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The knowledge economy, hub airports and accessibility. A location based perspective. The Case of Amsterdam-Schiphol.

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Abstract

“You can’t participate in life via conference call” (United Airlines 2005)

The airplane is gradually creating a completely new spatial pattern as did other kinds of transportation modes in the past. Successively, international airports have gone through a morphogenesis from original pure infrastructure facilities into multimodal and multilayered spatial growth poles and centers of competence. Landside infrastructure investments have converted airports and their hinterlands into spaces of highest accessibility. The airports unique locational advantages and the growing segment of non-aviation activities on the part of the airport operators have made airports an advantageous business location for knowledge-intensive industries.

At the same time airports have become a crucial asset for city-regions especially those competing on a European or international spatial level for future-oriented enterprises and highly skilled employees.

The paper examines about the general interplay between airports, air transportation and the knowledge economy. What are the contributions of the knowledge economy that explain the economic effects of airports on the spatial structure? What kinds of knowledge economy linked locational pattern have already emerged around airports? What is their spatial

relationship to more traditional locations for example within the core cities? Why do an array of knowledge-based companies relocate their business activities to spaces of highest accessibility as international airports?

This paper analyzes aviation induced spatial patterns and processes of specialization around European airports, especially around those with a hub function. First results show that airports and their vicinities have become attractive sites for real estate development and property-led capital accumulation. Locations directly at or close by international airports are notably in demand among highly globalized sectors characterized by their need for frequent face-to-face interaction, high value products and services.

As the traditional role of airports is redefined a new spatial entity is evolving within city regions.

1. Introduction:

The airplane is gradually creating a completely new spatial pattern as did other kinds of transportation modes in the past. Within this development process airports are taking center stage. Formerly planned as stand-alone facilities in the cities' periphery, airports – particularly those with a hub function – have gone through a morphogenesis into more or less urban-like entities. Today, as Michael and Mathis Güller have stated, airports are not just airports any more (Güller, Güler 2003). Far more interactive within the spatial context than in the past, airports have evolved from original pure infrastructure facilities into multimodal and multilayered spatial growth poles and centers of competences distinguished by their unique accessibility and connectivity profiles.

In recent years, they have not only made a contribution to a process sometimes referred to as “postmodern urban restructuring”, but also in reshaping real estate markets. Today they are perceived as powerful economic engines with considerable economic and social impact on cities and regions (ACI 2004), as nodes of trans-national value creation chains and hubs of knowledge exchange.

For a considerable time now, airports are not primarily seen as a pure infrastructure facility but as an advantageous business site. According to different studies cited, for example, by the European section of the Airports Council International global accessibility has been seen as “absolutely essential” to businesses making location decisions (ACI 2004: 6).” For example, 31% of companies relocating to the area around Munich Airport cited the airport the primary factor in their location decision. A survey of businesses in the Hamburg area found that 80% of manufacturing companies reported air service connections as important to getting customers to look at their products. The Ile de France Region generates 30% of the French national GDP. Accessibility to Paris CDG Airport is powerful factor in companies location decision, particularly for the large global companies headquartered in the Paris area, and to firms engaging in new-high-tech, innovation, industries. The attractiveness of airports and their hinterland is particularly strong for high tech industries as evidenced by Copenhagen und Nice Airports.” (ACI 2004: 6).” For German airports the European Center for Aviation Deveopment (ECAD) notes, that German airports and their key services as international network infrastructure are a prerequisite for long-term competitiveness of regional and national economies. Moreover, airports are essential for added value but also for the development of business markets in- and outside Europe (ECAD 2007).

This paper scrutinizes spatial patterns and process of specialization at and around international airports. The focus is on Amsterdam’s Schiphol airport. Through its dense spatial usage and its tradition of developing means of transportation Europe has reached a structure that is significantly differentiated from the situation of Northamerica or Asia – even when the underlying spatial drivers unfold global impacts.

This paper investigates about the general interplay between airports, air transport and the knowledge economy. What are the contributions of the knowledge economy that explain the economic effects of airports on the spatial structure? What kinds of knowledge economy linked locational pattern have already emerged around airports? What is their spatial relationship to more traditional locations for example within the core cities? Why do an array of knowledge-based companies relocate their business activities to spaces of highest accessibility such as international airports?

