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TRENDS IN DISTRIBUTION CENTRES AND THEIR LOCATIONS: SPRAWL AND POLARIZATION

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Abstract

The logistics industry is an important sector for the Dutch economy. Distribution centres (DCs) are important to perform logistics activities. In 2015 the demand for logistics real estate has been particularly high compared to previous years. To facilitate the logistics sector and to develop sustainable spatial policies – that for example reduce congestion - it is important that spatial planners have insights in logistics location patterns. This paper analyses some trends in the spatial patterns of DC settlements within the Netherlands, based on real estate data. We find that the shares of logistics real estate of the provinces Limburg and Noord-Brabant marginally increased in the period 2004 – 2014, while the shares of all four Randstad provinces marginally decreased. This indicates that, although absolute growth has been high in the periphery (especially along the line Rotterdam – Noord-Brabant – Venlo), on a national level no significant sprawl of logistics real estate from the Randstad towards peripheral regions can be observed. On the regional level, polarization in the periphery is visible within regions that have been forming new logistics clusters.

Another phenomenon which is relevant for spatial planners is the growing demand for very large DCs, in particular for e-commerce logistics activities. This implies that municipalities increasingly will have to supply large logistics land plots. Extra attention of spatial policy makers is also needed for re-use or transformation of existing distribution centres – of which the floor space is often considered too small - to prevent further increase of unsalable DCs.

This study has not investigated possible explanations for the spatial patterns of logistics real estate within the Netherlands. We hope to follow up the present study with an explanatory analysis.

1. Introduction

The logistics industry is an important sector for the Dutch economy. Some 9% of Dutch employees direct and indirectly worked in the logistics sector in 2012. About 9,2% of value-added generated in the Netherlands is connected with logistics activities such as storage and distribution (Buck Consultants, 2014). Distribution centres (DCs) are important to perform these logistics activities. A distribution centre can be defined as *"a single large warehouse or cluster of warehouses dedicated to the rapid movement of goods"* (Higgins et al., 2012). A lot of goods enter Europe via DCs located in the Netherlands and from here they are transported or re-exported to other European countries, especially Germany (Levelt, 2010). Next to international distribution centres, there are also nationally oriented DCs, for example owned by a Logistics Service Provider (LSPs) focusing on parcel distribution in the southern part of the Netherlands.

To facilitate the logistics sector and to develop sustainable spatial policies – for example to reduce congestion - it is important that spatial planners have an insight in the demand for logistics locations. The current spatial policy within the Netherlands is to avoid new industrial land developments outside urbanised zones and to redevelop existing industrial areas. A 'sustainable urbanisation procedure' has been set up in which authorities need to assess whether demand for spatial developments, such as

industrial sites, can be met within existing urbanised and economic zones (Ministry of Infrastructure and the Environment, 2011). In practice, however, distribution centres do locate on peripheral locations. Logistics professionals have also identified peripheral "logistics hotspots" such as Tilburg and Venlo (Logistiek NL, 2016) where the industrial and services sectors conglomerate around logistics clusters of transportation and warehousing activities (Sheffi, 2012).

Dablanc and Rakotonarivo (2010) already have pointed to the spreading out of logistics centres towards the peripheries, where cheap land parcels are still available, moving further away from the cities. This concept of logistics sprawl can be defined as *"the spatial deconcentration of logistics facilities and distribution centers in metropolitan areas"* (Dablanc and Ross, 2012). Another spatial trend seems to be polarization. Polarization refers to the fact that DCs, although sprawling towards peripheral locations, still tend to concentrate at a few of these locations within large metropolitan agglomerations (Ibid.). Note that polarization and sprawl do not necessarily contradict each other but can occur simultaneously.

To facilitate the logistics sector and to develop sustainable spatial policies it is important that spatial planners know about location preferences, but also about distribution centre preferences in terms of size (building and land plot) and user type (shippers or Logistics Service Providers). This paper investigates changes in spatial patterns of logistics locations in the Netherlands. For this we compared the relative shares of m^2 logistics real estate of Dutch provinces in 2004 and 2014. The questions we aim to answer are the following:

- What are the main trends impacting spatial patterns of DC settlements?
- Are distribution centres sprawling from the Randstad region all over the Netherlands?
- Can we observe spatial polarization in so-called logistics hotspots when looking at actual activity data?

