Chapter 5

Clustering of Economic Activities in Polycentric Urban Regions: The Case of the Randstad

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It has been slightly edited to fit the format of this book.

Abstract
Local contexts are becoming more important as the impact of the process of globalisation on the spatial distribution of economic activities seems to generate not so much processes of homogenisation as of heterogenisation between regions in advanced economies. The combination of specialisation and spatial concentration of economic activity in advanced economies has attracted much attention from economists and geographers. Here, we explore at what level of spatial aggregation contemporary tendencies of clustering of economic activities articulate themselves within the archetypal polycentric urban region of the Dutch Randstad. To examine this question, we look at profiles of business start-ups in the individual cities of the Randstad. Our focus is on business start-ups as they respond most directly to the changes taking place in the economic environment and especially those regarding the supply of labour. Our findings point to the direction of cluster formation at a supraurban level. The profiles of business start-ups are clearly converging. A process of intraregional – i.e. at the level of the polycentric urban region – homogenisation with respect to new economic activities is taking place. Within the Randstad, notably a decreasing divide between a north wing and a south wing is revealed.

5.1 Introduction

Globalisation is a structural process whereby the economically relevant spatial arena becomes ever larger. This process involves the creation of complex worldwide webs in which economic actors such as producers, consumers, workers and investors are linked together in both physical and virtual ways. Globalisation is, of course, by definition, a 'global' process, but its impact will affect specific localities in rather different ways. Socioeconomic changes that are supposedly global in character are superimposed upon individual spaces that have their own specific legacies. These historical legacies may be very palpable, as in the case of an urban morphology captured in concrete and stone, but they may also be more abstract in the sense of institutions or durable practices that regulate all kinds of aspects of life (such as doing business). Globalisation impinges upon these local legacies, and they in turn filter and shape this quasi-omnipresent process of socioeconomic change.

The strongly intertwined processes of technology-driven changes in transport and communication, on the one hand, and of the erosion of trade barriers between individual countries on the other, have enabled a hitherto unknown intensity of cross-border movements of goods, services, capital and people. This process of globalisation has broadened the scope of many markets and thus intensified competition. The erosion of 'national' markets has also been stimulated by the gradual fading away of differences in macroeconomic policies between advanced economies. As they commit themselves to the economic and monetary frameworks of larger supranational bodies such as the European Union and the North American Free Trade Agreement (NAFTA), their degrees of freedom in this respect are severely curtailed creating a much more level playing-field. As a result, the importance of the (local) microeconomic foundations in achieving competitive advantages is rising (Porter, 1999).

When local contexts become more important, the impact of the process of globalisation on the spatial distribution of economic activities is not so much a process of homogenisation as one of heterogenisation between regions.[1] Differences between regions in the composition of leading economic sectors, hence, become more prominent whereas intraregional differences decrease as economic actors build upon specific local legacies of physical endowments (natural or man-made), of specific skills and know-how and of already existing networks. This way, local legacies contribute to the emergence and continuation of areas that are highly specialised in a limited number of specific activities that can build upon the same regional and sometimes even local base of competitive advantages. These highly specialised regions, 'new industrial districts' (Storper, 1995, 1997; Scott, 1998), are home to clusters of specific economic activities: "critical masses – in one place – of unusual competitive success in particular fields" (Porter, 1998, p. 78). These clusters can encompass a wide variety of economic activities – for example, from garment industry to film animation in Los Angeles (Scott, 1988); from wine-making in California to leather fashion in northern Italy (Por-

ter, 1998); or from horticulture in the Westland area south of The Hague (Lambooy, 1998a) to environmental firms in the Ruhr area (Kunzmann, 1996), to racing-car making around the M4 corridor in the south of England (*The Economist*, 1996c, p. 36).

Proximity, then, is crucial in understanding the current competitive edge of these advanced regions in specific economic activities. Unsurprisingly, the study of the clustering of economic activities has become a very important research topic in current economic geography, regional, management and even general economics. (For a critical review of this recent 'geographical turn' in economics, see Martin, 1999.) Different theoretical approaches have been offered to explain this clustering. Economists tend to rely on interpretations based on a particular kind of agglomeration economies – so-called localisation economies – that are sector-specific in the sense of pertaining to a limited range of economic activities (see Anas *et al.*, 1998; Krugman, 1998; Quigley, 1998). Geographers tend to take a less abstract approach and focus on 'real places' (Martin, 1999). This approach opens up a much thicker empirical social world and economic clustering, hence, becomes part of a much broader social process. A recent, very fruitful, attempt to explain economic clustering in a more social way has been made by Gordon and McCann (2000).

Below, we will explore if and, if so, at what level of spatial aggregation a kind of clustering of economic activities is taking place within a specific kind of advanced urbanised area, namely, a polycentric urban region. These polycentric urban regions can be defined as follows:

(1) They consist of a number of historically distinct cities that are located in more or less close proximity (roughly within current commuting distances).
(2) They lack a clear leading city which dominates in political, economic, cultural and other aspects and, instead, tend to consist of a small number of larger cities that do not differ that much in terms of size, or overall economic importance and a greater number of smaller cities.
(3) The member cities are not only spatially distinct, but also constitute independent political entities.

