# Enhancing Urban Competitiveness through Innovative Growth Clusters

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## 1. Introduction

Increasing competitiveness is of high interest to cities: it is indispensable to further the well-being and prosperity of citizens and firms, and to generate employment. Thus, it is important to gain insight into the economic growth opportunities in cities. In this respect, new growth sectors such as information technology, biotechnology, environmental technology, media and tourism are at the centre of interest to academics as well as to urban managers. Many cities invest heavily in developing and attracting industries in these promising sectors. However, little is known about critical success-factors that determine economic development of cities and regions, and empirical studies that draw lessons for policy are scarce (Nijkamp, 1999). Moreover, there are good reasons to doubt to what extent a pure sectoral view is adequate to analyse urban economic growth and to design policies. There are many indications that, increasingly, competitiveness seems to emerge from fruitful co-operation between economic actors, who form innovative complexes of firms and organisations. It is in these geographically concentrated network configurations, or "clusters", that value-added and employment growth in urban regions is realised. This asks for a new policy approach in urban economic development. The general aim of this paper is to increase the insight into new growth opportunities for cities and to provide scope for urban policy. We have focused on growth processes (why and how some clusters are growing) rather than growth figures,

and we have made a comparison between growth clusters in different European cities. The paper is organised as follows: section 2 introduces the background and methodology of the investigation. Section 3 contains the framework of analysis that was constructed to analyse cluster development. Section 4 includes a synthesis of experiences with "growth-clusters" in nine metropolitan cities in Europe. The article ends with some concluding remarks.

## 2. Background and methodology

This article is based on the results of an international comparative urban research in nine European cities into growth clusters and the scope for urban economic policy (Van den Berg, Braun, Van Winden, 1999).

These cities are active member cities of the Eurocities-network[1]. They are part of a larger group of cities that are interested in the fundamental question how large urban regions can benefit from the rapid growth of sectors such as biotechnology, medical services, tourism, information technology and the media industry. The group members organised frequent meetings with the aim to exchange information and good practises. The nine cities that appear in this article however wanted to take a step further: they felt the need for a more thorough analysis of new growth opportunities, and asked the authors to execute a systematic analysis on growth clusters in general and potential growth clusters in the individual cities in particular.

We asked the cities to come up with a list of clusters that the cities considered as promising sources of new economic growth. From that list, we selected one cluster for each city for closer analysis. Since we wanted to focus on factors that could

[1] Eurocities is the association of European metropolitan cities. It currently represents 90 large and medium-sized cities from 26 European countries. One of the aims of the network is to promote the exchange of experience and best practice between city governments.

explain growth processes rather than growth figures, we have included very different clusters and cities to get an interesting mix of experiences: we have studied mature growth clusters with high growth figures as well as smaller clusters where previous research in the city has indicated that there is growth potential.

The following cities were included (in alphabetical order): Amsterdam (The Netherlands), Eindhoven (The Netherlands), Helsinki (Finland), Leipzig (Germany), Lyons (France), Manchester (UK), Munich (Germany), Rotterdam (The Netherlands) and Vienna (Austria). The cities differ in size as well as in economic structure and performance, as can be seen in table 6.1.

Table 6.1 Some data on the participating cities

| City | Inhabitants of agglomeration | Chosen cluster |
|---|---|---|
| Amsterdam | 1,300,000 | Tourism |
| Eindhoven | 670,000 | Mechatronics |
| Helsinki | 920,000 | Telecom |
| Leipzig | 502,878 | Media |
| Lyons | 1,262,000 | Health |
| Manchester | 2,591,000 | Cultural industries |
| Munich | 1,241,000 | Media |
| Rotterdam | 1,065,000 | Media |
| Vienna | 1,807,000 | Health |

We studied the following clusters. In Lyons and in Vienna, we investigated the health cluster: the complex of health care institutes, medical and biological research,

the pharmaceutical industry, and medical instruments. Both cities have a great tradition in medical research and health care, and both cities share the ambition to make more out of their medical complexes in economic terms. In Munich, Rotterdam and Leipzig we have studied the complex of media and related activities as growth clusters, although there were important differences. In Munich, the media cluster is very large and very well developed. In Rotterdam, the media industry is very small, but the municipality considers this cluster an important element in their strategy to diversify the city's economic base and to create new employment. For Leipzig, the situation is again very different: as former GDR city, Leipzig seeks to re-establish the media cluster in which it had a great tradition. For Helsinki, the investigation was concerned with the cluster of telecommunications -both the production of equipment and services-, characterised by very high growth rates, with Nokia, a world leader in mobile phone, playing a very important role. In the city of Eindhoven the mechatronics cluster, a high-tech industrial cluster, was surveyed. For Amsterdam, tourism was the target cluster. In Manchester finally, we have investigated the cultural industries as growth cluster, with a special eye for the potential for urban regeneration.

We started out work by studying the relevant literature on cluster development. To be able to analyse and compare the different clusters in the different cities, we developed a framework of analysis with the help of which we were able to study the clusters not in isolation but in their urban context. Next, for each case-city we thoroughly reviewed the available reports and studies on the cluster involved. On that basis, we were able to identify key actors in the cluster. After this, we executed in-depth interviews with key representatives.

## 3. Frame of analysis

The literature on clusters is extensive. Most studies focus on theoretical aspects of clustering, or take (very) large regions as geographical unit. In empirical studies, there is a strong bias towards well-performing regions (the 3rd Italy, Baden Würtemberg, Silicon Valley, Route 128-Boston, Cambridge) with high rates of growth and innovation, and dense network structures. However, empirical (comparative) cluster-studies in urban regions are scarce.

