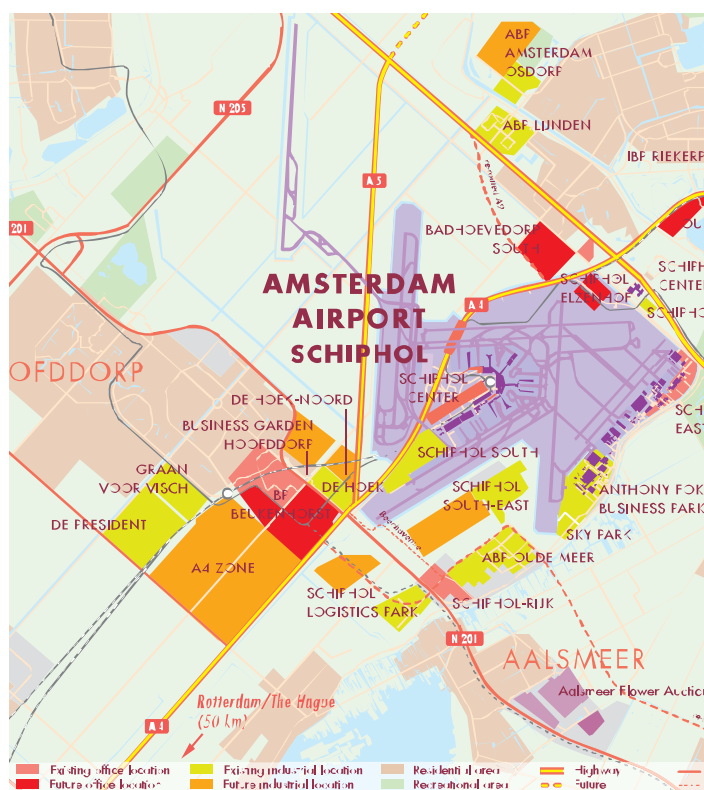


The Dynamic Spatial Impact of Amsterdam Airport Schiphol

This paper is about the agglomeration effect of Amsterdam Airport Schiphol and its implications for location policy regarding the airport region. We focus on a specific case, namely the important concentration of European Distribution Centers (EDCs) around the airport. The traditional answer to the question why EDCs are attracted to the airport is due to the importance of having air transport services at their disposal. However, we show that this is only a partial answer and that economies of agglomeration are the most important determinants. Moreover, we show that the spatial economic development of the airport area needs to be accompanied by new insights concerning location policy.

by: Pim Warffemius, Toon van der Hoorn and Henk Klaassen



Introduction

Airports essentially have four potential types of impact on the economy in their region [Button and Stough, 2000, p. 237-240]. Primary effects are the benefits to the region of the construction or expansion of the facility such as local employment required in the construction process and the work done by local contractors. Secondary effects are longer-term effects and are associated with the local economic benefits of running and operating the airport. Tertiary effects stem from the stimulus enjoyed by a local economy as the result of firms and individuals having air transport services at their disposal. Finally, there are perpetuity effects. The idea of perpetuity effects reflects an increasingly widely accepted school of thought arguing that economic growth, once started in a region, can become self-sustaining and may accelerate. The construction of a new airport or major enlargement of an existing facility may therefore act to set in progress a much larger and longer-term development process in the region [see also: Kramer, 1990, p. 16; Fujita et al., 2000, p. 4]. By initially attracting firms and activities to the area in sufficient numbers, airport development can lead to a favorable economic environment. The regional economy can feed on this and accelerate its growth. This type of dynamic economic impact of an airport has been little researched and is the focal point of this paper.

We concentrate on a specific case, namely Amsterdam Airport Schiphol and its European Distribution Centers (EDCs). Airport Schiphol is the main airport in The Netherlands and holds a place among the top five airports in Europe measured by passenger movements as well as by freight transport. The Schiphol agglomeration represents an important concentration of EDCs. The traditional answer to the question why distribution centers are attracted to the airport is due to the importance of having air transport services at their disposal. However, we show that this is only a partial answer.

The explanation of why economic activities are attracted to airports is not just important for location theory but also for location policy regarding airport regions. The amount and nature of distribution centers located in the surrounding areas of Schiphol is a prime concern for Dutch policymakers for two reasons. First, attracting distribution centers means attracting all kinds of goods flows, investments and employment. Second, distribution centers are space-demanding while the amount of open space outside the airport is limited and earmarked for airport-dependent (or airport-related) firms. However, since the second half of the 1990s, there have been conjectures that a significant amount of EDCs near Schiphol is non-airport-dependent.