2. Knowledge economy as hidden spatial diver

2.1 The knowledge economy

Knowledge is a key driver for the competitiveness of companies, cities and regions. For firms, knowledge is an important resource for innovation, which, in turn, is one of the mayor drivers of economic growth. According to Michael Polanyi, knowledge can be divided into two major categories: codified and tacit knowledge (Polanyi 1967). Codified knowledge can be applied, expressed and standardized. Hence, it is a marketable good than easily be distributed over time and space. New information and communication technologies offer the opportunity of increasingly codifying and commodifying knowledge and making it tradable across long distances, which means that codified knowledge becomes more and more de-territorialized. This enables companies to source activities and inputs globally and to benefit from relational proximity and international knowledge spillovers. Tacit Knowledge, in contrast, refers to knowledge, that cannot be easily transferred. It comprises skills bases on interactions and experiences. Tacit knowledge and personal experience are necessary in order to make use of codified knowledge in creative and innovative processes (Schamp 2003: 181). Since the transfer of tacit knowledge requires direct face-to-face interactions, the findings of Michael Polanyi are not only important for firms but also for regions. Innovative activities have been shown to be highly concentrated in a minority of urban regions (Simmie 2003). The main reason why these regions play an important role in the supply of knowledge is that firm networks benefit from geographical proximity and local knowledge spillovers. Malecki describes this aspect as the “local nature of knowledge” and highlights the necessity to accept knowledge as a spatial factor of competition:

“If knowledge is not found everywhere, then where it is located becomes a particularly significant issue. While codified knowledge is easily replicated, assembled and aggregated (...), other knowledge is dependent on the context and is difficult to communicate to others. Tacit knowledge is localized in particular places and context (...)” (Malecki 2000: 110).

The distribution and transfer of codified and tacit knowledge as well as the interplay between geographical and relational proximity forms a key basis for the development of polycentric Mega-city Regions. On the one hand, the concentration of knowledge resources in particular

Mega-city Regions influences the roles that they may play in the global economy. On the other hand, the dynamics of knowledge exchange within and between Mega-City Regions contribute to either the maintenance or change in roles within the functional urban hierarchy. This raises questions over the relative importance of regional versus international knowledge spillovers. Simmie (2003) shows that knowledge intensive firms combine a strong local knowledge capital base with high levels of connectivity to similar regions in the international economy. On this way they are able to combine and decode both codified and tacit knowledge originating from multiple regional, national and international sources.

2.2 The importance of face-to-face-congregations within knowledge economy context

According to Polanyi, we know more than we can tell (Gertler 2003: 77). Means of communication allow the transfer of information. Through cognitive performance, new knowledge and innovations are generated. Despite all new kinds of efficient communication technologies and virtual connections, there still remains a variety of information and knowledge that cannot be articulated or codified verbally, visually or symbolically. The effective transfer of tacit knowledge necessitates trust and very often extensive face-to-face interactions (Laepfle 2001: 23). A common cognitive, cultural or social context is required.

“During the past half century, the faster pace of specialization, globalization, and technical change has profoundly altered companies, their customers, the supply chains around them, and, consequently, the nature of work within them and at their borders. The result is a dramatic increase in the volume and value of interaction” (McKinsey 2006: 2). Research done by consulting company McKinsey has established that tacit interaction is central to economic activity and constitutes approximately 63 percent of the employees’ total work in insurance business, 60 percent in securities companies, 70 percent in healthcare, and 45 percent in retailing.

2.3 The airport as network-infrastructure

Knowledge-intensive enterprises generate new knowledge by physical interaction locally. Generally, individual branches of a company are part of a global corporate network and

efficiently networked among each other. Short geographical distances between individuals, organizations or towns bring people together and enable them to exchange tacit knowledge – the “je ne sais quoi” of any learning process – which requires personal contact. The larger the distance between people or cities, the less chance there is of such exchanges occurring. Relational proximity, typified by people in far-flung locations collaborating on a shared project, is supported by a rich and diversified infrastructure of global travel and communication, including rapid and frequent trains and flights, sophisticated logistics networks – nowadays continental high-speed trains and intercontinental hub airports – to keep freight and people on the move, and easy access to a variety of facilities for real-time and interactive communication. APS and high-tech firms involve a mix of geographical and relational proximity. Both proximities are counterparts of the knowledge economy and go hand in hand.