In our study, we aimed to study clusters in urban regions in an integral way, from the view that clusters are embedded in the spatial-economic, cultural and administrative/political structures of the urban region.

We have drawn up a frame of analysis to take several aspects into account and study their interrelations: it should serve as basis to structure our empirical work in the cluster/city cases, and enable us to understand growth processes in clusters in urban regions, provide scope for policy improvement, and allow the comparison of different types of clusters. The elements of our framework are derived from existing literature (partly discussed in the preceding sections) and recent insights in the importance of "organising capacity" as determinant of economic development of urban regions (Van den Berg, Braun, Van der Meer, 1997).

In the framework, we assume that three interrelated elements influence the growth of a cluster: 1) spatial-economic conditions, 2) cluster specific conditions, and 3) organising capacity regarding the cluster.

Figure 6.1 shows the components of the framework and the interrelations between the parts. In the following, the contents of the framework are elaborated.

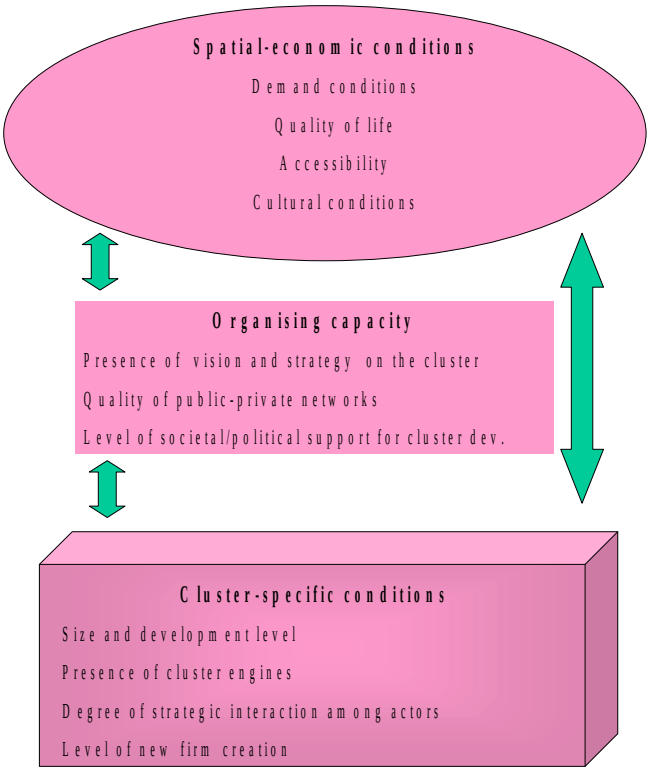


Figure 6.1 Framework of reference

## 4. Results

As already outlined in section 2, in our survey we analysed several type of clusters: two mature health clusters (Lyons and Vienna), two small media clusters (Rotterdam and Leipzig) and a very mature one (Munich), a large tourist cluster (Amsterdam), a specialised cultural cluster (Manchester), and two mature technologically-oriented clusters (telecommunications in Helsinki and mechatronics in Eindhoven). At first sight, comparison seems difficult: the cases are dispersed across several countries, entailing country-specific aspects; they differ in type, and in their "development stage". However, the above described frame of reference proved a fruitful guideline to analyse clusters in the urban context and enabled us to look systematically at clusters of different size and structure in very different cities.

For each case-city we thoroughly reviewed the available reports and studies on the cluster involved. Also, we executed in-depth interviews with key representatives,

to find out how the key organisations are strategically linked up with other organisations (firms, knowledge institutes, government) within and outside the region (see figure 6.2) and to collect evidence on the presence of formal and informal co-operative structures, joint facilities or joint projects in the growth-cluster in the urban region.

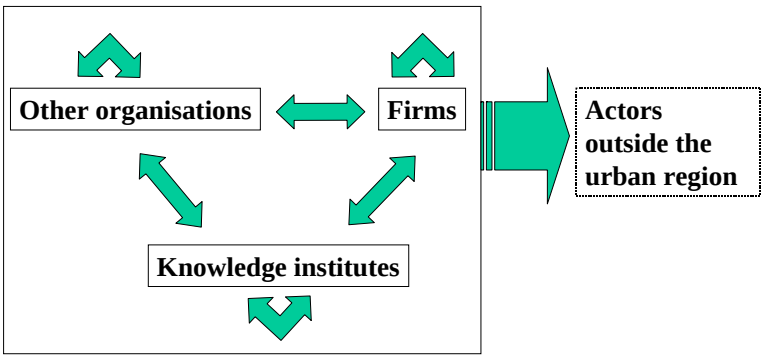


Figure6.2 Inter-organisational relations

Also, in the investigation we included the impact of general conditions (accessibility, quality of life, and cultural aspects) on the cluster's functioning. We interviewed policy makers to identify and judge urban cluster strategies. The (semi-structured) interviews proved to be an indispensable and very rich source of information. In this section, we compare the clusters along the aspects that were presented in our frame of reference. We try to investigate whether our framework is appropriate (do the presumed variables indeed play a role in the development of clusters), and whether it is applicable to different type of clusters and to different stages of cluster development. The structure of this section follows that of the framework of reference.

## The role of spatial economic conditions in cluster development

In the case studies we found our assumption confirmed that the functioning, dynamics and opportunities of cluster development are largely dependent on the general economic and spatial conditions that prevail in the city under consideration. Besides, cultural variables seem to matter. In this section we will elaborate on each of these subjects.

