facilities.

It was also found that culture plays a role in a business context, if, for example, a firm’s operation serves a special ethnic group. In that case, employees are also more likely to be of that nationality, and hence the percentage of that nationality in regional population becomes a decision factor.

Furthermore, as discussed earlier, the use of public transport, walking or biking versus the use of a private car, differs between cultures. Emiratis rarely use buses and travel mostly first-class in the metro. On the other hand, Germans and Indians use public transport without hesitation. This is influenced not only by the place but also by culture as the place a person grows up in shapes their norms and values (culture). A statement of a decision-maker in Dubai of Indian origin shows that he thinks that it is not impossible to walk in the UAE weather conditions, while numerous Middle Eastern interviewees stated that they would not walk or use public transport:

... at least eight months in the year you can walk easily outside. (DB38/10)

The difference between different cultures was in general very obvious in the choice for transport modes. While American and Middle Eastern participants stated widely that the most important access mode for the airport would be the car, public transport was dominant with interviewees of European origin.
For medium-sized companies where the decision of location is left to a general manager at the location, it was found that his or her cultural background influences the location process more than in larger companies. In larger companies, the process and decision factors seem to be more generalised and not so much influenced by personal preferences. Interestingly, in that circumstance, the background or ‘culture’ of the company plays a part. The ‘original’ nationality shaped values and norms – ‘how things are done’ – and therefore what is included in the decision for a new location. Finally, the culture in general at a place shapes the decision-making process.

### 7.8 Summary and Conclusion

This chapter has shown that the decision of location is influenced by much more than the preferences and availability of different physical and social infrastructure elements. Furthermore, even the preferences for different physical and social infrastructure elements are influenced by the regional context, the workforce and culture. Findings also indicate that sometimes it is not infrastructure that influences the decision of location, but much more the background of the decision-makers, entrepreneurship or resistance to leaving ‘traditional’ locations. All these ‘external’ and often invisible factors have an ongoing influence on the decision-making process (see Figure 52).

It is contended there should be a distinction between decision on a macro-level (country, region) and on a micro-level (decision of location inside a city or region). If on a macro-level the decision is not made based on entrepreneurship, personal backgrounds or long establishment in one region, economic factors like future growth perspective and availability of right employees, the business context, such as business infrastructure and business friendly policies and geographical considerations like air connectivity, centrality and connectivity, are considered.
Once a decision is made for a region or city, factors like the structure of the place, the business context in form of cluster or business agglomeration, geographic considerations like accessibility and connectivity and many soft, social and physical factors such as the price, the availability of a gym, childcare facilities, food and lunch options, electricity, communication facilities, meeting and conference facilities or representative office space become important.

Most of the companies mentioned business clustering as an important factor, either in the form of a real business cluster or in the form of business centres or agglomerations. In places like Dubai and Abu Dhabi free zones play an important role as well. In Germany, more often, a structure of a neighbourhood or ‘Kiez’ is mentioned.
This chapter has presented findings of this study that reach beyond the scope of answering the four research sub-questions and draw a comprehensive picture of the decision-making process and decision-making factors. It was discussed that factors such as regional context, culture, entrepreneurship, and the background of the company, decision-maker and the workforce influence the decision of location. If a decision for a country or region needs to be made, air connectivity, centrality, accessibility, workforce availability, market perspective and public policies and strategies are considered. Similar considerations are important for choosing a certain location inside a region. Additionally, numerous physical, social, soft and hard factors will be evaluated before making a decision. This chapter spelled out the requirements and spatial dimensions for a wealth of physical and social infrastructure elements. The next chapter will conclude this thesis by summarising and discussing the research findings, the contribution of this thesis to theory and practice, some limitations and implications for methodology as well as possible future research.
Many important cities in the Western world are currently struggling with how to create the best conditions to accommodate economic activities that are regarded as vital for the city’s economic success. Rethinking the necessary and sufficient conditions is required since the economic structure and world conditions have changed significantly, today’s prosperity mainly comes from successful firms in high-tech branches, in finance, business services, creative or cultural industries and in the services to the consumers who are living in the city or simply are visitors or commuters. The question, then, is how to attract these firms and people and how to keep them.

(Musterd, 2006, 1325)

8.1 Introduction

This research began with the aim to investigate the relationship between infrastructure and economic development in the environment of an Airport City or Aerotropolis and to answer the question ‘What is the role of infrastructure for economic development in the Airport Metropolis’ Region?’ In order to achieve this, the researcher generated the following research sub-questions:

1. What is the role of airports as economic development infrastructure in the Airport Metropolis’ Region?

2. What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?

3. What is the role of social infrastructure for economic development in the Airport Metropolis’ Region?

4. Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?

As discussed in Chapter 1, airports’ business models have changed in recent decades from publicly owned infrastructure providers to profit-oriented enterprises. Privatisation and uncertainty in aviation-related revenues forced
airports to look for new revenue streams. Commercialisation at both airside and landside was discovered as a new source of revenues and the business models of Airport City and Aerotropolis soon emerged. While these business models are widely used in the industry, academia has begun only recently to explore this emerging field of airport-centred urban development and business models. Many different terms are used to describe this transformation and researchers agree that often an evolution from a ‘traditional’ airport towards an Airport City to an airport corridor and further to an Aerotropolis can be observed (Peneda, 2010, Schaafsma, 2010). The term ‘Airport Metropolis’ Region’, as used in this thesis, encompasses these different terms for airport-centred urban developments. For an economically sustainable Airport Metropolis’ Region, companies’ long-term decision to locate at the Airport City or in the corridor between the airport and the host city is of paramount importance. The literature has identified some factors for the successful implementation of the new business models – such as a vibrant economy (Schaafsma, 2010, Peneda et al., 2011), regional integrative planning (Appold and Kasarda, 2010, Droß and Thierstein, 2011, Michaeli et al., 2011, Peneda et al., 2011) and a central location with good connectivity (Güller and Güller, 2001, Appold and Kasarda, 2010, Betz, 2010, Schaafsma, 2010, Michaeli et al., 2011, Peneda et al., 2011, Schubert and Conventz, 2011) – but very limited research has been undertaken on sustainable real estate development at airports. While airports worldwide are developing land in the airport precinct commercially, the factors for companies’ decision to move to these locations are not well understood. Research (Peneda, 2010) suggested that asking companies in the precinct of Airport Cities about their location-decision preferences would be a valuable contribution to the field. Therefore, this research concentrated on economic development at the Airport City and the corridor between the Airport City and the CBD by asking companies about their infrastructure preferencs for location decision.

In Chapter 2, economic development was defined as the number of businesses settled in a certain area. The literature review revealed that the relationship between physical infrastructure, such as airports and roads, and companies’ location decision was widely researched, but also that not much research exists
about other physical infrastructure elements such as trains and public transport and their influence on companies’ choice of location. In regard to social infrastructure, ‘quality-of-life’ was researched but not many studies disentangled the different social infrastructure elements, such as ‘community service facilities’, ‘health’, ‘leisure’ and ‘religious facilities’, and their influence on firms’ location. An exception was ‘education facilities’. Hardly any study investigated the spatial dimension of infrastructure supply. Research identified other influencing factors on the location decision and their influence on the preferences for different infrastructure elements such as context, perception of decision-makers, business sector, company size and country of origin. Consequently, this research took these factors into account.

Industry location theory (Weber, 1909) and creative class theory (Florida, 2002) were introduced as underpinning theories of this research. Both theories select the role of infrastructure in economic development as a central theme. Nevertheless, while location theory concentrates widely on physical or transportation infrastructure and its influence on firms’ location decision, creative class theory seeks to understand companies’ choice of location as a result of the workforce’s preference for a region in response to social infrastructure, and in some instances physical infrastructure. It was identified that taking the ‘environment’ into account would be a valuable contribution to location theory (McCann and Sheppard, 2003). Moreover, it was argued that the economic world has changed from emphasising raw materials and transportation towards the importance of knowledge workers or the ‘creative class’ as a location factor for industry (Florida, 2005, Kasarda and Lindsay, 2011). Combining the two theories in one research project was useful for understanding companies’ location decision in the twenty-first century and in the context of new ‘man-made’ or ‘constructed’ regions, influenced by airport-centred urban developments. Applying the two theories to the new environment of Airport Cities and Aerotropoli increased the understanding of the importance of the built environment and the relationship between the provision of social infrastructure and the availability of the ‘right’ workforce. It was found that indeed firms emphasise attracting and retaining the ‘right’ workforce for their location decisions and that
the built and business environments and culture are important location decision factors.

The literature review and a pragmatism and (post-)positivism paradigm led to the use of multiple methods and a mixed methods approach. An email survey of airports worldwide identified business sectors for company interviews. The literature review helped to select four Airport Metropolis’ Regions, in Germany and the UAE. Many similarities and differences of the four study areas were described in chapters 4 and 5 to offer a base for a comparative methodology. Interviews with business leaders of three different industries and economic development agencies located in the different Airport Metropolis’ Regions were conducted to disentangle the influence of various infrastructure elements and their spatial dimension for the decision of location in the environment of Airport Cities and Aerotropoli.

