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Entreprise clustering: a contributory factor of the grouping of high value-added activities in European regions

This article summarises studies, conducted under the GEMACA II project, on the grouping and development of high value-added activities in Dublin, London, Paris Ile-de-France and RhineRuhr. The studies show that certain enterprise clusters have developed in these West European metropolitan areas because of the significant competitive advantages such areas provide. This, in turn, highlights the strategic role of geographical/spatial location in the context of globalisation. Yet, paradoxically, the ongoing globalisation process is often reflected in the ability of enterprises to locate wherever they wish in the world. However, it is now recognised that enterprise clustering is an important factor in economic development and has not developed through spontaneous dynamics alone. Local players from the public, private and voluntary sectors have sometimes played a prominent role in fostering the birth and development of enterprise clustering.

(1) Director of «strategy and analysis» Department, Paris Regional Development Agency in Ile-de-France
(2) The complete study is available from the partners involved in the project and can be downloaded from the following address: http://www.iaurif.org/en/projects/networking/gemaca/
(3) Defined as geographical groupings of companies in related lines of business.
The GEMACA study analysed the development of spatial sectors or enterprise clusters with high growth potential in the Functional Urban Regions (FURs) of Dublin, London, Paris Ile-de-France and RhineRuhr. In the context of increasing European and global economic integration, cost competitiveness plays an important role. Therefore, the purpose of the study was to identify the economic activities that have been developing rapidly in these four major metropolitan areas.

Enterprise clusters: factors of regional competitiveness

To identify the competitive advantages of companies in the regional environments of Dublin, London, Paris Ile-de-France and RhineRuhr, the GEMACA team had to decide which level of analysis to adopt: the company, the sector, the cluster or the type or line of business. After studying the existing literature on the subject, the team decided that the most relevant level for analysing the advantages and disadvantages of these regions was that of enterprise clusters. This was recognition of the renewed importance of the local, territorial dimension to the redistribution of industrial activity and the significance of innovation for the dynamics of regional development. Analysis at the enterprise cluster level helps to identify regional economic specialisation differently from the traditional sector approaches. The GEMACA team used a definition of enterprise cluster proposed by Michael Porter, a professor at Harvard Business School: an enterprise cluster is «a geographically proximate group of interconnected companies and associated institutions (universities, standards agencies or trade associations, for example) in a particular field, linked by competition and co-operation.» The geographical size or scope of clusters varies according to the local context. Enterprise clusters also vary according to their level of development. The study distinguished between three possible stages of development: embryonic (new), established (emerging) and mature (well-developed).

The clusters studied as part of the GEMACA project often extend over an entire FUR (Functional Urban Region), although there also exist intra-regional clusters, such as the genetics cluster («génopôle») in Evry, Ile-de-France, and the media cluster in Soho, London.

As part of this project, 21 case studies were conducted in the four chosen regions. The business sectors of the enterprise clusters studied are listed on the map below. Three business sectors were common to all four regions: information and communication technologies (ICT), creative industries and biotechnologies. In addition, each national team studied at least two other clusters chosen because of their local strategic importance. Most of the clusters that were studied featured high value-added industries.

(4) The results of the four case studies are presented in this IAURIF Cahier.
To make it easier to carry out a comparative analysis, a common methodology/framework for analysis was agreed. Data about each cluster were collected to answer several sets of questions. What factors have contributed to the formation and development of clusters of high value-added industries in Europe’s major areas of economic activity? What are the growth prospects for the clusters analysed? What location/relocation strategies did companies implement? How did the public authorities influence the birth and development of the clusters analysed?

In addition to analysing the dynamics of enterprise clustering, this research work allowed the teams to outline certain recommendations concerning the potentially suitable policies on enterprise clustering.

The proximity factor

What explains the emergence and development of enterprise clusters in the major European metropolitan areas? The geographical/spatial concentration of enterprises in clusters can be explained mainly by the external savings they benefit from by being located in metropolitan areas. This explanation goes back quite a long way in history, that is, to the heyday of capitalist development. In 1890, the British economist Alfred Marshall had already identified the benefits of concentrating economic activities in what he called «industrial districts».

