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PBL Netherlands Environmental Assessment Agency

The rationale of spatial economic top sector policy

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1 Introduction

Cities and clusters are important from an economical point of view. According to various national and international studies, agglomeration economies mean that businesses in urban areas and clusters are more productive, experience greater growth and are more innovative than businesses located in non-urban areas.[1] However, this does not apply to every type of business; nor is every type of urban area a dynamic motor for economic growth: there can even be considerable differences in the functioning and performance of regional economies within the Netherlands.

A region's performance is partly related to its economic structure; a region in which there are many growth sectors will, for example, often experience high economic growth (a compound effect). However, the type of commercial activity in the local area also provides businesses with a form of economic power. The presence of other activities affects, for example, the extent to which a company can profit from knowledge spillovers, or the size of a local specialised labour market or supply and demand market. Various aspects of the business environment also affect the functioning and performance of companies, or the extent to which a region is considered an attractive location for a company. Examples are accessibility (by road, public transport and air), the presence of centres of expertise, the quality of the labour force and the availability of various facilities. In summary, economic success is driven to a large extent by the regions, or can be related to the regional context in which businesses operate.

The finding that regions are important to the economy[2] therefore raises the question of whether, and if so how, spatial economic policy can contribute to the success of urban economies and clusters. The Dutch Ministry of Economic Affairs (EZ) has posed an additional question regarding the rationale behind national spatial economic policy; if the regions are important, does this mean that they themselves are responsible for their development, or should we be looking at an active role for the national government?[3] This is an interesting question, particularly in light of the government's recent top sectors policy, which barely touches on the spatial economic perspective.

This question is addressed in this memorandum. To find the answer, we have investigated the pros and cons of spatial economic policy, both in general and more specifically in relation to the top sectors. Both the philosophy of the top sectors policy and the choice of top sectors are beyond the scope of this memorandum. We are primarily interested in presenting the facts and figures related to the top sectors and their spatial distribution: information that until now has not been addressed in the top sectors debate. With this in mind, PBL Netherlands Environmental Assessment Agency, together with Statistics Netherlands, quite literally has 'mapped' the top sectors (see Appendix 1 for further explanation). However, before presenting these facts and figures, top sectors policy is first described from a historical perspective.

2 Top sectors approach in perspective

Roughly speaking, spatial economic policy has been developed over the last few decades with two types of objectives in mind.[4] The first of these has been to remove regional disadvantages or to support sectors – often those experiencing difficulties – in specific regions. Through this *equity* policy, the government has aimed to reduce welfare disparities between regions. The second objective has focused on the strengths and potentials of individual regions. Through this *efficiency* policy, the government has aimed to stimulate *productivity* (added value per employee) and *export*.

The equity policy has played a particularly dominant role in the Netherlands. Up until 2000, it was the cornerstone of almost every spatial economic policy document. Very often it was the only objective, although it was sometimes supplemented with elements of efficiency. This trend changed with the 2004 policy document *Pieken in de Delta* (Peaks in the Delta) by the Ministry of Economic Affairs, in which the equity policy was completely renounced. Since then, spatial economic policy has focused mainly on the growth capacity of the Dutch economy and on improving the competitive position of the Netherlands.[5] With *Pieken in de Delta*, the government aimed to stimulate economic growth in every region by making use of region-specific opportunities that would have an effect at the national level. This policy was based on the region and the strong sectors in those regions.[6] The Ministry of EZ has continued this focus on efficiency in its top sector approach described in the recent *Bedrijfslevennota* policy document (EZ, 2011). This policy focuses on reinforcing the competitive position of the Netherlands, based on the ambition to make the Netherlands one of the strongest knowledge economies in the world.[7] Of note is the fact that this focus is mainly on the sectors (the nine top sectors), and to a much lesser extent on the regions. Another focus of this top sector policy is the decentralisation of spatial economic policy. Although the *Bedrijfslevennota* does state that strong clusters are partly responsible for the success of the top sectors, it goes on to emphasise the need for good cooperation between centralised and decentralised administrative divisions – each operating according to its own responsibilities – to enable businesses to excel and the Dutch economy to flourish (EZ, 2011: 9). It states that decentralised government authorities are in a better position than national government to assess what the regional clusters need to compete successfully. The *Bedrijfslevennota* therefore shows national government withdrawing from the field of the regional economy [8]. This transition can also be seen in the *Structuurvisie van Infrastructuur en Milieu* (IenM, 2012) and the *Bestuursakkoord* (BZK, 2011), in which the provinces are considered to be responsible for facilitating the regional knowledge triangle, business location policy, the regional business environment and the spatial integration of commercial activities and centres of expertise. National government retains responsibility for the development of a coherent policy agenda for the nine top sectors – in other words, an agenda that encompasses the full breadth of government policy. However, what exactly does this mean? This policy agenda *may* contain regional elements, but there is no mention of how these are to be further defined by the Ministry of EZ's top teams[9]. The *Structuurvisie Infrastructuur en Ruimte* is the most specific: given the concentration of top sectors in the urban regions surrounding the *main ports*, *Brain Port* and *green ports* and a number of *valleys*, national government will focus on strengthening the spatial economic structure and on investment in infrastructure in these regions (IenM, 2012: 6-7).[10]

The most recent spatial economic policy documents, therefore, have abandoned the equity objectives of spatial economy policy. It is no longer about removing regional disadvantages; rather the focus is on the strength and potential of certain sectors in the regions (efficiency). There is however an important difference between the two efficiency-oriented policy documents. Whereas *Pieken in de Delta* is based on the regions, with peaks (in other words sectors) defined within these regions, the top sectors

perspective in the *Bedrijfslevennota* focuses mainly on a sectoral approach, with much less importance attached to the region.

Lacuna

There is a lacuna in both policy documents. One point of criticism regarding *Pieken in de Delta* is that although this policy document addresses the main sectors in *each region*, it lacks knowledge of and consideration for how these regional peaks relate to one another at the national level: which regions are truly important in a particular sector (peak)? There is also a lack of international perspective in this policy document: are the Dutch peaks the same as the European peaks? The approach missing in *Pieken in de Delta* is in fact central to the top sector approach in the *Bedrijfslevennota*: the strongest and most important sectors at the international level. However, much less developed in this policy document is *where* these sectors are concentrated exactly. It is therefore possible that much of the cluster potential and agglomeration power remains hidden in the top sector policy. It is also possible that the regions will be much less involved in policy – involvement that, in the peaks policy, was considered so positive, particularly in the form of the regional cooperation between companies, organisations and research institutions.[11]

Without information on the spatial concentration of the top sectors, therefore – information based not on the relative specialisations of the regions but on the real concentration of business locations – it will be difficult for national government to estimate the potential of the various regions and to implement effective spatial economic policy.

3 Which information is required?

We believe there are three fundamental elements required to fill the lacunas described above. First of all, information is required about the spatial distribution of the top sectors: where are the top sectors concentrated in the Netherlands? The regions characterised by a *strong concentration* of business locations in a particular top sector are of potential interest to national top sector policy. After all, it is the quality of the regional business environment that is largely responsible for the functioning and needs of the companies in a particular top sector. In addition, clusters of companies develop for a reason (see Text Box 2). The assumption is that companies that are located in clusters and agglomerations profit from urbanisation and localisation economies, and are therefore more productive and innovative than other companies.[12] Secondly, concentrations of companies are particularly interesting if the cluster also has a certain *mass*. In addition to the number of business locations (which is already taken into account in the concentration), mass mainly concerns the number of jobs in the cluster. From a national point of view, large clusters are often more interesting than small clusters, as a lot of policy is based on stimulating, creating or maintaining employment opportunities. Thirdly, regional *specialisation* also plays a role. If there is a high level of specialisation within a cluster in a region, then it will probably be easier to tally regional policy with national top sector policy, as the top sector will already be a primary focus area from the regional point of view.

These three elements should be considered in relation to one another. In our opinion, the concentration of businesses in the top sectors is the main issue, followed by the combinations of concentration with mass and with specialisation. Most interesting are the regions that combine a high concentration of top sectors with both a large job mass and a strong specialisation in the sector within the regional economy. The three elements taken together therefore identify regions that are so strongly linked to a top sector that they are very important to successful top sector policy. In addition, it is also easy for national government and the region to act in unison as there is a mutual interest: a top sector is a primary focus area at both the national and the regional level. However, it is not always the case that only those regions that score highly in the combination of concentration, mass *and* specialisation are of interest to top sector policy. Regions with a high concentration *and* a strong specialisation in a top sector but a lower mass are also potentially interesting. These are regions with a cluster of lots of small companies. In fact, cluster theory describes mass in terms of the number of business locations, not the number of jobs: a large number of jobs can also be due to one large company in a region. However, regions with a high concentration *and* a high mass but with no strong specialisation are also potentially interesting. These are often the larger regions or urban conurbations with a high diversity in economic activities. In such cases, a relative specialisation in a top sector is not easily discerned, although there are, in absolute terms, a lot of jobs in this sector. Finally, a sector may be important in a region due to a strong relative specialisation even if there is not a high concentration, in particular if there are a relatively high number of jobs in this sector. This often concerns a relatively large company in a region that does not otherwise provide many jobs.

By mapping these three elements for the top sectors (see Appendix 2), PBL and CBS have been able to provide a wealth of information on the spatial distribution and concentration of the top sectors. The spatial distribution, the extent of clustering and the mass in terms of number of jobs are clearly defined for each top sector and each region. The research strategy is described in Text Box 1.

Text Box 1 The research strategy[13]

The PBL Netherlands Environmental Assessment Agency and Statistics Netherlands have mapped the information relating to the three top sector elements described above. The information was collected at the micro – business location – level. The extent of clustering was determined by measuring the distance between a business location and all the other business locations in the same top sector. This resulted in a cluster score for each business location. The main advantage of this method is that clustering was not calculated based on pre-determined administrative divisions. This indicator is further described in Appendix 1. The result was a map of the Netherlands in which each dot shows a business location in a top sector; the cluster score is shown by giving each business location a colour. The maps for all the top sectors are shown in Appendix 2. The redder the dot, the higher the cluster index; in other words, the more companies there are in the same top sector in the vicinity. The greener the dot, the lower the cluster index; in other words, the fewer similar companies there are in the vicinity. The dots vary not only by colour, but also by size according to the number of jobs. The result, therefore, is an absolute concentration pattern that also shows the number of jobs of each business location. To see whether very strong clustering is indeed taking place, a separate map was produced showing only the scores that are very high compared with the benchmark population. It should be noted that the terms clustering (or clusters) and concentration are both used to indicate the spatial pattern of the top sectors.

The maps provide a wealth of information on the spatial distribution and concentration of the top sectors. Aggregating this cluster information by COROP (coordination commission regional research programme) region and comparing this with the regional specialisation shows which regions are strongly concentrated and specialised in the top sectors. The mass in terms of number of jobs is also given for each region. We have named these graphs 'bubble graphs' (the axes show the average cluster index and the relative specialisation (location quotient)), and each bubble varies in size depending on the number of jobs. The graph also displays two lines that cross the axes. The horizontal line is the average cluster index of the benchmark population: if a top sector in a region has a higher score than the benchmark, the concentration in the region is higher than that of the benchmark sector. The vertical line refers to the specialisation of a region and represents the national average (with a location quotient of one); a region to the right of the line is relatively over-represented, whereas a region to the left of the line is relatively under-represented compared with the sector structure in the Netherlands. The regions that combine a high concentration of top sectors with a high mass of jobs and a strong specialisation in this sector in the regional economy – in other words the interesting regions in terms of national top sector policy – are found in the upper right quadrant of the bubble graphs. Regions in the bottom left quadrant are much less interesting; they are less concentrated and less specialised. Regions in the upper left quadrant have a high concentration, may have a high mass (and therefore possibly be interesting due to this combination), but are not highly specialised. Regions in the bottom right quadrant have a low concentration, possibly a high mass, and a strong specialisation. These may be important sectors for the region, but compared with other regions the number of business locations in a particular area is low.

4 The spatial effect of the top sectors: analysis results

Where are the top sectors concentrated in the Netherlands?

The maps in Appendix 2 show the spatial distribution of the top sectors, the extent of clustering and the size of the business locations. The maps therefore also provide information about the type of cluster, such as a cluster of lots of small businesses (also called Marshallian clusters in the literature) or clusters consisting of one or a few large companies surrounded by lots of smaller companies (also called hub and spoke clusters in the literature).[14] The maps also provide information about the location of isolated (unclustered) large companies.

Broadly speaking, the maps show the following clusters for each top sector:

- *Agro & Food*. The broad Agro & Food sector is most strongly concentrated in the four large cities of the Randstad (Amsterdam, Rotterdam, The Hague and Utrecht). This is mainly due to the fact that the broadly-defined sector also includes the related retail trade. Primary production in the Agro & Food top sector (narrow definition) is most concentrated in the Randstad and Noord-Brabant. The strongest cluster is in Westland and Den Haag.
- *Life Sciences & Health*. The highest concentrations of the Life Sciences & Health top sector are found in Amsterdam, Rotterdam, Utrecht and Leiden. There are also clusters around Amsterdam (Amstelveen and Ouder-Amstel) and around Utrecht (Zeist, Bunnik, Houten and Nieuwegein), as well as in Het Gooi. The only cluster outside the Randstad is in Nijmegen.
- *High-tech Systems and Materials*. The Manufacturing Industry sub-sector is concentrated in the Randstad, Midden-Nederland and Noord-Brabant. There are also a relatively large number of manufacturing business locations in Twente and in Limburg. A very strong cluster of the Manufacturing Industry sub-sector is found in Zuid-Holland (Rotterdam, Schiedam and Krimpen aan den IJssel). The Brain Port activities in this top sector are mainly concentrated in Zuid-Holland, in the Eindhoven region, and in Amsterdam. Smaller clusters are also found in Delft, Nieuwegein, Gouda and Zoetermeer. Finally, the High-tech Services sub-sector is found mainly in the large cities, with the highest clustering in Amsterdam.
- *Chemicals.* The Chemicals top sector is concentrated mainly in the Randstad, the centre of the Netherlands and Noord-Brabant, in particular in Rotterdam, Tilburg-Waalwijk, Amsterdam, Zaanstreek and Amersfoort.
- *Horticulture & Propagation Materials.* The Horticulture & Propagation Materials top sector is mainly concentrated in the province of Zuid-Holland. There are also clusters in Kop van Noord-Holland, Betuwe, Noord-Brabant and Noord-Limburg, although Westland stands out the most.
- *Logistics*. The Logistics top sector is mainly concentrated in and around the main ports of Rotterdam and Amsterdam, with strong clustering in Rotterdam, Zwijndrecht and Dordrecht, and in Amsterdam, Aalsmeer, Amstelveen and Haarlemmermeer.
- *Water*. The Water top sector is mainly concentrated in the southern part of Zuid-Holland, around Amsterdam and in the west of Friesland, that is in Rotterdam, Werkendam, Krimpen aan den IJssel, Capelle aan den IJssel, Ridderkerk, Amsterdam, Zaanstad, Aalsmeer, Sudwest Fryslan and Harlingen.
- *Creative Industry*. The Media and Entertainment sub-sector of the Creative Industry top sector is concentrated most strongly in Amsterdam, Het Gooi and Utrecht. The Culture and Services sub-sectors are most concentrated in the four major cities, in particular in Amsterdam.
- *Energy*. The Energy top sector is concentrated mainly in Zuid-Holland, in particular in the municipality of Rotterdam. However, strong clustering is also seen in the regions around Amsterdam and Eindhoven.

Regions of interest to national government

Regions that are potentially interesting to national government display a high level of clustering of the top sectors, with a relatively large number of jobs, in addition to which the top sector concerned is a major contributor to the regional economy (specialisation). However, the other two types of regions may also be of interest. Table 1 therefore provides a summary by region type of the regions that are potentially interesting in each top sector. The table shows that the top sectors can be present in all three of the region types. This means, therefore, that all the region types may be relevant in the spatial implementation of top sector policy. It is also possible that a top sector is represented in more than one region, or that several top sectors are represented in a single region.

Table 2 lists the interesting top sectors in each region. This shows clearly which top sectors are important at the national level; this may be more than one or two in some regions. The districts as applied by the Ministry of EZ are used in Table 2, making it possible to see which areas are important to the various top sectors in which district.

Table 1 Regions of interest to national government

	Region type		
Top sector	**Type 1:** Strong clustering of business locations Large volume of jobs Strong specialisation in the region (large bubbles top right quadrant)	**Type 2:** Strong clustering Small volume of jobs Strong specialisation in the region (small bubbles top right quadrant)	**Type 3:** Strong clustering Large volume of jobs No strong specialisation in the region (large bubbles top left quadrant)
Agro & Food	- Noordoost-Noord-Brabant - Veluwe	- Delft en Westland	
Life Sciences & Health	- Agglomeratie Leiden and Bollenstreek	- Agglomeratie Haarlem	- Noordoost-Noord-Brabant
High-tech Systems and Materials - Manufacturing Industry	- Zuidoost-Noord-Brabant	- Zuidoost-Zuid-Holland - Noordoost-Noord-Brabant - Zaanstreek - Zuidwest-Gelderland	- Groot-Rijnmond - Utrecht
High-tech Systems and Materials - Brain Port activities	- Zuidoost-Noord-Brabant - Noordoost-Noord-Brabant	- Zuidoost-Zuid-Holland - Zuidwest-Gelderland	- Groot-Rijnmond
High-tech Systems and Materials - Services	- Utrecht	- Delft en Westland	- Groot-Amsterdam - Groot-Rijnmond
Chemicals	- Midden-Noord-Brabant - West-Noord-Brabant	- Zuidoost-Noord-Brabant - Zuidwest-Gelderland	- Groot-Rijnmond
Horticulture & Propagation Materials	- Delft en Westland - Agglomeratie	- Oost-Zuid-Holland	- Groot-Amsterdam - Groot-Rijnmond

	Leiden and Bollenstreek		
Logistics	- Groot-Rijnmond	- Zuidoost-Zuid-Holland	- Groot-Amsterdam
Water	- Groot-Rijnmond - Zuidoost-Zuid-Holland	- Zuidwest-Friesland	
Creative Industry - Media	- Groot-Amsterdam	- Het Gooi en Vechtstreek - Agglomeratie Haarlem - Utrecht	
Creative Industry - Culture	- Groot-Amsterdam	- Agglomeratie 's Gravenhage - Agglomeratie Haarlem	- Groot-Rijnmond
Creative Industry - Services	- Groot-Amsterdam - Groot-Rijnmond - Utrecht	- Agglomeratie Haarlem - Het Gooi en Vechtstreek	
Energy	- Groot-Rijnmond - Delft en Westland - Zuidoost-Noord-Brabant		

Table 2 Interesting top sectors by district

Region	**Type 1:** Strong clustering of business locations Large volume of jobs Strong specialisation in the region (large bubbles top right quadrant)	**Type 2:** Strong clustering Small volume of jobs Strong specialisation in the region (small bubbles top right quadrant)	**Type 3:** Strong clustering Large volume of jobs No strong specialisation in the region (large bubbles top left quadrant)
North		**Water** (Zuidwest-Friesland)	
East	**Agro & Food narrow** (Veluwe)	**High-tech Systems and Materials – Manufacturing industry** (Zuidwest-Gelderland) **High-tech Systems and Materials – Brain Port** (Zuidwest-Gelderland) **Horticulture** (Zuidwest-Gelderland)	**High-tech Systems and Materials – Brain Port** (Arnhem-Nijmegen)
North wing	**Creative Industry – Culture** (Groot-Amsterdam) **Creative Industry – Services** (Groot-Amsterdam) **Creative Industry –**	**Chemicals** (Zaanstreek) **Creative Industry – Culture** (Utrecht, Agglomeratie Haarlem, Zaanstreek, Het Gooi en Vechtstreek, Agglomeratie	**Agro & Food narrow** (Utrecht) **Energy** (Groot-Amsterdam) **High-tech Systems**

	Media (Groot-Amsterdam, Het Gooi en Vechtstreek) **Life Sciences & Health** (Utrecht, Agglomeratie Haarlem) **High-tech Systems and Materials – Services** (Utrecht)	's-Gravenhage) **Creative Industry – Services** (Utrecht, Agglomeratie Haarlem) **Creative Industry – Media** (Utrecht, Agglomeratie Haarlem) **Energy** (IJmond) **Life Sciences & Health** (Zaanstreek) **Water** (Zaanstreek)	**and Materials – Brain Port** (Utrecht) **High-tech Systems and Materials – Services** (Groot-Amsterdam) **High-tech Systems and Materials – Manufacturing Industry** (Utrecht, Groot-Amsterdam) **Life Sciences & Health** (Groot-Amsterdam) **Logistics** (Groot-Amsterdam, Utrecht) **Horticulture** (Groot-Amsterdam)
South wing	**Agro & Food narrow** (Delft en Waterland) **Creative Industry – Culture (**Groot-Rijnmond,'s-Agglomeratie 's-Gravenhage**)** **Creative Industry – Services** (Agglomeratie 's-Gravenhage, Groot-Rijnmond) **Energy** (Delft en Westland, Groot-Rijnmond) **Life Sciences & Health** (Agglomeratie Leiden en Bollenstreek) **Logistics** (Groot-Rijnmond) **Horticulture** (Delft en Westland, Agglomeratie Leiden en Bollenstreek) **Water** (Groot-Rijnmond, Zuidoost Zuid-Holland)	**Creative Industry – Services** (Delft en Westland) **High-tech Systems and Materials – Manufacturing Industry** (Zuidoost-Zuid-Holland) **High-tech Systems and Materials – Services** (Delft en Westland, Oost-Zuid-Holland) **High-tech Systems and Materials – Brain Port** (Delft en Westland, Oost-Zuid-Holland) **Life Sciences & Health** (Agglomeratie Leiden en Bollenstreek) **Logistics** (Zuidoost-Zuid-Holland) **Horticulture** (Oost-Zuid-Holland) **Water** (Zuidwest-Friesland)	**Chemicals** (Groot-Rijnmond) **High-tech Systems and Materials – Manufacturing Industry** (Groot-Rijnmond) **High-tech Systems and Materials – Services** (Agglomeratie 's-Gravenhage, Groot-Rijnmond) **High-tech Systems and Materials – Brain Port** (Groot-Rijnmond, Utrecht) **Life Sciences & Health** (Groot-Rijnmond) **Water** (Agglomeratie 's-Gravenhage)
South-east	**Agro & Food narrow** (Noordoost-Noord-	**Chemicals** (Midden-Noord-Brabant)	**Agro & Food narrow** (Zuidoost-Noord-

	Brabant) **Chemicals** (Midden-Noord-Brabant, West-Noord-Brabant) **High-tech Systems and Materials – Brain Port** (Zuidoost-Noord-Brabant)	**High-tech Systems and Materials – Manufacturing Industry** (Zuidoost-Noord-Brabant) **High-tech Systems and Materials – Services** (Zuidoost-Noord-Brabant)	Brabant) **High-tech Systems and Materials – Brain Port** (Noordoost-Noord-Brabant) **Life Sciences & Health** (Noordoost-Noord-Brabant)

The power of agglomerations

Although top sectors are found throughout the Netherlands, they are particularly common in agglomeration areas, as can be seen on the spatial distribution pattern maps in Appendix 2. Although it is mainly the primarily service-oriented top sectors that are found in the agglomerations, the industrial and logistics top sectors are found there too. Some regions are mainly of interest due to the localisation benefits (based on the clustering of similar business types), as well as the broader urbanisation benefits that they offer companies (see Text Box 2). As can be seen in Table 1, Groot-Amsterdam and Groot-Rijnmond are important regions for several top sectors. In conclusion, the spatial dimension of the top sectors is characterised by specific geographical clusters as well as strong cities and agglomerations.