Chapter 6 presented the results of the email survey and the interviews. It was found that physical infrastructure is in general more important than social infrastructure but that ‘community service facilities’ are in particular influential. Furthermore, it was found that airports are less important than prior research had proposed, but that connectivity and intermodality is paramount. Moreover, a significant finding in regard to location theory was that the context or ‘environment’ has a high influence on the location decision. Additionally, it was found that companies emphasise the availability of the right workforce for their location decision, but this is rarely mirrored in the companies’ preferences for social infrastructure. This finding indicates that the relationship between the availability of knowledge workers and the provision of social infrastructure, as formulated in the creative class theory, is not well understood by industry. As a result, an undersupply of social infrastructure in the Airport Metropolis’ Region can lead to an undersupply of talents in that region and can influence negatively companies’ decision to locate in the area. In Chapter 7 more findings were discussed and a comprehensive picture of the decision-making process and its influencing factors, such as culture, regional context, entrepreneurship as well as numerous factors on a macro- and micro-level, was introduced.
This final chapter will complete the thesis by presenting and discussing the research findings in relation to the literature. Furthermore, the contribution to the field and to theory and practice will be demonstrated (see Table 38 and Section 8.3). Following the discussion about the research findings and contributions of this thesis, some limitations and implications for methodology will be stated. The thesis finishes with an outlook for future research and some final remarks (compare Figure 53).

Table 38: Main contributions of the thesis

<table>
<thead>
<tr>
<th>Finding/Topic</th>
<th>Contribution</th>
</tr>
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<tbody>
<tr>
<td>Airports alone are not ‘enough’ for companies that does not consider ‘airport’ as a ‘very important’ location factor</td>
<td>Clarification about the importance of ‘airport’ in the interrelation of other infrastructure elements</td>
</tr>
<tr>
<td>Importance of connectivity and location at airport/Airport City</td>
<td>It was found that not only the air connectivity is paramount but that accessibility and centrality on an international/national and regional level are at least same important.</td>
</tr>
<tr>
<td>Airport City as marketing tool</td>
<td>It was found that the Airport City as marketing tool for non-aviation related business sectors is insufficient as widely unknown.</td>
</tr>
<tr>
<td>Location of infrastructure for economic development</td>
<td>A start was made to define the necessary spatial distribution of different infrastructure elements for their positive impact on economic development.</td>
</tr>
<tr>
<td>Preferences for physical infrastructure elements depend on cultural background</td>
<td>It was found that preferences for infrastructure elements vary widely between different cultural backgrounds, e.g. public transport has a much higher value for the location decision for German companies than for other nationalities.</td>
</tr>
<tr>
<td>Preferences for social infrastructure elements depend on cultural background and regional structure</td>
<td>It was found that importance of different social infrastructure elements depend highly on various factors, such as culture, business sector and regional structure and needs more ‘disentangling’ and stronger consideration in location theory and creative class theory.</td>
</tr>
<tr>
<td>Including built environment into location theory</td>
<td>It was found that the built and business environments are paramount for the decision of location.</td>
</tr>
</tbody>
</table>
8.2 Research Findings

The thematic, content, descriptive and statistical analysis offered a wealth of research results. The airport survey revealed ‘Business & Consumer Services’, ‘Leisure & Tourism’ and ‘Information & Communications Technology’ as the non-aviation related business sectors that are preferred by airports worldwide (see Section 6.2). For all three identified industries, companies in each case region – Abu Dhabi, Berlin, Dubai and Frankfurt – were contacted and a total of 33 interviews were undertaken, in 2012, plus 6 interviews with economic development agencies.

Both physical and social infrastructure were recognised as important for the location decision by interviewees, but there was a clear preference for physical infrastructure in the nearer office precinct. Nevertheless, especially ‘community service facilities’ were found to be important in walking distance and ‘health facilities’ were found important for companies with a higher average-age workforce. A gym in walking distance was widely recognised as important as well.
Airports were acknowledged overall as an important factor for the decision of location but Airport Cities played a much smaller role. The following sub-sections will discuss in more depth the individual responses to the four research sub-questions –

(1) What is the role of airports as economic development infrastructure in the Airport Metropolis’ Region?

(2) What is the role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region?

(3) What is the role of social infrastructure for economic development in the Airport Metropolis’ Region?

(4) Where should infrastructure be provided to stimulate spatial economic development in the Airport Metropolis’ Region?

– and will highlight where the findings correspond with the literature or where they differ. Sub-section 8.2.5 will discuss further findings that were presented in Chapter 7.

8.2.1 The role of airports for economic development in the Airport Metropolis’ Region

Many studies about the relationship between infrastructure and economic development, especially in airport precincts, limit their focus to air traffic and researchers agree that in general a positive relationship between airports and economic development exists (Robertson, 1995, Nunn, 2005, Allroggen and Malina, 2010, Smyth et al., 2010). The results of this study confirm this finding as nearly two-thirds of the interviewees acknowledged the airport as ‘important’ or ‘very important’ for a future location decision (see Table 12 in Chapter 6). Nevertheless, this study found that the preference for airports and air traffic and its influence on the location decision depends on different factors and that the influence of airports on economic development is not as clear as the literature suggested.

In line with Button et al. (1995), this research ascertained that larger companies and companies of foreign origin value air connectivity as a location factor more than do
other companies (see Figure 29 in Chapter 6). Nevertheless, Fox (1996) argued that airports are important for headquarters locations and a good commercial air service is needed where companies do not use private jets. Others argued that hub airports attract more companies to their precincts than regional airports do to theirs (Dennis, 1994, Bowen, 2000, Button, 2002). Some indications were found that hub airports play some role for companies’ decision of location but no evidence could be found that companies are using private jets. Rather, it seemed that companies value air connectivity in general but not to that extent that they would prefer a hub airport over a well-connected regional airport or using private jets. This finding has implications for the use of the Airport City and Aerotropolis business models as it clarifies that the business models can be used not only for big hub airports but also for smaller regional airports if other preconditions are in place. The economic development agencies and the literature (Kasarda and Lindsay, 2011) assumed that companies that value air traffic would prefer a location inside the Airport City but hardly any evidence could be found for that aspect in this research (see Table 16 in Chapter 6). Earlier findings that the airport alone is not sufficient for attracting companies to a certain location (Robertson, 1995, Nunn, 2005, Arndt et al., 2009) were confirmed as companies highlighted the importance of the availability of all other infrastructure elements apart from education facilities, if the airport is ‘only’ an ‘important’ and not ‘very important’ location factor (see Table 17 in Chapter 6). This is an important contribution to knowledge as it not only confirms earlier findings that air traffic connectivity is necessary yet not sufficient, but also gives a better idea of the value of other infrastructure elements in relationship to air traffic as Table 17 in Chapter 6 has shown.

The literature review revealed that urban development around airports is a relatively new phenomenon and is largely unreported in academic research. Indeed, no unified definition of airport-centred urban development exists (Betz, 2010, Peneda, 2010, Schlaack, 2010). An important contribution of this study is the finding that the Airport City concept is not only under-researched in academia but also virtually unknown in the business community of non-aviation related business sectors. This finding has wide implications for the implementation of the new
business models ‘Airport City’ and ‘Aerotropolis’ as several times in the literature (Appold and Kasarda, 2010, Peneda, 2010, Schlaack, 2010) it was suggested that Airport Cities and Aerotropoli could be used as a marketing tool for business location and therefore economic development for the airport and the whole region. This research found that the Airport City/Aerotropolis concept is widely unknown among non-aviation related industry leaders, as was stated many times by participants during the interviews. Furthermore, Airport Cities or business parks played only a small role for the decision of location (see Table 10 in Chapter 6 and the discussion in Section 6.4). Additionally, similar to the findings of Schubert and Conventz (2011), this study found that companies are not prepared to pay premium rents for a location in the Airport City. Hence, the Airport City or Aerotropolis is not useful as a branding or marketing tool as companies are widely unaware of the concepts and do not consider Airport Cities as a location factor. Furthermore, even if they consider it as a location, they are reluctant to pay higher rents than in the CBD. This finding needs consideration when the Airport City business model is implemented because a realistic forecast of what is possible in achieving rents has implications for the financial viability.

Apart from the level of the rents, other aspects need to be considered for a successful implementation of an Airport City or Aerotropolis. The results of this study regarding the success factors are interesting as they emphasise the importance of the business and built environment. Consistent with the literature (Güller and Güller, 2001, Reiss, 2007, Appold and Kasarda, 2010, Betz, 2010, Schaafsma, 2010, Michaeli et al., 2011, Peneda et al., 2011, Schubert and Conventz, 2011, Wang and Hong, 2011), it was discovered that connectivity, centrality and accessibility is one of the most wanted location factors and often the main reason for a location at the Airport City. Additionally, an important finding was that the built or urban environment is for many companies paramount and often a factor for not moving towards the Airport City as the built environment does not fit their needs. This extends earlier findings of Schubert and Conventz (2011) as this research clarified that companies prefer an urban centre as a location and are not satisfied with the offer of only some lunch options or staff canteens. Moreover,
companies emphasised business agglomeration or cluster as an essential precondition to consider the Airport City as location. On a country or regional level, they mentioned market perspectives as crucial, confirming the hypothesis that a vibrant economy helps to establish a successful Airport City (Schaafsma, 2010, Peneda et al., 2011).

In summary, it was found that the airport plays a role for companies’ decision of location in the Airport Metropolis’ Region but that ‘airport’ is only one factor for the location decision. The positive decision to settle in the airport precinct is accompanied by available business agglomeration, ground transportation connectivity, accessibility and centrality. While firms that are seeking headquarters locations or are of larger size and/or of foreign origin seem to value the element ‘airport’ more for their location decision than others, non-aviation related companies in general seem to be reluctant to move into the Airport City precinct for premium rents as they do not value the location ‘Airport City’. Furthermore, companies explicitly ruled out moving to the Airport City precinct as they expected the built environment would not meet their needs of a business location. While it was confirmed that transportation, in line with location theory, is still today an important location factor, it was clear that transportation for knowledge-intensive companies is more important in terms of ‘moving’ their workforce and making the place easily accessible for employees and customers than minimising transportation costs for goods. An important finding was that the built environment is similarly important as the transportation options for the location decision. Companies indicated that the built environment is paramount as they expect that ‘talents’ want to work in a surrounding that matches their expectations of a workplace. In conclusion, it was found that creative class theory explains the emphasis that companies place on the built environment (in contrast to direct access to air traffic connectivity and transportation options). Therefore, a shift from goods transportation to people transportation and an increasing value placed on human capital can be observed, and this observation enhances the understanding of location theory. The airport or Airport City alone is not decisive for the location decision; rather, other infrastructure elements need to be available to complement
it. The next sections discuss the findings for the importance of other physical and social infrastructure elements.