In this context international airports and Mega-City Regions have become crucial for tacit interactions and international knowledge generation. Polycentric Mega-City regions are “nodes of the global economy, location of creation of knowledge and also engines of the cultural development” (Goebel et al. 2007: 87). They provide spatial proximity, dense spaces and diverse urban neighborhoods with opportunities for information exchange such as cafés, bars and restaurants. These establishments allow knowledge exchange within an informal setting, for example, during lunch breaks or after office hours. Increasingly, such places have popped up outside the traditional city centers. Very often these new and decentralized cores of urban activity have emerged close to areas of high accessibility such as high-speed railway stations or international airports.

Airports again, especially those with a hub function, have evolved as locations where local, regional, national and global information exchange overlap. Like no other infrastructure facility, airports integrate two locational qualities: worldwide connectivity by air and multimodal landside accessibility on a local, regional, national and sometimes international scale. With respect to the urbanization of airports and their hinterlands, landside infrastructure investments have become vitally important (Schubert / Conventz 2011). Once planned as simple airport train stations or terminal stop of a single rail or metro line, the airport railway stations have become interchanges with key positions within the national and international High Speed train systems, railway, and light rail networks. According to Güller, the airport interchange can be defined as follows:

“Airport interchange is the airport railway station’s function as node in landside traffic networks: it not only serves air traffic passengers and airports employees, but also uses to interchange between regional and national public transport networks (rail-rail, rail-subway, rail-bus, bus-bus...etc.)” (Güller, Güller 2003: 131).

Following Castelles “Space of Flows” concept, societies are centered around all kinds of different flows: financial flows, flow of information, knowledge, technologies, flows of images, sounds, and symbols (Castells 1996: 412). Through their capability of concentrating different kind of flows airports have advanced to key nodes within superordinate und mostly global networks.

2.4 The airports as service infrastructure

Today, the term “airport city” principally refers to “the more or less dense cluster of operational, airport-related activities, plus other commercial and business corners, on and around the airport platform” (Güller, Güller 2003: 70). Although airport space has been extremely commercialized, one has to understand that this development is primarily a new business strategy to open up new sources of revenues in addition to revenues generated from air traffic. Facing intensified competition within the aviation industry as a result of globalization, liberalization and deregulation, airport operators are forced to identify and implement innovative business models in order to generate additional non-aviation revenues. The main objective is to reduce the business risk resulting from one-sided dependencies and supplement the traditional airport core business revenues (e.g. landing fees, gate leases, passenger service charges). Already in 2004 the Boston Consulting Group (BCG) has stated that the non-aviation sector will become a key factor in terms of future growth and profit (BCG, 2004: 10). Today, as many cases plainly show, non-aviation revenues already contribute more than 50 percent to the airport operators’ profit (ATKearney, 2007; 2010). In this context, retail activities and office real estate developments in particular have become important for the airports’ financial sustainability (Conventz 2008).

2.5 The importance of airports for cities

Under the general framework of the global (time-based) competition, the potentiality and the locational advantages of airports as network- and service-infrastructure have become more integral than ever to cities, business models and the location decisions of a broad spectrum of industries. For cities, especially those exposed to global competition, urban competitiveness is highly determined by connectivity and networks (Jones Lang Lasalle 2002: 1; Peter J. Hall et. al. 2011).

Increasingly, cities set out to regard their airports not only as a “foyer or entree” to their urban area, but as providing a competitive advantage within the global competition for future-oriented enterprises and highly skilled employees especially of the knowledge economy. In order to increase the attractiveness of airports and their hinterland as office sites for service companies, many cities, airport authorities and other actors have started to develop the locations at and around airports strategically. One of the most prominent examples is Amsterdam’s Schiphol airport, which discovered the potentiality of its airport the first.