**Demand conditions**

In the health clusters of Lyons and Vienna, the role of local demand conditions is different: Health services are predominantly consumed by the local populations. For the pharmaceutical industry located in both cities, regional demand is not particularly important, as most firms produce for the national or even European markets. In the cultural industry cluster in Manchester, the local demand does not play a decisive role in the cluster's development either. In Helsinki, we found that deregulation of the telecom-market (already in the 1980s) created a boom in national demand for new telecom services and equipment. The very early deregulation has given the firms in Helsinki's telecom cluster a lead over others: Many of them (the best known are Nokia and Sonera) currently sell their products, services and know-how on the world market.

**Accessibility**

In our analytical framework, we hypothesised internal and external accessibility as relevant factors in cluster development. From the cases, we found that good internal accessibility -the ease with which actors in the urban region can get through to one another- enhances strategic co-operation in the cluster, as it brings co-operating actors nearer to one another and thus increases the chance of fruitful (new) combinations. However, it appeared that in many cases, the friction of physical distance is much less important than psychological barriers. Even the location of

actors in the same building does not imply an incentive to co-operate. Personal contact seems to be a much more important determinant of co-operation than distance. Moreover, we found that proximity is positively related to the propensity to co-operate when the actors have "grown up together" in the same building or location. An illustration of this is the in-situ co-operation in the Vienna BioCenter, where the pharmaceutical firm Boehringer Ingelheim works closely together with institutes of the University of Vienna in fundamental and applied research. Another example can be found in Finland in the city of Olou, where very close ties between Nokia, smaller firms and the University of Olou have developed since they were located on the same campus.

The ease with which other cities, national and international, can be reached by all kind of mode -the external accessibility -is also relevant for the growth possibilities of clusters. All the case cities are well connected to rail networks, airports and highways. However, the impact of the external accessibility on cluster development depends on the type of cluster. For one thing, good (inter)national connections make it easier for actors in the cluster to "export" their products. It also increases the exposure of the cluster actors to international competition, which tends to make the cluster stronger. From our interviews we found that owing to internationalisation of R&D and technological developments, international connections are indispensable to clusters in which technology and R&D are important (the health clusters in Lyons and Vienna, mechatronics in Eindhoven, telecom in Helsinki), to attract international staff, and to provide access to international partners. However, it is not just the technology-oriented clusters that put high demands on external accessibility. For the tourist cluster of Amsterdam, the strong position of Schiphol Airport is vital for its success in business tourism. Manchester airport could be instrumental to the

international aspirations of the city’s cultural enterprise.

Good connections may have a negative impact on cluster development when strong competing cities are nearby. For Rotterdam for instance, the nearness of "media capital" Amsterdam makes it difficult to build up a media-cluster of its own. The same holds, to some extent, for Leipzig, that competes with nearby Berlin in the attraction of media activities. Another illustration is the cultural cluster in Manchester, where the attractiveness of London for creative talent is something to be reckoned with. Thus, cluster development in cities with strong "magnets" in their vicinity will have to develop a clear specialisation based on local strengths instead of trying to do the same as the already well-developed neighbour. Urban specialisation becomes all the more relevant with the arrival of new fast transport means such as the high-speed rail network.

**Quality of life**

The attractiveness of a city in terms of housing, cultural and leisure facilities proves a fundamental factor in cluster development, as a means to attract and retain highly skilled people to the region. In that respect it is interesting to compare the cities of Munich and Leipzig. Firms in the "booming" media cluster of Munich manage to attract excellent staff from other German cities (and even from abroad) because of the superior quality of life that the city offers. By contrast, for Leipzig, with a much less favourable living climate, it proves very difficult to keep skilled people in the region, let alone to attract them from elsewhere. The specific demands on the quality of the living environment differ by cluster. In the very technologically-oriented clusters –in Eindhoven, Helsinki and, to a lesser extent, Lyons and Vienna- the quality of housing and the nearness of the countryside are considered to be important, while in the media-clusters (Rotterdam, Leipzig, Munich), as well as in the tourist (Amsterdam)

and cultural (Manchester) clusters, the cultural climate and the metropolitan ambience appear to be somewhat more important.

The unique quality of life and cultural amenities that many European cities can offer can be regarded as a weapon in the global competition for top-level staff. In Vienna, for instance, we found that for some international top-researchers, the high quality of life in Vienna compensates for high income tax rates compared to other countries (notably the US). Thus, particularly Europe's heritage cities are pearls of great economic value in the global competition for talent. Preservation and further amelioration of the quality of life is a long-term investment, with high payoffs in the long run.

**Cultural variables**

In our framework, we assumed that "cultural variables" would be important factors in cluster development. We discerned three types of cultural variables: 1) the willingness of people and firms to adopt new products 2) the valuation of entrepreneurship in the case-cluster and 3) the willingness to engage in strategic co-operation. Although we made no attempts to quantify these variables, we have strong indications that these cultural variables are indeed important factors explaining the development of clusters.

The cases of Munich, Helsinki and Manchester show how cluster actors can benefit from an "early and eagerly adopting" home market, as this entails market for new cluster-products, and an ideal testing ground. In the media cluster in Munich, digital broadcasting techniques are tested in the very receptive local market. In Helsinki, experiments are run allowing ordering and paying for a can of Coca-Cola by a mobile telephone on the city’s airport. In Manchester the openness to cultural innovation is the basis for the cultural cluster development as such. The valuation of

entrepreneurship proved a relevant non-tangible cultural factor. Entrepreneurial people are indispensable to any cluster, discover new things, to make new combinations, to start new firms, and so on. We found very different attitudes in the several clusters. In the health clusters of Lyons and Vienna (to a lesser extent), entrepreneurialism was esteemed very low by the universities, an attitude that hampers linkages between universities and business in the cluster. At the other end of the spectrum are Eindhoven, Munich and Helsinki, where entrepreneurialism is more appreciated: students and teachers are much more inclined to link up with business, and correspondingly higher numbers of start-ups and spin-offs from universities can be observed. The city of Leipzig is a special case, with a very low entrepreneurial spirit due to the legacy of communism. The municipality has even defined entrepreneurship as the leading principle of its economic policy, and seeks to stimulate entrepreneurial activities. Although the attitude towards entrepreneurship is partly a cultural phenomenon, financial and legal incentives can do much to enhance it. In Vienna and Lyons, we found that entrepreneurial behaviour is rare because people have long-term, fixed contracts and virtually no incentive to do something new. A decrease in direct financing may have the positive side effect of giving universities an incentive to execute contract research and seek contact with business.