8.2.2 The role of other physical infrastructure elements for economic development in the Airport Metropolis’ Region

The investigation of different physical infrastructure elements for economic development in the Airport Metropolis’ Region provided a good insight into the importance of different elements but also revealed that while different elements are important, the ‘sum is more than its parts’. Companies considered less the availability of separate infrastructure elements but highlighted the importance of connectivity or rather the transportation network and intermodality. Companies stressed that they are not gravitating towards the Airport City because of the convenience of air connectivity at their doorstep but because of the connectivity offered by the transport hub via air, road and rail. Furthermore, they considered this aspect not so much important for moving products but people. Companies wanted to be easily accessible for their employees and customers and also wanted to be well connected in the region as their ‘product’ was often ‘knowledge’; that is, employees travel to the customers to consult with them. This is a critical finding as it could mean that location theory is still valid in its original idea (to minimise transport costs) but that in a more service-oriented economic world it is not physical goods but people that are transported.

Apart from the finding that firms value connectivity and accessibility, the qualitative and quantitative data offered a deeper insight into the importance of single physical infrastructure elements for the location decision. The importance of roads and parking possibilities for the decision of location reaffirmed the findings in the literature (Button et al., 1995, Bruinsma et al., 1997, Richaud et al., 1999, Holl, 2004, Conventz, 2010). Parking was for more than 90% of the companies an important location factor while roads were important for nearly 88% (see Table 18 and Table 21 in Chapter 6). Similarly, more than 80% of the interviewed decision-
makers stated that public transport is ‘very important’ or ‘important’ for the location decision (see Table 19 in Chapter 6). This result is in contrast to the findings of Kimelberg and Nicoll (2012), who found that it is only ‘moderately important’. One explanation could be that the study of Kimelberg and Nicoll took place in the USA while this study interviewed companies in Germany and the UAE. Especially in Germany, public transport was strongly emphasised by many companies. The findings for the component ‘rail access’ were influenced by perception and, as with public transport, by cultural differences. In contrast to the findings of Buurman and Rietveld (1999), 60% of firms found rail access important for the location decision. Similar to public transport, the country or context (Thailand versus Germany and the UAE) in which the research took place could explain these differences. In Frankfurt, several companies stressed the convenience of the access to the high-speed rail network as a location factor for the Airport City, confirming Conventz’s (2010) assumption that high-speed rail access could be a competitive advantage for the Airport City. The qualitative data uncovered that ‘rail access’ was an important location factor for German companies as people are used to it and expect it in close proximity to the office location while in the UAE it was only mildly important as not available and therefore often not considered for the location decision. These findings pinpoint the need of more consideration of cultural and regional circumstances in location theory. Furthermore, it could be an indication that the cultural background of the ‘creative class’ needs consideration as well, as it is possible that knowledge workers from different backgrounds consider different aspects when considering where to (re)locate.

In conclusion, it was found that both location theory and creative class theory can explain the importance of physical infrastructure elements other than the airport for economic development in the Airport Metropolis’ Region. The clear emphasis of firms’ location decision in regard to physical infrastructure elements is on people, either in the form of ‘product’ (knowledge, service) or convenient access for the workforce or customers. Hence, physical infrastructure elements play a crucial role for economic development in the Airport Metropolis’ Region. Regional circumstances and cultural backgrounds influence firms’ preferences of different
physical infrastructure elements for the location decision and should be considered in location and creative class theory.

8.2.3 The role of social infrastructure for economic development in the Airport Metropolis’ Region

For a knowledge-based and service-oriented world, qualified workers have become the most important resource and young professionals have become extremely mobile and value social infrastructure (Florida, 2002, Florida, 2005, Florida, 2010, Kasarda and Lindsay, 2011). The question arises: are companies paying enough attention to the importance of social infrastructure as a contributing factor in attracting the right workforce? Interestingly, this seems to be the case in the classical creative industries such as the media. The literature found that businesses of the creative industries prefer urban places with good social infrastructure:

... there are clear differences in terms of the spatial orientation of different types of firms and different types of workers. There is, indeed, strong support for the argument that both economic activities in the creative sphere and those who are working in these activities show preference for the most urban locations, which are characterised by very high levels of functional and physical – and also some social and cultural – variety; these areas are also the core areas where one can find restaurants, cafes, theatres and other public and lively spaces. (Musterd, 2006, 1134f.)

An interviewee from a company offering business services in a creative sector confirms the claims of the literature:

Honestly, not really [considering the Airport City as location]. The opposite, I know from another company, but that only as a side note, they were considering one location in the Airport City but decided against it. They say rightly, if we like to offer our talents something, then we must be located in real city proximity. An Airport City cannot really offer SOHO-like inspiring environments. This is critical to attract especially creative talent. (Company creative industry, Frankfurt; code deleted to guarantee anonymity)
Endorsing this finding, van Oort et al. (2003) found that companies were afraid to lose their workforce when relocating from a high-amenity area to one with fewer amenities, but companies interviewed for this research frequently mentioned being afraid of losing their workforce more in the sense that the distance to the living location of employees could become too high when relocating to a different part of the city (e.g. in Dubai towards Dubai World Central). This different consideration of space (region versus actual location) is a repeating theme for the findings of the importance of social infrastructure for location decision and in contrast to creative class theory, which looks at wider regions. Furthermore, similar for the findings of physical infrastructure, culture and regional circumstances were found influential for the importance of different social infrastructure elements. In the following section, the findings for the different social infrastructure elements will be discussed in more depth.

‘Community service facilities’ were an important location factor for more than 60% of the interviewed group. This is, in part, in accordance with the literature as Kimelberg and Nicoll (2012) found it a moderately important location factor and Maoh and Kanaroglou (2009) found a positive relationship for malls. In contrast, van Oort et al. (2003) could not find any evidence. Noteworthy is the emphasis of German companies on lunch options or staff canteens. This confirms earlier findings by Conventz (2010). As discussed above, this indicates that location theory and creative class theory need to consider stronger regional circumstances and cultural background to determine companies’ decision of location. This example shows that while one factor can be paramount for a location decision of a special ethnic group, it is possibly irrelevant to another. These findings contribute significantly to the understanding of firms’ decision of location in the twenty-first century.

Apart from one study for start-ups (Audretsch et al., 2005) that found a positive relationship for ‘education facilities’ and location decision, all other studies (Johnson and Rasker, 1995, Audretsch and Stephan, 1996, Moreno et al., 1997, Granger and Blomquist, 1999) that investigated the influence of education facilities could not find a positive relationship between economic development and
education infrastructure. The findings of this study confirm these latter results. Furthermore, one of the few companies that emphasised education facilities as an important location factor was a young start-up, confirming earlier findings by Audretsch et al. (2005). This research has assisted in clarifying in what circumstances education facilities – in most cases irrelevant for the location decision – could become an important location factor. As seen earlier in Chapter 6, education facilities, for example in Masdar City, Abu Dhabi, were in some cases the number-one location factor.

In regard to ‘health facilities’, findings of the literature (Moreno et al., 1997, Love and Crompton, 1999) were not clear; similar results were found in this study. Only 36.4% of questioned firms found health facilities important for the location decision. Nevertheless, the qualitative data revealed that health facilities are often not a location factor as they are expected to be available in the metropolitan area regardless (Germany) or are considered unnecessary as the workforce consists of young, healthy expatriates (UAE). These are significant findings as they indicate that health facilities could be much more important in a certain context, such as a stand-alone Airport City, than the literature and the quantitative data revealed. The findings for ‘religious facilities’ need to be interpreted similarly. ‘Religious facilities’ were considered ‘very important’ for more than 15% of the interviewed firms. This outcome was clearly influenced by the environment of Muslim countries (UAE). As the results in Chapter 6 show, if ‘religious facilities’ were important, they were often ‘very important’ and had to be directly accessible. Therefore, the regional context and the culture of the possible workforce can have a high influence on the success of a stand-alone Airport City where all kinds of wanted infrastructure elements need to be available as the development is not embedded in a metropolitan context.

A study by Kimelberg and Nicoll (2012) found weak evidence for the importance of ‘leisure facilities’ in general and also found that this factor could be more important in certain context settings such as relocating to a different state or rural area (Love and Crompton, 1999). The results of this research confirm these findings as some
companies (those working in creative industries) emphasised it more than others. Overall, only 27.3% of the firms found leisure facilities a ‘very important’ or ‘important’ location factor. An exciting finding was that many companies emphasised leisure facilities not per se but stressed the importance of gym facilities in close proximity to the office location – a finding that could indicate that firms are considering the needs of their employees. Furthermore, it pinpoints the need of further disentangling the different infrastructure elements as it seems that some elements such as a gym are much more important than others such as a theme park or cinema. This aspect needs consideration in planning of future Airport Cities as at the current stage developers often emphasise theme parks and entertainment complexes.