3. The case study: Amsterdam Schiphol

3.1 The spatial context of Amsterdam

Under the conditions of globalization, the urban shape of Amsterdam has been reconfigured. The urban system of Amsterdam and its growth pattern were perceived as “prototypical expansion of the monocentric city” (Salet, Majoor 2005: 19). From the early 1960s onwards, the historical inner city, characterized by channels, listed buildings etc., has not been able to fulfill the increased demand of large- scale leasings on the part of the rising service and knowledge economy. As a consequence, companies started to settle in the surroundings of the urban ring road or sometimes further away. Initiated by this, the spatial formation of Amsterdam has gradually been transformed into a polycentric urban landscape. New concentrations of urban activities appeared for example at the southern edge of Amsterdam transforming the area into a dynamic growth zone (Bontje, 2005). In this context, Schiphol has become “the most prominent growth engine [...] and the largest employment concentration in the metropolitan area [...]” (Bontje, 2009: 193).

3.2 Schiphol airport and its spatial context

Amsterdam-Schiphol, located 17.5 km south-west of Amsterdam, is the Netherlands' main airport, Europe's 4th biggest airport and one of the world's major hubs in international air traffic. Moreover, Schiphol is home base of AirFrance-KLM. Although considered as Amsterdams-Schiphol, the airport is actually located in the neighboring municipality of Haarlemmermeer and not on the city of Amsterdam's ground. Through the different airline networks, virtually every major city or economic market in the world is reachable. This integration of the airport into international air traffic is supplemented by an ideal landside connection by all means of transportation. By road, Schiphol is linked by two major highways (A4 and A9) to downtown Amsterdam and the broader metropolitan area. By rail, Schiphol is directly connected to Amsterdam and to important western European business centers such as Brussels, Paris, Frankfurt or Cologne / Dusseldorf.

3.3 A new glocal nexus of knowledge exchange

Today, the airport respectively its operator and owner – the Schiphol Group – have a world-wide reputation as pioneer in the field of airport-linked spatial development. According to Schaafsma, “two organizational decisions [...] formed the framework for the development of airport-related real estate” (Schaafsma, 2008: 71):

- the foundation of the Schiphol Area Development Company (SADC) a public private partnership between the Province of North Holland, the City of Amsterdam, the municipality of Harlemmermeer, the Nationale Investeringsbank (NIB) and Schiphol Airport and
- the foundation of Schiphol Real Estate, a wholly-owned subsidiary of the Schiphol Group.

While SADC's main purpose is to develop the land in the airport's vicinity in accordance with the “mainport strategy”, the purpose of Schiphol Real Estate is to develop the airport-owned land “by constructing and renting out buildings, and by leasing land to other developers”

(Schaafsma, 2008: 71). In contrast to other airports or airport operators in the world, Schiphol benefits from the circumstance that the commercial land on the airport territory and most of the land in the airport's vicinity is in its ownership (Schaafsma, 2008: 71).

Since the 1990s, the company's strategy has focused on a new commercially oriented approach, which has not only radically altered the passenger terminal but also the airport's hinterland. Through its commercial oriented approach, the Schiphol Group has substantially increased revenues through rents and passengers' purchase.

Another important component in the context of airport-centric spatial development is the property-led development of offices. At the end of the 1980s, the masterplan for Schiphol proposed for the first time the idea of realizing office projects in the central area within the loop of the access roads (Kloss and de Maar, 1996: 82). Today, the strip is known as Schiphol-Center. Since the beginning of the 1990s, new office sites have gradually been built up (Schiphol Group, 2010; Kloss and de Maar, 1996). Currently, the total stock comprises nearly 200,000 m² of office space (Jones Lang Lasalle, 2010: 9). In the future, the office stock at Schiphol-Center will grow by another 8 – 15 percent due to a number of projects in the pipeline, such as the extension of the Outlook Building (Jones Lang Lasalle, 2009a: 11).

The construction activities of the office complexes were accompanied by a simultaneously increasing number of high-quality facilities such as hotels of different categories or meeting and conference centers. Similar to the office buildings, most of these premises are either directly linked to the terminal via walkway or promenade. All this helped to transform the location of Schiphol-Center into a multifunctional and multimodal premium business site at the periphery of Amsterdam that is today considered to be one of the top office locations in the whole of the Netherlands.