Valleys

As described in the policy documents *Bedrijfslevennota* and the *Structuurvisie Infrastructuur en Ruimte*, the 'valleys', as well as the main ports, green ports and Brain Port, are also important at the national level. The main valleys are the *Energy Valley* in Groningen, the *Food Valley* in Wageningen, the *Health Valley* in Nijmegen, the *Maintenance Valley* in West-Brabant and Midden-Brabant, the *Utrecht Science Park*, and *nanotechnology* in Twente and Delft. The identification of such valleys is based on the success model of Silicon Valley, a concentration of technology companies in the San Francisco Bay Area in the American state of California. Regions often attempt to copy this success model, in the hope that a valley in the region will herald the start of great things.

There has been, at the regional level in particular, a proliferation of all kinds of valleys in recent years, a few of which are referred to in national policy documents. The question is whether these valleys are also visible in the top sector maps. In other words, are there clear Life Sciences & Health clusters around Arnhem-Nijmegen, Agro & Food clusters around Ede-Wageningen, Energy clusters around Groningen-Delfzijl, High-tech Systems and Materials clusters in Twente and Delft and Maintenance clusters (a sub-sector of High-tech Systems and Materials) around West-Brabant and Midden-Brabant? This is explored below for each valley.

Energy Valley Groningen

The Energy top sector is mainly clustered in Zuid-Holland (around Rotterdam–Den Haag), around Amsterdam and around Utrecht and Eindhoven. There are also more isolated, smaller clusters of energy activities, for example around Arnhem. Groningen and Delfzijl are less prominent as a valley; there are relatively few clusters of energy companies in these regions. However, the Groningen region stands out due to the relatively large proportion of jobs in the energy sector (almost 10% of the total in the Netherlands), while the Delfzijl region has a relatively high degree of specialisation as there are relatively few other types of economic activity in the region. In summary, therefore, the Energy Valley in Noord-Nederland is not so much a cluster of business locations, but more a concentration of a few large companies.

Food Valley Wageningen
The Agro & Food (narrow definition) top sector is concentrated in the Veluwe and, to a lesser extent, the Zuidwest-Gelderland region. This may point to a concentration of agro & food companies around Food Valley Wageningen. However, the cluster pattern covers a much larger area as agro & food companies appear to cluster in the Zuid-Zuid-Holland (including Westland)–Veluwe (including Ede-Wageningen)–Noordoost-Noord-Brabant triangle. Food Valley Wageningen, as this cluster is called in the policy documents (the name is based mainly on the available agro & food expertise and technology in the area around Wageningen University), should therefore not be defined too narrowly in geographical terms. The potential would be much greater if the whole of the triangle were to be considered.

Health Valley Nijmegen
The Life Sciences & Health top sector is clustered mainly in the Randstad around Amsterdam, Leiden and Utrecht and in parts of Zuid-Holland (around Rotterdam–Den Haag). There are also a few smaller clusters, such as Oss, Eindhoven and Arnhem–Nijmegen. There is a relatively high level of clustering in Health Valley Arnhem–Nijmegen, but this is clearly isolated compared with the clusters in the Randstad. Over four per cent of the total number of jobs in the life sciences in the Netherlands is related to the Arnhem–Nijmegen region. Though not insignificant, there are clearly other regions in the Netherlands that are more important to the Life Sciences & Health top sector, both in terms of number of business locations and jobs (mass).

Technology Valley Twente
The Twente region mainly stands out due to the Brain Port and manufacturing high tech activities, rather than the technology service industry. There is a relatively strong specialisation in Brain Port activities in the region, with over 8.5 % of jobs in these activities in the Netherlands related to this region. The same applies to the manufacturing industry; over 7 % of jobs in the high tech manufacturing industry are in the Twente region. Despite this, however, the level of clustering is relatively low. There are therefore relatively few high tech companies located relatively near to one another in Twente. Such clusters do however exist around Eindhoven and in the Randstad. Twente mainly has a few relatively large companies in this top sector.

Maintenance Valley in West-Brabant and Midden-Brabant
Maintenance Valley represents several developments taking place at the same time and all related to maintenance, in particular aircraft maintenance. It is therefore difficult to relate each of these activities to a top sector. The High-tech Systems and Materials top sector, and in particular the Manufacturing Industry sub-sector, is most related to this valley as this includes high tech maintenance. About seven per cent of the high tech manufacturing jobs in the Netherlands are related to the Midden-Brabant and West-Noord-Brabant regions. However, the high tech manufacturing industry is concentrated in a much larger area, in particular the whole of Noord-Brabant and the Randstad.

Summary

From the point of view of the top sectors, it is important to view the valleys from a national perspective. They are in fact not always the primary focal point of the top sectors themselves, as was made clear above[15], but are more important to the regions themselves, as the sectors concerned represent a relatively high level of specialisation in the regional economy. Nevertheless, the sector in which the region aims to stand out as a valley is often part of other, more powerful, regions. These are often larger urban regions (agglomerations) that in addition to the cluster advantages of similar companies in the vicinity also offer agglomeration advantages that follow from the presence of a large number and variety of other types of companies.

Which top sectors are highly concentrated?

Not every top sector has the same level of clustering: some sectors are strongly clustered in certain regions, while other sectors are spread more evenly throughout the Netherlands. It is therefore useful to look not only at the spatial distribution patterns, but to also compare the level of clustering of the top sectors. To do this, the average level of clustering was calculated for each sector. The higher the average cluster index score, the stronger the level of clustering in a sector; the lower the average cluster index score, the lower the level of clustering in a sector. The average score can also be compared with the benchmark scores for all business locations in manufacturing and services. The clustering values (please also refer to Appendix 2) are shown in Figure 1. In particular:

- Services are much more clustered than companies in the manufacturing industry, as reflected in the average value of the cluster index, and in particular the maximum value. This means that there are regions in the Netherlands in which lots of service companies are located close to one another, in particular in the cities.
- Clustering is particularly high in the Creative Industry top sector (compared with services in general and with the other top sectors). Within Creative Industry, the strongest clustering is in the Media sub-sector, followed by Culture then Services.
- High-tech – Services displays less clustering than services in general.
- The Horticulture & Propagation Materials, Life Sciences & Health, Logistics, Energy and Water top sectors are all more clustered than industry in general.
- The High-tech Systems and Materials, Chemicals and Agro & Food top sectors are all less clustered than industry in general.

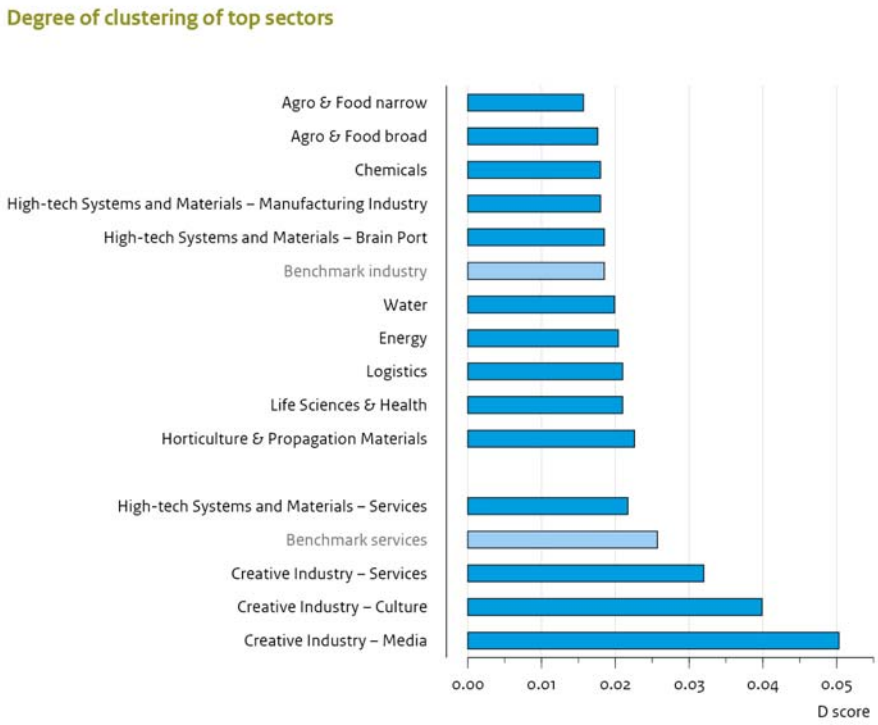

Figure 1.

Conclusion

The top sectors are not distributed evenly throughout the Netherlands, but concentrated in regions that often contain more than one top sector. One important conclusion for top sector policy is that linking a top sector with a specific region does not reflect the fact that a top sector may be important in several regions. Linking a top sector with a specific region also fails to take into account the fact that several top sectors may be important in a particular region.

Text Box 2 Why are regions important to companies?

To answer the question why regions are important to companies, we need to consider the role of *agglomeration economies*. Agglomeration economies are the benefits experienced by companies due to clustering, by profiting from the proximity of other companies. These benefits can be the result, for example, of a larger and more specialised labour market and the corresponding increase in 'matching' opportunities, the specialisation of the supply market (input sharing) and the presence of industry-specific expertise – all of which can result in knowledge spillovers.[16]

Three types of agglomeration economies are often defined: 1) external benefits experienced by all companies in the area (unrelated to the sector to which they belong), 2) external benefits experienced by all companies within the same sector, and 3) external benefits due to the variety of sectors in the area. These benefits are called *urbanisation economies*, *localisation economies* (or Marshall's externalities) and *Jacobs' externalities*, respectively. Urbanisation economies develop with the size and density of an urban area (benefits due to the concentration of economic, social, political and cultural organisations in densely-populated urban areas, but also due to the presence of universities, research institutions, consumer-oriented facilities, trade organisations and government agencies); localisation benefits are the result of regional concentrations of companies in the same sector (specialised clusters), and Jacobs' externalities are due to the presence of a variety of sectors in a region. These last two agglomeration economies relate, for example, to the question whether a specialised economic structure benefits the economic performance of a region, or whether a varied economic structure would be better. Is potential knowledge spillover and labour market mobility greater, for example, between the same types of companies, or different types of companies? 'Related variety' is increasingly considered to be important: sectors that are related through a common knowledge or technology base. The idea is that spillovers mainly take place between sectors with some kind of overlap rather than between totally unrelated sectors.

Agglomeration economies are mainly the result of interactions between companies – these may take the form of trade relations, but also informal, incidental and unintentional interactions, and face-to-face contact is often very important. People need face-to-face contact to be able to exchange personal and complex information, to build trust and to make a continuous and accurate assessment of the potential of constantly-changing business relations. Refining products and services, working together, completing business transactions and – possibly most important – learning from one another and being able to improve through comparison with others (peers) all rely strongly on the opportunities provided by personal contact.

In addition to these economic structure variables, there are all kinds of location factors that also play a role. Examples are accessibility (by road, rail, water and air), the knowledge infrastructure, the labour market (human capital), and so on.[17]

5 Arguments for a national regional-economic policy

It is clear that many companies cluster in specific regions, their spatial distribution mainly dependent on the benefits of being in the proximity of other companies and certain regional circumstances. This also applies to the companies in the top sectors. Who, therefore, is responsible for top sector policy? Does national government have a role in facilitating such clusters, or are the regions themselves responsible for this? On the one hand, it is efficient to allow regions to take the lead in regional economic policy. After all, local authorities and market parties have a better understanding of local conditions: conditions that may vary greatly and that national government may not be in a position to judge as well as the regions. Clusters and business dynamics within the clusters (such as spin-offs) are often locally embedded in networks of companies, government agencies and centres of expertise (regional innovation systems). The exact ingredients and success factors of economic policy therefore require a tailor-made approach. Making regional stakeholders responsible for such an approach means that there will be less chance (at least that is the idea) that a lack of information on local conditions and interaction mechanisms will result in the wrong choices being made. On the other hand, national government has, with its top sector policy, taken on the responsibility of producing a coherent agenda across the full breadth of government policy. This government policy plays a role at national level between the various departments, as well as between the various national and decentralised government agencies. In the case that the top sectors are strongly linked to a specific region, the success of top sector policy will be highly dependent on those regions. In this case, top sector policy is inextricably linked to the region. Some top sectors are very specifically linked to one or several regions, as far as the concentration of lots of business locations combined with the number of jobs and regional specialisation are concerned. Examples are the creative industry (Groot-Amsterdam), Life Sciences & Health (Agglomeratie Leiden), Horticulture & Propagation Materials (Westland and Agglomeratie Leiden), Logistics (Groot-Rijnmond), Energy (Groot-Rijnmond) and, to a lesser extent, the High-tech – Brain Port activities (Eindhoven region). In these cases, regional policy is a logical component of a coherent national policy agenda. National government does however have another important role to play as far as top sector policy is concerned – in the supra-regional view that is required to improve the competitive position of many of the top sectors. The regions do not usually look very far across their borders when drawing up policy, and it is more likely that their ‘outlook’ ends at the administrative borders of their region than that they tailor their policy activities to the larger context in which they operate – exceptions excluded. The spatial distribution patterns (see Appendix 2) indicate that policy should focus on the supra-regional strength of the top sectors. However, as these distribution patterns do not always correspond with the administrative limits of municipalities or provinces, clusters of top sectors go beyond the level of the local and regional decision-making power of policymakers.

The analysis also shows that the top sectors are rarely linked to a single region. For example, the high tech industry is often linked to the Eindhoven Brain Port, while it is also highly concentrated in parts of Zuid-Holland. The service-related high tech activities, on the other hand, are strongly linked to Groot-Amsterdam and Utrecht. This means that there is potentially great synergy between these spatially separated clusters – synergy that can only be made use of by taking a supra-regional approach. It is also possible to ask why the Eindhoven Brain Port focuses so strongly on the Eindhoven-Leuven-Aachen triangle when there are many similar companies elsewhere in the Netherlands.

What is possibly more important is the fact that the Dutch regions can only compete nationally and internationally if they are able to provide the top sector companies with an excellent business environment. Examples of such an environment are a good physical infrastructure and knowledge infrastructure and all kinds of aspects relating to quality of life. However, other features of the regional economic structure also play a role, such as

the presence of clusters in the area, the labour market (human capital) and urbanisation (agglomeration force) features. Very often, the aspects that produce an internationally-competitive business environment are available in varying quantities in a region. The question then arises whether it is wise for a region to invest in those qualities that it is lacking, or whether it would be better to 'borrow' these qualities from other regions. For example, compared with the major competitors of top sector companies, Dutch regions are relatively small and less urbanised. As a result, Dutch regions lack agglomeration force (see Raspe et al., 2012; Thissen et al., 2011). Regions could focus policy on increasing mass and density, but they could also borrow some of the required agglomeration force from nearby regions using the 'borrowed size' concept, or from major agglomerations elsewhere through good links (possibly international). Other qualities that are lacking in a particular region could also be 'compensated' through good partnerships with other regions ('borrowed qualities'). For example, the high tech cluster in the Eindhoven Brain Port could compensate for its average public knowledge infrastructure score through good partnerships with those Dutch regions that are strong in this area, such as Noord-Holland and Zuid-Holland. Recent research carried out by PBL (Raspe et al., 2012b) showed that although many of the competitors of Noord-Brabant do less well in private R&D, they score well in public R&D, examples being Oxford, Paris, Cologne and Rhône-Alpes. However, compared to regions with a very strong private knowledge infrastructure, such as Munich or Tuebingen, Noord-Brabant does not do that well in public R&D either. There are plenty of examples of features for which excellent links could compensate for local 'weaknesses'.[18]

6 Conclusion and discussion

There is certainly a rationale behind spatial economic government policy, as identified in the previous section. Therefore, the national government could link its spatial economic vision more strongly to the top sector policy than it currently does. After all, both 'borrowed size' and 'borrowed qualities' require a national vision on the competitive position of Dutch regions. Certainly if national government is responsible for this competitive position, and if the regions are important to the success of economic policy, it would be illogical to make the regions solely responsible for regional economic policy. However, as the success of top sector policy is partly determined by the region, it would make sense for national government and the region to act together. Which roles are to be taken by each party will vary as the regional situation differs for each top sector; this is beyond the scope of this memorandum. One issue that reinforces this rationale is international competition, in which many companies in the top sectors attempt to take part. PBL studies into the competitive position of the top sectors indicate that the elements required for an internationally-competitive business environment in the regions are not consistent within the Netherlands, and that Dutch regions are particularly lacking in agglomeration force. Furthermore, many Dutch clusters are relatively small compared with the most competitive regions elsewhere in Europe. There is no region where both public and private knowledge infrastructures are well-developed, and international connectivity is important to almost all the top sectors, even in regions situated relatively far away from Schiphol airport.

These are a few examples that lead to the conclusion that top sector policy would certainly benefit from a spatial economic vision at the national level: a vision based on powerful agglomerations and the crucial links between them to utilise the synergy that exists between the regions. Only then will the whole (Dutch competitive power) be greater than the sum of its parts (the regions). It is national government that can make this happen. Our conclusion, therefore, is that national government could form a more prominent spatial economic vision regarding the top sectors. This conclusion leads to a number of important *discussion points*.

A national spatial economic strategy should take into consideration medium-sized, small and new companies

The top sectors consist of large, medium-sized and small companies, as shown in the maps in Appendix 2. Clusters may be made up of a concentration of small companies, or a large company surrounded by small companies. We note here that large companies, in particular multinationals, are generally perfectly capable of building up their own regional and international networks. Large companies are also better equipped to invest in knowledge, for example, as they have more resources and greater capacity. Large companies also find it easier to maintain good relationships with the ministries and politicians in The Hague, and therefore also find it easier to apply for subsidies, for example.

At the same time, it is mainly the small and medium-sized enterprises and new and young companies that benefit most from good local and regional conditions. These are the companies that benefit from a location in an agglomeration or a cluster: they are more dependent on their external networks and surroundings, even if the chance of survival in this more competitive environment is lower. It is therefore the small and medium-sized companies that would particularly benefit from an 'internationalisation shift'.

In summary, spatial economic policy that focuses on strong regions needs to take small, medium-sized and new companies into account. It is often these companies, furthermore, that challenge the established order. This means that top sector policy must also have enough elements of 'backing challengers', and not just 'picking' or 'backing' winners. However, the question of what these elements consist of remains.

A national spatial economic strategy should contain elements of resilience

In our analysis, we have looked for the regions with strong concentrations of top sector companies. After all, we wanted to discover the most powerful regions corresponding to a top sector, not the most powerful sector in a region (as the sector may be much more dominant in another region). This is the lacuna in the previously-discussed *Pieken in de Delta* policy. One of the results of this choice is that the Randstad and Noord-Brabant were found to be the most powerful regions for the top sectors. However, this does not alter the fact that there may also be reasons to look at those regions in which the concentration of business locations is less, but in which a relatively large number of jobs are related to a particular sector, making the sector important to the region. This often concerns one or several large companies in regions in which there are very few other significant economic sectors. This makes these regions susceptible to events that affect these companies or sectors. The departure or loss of these crucial companies could be a reason for national government to implement active policy in these regions. The focus in this case is not so much on growth potential and the international competitive position of the top sectors, but on the resilience of regions to deal with economic setbacks or crises. It is not immediately obvious what the best policy would be in such cases, as relatively little information is available regarding the regional and national impact of such setbacks and the best policy options. PBL, together with Statistics Netherlands (CBS), has therefore begun researching the economic resilience of regions and their susceptibility to the closure of large companies, for example. Although the results of this research will not be available until the summer of 2013, it is possible to put forward the discussion point that a national spatial economic strategy must also contain elements of resilience. Again, this raises the question of what these elements should be.

More research is required into the functional links between the regions

The ‘valleys’ do not always represent the primary concentration points of a top sector. What, therefore, is their purpose and role in a spatial economic vision? Given that the valleys represent primarily regional specialisations, they should be seen in relation to clusters of companies elsewhere. For example, we have seen that Food Valley Wageningen does not just include the Ede–Wageningen or West-Gelderland region, but in fact an area that stretches across the whole of the Randstad, Noord-Brabant and Gelderland. Given the lack of knowledge about the actual relationships between, for example, the University of Wageningen as a centre of expertise and the companies in the regions further away from Ede–Wageningen, this represents an important research question. The overly narrow geographical definition of the valleys, as well as their proliferation, does not in fact contribute to the potential of spatial clustering in the top sector companies. It would therefore make more sense to base a spatial economic vision for the top sectors on the maps of the actual distribution of business locations.