The layout of the remainder of the paper follows these questions. Section 2 provides an overview of Dutch logistics real estate trends, e.g., trends in demand for distribution centre floor space (XXL DCs), DC user types and DC investors. The trends are drawn from both academic literature and industry reports and confronted with logistics property data over the period 1995 - 2014 in the Netherlands (Bak Property Research and Consultancy, 2016). Section 3 presents a spatial analysis where we use the same commercial logistics property data. This analysis is based on data at the local municipality level. Section 4 concludes the paper with a summary of the main findings and recommendations for research.

2. Trends in distribution centres

Different topologies of distribution centres exist in the academic literature (see, for instance, Vermunt, 1993). Some distribution centres have a regional (RDC) or national dimension (NDC), whereas European distribution centres (EDCs) supply the whole of Europe or parts of north-western Europe.

RDCs and NDCs are frequently used for daily distribution towards local markets, but also perform packaging and labelling activities. EDCs or Continental Distribution Centres (CDCs) are used for international distribution. These DC types often function as postponed production centres or perform Value Added Logistics (Higgins et al., 2012). A recent trend are E-commerce distribution centres. They are remarkably large. For instance, the Wehkamp fulfilment centre in Zwolle, the Netherlands (which opened in 2015) covers 53.000 m^2 and the Coolblue centre (which also opened in 2015) in Tilburg, the Netherlands has a surface of 22.000 m^2 (Visser and Francke, 2015).

In the period 1995 - 2014, the total floor space of logistics real estate grew from 10 million square metres in 1995 to 25 million square metres in 2014. This is a 150% increase in twenty years. Annual growth rates were particularly high at the end of the 1990s, between 6 and 11%. Figure 1 shows the annual growth rate of logistics real estate as a percentage of the total. The same figure also shows that a relationship exists between economic growth and the expansion of logistics real estate. From 2000, the increase in international freight transport approximately matched economic growth, whereas the expansion of logistics property lagged behind.