Thirdly, the willingness to co-operate is a key cultural factor of relevance, in a "network economy" where access to resources of other organisations is vital. In this respect also, differences among the cities are pronounced, with Eindhoven, Munich and Helsinki leading, followed by Rotterdam, Amsterdam and Manchester. The medical clusters of Lyons and Vienna showed the lowest levels, on the one hand because of large culture barriers and mutual disrespect between the various cluster actors (large pharmaceutical firms, smaller firms, universities, and hospitals), on the

other because of strong regulation in medical fields compared to the other clusters. We found that dense informal networks in a city generate the necessary mutual trust that is indispensable for co-operation in innovative and risky activities. The most striking case was the mechatronics cluster in Eindhoven, where inter-organisational co-operation is much facilitated by the high density of informal networks (sports clubs, unions, study-clubs etc). Ideally, co-operations emerge spontaneously, but policy makers could do much to create an environment that stimulates informal interaction. A good example can be found in Munich, were the municipality invested in the Literaturhaus, a meeting place for the publishing scene.

## Cluster-specific conditions

In our empirical analysis, with the help of our framework we studied several cluster-specific aspects: the importance of scale, the role of large companies as engines of cluster development, the level of strategic interaction amongst cluster actors, and the levels of new firm creation. Additionally, we found that the role of history and tradition can hardly be underestimated. The table below shows the scores of the cities/clusters involved in the study They are indicative and based on the information that the authors have collected through reports and interviews, not on a through quantification of the several factors. Therefore, they should be interpreted with caution. Below, the scores are justified.

Table 6.2 Indicative scores of the case-clusters on cluster specific conditions

| City | Amsterdam | Eindhoven | Helsinki | Manchester | Leipzig | Munchen | Rotterdam | Lyon | Vienna |
|---|---|---|---|---|---|---|---|---|---|
| Cluster | Touris | Mechat | Tele | Cultura | Med | Medi | Media | med | Med |

| | m | ronics | com | l ind. | ia | a | | ical | ical |
|---|---|---|---|---|---|---|---|---|---|
| History/Tradition | + | + | + | 0 | + | + | - | + | + |
| Critical mass | + | 0 | + | 0 | - | ++ | - | + | + |
| Presence of cluster engines | 0 | + | + | 0 | - | + | - | + | + |
| Degree of strategic networking | + | ++ | + | 0 | 0 | + | - | - | 0 |
| Levels of new firm creation | 0 | + | + | 0 | 0 | + | 0 | - | 0 |

++ very strong, + strong, 0 moderate, - weak

## History and tradition

Tradition and history matter in cluster development. Many cities included in the investigation have a tradition in the cluster we studied: for instance, Vienna (health) has always had a world-famous medical school; Lyons long served as the health-centre for the whole of Southern France; Munich's function as an important media-city (particularly publishing) dates back for centuries. The Amsterdam canals have been a tourist attraction since the early days of urban tourism and Manchester has gained a reputation in popular (youth) culture since the early 1960s. Tradition and history are the ‘substratum’ of many of the clusters in the investigation. From the

cases, the clusters with a long tradition appear very well developed and complete. Tradition gives a lead, because often, history has created a valuable and well established "cluster infrastructure" that took years to build: a knowledge base, education institutes, research units, branch unions and so on. The social-cultural infrastructure in a cluster is of great value, as it determines the levels of mutual trust and willingness to co-operate, but it takes much time for such an infrastructure to come into being.

The absence of history and tradition makes it very difficult to develop a cluster. This has become clear in the case of Rotterdam, where it proves to be extremely difficult to develop a media-cluster without having a media tradition at all, as neither buyer of media products nor media production firms regard Rotterdam as a media location. In relation to the issue of tradition, we found that the commitment of influential firms or individuals to a city of region can do much for a cluster. For instance, the commitment of well-known media-tycoon Leo Kirch to the city of Munich has contributed much to the development of commercial television activities in that city. In Lyons, the Boiron-family, owners of a large homeopathy-conglomerate, are strongly attached to the Lyons region. In Eindhoven, partly as compensation for the move of the Philips headquarters to Amsterdam, the company decided to invest in a huge technology campus in Eindhoven. An interesting case in that respect is Leipzig, which is trying to re-establish itself as the media-city that it was before the Second World War and the communist period. In Leipzig, traditional ties have survived the decades of communism: some German firms with roots in Leipzig re-open subsidiaries to breathe new life into the ties between the firm and the city. A policy consideration of these observations is that psychological factors such as commitment and "local attachment" should be explicitly recognised and built upon.

## The size of the cluster

The investigation confirms the expectation that large clusters in terms of the number of firms, added value and employment have an advantage over smaller ones due to externalities. In Munich for instance, thanks to its size, the media cluster comprises sophisticated suppliers of digital equipment, whereas in the smaller media-clusters of Rotterdam and Leipzig, there is no critical mass for such specialised services. Guided by the same logic, large clusters a benefit from a huge and specialised labour pool. In audio-visual activities (film, TV production), people such as directors, actors, and cameramen usually work on a project basis and hop from the one project to the other. Thus, some degree of critical mass proved necessary to attract such staff to the city.