Photo 1: "Location policy"

The rest of the paper is structured as follows. We start with pointing out the role of EDCs (section 2) and a review of the governmental EDC location policy for Schiphol's surrounding areas (section 3). Subsequently, we address the location forces that interplay in the making of the EDC cluster near the airport (section 4). There we show that the spatial economic development of the airport area needs to be accompanied by new insights concerning location policy. Finally, we present implications of our findings and discuss new options for governmental steering.

The European Distribution Centers (EDCs)

Many international logistics companies have organized their European distribution network according to the concept of central European distribution. Within this concept, EDCs fulfill a main role. In an EDC, goods from mainly overseas production locations such as Japan or the USA are stored before being distributed throughout Europe, the Middle-East and Africa (EMEA-countries). In most cases, delivery lead times from the EDC to a customer somewhere in Europe range from 24 to 72 hours. Following Holland International Distribution Council (or HIDC) [see BCI, 1997, p. 25], we define an EDC as follows:

A European Distribution Center (EDC) is: (1) a central European warehouse, or part of a central European warehouse, where goods are stored, (2) the point of origin of more than 50% of the inbound goods flows (by weight or units) is made up of production plants located in a different country than the warehouse, and (3) from the warehouse goods are distributed to customers in at least five different European countries.

Within Europe, The Netherlands has a dominant market share of EDCs. There are approximately 1,200 EDCs in Europe. Research [BCI, 1997, p. 39-54] [NDL and BCI, 2001, p. 11-14] shows that about 50 per cent of these EDCs is located in The Netherlands. In 2002, the EDC sector contributed about 95,000 jobs (full time equivalents) and 1 per cent of the gross national product (GNP) to the Dutch economy [Ernst & Young ILAS et al., 2002, p. 24-27]. The wider Schiphol region is an attractive location for EDCs. Approximately 20 per cent of all EDCs in The Netherlands is located there [NDL and BCI, 2001, p. 14].

The EDC Location Policy

Schiphol is a major European airport, handling an ever growing number of passengers and freight. Demand for industry locations near Schiphol has grown accordingly. However, the total amount of enclosed or open space available outside the terminal that can be used for the building of maintenance facilities, hotels, offices, or warehouses is limited. To control economic development of Schiphol's surrounding areas, the Dutch government applies planning and zoning regulations on what can be built and on the uses to which the land may be put. This spatial policy is a combination of national government directives and specific policies of regional and local governments. The national government directives say that only airport-dependent (or airport-related) activities are permitted. The aim of the spatial policies of regional and local governments is to create a favorable economic environment and to strengthen Schiphol's market position through accommodating the growing demand for business parks in the Schiphol area with as little negative impact as possible on the land use and airport accessibility [Provinciale Staten van Noord-Holland, 1986, section 2].

Uncontrolled economic development of Schiphol's surrounding areas can result in the allocation of scarce land just outside the airport to non-airport-dependent firms. As a consequence, later arriving airport-dependent firms might be confronted with completely occupied business parks forcing them to decide for a location near another but smaller Dutch airport, a non-airport location in The Netherlands, or a location near a major European airport in another country. Moreover, uncontrolled economic development can easily result in: overcrowded business parks; rising land costs; congested routes from the business parks to connecting roads and to the airport; and worsening airport accessibility.

To control economic development of the airport area, regional governmental authorities, local governmental authorities, and Schiphol founded the Schiphol Area Development Company or SADC in 1987. SADC performs four main tasks: (1) development of business parks in the Schiphol area, (2) to check that locations on those business parks are only allocated to airport-dependent firms, (3) provide connecting roads from the SADC business parks to the highways and to Schiphol, (4) marketing and sales. All SADC business parks are situated in Schiphol's surrounding areas.

Table 1: Importance of location factors on the choice of the Schiphol area

Location factors	Type	Re-weighted frequencies
Proximity to former warehouse location	A	40
Proximity to airport Schiphol	E	36
Availability of warehouse space/ land (*)	A	22
Accessibility by roads and rail	A	14
Proximity to logistics service providers (LSP)	A	14
Quality of life for employees (**)	A	11
Status of immediate environment (***)	A	11
Number of flight destinations offered by airport Schiphol	E	9

Note 1: A= Agglomeration economies; E= Endowments of the airport (that are the air transport services offered)

Note 2: (*) Within an agglomeration, floor space regularly becomes available;

(**) Examples are proximity to an international city (Amsterdam) and international schools;

(***) Image-effect of being located near a major airport and an international city

A Key Role for Economies of Agglomeration and Locked-in Logistics

From the viewpoint of the company location policy for the Schiphol area as developed by the Dutch government, EDCs are attracted due to the importance of having air transport services at their disposal. Examples of such location factors are the number of international flight destinations and flight frequencies. We tested this idea and asked the logistics managers of the EDCs near airport Schiphol to break down their inbound and outbound goods flows. It appears that almost 40 per cent of the Schiphol-EDC-population is non-airport-dependent. That is, they do not (or hardly) transport their freight flows (by weight or units) via Schiphol by airplane. Our results show that the idea that EDCs are attracted into the airport region because of the importance of air transport services is only a partial answer.