This kind of urban region can be found, for instance, in Japan (the Kansai area), in Germany (the Rhine-Ruhr region) and in northern Italy (the Po valley). The Dutch Randstad, consisting of the four largest cities (Amsterdam, Rotterdam, The Hague and Utrecht), together with a number of smaller cities in the western part of the Netherlands, can be seen as a prime example of a polycentric urban region with relatively strong functional relationships. According to Hohenberg and Lees (1985, p. 242), the Randstad goes beyond the rather thin definition and is a prime example of a network system in a relatively pure form. Its cities, paralleling the gradual transformation of the Netherlands from a decentralised mercantile oligarchy to a centralised nation on the European model, have gradually

joined into a more articulated whole. David Batten (1995, p. 314) refers to the Randstad as a classical example of a modern urban agglomeration consisting of an intricate web of corridor cities with longstanding, strongly developed functional and locational relationships (see also Dieleman and Musterd, 1992; 't Hart, 1994; Clark and Kuijpers-Linde, 1994).

Here, we will explore at what level of spatial aggregation, contemporary tendencies of clustering of economic activities articulate themselves within the archetypal polycentric urban region of the Randstad. We want to know, in other words, at what spatial level processes of heterogenisation between regions and homogenisation within regions manifest themselves in a period of pronounced internationalisation – namely, the last decade of the 20th century. To be able to trace the more recent developments, the focus is not on the changes in the industrial composition of the cities that constitute the Randstad as a whole. Instead, we only take into account business start-ups for the period 1988-97. They reflect much more directly the changes in the economic environment. The composition of business start-ups is, accordingly, a much better indicator of current tendencies towards economic specialisation. Our endeavour involves the following research questions:

(1) Do we see a convergence in the sectoral composition of business start-ups in the 13 larger cities of the Randstad for the period 1988-97?
(2) To what extent can sub-Randstad patterns be discerned, especially with respect to the so-called north and south wing of the Randstad?
(3) What are the implications of our findings for the current debate on processes of spatial clustering of economic activities?

In section 5.2, we discuss some more recent insights on the clustering of economic activities. This will include a brief presentation of rather straightforward agglomeration economies as well as more social explanations. In the next section, we will focus on cluster formation and polycentric urban regions. In section 5.4, the empirical findings with respect to the patterns of economic clustering in the Randstad will be presented. In section 5.5, finally, the consequences of these findings for the understanding of polycentricity and economic clustering more generally will be elaborated.

5.2 Agglomeration and specialisation

Throughout history, different factors have asserted their influence on the spatial distribution of economic activity. In the pre-industrial and early industrial eras, spatial non-homogeneities and internal economies of scale were instrumental in the creation of spatial concentrations of (specialised) economic activities (see Anas *et al.*, 1998). Spatial non-homogeneities refer to, for example, differences in mineral deposits or soil, whereas economies of scale pertain to the reduction of costs within particular production processes when output rises and average fixed

costs decrease. These economies of scale can be either private or public (such as infrastructure endowments). These factors, complemented by technological improvements in transport and communications, enabled formerly self-supporting cities and their hinterlands to engage in the trade of products (goods and services) with other cities. Cities were stimulated to specialise and build on their specific strengths of natural endowments or economies of scale in particular activities. As a result, functional relationships between cities intensified and inter-urban trade grew. The rise of Italian city-states in the Middle Ages is a case in point. When nation-states gradually emerged after the 15th century, the framework of trade changed as well. States tried to control trade within and even across their borders and individual cities and regions lost part of their economic independence. This latter phenomenon is also linked to a new phase in the evolution of the world system where nation-states try to expand their area of controlled trade by conquering new territories (Wallerstein, 1974). This phase lasted roughly about four centuries, from 1550 to 1950.

After 1950, contemporary capitalism gradually transcended the boundaries of the nation-state. The expansion of the world system, however, has shifted to a higher gear by incorporating regions (such as parts of Southeast Asia and some former communist countries). Nation-states in the advanced world have more or less willingly given up significant parts of their sovereignty with respect to trade and have become part of supranational bodies. Cities and regions are now once more part of large international economic spaces and this, inevitably, has a strong impact on the international division of labour and the role of these sub-national entities in particular.

To understand the general backdrop of the role of cities and regions in the evolving world system, one also has to take into account the process of space-time compression. Technological changes have – especially in the 20th century – significantly reduced both time and costs involved with transport and communication. Distances – and even national boundaries – still matter, of course, but in a rather different way than a few decades ago.

As a result, markets within this world system, particularly those within the large international trading blocks, have become more connected. This, in conjunction with rising average discretionary income of households in advanced economies, has helped to change the nature of many product markets: they have become more volatile and customers have developed a strong preference for quality and variety as regards the products they consume. These circumstances have favoured more flexible ways of production over systems based upon so-called Fordist mass production and have given rise to a more refined social and spatial division of labour (Scott, 1988). In addition, although the production of physical goods in purely quantitative terms still rises, the role of knowledge-intensive activities as problem-identifying, problem-solving and strategic brokering has become crucial in advanced economies (Reich, 1991).

In spite of technological developments suggesting a diminishing role for proximity, many economic activities display a strong tendency to concentrate in

space (see, for example, Krugman, 1991; Quigley, 1998; Scott, 1998; European Commission, 1999). The combination of specialisation and concentration of economic activity in advanced economies has currently been attracting much attention from economists and geographers (see Porter, 1990, 1998; Krugman, 1994; Storper, 1995, 1997; Anas *et al.*, 1998; Martin, 1999; Wever and Stam, 1999; Scott, 2000). Notwithstanding, a strong overlap with regard to the factors underlying these processes of spatial concentration, much less consensus seems to exist with respect to the level(s) of spatial aggregation on which these clusters of economic activities manifest themselves.[2] This issue is central in our case study of the Randstad but, before we turn to this, we will first address the underlying processes of clustering.