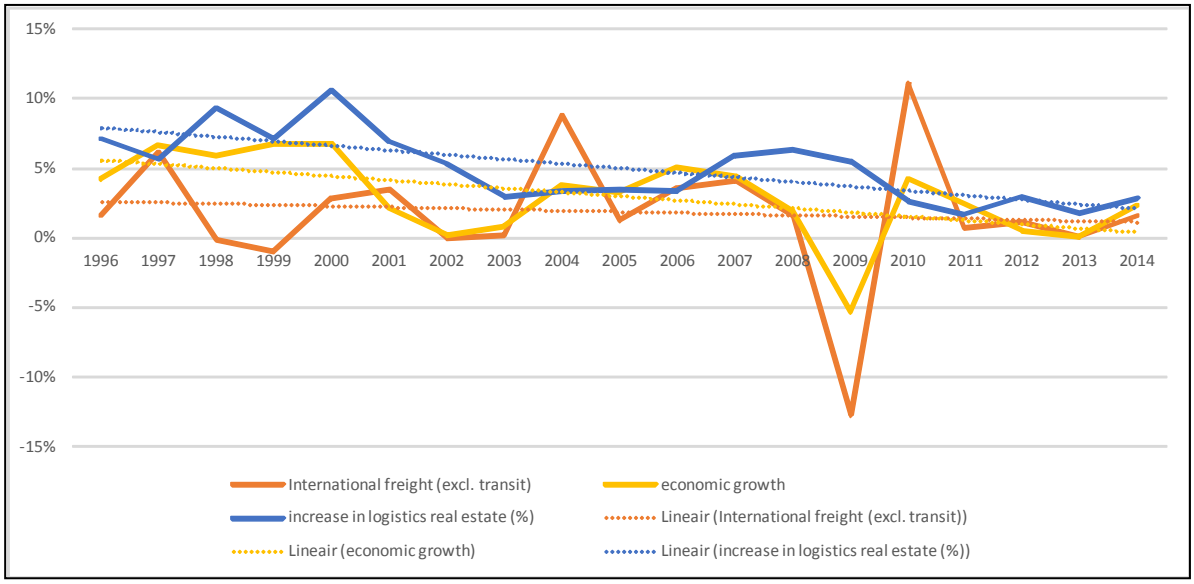

Figure 1 Annual growth rate of international freight transport, logistics real estate and the economy as a percentage of the total between 1995 and 2014 and as trend (the dotted lines). Source: KiM on the basis of various sources.

2.1 Variations in demand for distribution centres

Similar to the year 2000 (figure 1), 2015 has been a year of significant growth in the number and floor space of distribution centres. As shown in figure 2, demand for logistics real estate has been particularly high in 2015 (1,7 million m^2) compared to previous years. In 2016, demand in Q1 was extreme, around 420.000 m^2, but dropped in Q2 (CBRE, 2016). In practice not all demand is fulfilled.

In 2014, for example, according to our data only 0,7 million m^2 was constructed while demand exceeded 1,1 million m^2. The southern part of the Netherlands is the most favoured region to locate distribution centres. In 2015, 62% of demand was related to this part of the Netherlands (Bak, 2015).

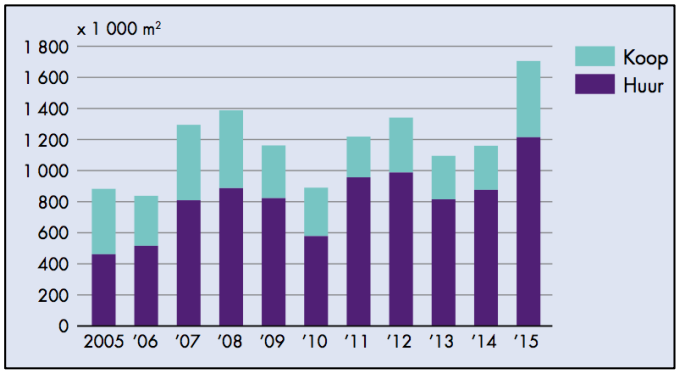

Figure 2 Demand for logistics real estate 2005 – 2015. 'Koop' and 'huur' indicate 'ownership' and 'rental' real estate (Bak, 2015, p. 32).

According to the Dutch 'Bureau of Urban Renewal' (Bureau Stedelijke Vernieuwing), logistics companies prefer new DC premises because of scale economies and because of the opportunity to build large e-commerce DCs (Logistiek Profs, 2016). Although logistics companies prefer new distribution centres, still almost half of them (45%) fulfilled their need for space in 2015 by utilising existing distribution centre premises (Bak, 2015; CBRE, 2016). This may be driven by short-term insufficient supply of new DCs. A main driver for the demand for new DCs is that existing premises do not fulfil the current market´s requirements (CBRE, 2013; Logistiek Profs, 2016). This may explain the co-existence of oversupply and shortages in the market. At present, there is a shortage of new large distribution centres (CBRE, 2016). Over the long term, however, a structural supply of 1,2 million m^2 of existing floor space remains - of which 64% is over 18 years old (Bak, 2015). It is uncertain whether these properties will be used in the future. Avoiding structural supply remains a challenge as companies demand new built-to-suit DCs (CBRE, 2016). Our conclusion is that although the uptake of distribution centre floor space increased in 2015, spatial policy makers should still pay attention to the re-use or transformation of existing distribution centres in order to prevent a further increase of a structural supply of DCs, that does not meet the requirements of the present time.