Notes

[1] See Text Box 2 for an explanation.
[2] The Dutch policy focus on regional competitive power also fits in with recent policy ideas at the European level. Place-based development (Barca, 2009) assumes that the development of regional conditions can produce more local growth, and that this is different in each region. This is often linked to 'smart' specialisation: not every region can specialise in the same sectors, as the market for these sectors is limited (and the positions on the market often already defined). Smaller, non-specialised regions therefore need to focus on facilitating supply sectors and investing in networks with other regions, and should not aim to achieve more than this.
[3] This is also called the 'subsidiarity principle', which in this case means that government decisions should be taken at the most suitable level. In other words, the principle that a centralised or higher level of government should not do what can be done by a lower level of government.
[4] See Raspe & van Oort (2007) for an overview of industrial economic and spatial economic policy in recent decades.
[5] See Ministry of Economic Affairs (2004: 17).
[6] It is sometimes claimed that the shift from equity to efficiency policy is also the main difference between regional economic and spatial economic policy. However, this claim is mainly related to the naming of policy documents, a change that took place at the same time as the shift from equity policy to efficiency policy (see Raspe & van Oort 2007: the policy document *Ruimtelijk Economisch Beleid, dynamiek in netwerken* published in 1999 spoke for the first time of spatial economic policy rather than regional economic policy). We would like to emphasise that it is the change from equity to efficiency that is relevant, rather than the name of the policy, as the two concepts are not so very different. Within national policy, both regional economic policy and spatial economic policy focus on 'all factors that are important to the business environment in a region'. Specific areas are also sometimes mentioned, such as main ports or Brain Ports, or it sometimes applies to every region.
[7] See Ministry of Economic Affairs (2011: 7).
[8] See Ministry of Infrastructure and the Environment (2012: 10) and Bestuursakkoord (2011: 42). In the light of the subsidiarity principle (note 3) this is much more about the fact that it is the 'turn' of the regional authorities, and whether national government needs to introduce additional policy.
[9] The core philosophy of business policy is 'demand driven': the companies – represented in the top teams – indicate where the main bottlenecks lie and what the government could do to help. This has contributed to 'the region' being regarded as being less relevant as an entity. This is also related to the fact that fewer SMEs are represented in the top teams, and that there is much less emphasis on new, young and small enterprises, while the regions and local embedding are particularly important to these companies. Large companies and multinationals are much more likely to have their own networks and are less dependent on their location for their essential networks.
[10] The *Bedrijfslevennota* policy document by the Ministry of Economic Affairs also includes an appendix with a vision of the 'northern wing' of the Netherlands (also called the *Amsterdambrief*), in line with the previous port vision and the vision of the Brain Port.
[11] See Geerding et al. (2010) and OECD (2010).
[12] The question whether a location in a cluster or agglomeration makes a company more innovative or productive, and whether this is a region with an exceptional business dynamic (for example because there are more start-ups), is the subject of a PBL/CBS research programme. The analysis, however, is beyond the scope of this memorandum.
[13] The literature dealing with clusters is extensive, and various definitions are provided. In this memorandum and in the maps we assume a cluster index that indicates the clustering or concentration of similar types of business locations. After all, we are interested in the spatial patterns of the top sectors. These patterns do not provide information about the functional relationships between these and other companies.
[14] See Markusen (1996).
[15] It is certainly relevant, as far as the valleys are concerned, to investigate whether the relevant economic activities also benefit from clustering at the international level. Based on international research, Thissen et al. (2012) concluded that the Netherlands would benefit more from policy that focuses on regional economic diversification than from policy that focuses on concentration or cluster-formation. Cluster orientation and concentration would however seem to be useful in

specific sectors. Thissen et al. (2012) name the high-tech manufacturing and knowledge-intensive service sector as sectors that are cluster-sensitive.

[16] See for example Raspe (2012) for a further explanation of agglomeration economies.

[17] See Weterings et al. (2011), Raspe et al. (2012a) and Thissen et al. (2011) for an overview and description of these factors.

[18] See Raspe et al. (2012a) for more examples and arguments regarding borrowed size and borrowed qualities.

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Appendix 1 Measuring clusters

Two methods were used to map the spatial concentration of sectors: location quotients and a cluster index at the business location level. Both methods are explained in this appendix. The second part of the appendix provides further information about the data used to measure the top sector clusters.

Methods for measuring clusters

Location quotients are the most commonly applied method in spatial economics for measuring the spatial concentration of sectors. A location quotient is calculated using the following equation[1]:

$$(0.0)\quad LQ_{s,r} = \frac{Vest_{s,r} / Vest_r}{Vest_s / Vest}$$

Where:

$Vest_{s,r}$ = the number of business locations in region *r* and sector *s*

$Vest_r$ = the total number of business locations in region *r*

$Vest_s$ = the number of business locations in sector s in the Netherlands

$Vest$ = the total number of business locations in the Netherlands

The proportion of business locations in a region in a particular sector was compared with the proportion of business locations in the sector at the national level. If the proportion of business locations in a sector is the same at the regional level as at the national level, the location quotient is one. If the proportion is lower in the region compared with the national level, the score is less than one (under-representation). If the proportion is higher in the region, the location quotient is greater than one (over-representation). The location quotient therefore provides an indication of whether the number of business locations in a particular sector in a particular region is higher or lower than average. The location quotient can therefore be regarded as the degree of specialisation.

Although the location quotient is useful for understanding the spatial distribution of sectors, it does have two drawbacks. First of all, the location quotient is calculated at the regional level, which means that a regional division has to be chosen. The calculated values are therefore highly dependent on the chosen divisions; if the regional divisions are changed, the calculated scores will also change (the scale effect). Furthermore, use is often made of administrative zones when drawing up regional divisions, so that the question arises whether this corresponds to actual business practise (the zoning effect). Secondly, location quotients underestimate the level of sector clustering in regions that contain lots of companies in different sectors, such as large cities. Although the absolute number of business locations in a sector in these regions may be high, the location quotient will be low as lots of other activities also take place in these regions.

To compensate for these limitations, we have also used a *cluster index* at the business location level, in addition to the location quotient, to determine the spatial concentration of top sectors. This cluster index was developed by Scholl & Brenner (2011) and is based on the address of every business location that carries out activities related to the top sectors. The spatial dimension of the cluster depends on the spread of business locations in the sector, rather than on predetermined regional divisions. Furthermore, the concentration is first calculated based on the spatial distribution of business locations in the sector concerned, after which it is compared with the distribution of companies in general. This also makes it possible to detect clusters in regions in which many different activities take place.

The basic idea behind the cluster index was based on earlier work by Sorenson & Audia (2000) that measured the proximity of each business location in relation to every other

location in a sector. Sorenson & Audia (2000) calculated the sum of the reciprocal of the distances D_i between a business location and every other location in the same sector:

(0.0) $$D_i = \frac{1}{J-1} \sum_{j=1, j \neq i}^{J} (f(d_{i,j}))^{-1}$$

$(f(d_{i,j}))^{-1}$ represents every possible function, whereby the reciprocal of the distance between two points is calculated so that the distance between points that are closer to each other weighs more heavily than larger distances[1]. Scholl & Brenner (2011) showed that the simple hyperbolic function $(d_{i,j})^{-1}$ is the most suitable for an index to measure sector clustering.

We therefore also used this function.

Because the sum of the right-hand side of the equation (1.2) increases with the number of observations *J*, an average is calculated so that the values for D_i can be compared between sectors.

The term $\frac{1}{J-1}$ means that the index is independent of the number of business locations in a sector.

The method for calculating D_i is shown further based on the example in Figure B1.1.

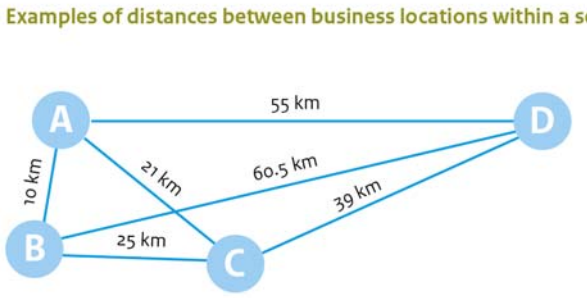

Figure B1.1

For business location B in this example, the average inversed distance D_i is:

(0.0) $$\frac{1}{3} \cdot \left(\frac{1}{10km} + \frac{1}{25km} + \frac{1}{60.5km} \right) = 0.052 \left[\frac{1}{km} \right]$$

The higher the value of D_i for a business location, the more other locations there are belonging to the same sector in the vicinity. Comparing the four business locations in the example in Figure B1.1, D_i is highest for location A (0.055), followed by B and C, and location D has the lowest score (0.02).

[1] Scholl and Brenner (2011) used the orthodromic distance – the distance between two points is corrected for the curvature of the Earth. This correction is not made here as it has little effect on the distances within the Netherlands.

Locations that are very close together – for example in the same business park – can confuse the results for D_i . A threshold value of one kilometre is therefore included in the calculation. The equation (1.2) therefore becomes:

$$(0.0) \quad D_i = \frac{1}{J-1} \sum_{j=1, j \neq i}^{J} \frac{1}{\max\{1km, d_{i,j}\}}$$

In this memorandum, this is the score referred to by the 'd score'.

The spatial distribution of the business locations in a specific sector was then compared with that of a benchmark population, to determine whether the distribution within the sector deviates from the general distribution of business locations in the Netherlands. Two benchmark populations were selected: one for all industrial activities and one for services. It was not possible to compare the distribution of all top sectors with a single benchmark population as 'services' displays a much higher level of concentration than 'industry'. Comparing the spatial distribution of industrial top sectors with a benchmark population that also included service activities could therefore lead, incorrectly, to the conclusion that these top sectors are not spatially concentrated.

The benchmark population for industry includes all business locations involved in industrial activities on 31 December 2011. These are all the business locations for which the primary activity falls under Standard Industrial Classification codes 10 to 32 and 383. This population is the benchmark for the following top sectors: Agro & Food (narrow and broad definition), Life Sciences & Health, High-tech Systems and Materials – Manufacturing Industry and Brain Port, Chemicals, Horticulture & Propagation Methods, Logistics, Energy and Water. For the High-tech Systems and Materials top sector and the three Creative Industry sub-sectors, the benchmark population consists of all the locations with Standard Industrial Classification codes 9, 33, 58 to 63, 69, 70 to 74 and 80 to 82. Activities such as consumer services, public utilities, government and education activities, wholesale and retail trade are not included as the choice of location for these activities mainly depends on the general distribution of the population, rather than the proximity of other services. D_i was also calculated for all the business locations in each benchmark population.
Two methods were applied to compare the spatial distribution of the top sectors with the distribution of the benchmark populations. First of all, the average and the median of D_i were calculated for both the top sector and the benchmark population. A comparison of these values gives an idea of the extent to which a top sector is more or less spatially concentrated than the benchmark population. Secondly, the d scores for the 90th and the 95th percentiles were calculated for the benchmark populations. For industry, these values were 0.0203 and 0.0269 respectively; for the services 0.0403 and 0.0579. All the business locations with a d score higher than these values are located near to lots of other business locations in the same sector. If business locations in the top sectors have a d score that is higher than these values, these are the areas in which the sector is very highly (95th percentile limit) or highly (90th percentile limit) concentrated.

Three methods for displaying spatial distribution
The spatial distribution of the top sectors is shown in three different ways. The first method used was to plot all the business locations on a map. Each 10th percentile was given a different colour, making it clear where the top sector is most concentrated in the Netherlands. This is called the top sector *concentration pattern*. The second method was to map all the business locations with a d score higher than the 90th or 95th percentile d score for the benchmark population. This map shows the top sector *clusters* – in other words, where the sector is most concentrated compared with the general spatial distribution of industry or services in the Netherlands. Thirdly, a scatter diagram was

produced showing the 40 COROP areas in the Netherlands. The x-axis represents the region's degree of specialisation in the top sector, expressed as a location quotient. This therefore shows whether the proportion of business locations in the sector in the region is higher or lower than the Dutch average. The y-axis represents the level of concentration of the sector. This is the average d score for all business locations in the COROP area, and indicates whether there are lots of business locations in close proximity to one another in the region. Finally, the size of the circle indicates how many jobs there are in the top sector in the COROP area, showing the mass of the top sector in the region. The spatial distribution of the top sectors is shown in Appendix 2.

Are low cluster scores in peripheral regions sensitive to measurement methods?
Looking at the maps in Appendix 2, the question arises whether peripheral regions in the Netherlands, such as Groningen, are sensitive to the clustering measure applied. In other words, does the measure of clustering imply that the peripheral regions will not achieve high cluster scores because the business locations in these regions are so far from areas with lots of business locations, such as the Randstad? To find out whether this is true, a sensitivity analysis was carried out, taking Figure B1.1 as an example. Consider, for example, that Region D is Groningen and that A, B and C are all located in the Randstad. Sensitivity analyses were carried out in which Region D was located increasingly closer to or further away from A, B and C, and in which the regions were placed very close together or far away from one another. The sensitivity analyses showed that high cluster scores were mainly the result of lots of business locations in close proximity to one another, not business locations situated further away from each other. The high scores for Amsterdam, therefore, were due to lots of business locations in close proximity to one another, rather than businesses in Utrecht, for example. For Groningen, therefore, relatively low cluster scores are due to the fact that there are relatively few companies located close together, not its peripheral location compared with the Randstad. The distance decay function in the formula, therefore, is relatively strong, and business locations that are located further away have a minimal effect on the scores.

Data
Business locations
The business location information was taken from the *ABR Regiobase* (General Business Register Regional Database) 2011. In Statistics Netherlands (CBS) jargon, a business location is called a local unit (*lokale bedrijfseenheid*; LBE) and a company a unit (*bedrijfseenheid*; BE). The Regional Database is used to produce statistical data by region, and contains all the local units (LBEs) in the general business register (ABR). An LBE is a collective term for all business locations in a single BE in a single six-digit postal code. As well as the LBEs, the regional database also contains equations for breaking down the variables that are known at the BE level into the corresponding LBEs. The regional database also contains the size and primary activity of every LBE, which may differ from those of the BE.

The Regional Database, which is produced every year, contains all the BEs and LBEs that were active in that year according to the ABR. The date of formation and possible date of closure is also known for every LBE. For the analyses carried out in this memorandum, all the LBEs were selected that were active on 31 December 2011. The six-digit postal code is also known for the LBEs in the ABR. The postal code can be used to create regional divisions, for example by municipality or by province. In this memorandum, the postal code was used to calculate the distances between the business locations.

One of the extra variables in the Regional Database is the main activity of the LBE, classified according to the Dutch Standard Industrial Classification (SBI) 2008. However, not every business location may be involved in the company's primary activity, an example being a supermarket distribution centre. If we want to know which activities take place in a region, it is more useful to use the primary activity of the business location, not the BE. Information on LBE primary activities was taken from the Dutch

Chamber of Commerce trade register. When companies register a new business location with the Chamber of Commerce, they also indicate the activity or activities that will be carried out at the location. This information was used to determine the primary activity of the LBE. It should be noted that if a BE had only one location, the LBE was given the same SBI classification as the BE.

A second extra variable in the Regional Database is the equation used to break down data at BE level to the LBE level. This equation is based on two sources: 1) a questionnaire about the number of jobs per company per municipality, and 2) the number of employees per business location as recorded in the trade register. The central business administration of the UWV includes data about the number of jobs per company; the allocation by municipality was calculated using the results of the annual Statistics Netherlands' Regional Employment questionnaire. This questionnaire reports the distribution of employees in service in a company over the municipalities in which the company has one or more locations at the end of the report year. If a BE has more than one LBE within a municipality, the distribution within the municipality is determined based on the number of employees registered at the location with the Chamber of Commerce.

Jobs

The number of jobs in each business location was taken from the municipal *Statistiek Werkgelegenheid en Lonen* (Employment and Wages Statistics) SWL region database 2010. This database provides information on the distribution of jobs over the different municipalities in which a company has business locations. If a company has more than one business location in a municipality, the equation was used to calculate the number of jobs in each business location. The number of jobs in each business location was linked to the Regional Database 2010, and the data from 2010 used as an approximation for the number of jobs in 2011. The SWL region database only contains data on company employees, not on self-employed persons. If a business location in the regional database could not be linked to the SWL region database, the number of jobs was set to one. Most of the people in this group are self-employed.

Definition of top sectors

Selection of the top sectors was based on the definitions as applied in the advisory reports of the top teams. These definitions were drawn up by Statistics Netherlands (CBS) together with the Ministry of EZ (CBS, 2012b). As far as possible, the top sectors were defined based on the SBI. A check was then made to ensure that all the key players in a sector were included in the definition. If not, further analysis was carried out at the business location level, for which additional sources were used. Often, such sources consisted of lists of companies that are members of a particular trade organisation or business platform, for example. Four top sectors were finally defined based solely on the SBI 2008: Agro & Food, High-tech Systems and Materials, Life Sciences & Health and Chemicals. Additional analysis was carried out at the business level for the definition of the other five top sectors: Horticulture & Propagation Materials, Logistics, Water, Creative Industry and Energy. The SBI classification of the business location was also considered in this analysis. Only if specific companies were named were all business locations belonging to the company concerned included in the analysis. Please refer to *Nulmeting van de Monitor topsectoren, uitkomsten fase 2* (CBS, 2012a; 2012b) for details of the definitions.

The research conducted in this memorandum makes use of the Statistics Netherlands definitions and includes the following nine top sectors: 1) Agro & Food, 2) Life Sciences & Health, 3) High-tech Systems and Materials, 4) Chemicals, 5) Horticulture & Propagation Materials, 6) Logistics, 7) Water, 8) Creative Industry, and 9) Energy. Some top sectors were sub-divided, if they were very broadly defined and/or contained obvious sub-sectors; sub-sectors that were also applied by Statistics Netherlands in their definitions. An understanding of these sub-sectors is important because they have their own spatial

distribution patterns. Sub-sectors were defined for the following top sectors: Agro & Food, High-tech Systems and Materials, and Creative Industry. The definition of the Agro & Food top sector, for example, includes four sub-sectors: 1) primary production of raw materials for food products, 2) food product processing, 3) wholesale and retail trade, and 4) other. In this analysis, we use a broad definition for Agro & Food (the sum of these four sub-sectors) and a narrow definition (primary production and food product processing). We use the narrow definition as there are a lot of business locations involved in wholesale and retail, usually in cities (where primary production does not take place). To give an example: the broad definition includes 136,419 business locations; the narrow definition 58,053. There are also four sub-sectors in the High-tech Systems and Materials top sector: 1) metal industry, 2) machine and equipment manufacturing, 3) vehicle manufacturing, and 4) other. The 'other' category is relatively large, with a specific service profile. To give an example: the total top sector consists of 80,440 business locations, of which 51,627 are in the 'other' category: companies involved in software development, technical research and development, engineering and other technical design and consultancy, and machine, equipment and material inspection and control. We refer to this 'other' category as High-tech – Services in our research. Metal industry, machine and equipment manufacturing and vehicle manufacturing together form High-tech – Manufacturing Industry (together 21,825 business locations). High-tech – Brain Port is treated separately as these activities are also treated separately in the policy documents, as the Zuidoost-Brabant/Eindhoven region Brain Port. The Eindhoven region and Veldhoven are particularly strong in Brain Port activities within the High-tech Systems and Materials – Manufacturing Industry top sector definition. This concerns sections of the electrical equipment industry, the computer industry, the medical equipment industry, the lighting industry and the automotive industry, including the corresponding supply industries. This concerns about 7,000 business locations in the Netherlands. Finally, there are also four sub-sectors in the Creative Industry top sector: 1) art, 2) cultural heritage, 3) the media and entertainment industry, and 4) creative business services. These definitions are also applied in our analysis, although we combine the first two sub-sectors under the heading 'Culture'.

Appendix 2
Spatial concentration and specialisation in the top sectors

Text Box 1 describes the research strategy used to map the top sectors and to display the relationships between regional concentration, specialisation and job mass. The results are included in this appendix. However, before moving on to the maps and bubble figures, we first present the number of business locations and the average, median and maximum cluster scores for each top sector in the table below.

Top sector	**Number of business locations 31-12-2011**	**Average d score**	**Median d score**	**Maximum d score**
Benchmark industry	52,927	0.0185	0.0193	0.0346
Benchmark services	334,373	0.0257	0.0229	0.0687
Agro & Food broad	136,419	0.0176	0.0166	0.0410
Agro & Food narrow	58,053	0.0157	0.0158	0.0334
Life Sciences & Health	2,703	0.0210	0.0207	0.0422
High-tech Systems and Materials – Manufacturing Industry	21,825	0.0180	0.0189	0.0287
High-tech Systems and Materials – Brain Port	6,988	0.0185	0.0197	0.0268
High-tech Systems and Materials – Services	51,627	0.0217	0.0211	0.0477
Chemicals	2,509	0.0180	0.0188	0.0268
Horticulture & Propagation Materials	19,338	0.0226	0.0193	0.0506
Logistics	28,187	0.0210	0.0197	0.0436
Water	3,511	0.0199	0.0196	0.0331
Creative Industry – Media	14,304	0.0503	0.0319	0.1525
Creative Industry – Culture	47,681	0.0399	0.0276	0.1226
Creative Industry – Services	55,037	0.0320	0.0256	0.0967
Energy	1,410	0.0204	0.0189	0.0451

NB: High-tech Systems and Materials – Brain Port is a sub-group of High-tech Systems and Materials – Manufacturing Industry. The total number of business locations in the top sector of High-tech Systems and Materials is the sum of their locations in the Manufacturing Industry and Services.