Contemporary tendencies towards specialisation and concentration in space are to an ever lesser degree explained by the traditional sources determining the distribution of economic activity over space.[3] Instead, the rationale for clustering is currently most often associated with the existence of so-called external economies of scale (see Krugman, 1994, p. 227; Anas *et al.*, 1998). The basic idea is that, by congregating in space, firms are enabled to produce at lower cost by benefiting from lower transaction costs, wider opportunities for matching needs and capabilities, and the exchange of useful knowledge and information (Scott and Storper, 1992). The productivity gains and factor rewards resulting from these benefits remain restricted to the area within which the benefits can be offset against the costs of getting access to them. The idea that such externalities play an important part in contemporary flexible systems of production (Scott, 1988, 1998) clearly adds to the appeal of this approach.

In contrast with the relatively unambiguous concepts of spatial non-homogeneities and internal economies of scale, the concept of external economies of scale is rather complex and wide-ranging. Several typologies of external economies of scale are in use, each of them being based upon different dimensions. A first typology distinguishes between static and dynamic external economies of scale. Whereas static externalities have an important part in describing the emergence and existence of patterns of regional specialisation, their dynamic counterparts also address the issue of localised growth. Research on dynamic external economies of scale has displayed much interest in the role of knowledge spill-overs in fostering innovation and localised growth (see Glaeser *et al.*, 1992; Henderson *et al.*, 1995; Henderson, 1997). Static external economies of scale are often divided according to the industrial sector in which they occur. Economies of urbanisation occur across industries and entail the benefits accruing to firms from overall local urban scale and diversity. Economies of localisation on the other hand, are realised by firms within the same industry. By locating in close proximity, such firms are enabled to exploit economies of scale while conserving on production costs. This much-applied dichotomy is derived from the work of Hoover in the 1930s and 1940s (Hoover, 1937, 1948).

A more functional typology, finally, cuts across the latter (Gordon and McCann, 2000) and goes back to Alfred Marshall's work on 'industrial districts'.

It distinguishes between the existence of a local pool of specialised labour, the provision in greater variety and at lower costs of non-traded inputs specific to an industry, and the ease of transmitting ideas and information as important motives for firms to congregate in space (see Krugman, 1991). Within these three broad categories, a variety of more specific external economies of scale can be identified. These include so-called economies of massed reserves (such as offering a deep and sufficiently wide labour market) and also human capital-accumulation as labour specialisation encourages education (Anas *et al.*, 1998, p. 1447; see also Gordon and McCann, 2000, p. 517, for an overview of more specific sources). Each of these potential sources of localised external economies of scale can be obtained within one or more industrial sectors, or across the whole of a local economy (O'Sullivan, 2000).

Notwithstanding the high extent of consensus with respect to the underlying factors, determining which specific economies (and to what extent) can be associated with observed patterns of regional specialisation and diversification and the identification of the trade-offs between these two trajectories, is highly problematic. Different mechanisms may operate simultaneously, indirectly, cumulatively, counter-productively or with different time-lags; and their effects may vary for different industrial sectors or even for similar industries being entangled in different stages of product development (Henderson *et al.*, 1995; Henderson, 1997; Gordon and McCann, 2000). Also, in a broader perspective, economic and politico-institutional transitions as briefly touched upon above may put on the stage new types of externalities and sources for agglomeration and growth.

Empirical studies so far have provided conflicting results as regards the relative importance of localisation and urbanisation economies in urban and industrial development (see Glaeser *et al.*, 1992; Henderson *et al.*, 1995; Henderson, 1997; O'Donoghue, 1999). Generally, however, the occurrence of economies of localisation is associated with the clustering of firms that belong to a single industry or a rather limited group of industries. These localisation economies are especially important when new industries emerge in dynamic places during dynamic times (Glaeser *et al.*, 1992). Being new, their markets are still unstable, their products not yet standardised and the firms themselves still relatively new and small, these firms' dependence on externalities arising from co-location with similar firms may be maximal. As long as the lack of standardisation brings about high measurement costs and expensive formal contracting, trust and the exchange of information and ideas about new products and new production techniques have to be generated via frequent informal contacts on a face-to-face basis. (Many authors point to the overriding importance of face-to-face contacts – see, for example, Jacobs, 1969; Saxenian, 1994; Porter, 1998; Anas *et al.*, 1998; Glaeser, 1998; Goe *et al.*, 2000; Scott, 1999.) Since such contacts, despite the fall of costs of other types of communication and exchange, are still particularly costly, clustering in space enables these firms to reap the benefits of scale without being too big themselves to hamper their flexibility and their innovative potential. Being located in close proximity, furthermore, reduces the formal and

informal costs of matching demand and supply of adequate labour and the costs of workers moving between firms in the same area (O'Sullivan, 2000). In addition, it may enlarge peer pressure amplifying competitive pressure within a cluster, even among noncompeting or indirectly competing firms. Pride and the desire to look good in the local economy spur executives to attempt to outdo one another (Porter, 1998, p. 82).