To find the rest of the answer, we followed the theoretical framework of New Economic Geography and focused at the other important location factor, namely economies of agglomeration [see Arthur, 1994, p. 49-67, p. 99-110; Brakman et al., 2001; Fujita and Thisse, 2002]. Agglomeration economies stress the location benefits of being close to other firms or concentrations of economic activity. These may be due to: the existence of specialized suppliers and large local markets; the existence of a large pool of labor; the opportunities of interaction, learning, creativity and innovation; or access to community infrastructure (e.g. energy, communication and transportation). There are economies of agglomeration if the benefits of being in a location together with other firms increase with the number of firms in that location.

We asked the logistics managers about the importance of the location factors on the choice of the Schiphol region. First, each logistics manager was asked to express why the Schiphol area was chosen for the establishment of the warehouse. After he answered this open question, we handed over a standard list of location factors and requested to indicate additional location

factors on the list. We discriminated between location factors mentioned with and without help. Location factors mentioned spontaneously were given a score of 2 while location factors indicated on the list were given a score of 1. These are the weights of importance. The importance of a location factor is determined by its aggregated score. That is its re-weighted frequency [1]. The most important location factors are given in table 1.

As can be seen from table 1, economies of agglomeration is by far the most important force that attracts the distribution centers into the airport area. That means that growth of the Schiphol agglomeration can lead to a favorable economic environment which, in turn, can attract more firms and accelerate its

growth. We empirically validated the self-reinforcing character of the growth process of the EDC cluster near the airport.

However, EDCs, once settled at the business parks near the airport, can become locked into their location. That is, high thresholds are formed producing inertia that can make pressures to change –such as worsening location conditions or policy interventions- ineffective when it comes to relocation. Due to such lock-ins, a bad EDC location policy can have long-lasting bad effects. In order to test the individual warehouses for location lock-in, we first asked the logistics managers “Will your warehouse operations move to a new location within a

“Imagine that you can choose a new location for the establishment of your warehouse...”

period of 2 years?” Then we asked “Imagine that you can choose a new location for the establishment of your warehouse and that you can relocate the warehouse without costs; Would you decide for the current location or would you decide differently?” We indicated that a warehouse is locked into its

location if the respondent would decide for a different location but will not move. It appears that approximately 30 per cent of the Schiphol-EDC-population is locked into its location.

Conclusions

In this paper, we presented a new model of spatial economic development of an airport area. We focused on a specific case, namely the area around Amsterdam Airport Schiphol and its cluster of European Distribution Centers (EDCs). The model is based on New Economic Geography insights and the following location forces interplay in the making of the EDC cluster:

- ✦ location endowments;
- ✦ agglomeration economies;
- ✦ locked-in logistics.

The Schiphol agglomeration represents an important concentration of EDCs. The traditional answer to the question why distribution centers are attracted to the airport is due to the importance of having air transport services at their disposal. In other words, that they are attracted due to the specific

airport endowments such as international flight destinations and flight frequencies. However, we showed that this is only a partial answer and that almost 40 per cent of the EDC population in the Schiphol area is non-airport-dependent. We uncovered that economies of agglomeration operating in the airport region are the most important location factors. Not the specific airport endowments.

This means that the self-reinforcing character of the growth process of the EDC cluster near the airport is empirically validated. This self-reinforcing character makes it very difficult to forecast the effects of governmental EDC location policy for the airport region. The implication of this message becomes even stronger in the light of our results on locked-in logistics. We showed that 30 per cent of the EDC population in the airport area is locked into its location. Due to this phenomenon of irreversibility a bad EDC location policy for the airport region may have significant long-lasting bad effects. Here the main message is one of caution.

However, the outcome that economies of agglomeration are the most important location factors also offers new options for governmental steering. It shows that airport Schiphol offers its EDCs much more than only being a transport hub. And it argues in favor of introducing a free-market process for the location allocation of EDCs in the airport area. Finally, economies of agglomeration operate in the wider airport region, therefore, this whole region can offer attractive locations for all EDC types.

Endnotes

1 Re-weighted frequency of location factor "X" = $\sum_{i=1}^n W_i$
 where W_i is the weight of importance attached to the i^{th} time the location factor was mentioned.

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