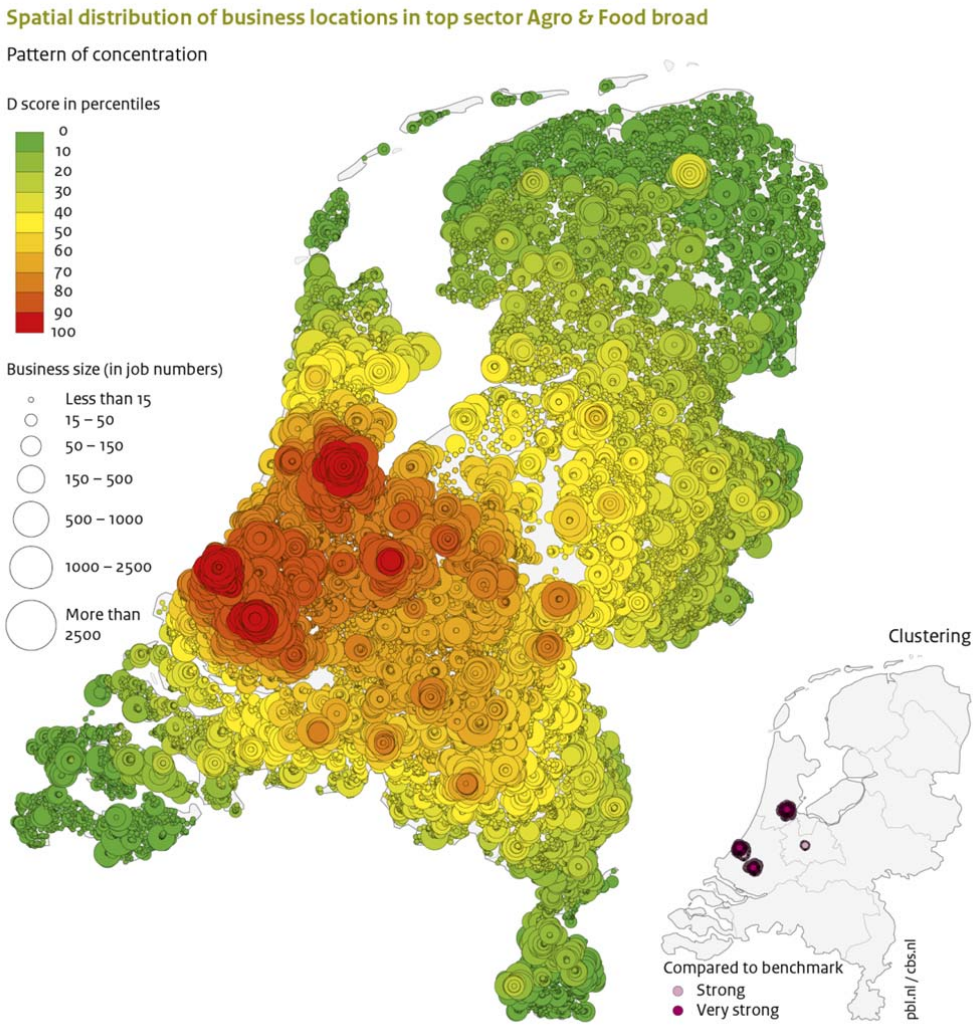
Spatial distribution of business locations in top sector Agro & Food broad
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.1

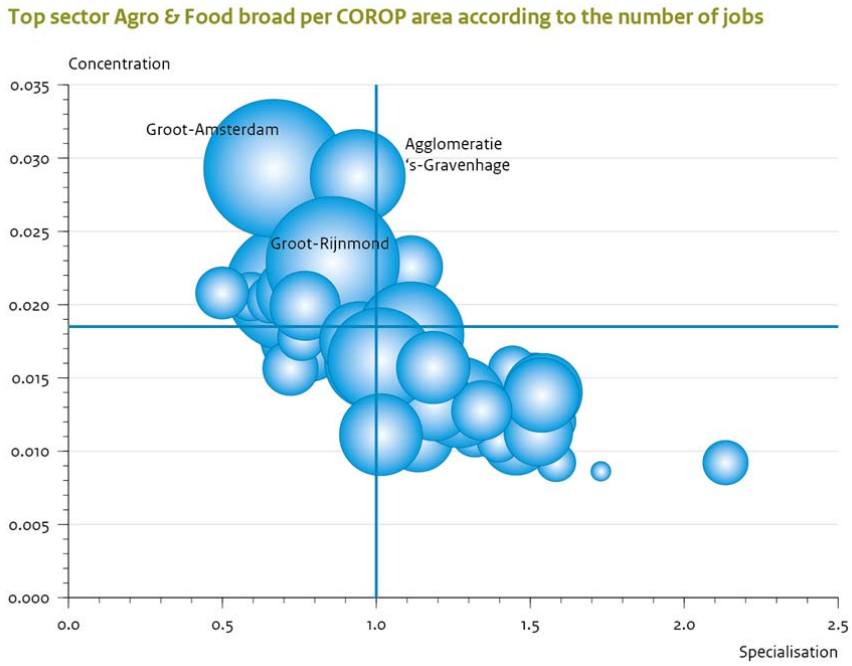

Figure B2.2

The Agro & Food top sector includes the Primary Production, Food Industry, Wholesale and Retail Trade, and Other sub-sectors. These sub-sectors display very different distribution patterns. Wholesale and Retail Trade also includes supermarkets and other food stores, as well as catering establishments: population-dependent activities that are concentrated mainly in cities. Primary Production and Food Industry are more evenly distributed throughout the Netherlands (see description for Agro & Food – narrow definition). The Agro & Food top sector does not display a high degree of spatial concentration compared with industry or services, as proven by the fairly low average d score for this sector (0.0176). There is however a high concentration in this sector in specific areas, as the maximum d score is higher than the maximum score for industry as a whole (0.0410 and 0.0346 respectively). The cluster map shows that the business locations with the highest spatial concentration are located in the four major cities of the Randstad. These locations are mainly involved in activities in the Wholesale and Retail Trade sub-sector. The Primary Production and Food Industry sub-sectors display much lower spatial concentrations. The location quotients also show a fairly even distribution in the Agro & Food top sector throughout the Netherlands. Wholesale and Retail Trade is concentrated in the cities and Primary Production in more rural areas. The Zeeuwsch-Vlaanderen region displays the highest specialisation in Agro & Food. Measured as the number of jobs, the sector is most strongly represented in the Groot-Amsterdam region and the other four major cities.

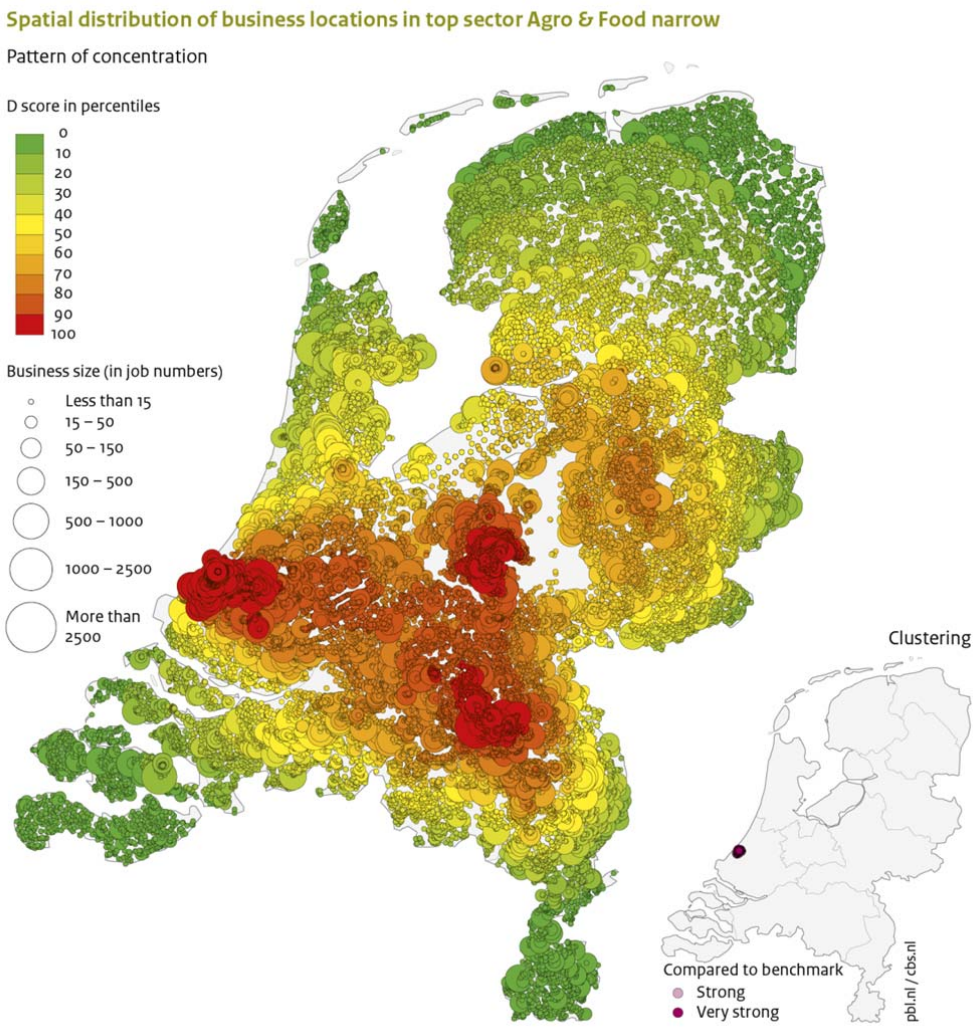
Spatial distribution of business locations in top sector Agro & Food narrow
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.3

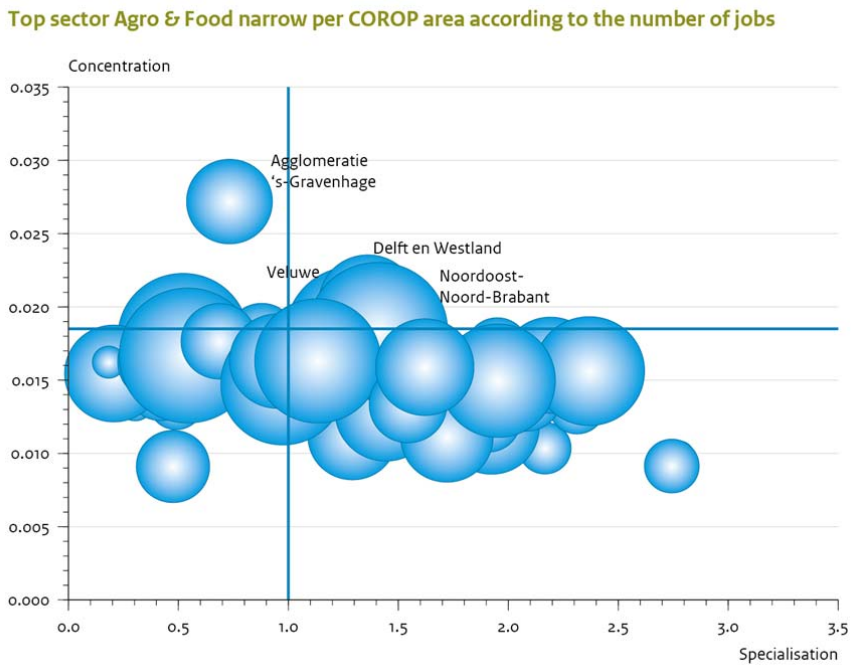

Figure B2.4

The Primary Production and Food Industry sub-sectors in the Agro & Food top sector are spread throughout the Netherlands, with a low average d score compared with most other top sectors. This is mainly because Primary Production is concentrated in the more peripheral regions of the Netherlands. Nevertheless, the highest concentrations in this sector are also in the Randstad and Noord-Brabant – the most highly urbanised areas of the Netherlands. The cluster map shows that this top sector is most concentrated in the municipality of Westland and the bordering municipality of Den Haag. The location quotients for this sector, however, show a very different pattern: the regions with the highest degree of specialisation in Primary Production and Food Industry are Noord-Nederland, Achterhoek and Zeeuwsch-Vlaanderen. Activities in the Delft en Westland region are also highly specialised in these sub-sectors. Measured in terms of the number of jobs, Noordoost-Noord-Brabant, Zuidoost-Noord-Brabant, Veluwe, Groot-Rijnmond and Utrecht stand out the most.

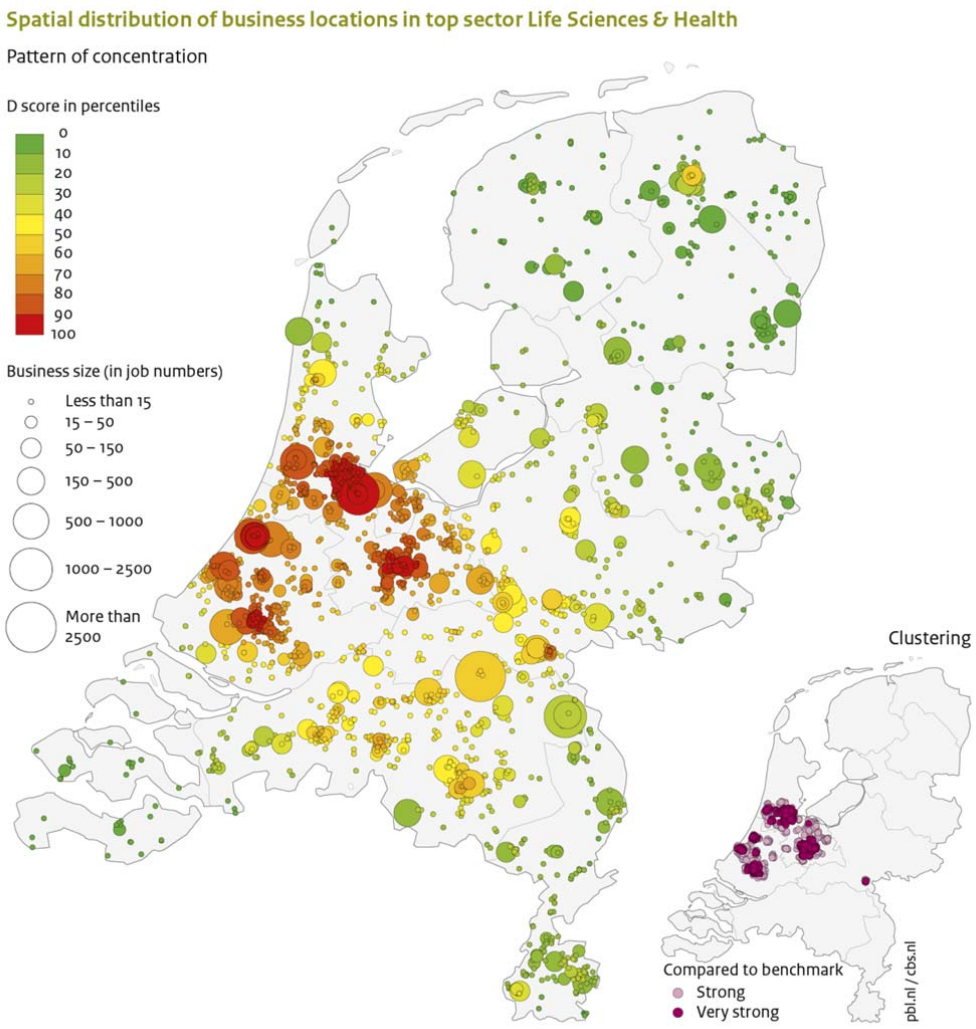
Spatial distribution of business locations in top sector Life Sciences & Health
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.5

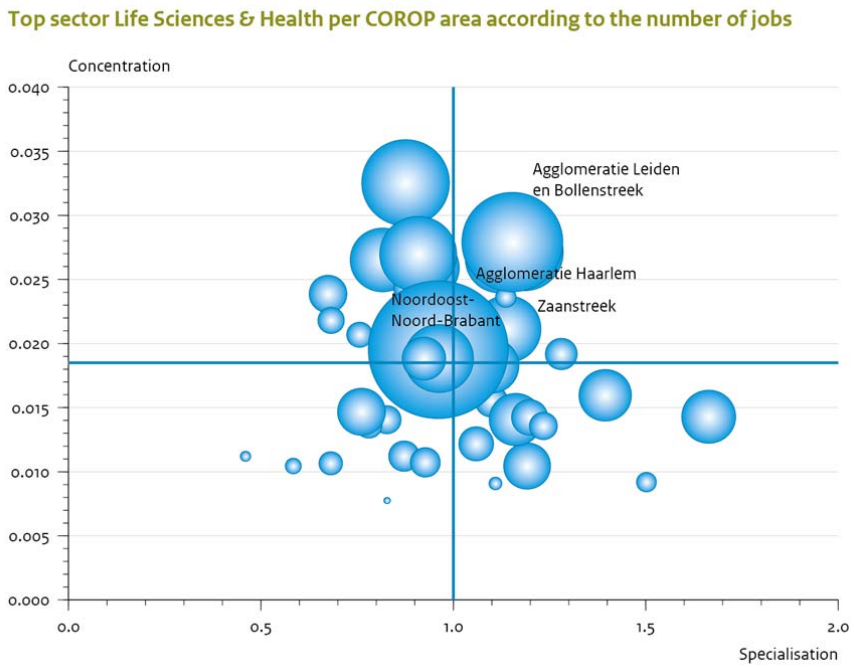

Figure B2.6

The Life Sciences & Health top sector is more concentrated in and around the cities of the Randstad and Nijmegen than any of the other industrial activities. The average d score for Life Sciences & Health business locations indicates a higher level of concentration in this sector than for industry in general. The average d score of all Life Sciences & Health business locations is 0.0210, compared with 0.0185 for industry in general; the highest d score in this top sector is even 0.0422, compared with 0.0346 for industry as a whole. The highest concentrations in the Life Sciences & Health top sector are found in Amsterdam, Rotterdam, Utrecht and Leiden. Business locations in the municipalities around Amsterdam (Amstelveen, Ouder-Amstel) and Utrecht (Zeist, Bunnik, Houten, Nieuwegein) also have high d scores. A fairly high level of clustering of Life Sciences & Health businesses is also seen in Het Gooi. The only cluster outside the Randstad is in Nijmegen. The high level of concentration in Life Sciences & Health, however, does not coincide with a high degree of specialisation in the life sciences. The regions with the highest location quotient – Zuid-Limburg and Oost-Groningen – do not have a high level of clustering in this sector, while the regions with the most clustering – Amsterdam, Rotterdam, Utrecht and Leiden – are not highly specialised in this sector. This is mainly due to the fact that the Life Sciences & Health top sector is most strongly concentrated in urban areas, where lots of other economic activities also take place. The region with the most jobs in Life Sciences & Health is Noordoost-Noord-Brabant, where there are two large business locations in the sector. The total number of business locations in the region, however, is low. Only the Agglomeratie Leiden en Bollenstreek region displays a high level of clustering, above-average specialisation and a large number of jobs in Life Sciences & Health.

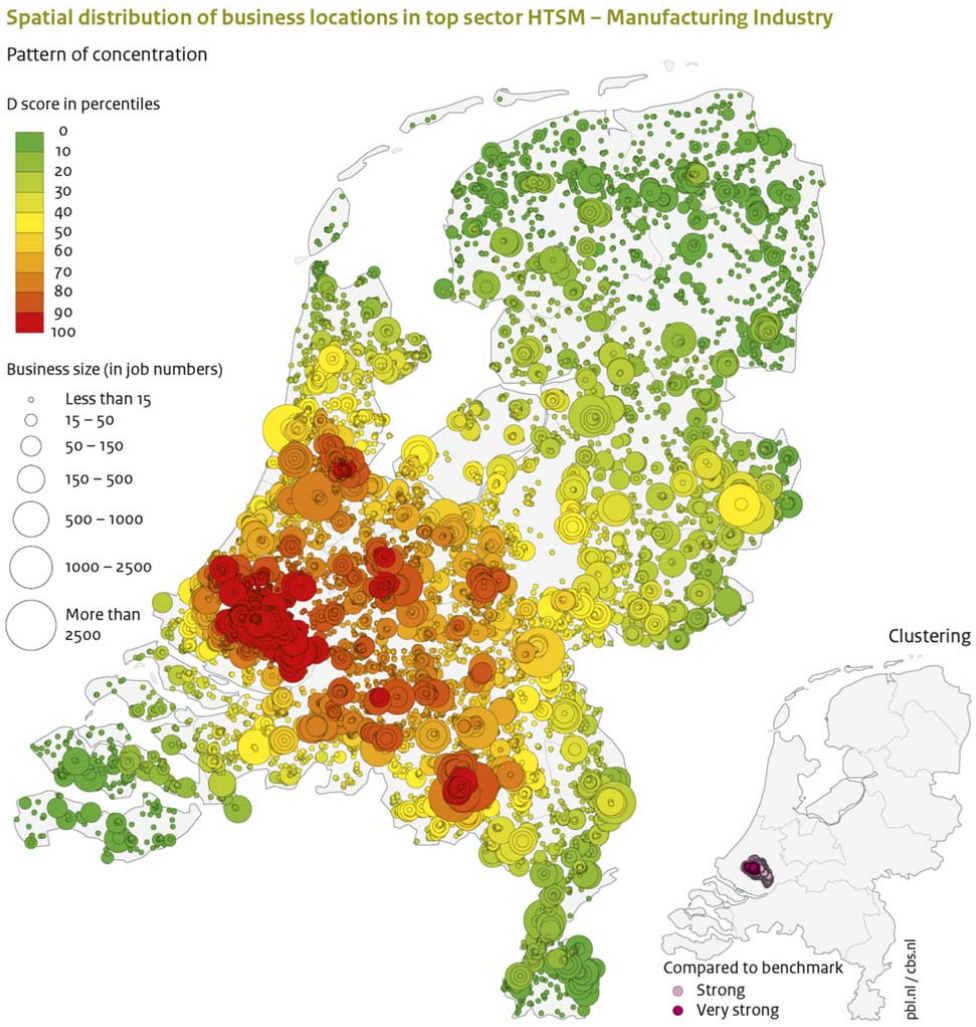

Figure B2.7
NB: HTSM = High-tech Systems & Materials

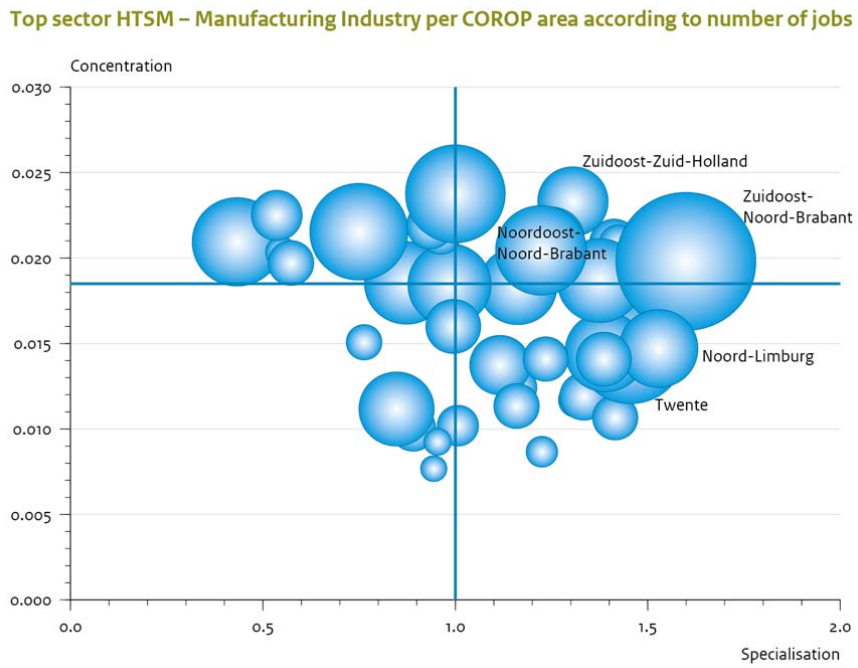

Figure B2.8
NB: HTSM = High-tech Systems & Materials

Although the spatial distribution of business locations in the High-tech Manufacturing Industry seems very similar to that of industry in general, this top sector has a lower spatial concentration than industry as a whole (0.0180 compared with 0.0186). Most business locations are in the Randstad, Midden-Nederland and Noord-Brabant. There are also a relatively high number of business locations in the High-tech Manufacturing Industry in Twente and Limburg but, as the map shows, the number of business locations and the distance between them is too large to be able to talk of strong clustering. The cluster map (right) shows that strong clustering in this top sector is only seen in Zuid-Holland. Lots of High-tech – Manufacturing Industry business locations in close proximity to one another are seen mainly in the municipalities of Rotterdam, Schiedam and Krimpen aan den IJssel. However, this is not the region with the most specialisation. The proportion of business locations in this sector is higher in the Zuidoost-Noord-Brabant, Noord-Limburg, Twente and Zaanstreek regions than in Zuidoost-Zuid-Holland, although the level of specialisation in Zuidoost-Zuid-Holland is higher than the national average. The number of jobs in High-tech – Manufacturing Industry is the highest by far in the Zuidoost-Noord-Brabant region, due to the large business locations in this sector near Eindhoven.