To summarise, the results have shown that social infrastructure plays an important role for economic development in the Airport Metropolis’ Region but that much more research is necessary to disentangle the importance of different elements more in depth. Furthermore, more research is needed to better understand the influencing factors such as region, culture and workforce. Confirming the creative class theory, ‘talents’ value cafes, bars and restaurants more than, for instance, sports events. This study found a significant influence of ‘community service facilities’ for companies’ decision of location. Notable implications can be drawn from the fact that cafes, restaurants, banks, shopping centres and – in the group of leisure facilities – gyms were valued highest from companies. The organisation of the daily workday has changed from a more or less break-free eight-hour day in the beginning of the twentieth century to a workday in the twenty-first century where employees are doing their shopping, visiting the gym or going outside to eat or drink a coffee during their breaks. These are changes that need to be considered in location theory as companies consider, at least to a certain extent, the needs of their employees when making a decision about office location. Nevertheless, it does not seem that companies consider social infrastructure in terms of attracting the ‘right’ workforce to a region but consider it important in a closer spatial setting to the office location as they assume to attract or retain the ‘right’ workforce by doing so. This could hold significant implications for creative class theory as it could mean
that the spatial dimension needs reconsideration, from a regional to a more localised area. The next section will summarise the findings in regard to the desired spatial dimension of different infrastructure elements.

8.2.4 Spatial distribution of infrastructure elements for economic development in the Airport Metropolis’ Region

Hardly any study in the literature review looked at the spatial dimension of infrastructure elements. This research has made a start at addressing this issue by asking companies about the maximum acceptable distance of different infrastructure elements to their office location. As the literature review revealed, it is important to define where infrastructure should be located in relation to an economic development site due to possible (negative) spillover effects. Furthermore, it was found in this research that businesses are sensitive to the importance of their distance to infrastructure elements. For instance, parking possibilities often were not only a very important location factor but were also desired to be in walking distance (the definition of walking distance varied widely between nationalities of interviewees and is therefore important to consider as well). The findings for the spatial distribution of infrastructure thus hold important implications for a ‘man-made’ Airport Metropolis’ Region and its economic sustainability.

As clarified earlier, the Airport Metropolis’ Region is similar to the Aerotropolis and encompasses the Airport City, the host city and the corridor. Kasarda (2009) defines the influence of the Aerotropolis as up to 32 km from the airport. This study found that interview participants desired all infrastructure elements to be located in that radius, or rather inside the boundaries of the Aerotropolis. Interestingly, by calculating the mean values of the quantitative data, the highest value was found for airports with 28.5 km. All other infrastructure elements were desired to be closer to the office location by interviewees. Nevertheless, the desired location for
different infrastructure elements varied widely. Figure 54 summarises the research findings.

Figure 54: Desired maximum distance of infrastructure elements to economic development site

In contrast to the hypothesis that every company wants to be located at the airport (Kasarda and Lindsay, 2011), a mean value of 28.5 km was calculated for airports in this research. ‘Parking’, ‘public transport’ and ‘religious facilities’ have to be in walking distance to the office location. In a wider radius, up to 5 km, ‘community service facilities’, ‘road access’ and ‘rail access’ should be available. A study by Bruinsma et al. (1997) and a study by Holl (2004) investigated the spatial dimension of roads and found a distance of 7.5 km and 10 km, respectively. This thesis found a mean value of 4.6 km. The lower distance is explainable as ‘road access’ meant in
the context of the UAE any road, while usually freeways or highways were researched in the literature. The mode value of 100 m confirmed this assumption (see Table 27 in Chapter 6). ‘Rail facilities’ were desired in a radius of 3.9 km while ‘community service facilities’ have to be in a maximum distance of 2.3 km. Nevertheless, the median and mode values for ‘community service facilities’ are both 1 km. Therefore, ‘community service facilities’ should be considered in walking distance. In a distance of 5 to 15 km, ‘health facilities’, ‘leisure facilities’ and ‘education facilities’ should be located. ‘Health facilities’ can be in a distance of 6.7 km while ‘leisure facilities’ can be 13.6 km away from the office location. Audretsch et al. (2005) found a median of 7 km for ‘education facilities’ in their study while this research found a median of 7.5 km (mean value of 11.4 km).

In summary, the findings for the spatial dimension for ‘education facilities’ and ‘roads’ confirm the sparse findings of the literature. In contrast to the literature, where it is asserted that businesses want to be located directly at the airport, or rather inside the Airport City, this study found that many companies value a location in proximity to the airport but that they are not necessarily seeking a location in direct proximity. While important facilities for employees, such as transportation access and community service facilities, have to be close by, it was observed that education, health and leisure facilities are still valid location factors but only have to be available in the wider region to satisfy the living needs of employees or to facilitate the recruiting of future employees. This is in line with the creative class theory as it applies to cities and regions, but the observation also shows that location theory and creative class theory need to include a spatial definition of the region or ‘environment’ under consideration.

This study has made a start in defining desired locations of infrastructure elements for economic development in the Airport Metropolis’ Region. However, as the rich qualitative data revealed, preferred distances are influenced by many other factors, such as the cultural background of the decision-maker and workforce, the business sector and the regional structure. Chapter 7 discussed these findings in detail. The next section highlights some of these findings and their contribution to the field.
8.2.5 Further findings for decision of location in the Airport Metropolis’ Region

Further findings were discussed extensively in Chapter 7. At this point, only selected comparisons with the literature will be made and some main contributions to the field and theory highlighted.

Appold and Kasarda (2011) questioned if air traffic is really a pull factor for business location as ‘air traffic itself does not appear to have a significant effect on seeding regional real estate or employment development’ (Appold and Kasarda, 2011, 99). Robertson (1995) argued that airports stimulate new investment and good air connectivity and connectivity with the road network can be a pull factor for business. Similarly, Smyth et al. (2010) found that in a globalised marketplace, competitiveness of the region could rise through connectivity. Reiss (2007) hypothesised that for the success of a modern airport ‘connectivity’ is paramount. The findings of this study conform with the literature as connectivity, centrality and accessibility was found to be a central theme for the location decision and it was found that air traffic alone is often not a strong pull factor for location decision. Beyond this, the concept of connectivity was understood on a much deeper level. As discussed in Section 7.3, companies consider not only air connectivity for their location decision but connectivity, accessibility and centrality on an international, national and regional level. In line with the literature (Kasarda, 2008e, Kasarda, 2008b, Keast et al., 2009, Betz, 2010, De Lange, 2010, Kramer and (Kramer Aerotek Inc.), 2010, Schaafsma, 2010, Stevens et al., 2010, Michaeli et al., 2011, Peneda et al., 2011, Schubert and Conventz, 2011) it was found that a competitive advantage of the Airport City could be its connectivity with an intermodal network. Companies in Germany stressed numerous times that they are either located at the Airport City for that reason or that that would be a ‘must to have’ factor.

It was found in the literature that air traffic is a necessary but not sufficient condition for economic development. Robertson (1995) found that good air traffic can help to stimulate economic growth in a region, but that other factors are
complementary: the level of skilled workers, the telecommunication network and the provided education facilities. A similar finding was made by Nunn (2005). He examined aviation investments and economic outputs in different regions in a comparative study and found that airports alone do not guarantee economic success of a region but other assets are more important, like skilled workers and agglomerations of companies in the same business. Actually, he found that some regions are economically successful although they have shortcomings in aviation infrastructure. As the developed schema in Chapter 7 (Figure 52) shows, numerous considerations and factors play a role for the decision of location. The regional context and culture of a place especially influence what kind of built environment is successful in attracting tenants and which is not. This is in line with Baker and Freestone’s (2011) assertion that a ‘build it and they will come’ approach is unlikely to work. Indeed, it was found that the business environment is an important location factor either in the form of traditional cluster or of business agglomeration. Often companies also stated that a certain ‘ambience’ is connected with this and therefore must be taken as a location factor. Furthermore, regional preconditions influence preferences for the built and business environment. For instance, companies in Berlin mentioned often that they prefer a ‘Kiez’ (neighbourhood) atmosphere while a free zone set-up was paramount in the UAE. Therefore, an important contribution of this study is that location theory and the Airport City/Aerotropolis concept need to consider regional characteristics much more in the future.

Another main contribution of this thesis is its revelation about the influence of culture on the infrastructure (both physical and social) preferences for companies’ decision of location. For example, it was found that German companies value public transport much more than other nationalities. Likewise, it was found that lunch options or staff canteens are paramount for a location decision of a German company or a company with a high amount of German employees. Therefore, an important finding is that Airport Cities as business locations need to be customised according to regional characteristics and the needs of their future tenants by taking the cultural background into account.
8.3 Contribution

8.3.1 Theoretical contribution

This research presents several theoretical contributions. First, it contributes to the Airport City or airport-centred urban development literature and research. From the literature review, research on this emerging phenomenon is limited. So far, most of the research has concentrated on understanding the urban form but falls short in exploring both its limitations and strengths for economically sustainable real estate development. This research explores in depth the relationship of infrastructure and companies’ decision of location in the environment of an Airport City or Aerotropolis. Furthermore, it analyses the Airport City as an infrastructure catalyst for economic development. Additionally, it contributes to Kasarda’s (Kasarda, 2009, Kasarda and Lindsay, 2011, Kasarda, 2013) Aerotropolis concept as it was shown that the concept needs stronger consideration of the regional context and social infrastructure needs to be included in addition to transportation infrastructure (see Figure 14 in Chapter 3). Second, this thesis extends the research on the relationship between infrastructure and economic development by including more substantially social infrastructure elements into the investigation. Social infrastructure, as defined in this research, was analysed only in a very limited way in prior research. Additionally, although there is much more research on physical infrastructure, existing research concentrates mainly on air traffic and road supply and their implications for economic development and is limited regarding other physical infrastructure elements. This research investigates in depth many physical and social infrastructure elements and their influence on a firm’s location decision and goes even further by defining ‘ideal’ or maximum acceptable distances to economic development sites – an aspect that is largely neglected in former research.