In the health clusters of Lyons and Vienna, we also found that their large scale allows for specialised health services, enabling them to serve national or even international markets (for instance, a hospital-unit in Lyons is very strong in treatment of sports injuries and attracts patient from all of France and abroad).

Thus, a cluster's size is related to its geographical market: the bigger the cluster, the higher the levels of specialisation ("uniqueness") within the cluster, the greater the cluster’s market reach. We indeed found that all of the mature clusters serve the international market (for example Helsinki and Munich). Interestingly, the case of Manchester shows that actors in the cluster can develop international contacts, whereas many of the cultural enterprises still have difficulty developing the local market.

Additionally we found that clusters can benefit much when "job hopping" specialised staff stay within the region: we found this process strongly at work in the mechatronics cluster in Eindhoven, where people are very inclined to change jobs,

taking best-practice and new knowledge from one firm to another, thereby increasing the clusters' competitiveness.

Also, a sufficient scale of a cluster is needed to sustain a "cluster superstructure", such as privately operated education facilities. An example is the Medien-Akademie in Munich that is supported by the many TV stations.

In sum, large size clusters seem to have considerable advantages over smaller ones, as a large-scale cluster entails division of labour and specialisation; the large, specialised job-market generates knowledge transfer; this permits further sophistication of the "cluster product": that, in turn, may activate more demand; next, the increase in demand stimulates firms to expand, induces cluster-specific new firm creation and attracts more firms to the cluster, so that the economies of scale increase further. See figure 6.3 for a graphical representation of this "virtuous circle". Nevertheless, t[illegible]le is by no means an automatism. The potential danger is that success [illegible] time induce sluggishness and conservatism with (key) pla[illegible]

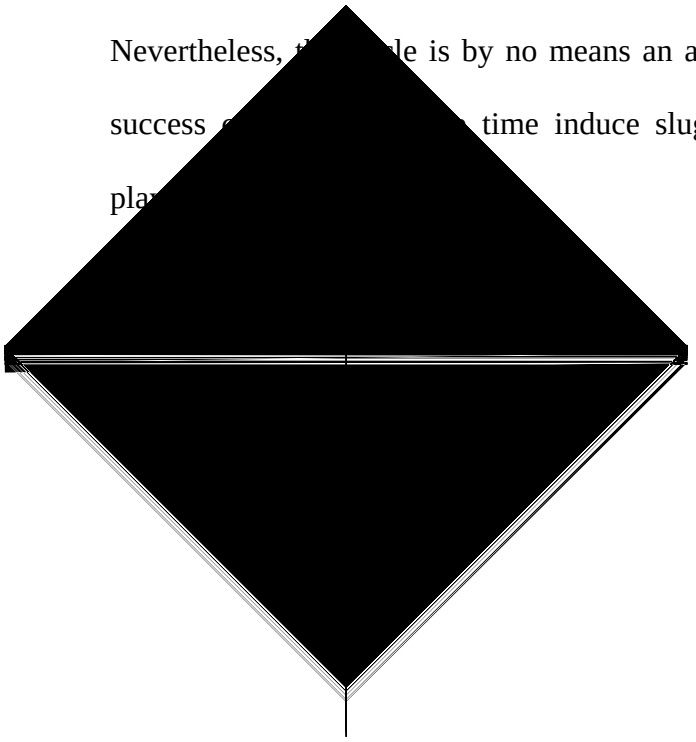

Figure 6.3 The "virtuous circle" of cluster development

## Presence of cluster engines

In our investigation, we found that clusters can benefit much from "cluster engines" (large organisations with a dominant position in the cluster), as sources of knowledge, and providers of all kinds of spin-offs. Examples of cluster engines are Nokia in the telecom-cluster of Helsinki, Novartis (pharmaceuticals) and Boehringer Ingelheim in Vienna and Mérieux (pharmaceutics) in Lyons. All of the multinationals have linked up with universities, and provide much knowledge-transfer in the cluster. In some cases, big firms even have an active policy to serve as an umbrella for spin-out firms that are no direct competitors (Novartis), from the wish to develop a set of satellite-firms with complementary competencies.

The presence of large firms as part of the cluster is a valuable asset, even if their interaction with the other cluster constituents is limited. In the case studies, we have found wide differences among big companies in the degree to which these firms are "rooted and fledged" in the region. Some companies -such as Immuno-Baxter (world leader in the production of blood products) in Vienna and, to a lesser extent, Philips (electronics) in Eindhoven,- are relatively "inward-looking", and do not actively regard the presence of other cluster actors in the region as an advantage. Their degree of strategic networking in the region is generally small. This does not mean that these firms are unimportant: they are valuable sources of knowledge and people and a potential "breeding ground" for spin-out firms. An example can be found in the mechatronics cluster in Eindhoven of which Philips, the multinational electronics company, forms a part. Although Philips is relatively self-sufficient (it has little direct interaction in the region), the organisation is extremely important as source of high-grade knowledge (which spills over when people change jobs), as mother of spin-out companies, and as breeding ground for talent: many firms in the

mechatronics cluster somehow have some Philips-background or relation.

In some cases, a cluster can become too dependent on one single firm, as seems to be the case in Helsinki, where the cluster is strongly dominated by the rapidly expanding Nokia: this firm hires more than half of Helsinki's technical university graduates; many firms in the regions are strongly dependent on assignments of Nokia. A possible downturn of such a dominant firm may have detrimental impact. The lesson is that diversification is important, both within a cluster as in a city as a whole. Not all clusters studied contain engines: we could not identify cluster engines in Manchester and Rotterdam. This makes the clusters in these cities much less "visible".