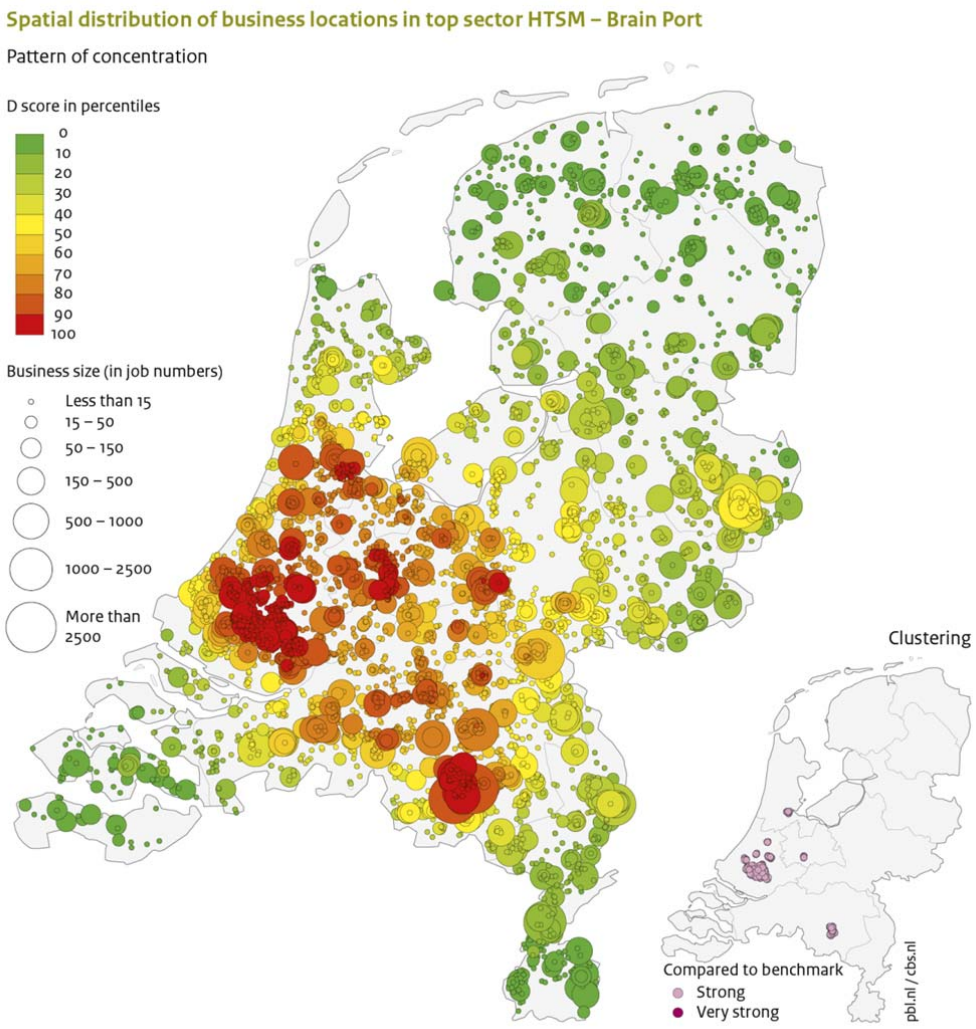

Figure B2.9
NB: HTSM = High-tech Systems & Materials

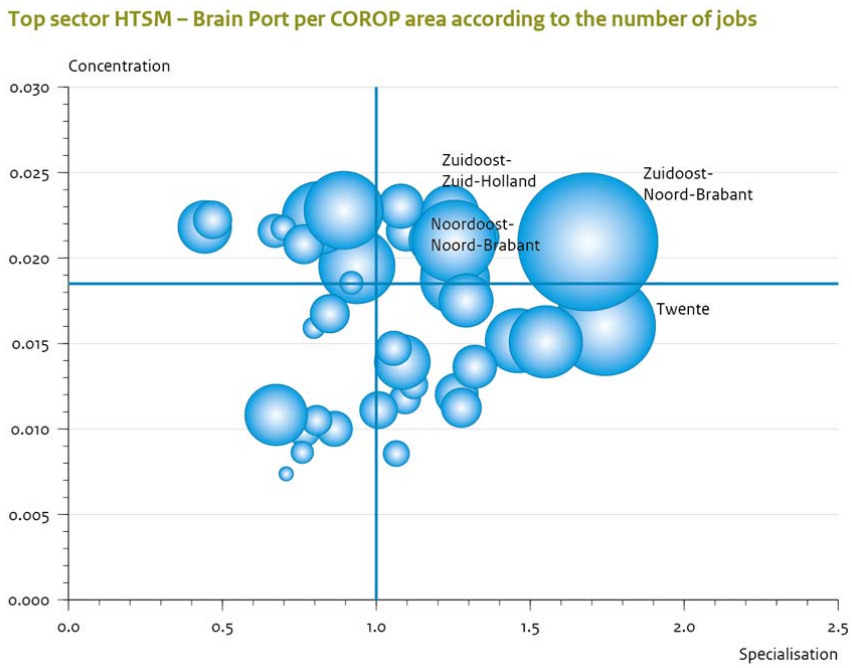

Figure B2.10
NB: HTSM = High-tech Systems & Materials

These maps show the spatial distribution of business locations that manufacture computers, electronic and optical equipment, electrical appliances, other machines and equipment and cars and car accessories (SBI codes 26 to 29). These are the High-tech Manufacturing Industry activities in which most business locations in the region surrounding Eindhoven (the so-called Brain Port) are specialised. Generally speaking, the spatial distribution of these sectors strongly resembles that of High-tech – Manufacturing Industry. The average d score of the business locations in this part of the High-tech top sector is somewhat higher than that of High-tech – Manufacturing Industry as a whole (0.0185 compared with 0.0180), while the maximum d score is a little lower. The cluster map shows a strong concentration of this sector in Zuid-Holland, Eindhoven and, to a lesser extent, Amsterdam. This group of High-tech – Manufacturing Industry business locations is also most concentrated in the municipalities of Rotterdam, Schiedam and Krimpen aan den IJssel, although there is very little difference with the business locations in the municipality of Eindhoven. There are also several smaller clusters in the municipalities of Delft, Nieuwegein, Gouda, Zoetermeer and Amsterdam. Most jobs by far in this sector are in the Zuidoost-Noord-Brabant region (see Appendix 3). This region therefore has several large companies in these sectors, while the regions around Rotterdam have lots of smaller business locations. There are also lots of jobs in this sector in the Twente region, which has the highest degree of specialisation in this sector, although there is not much difference with the Zuidoost-Noord-Brabant region (1.74 and 1.59 respectively). However, the number of business locations in this sector is too low in the Twente region to be able to speak of strong clustering.

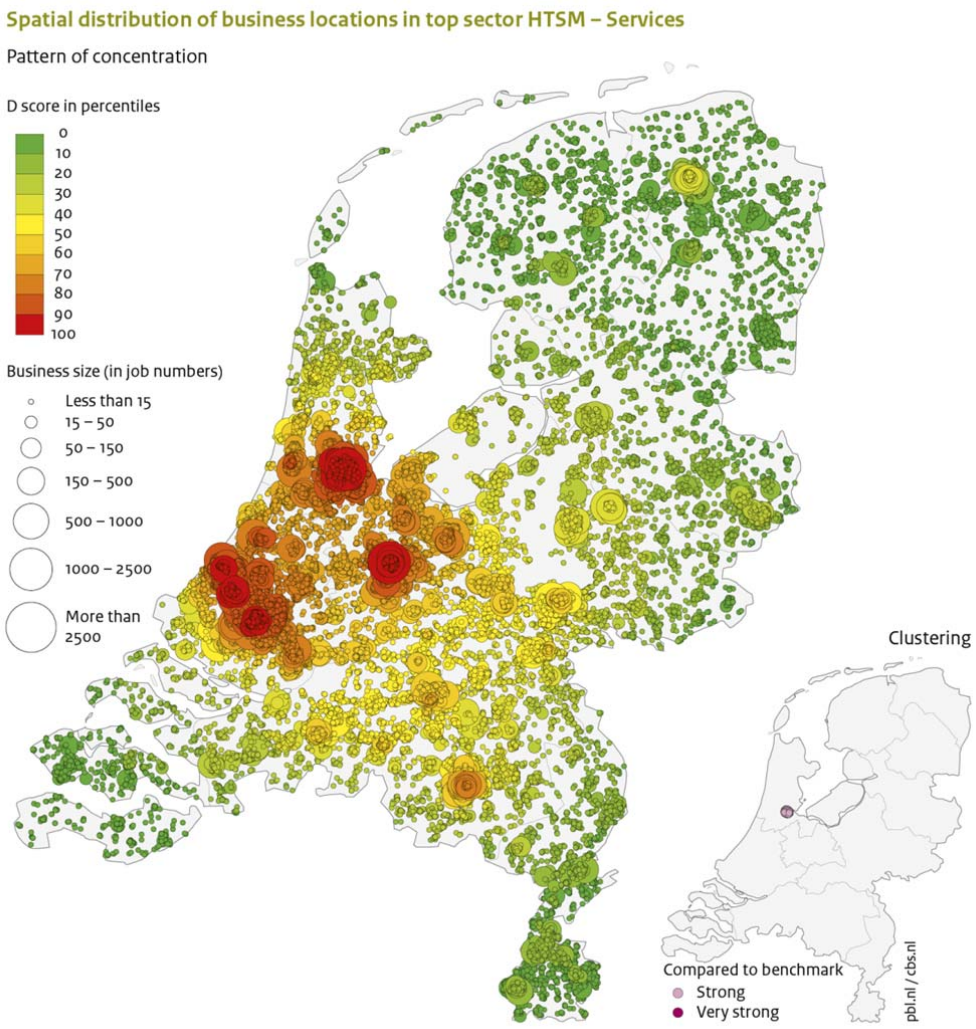

Figure B2.11
NB: HTSM = High-tech Systems & Materials

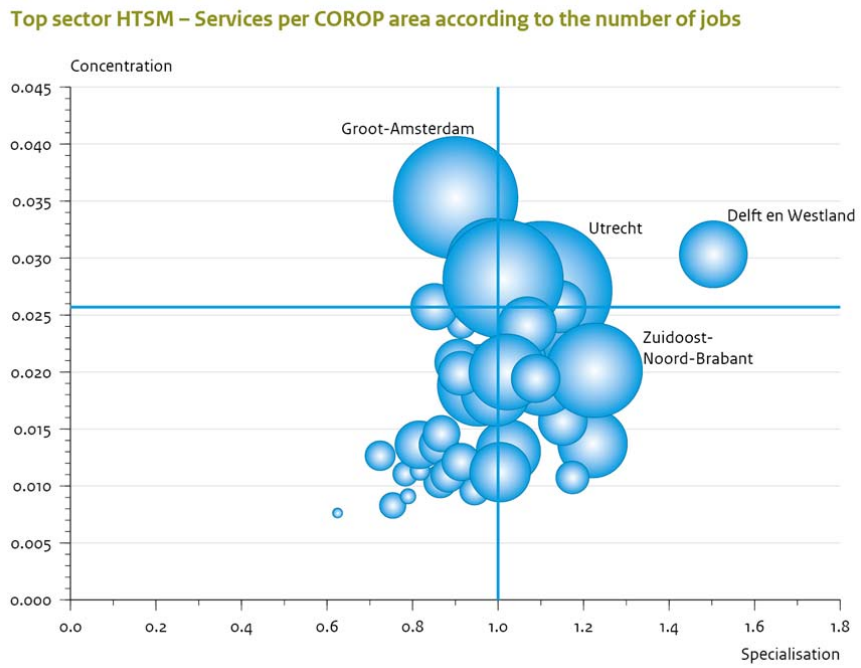

Figure B2.12
NB: HTSM = High-tech Systems & Materials

The average d score for High-tech – Services is higher than that for High-tech – Manufacturing Industry (0.0217 compared with 0.0180). However, services are generally more concentrated in urban areas than industrial activities. The d score for services is therefore naturally higher than that for industry. High-tech – Services displays less spatial concentration than services in general (an average d score of 0.0217 and 0.0257 respectively). High-tech – Services only displays a high level of concentration in Amsterdam, although even then the maximum d score is significantly lower than the maximum d score for services business locations in general (0.0477 compared with 0.0687). The location quotients also indicate a fairly even distribution for High-tech – Services in the Netherlands. The highest level of specialisation in this sector is seen in the Delft en Westland region, with 1.5 times as many business locations as the national average. The Zuidoost-Noord-Brabant region is also relatively specialised in this sector. The many other economic activities in the Groot-Amsterdam region means that the degree of specialisation of this region in the High-tech – Services top sector is even lower than average. Although the Utrecht region has the most jobs in the High-tech – Services top sector, this region is relatively large (the whole of the province of Utrecht).

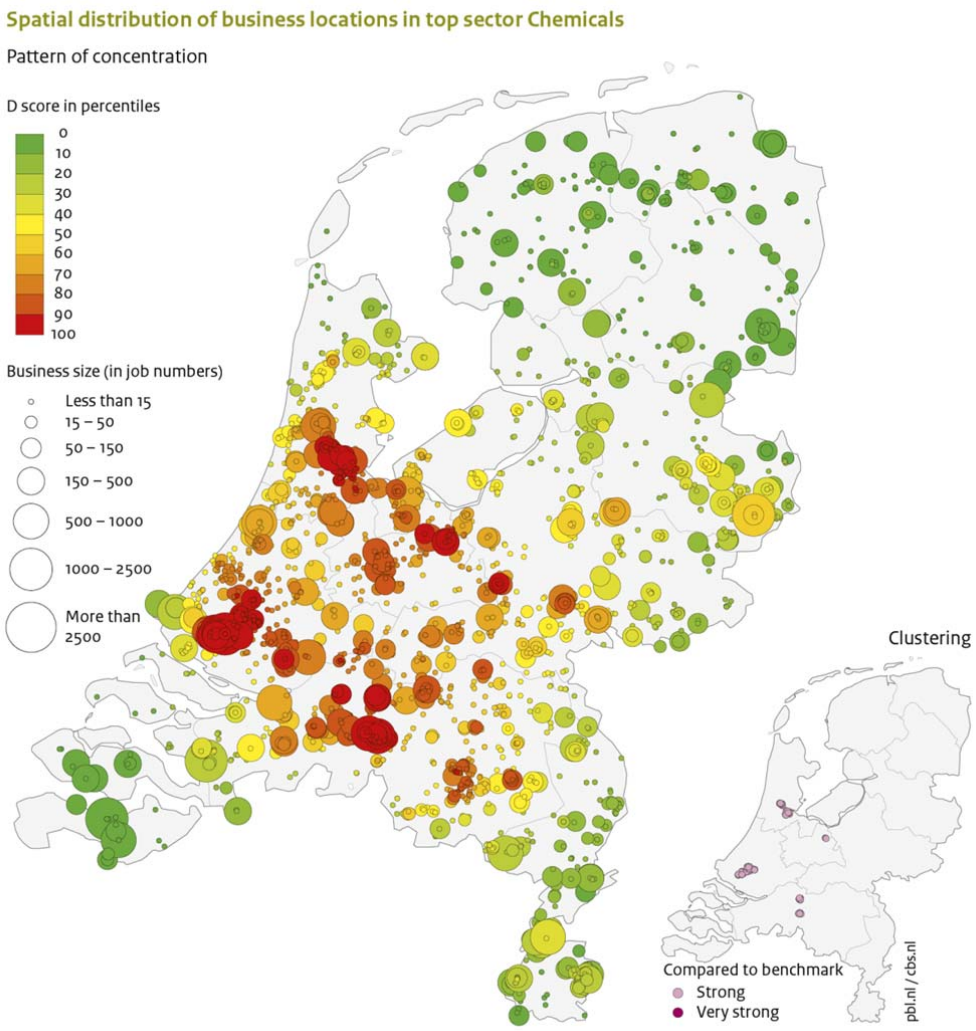
Spatial distribution of business locations in top sector Chemicals
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
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Figure B2.13

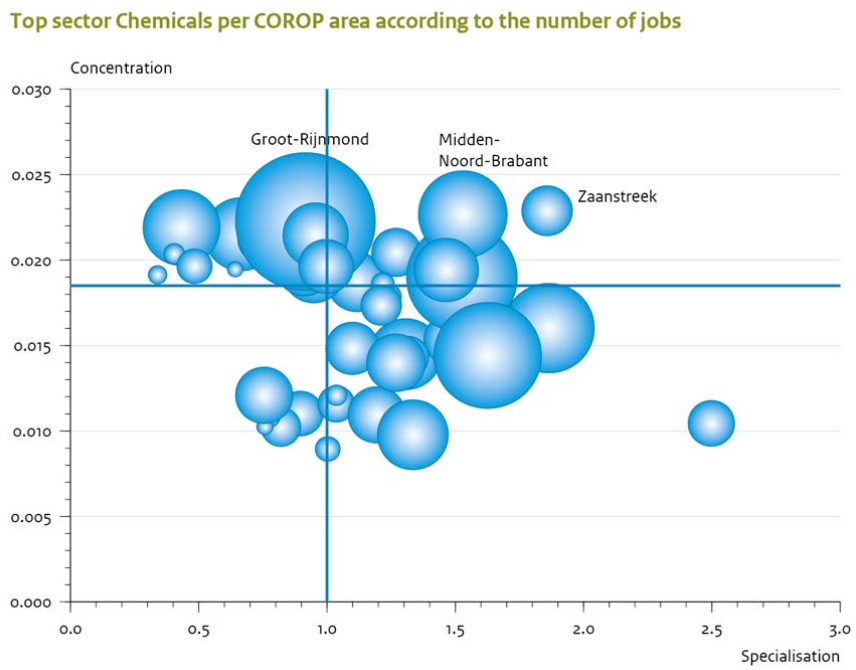

Figure B2.14

The distribution pattern of business locations in the Chemicals top sector closely resembles that of industry in general, with the highest concentrations in the Randstad, the centre of the Netherlands and Noord-Brabant. The average of all the d scores for business locations in the Chemicals top sector is lower than that of all the business locations in industry. The Chemicals top sector is therefore less spatially concentrated than other industrial activities in the Netherlands. The average d score for the business locations in this top sector is 0.0180, compared with 0.0185 for all the business locations in industry. The highest d score in this sector is also lower than that of all the business locations in industry (0.0268 and 0.03458 respectively). The top sector is however highly concentrated at a few locations. The right-hand map shows that the Chemicals top sector is most concentrated in Rotterdam, the centre of Noord-Brabant (Tilburg and Waalwijk), Amsterdam and Zaanstreek and Amersfoort. The Zaanstreek and Midden-Noord-Brabant regions are also relatively specialised in this sector. This means that the proportion of business locations in the Chemicals sector in these regions is higher than the proportion at the national level (see Appendix 3). The Groot-Rijnmond region has the most jobs in the Chemicals top sector, but the degree of specialisation is low as many other activities also take place in this region. Although Delfzijl and Twente are more specialised in chemicals, the distance between the business locations is so large that there is no strong clustering.