Furthermore, this research makes a significant contribution to location theory and creative class theory. It was found that the knowledge-intensive economy of the twenty-first century is influenced by many more factors than was the case more
than 100 years ago when Weber (1909) formulated his industry location theory, and that in particular the environment has become an important location factor. Companies acknowledged widely, conforming with creative class theory, that the availability of the ‘right’ workforce is an important location factor but often they would connect it only in a limited way to the importance of social infrastructure in the wider region. While firms of different backgrounds and sizes acknowledged the importance of the availability of the ‘right’ workforce, this study found that regional circumstances and cultural background influence strongly the preferences for different physical and social infrastructure elements. Both location theory and creative class theory do not take these factors into account. Furthermore, by combining the two theories in one research project, it was possible to explain why companies in a knowledge-oriented economic world still value transportation infrastructure for the location decision. Their interest shifted from minimising transport costs of goods to those of people. Creative class theory considers the needs of the workforce and their location decision. Companies acknowledge the truth of this but not necessarily at a wider regional level but in a more defined spatial setting. As a result, it can be argued that especially in the context of the ‘man-made’ environments of Airport Cities and Aerotropoli, the built environment, and within it the spatial dimension of different infrastructure elements, needs consideration in both theories as it influences significantly how well location theory and creative class theory can explain companies’ decision of location in regard to infrastructure. It is only by combining the understanding of location theory, including the knowledge of foreign direct investment and agglomerations, and creative class theory complemented by a component for regional circumstances and culture, that companies’ choice of location in the new built and business environment of Airport Cities and Aerotropoli becomes predictable.

8.3.2 Contribution to practice

In addition to the above theoretical contributions, this thesis presents many practical contributions.
First, this research will help airport managers of Airport City developments to understand the importance of developing from airport managers to regional managers. It will also enhance the understanding of real estate in the airport precinct and the interfaces of the Airport City with the wider region. Furthermore, it was demonstrated that the concept ‘Airport City’ and ‘Aerotropolis’ is little known in the business world and therefore is not useful as a branding or marketing tool contrary to the assertions in the literature (e.g. Appold and Kasarda, 2010). Additionally, it was shown that the non-aviation related business world is mostly reluctant to pay a premium for real estate inside the airport precinct. Hence, there is a need for the adjustment of the business model’s financial implications to ensure realistic economic forecasts. Furthermore, it was demonstrated that the provision of air traffic alone rarely attracts businesses to a location. Therefore, if airport management intends changing its business model from pure air traffic infrastructure providers to Airport City developers and beyond, it will need to consider all kinds of infrastructure supply and in appropriate distances and it will need to develop suitable approaches for its timely development and financing to guarantee a successful and sustainable Airport Metropolis’ Region.

Second, city and regional councils will be able to better understand how and why an Airport City development needs wide integration with the city or regional design layout. Infrastructure development should not be left to the Airport City developers but should be designed and implemented in a wider regional context. For example, if the Airport City is in close proximity to the city centre, social infrastructure developments in the geographical ‘middle’ of the two could serve both locations if the location of this ‘middle’ does not go beyond the maximum accepted distance to the office location as determined in this research.

Third, architects, Airport City planners and economic development agencies are presented with useful tools in this research to design the Airport Metropolis’ Region in a more sustainable and economically successful way. By developing a better understanding of the decision-of-location process and of the different preferences for infrastructure supply and how these preferences are influenced by cultural
backgrounds will help to make the Airport Metropolis’ Region of the future a better place in which to work, live and spend leisure time.

### 8.4 Limitations

A few limitations of this research can be identified. The sample size for the interviews was rather small for the analysis of the quantitative data, but it gave in combination with the qualitative data deep insight into companies’ infrastructure preferences and their spatial dimension. Furthermore, this research did not cover every business sector, although three business sectors and four context regions in two different countries were studied. To extend the research findings, more research in different regions with different business sectors and larger sample sizes would be desirable in the future. Nevertheless, this research has given a deep insight into the role of infrastructure for the location decision of companies of different backgrounds, sizes and business sectors in the Airport Metropolis’ Region.

### 8.5 Implications for Methodology

The research design was extensively discussed in Chapter 4. The choice for different methods was clarified and justified. It was found that the mixed methods approach of embedded quantitative data collection in a qualitative interview approach revealed good insight into the research problem (such as the preferences for parking and rail, see Section 4.1) that could not have been revealed with a purely qualitative or quantitative study. Nevertheless, a ‘follow-up’ quantitative study with a large sample would be useful to confirm the research findings, especially in the aspect of ‘preferred distances’.

### 8.6 Future Research

Future research in the area of understanding the importance of infrastructure supply for employees in their decision for a certain workplace and company would extend this study. This demand-side study of employees would provide a deeper
understanding of the needs of the workforce and give further insights for the creative class theory. Are people choosing a workplace because of offered infrastructure, physical and social, in the surroundings of the workplace? What are their preferences? What is the importance of quality-of-life for relocating for work? The wishes of employees are only considered in a limited way when companies decide on a certain location. In a location with full employment like Australia or with a shortage of engineers, like in Germany, the decision of location can be crucial for a company’s success – or failure if it fails to attract the ‘right’ employees. While Florida (2005, 2010) undertook extensive research in that field for the USA, it would be valuable to do more research in different countries and include the environment of an Airport City and Aerotropolis. Airports attract human-capital-intensive jobs and jobs in service-related and high-technology industries. The employees of these industries are usually people who love travelling and have friends and families overseas (Tretheway and Emerson, 1994). It can be expected that employees would prefer locations where the overall infrastructure fits their needs and the needs of their families. Therefore, a complete set of infrastructure elements should be tested. The following quote epitomises this view:

... if we take into consideration the fact that the current employees in new economic activities clearly have more choice opportunities compared with the manufacturing workers of the past; this is especially true for employees with higher education and those who are relatively affluent. Increased choice is connected with higher levels of individual mobility, which is reflected in higher levels of intra-national and transnational migration in the post-World-War-Two period. These developments may imply that interurban and interregional competition has grown regarding attracting the best-qualified people. Consequently, at this moment, creating conditions for those who are working in vital urban economic activities may have become a more important aspect of stimulating the urban economy. (Musterd, 2006, 1326)

Furthermore, more individual research of different infrastructure elements and their spatial dimension is desirable to create comprehensive knowledge in that field. As outlined in 2.3.1, the Airport Metropolis’ Region offers a unique
opportunity to set the spatial distribution for economic development ‘right’. More data of bigger sample sizes and different regional and cultural settings would extend the understanding of the infrastructure needs and spatial distribution for economic development in the Airport Metropolis’ Region. Moreover, it would be interesting to explore other industry sectors, widen the existing sample and add different study regions.

Additionally, research on Airport Cities, Aerotropoli and their affiliated urban forms is very limited and need more investigation in all its aspects. Future research should focus on understanding the different airport-centred urban developments in depth and their benefits and limitations for real estate development in the airport precinct. In particular, the environment ‘Airport City’ and the spatial dimension of infrastructure supply should be investigated more in depth.

### 8.7 Some Final Remarks

This study is an initial contribution to a more in-depth understanding of the Airport City/Aerotropolis concept and its economic development potential. It has disentangled some of the relationships between infrastructure supply and economic development. It clearly contributes to the literature and diverse theories of the relationship between infrastructure and companies’ decision of location. Furthermore, it gives practitioners a deeper understanding of the Airport City/Aerotropolis concept and the relationship of provision of infrastructure and the attraction of non-aviation related companies to their sites. Furthermore, by defining ‘optimal’ distances of infrastructure elements to an economic development site, it gives practitioners a powerful tool to develop their Airport Cities in a more sustainable way.

Two main conclusions can be drawn from this research. First, the Airport City/Aerotropolis concept is widely unknown among business leaders of non-aviation related companies, and these leaders do not see the Airport City necessarily as attractive as a business location, at least not for a premium.
Nevertheless, they would consider the Airport City as a location if the facilities and conditions, like price, business cluster and infrastructure supply to name a few, would be at least as equally as good as in the city centre, or rather meet their location needs. Therefore, extensive marketing is necessary to advertise the business location ‘Airport City’ and consideration of the built environment has to take the needs of future tenants into account. Second, although business leaders emphasised physical infrastructure elements in their decision of location, social infrastructure plays a role for the decision of location and attraction of the right workforce to the site. This holds especially true for community service facilities and gyms as company decision-makers are aware that these facilities are important for their employees to use, for example during lunch breaks.

The literature suggests that air traffic is the key driver of economic development in the airport precinct. This research was able to show that airports alone rarely attract non-aviation related companies to the Airport City as companies demand a whole set of factors to make a decision for a certain location. It was clear that various infrastructure elements need to be supplied to enforce economic development and cannot be left to market-driven demand. In terms of transportation infrastructure, companies value a network of different transport options. The supply of, for instance, road access alone is seen as insufficient for a positive location decision. Some social infrastructure elements such as a gym and cafes and restaurants are strong preconditions for the location decision. Furthermore, companies emphasised that they are looking for an urban centre as a location. This indicates that all forms of infrastructure need to be offered from the start to facilitate an economically sustainable development in the Airport Metropolis’ Region.

By analysing the role of different infrastructure elements for companies’ decision of location in the Airport Metropolis’ Region, this research has made a contribution to better understanding sustainable economic development in the light of new airport-centred urban developments, known as Airport Cities and Aerotropoli.
9 References


AL AMRI, A. 2010. A comprehensive review of airport business models. ACI Asia Pacific Young Executive of the Year 2011. Award Submission: ACI.


ALBRECHT, F. 2008. Wirkungen der Airport City auf die regionale Einzelhandelsstruktur. Frankfurt Airport City-Chance oder Risiko für die Region Rhein-Main? . Offenbach am Main, Germany: Vereinigung für Stadt-, Regional- und Landesplanung Regionalgruppe Hessen/Rheinland-Pfalz/Saarland, Kommunale Arbeitsgemeinschaft Flughafen Frankfurt/Main, Rhein-Main-Institut e.V.