## Strategic relations among cluster actors

In the case studies, we found a great variety of the nature and intensity of relationships within clusters, which makes comparison among the clusters very difficult. Despite this we have made an attempt to rank the cities, on the basis of indicative evidence. Table 8.2 shows that in general, we found the highest levels of strategic cluster interaction in Amsterdam, Munich, Helsinki and particularly Eindhoven. Manchester holds an intermediary position, as well as Vienna and Leipzig. At the bottom, we found Lyons and Rotterdam, where actors act relatively independently. More specificly, for each cluster, we have focused on regional co-operation 1) between firms and education institutes 2) among education institutes and 3) among firms and research institutes.

## Links among firms and education institutes

In Figure 6.4, several degrees of strategic interaction between the business community and the educational institutes are illustrated.

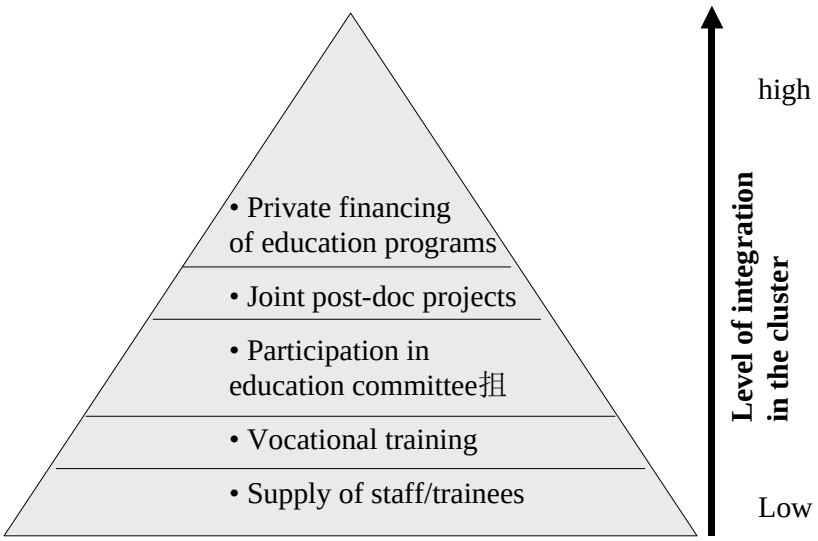


Figure 6.4 Embeddedness of education

On a basic level, the universities provide trainees and future staff for the cluster firms. In this respect we found that the match between education supply and needs of the cluster differ widely among the cases. In Amsterdam and Manchester, university education is ill adapted to cluster-firm needs. To a lesser degree this holds also for the health-clusters of Vienna and Lyons: the firm's representatives complain about a lack of entrepreneurial skills among students and a too one-sided emphasis on old-fashioned scientific education. The more strategic involvement of cluster firms with the university is depicted in the higher layers of the pyramid. Cluster-firms can participate in education programmes (this happens for example in Helsinki and in Munich), use the university for vocational training or PhD projects, education for their staff, finance chairs (Philips in Eindhoven), or sponsor education programmes.

## Strategic linkages among education institutes

In most of the clusters these are weakly developed. In Rotterdam, three institutes offer media or media-related education on several levels, but the programmes are not compatible. A similar situation prevails in Leipzig. In Helsinki,

the potentially complementary universities function in almost complete separation from each other. Our conclusion is that the prevailing "island mentality" of many institutes means missing chances for cluster development. More co-operation -for instance in joint marketing of the city as the educational centre for a cluster, or in matching programmes on several levels- can increase the inflow of young talent into the cluster, and thus strengthen its position in the future.

## Strategic links among firms and public research institutes.

For research just as for education, a pyramid can be drawn up that indicates the level of strategic interaction between cluster-firms and research-units. See figure 6.5.

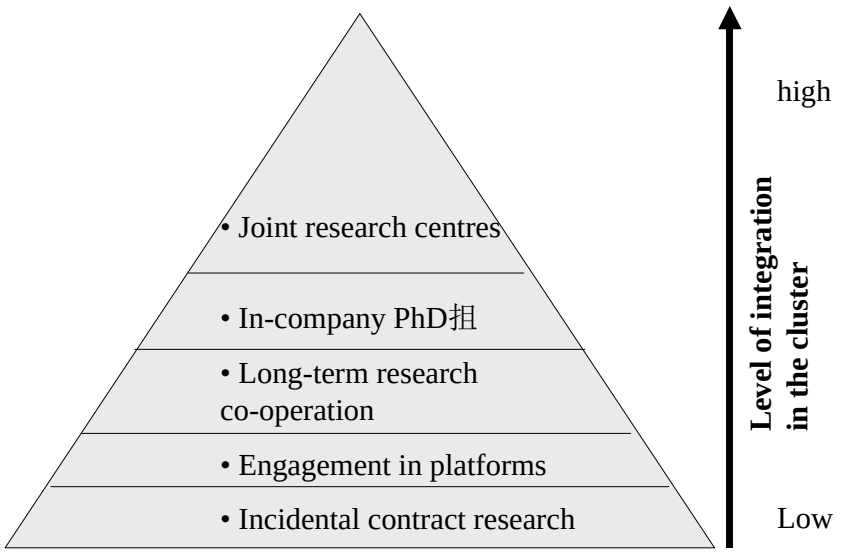


Figure 6.5 Integration of firms and research institutes

On a fairly low interaction level, firms may incidentally outsource research, or engage in discussion/research platforms with a university. A good example is found in Eindhoven, where the university is involved in a platform on embedded systems. On a

more strategic level, a university may have more value for a cluster. For instance, the engagement of universities in longer-term contract research and licensing for cluster actors may strengthen the competitive position of firms that co-operate with the university. This holds particularly for "research-intensive" clusters (the health cluster of Vienna and Lyons, the mechatronics cluster in Eindhoven, and telecom in Helsinki). Fruitful combinations emerge readily where the more fundamental research activities of the university are a very valuable complement to the applied research of firms.