However, the study of the relative importance of cluster growth factors is very recent and therefore does not have much to show for it in terms of results.
Today, the economic environment is very different from that of the late 19th century. In particular, enterprises are now engaged in worldwide competition. In this context, companies that locate or relocate to clusters related to their lines of business can benefit from several decisive competitive advantages. These are based on generic location-related factors, such as the level of qualification of the working population, the quality of governance, territorial infrastructure and local or regional research & development (R&D). Companies can make the most of specific location-related benefits of enterprise clustering when such benefits are available at cluster level. These specific benefits include the following:

- Access to specialised skills. The existence of a pool of qualified people whose qualifications fit those required by companies, and the availability of specialised local subcontractors are significant advantages. Companies also often benefit from the local presence of institutions (such as research centres, universities, start-up incubators, chambers of commerce, etc.), non-profit organisations (local employer groupings, economic development agencies, trade associations, etc.) and service companies (business law firms, consultants, financiers, etc.) that meet corporate needs.

- By encouraging local actors to capitalise on, develop and cultivate links between the enterprises, research centres, non-profit organisations, chambers of commerce, etc. that make up clusters, clustering is also a factor of regional differentiation.

- The existence of a cluster leads to the creation and development of specialised public and private sector facilities that benefit the community as a whole, such as, for example, technology resource centres, start-up incubators and vocational training units.

- Spatial proximity makes it easier to transfer information, tacit knowledge and expertise through formal and informal exchanges. It also enhances the possibility of face-to-face contacts, which favour technology spillovers that are critical for innovation.

- The sharing of cultural norms, standards and codes is also very beneficial. By joining the same trade bodies, using the same leisure facilities, attending the same church services, practising the same sports, etc. the people who are part of a cluster create and develop a system of local standards. This system enhances the quality of professional relationships and discourages opportunistic behaviour because people have to preserve their reputations. The financial community in the City of London is a particularly good example of this.

- Quicker and better understanding of market demand is a specific benefit. To meet the needs of partner enterprises and buyers, companies are led to be more innovative.

- Finally, the last two major factors of competitiveness relate to “co-opetition”, that is, the dialectical interaction between co-operation and competition that goes on within clusters. Enterprises interact with each other through a complex interplay of co-operation and competition. Depending on the market segments or their interests, they can form alliances or, on the contrary, compete strongly with each other. Such interplay between players in the same cluster stimulates their efforts to improve productivity and enhance their innovation capacity.

The combination of all these factors explains why enterprises cluster together in major metropolitan areas. If they took production costs alone into account, they would not do so, because locating or relocating to such areas generates higher costs, such as higher salaries and rent charges, for example. However, the case studies have shown that the development of enterprise clusters also results from historical factors.
The role of historical factors

As we have seen, the formation of enterprise clusters owes a lot to generic factors. However, their birth and development can also be explained by a number of special conditions that cannot be reproduced. In some cases, such conditions have been brought about by accident of history (the availability of specific local resources, the spontaneous development of a given field of activity, etc.); in other cases, the conditions are intrinsic to a given area, such as the presence of a company that is the driving-force of the local economy or the existence of major local facilities for research and innovation.

The example of the «creative industries» is a good illustration of the role played by historical factors in cluster formation. Under the GEMACA II project, on the basis of a study by the British government, the following industries were shown to have formed a very diverse cluster made up of several lines of business: advertising, film production, television, the music industry, architecture, engineering, software, IT services and photography.

The presence of these industries in London and Paris can be explained by certain special historical conditions, such as the existence of creative artistic capabilities, strong cultural identities, the “national capital city” factor, etc. These conditions have been sustained by an ongoing capacity for innovation, which has allowed these two cities to capitalise on these special historical conditions, enabling them to establish their reputations as two of the main global centres for the creative industries, while at the same time allowing them to renew their industrial fabric.

Employment in the «creative industries»

An illustration: the factors that explain the presence of ICT and finance clusters in North Western Europe

To show how proximity and historical factors explain the development of enterprise clusters, we can look at two examples: the financial and ICT growth sectors in the Dublin, London, Paris Ile-de-France and Rhine-Ruhr metropolitan areas.

The development of information and communication technologies (ICT)

In recent years, the ICT sector has been very much in the news with the rapid development of the “new economy”, followed by the bursting of the speculative bubble caused by this rapid development. Although this sector has been in serious difficulties recently, there is no doubt that it has played a strategic role in the development of modern economies, particularly because of the structural change it has brought about and the new possibilities it has opened up for regional development.

Against this background, the location of ICT producers has become highly concentrated in several European metropolitan areas, including Dublin, London, Paris Ile-de-France and the Rhine-Ruhr area.