ALJAIJEJ, S. 2010. 10 things to know about Dubai and Abu Dhabi Markets. 3rd Annual World Medical Tourism &
Global Health Congress. Hyatt Regency Century Plaza Hotel, Los Angeles, CA, USA.

ALLROGEN, F. &MALINA, R. 2010. Casual relationships between airport provision, air traffic and economic
growth: an econometric analysis. 12th WCTR. Lisbon, Portugal.

AMERICAN PLANNING ASSOCIATION 2006. Planning and Urban Design Standards, Hoboken, New Jersey, John
Wiley & Sons, Inc.

AMMARI, S. S. 2009. ADAC showcases business and logistics park to French delegation [Online]. Dubai, UAE:
November 2011].

AMT FÜR STATISTIK BERLIN-BRANDENBURG. 2013. Statistik Berlin Brandenburg [Online]. Potsdam, Germany:


Der Tagesspiegel, 07th of January 2013.

Insight Media.

Media.


market literature. Research in Transportation Business & Management, 1, 91-100.

Studies, 50, 1239-1259.

Conway Data.

Impacts of Air Transport in Germany-The Influence of Connectivity by Air on Regional Economic
Development. 13th ATRS Conference. Abu Dhabi, UAE.

2013].

ASEMANN, K. H. 1963. Frankfurt am Mai, Arbeitsplatz für 500 000 Menschen: Eine Untersuchung über die
Struktur der Frankfurter Wirtschaft und ihrer Beschäftigten nach den Ergebnissen der
Main. Frankfurt am Main, Germany: Buchdruckerei Kumpf & Reis.

ATTWOOD, E. 2011. Dubai int'l airport outlines $7.8bn expansion plans. arabian business.com, 06th of July
2011.


BRAKE, K. 2008. Wirkungen einer Airport City auf die Urbanität der Stadtkerne der Region. Frankfurt Airport City-Chance oder Risiko für die Region Rhein-Main? Offenbach am Main, Germany: Vereinigung für Stadt-, Regional- und Landesplanung Regionalgruppe Hessen/Rheinland-Pfalz/Saarland, Kommunale Arbeitsgemeinschaft Flughafen Frankfurt/Main, Rhein-Main-Institut e.V.


DUBAI INTERNATIONAL AIRPORT. 2012. DXB registers a record 27.9m passengers in the first half [Online]. Air Transport News. [Accessed 04th of September 2012].


FLORIDA, R. 2010. The flight of the creative class: The new global competition for talent, Pymble, Australia, HarperCollins (ebook).


FRAPORT AG 2010a. Airrail Center heiß jetzt THE SQUAIRE. AeroBrief. München, Germany: entity38 AG.


FREESTONE, R. 2010. Commercial development on Australian airports: Planning issues and debates through the lens of the National Aviation Policy Review. Faculty of the Built Environment, University of NSW.


ICAO 2013b. Case Studies on Commercialization, Privatization and Economic Oversight of Airports and Air Navigation Services Providers (ANSPs) - South Africa. Montreal, Canada.


Launhardt, W. 1885. Mathematische Begründung der Volkswirtschaftslehre, Leipzig, Germany, B.G. Teubner.

Lehn, I. 2008. Die Entwicklungen der Airport City in Frankfurt. Frankfurt Airport City-Chance oder Risiko für die Region Rhein-Main? Offenbach am Main, Germany: Vereinigung für Stadt-, Regional- und Landesplanung Regionalgruppe Hessen/Rheinland-Pfalz/Saarland, Kommunale Arbeitsgemeinschaft Flughafen Frankfurt/Main, Rhein-Main-Institut e.V.


10.1 Email Survey

Subject: Airport Research

Dear XXX,

It was a pleasure to meet you at XXX in XXX. As you know, I am a PhD candidate at the School of Tourism and Hospitality Management at Southern Cross University in Australia. As part of my research: “Analysing the optimal infrastructure for economic development in an Airport Metropolis’ Region”, I am conducting a very short survey about business sector preferences in an airport surrounding. I would like to ask you to fill in the survey below and send it back via reply email. It will not take more than 5 minutes of your time.

If you think another person in your company is better eligible to answer that kind of questions, feel free to forward it.

Please answer not later than 30 September 2011. Your participation is greatly appreciated.

Kind regards

[Signature]

Should you require any further information regarding this study please, feel free to email or phone me.

Mirjam Wiedemann, Dipl.-Ing.
PhD Candidate & Research Assistant

Southern Cross University
School of Tourism & Hospitality Management
Gold Coast Beachside Campus, A3.16 B
Southern Cross Drive, Gold Coast Airport
Bilinga, QLD 4225
postal address:
Locked Mail Bag 4, Coolangatta, QLD 4225
Australia
T   +61 7 5589 3116
F   +61 7 5589 3700
M   +61 4 1684 9841
Survey

All data will be treated strictly confidential and results should be anonymised!

1. Name of airport you are working for:................................................................................................................

2. What is your position?
........................................................................................................................................................................

3. For how many years have you
   a) worked for this airport?
   ...........................................................................................................................................................
   b) worked in your today’s position?
   ...........................................................................................................................................................

4. Please mark (by highlighting) the five most wanted non-aviation related business sectors you would like to attract to the corridor between the airport and the host city!

   Accommodation, Cafes and Restaurants
   Advanced Engineering (non-aviation related, for example automotive, machinery, etc.)
   Agriculture, Horticulture & Fisheries
   Business & Consumer Services
   Chemical Industry
   Clothing, Footwear & Fashion
   Construction
   Cosmetic Industry
   Creative & Media
   Cultural & Recreational Services
   Defence & Security
   Education & Training
Energy (renewable)
Environment & Water
Financial, Insurance & Professional Services
Food & Beverage Industry
Giftware, Jewellery & Tableware
Health & Community Services
Household Goods, Furniture & Furnishings
Information- and Communications Technology (for example high-technology electronics)
Leisure & Tourism
Medical Technology, Biotechnology & Pharmaceutical Companies
Marine
Logistics
Printing & Publishing
Textiles, Interior Textiles & Carpets
Wholesale Trade

5. What are the reasons for your choice under 4.?
......................................................................................................................
......................................................................................................................
......................................................................................................................
......................................................................................................................

6. Do you have any other comments you like to add?
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......................................................................................................................
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7. If you like to get notice via email once the PhD thesis is published,
please leave your email address here
......................................................................................................................

Thank you very much for your participation!
CONIDENTIALITY
All information gathered from you will be treated confidentially and anonymously. All data presented in the final thesis will be de-identitied to protect privacy and identity. In addition, all material from the survey will be kept on a password protected computer and in a locked filing cabinet. The results of this study will be published in the research thesis and may be presented at conferences or published in a peer-reviewed journal later on.

ETHICAL CONDUCT
This research adheres to the Guidelines of the ethical review process of Southern Cross University. The ethical aspects of this study have been approved by the Southern Cross University Human Research Ethics Committee (HREC). The approval number is: ECN-11-177. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the HREC through the Ethics Complaints Officer:

The Ethics Complaints Officer
Southern Cross University
PO Box 157
Lismore NSW 2480
Email: ethics.lismore@scu.edu.au

All information is confidential and will be handled as soon as possible.
10.2 Company Interviews

Subject: Economic Development Research

Dear XXX,

I am a PhD candidate at the School of Tourism and Hospitality Management at Southern Cross University in Australia. As part of my research: “Analysing the optimal infrastructure for economic development in an Airport Metropolis’ Region”, I am conducting a study to understand the relationship between infrastructure and decision of location.

As an executive of your company, I would like to ask you to participate in a face-to-face, telephone or skype interview at your location in XXX which will take between 30 and 60 minutes. Interview questions will aim to cover the location decision-making process of your company and the role of different infrastructure elements embedded in it.

Please let me know, if you are willing to participate and what date and time in the period XX to XX 2012 would suit you. Your participation would be greatly appreciated!

If you think another person in your company is better eligible to answer these kinds of questions, please feel free to forward this request.

Kind regards

Mirjam Wiedemann, Dipl.-Ing.
PhD Candidate & Research Assistant

Southern Cross University
School of Tourism & Hospitality Management
Gold Coast Beachside Campus, A3.16 B
Southern Cross Drive, Gold Coast Airport
Bilinga, QLD 4225
CONFIDENTIALITY
All information gathered from you will be treated confidentially and anonymously.
All data presented in the final thesis will be de-indentified to protect privacy and identity. In addition, all material from the interview will be kept on a password protected computer and in a locked filing cabinet. To ensure your data has been accurately reflected by me, a summary of the spoken words will be offered to you for confirmation and approval.
The results of this study will be published in the research thesis and may be presented at conferences or published in a peer-reviewed journal later on.

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All information is confidential and will be handled as soon as possible.
**Subject:** Ökonomische Entwicklung Forschungsarbeit

Sehr geehrter Herr/Frau XXX,

Ich bin Doktorandin an der Southern Cross University in Australien. Im Rahmen meiner Doktorarbeit: *Analyzing the optimal infrastructure for economic development in an Airport Metropolis' Region*, führe ich zurzeit eine wissenschaftliche Untersuchung über den Zusammenhang zwischen Infrastruktur und Standortentscheidung durch.

Als Führungskraft in Ihrem Unternehmen würde ich Sie gerne per Telefon, Skype oder persönlich interviewen. Das Interview würde zwischen 30 und 60 Minuten dauern und Fragen zum Standortentscheidungsprozess und die Rolle von Infrastrukturlelementen beinhalten.

Bitte lassen Sie mich wissen, ob Sie bereit sind, an der Befragung teilzunehmen und wenn ja, welcher Tag und Uhrzeit im Zeitraum XXX bei Ihnen möglich wäre.

Wenn Sie glauben, ein Kollege wäre besser geeignet, diese Art von Fragen zu beantworten, so können Sie diese Anfrage gerne weiterleiten.