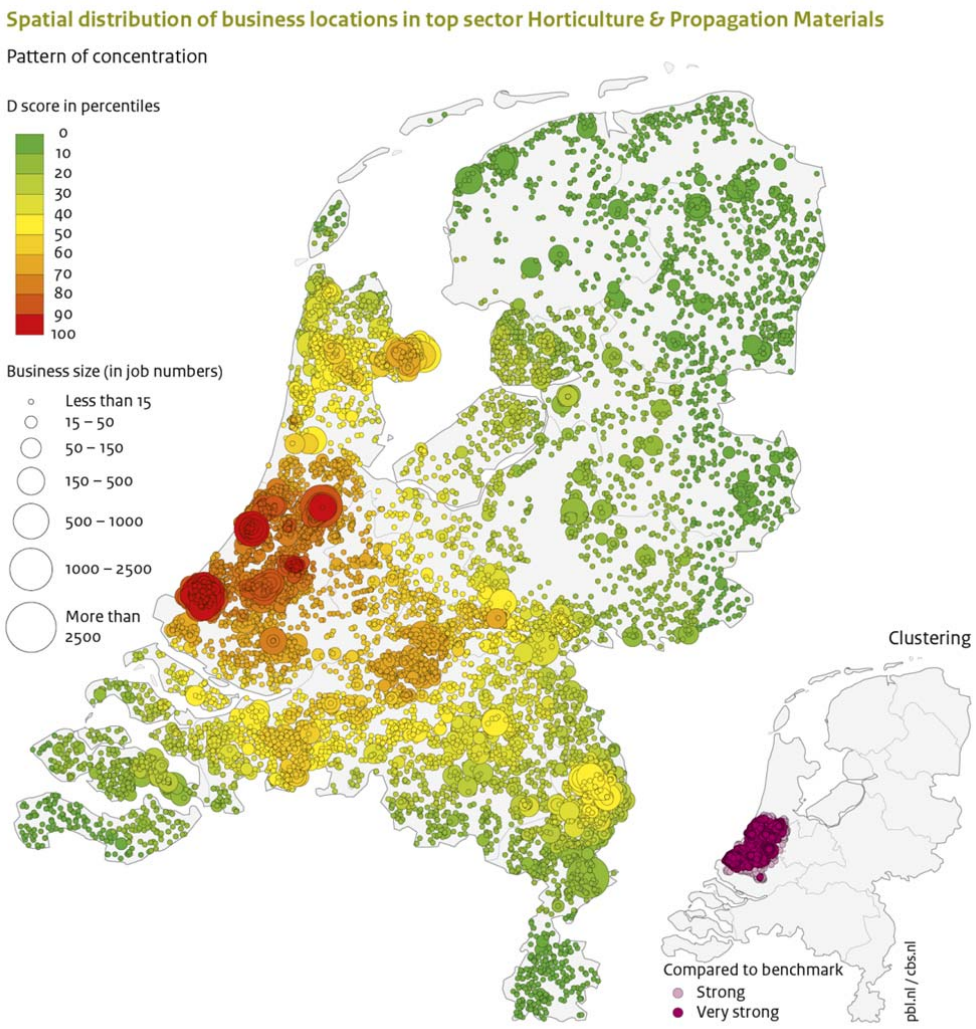
Spatial distribution of business locations in top sector Horticulture & Propagation Materials
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.15

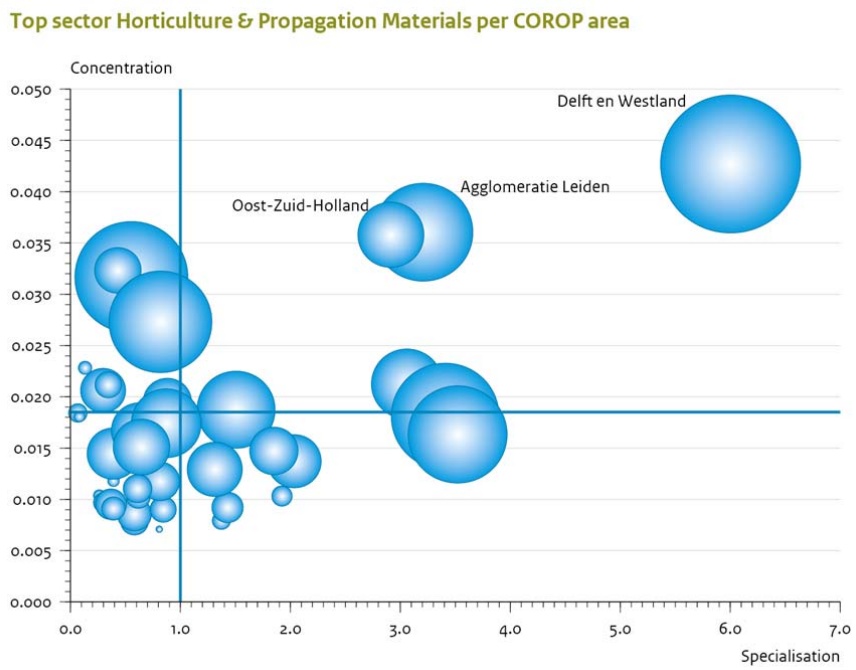

Figure B2.16 Top sector Horticulture & Propagation Materials per COROP area according to the number of jobs

The Horticulture & Propagation Materials top sector is highly concentrated in the province of Zuid-Holland. There are also many business locations in Kop van Noord-Holland, Betuwe, Noord-Brabant and Noord-Limburg. There are relatively few Horticulture & Propagation Materials companies in the east and the north of the Netherlands. The average d score of the Horticulture & Propagation Materials top sector is fairly high compared with the average d score for industry (0.0226 compared with 0.0185). The maximum d score is also high in this top sector (0.0506). The Horticulture & Propagation Materials sector is most concentrated in Westland; the business locations in this region have the highest d score. The Delft en Westland region is also the most specialised in this sector and has the most jobs (see Appendix 3). However, the map showing the spatial concentration of the Horticulture & Propagation Materials top sector indicates that the strong clustering in this top sector is not limited to Westland, but is in fact spread over the north-western part of the province of Zuid-Holland. There are also lots of jobs in the Horticulture & Propagation Materials sector in the Leiden en Bollenstreek, Groot-Rijnmond and Groot-Amsterdam regions, while the number of business locations in the sector in the Leiden en Bollenstreek, Zuidwest-Gelderland, Kop van Noord-Holland and Noord-Limburg regions is more than three times the national average (see Appendix 3).

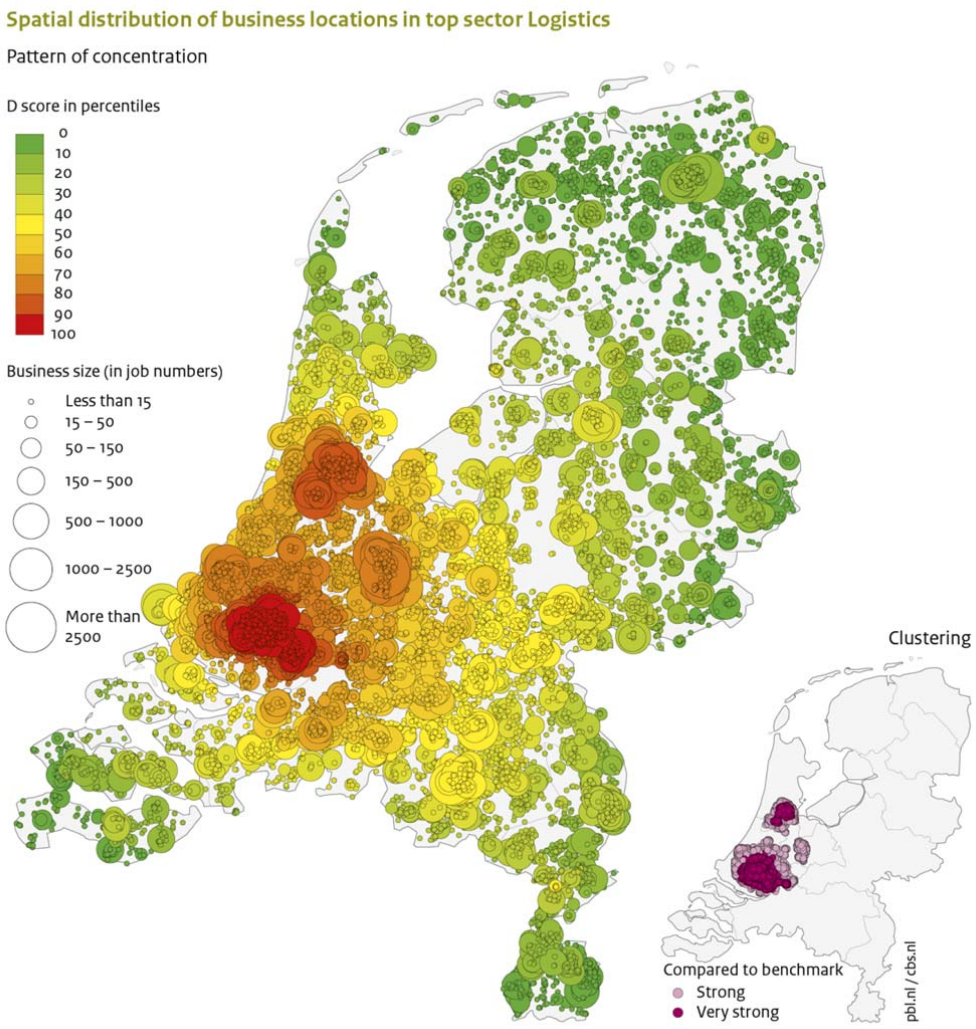
Spatial distribution of business locations in top sector Logistics
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.17

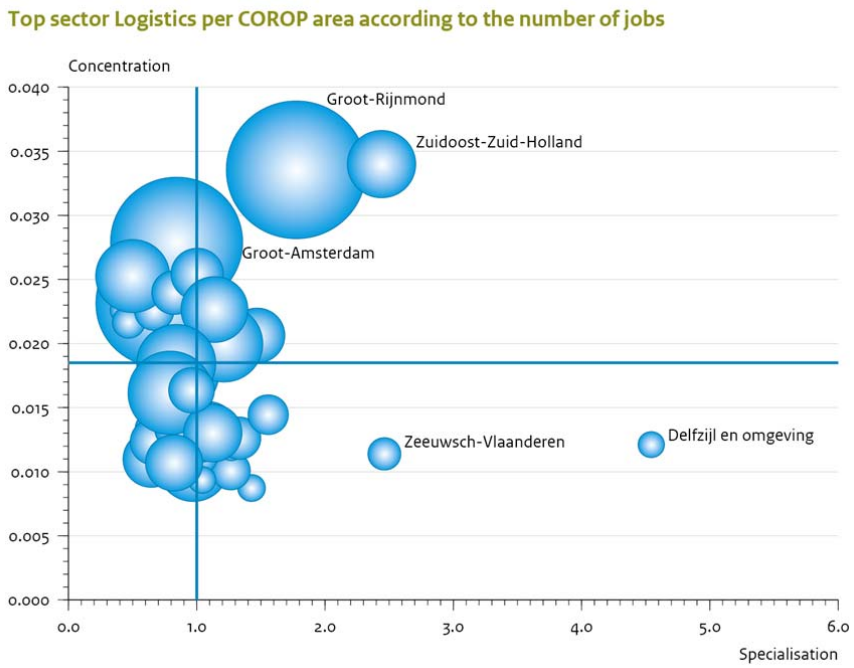

Figure B2.18

Although business locations active in the Logistics top sector are found throughout the Netherlands, they are mainly concentrated in the south of Zuid-Holland and in Noord-Holland. As can be seen in the cluster map, almost the whole of Zuid-Holland displays strong clustering, while the sector in Noord-Holland is more concentrated in Amsterdam, Aalsmeer, Amstelveen and Haarlemmermeer. The Logistics top sector is also concentrated in Utrecht and the surrounding municipalities, though to a lesser extent. The business locations in the municipalities of Zwijndrecht, Rotterdam and Dordrecht have the highest d score for this sector. In the regions in which these municipalities lie (Zuidoost-Zuid-Holland and Groot-Rijnmond), the proportion of business locations in this sector is almost 2.5 times the national average (see Appendix 3). Only the Delfzijl en omgeving region has a higher degree of specialisation in this sector, but the number of logistics jobs is much lower in this region. The high location quotient for this sector is mainly due to the limited number of other economic activities in this region. The number of jobs in the Logistics top sector is especially high in the Groot-Rijnmond, Groot-Amsterdam and Utrecht regions.

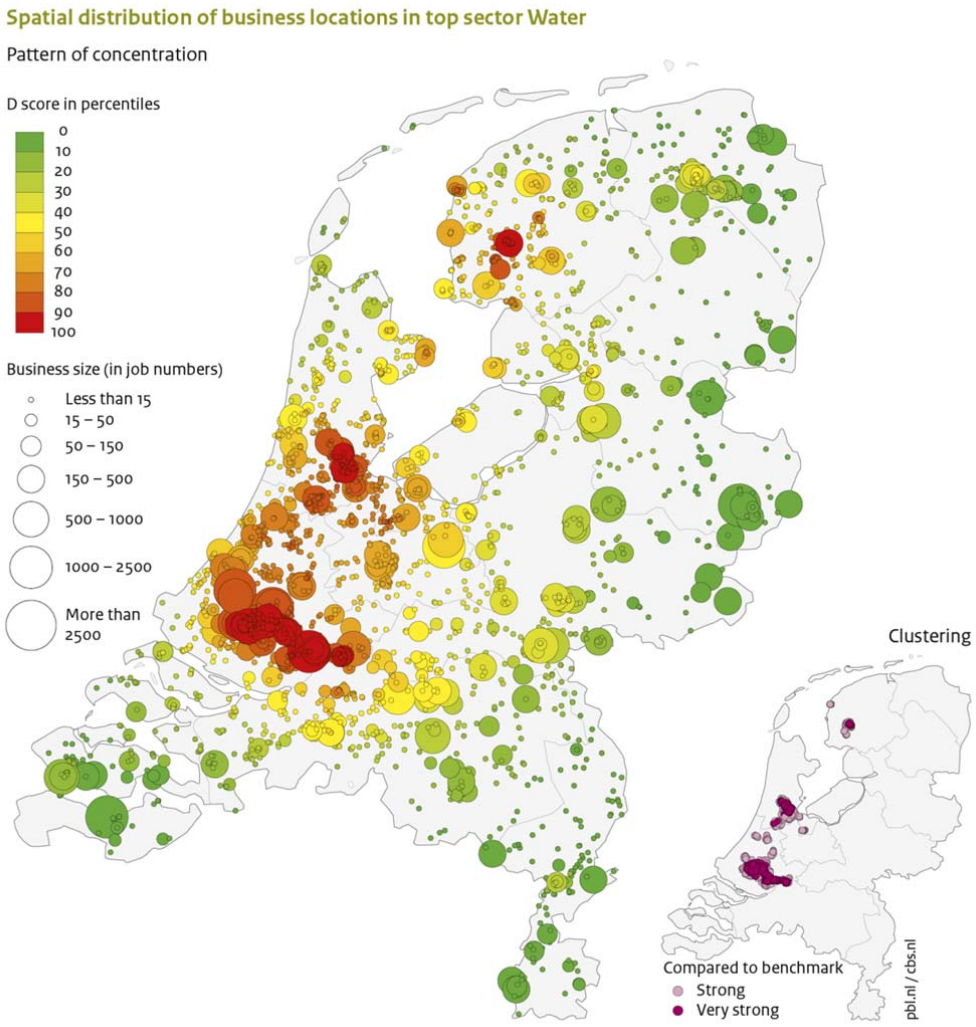
Spatial distribution of business locations in top sector Water
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.19

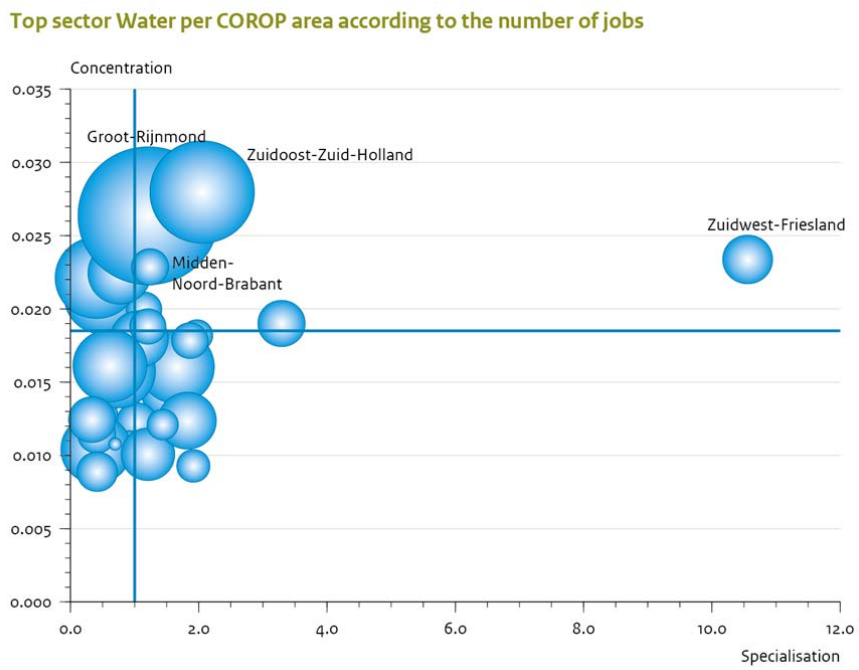

Figure B2.20

The spatial distribution of business locations in the Water top sector shows that this sector is mainly concentrated in the southern part of Zuid-Holland, around Amsterdam and in the west of Friesland. Although business locations active in this sector are found throughout the Netherlands, they are fairly isolated from other locations in the sector. The Water top sector is slightly more concentrated than industry in general, as shown by the higher average d score (0.0199 compared with 0.0185). Three clusters can be seen on the cluster map (right): an area in the south of Zuid-Holland, an area around Amsterdam and an area in Friesland. Strong clustering can be seen in particular in the south of Zuid-Holland; the business locations in Rotterdam, Werkendam, Krimpen aan den IJssel, Capelle aan den IJssel and Ridderkerk have particularly high d scores. Around Amsterdam, this mainly applies to business locations in the municipalities of Amsterdam, Zaanstad and Aalsmeer. In Friesland, the Water top sector is mainly concentrated in the municipalities of Sudwest Fryslan and Harlingen. The Zuidwest-Friesland region is also highly specialised in the water sector, where the number of business locations in the sector is ten times higher than the national average. Although this is 'only' twice as high in the Zuidoost-Zuid-Holland region, this region has by far the most jobs in the sector (see Appendix 3).

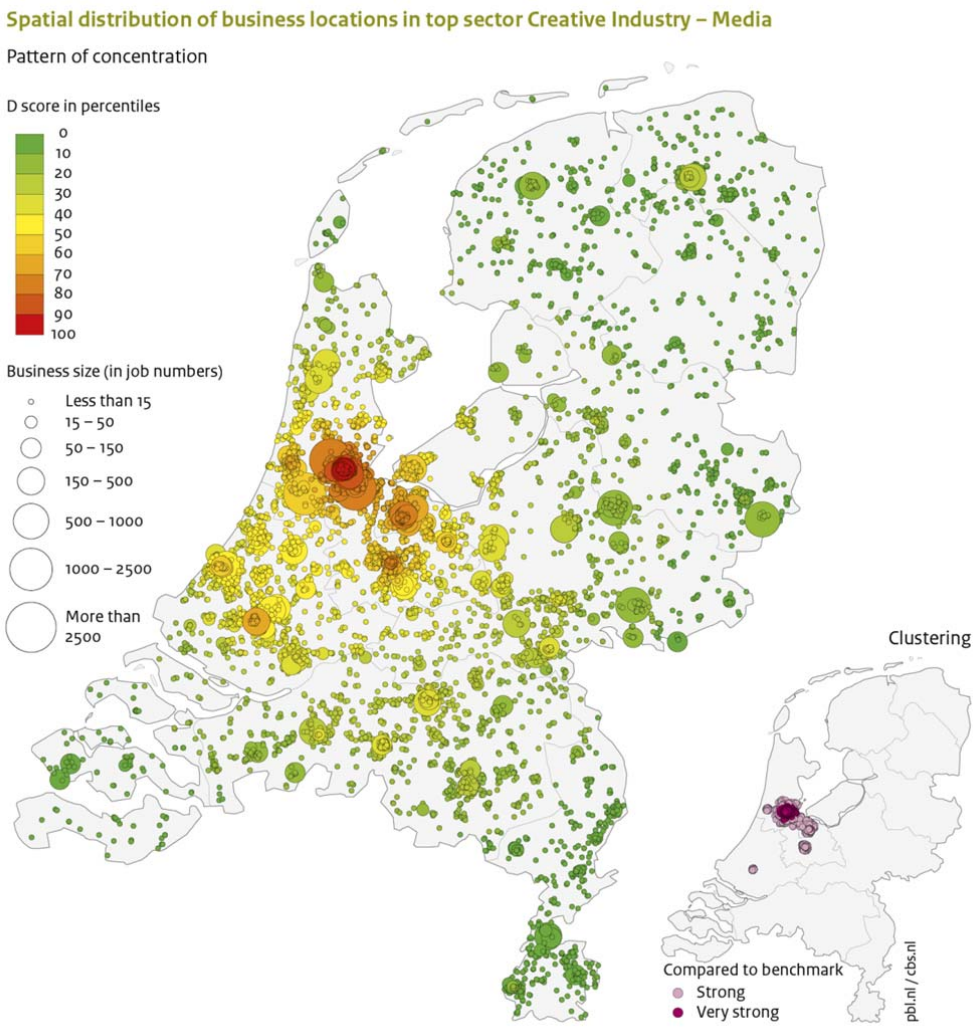
Spatial distribution of business locations in top sector Creative Industry – Media
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.21

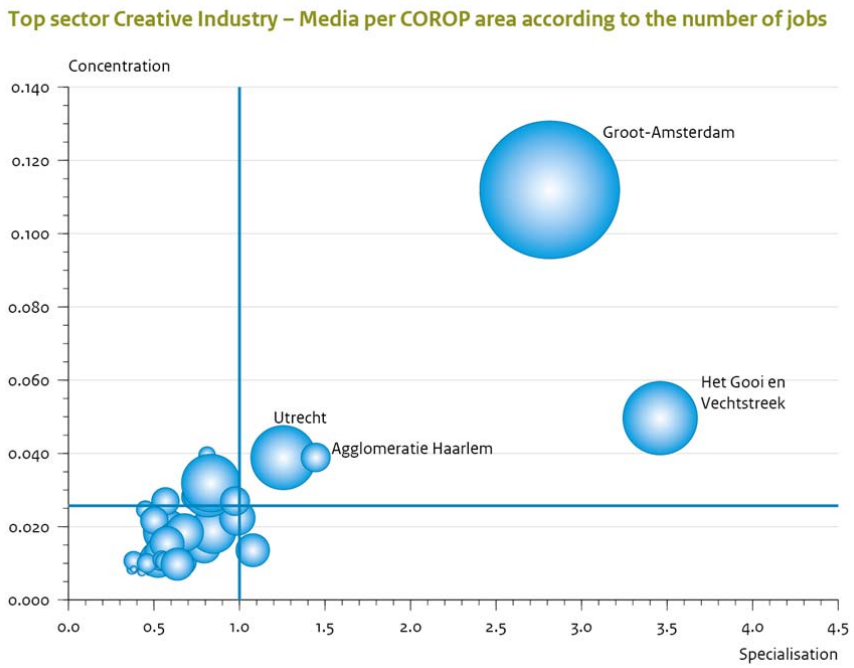

Figure B2.22

The Creative Industry top sector has more business locations than any other top sector. The sector is split into three sub-sectors: culture (art and cultural heritage), the media and entertainment industry, and creative commercial services. All three sub-sectors are strongly spatially concentrated – more so than services in general. Not only do the sub-sectors have a higher average d score, but they also have a much higher maximum d score than services in general. The Creative Industry – Media and Entertainment Industry sub-sector has the highest spatial concentration of all the top sectors. The average d score for business locations in this sector is 0.0503, almost twice as high as the average d score of the services sector as a whole. As with the Culture sub-sector, this sub-sector is most concentrated in the municipality of Amsterdam, although it is also concentrated in Het Gooi and the municipality of Utrecht. There are two smaller clusters in the media and entertainment industry in the municipalities of Rotterdam and Haarlem. The Het Gooi en Vechtstreek region is most specialised in the sector (see Appendix 3), where the number of business locations in the media and entertainment industry is 3.5 times the national average. However, the Groot-Amsterdam region is also specialised in these activities (2.8 times). This is notable, because lots of other economic activities are also concentrated in Groot-Amsterdam, as a result of which most sectors do not have a high location quotient in this region. There is also an above-average degree of specialisation in Utrecht, Groot-Rijnmond and Haarlem, although this is still much lower than in Groot-Amsterdam and Het Gooi en Vechtstreek. These last two regions also have the most jobs in this sector. The distribution map (left) also shows that there are some large companies in this sector in these regions.