Observations suggest that the spatial domain over which such externalities are potentially available vary by industrial sector and by spatial-historical context. Clusters have been reported to emerge in specific neighbourhoods of cities – for example, the new firms in internet publishing around the Flatiron Building in New York (*The Economist*, 1996b) or the recording companies in lower Manhattan (Scott, 1999, p. 1972). They have also been identified in larger metropolitan areas – for example, the entertainment industry in Los Angeles (Scott, 1988). Clusters have also been identified in whole regions encompassing several cities, such as the wine industry in California (Porter, 1998). Such spatial domains, however, may be subject to change over time as well. For example, developments in transport and telecommunications technologies – as far as they impinge on the costs of transactions – may alter the balance between the benefits and the costs of getting access to them. Also, the deepening or blurring of cultural divides between specific areas may affect the spatial scale over which economies of agglomeration can be obtained.

5.3 Cluster formation and polycentric urban regions

To what extent are these tendencies to economic clustering articulated within the context of the Randstad? Does the Randstad as a – potential – spatial entity sustain these localisation economies and, hence, constitute a base for cluster formation or do we have to descend to lower level of aggregation, namely the individual cities themselves? Before we turn to an empirical elaboration of this question, we first explore this issue from a more theoretical point of view. The historically contingent spatial structure of an urban system is relevant to both the structure and the quality of the economy (see Lambooy, 1998b). Processes of cluster formation are articulated within these existing spatial structures. To understand patterns of economic clustering in the Randstad, we have to examine its polycentric character more in detail.

The Randstad, as we have seen, can be seen as an archetypal polycentric urban region. In western Europe, polycentric urban configurations are rather prominent; dominant primate cities such as London and Paris are not at all typical of the Netherlands, Germany or northern Italy. Much theorising, however, departed from the implicit assumption that primate cities are almost self-evident. To deal with historical polycentric urban regions, new approaches are needed that go beyond a strict central place hierarchy (see Hohenberg and Lees, 1985; Cortie and Dignum, 1991; Camagni and Salone, 1993; Batten, 1995; Kloosterman, 1996). Recently, research into polycentric urban regions has moved up

higher on the agenda now that transport and telecommunication technologies increasingly enable polycentric urban regions to achieve agglomeration economies of comparable magnitude to those of large monocentric cities (see Lambooy, 1998a). These linkages between constituent parts of polycentric urban regions are crucial in helping to create agglomeration economies for all parts concerned on a higher level than can be achieved by the individual parts (see Batten *et al.*, 1995). Polycentric urban regions then become polycentric urban networks. They differ from other urban networks in the sense that they constitute a contiguous travel-to-work area. Notwithstanding the ambiguity with regard to the spatial scale at which economic clusters are expressed, there is an apparent limit to the size of competitive clusters which is determined by the costs and time of travel.

Localisation economies are strongly rooted in localised supplies of highly specialised labour. Since the "the daily journey to work represents a particularly expensive kind of transaction per unit of distance" (Scott, 1998, p. 92), the upper limit of such clusters is set by the – albeit loosely defined – spatial scope of travel-to-work areas. The same holds for the circulation of ideas. Since these are more than simple reproducible, standardised packets of information, strongly attached to their human carriers, their exchange strongly depends on costly face-to-face contacts. Infrequent contacts may be maintained over relatively large distances. However, to create a viable environment for innovative firms, high frequencies are needed and this, accordingly, limits the distance considered to be acceptable.

In the Netherlands, the interurban links are clearly increasing. The daily distance travelled per head for labour-related purposes (commuting and business visits) increased by some 40 per cent between 1985 and 1998 (CBS figures). Part of this increase stems from the extension of the average commuting distance from 14 to 17 km (20 per cent) over the same period. Although commuting within the urban region remains prevalent, empirical evidence suggests that an increase in commuting between different (urban) regions is particularly responsible for this extension. Such interregional commuting covers on average some 45-50 km and is typically carried out by highly educated professionals (Kapoen and Smit, 1998).

Such figures also suggest that polycentric urban regions increasingly fulfil a crucial spatial condition for cluster formation – namely, the emergence (at least with respect to highly skilled workers) of one pool of labour. By functioning as a daily travel-to-work area at the higher end of the labour market, the Randstad may become a region where external economies of scale can occur. From this viewpoint, the evidence for the formation of a polycentric urban network with strong interurban links in the Netherlands, therefore, seems to be mounting. Some researchers, however, are observing the emergence of such networks not so much at the level of the region as a whole, but at a lower level – namely, that of the northern and southern wings of the Randstad (see van der Laan, 1998; Musterd and van Zelm, 2001).

Much of the research on the network aspect of the Randstad so far has been devoted to linkages in terms of commuting patterns and of (potential) functional relationships between the individual components. We, however, focus on a different aspect of network formation – i.e. whether the Randstad can be seen as a relevant scale for the formation of economic clusters. Wever and Stam (1999) have also looked at this issue, but from a different viewpoint. They interviewed high-tech small and medium-sized businesses in two parts of the Randstad to find out if close networks of suppliers and customers had a strong regional basis on a rather low level of spatial aggregation. They concluded that indications for spatial clustering on this sub-Randstad level were rather modest.