The high value of the airport sites is reflected in the office rents. In recent years, Schiphol-Center has become the country's top office location achieving the highest office rents countrywide. From 2004 – 2007, the recorded prime rents at Schiphol-Center were at 350 €/m² per year (Jones Lang Lasalle, 2009b, 2010: 10). At the end of 2009, the annual top rent was around 365 €/m² (Jones Lang Lasalle, 2010: 10). That was a decrease by 3 percent compared with 2008 where a maximum of around 375 €/m² was reached (Jones Lang Lasalle, 2010: 10). Recently, contractual agreements with maximum rents of 390 €/m² per year or even above have been registered (DTZ Zadelhoff, 2009). In comparison to this, the

South-Axis (Zuidas), the actual central business district of Amsterdam halfway between city center and Schiphol Airport, exhibited with approximately 335 €/ m² per year in 2009. In the city center itself, a prime rental value of around 255 Euro /m was realized at the end of the fourth quarter of 2009 compared to 280 €/ m² in 2008 (Jones Lang Lasalle, 2009b, 2010: 10).

Accordingly, two conclusion can be drawn: Firstly, in the Amsterdam office market, contrary to what one might initially presume, it is not the city center which is the most expensive office location, but Schiphol-Center at the city’s edge. This is a unique finding, as the comparison with other selected European top office locations such as London, Paris or Frankfurt plainly shows.

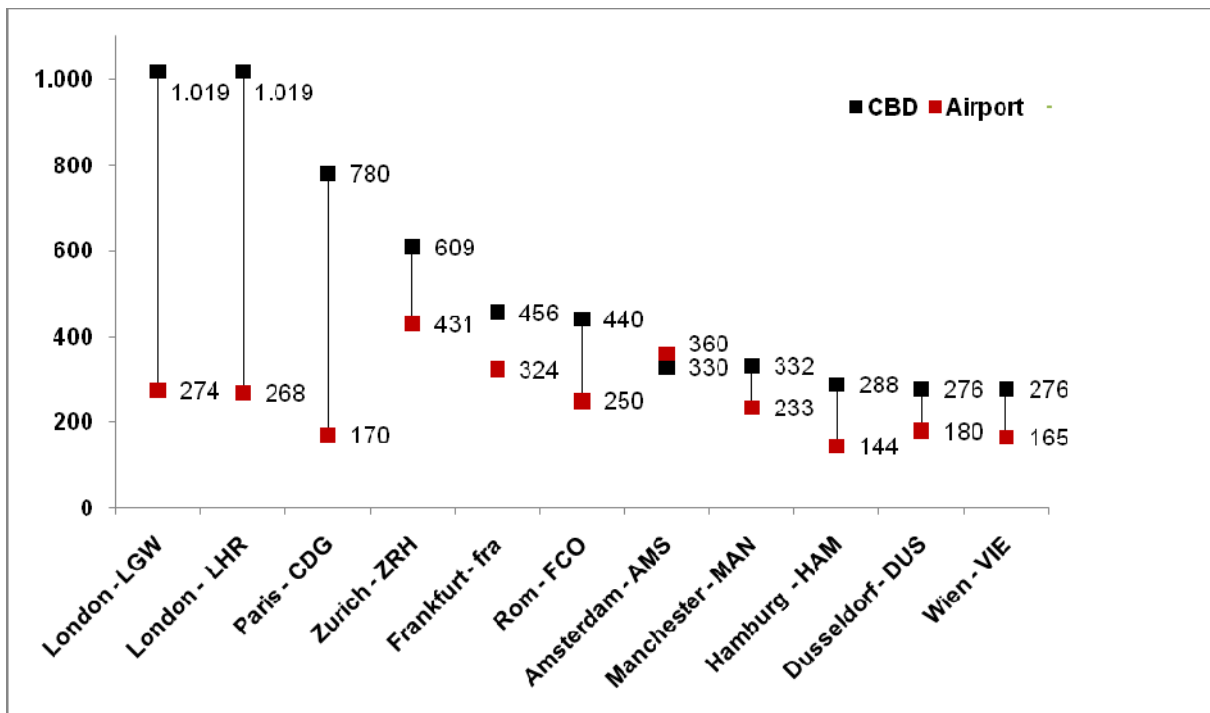


Figure 1: Selected prime rents airport vs. Central Business District (CBD) (own illustration, modified according to CB Richard Ellis, 2009)

Secondly, despite the considerable turbulences which have affected the real estate markets over recent years, the prime rents at Schiphol-Center have remained relatively stable. The same applies to Amsterdam South (Zuidas). From an international perspective, the corridor Schiphol-Zuidas is perceived as an international top location within an otherwise modestly priced Dutch office market.