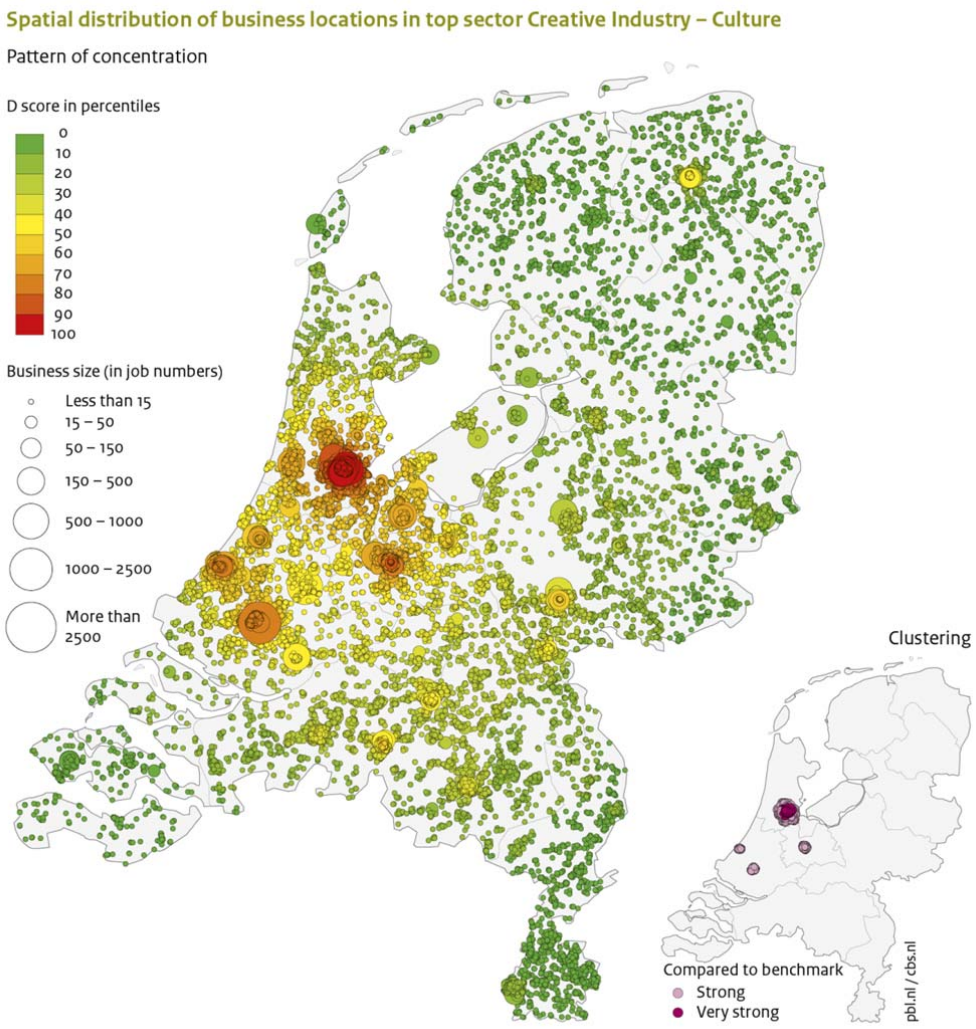
Spatial distribution of business locations in top sector Creative Industry – Culture
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.23

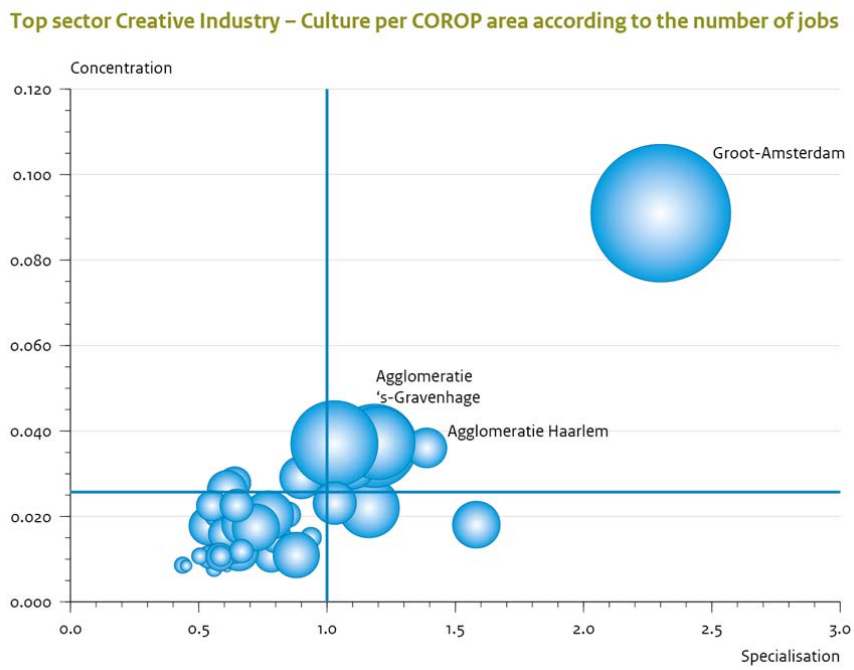

Figure B2.24

The cluster map for the Culture sub-sector shows that these activities are mainly concentrated in the four major cities. The highest spatial concentration of business locations in this sector is in the City of Amsterdam, followed at a fair distance by Utrecht. Of all the COROP areas, the Groot-Amsterdam region also has the highest degree of specialisation and the most jobs in the sector (see Appendix 3). Following Groot-Amsterdam, the Groot-Rijnmond and Utrecht regions have the most jobs in the cultural sector, but the degree of specialisation in these regions is fairly low. After Amsterdam, Overig Groningen – the COROP area that includes the city of Groningen – is most specialised in the cultural sector.

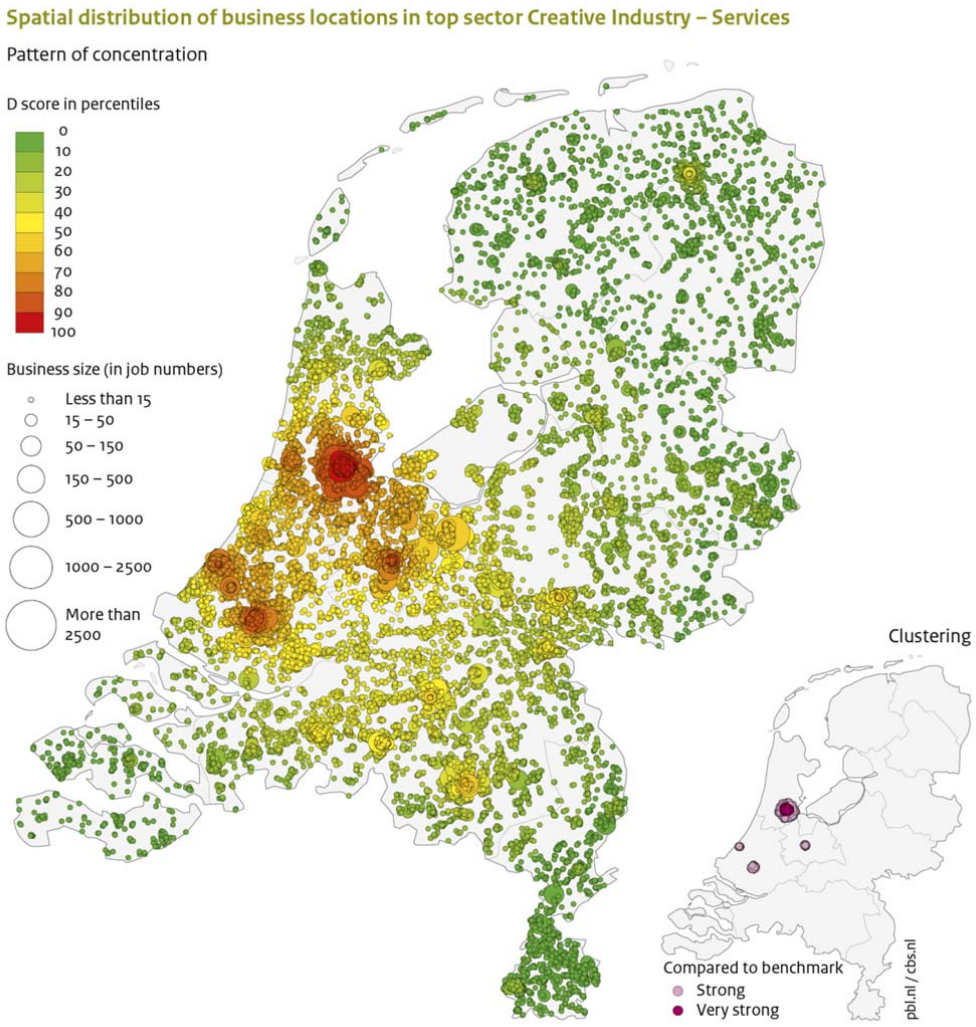
Spatial distribution of business locations in top sector Creative Industry – Services
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.25

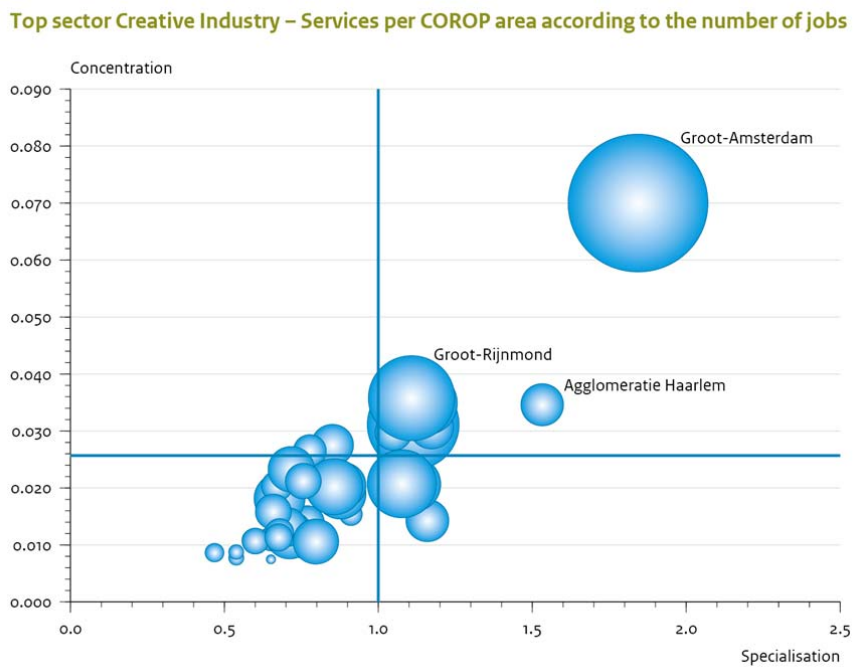

Figure B2.26

Of the three sub-sectors in the Creative Industry top sector, Commercial Services displays the lowest spatial concentration. However, this sub-sector is still more concentrated than services in general, as shown by the higher average d score. The cluster map shows that these business locations are also mostly concentrated in the four major cities. However, the concentration is lower than that of the other two Creative Industry sub-sectors, with a maximum d score that is much lower than that for Culture and Media and Entertainment Industry. The location quotients also show that the business locations in this sector are more evenly spread throughout the Netherlands. The Groot-Amsterdam and Agglomeratie Haarlem regions have the highest degree of specialisation, although the proportion of business locations in this sector in these regions is 'only' 1.8 and 1.5 times that of the average. Most jobs in this sub-sector are in the Groot-Amsterdam, Utrecht and Groot-Rijnmond regions.

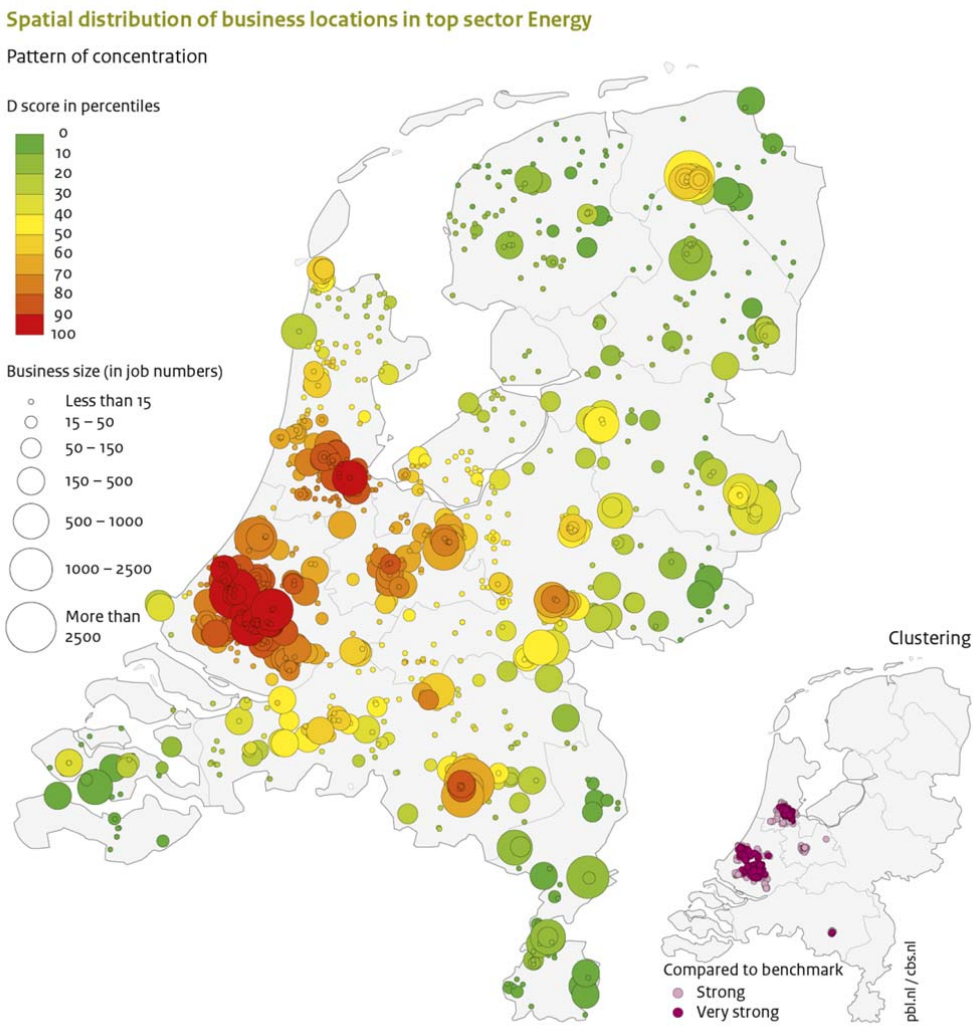
Spatial distribution of business locations in top sector Energy
Pattern of concentration
D score in percentiles
0
10
20
30
40
50
60
70
80
90
100
Business size (in job numbers)
Less than 15
15 – 50
50 – 150
150 – 500
500 – 1000
1000 – 2500
More than 2500
Clustering
Compared to benchmark
Strong
Very strong
pbl.nl / cbs.nl

Figure B2.27

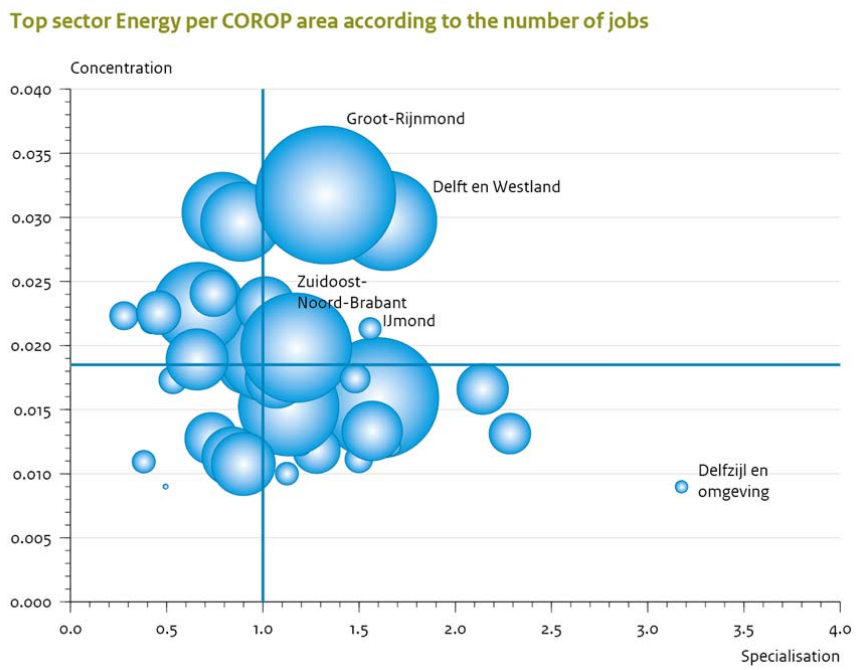

Figure B2.28

The Energy top sector is more spatially concentrated than industry in general (an average d score of 0.0204 and 0.0186 respectively). The cluster map shows that this sector is mainly concentrated in the five largest cities. The sector is most highly concentrated in the municipality of Rotterdam, where the business locations have the highest d score. This region also has the most jobs in this top sector, although it does not have the highest degree of specialisation (see Appendix 3). The Delfzijl en omgeving region is most specialised in this top sector, mainly due to the limited total number of business locations in the region.