(6) See the article on science and technology.
(7) This study is available from: www.culture.gov.uk/creative/mapping.html
The main factors that explain this concentration have been the following:
- The strength of local demand for IT services due to the size of the functional urban regions concerned. In these four regions, the penetration rate of the internet in companies and private homes has been higher than elsewhere.
- These regions are very accessible, especially London, Paris and the RhineRuhr area.
- The high quality of urban life in many large metropolitan areas, which is particularly attractive to the highly qualified employees in the ICT sector.
- Use of ICT is far more developed in large metropolitan areas than in the rest of the European Union.
- The presence of considerable scientific and technological resources.
- The development of local enterprise clusters, such as the one in the Sentier district of Paris.
- The favourable impact of the financial sector on the deployment of high-speed (high bandwidth) telecommunication networks and related services.

As regards ICT, London and Paris significantly surpass the other two metropolitan areas. This has resulted, in particular, from the multiplier effects of the existence in these two cities of very active financial centres, which have stimulated the development of high-speed networks and related services. These financial centres also explain the presence in these two cities of a large working population of people with high qualifications in ICT. (See table 1). These favourable conditions stimulated the development of ICT enterprise clustering in Paris and London through both new local companies and the arrival of foreign companies. On a more modest scale, similar developments have taken place in Dublin and the RhineRuhr area.

ICT in Dublin, London, Paris and RhineRuhr (2)

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<tr>
<th></th>
<th>Dublin</th>
<th>London</th>
<th>Paris</th>
<th>Rhine-Ruhr</th>
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<tbody>
<tr>
<td>Number of companies</td>
<td>2,100</td>
<td>N.A</td>
<td>7,500</td>
<td>10,257</td>
</tr>
<tr>
<td>Employees</td>
<td>65,900</td>
<td>364,000 (2)</td>
<td>376,700</td>
<td>122,000</td>
</tr>
<tr>
<td>Take-off</td>
<td>1990s</td>
<td>Mid1980s</td>
<td>Late1980s</td>
<td>Late1980s</td>
</tr>
<tr>
<td>Stage of development</td>
<td>Established</td>
<td>Established</td>
<td>Established</td>
<td>Established</td>
</tr>
<tr>
<td>Strengths</td>
<td>Low corporation tax for ICT firms - Ireland is a global leader in software production</td>
<td>Strong demand for IT services - Proximity to clients (including a financial centre) - Leisure software - Financial software - Highly qualified workforce</td>
<td>National and international leading companies are part of the cluster - Proximity to clients (incl. financial centre) to design software - Availability of training - Well qualified workforce</td>
<td>National leading companies are part of the cluster - High income population</td>
</tr>
<tr>
<td>Weaknesses</td>
<td>Strong competition from emerging low cost countries (India, Eastern Europe) - Emerging skills shortages and wage costs sharply up</td>
<td>Competition is increasing in Europe - High property values and major space constraints</td>
<td>High cost of access to internet - US competitors - High wage costs</td>
<td>Corporate culture - ICT sector underdeveloped - Problems in integrating different functions</td>
</tr>
<tr>
<td>Spatial aspects</td>
<td>Central Business District - Industrial area situated around the M50/ Naas Road axis - The Sandyford business park - and north of Dublin City</td>
<td>Software industry is heavily concentrated in London and South East</td>
<td>Core of the cluster is in Paris, the inner suburbs of Paris (Hauts de Seine) - and southwest of Paris (Vélizy, Sceaux, etc.)</td>
<td>Major companies along the Cologne - Bonn - Düsseldorf - Essen axis</td>
</tr>
<tr>
<td>Prospects</td>
<td>Dublin is currently evolving from a production centre to more specialised activities, such as e-business</td>
<td>London has great capacity for development because it has the required critical mass and assets.</td>
<td>Île-de-France could become the software and multimedia capital of Europe within five years</td>
<td>Depends more and more on demand-side factors such as societal acceptance, changing values and integration capacity</td>
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</table>

(1) OECD definition and data collected in each region
(2) Estimate
Source: GEMACA II reports, December 2001

Finance: a highly concentrated line of business

An effective financial system is essential for the smooth running of the economy. Financial services, acting as vital intermediaries between lenders and borrowers, savers and investors, also provide optimal risk management.

According to European labour force surveys, 5.2 million employees in the European Union were employed in the financial sector in 1999, i.e. approximately 3.4% of total employment in Europe. The London FUR accounts approximately for 8.3% of European financial employment.