The highest level of integration we found in the case-studies was the joint research centre set up by the University of Vienna and Boehringer-Ingelheim Austria. Illustrative of the importance of universities for firms is the strategy of the expanding telecom-multinational Nokia of locating its new research institutes (all through the world) in the close vicinity of universities. For marketing efforts of local governments to attract new firms, this implies that universities in the region should be regarded and treated as important location factor. An important observation is that the benefits of firms-university interaction accrue to the university as well: it generates financial resources, helps to focus research activities on matters that are relevant for business or society, and thus entail a more efficient spending of (public) money. It may also increase the quality of the research, since the demands of the market are generally high. In Lyons, where university-business interaction is at a very low level, scientific discoveries of universities often appear useless for the business sector. A major problem hampering fruitful interaction -not only in Lyons but in virtually every cluster- proves to be the cultural difference between the business sector and universities in terms of objective-orientation and time span of activities. Although university-related policies are in most cases on a national level, there might be a role for urban government to break these barriers: the potential economic spin-offs of

university-industry co-operation for the region can be high.

In sum, the principle benefit of strategic interaction (on all levels) in a cluster is that it allocates resources more efficiently as it allows for specialisation. Additionally, it helps to "tie" (international) firms to the region. In the face of mergers, acquisitions and rationalisations in many sectors (notably electronics, automobiles and pharmaceutics), an international firm is much more likely to remain in the region when it is firmly embedded and fledged. An example is ASMlithography (equipment for chip production) in Eindhoven. As this strongly networked firm is very dependent on suppliers in its vicinity, its propensity to relocate is small. Another example is Boehringer Ingelheim, a German pharmaceutical firm with a large research facility in Vienna, which has very close ties with the University of Vienna.

## Levels of new firms creation

New firms in the cluster create dynamics, as they offer employment, create value added, and may act as useful suppliers for existing firms in a cluster. Particularly when active in expanding markets, new firms may grow very rapidly and add even more to the cluster. New firms are started from several sources: from educational institutes, existing firms, universities (researchers who commercialise a scientific discovery), or other educational institutes. We found different levels of new firm creation in the several clusters. The clusters with the highest figures are Eindhoven, Helsinki, and Munich. Rotterdam, Amsterdam and Manchester hold an intermediate position. At the lower end, we find Leipzig, Lyons and Vienna. We found that the level of new-firm creation depends on the type of cluster, the degree and level of starters-support, and the general attitude towards entrepreneurship. In the medical clusters (in Vienna and Lyons), to set up a new firm (for instance in biotechnology and medical technology) is very difficult because of strict regulations, strong vested

interests of existing (multinational) companies and a lack of incentives: in Vienna for instance, hospital staff has no incentive to develop new products, as any benefits of patents accrue to the city –the owner of the hospitals-, not to the inventor. In Lyons more than in other clusters, we found that the huge cultural and mental gap between universities and business world seriously hampers the development of spin-off companies from the university. In the field of media (particularly new media) it is much easier to start new business, because of less regulation, fewer requirements in terms of scale, technology and capital, and a less mature market.

We found several type of starters support policy. A very integral approach was found in the starters facilities in Munich and in Helsinki, that offer not only office space and all kinds of support but also offers starters access to networks of established firms in the region. The concept of "twinning" new firms to existing ones is also developed in Eindhoven, where large firms contribute to a starters' facility, not only financially but also by sharing their knowledge and networks. In other clusters as well (for instance in Vienna), large firms indicated to benefit from the proximity of young, dynamic complementary firms, and are willing to invest in it with several resources. In Rotterdam, Vienna, Leipzig, Lyons, Manchester and Amsterdam we found no cluster-specific support structures.

We conclude that effective support for starting firms should not remain restricted to financial support and space provision, but become more integral and more targeted. This implies that starters' policy should not be a matter of public agencies only: precisely the knowledge, experience and networks of existing firms can make a starters policy successful and should be used to the full.

## Organising capacity

The final element that we presented in the analytical framework as one of the factors that contribute to the development of clusters is the degree of "organising capacity" regarding the cluster. Previous research (Van den Berg et al., 1997) has identified several factors that contribute to organising capacity in cities. In this investigation we have investigated 1) whether the urban management has a vision and whether there is strategy regarding the development of the cluster; 2) to what extent cluster actors are involved in the making of cluster policies, 3) to what extent there is political /societal support. Table 6.3 shows the scores of each of the city/cluster cases. These scores should be treated with care: they are not based on hard data-analysis but form an indication on the basis of an evaluation of policy documents of the cities and expert interviews in both the public and private sector.