2.2 The XXL DC era: demand for more XXL DCs

The average floor space size of distribution centres is increasing. Logistics companies more often demand large distribution centres of over three hectares of floor space (Dynamis, 2016). Scale economies are an important driver to expand distribution centres - for example by centralizing inventories. In addition, companies may prefer large DCs because of a lack of space at their current location (Van Geffen and Ploem, 2015). Lately, according to Buck Consultants International, a trend

towards so-called XXL warehouses has emerged with more than 40.000m^2 floor space (Logistiek NL, 2016b). Between 2013 – mid 2016, 28 new XXL DCs were built, mostly in Noord-Brabant. Today, according to CBRE (2016), a shortage of large new distribution centres exists. This implies that municipalities increasingly will have to supply large logistics land plots. The XXL DC trend cannot be confirmed by our database, which does not provide data on the floor space of individual DCs.

2.3 Investor attention increases

An increased attention from investors can be observed. As demand is high, some logistics real estate developers have started speculative construction of new DCs. Prologis, for example, developed a distribution centre in Venlo before contracting a tenant. In the first half of 2014, investments in logistics real estate totalled 618 million euro's. Most investments seem to be done by established international real estate parties. The total investment volume is limited because of a lack of investment possibilities. However, there seems to be sufficient new supply to keep market rents from increasing (CBRE, 2016).

2.4 Distribution centre users: more demand from logistics service providers

In the last decennium, half of logistics real estate demand came from Logistics Service Providers (LSPs). LSPs are the most important users of logistics real estate (figure 3). Our database shows that in 2014, 43% of logistics real estate was purchased by LSPs. As such, in 2015 LSPs have become even more important as a buying party.

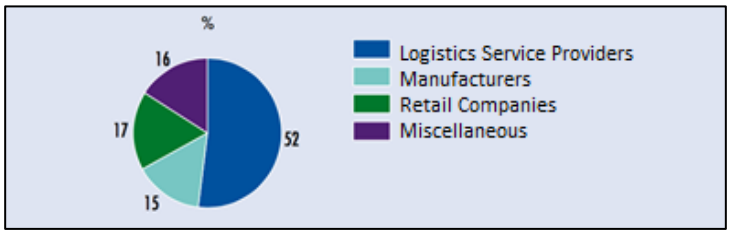

Figure 3 Logistics real estate users 2005 - 2015 in percentage (Bak, 2015, p. 33).

2.5 The locations of DCs: logistics hot spots

The province of Noord-Limburg, especially logistics hotspot Venlo/Venray, close to the German border, has experienced massive growth over the past few years. Figure 4 presents a map of popular logistics hotspots. The rise of Noord-Limburg is often explained by its location near Germany. Another factor are the relatively low land prices of 40 Euro/m^2 in Venlo compared to 75 Euro/m^2 in Rotterdam and Amsterdam Airport Schiphol. According to Prologis (2013) Venlo, Antwerp-Brussels and Rotterdam are the most desirable logistics locations within Europe. Prologis expects that Venlo will also be Europe's most desirable logistics location in 2018.

When it comes to the total land area covered by logistics real estate in the Netherlands, the region of West-Brabant (close to the Belgium Border in the south) is at the top, followed by Groot-Amsterdam (Port of Amsterdam and Amsterdam Airport Schiphol area), Noord-Limburg (close to the German border) and the Groot-Rijnmond region which includes the Port of Rotterdam (Visser and Francke, 2015). The highest concentrations of logistics activities can be found near mainports Schiphol and Rotterdam (Weterings et al., 2007). Still, the Noord-Brabant province houses most logistics real estate. This logistics real estate is, however, located less concentrated and can be found near several logistics hotspots such as West-Brabant, Tilburg, Oss, Veghel, Uden and Eindhoven.

Figure 4 Logistics map of the Netherlands 2015 (Logistiek NL, 2015).