From the very beginning, the main strategy of the Schiphol Group was to attract companies that are either airport-related or have a strong affinity to the aviation business. However, scientific literature does not offer a standard definition for either of these terms. One approach defines airport-related companies as companies “that have their business at the airport (such as airlines) or use the airport intensively (such as the head offices of international companies)” (Schaafsma, 2008: 71). Indeed, Schiphol has been very successful in attracting internationally oriented companies offering superior business services, which have located their international or European headquarters at the airport. Today, the demand for office space is generated from a broad spectrum of business sectors such as finance, consultancy, traffic and transportation, government or healthcare (Conventz, 2008). Among the office space occupiers are prominent companies or institutions like for example the American Chamber of Commerce, AXA Investment Managers, Citibank International, the Dutch infrastructure Fund or Delta Hydrocarbons (WTC Schiphol, 2010). Hence, the demand comes from enterprises that are not directly related to the aviation business. Today, the submarket has reached a certain level of maturity, characterized by a manageable amount of high quality office properties with different locational qualities and price ranges. Basically, the closer the office is to the passenger terminal, the higher is the office rent. Future prospects expect a further densification of the strip and new office constructions, such as for example the Gateway building (Conventz, 2008).

3.4 Summary and concluding remarks

Just as much as people were attracted to ports, railway stations or motorway intersections in past centuries, airports have rapidly become new urban growth generators, hubs of information and knowledge exchange and centers of competence. The accessibility profile of international hub airports again induces myriad economical and regional catalytic effects such as settlement of companies, employment development, or stimulation of innovation...etc. (ECAD 2007: 4).

As the example of Schiphol illustrates, airports are not primarily perceived as a transportation node but as an advantageous business site. Multimodality of transportation infrastructure combined with an extensive business infrastructure is understood as a crucial competitive and developmental advantage within the international time-based competition. With the

expanding floor space for office based services at and around international airports, a new urban locational pattern is evolving. This kind of locational quality is exactly tailored to the locational requirements of knowledge-intensive companies. The willingness of those customer groups to pay top rents, i.e. far above the average, reflects the demand for such locations.

Against this background of market driven property values Schiphol would appear to be exemplary of the trend towards the trend hub airport spatial development. Nevertheless, there are still deficits, especially concerning the urban design qualities. In the future it is expected that prospective improvements of the design qualities will further contribute to fostering the business estates' attractiveness at Schiphol and its surroundings.

Literature

Airport Council International (ACI) (2004): The social and economic impact of airports in Europe. Retrieved April 8, 2007 from the ACI Web Site: www.airports.org

AT Kearney Consulting (2007): Verkehrsknotenpunkte – Handelsstandorte der Zukunft Retrieved April 24, 2009 from the AT Kearney Web Site: www.atkearney.de.

AT Kearney Consulting (2010): Shoppen im Vorbeifliegen. Retrieved March, 2010 from the AT Kearney Web Site: www.atkearney.de.

Boston Consulting Group (BCG) (2004): Airports – Dawn to a New Era. The Boston Consulting Group (BCG).

Bontje, M. (2005): Der Amsterdamer Südraum – Eine dynamische Wachstumszone. In: Beiträge zur Regionalen Geographie: Europäische metropolitane Peripherien, 193 - 205.

Castells, M. (1996): The information Age: Economy, society and culture. Bd. Volume 1 – The Rise of the Network Society. Malden: Blackwell Publishers.

European Regional Science Association (ERSA) Conference 2011, Barcelona.