Table 6.3 **Indicative scores of the case-clusters on organising capacity**

| | **Amsterdam** | **Eindhoven** | **Helsinki** | **Manchester** | **Leipzig** | **München** | **Rotterdam** | **Lyons** | **Vienna** |
|---|---|---|---|---|---|---|---|---|---|
| Cluster | Tourism | Mechatronics | Telecom | Cultural ind. | Media | Media | Media | Medical | Medical |
| Presence of vision/strategy | + | ++ | - | 0 | 0 | 0 | - | ++ | - |
| Involvement of cluster actors in | + | ++ | 0 | 0 | 0 | + | - | 0 | - |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| policy making | | | | | | | | | |
| Political/ societal support | 0 | + | 0 | 0/+ | ++ | + | + | + | 0 |

++ very strong, + strong, 0 moderate, - weak

## Presence of an integral cluster strategy

Do the cities have an integral target cluster strategy, and to hat extent does having a strategy contribute to cluster development? Amsterdam, Munich and Eindhoven have the most integrative strategies. The city of Amsterdam has a clear vision of and strategy for the tourist cluster, broadly supported by key actors in the cluster itself. Eindhoven has made the promotion of networking and partnerships in the region a leading principle in the region's economic policy. This is particularly important for the mechatronics cluster in which the combination of different technological disciplines is essential. In the case of media in Munich, it was the Freestate of Bavaria that developed a policy favouring the media cluster. Ten years ago the city of Munich was not very supportive of the cluster, but that attitude is changing with positive initiatives such as the Munich Technology Centre as a sign of the new strategy in the city. The approach to the cultural industries in Manchester is also changing. Culture and cultural enterprise has been given a place in the region-wide regeneration strategy, with Manchester City Council now working on a policy scheme for tailor-made support to cultural business in the fields of design, media, multimedia and popular music. Lyons has developed an integrated vision on the health cluster with five concentration poles, however, there is no clarity on the development direction of these focal poles. In the other cities a clear, fully balanced

vision of and strategy for the development of the cluster as a whole is yet to be developed or in progress (Vienna, Rotterdam, Leipzig and Helsinki). The experiences of the cities illustrate that some successful clusters are supported by an integral vision on the development of the cluster in the context of the local and regional economy. Particularly from the Helsinki case, it may be concluded that the absence of a regional vision or strategy does not hamper favourable cluster development. However, to fully use the growth potential on the longer run might call for a specific cluster strategy. There is certainly a case for public leadership in cluster development, to establish missing links in the clusters, to promote new technology or to create incentives for co-operation.

## Involvement of cluster actors in cluster policy making

To what extent are cluster actors involved in policymaking regarding the cluster under consideration, and to what extent do they contribute to the quality and effectiveness of policies? We found high levels of private involvement in Eindhoven, Munich and Amsterdam, low levels in Rotterdam and Vienna. The other cities hold an intermediate position. In Rotterdam lack of strategic interaction between the city departments and the business community has resulted in ineffective ad-hoc policies: several large real-estate projects in the field of media are developed by the city without having consulted the private business. In Manchester the strategic contacts between the city and the cultural industries could be improved as well: The city's cultural industries are an economic factor as well as source of creativity that the city government could use in the marketing of Manchester. Lyons serves as example of good co-operation: A medical cluster-strategy was drawn up under leadership of the Chamber of Commerce, but in very close co-operation with the central hospital-organisation, the medical faculty of the universities, the pharmaceutical

industry ad local and regional government. In Helsinki, the establishment of structural consultation between key figures in the Helsinki club (a club of leaders in the metropolitan area, for the public and the private sector) might lead to efforts to overcome the lack of a metropolitan vision with regard to the telecommunications cluster. The strategic interaction in the mechatronics cluster in Eindhoven has been strongly stimulated by the Stimulus Programme leading to public and private investment in the Twinning Centre, whose aim is to accommodate young entrepreneurs and twin them with the expertise of senior business people.

It can be concluded that public-private co-operation is a prerequisite to develop effective and efficient cluster-policies. "Interactive policymaking" is needed in the marketing of the cluster, in attracting new firms, in helping start-ups and in all other aspects of cluster policies, to make optimum use of the knowledge and resources of the existing actors in the cluster. This also implies that civil servants involved in cluster policies need to be well educated and have sufficient "feeling" with the cluster.

## Political and societal support

How important are political and societal support for cluster development? We found that clusters with growth potential are helped by well-developed political and societal support, and that lack of support can be a threat to growth possibilities for the cluster. One of the clearest examples is the case of tourism in Amsterdam, where tourism causes inconvenience to inhabitants, in particular for those in the city centre. There is still enough political and societal support, but the challenge for policy makers is to sustain support as the cluster continues to grow. In Leipzig, the promotion of the media sector is supported wholeheartedly in the political circlesand can count on support from the population as well, since unemployment is still a major problem for the city in transition. In Vienna, the negative attitude of the general public towards

gene manipulation hampers (public) investment in starter facilities in biotechnology, one of the most dynamic parts of the health cluster.

## 5. Final remarks

Large urban regions throughout Europe are seeking to capitalise on new growth opportunities to increase their competitiveness. In this paper we have tried to analyse and compare the development of different kinds of growth clusters -localised networks of specialised organisations- in urban regions. The cluster perspective, with its focus on local interaction and innovation, proved useful, as increasingly, economic activities cross the boundaries of traditional economic sectors and innovations are generated in inter-organisational settings. We found strong evidence that despite the emergence of global networks, many networks have a strong local dimension, due to the importance of "cultural proximity" in strategic relations, even though the actors in the clusters seem to thrive in the global economy as well.

The investigation shows that for any type of economic activity, the generation of new value-added and employment growth should be seen in the urban context: the potential of individual cities to benefit from growth sectors depends not only on "autonomous" growth of that particular sector, but also on the initial strength of that city in that sector, and on the quality of urban policies. Other factors are the quality of life a city can offer –to attract appropriate staff-, and its accessibility. This limits the capacity of ambitious cities to "build" growth sectors from scratch and asks for policies that are resource-based, i.e. based on a thorough evaluation of the cities' strengths.

Increasing urban competition urges cities to make optimum use of their resources. In this light, stimulation of networking and clustering can be an effective

means to better use resources that are dispersed among many actors. This can be done by supporting cluster-institutions, investing in cluster-specific infrastructure, or supporting informal networking. In addition, cluster-oriented policies are a means of tying increasingly mobile firms to the region by embedding them strongly in regional networks.

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