Über eine positive Rückmeldung würde ich mich sehr freuen, und verbleibe mit freundlichen Grüßen in die Heimat

[Unterschrift]

Sollten Sie mehr Informationen benötigen, so können Sie mich gerne jederzeit anrufen oder anschreiben.

Mirjam Wiedemann, Dipl.-Ing.
PhD Candidate & Research Assistant

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The results of this study will be published in the research thesis and may be presented at conferences or published in a peer-reviewed journal later on.

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All information is confidential and will be handled as soon as possible.
INFORMATION SHEET

The Consent Form is given to and retained by the Southern Cross University researcher for their records. The Information Sheet is kept by the participant. The participant may request a copy of their consent form.

<table>
<thead>
<tr>
<th>Title of research project</th>
<th>Analysing the optimal infrastructure for economic development in an Airport Metropolis’ Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of researcher</td>
<td>Mirjam Wiedemann</td>
</tr>
</tbody>
</table>

Dear Sir / Madam,

My name is Mirjam Wiedemann and I am a PhD candidate at the School of Tourism and Hospitality Management at Southern Cross University, Australia.
As part of my research project I am conducting a study to understand the relationship between infrastructure and decision of location.

ABOUT THE PROJECT
This research involves participation in a face-to-face or telephone interview which will take not more than 60 minutes. Involvement in the interviews is on a voluntary basis. You are free to ask questions and to withdraw at any time without providing any explanation. The interview will be conducted at a convenient place and time to you. It will be digitally recorded with your permission.
Interview questions will aim to cover the location decision making process of your company and the role of different infrastructure elements embedded in it.

CONFIDENTIALITY
All information gathered from you will be treated confidentially and anonymously.
All data presented in the final thesis will be de-indentified to protect privacy and identity. In addition, all material from the interview will be kept on a password protected computer and in a locked filing cabinet. To ensure your data has been accurately reflected by me, a summary of the spoken words will be offered to you for confirmation and approval.
The results of this study will be published in the research thesis and may be presented at conferences or published in a peer-reviewed journal later on.
Should you require any further information regarding this study please, feel free to email or phone me.

Mirjam Wiedemann
Phone: +61 7 5589 3116
Email: m.wiedemann.10@scu.edu.au
Email: Mirjam.Wiedemann@gmx.de

Thank you very much for your time!

Yours sincerely,

Mirjam Wiedemann

ETHICAL CONDUCT
This research adheres to the Guidelines of the ethical review process of Southern Cross University. The ethical aspects of this study have been approved by the Southern Cross University Human Research Ethics Committee (HREC). The approval number is: ECN-11-177
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PO Box 157
Lismore NSW 2480
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All information is confidential and will be handled as soon as possible
CONSENT FORM

Title of research project: Analysing the optimal infrastructure for economic development in an Airport Metropolis' Region
Name of researcher: Mirjam Wiedemann

Please tick the box that applies, sign and date and give back to Ms Wiedemann

I agree to take part in the Southern Cross University research project specified above.

Yes ☐ No ☐

I understand the information about my participation in the research project, which has been provided to me by the researcher.

Yes ☐ No ☐

I agree to be interviewed by the researcher.

Yes ☐ No ☐

I agree to allow the interview to be audio-taped.

Yes ☐ No ☐

I agree to make myself available for further interview if required.

Yes ☐ No ☐

I understand that my participation is voluntary.

Yes ☐ No ☐

I understand that I can cease my participation at any time.

Yes ☐ No ☐

I understand that my participation in this research is anonymous.

Yes ☐ No ☐

I understand that any information that may identify me, will be de-identified at the time of analysis of any data.

Yes ☐ No ☐

I understand that no identifying information will be disclosed or published.

Yes ☐ No ☐

I understand that all information gathered in this research is confidential. It will be kept securely for 7 years at the University.

Yes ☐ No ☐

I am aware that I can contact the researchers at any time with any queries. Their contact details are provided to me.

Yes ☐ No ☐

I understand that this research project has been approved by the SCU Human Research Ethics Committee.

Yes ☐ No ☐

Participants name: ____________________________

Participants signature: ____________________________ Date: ____________________________

☐ Please tick this box and provide your email address below if you wish to receive notice once the PhD research is published:

Email: ____________________________

Southern Cross University
CONSENT FORM

Page 1 of 1

Analyzing the optimal infrastructure for economic development in an Airport Metropolis' region

Appendices 333
Date: ..............................................................
Time: ..............................................................
Place: ..............................................................

Interview (Company)

All data will be treated strictly confidential and results should be anonymised!

1) Name of company/nationality of company:
...........................................................................................................................................

2) What is your position in the firm?
.................................................................................................................................

3) How many years have you

worked in the firm?
...........................................................................................................................................

worked in your current position?
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4) Which products does your firm produce/offer?
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5) Name of closest airport
...........................................................................................................................................

Appendices 334
6) Distance to this airport
..............................................................................................................

7) How long is the company in that location?
..............................................................................................................

8) Was the airport an important factor in deciding to locate in the catchment area of this airport? Yes No

9) Did the type of airport (hub/gateway/border/capital) play a role by deciding to locate in the catchment area of this airport? Yes No

10) Did Airport Cities or proximity to business parks play a role for the location decision? Yes No

If yes, please specify.
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10a) What would the Airport City need to offer that you would consider them as a location in the future?
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11) How do you/your company make the choice of your business location?
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12) How important were the following infrastructure elements for your decision of location? Please use the following scale for your answers: 1 = very important, 2 = important, 3 = rather unimportant, 4 = not considered at all.

And up to which distance do you consider the following infrastructure elements important for your business?

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<thead>
<tr>
<th>Element</th>
<th>1</th>
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<th>4</th>
<th>Distance</th>
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<tbody>
<tr>
<td>Airports</td>
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<tr>
<td>Community service facilities like clubs, shopping centers, banks, etc.</td>
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<tr>
<td>Education facilities, like schools, kindergartens, universities, etc.</td>
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<td>Health facilities like hospitals, clinics, doctors, etc.</td>
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<td>Leisure facilities like swimming pools, parks, sport clubs, cultural sites, cinemas, etc.</td>
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<td>Parking possibilities</td>
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<td>Public Transport</td>
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<td>Rail</td>
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<tr>
<td>Religious facilities, like churches, synagogues, mosques, etc.</td>
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<tr>
<td>Roads</td>
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</table>

Which other infrastructure elements did you consider for your decision of location?

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<tr>
<th>Element</th>
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</table>
13) What do you think, how important is social infrastructure, such as health, education and leisure facilities, for your employees?

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14) How much was your location decision influenced by other companies' decision for this location (Cluster)?

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15) Was the connectivity a reason for the location? Yes No

If yes, please specify.

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16) What kind and how many access points/ways (multimodal transport: rail, metro, tram, taxis, bus, etc.) into the airport are necessary? Please specify.

..................................................................................................................................................

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17) Who should pay

a) for providing physical infrastructure elements?

b) for providing social infrastructure elements?
Different regions

Germany

a) Berlin

18) Which role plays the cheap housing/rental market for Berlin?
19) Which role plays the perception of the completion of the new airport or the new Autobahn (Osttangente)?

b) Frankfurt

18) Why didn’t you locate in Berlin?
19) If Berlin would offer the same air connectivity like Frankfurt would you prefer Berlin as location? Please specify your answer.

Middle East

a) Dubai

18) Why did you decide for Dubai and not for Abu Dhabi? Probe: Has better integrated infrastructure in one case influenced your decision? Please specify your answer.
19) Will you relocate to DWC? If yes, why? When?

b) Abu Dhabi

18) Why did you decide for Abu Dhabi and not for Dubai? Probe: Has better integrated infrastructure in one case influenced your decision? Please specify your answer.
19) Did Al Bateen Executive Airport play a role for the decision of location?

20) Do you have any other comments you like to add?

................................................................................................................................................
................................................................................................................................................

Thank you very much for your participation!
10.3 Interviews Economic Development Agencies

INFORMATION SHEET

The Consent Form is given to and retained by the Southern Cross University researcher for their records. The Information Sheet is kept by the participant. The participant may request a copy of their consent form.

<table>
<thead>
<tr>
<th>Title of research project</th>
<th>Analysing the optimal infrastructure for economic development in an Airport Metropolis’ Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of researcher</td>
<td>Mirjam Wiedemann</td>
</tr>
</tbody>
</table>

Dear Sir / Madam,

My name is Mirjam Wiedemann and I am a PhD candidate at the School of Tourism and Hospitality Management at Southern Cross University, Australia. As part of my research project I am conducting a study to understand the relationship between infrastructure and decision of location.

ABOUT THE PROJECT
This research involves participation in a face-to-face or telephone interview which will take not more than 60 minutes. Involvement in the interviews is on a voluntary basis. You are free to ask questions and to withdraw at any time without providing any explanation. The interview will be conducted at a convenient place and time to you. It will be digitally recorded with your permission. Interview questions will aim to cover the location decision making process of companies and the role of different infrastructure elements embedded in it.

CONFIDENTIALITY
All information gathered from you will be treated confidentially and anonymously. All data presented in the final thesis will be de-indentified to protect privacy and identity. In addition, all material from the interview will be kept on a password protected computer and in a locked filing cabinet. To ensure your data has been accurately reflected by me, a summary of the spoken words will be offered to you for confirmation and approval. The results of this study will be published in the research thesis and may be presented at conferences or published in a peer-reviewed journal later on.
Should you require any further information regarding this study please, feel free to email or phone me.

Mirjam Wiedemann  
Phone: +61 7 5589 3116  
Email: m.wiedemann.10@scu.edu.au  
Email: Mirjam.Wiedemann@gmx.de

Thank you very much for your time!