Here, we look at the changes in the sectoral composition of the business start-ups in the cities of the Randstad. Business start-ups depend on a particular kind of supply of aspiring entrepreneurs and on the available market openings for new firms. If a city or region is moving in the direction of the formation of an economic cluster, both the supply and the demand not only become better matched, but also more focused towards specific activities. If these compositions are increasingly divergent, there is no tendency towards cluster formation at a supraurban level. If, however, they tend to converge in a clear way, there is a strong indication of a tendency towards cluster formation on a supraurban level. In that case, the Randstad is becoming more of a uniform milieu rooted in the same kind of localisation economies and social networks that are instrumental in creating a highly specialised interurban economy. In the next section, we will explore empirically at what spatial level agglomeration economies and/or external economies of scale occur.

5.4 Cluster formation: the empirical evidence for the Randstad

Empirically assessing the presence, nature and scope of external economies of scale in a certain area or industry is a highly complex endeavour. Labour productivity is usually considered to be the key to measuring agglomeration economies. The presence of economies of agglomeration should find (positive) expression in the output per worker in a particular industry. One approach to measuring localisation and urbanisation economies is to estimate the effects of changes in industry output and city size on labour productivity (O'Sullivan, 2000).[4] Another approach focuses on the realised effects of productivity, growth and local factor prices in a particular place relative to other locations (Gordon and McCann, 2000).

Here, we follow a different approach. We look for indications of localisation economies by looking for evolving patterns of economic clustering in the Randstad. Our focus is on business start-ups as they respond most directly to the changes taking place in the economic environment and especially those regarding the supply of labour. By examining how business start-up profiles of different cities in the Randstad relate to each other over time, we are able to identify whether and at what spatial level specialisation of economic activity takes place.

If specialisation occurs at the level of the individual cities or, in other words, if each city further specialises in a specific industrial sector or group of sectors, we may expect the business start-up profiles of the cities to diverge from each other over time. If, on the other hand, patterns of specialisation are starting to articulate themselves at levels transcending the scale of the individual cities, we may expect the business start-up profiles of groupings of cities to converge over time. The role of proximity in the formation of clusters suggests that specialisation among groupings of cities would first concern cities located at close proximity. We consider the spatial scale over which specialisation takes place to be an indirect indicator of the availability of external economies of scale and, more particularly, economies of localisation over the same domain.

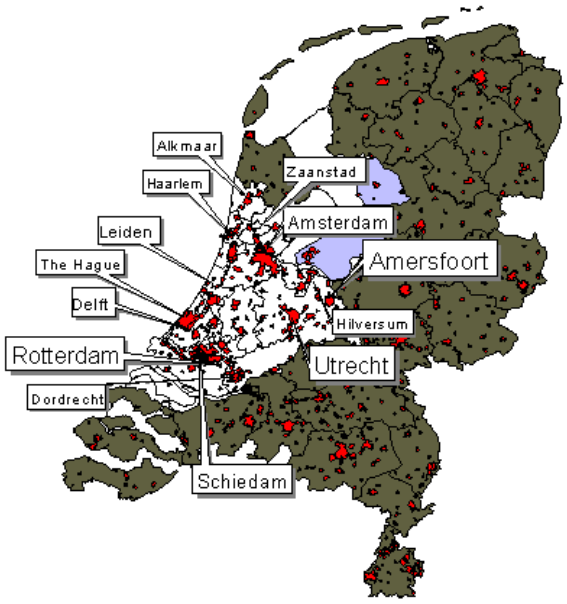

Figure 5.1 *Location of the 13 cities in the Randstad*

In this analysis, we used a set of data containing the number of business start-ups in 13 cities in the Randstad in four selected years out of a 10-year time-period.[5] These 13 cities can be considered the largest historical urban centres of the Randstad (see Figure 5.1). New towns such as Zoetermeer, Hoofddorp and Almere, are not included. The 13 cities together are home to almost 3 million inhabitants and make up approximately 45 per cent of the population figure of the Randstad (if the latter is defined relatively loosely). In 1997, these cities accounted for 22 per cent of the business start-ups in the Netherlands. The figures on the business start-ups were available at 2-digit SBI codes for the years 1988, 1991 and 1994, and at 2-digit BIC codes for 1997. The 2-digit level distinguishes between 60 different economic subsectors. The Dutch Chambers of Commerce collected these data.

To visualise the temporal changes in the business start-up profiles of the 13 cities, we used the technique of correspondence analysis. Correspondence analysis is basically a graphical method of data analysis which enhances the distillation and visualisation of information from complex tabular data that are not easily made accessible by means of normal scatter plots and maps. In our case, for example, we are in danger of becoming overwhelmed with data in no less than 4 x 60 x 13 cross-tabulations.

The tables can be understood to provide business start-up profiles for the 13 individual cities for the years 1988, 1991, 1994 and 1997. A business start-up profile for an individual city is a set of frequencies (the number of business start-ups in the different 2-digit economic sectors in that city) divided by their total. For each year, the 13 business start-up profiles related to the individual cities add up to a yearly average profile. Similarly, the 4-yearly average profiles add up to a total average profile. Correspondence analysis now creates a profile space in which the number of 2-digit economic sectors determines the number of dimensions (or axes). Sixty economic sectors result in a 60-minus-1 dimensional space. Figure 5.2 shows the 2-dimensional sub-space that most accurately approximates the 59-dimensional profile space. The centre (or centroid) from which the arrows emerge, represents the weighted average of all city profiles of the four years included. The length of the arrows is a measure of the weight of the economic sector in explaining the variance between the business start-up profiles of the individual cities. For reasons of clarity, the only economic sectors to have been labelled are those that play a relatively important role in explaining the variance between the individual city business start-up profiles. In addition, economic sectors that hardly or do not play a role in absolute terms (for example, mining) are omitted from the analysis.