3. Logistics sprawl in the Netherlands?

As stated before, logistics sprawl is *"the spatial deconcentration of logistics facilities and distribution centers in metropolitan areas"* (Dablanc and Ross, 2012, p. 432). Logistics sprawl can be investigated at the metropolitan / regional level, but also at the national level. As an upcoming research topic, several studies on logistics sprawl have been performed recently. Dablanc, for example, investigated the concept in the megaregions of Paris 'Ile-de-France' (Dablanc and Rakotonarivo, 2010), Los Angeles (Dablanc, 2014) and Seattle (Dablanc, Ogilvie and Goodchild, 2014). In Paris, logistics real estate is indeed sprawling towards the peripheral zones of the metropolitan area. Between 1974 and 2008 the companies on average moved 10 kilometres out of their barycentre. In Los Angeles warehouses also sprawled from the city centre, on average over 6 miles. In Seattle, logistics locations show a relatively stable pattern. Factors contributing to logistics sprawl are cheaper land prices and

less congestion (Dablanc and Ross, 2012). Visser and Francke (2015) studied sprawl of Dutch logistics centres and their relation with container transhipment by rail and inland waterways. It seems that regions containing a large amount of logistics real estate also exhibit a large amount of container transhipment via rail and inland waterways.

Heitz, Dablanc and Tavasszy (2016) investigated logistics sprawl within the four provinces of the Dutch Randstad megaregion. The polycentric Randstad region was compared with the monocentric region of Paris. In two out of four Randstad provinces, Utrecht and Flevoland, logistics locations are sprawling. Contrastingly, in the other two provinces of Noord-Holland and Zuid-Holland, logistics real estate locations have become more concentrated between 2007 and 2013.

Although the authors conclude there has been logistics sprawl as well as concentration in the Randstad provinces, it is also interesting to investigate whether logistics activities sprawl towards peripheral Dutch provinces. The provinces of Noord-Brabant and Limburg for example, attract a lot of new distribution centres. As shown in figure 5, Noord-Brabant is the number one province in terms of total square metres logistics real estate in both 2004 and 2014. The province of Limburg experienced the highest growth rate (81%) between 2004-2014.

As an indicator for sprawl we compared the relative shares of m^2 logistics real estate of Dutch provinces in 2004 and 2014. It can be calculated that Limburg represented 9,17% of total m^2 Dutch logistics real estate in 2004. This share increased to 11,65% in 2014. The share of Noord-Brabant increased marginally from 29,3% in 2004 to 30,01% in 2014 (figure 5). In the same period, the share of all four Randstad provinces has almost remained constant (for example, the share of Noord-Holland decreased from 13,95% to 13,35% and Zuid-Holland from 14,91% to 14,88%). This indicates that on a national level no significant sprawl can be observed from the Randstad towards Limburg and Noord-Brabant.

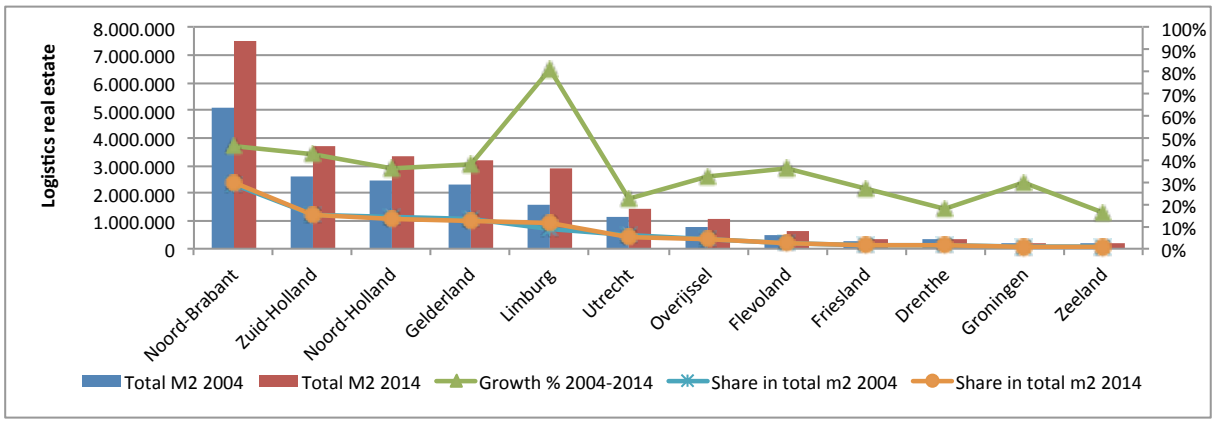

Figure 5 Total surface (m^2) and relative share of logistics real estate per Dutch province in 2004 and 2014 (Bak Property Research and Consultancy, 2014).