Yours sincerely,

Mirjam Wiedemann

---

**ETHICAL CONDUCT**

This research adheres to the Guidelines of the ethical review process of Southern Cross University. The ethical aspects of this study have been approved by the Southern Cross University Human Research Ethics Committee (HREC). The approval number is: ECN-11-177

If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the HREC through the Ethics Complaints Officer:

The Ethics Complaints Officer  
Southern Cross University  
PO Box 157  
Lismore NSW 2480  
Email: ethics.lismore@scu.edu.au

All information is confidential and will be handled as soon as possible.
CONSENT FORM

The Consent Form is given to and retained by the Southern Cross University researcher for their records. The Information Sheet is kept by the participant. This participant may request a copy of their consent form.

<table>
<thead>
<tr>
<th>Title of research project</th>
<th>Analysing the optimal infrastructure for economic development in an Airport Metropolis’ Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of researcher</td>
<td>Mirjam Wiedemann</td>
</tr>
</tbody>
</table>

Please tick the box that applies, sign and date and give back to Ms Wiedemann

I agree to take part in the Southern Cross University research project specified above.

I understand the information about my participation in the research project, which has been provided to me by the researcher.

I agree to be interviewed by the researcher.

I agree to allow the interview to be audio-taped.

I agree to make myself available for further interview if required.

I understand that my participation is voluntary.

I understand that I can cease my participation at any time.

I understand that my participation in this research is anonymous.

I understand that any information that may identify me, will be de-identified at the time of analysis of any data.

I understand that no identifying information will be disclosed or published.

I understand that all information gathered in this research is confidential. It will be kept securely for 7 years at the University.

I am aware that I can contact the researchers at any time with any queries. Their contact details are provided to me.

I understand that this research project has been approved by the SCU Human Research Ethics Committee.

Participants name: __________________________________________

Participants signature: ________________________________ Date: ________________________________

☐ Please tick this box and provide your email address below if you wish to receive notice once the PhD research is published.

Email: __________________________________________

Analysing the optimal infrastructure for economic development in an Airport Metropolis’ region Consent Form Page 1 of 1
Date: .....................................................
Time: .....................................................
Place: .....................................................

**Interview (Economic Development Agencies)**

*All data will be treated strictly confidential and results should be anonymised!*

1) **Name of organisation:**

........................................................................................................................................

2) **What is your position in the organisation?**

........................................................................................................................................

3) **How many years have you**

   worked in this organisation? ............................................................................................

   worked in your current position? ....................................................................................

4) **What is the main purpose/key objective of the organisation?**

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5) **When was the organisation established?**

........................................................................................................................................
6) Why was the organisation established?
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7) What is the main strategy to attract companies?
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8) Name of closest airport:
.................................................................................................................................

9) Distance to this airport from current location:
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10) How important is the airport for the region? And how important is it to the strategy of the agency?
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11) What do you think which business sectors do attract the airport in particular to the corridor between the airport and the host city?

Accommodation, Cafes and Restaurants
Advanced Engineering (non-aviation related, for example automotive, machinery, etc.)
Agriculture, Horticulture & Fisheries
Business & Consumer Services
Chemical Industry
Clothing, Footwear & Fashion
Construction
Cosmetic Industry
Creative & Media
Cultural & Recreational Services
Defence & Security
Education & Training
Energy (renewable)
Environment & Water
Financial, Insurance & Professional Services
Food & Beverage Industry
Giftware, Jewellery & Tableware
Health & Community Services
Household Goods, Furniture & Furnishings
Information- and Communications Technology (for example high-technology electronics)
Leisure & Tourism
Medical Technology, Biotechnology & Pharmaceutical Companies
Marine
Logistics
Printing & Publishing
Textiles, Interior Textiles & Carpets
Wholesale Trade
12) In your experience, how important is the type of airport (hub/gateway/border/capital) for industry by deciding to locate in the catchment area of the airport?

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13) In your experience, how important are Airport Cities or proximity to business parks for the location decision?

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13a) In your experience, what would the Airport City need to offer that companies would consider them as a location in the future?

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14) In your experience, how important are the following infrastructure elements for the decision of location? Please use the following scale for your answers: 1=very important, 2=important 3=rather unimportant, 4=not considered at all.

And up to which distance are they considered important for the location decision?

<table>
<thead>
<tr>
<th>Infrastructure Elements</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Distance</th>
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<tbody>
<tr>
<td>Airports</td>
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<td>Community service facilities like clubs, shopping centers, banks, etc.</td>
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<td>Parking possibilities</td>
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<td>Rail</td>
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<tr>
<td>Religious facilities, like churches, synagogues, mosques, etc.</td>
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<td>Roads</td>
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</table>

In your experience, which other infrastructure elements play a role for the decision of location?

<table>
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<th>Infrastructure Elements</th>
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<th>Distance</th>
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</table>
15) In your experience, how much is the location decision influenced by other companies' decision for a particular location (Cluster)?

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Different regions

Germany - Berlin

16) In your experience, which role plays the cheap housing/rental market for Berlin?

17) In your experience, which role plays the perception of the completion of the new airport or the new Autobahn (Osttangente)?

Middle East – Abu Dhabi

16) In your experience, does Al Bateen Executive Airport play a role for the decision of location?

18) Do you have any other comments you like to add?

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Thank you very much for your participation!
### 10.4 SPSS Codebook

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<thead>
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<td>1= yes</td>
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<td></td>
<td>4 = not considered at all</td>
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</table>
| 12 | 12 | AD      | F1.0   | Acceptable distance of airports to location in ranges | 1 =<= 1km  
2 =>1km and <= 10km  
3 = >10km | 0 = not applicable because Importance = 4  
-1 = no answer or time | ordinal |
| 12 | 13 | ADreal  | F3.2   | Acceptable distance of airports to location | 0 = not applicable because Importance = 4  
-1= no answer or time | scale |
| 12 | 14 | CSI     | F1.0   | Community service facilities importance for decision of location | 1 = very important  
2 = important  
3 = rather unimportant  
4 = not considered at all | / | ordinal |
| 12 | 15 | CSD     | F1.0   | Acceptable distance of community service facilities to location in ranges | 1 =<= 1km  
2 =>1km and <= 10km  
3 = >10km | 0 = not applicable because Importance = 4  
-1 = no answer or time | ordinal |
| 12 | 16 | CSDreal | F3.2   | Acceptable distance of community service facilities to location | 0 = not applicable because Importance = 4  
-1= no answer or time | scale |
| 12 | 17 | EFI     | F1.0   | Education facilities importance for decision of location | 1 = very important  
2 = important  
3 = rather unimportant  
4 = not considered at all | / | ordinal |
<table>
<thead>
<tr>
<th>No.</th>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
<th>Column 5</th>
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</thead>
<tbody>
<tr>
<td>12</td>
<td>18</td>
<td>EFD</td>
<td>F1.0</td>
<td>Acceptable distance of education facilities to location in ranges</td>
<td>1 = &lt;= 1km&lt;br&gt;2 = 1km and &lt;= 10km&lt;br&gt;3 = &gt;10km&lt;br&gt;0 = not applicable because Importance = 4&lt;br&gt;-1 = no answer or time</td>
</tr>
<tr>
<td>12</td>
<td>19</td>
<td>EFDreal</td>
<td>F3.2</td>
<td>Acceptable distance of education facilities to location</td>
<td>0 = not applicable because Importance = 4&lt;br&gt;-1 = no answer or time</td>
</tr>
<tr>
<td>12</td>
<td>20</td>
<td>HFI</td>
<td>F1.0</td>
<td>Health facilities importance for decision of location</td>
<td>1 = very important&lt;br&gt;2 = important&lt;br&gt;3 = rather unimportant&lt;br&gt;4 = not considered at all&lt;br&gt;-1 = no answer or time</td>
</tr>
<tr>
<td>12</td>
<td>21</td>
<td>HFD</td>
<td>F1.0</td>
<td>Acceptable distance of health facilities to location in ranges</td>
<td>1 = &lt;= 1km&lt;br&gt;2 = 1km and &lt;= 10km&lt;br&gt;3 = &gt;10km&lt;br&gt;0 = not applicable because Importance = 4&lt;br&gt;-1 = no answer or time</td>
</tr>
<tr>
<td>12</td>
<td>22</td>
<td>HFDreal</td>
<td>F3.2</td>
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<td>0 = not applicable because Importance = 4&lt;br&gt;-1 = no answer or time</td>
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| 12   | 30   | PTD  | F1.0 | Acceptable distance of public transport to location in ranges                | 1 ==< 1km  
2 = >1km and <= 10km  
3 = >10km |       | ordinal | 0 = not applicable because Importance = 4  
-1 = no answer or time                                                    |      |
| 12   | 31   | PTDreal | F3.2 | Acceptable distance of public transport to location                         |       | scale | 0 = not applicable because Importance = 4  
-1 = no answer or time                                                    |      |
| 12   | 32   | RI   | F1.0 | Rail importance for decision of location                                    | 1 = very important  
2 = important  
3 = rather unimportant  
4 = not considered at all |       | ordinal | /                                                                           |      |
| 12   | 33   | RD   | F1.0 | Acceptable distance of rail station to location in ranges                   | 1 ==< 1km  
2 = >1km and <= 10km  
3 = >10km |       | ordinal | 0 = not applicable because Importance = 4  
-1 = no answer or time                                                    |      |
| 12   | 34   | RDreal | F3.2 | Acceptable distance of rail station to location                             |       | scale | 0 = not applicable because Importance = 4  
-1 = no answer or time                                                    |      |
| 12   | 35   | RFI  | F1.0 | Religious facilities importance for decision of location                    | 1 = very important  
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3 = rather unimportant  
4 = not considered at all |       | ordinal | /                                                                           |      |
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# 10.5 Interview Results

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