The business start-up profiles for the individual cities, for single years, can now as weighted averages be plotted as single points in this multidimensional profile space. The result is shown in Figure 5.3. The different cities occupy clearly different positions in the plot, indicating that the business start-up profiles vary. A closer look reveals that the business start-up profiles in the plot display a tendency to move from left to right and slightly upward over the years. In 1988, the business start-up profiles of the cities are relatively widely scattered, predominantly on the left side of the plot, indicating heterogeneity among the business start-up profiles of the cities. In explaining this variance, all kinds of transport and transport-related activities, finance and the garment industry have an important role (compare with Figure 5.2). In 1991, the pattern has not changed much. The variance has perhaps even slightly increased. The profiles for 1994 and 1997, however, clearly present a different picture. The profiles of almost all cities start to move towards the upper corner at the right side of the plot. The communications sector, evidently one of the most important emerging industries of the last decade of the 20th century, plays an important part in this. Although this may not be a surprising finding in itself, it is interesting to note that it holds true for all cities included in the analysis. The dominating trend be-

tween 1991 and 1997 is one of convergence: the business start-up profiles of the various cities display an increasing degree of agreement throughout these years. This tendency may be interpreted as suggesting the emergence of a pattern of specialisation taking place at the level of the Randstad as a whole.

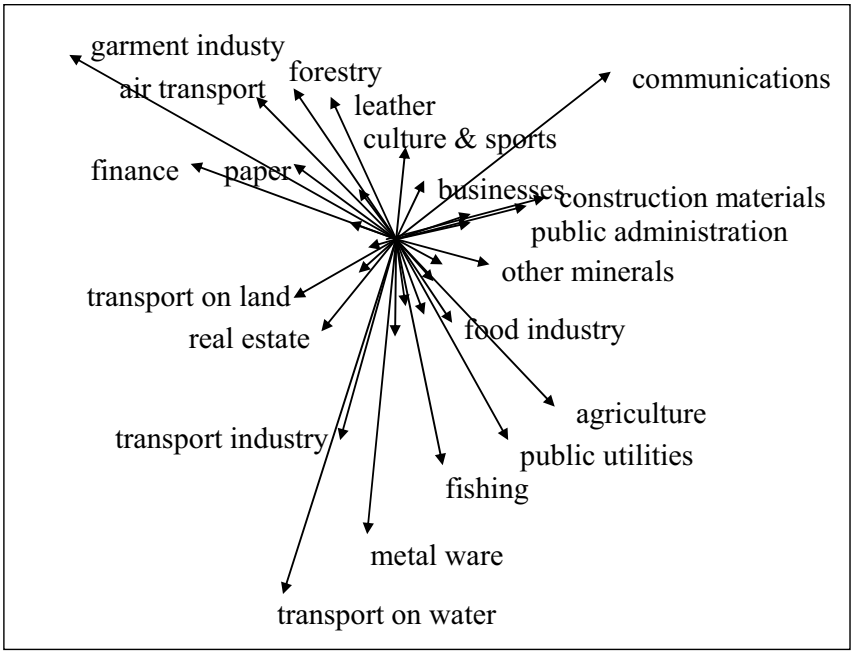

Figure 5.2 *Industrial sectors making a difference in the business start-up profiles of the 13 cities in the Randstad*

In Figure 5.4, the trajectories of the cities with respect to the trends in their different business start-up profiles are shown. The distribution of the cities in the plot confirms the more traditional images about their economic orientation. We find, for example, the transport industry, transport on water and metal goods having important parts to play in explaining the relative position of the business start-up profiles of cities in the Rijnmond (Rotterdam, Schiedam and Dordrecht). In addition, we see business start-ups in agriculture and the food industry affecting the relative position of The Hague and Delft, both cities that are located in very close proximity to the high-tech agricultural production area of the Westland. The explanation for Amsterdam being located in the extreme left upper corner in 1988 and 1991, lies in the legalisation (and thus registration) of parts of the relatively vast illegal sweatshop industry that had its base in the city (Raes, 2000).

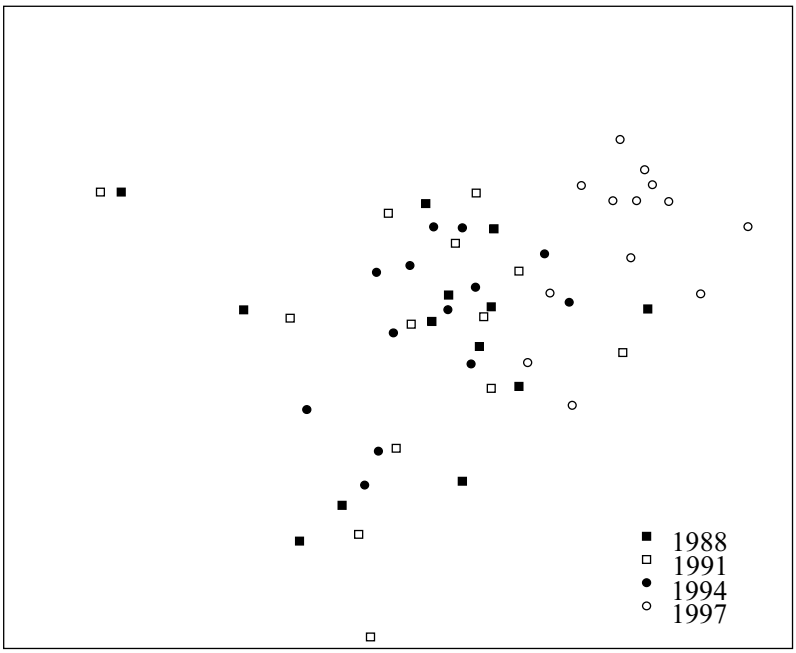

Figure 5.3 *The distribution of business start-up profiles for 1988, 1991, 1994 and 1997*