CB Richard Ellis (2009): Zum Abheben gut. Investitionsnische Flughafen. (Presentation Heuer Dialog, unpublished)

Conventz, S. (2008): Näher bei der Welt – Büroteilmärkte an internationalen Hub-Airports. Das Beispiel Frankfurt Rhein-Main im Vergleich zu Amsterdam-Schiphol, The University of Bayreuth, Diploma Thesis (unpublished).

DTZ Zadellhoff (2009): The Netherlands, a National Picture. Fact Sheets office and Industrial Property Market, mid 2009. Retrieved April 24, 2009 from the DTZ Zadellhoff Web Site: www.dtz.nl.

European Center for Aviation Development (ECAD) (2007): Katalytische volks- und regionalwirtschaftliche Effekte des Luftverkehrs in Deutschland. Darmstadt.

European Center for Aviation Development (ECAD) (2007a): Luftverkehr – ein zentraler Standortfaktor für die deutsche Volkswirtschaft. Ergebnisübersicht zur Studie „Katalytische volks- und regionalwirtschaftliche Effekte des Luftverkehrs in Deutschland“ der European Center for Aviation Development – ECAD GmbH. Darmstadt.

Gertler, M. S. (2003): Tacit knowledge and the economic geography of context, or the undefinable tacitness of being there. In: Journal of Economic Geography. Issue 3, 75 -99.

Goebel, V. et al. (2007): Functional polycentricity in the Mega-City Region of Munich. Conference Paper Annual Meeting of the Association of European Planning (AESOP), Napoli.

Güler, Mathis; Güler, Michale (2003): From airport to airport city. Gustavo Gil, Barcelona

Peter J. Hall et. al. (2011): Global urban Analysis. A Survey of Cities in Globalization. Earthscan Publishing, London, Washington, D.C.

Jones Lang Lasalle (2010): Dutch office Market Outlook 2010 – Randstad Core Markets.

Jones Lang Lasalle (2009a): Dutch office Market Outlook 2010 – Randstad Core Markets.

European Regional Science Association (ERSA) Conference 2011, Barcelona.

Jones Lang Lasalle (2009b): Selected office Market Key Numbers Amsterdam (unpublished).

Kloos, M. and de Maar, B. (1996): Schiphol Architecture. Amsterdam.

Läpple, D. (2001): Stadt und Region im Zeitalter der Globalisierung und Digitalisierung. In: Deutsche Zeitschrift für Kommunalwissenschaften, Volume 40, Issue 2, 12-36.

Malecki, E. (2000): Creating and Sustaining Competitiveness. Local Knowledge and Economic Geography. In: Byrson, J.; Daniels, P.; Henry, N. and Pollard, J. (Hrsg.), Knowledge, Space, economy. London, New York, 103-119.

McKinsey Quarterly (2006): Competitive advantage from better interactions. Number 2. The McKinsey & Company.

Polanyi, M. (1967): The tacit dimension. Loutledge & Kegan Paul. London.

Salet, W. and Majoor, S. (2005): Amsterdam Zuidas. European Space. 010 Publisher, Rotterdam.

Schaafsma, M. (2009): Accessing Global City Regions – The Airport as City .In: The Image and The Region: Making Mega-City Regions Visible! Lars Müller Publishers, Baden.

Schamp, Eike W. (2003): Knowledge, Innovation and Funding in Spatial Context: The Case of Germany. In. Thierstein, A. and Schamp, E. W. (Hrsg.), Innovation, Finance and Space. Frankfurt: Selbstverlag Institut für Wirtschaft und Sozialgeographie der Johann Wolfgang Goethe Universität, 179 – 193.

Schubert, J.; Conventz, S. (2011): Immobilienstandort Flughafen – Merkmale und Perspektiven der Airport Cities in Deutschland. In: Informationen zur Raumentwicklung (IzR), Heft 1, 13-26. Bundesinstitut für Bau-, Stadt- und Raumforschung, Bonn.

Simmie, J. (2003): Innovation and urban regions as national and international nodes for the transfer and sharing of knowledge. In: Regional Studies, 37 (6), 607–20.

European Regional Science Association (ERSA) Conference 2011, Barcelona.

WTC-Schiphol (2010): WTC Schiphol Airport Tenants. Retrieved April 2, 2010 from the WTC Schiphol Web Site: www.wtcschiphol.nl