Appendix 3
Number of jobs, degree of specialisation and concentration by COROP area

Sector	**Agro & Food - broad**			**Agro & Food - narrow**			**Life Sciences & Health**		
COROP area	# jobs	Specialisation	Concentration	# jobs	Specialisation	Concentration	# jobs	Specialisation	Concentration
Oost-Groningen	5,737	1.585	0.009235	1,832	2.167	0.010344	132	1.503	0.009182
Delfzijl en omgeving	1,459	1.730	0.008624	486	2.781	0.009932	14	0.829	0.007739
Overig Groningen	18,912	1.137	0.01096	5,328	1.293	0.011191	914	1.396	0.015965
Noord-Friesland	17,537	1.455	0.010663	6,036	1.925	0.011765	187	0.683	0.010652
Zuidwest-Friesland	6,705	1.581	0.012036	2,128	2.313	0.013227	36	0.461	0.011194
Zuidoost-Friesland	11,246	1.440	0.012211	3,373	2.083	0.013904	318	0.873	0.011212
Noord-Drenthe	8,907	1.322	0.011229	2,105	1.840	0.012824	299	0.928	0.010727
Zuidoost-Drenthe	7,194	1.398	0.010734	2,758	1.910	0.012253	736	1.193	0.010442
Zuidwest-Drenthe	6,963	1.417	0.013036	2,216	1.953	0.014961	399	1.061	0.012175
Noord-Overijssel	20,276	1.513	0.014235	6,357	2.193	0.016018	274	0.828	0.01405
Zuidwest-Overijssel	8,797	1.443	0.015567	2,614	1.951	0.017158	348	1.100	0.015503
Twente	31,804	1.271	0.013342	8,377	1.541	0.015048	942	1.163	0.014068
Veluwe	38,994	1.098	0.0177	12,734	1.302	0.018118	1,453	1.021	0.019021
Achterhoek	23,316	1.542	0.014023	8,154	2.369	0.015612	230	0.782	0.01363
Arnhem/Nijmegen	31,619	0.773	0.017812	5,224	0.516	0.016849	1,530	1.141	0.021126
Zuidwest-Gelderland	13,724	1.065	0.018774	4,535	1.276	0.018172	219	0.758	0.020695
Utrecht	61,754	0.719	0.021156	11,377	0.522	0.017894	2,035	1.186	0.027134
Kop van Noord-Holland	22,976	1.188	0.013336	6,858	1.445	0.01288	767	0.763	0.014678
Alkmaar en omgeving	11,548	0.722	0.015669	2,006	0.491	0.013459	342	1.282	0.019189
IJmond	8,666	0.758	0.017805	871	0.305	0.013438	80	1.026	0.021832
Agglomeratie Haarlem	9,130	0.594	0.020555	613	0.099	0.014173	1,556	1.122	0.026591
Zaanstreek	8,441	0.657	0.02033	3,279	0.422	0.014595	141	1.138	0.023632
Groot-Amsterdam	73,902	0.668	0.029317	6,428	0.208	0.015454	2,557	0.877	0.03255
Het Gooi en Vechtstreek	10,518	0.500	0.020802	707	0.184	0.016218	1,244	0.937	0.025905
Aggl. Leiden en Bollenstreek	20,621	0.731	0.020798	4,128	0.405	0.01625	3,392	1.155	0.027925
Agglomeratie 's-Gravenhage	34,085	0.940	0.028761	4,922	0.733	0.027191	1,390	0.817	0.026526
Delft en Westland	15,108	1.113	0.02259	6,432	1.363	0.02025	480	0.676	0.023879

Oost-Zuid-Holland	15,572	0.868	0.021091	3,207	0.880	0.017911	229	0.881	0.024315
Groot-Rijnmond	67,238	0.859	0.022888	12,513	0.544	0.016677	1,966	0.910	0.026977
Zuidoost-Zuid-Holland	18,546	0.770	0.019925	3,907	0.687	0.017648	234	0.684	0.02181
Zeeuwsch-Vlaanderen	7,701	2.135	0.009218	2,000	2.744	0.009129	55	1.111	0.009086
Overig Zeeland	17,716	1.527	0.011308	5,698	1.722	0.011132	84	0.585	0.010446
West-Noord-Brabant	34,492	0.988	0.01609	10,229	0.976	0.014743	1,036	1.099	0.018272
Midden-Noord-Brabant	23,279	0.944	0.017563	6,141	0.953	0.016294	474	1.090	0.02043
Noordoost-Noord-Brabant	42,835	1.112	0.017975	13,052	1.408	0.018331	6,519	0.962	0.019528
Zuidoost-Noord-Brabant	41,478	1.014	0.016256	10,593	1.135	0.016316	1,588	0.964	0.018833
Noord-Limburg	21,402	1.538	0.013825	8,812	1.954	0.014958	436	1.200	0.01424
Midden-Limburg	13,726	1.343	0.01279	4,022	1.545	0.013337	260	1.235	0.013566
Zuid-Limburg	25,913	1.016	0.011121	3,595	0.476	0.009095	973	1.665	0.014293
Flevoland	20,365	1.186	0.015714	6,409	1.621	0.01588	630	0.925	0.018823
Total Netherlands	880,202			212,056			36,499		

Sector	**HTSM – Manufacturing Industry**			**HTSM – Brain Port**			**HTSM – Services**		
COROP area	# jobs	Specialisation	Concentration	# jobs	Specialisation	Concentration	# jobs	Specialisation	Concentration
Oost-Groningen	1,573	1.226	0.008661	768	1.065829	0.008554	902	0.754	0.00828
Delfzijl en omgeving	1,089	0.945	0.007676	233	0.708	0.007374	136	0.625	0.007615
Overig Groningen	3,297	0.891	0.01	1,113	0.766659	0.009862	6,305	1.221	0.013701
Noord-Friesland	2,723	1.007	0.010189	1,442	0.865214	0.01001	1,451	0.866	0.010386
Zuidwest-Friesland	1,907	1.314	0.011687	1,075	1.094034	0.011765	801	0.784	0.011057
Zuidoost-Friesland	3,721	1.335	0.011899	2,076	1.262129	0.012012	2,240	0.982	0.011216
Noord-Drenthe	1,785	0.860	0.010449	1,038	0.806955	0.010506	1,448	1.174	0.010733
Zuidoost-Drenthe	3,274	1.416	0.010652	1,794	1.27708	0.011237	1,135	0.946	0.009598
Zuidwest-Drenthe	2,259	1.164	0.01243	891	1.122352	0.012566	505	0.818	0.011345
Noord-Overijssel	5,829	1.117	0.013734	3,485	1.085552	0.013919	3,081	0.816	0.013604
Zuidwest-Overijssel	2,042	0.764	0.015069	535	0.797921	0.015916	3,097	1.152	0.015662
Twente	18,926	1.456	0.014617	11,445	1.743661	0.016026	5,423	1.025	0.013032
Veluwe	9,854	1.163	0.018368	4,603	1.249855	0.019229	8,986	0.955	0.018816
Achterhoek	10,404	1.391	0.014507	4,811	1.461121	0.015163	2,063	0.862	0.013614
Arnhem/Nijmegen	11,248	0.874	0.018549	6,568	0.937661	0.019532	7,821	1.103	0.019509
Zuidwest-Gelderland	3,830	1.413	0.020862	1,936	1.331706	0.021217	2,932	0.908	0.020851

Utrecht	15,320	0.750	0.021544	6,133	0.814638	0.022355	25,609	1.103	0.027171
Kop van Noord-Holland	3,206	1.235	0.014087	1,387	1.057606	0.014719	1,786	0.868	0.014579
Alkmaar en omgeving	2,667	1.005	0.016936	1,715	0.849635	0.016746	1,679	1.009	0.018163
IJmond	10,994	0.986	0.018445	615	0.91984	0.018559	1,679	1.069	0.02142
Agglomeratie Haarlem	2,420	0.522	0.020249	1,286	0.671643	0.021594	2,356	0.971	0.026303
Zaanstreek	2,321	1.424	0.020838	510	1.258686	0.020871	1,104	0.915	0.024209
Groot-Amsterdam	12,811	0.434	0.020952	3,228	0.44376	0.021821	20,175	0.901	0.035299
Het Gooi en Vechtstreek	1,540	0.548	0.020348	688	0.69897	0.021762	2,916	0.852	0.025725
Aggl. Leiden en Bollenstreek	3,301	0.574	0.019711	1,800	0.765315	0.020815	3,684	1.012	0.025684
Agglomeratie ‘s-Gravenhage	4,129	0.537	0.022496	1,646	0.469548	0.022239	10,501	0.985	0.029619
Delft en Westland	2,697	0.962	0.021413	1,884	1.099317	0.021586	6,021	1.504	0.030333
Oost-Zuid-Holland	3,559	0.935	0.021899	2,275	1.080549	0.02304	3,715	1.144	0.025737
Groot-Rijnmond	15,794	1.001	0.023762	7,053	0.894737	0.0228	18,956	1.012	0.028158
Zuidoost-Zuid-Holland	7,904	1.306	0.023317	3,646	1.240565	0.022633	4,431	1.069	0.02407
Zeeuwsch-Vlaanderen	1,192	0.954	0.009245	570	0.760446	0.008622	314	0.790	0.009075
Overig Zeeland	3,301	1.160	0.011337	1,594	1.008543	0.011097	1,565	0.884	0.010941
West-Noord-Brabant	11,513	1.376	0.018684	5,408	1.256195	0.018746	6,222	0.994	0.018226
Midden-Noord-Brabant	6,847	1.251	0.021097	3,017	1.191392	0.021081	2,603	0.913	0.019891
Noordoost-Noord-Brabant	13,166	1.223	0.02045	7,825	1.253721	0.020978	7,770	1.022	0.01999
Zuidoost-Noord-Brabant	31,216	1.600	0.019804	22,012	1.687682	0.020941	12,024	1.226	0.020141
Noord-Limburg	9,948	1.528	0.014707	6,059	1.551431	0.015102	1,189	0.725	0.012643
Midden-Limburg	4,824	1.387	0.014081	2,154	1.32067	0.01364	1,878	0.914	0.012099
Zuid-Limburg	8,983	0.848	0.011165	4,377	0.675529	0.010819	4,824	1.005	0.011198
Flevoland	4,818	0.995	0.015995	3,289	1.292235	0.017507	3,113	1.088	0.019419
Total Netherlands	268,232			133,984			194,440		

Sector	**Chemicals**			**Horticulture & Propagation Materials**			**Logistics**		
COROP area	# jobs	Specialisation	Concentration	# jobs	Specialisation	Concentration	# jobs	Specialisation	Concentration
Oost-Groningen	324	1.004	0.008941	276	1.376	0.007917	1,808	1.430	0.008715
Delfzijl en omgeving	1,129	2.499	0.010435	36	0.811	0.007072	1,663	4.544	0.012099
Overig Groningen	1,072	0.897	0.011009	649	0.585	0.007827	11,868	0.976	0.010373
Noord-Friesland	819	0.821	0.010229	991	0.584	0.008546	3,654	1.268	0.010071
Zuidwest-Friesland	315	0.772	0.010902	112	0.265	0.010362	1,223	1.272	0.011719
Zuidoost-Friesland	704	1.037	0.011573	335	0.303	0.009668	3,090	1.027	0.011212
Noord-Drenthe	140	0.759	0.010246	584	0.846	0.009005	1,369	0.807	0.009956
Zuidoost-Drenthe	1,715	1.195	0.010937	823	1.432	0.009199	1,789	1.044	0.009346
Zuidwest-Drenthe	228	1.037	0.012087	485	0.620	0.010261	1,690	1.034	0.011721
Noord-Overijssel	2,715	1.307	0.014491	1,304	0.818	0.01175	8,654	1.088	0.013157
Zuidwest-Overijssel	1,161	1.132	0.018467	116	0.394	0.011791	2,356	0.646	0.01339
Twente	4,308	1.865	0.016015	820	0.371	0.00951	7,713	0.649	0.010958
Veluwe	1,879	1.118	0.018712	2,293	0.391	0.014451	11,418	0.867	0.016773
Achterhoek	1,324	1.477	0.015361	693	0.613	0.011041	5,263	0.666	0.012328
Arnhem/Nijmegen	1,988	0.949	0.019276	2,684	0.631	0.016712	11,525	0.902	0.017539
Zuidwest-Gelderland	1,255	1.271	0.020442	4,283	3.062	0.021239	7,343	1.473	0.020624
Utrecht	2,871	0.667	0.021513	1,717	0.300	0.020613	39,260	0.718	0.023128
Kop van Noord-Holland	1,481	1.100	0.014834	9,887	3.410	0.018076	4,897	0.852	0.013368
Alkmaar en omgeving	416	1.236	0.017845	1,760	0.843	0.01841	2,160	0.632	0.015949
IJmond	277	1.218	0.018583	396	0.766	0.019547	2,732	1.023	0.020057
Agglomeratie Haarlem	178	0.341	0.019136	147	0.136	0.022819	1,387	0.420	0.022609
Zaanstreek	1,332	1.859	0.022886	299	0.071	0.01842	3,669	1.053	0.02348
Groot-Amsterdam	3,082	0.434	0.021904	10,834	0.558	0.031669	41,547	0.845	0.027898
Het Gooi en Vechtstreek	1,325	0.752	0.021254	96	0.085	0.018068	2,525	0.472	0.021661
Aggl. Leiden en Bollenstreek	1,791	0.915	0.019602	8,397	3.209	0.036046	3,663	0.671	0.02253
Agglomeratie ‘s-Gravenhage	224	0.406	0.020375	1,832	0.434	0.032327	13,084	0.503	0.025265
Delft en Westland	128	0.643	0.019464	16,633	6.005	0.042713	4,743	0.827	0.023978
Oost-Zuid-Holland	642	0.485	0.019643	3,710	2.916	0.035798	6,526	1.006	0.025427
Groot-Rijnmond	10,180	0.917	0.022253	9,024	0.822	0.027309	46,560	1.777	0.03355

Zuidoost-Zuid-Holland	2,231	0.957	0.021461	592	0.346	0.021162	11,088	2.443	0.034003
Zeeuwsch-Vlaanderen	2,606	1.336	0.009772	353	1.926	0.010309	2,615	2.465	0.011383
Overig Zeeland	1,709	0.756	0.012083	2,464	2.039	0.013701	4,429	1.334	0.012612
West-Noord-Brabant	6,342	1.527	0.018972	5,179	1.510	0.018735	14,418	1.214	0.019979
Midden-Noord-Brabant	4,086	1.530	0.022668	2,010	0.884	0.019458	10,610	1.141	0.022648
Noordoost-Noord-Brabant	1,568	0.997	0.019624	4,144	0.875	0.017414	14,905	0.843	0.018449
Zuidoost-Noord-Brabant	2,161	1.466	0.019412	2,721	0.648	0.015094	17,089	0.797	0.016145
Noord-Limburg	884	1.318	0.014343	8,303	3.524	0.01632	8,165	1.127	0.013001
Midden-Limburg	1,789	1.270	0.013985	2,580	1.316	0.012913	3,878	1.559	0.014435
Zuid-Limburg	6,014	1.627	0.01442	473	0.394	0.009089	7,789	0.825	0.01068
Flevoland	856	1.213	0.017354	1,986	1.852	0.014703	4,993	0.962	0.016347
Total Netherlands	75,249			112,021			355,158		

Sector	**Water**			**Creative Industry – Media**			**Creative Industry – Culture**		
COROP area	# jobs	Specialisation	Concentration	# jobs	Specialisation	Concentration	# jobs	Specialisation	Concentration
Oost-Groningen	269	0.915	0.009729	70	0.431069	0.007632	213	0.561338	0.00772
Delfzijl en omgeving	697	1.910	0.009278	19	0.470343	0.007247	66	0.611411	0.007932
Overig Groningen	1,964	1.531	0.014344	995	1.079367	0.013503	1,976	1.582983	0.018057
Noord-Friesland	1,412	3.285	0.019006	904	0.656945	0.010619	952	0.783734	0.010696
Zuidwest-Friesland	1,557	10.548	0.02337	160	0.678342	0.01174	243	0.648265	0.011034
Zuidoost-Friesland	632	1.966	0.018207	347	0.455462	0.010514	459	0.541401	0.010476
Noord-Drenthe	1,058	1.026	0.012222	155	0.533528	0.009425	404	0.661257	0.009965
Zuidoost-Drenthe	412	0.916	0.01083	101	0.373295	0.00836	241	0.438597	0.008562
Zuidwest-Drenthe	124	0.777	0.013789	330	0.382745	0.010635	242	0.505742	0.010679
Noord-Overijssel	3,549	1.653	0.016041	500	0.62975	0.014323	854	0.802626	0.015046
Zuidwest-Overijssel	659	0.477	0.012808	913	0.79553	0.014357	385	0.938312	0.014999
Twente	3,102	0.394	0.010413	1,184	0.526064	0.010966	1,336	0.657758	0.011721
Veluwe	1,773	0.654	0.016476	1,807	0.571724	0.018625	1,345	0.54001	0.01777
Achterhoek	898	0.404	0.011402	1,103	0.55196	0.012664	1,027	0.637886	0.012899
Arnhem/Nijmegen	3,595	0.729	0.015758	1,890	0.846535	0.018871	3,249	1.163694	0.022017
Zuidwest-Gelderland	525	0.992	0.018386	233	0.526599	0.020486	594	0.573751	0.020427

Utrecht	3,903	0.511	0.020887	3,732	1.258178	0.038793	6,223	1.186436	0.036535
Kop van Noord-Holland	838	1.856	0.017839	533	0.607243	0.01687	904	0.601689	0.01591
Alkmaar en omgeving	89	0.656	0.017701	1,108	0.989366	0.022341	588	0.847981	0.020395
IJmond	803	1.141	0.019967	192	0.729032	0.028365	300	0.57383	0.025274
Agglomeratie Haarlem	300	0.468	0.021045	755	1.44708	0.03885	1,422	1.389396	0.03599
Zaanstreek	521	1.714	0.02472	245	0.812287	0.03957	484	0.926911	0.035213
Groot-Amsterdam	2,386	0.662	0.026634	17,197	2.814639	0.111973	17,023	2.301536	0.091
Het Gooi en Vechtstreek	773	1.073	0.023202	4,886	3.460784	0.049591	2,152	1.095506	0.032089
Aggl. Leiden en Bollenstreek	963	1.059	0.023064	614	0.739618	0.02814	1,625	0.901132	0.029097
Agglomeratie 's-Gravenhage	4,345	0.404	0.022121	2,283	0.819939	0.029429	4,754	1.199984	0.037152
Delft en Westland	2,509	0.758	0.022448	290	0.45203	0.024614	904	0.641158	0.027882
Oost-Zuid-Holland	823	1.053	0.023929	681	0.568991	0.026882	1,359	0.611921	0.026201
Groot-Rijnmond	12,482	1.209	0.026358	3,015	0.834472	0.031858	6,607	1.029973	0.037032
Zuidoost-Zuid-Holland	6,850	2.048	0.027988	674	0.504179	0.021668	833	0.552627	0.022462
Zeeuwsch-Vlaanderen	1,808	1.204	0.010075	38	0.382817	0.008322	119	0.451946	0.008434
Overig Zeeland	2,128	1.816	0.012361	336	0.460349	0.009971	702	0.584257	0.010453
West-Noord-Brabant	2,100	1.066	0.017946	1,046	0.621428	0.016536	1,301	0.666345	0.017968
Midden-Noord-Brabant	872	1.235	0.022869	600	0.653279	0.018512	1,613	1.031118	0.023079
Noordoost-Noord-Brabant	3,425	0.610	0.016112	1,281	0.680867	0.018393	2,179	0.773442	0.020172
Zuidoost-Noord-Brabant	1,372	0.330	0.012439	1,017	0.578245	0.015417	1,950	0.723669	0.017396
Noord-Limburg	102	0.691	0.010773	278	0.547965	0.010932	502	0.667441	0.011815
Midden-Limburg	615	1.433	0.012097	305	0.565564	0.010458	378	0.586805	0.010671
Zuid-Limburg	1,031	0.410	0.008881	946	0.63898	0.009698	1,860	0.881311	0.010917
Flevoland	833	1.201	0.018793	751	0.976107	0.026942	963	0.648582	0.022541
Total Netherlands	74,097			53,514			70,331		

Sector	**Creative Industry – Commercial Services**			**Energy**		
COROP area	# jobs	Specialisation	Concentration	# jobs	Specialisation	Concentration
Oost-Groningen	224	0.539808	0.007708	17	0.496	0.00899
Delfzijl en omgeving	83	0.651962	0.007442	99	3.177	0.008968
Overig Groningen	1,829	1.160412	0.014263	9,271	1.597	0.015902

Noord-Friesland	1,132	0.766856	0.010386	478	1.500	0.01113
Zuidwest-Friesland	354	0.589354	0.010898	220	1.669	0.012133
Zuidoost-Friesland	575	0.600756	0.010445	285	1.038	0.012271
Noord-Drenthe	485	0.707921	0.00968	1,385	1.280	0.011828
Zuidoost-Drenthe	350	0.46893	0.008608	1,068	2.285	0.013116
Zuidwest-Drenthe	608	0.653701	0.011038	249	1.200	0.012169
Noord-Overijssel	1,138	0.77044	0.013947	2,017	1.022	0.015253
Zuidwest-Overijssel	518	0.911623	0.015359	1,429	1.007	0.015729
Twente	2,319	0.712763	0.011706	6,218	1.136	0.015229
Veluwe	2,592	0.679935	0.018138	1,965	0.915	0.018392
Achterhoek	1,531	0.704735	0.013115	1,719	0.733	0.012741
Arnhem/Nijmegen	3,124	1.112801	0.020656	5,848	1.028	0.019359
Zuidwest-Gelderland	944	0.671182	0.020297	222	0.768	0.018597
Utrecht	8,407	1.113944	0.031114	5,186	0.667	0.02297
Kop van Noord-Holland	1,288	0.659989	0.015806	1,644	2.144	0.0166
Alkmaar en omgeving	912	0.876369	0.019746	426	1.023	0.018727
IJmond	603	0.856992	0.025136	308	1.558	0.021316
Agglomeratie Haarlem	1,820	1.533142	0.034588	504	0.280	0.022316
Zaanstreek	832	1.096969	0.031825	457	0.968	0.023933
Groot-Amsterdam	19,548	1.844008	0.07002	4,128	0.794	0.030385
Het Gooi en Vechtstreek	1,990	1.173096	0.030714	314	0.422	0.021783
Aggl. Leiden en Bollenstreek	1,769	0.851634	0.027513	1,214	0.461	0.022561
Agglomeratie ‘s-Gravenhage	4,185	1.152381	0.034856	3,988	0.888	0.029647
Delft en Westland	1,351	1.049688	0.029769	6,321	1.643	0.029726
Oost-Zuid-Holland	1,068	0.778643	0.026493	1,364	0.745	0.024076
Groot-Rijnmond	7,431	1.108764	0.035735	12,097	1.328	0.031748
Zuidoost-Zuid-Holland	2,128	0.718184	0.023253	2,136	1.015	0.02311
Zeeuwsch-Vlaanderen	220	0.539198	0.008728	334	1.126	0.009995
Overig Zeeland	697	0.60168	0.010656	2,257	1.570	0.013333
West-Noord-Brabant	2,624	0.877752	0.018944	2,374	1.072	0.017482
Midden-Noord-Brabant	2,126	0.885512	0.020475	490	0.535	0.017306
Noordoost-Noord-Brabant	3,265	0.857035	0.020203	2,383	0.659	0.01891
Zuidoost-Noord-Brabant	4,747	1.077057	0.020712	7,601	1.175	0.019823

Noord-Limburg	784	0.680165	0.012182	328	0.383	0.010932
Midden-Limburg	763	0.676969	0.011289	2,223	0.841	0.01134
Zuid-Limburg	2,076	0.797896	0.010557	2,524	0.900	0.010743
Flevoland	1,287	0.756944	0.02119	540	1.482	0.017435
Total Netherlands	89,727			93,631		

Appendix 4 COROP areas

Figure B4.1

Appendix notes

[1] Relative specialisations calculated using location quotients can be determined based on the number of jobs or the number of business locations in a region and a sector. The business locations are more relevant in this analysis as we are interested in where the sectors are concentrated (cluster theory is more concerned with the number of business locations as a measure of concentration rather than number of jobs, which can also be achieved by a single large company). The number of jobs is given separately, for each region and sector.