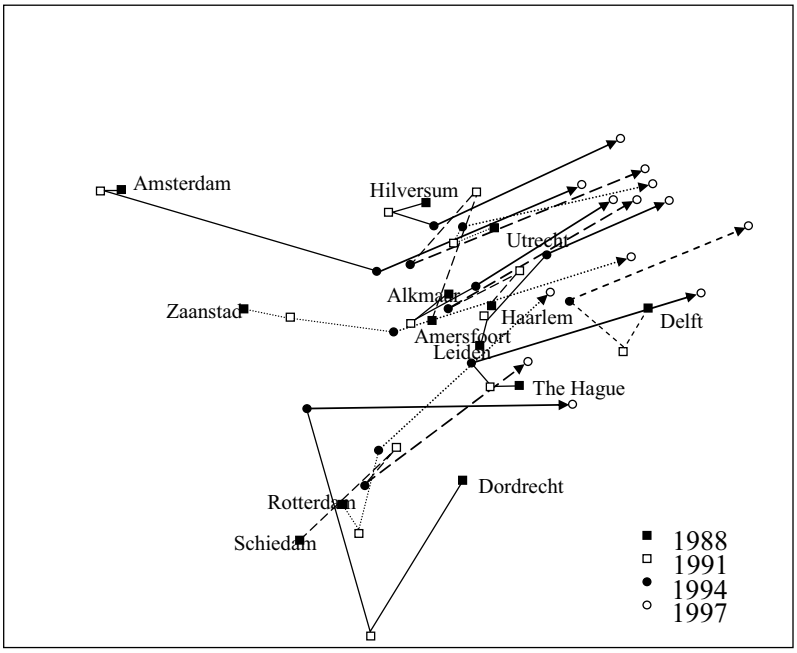

Figure 5.4 *Trajectories of business start-up profiles for the 13 individual cities, 1988-97*

Remarkably, this figure confirms the divide between the so-called north wing and the south wing of the Randstad. These wings differ in economic orientation and also in economic growth rates (de Smidt, 1992). The north wing is usually associated with trade, professional services, finance and entertainment. In the south wing, manufacturing and transport (Rotterdam) and public services (The Hague) carry considerable weight in the regional economic structure. The two wings are quite often considered to form – to a particular point – coherent urban regions, (much) more than does the Randstad as a whole. If we distinguish between the cities that belong to the north wing relative to the cities that make up the south wing, in our analysis the divide appears rather prominently (see Figure 5.5). In accordance with the classic picture, the economic sectors in the upper half of the plot (including finance, culture and sports, and businesses; see Figure 5.2) have an important part in explaining the character of the business start-up profiles of the north wing cities.

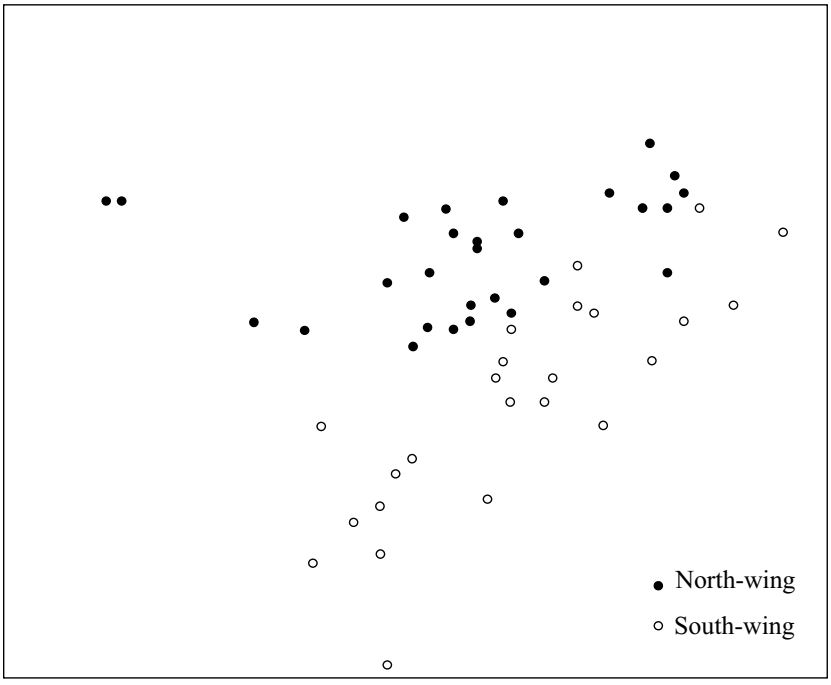

Figure 5.5 *Business start-up profiles of cities in the north and south wings of the Randstad*

The relative position of the south wing cities is largely explained by the economic sectors dominating the lower half of Figure 5.2, which include transport and manufacturing. As the trajectories in Figure 5.4 show, the start-up profiles of the individual cities are not only becoming more alike at the level of the two wings, but they also show a more overall convergence. The two wings are becoming more alike with respect to business formation. The cities of the south wing trav-

erse the largest distance in the plot, whereas the position of the north wing cities is more stable. This apparently implies that the south wing lags behind the north wing.