Figure 6 shows that, in absolute terms, several peripheral municipalities experienced massive growth in logistics real estate between 2004 and 2014. Venlo, for example, grew from 581.000m^2 logistics real estate in 2004 to 985.000m^2 in 2014, and Tilburg (834.000 m^2 in 2004) even houses 1.370.000m^2 of logistics real estate in 2014 (Bak Property Research and Consultancy, 2014). Other significant peripheral municipalities (housing over 100.000m^2) that have grown 100+% are Tiel, Overbetuwe (both along the A15 corridor), Waalwijk (Noord-Brabant), Montferland (near motorway A12 and the German border), Deurne, Echt-Susteren, and Peel and Maas (all located near Venlo). Although the relative shares of the provinces remained constant (figure 5), in absolute terms a line of logistics real estate has developed from Rotterdam via West-Brabant to the east (Tiel) and southeast (Tilburg and Venlo). Of course, the traditional logistics hotspots such as Amsterdam (Amsterdam Airport Schiphol and the Port of Amsterdam) and the Port of Rotterdam have also grown as a location for distribution centres and other logistics real estate. Figure 6 provides an overview for spatial planners of popular logistics locations in 2014. It can be expected that in the near future additional distribution centre space is needed at these locations.

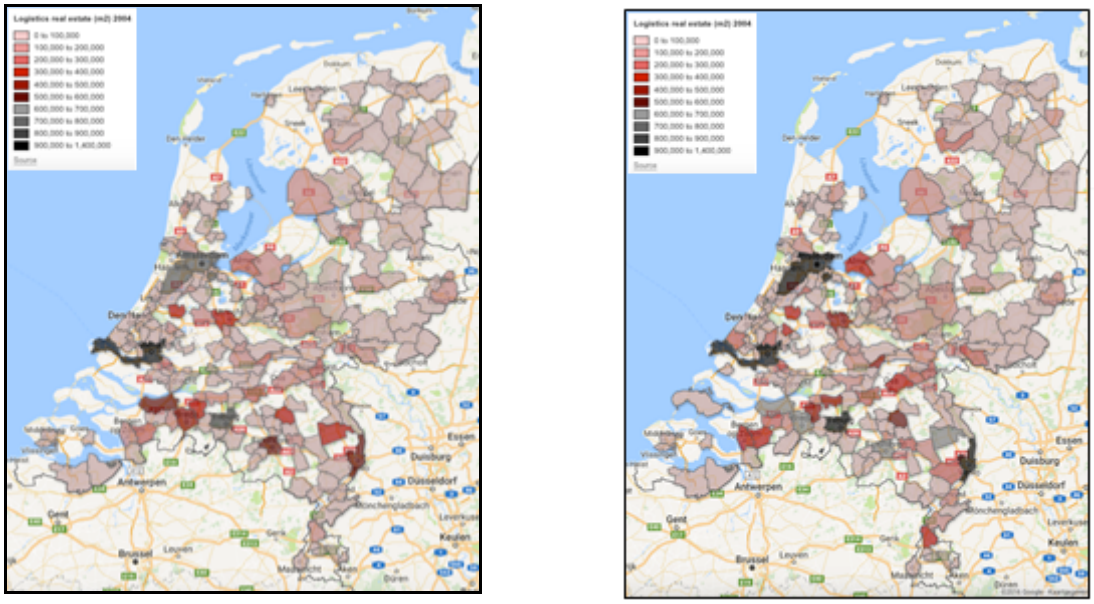

Figure 6 Logistics real estate (m^2) per municipality in the Netherlands in 2004 (left) and 2014 (right). Based on Bak Property Research and Consultancy, 2014.