5.5 Conclusions

Global competition is increasingly about making the most of local qualities that are hard to copy elsewhere. To survive, therefore, firms have to tap into specific resources that enable them to get a more durable competitive edge. In the post-industrial era, natural endowments – although still important – have lost their prominence. Man-made infrastructure and especially highly skilled labour is now crucial in advanced economies. Infrastructure can be copied, but a specific milieu that specialises in a particular set of products is completely different. These milieux ('new industrial districts' or 'clusters') are the subject of much current research. Their formation is strongly dependent on so-called localisation economies, in particular the easy availability of highly specialised labour. This sets an upper limit to such a milieu in the sense that it has to be a travel-to-work area. It is, however, not just the commuting distance that matters. The competitive edge of firms is strongly contingent on a process of permanent innovation involving the transfer of non-standardised knowledge on a frequent face-to-face basis. This means that, although the spatial levels at which these clusters of economic activities are formed vary, there are clear limits to the upper size.

Socioeconomic changes interact with specific local legacies in terms of morphology and institutions. The intensification of competition and its potential for economic restructuring, accordingly, is articulated within the polycentric form of the Randstad. We have explored the extent to which such tendencies of cluster formation in the polycentric urban region of the Randstad can be traced. We have focused on the business start-ups as they respond most directly to changes in the economic environment.

Our findings for the Randstad point to the direction of cluster formation at a supraurban level. The sectoral composition of business start-ups of the 13 cities is clearly converging in the span of a decade. A process of intraregional (i.e. at the level of the polycentric urban region) homogenisation with respect to new economic activities is taking place. Within the Randstad, a clear divide is revealed between the north wing (with Amsterdam and Utrecht as the largest cities) and the south wing (with Rotterdam and The Hague as the main cities). It seems, therefore, that cluster formation is more pronounced at this lower level of spatial aggregation than in the Randstad as a whole. The north wing is ahead of the south wing in terms of new firms in sunrise sectors, such as communications and media.

Judged by the trends in business formation, the polycentric urban region of the Randstad seems to be on the way to becoming more of an economic region that hinges on the same strategic sources of competitive advantage – namely, highly skilled labour. These conclusions are still rather tentative. The

links with other parts of the Netherlands have not yet been taken into account. There is also a lack of data on the commuting patterns of highly skilled labour. Furthermore, we do not know to what extent survival rates differ in the different parts of the Randstad. More research has to be undertaken, especially with respect to the links between the firms in the Randstad region and their effect on both short-term and long-term (innovative) labour productivity. More specifically, the new stage in the research should focus on the links between the economic actors of the polycentric urban region of the Randstad. Are these links strongly socially embedded and thus provide a base for trust and, hence, for collaboration, experimentation, shared learning and the creation of stocks of 'trade secrets' (Henderson *et al.*, 1995; O'Sullivan, 2000)? If this proves to be the case, then, inevitably, the so-called institutional thickness (Amin, 1994) of the Randstad should be increased, although the regional directorate that has been proposed by Allen Scott (1998, pp. 144-145) may be too far-fetched, perhaps even in the remote future. The formation of institutions that deal with educational facilities, public transport and the bringing together of important economic actors at the level of the polycentric urban region then becomes essential in order to secure the competitive position of the Randstad.

Notes

[1] According to *The Economist* (1996a, p. 65) indirect evidence from growing specialisation comes from the shape of trade between European countries. This has grown faster over the past decade than trade with the rest of the world, despite the migration of manufacturing jobs to countries outside the European Union with cheaper labour. The most likely explanation is that firms have specialised within Europe and are trading with each other to make up for sales lost in their abandoned businesses. In this process of regional specialisation Europe still lags behind the US However, with falling internal tariff barriers in the Union, thereby enlarging market, European countries/regions now appear to be moving in the direction of more pronounced specialisation (Scott, 1998, p. 71).

[2] Cortie *et al.* (1992) also looked at the Randstad as a potential metropolis, but they did not focus on the Randstad from the perspective of an (emerging) economic cluster.

[3] Although changes in the dominant ways of producing goods, transport and communications have set limits to the potential effect of spatial non-homogeneities and internal economies of scale, large numbers of cities still owe their present competitive edges and economic strongholds to their early location-related advantages and/or infrastructure endowments. In addition, new forms of location-restricted differences arise now and then. Currently, for example, firms that depend on the cross-Atlantic transmission of large electronic data files seek to optimise access to the so-called trans-Atlantic backbones of the internet, which, at least for the time being, seems to translate into a concentration of such firms near the 'gates' of these backbones. Another example is provided by the clustering of recreational activities, for example, in the Alps or along the Mediterranean coast, as the obvious result of topological and climatic circumstances (Duranton and Puga, 2000).

[4] The gross regional product per head in large parts of the Randstad exceeds that in most of the remaining parts of the Netherlands (CBS figures for 1996).

[5] Amsterdam, Rotterdam, The Hague, Utrecht, Haarlem, Zaanstad, Amersfoort, Dordrecht, Leiden, Delft, Alkmaar, Hilversum and Schiedam.

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