The relative growth of logistics real estate between 2004 and 2014 is indicated by figure 7. The Halderberge (761%) and Deurne (563%) municipalities grew expressively, respectively representing 210.000m^2 and 122.000m^2 logistics real estate in 2014. An explanation for the growth of Halderberge could be its central location between the ports of Rotterdam and Antwerp. The municipality of Emmen also grew significantly (424%), but only represents 40.000m^2 of logistics real estate. Although these

municipalities have high growth rates, they are not significant in absolute m^2 logistics real estate floor space, and, as such, provide no indication that polarization towards these cities is taking place.

The high growth rates (of 60+%) in the municipalities of Venlo, and Tilburg - which already house a lot of DC floor space - do however provide an indication that, on a regional level, logistics real estate is polarizing toward these municipalities – although land prices in these municipalities are relatively high compared to neighbouring municipalities in Germany and Belgium (Centraal Planbureau, 2015). This is not polarization within existing metropolitan areas, as meant by Dablanc and Ross (2012), but polarization in peripheral areas.

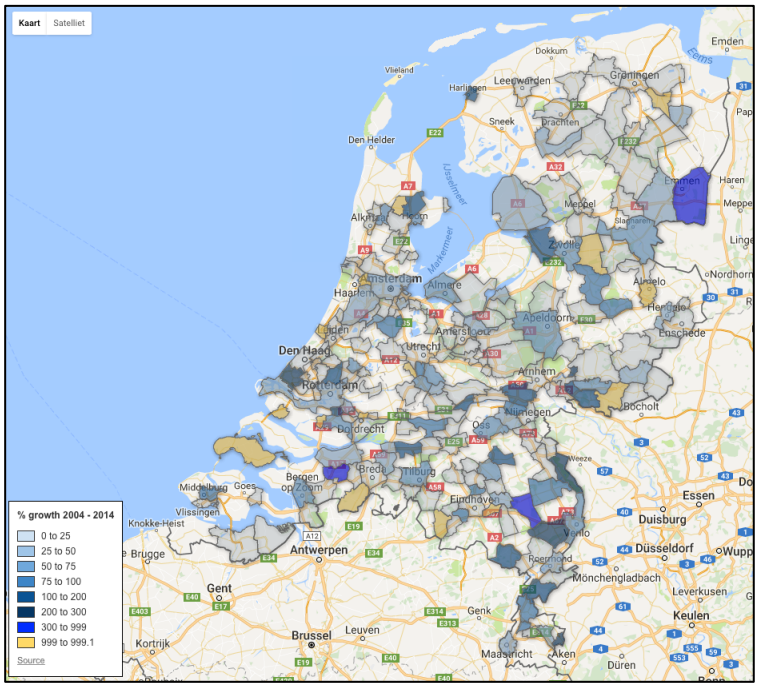

Figure 7 Growth (%) of logistics real estate per municipality between 2004 and 2014 (own work, based on Bak Property Research and Consultancy, 2014).

**999 indicates infinite growth of municipalities not having any logistics real estate in 2004.*

4. Conclusions

- To facilitate the logistics sector and to develop sustainable spatial plans it is important that spatial planners have insights in demand for logistics locations. This paper investigated whether logistics locations have sprawled from the Randstad towards peripheral Dutch regions. For this we compared the relative shares of m^2 logistics real estate of Dutch provinces in 2004 and 2014.
- We conclude that the share of logistics real estate increased marginally in peripheral regions compared to the Randstad, mostly in Limburg and Noord-Brabant. Despite the fact that absolute growth has been high in the periphery (especially along the line Rotterdam – Noord-

Brabant – Venlo), relative positions remain constant and no significant sprawl can be observed on the national level. On the regional level, polarization in the periphery is visible within these regions that have been forming new logistics clusters.

- The demand for logistics real estate has been particularly high in 2015 compared to previous years. In practice not all demand can be fulfilled due to an apparent lack of land and a change in needs of the logistics sector. Although there is a shortage of new distribution centres, an oversupply of old distribution centre buildings exists. Extra attention from spatial policy makers is needed for re-use or transformation of existing distribution centres to prevent further increase of unsalable DCs.
- This study has not investigated possible explanations for logistics patterns within the Netherlands. We hope to follow up the present study with an explanatory analysis.

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