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(8) See the article on the ICT and multimedia industries in Île-de-France.
The Ile-de-France region ranks second with 5.4% of European staff in this sector, but ahead of the Rhine-Ruhr region (3.6%), the Randstad in the Netherlands (2.7%) and Frankfurt (2.2%). Other cities which have performed well are, notably, Brussels (1.5%) and Dublin (0.8%), proportionally employing more people in the finance industry than all other sectors on a European level.

In the major regions of Europe, the finance industry has developed for specific historical reasons mainly in the London and Paris metropolitan areas, which have held their own within the international financial community. London capitalised very significantly on the lifting of foreign exchange controls in 1979 and especially financial deregulation in 1986 to develop a financial cluster made up of numerous enterprises that operate in a great variety of business lines, backed up by very powerful local trade associations. A single regulator, the Financial Services Authority (FSA), which also deals with the main financial market players in the City, regulates all financial activities. Finance companies located in the City benefit from major location-related external savings due to the presence of numerous companies (scale effect), specialised sub-contractors (jurists, consultants, IT service companies, technical experts, etc.) and a very highly qualified labour force trained in the world’s best management schools.

In Paris, deregulation also boosted the growth of the financial sector in the 1980s, a trend which has not been sustained since then for several reasons (sector consolidation, the spread of ICT, productivity drives, etc.), in spite of the efforts made by all financial market players in Paris to promote the French capital as a major financial centre. Thus, the number of jobs in the financial sector in the Paris Ile-de-France region fell by over 10% between 1989 and 1999, particularly due to the productivity drives carried out by the companies that are part of the cluster. However, the involvement of the Paris Bourse in the Euronext joint venture (with a total market capitalisation in 2000 amounting to 2,420 billion euros and 1,653 listed companies) is a real asset. Although the head office of the Euronext European holding company is located in Amsterdam, participation in this joint venture could increase the number of finance companies in Paris, thereby enhancing the competitive position of the French capital.
In Dublin, the ambitious policy of creating the International Financial Services Centre has helped foster strong growth in finance-related businesses. Out of the 41,000 people employed by the financial sector in the Dublin FUR, 15,000 are directly or indirectly employed by the IFSC, which has specialised in “back office” activities. In the RhineRuhr region, the development of finance-related businesses can be explained mainly by the region’s economic and demographic strengths, given that the financial capital of Germany is located elsewhere, that is, in Frankfurt, Rhin Main.

Clusters and cluster development policies

Cluster-oriented policies represent a major shift from traditional industrial development programmes, which focused mainly on supporting the development of industrial sectors as a whole. Cluster-oriented policies are similar to action in favour of businesses: they try to foster the development of activities related to the lines of business that characterise clusters. They do so by sustaining the local/regional geographical spaces in which the activities of the business lines are concentrated and by deploying all the economic assistance available, both direct and indirect (new business start-ups, local urban planning, location/relocation assistance, research and innovation, local venture capital, etc.). These policies affect all the actors involved in a cluster.

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<th>Finance in Dublin, London, Paris and the RhineRuhr region (1)</th>
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<tr>
<td>Spatial aspects</td>
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<tr>
<td>Prospects</td>
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</tbody>
</table>

(1) Sector definition based on the nomenclature of economic activity. Eurostat data; labour force surveys.
(2) Information compiled by IAURIF from Eurostat data and local sources of statistics.
Source: GEMACA II reports, December 2001
Cluster-oriented development strategies still tend to be exploratory, and have been implemented with varying degrees of sophistication in Dublin, London, Paris and the RhineRuhr region. The first metropolitan area to implement such a strategy was Dublin in the early 1990s, and this has been a factor of the dramatic development of the area. This strategy featured economic and urban development planning measures (Technology Foresight Ireland, and the National Development plan), and measures to strengthen existing regional growth centres (such as the Digital Media Hub in Dublin). By contrast, it was not until the late 1990s that the RhineRuhr, Paris and London areas began to implement cluster-oriented policies: the “Local Productive Systems” (LPS) policy in Ile-de-France; the software enterprise cluster in Dortmund; and the biotechnology cluster in London.

Based on 21 case studies and an analysis of all the existing literature on enterprise clustering, the GEMACA team drew up a methodology for formulating cluster-oriented policies in European regions. A review of the principal features of this cluster approach and the main policy recommendations for each of the four European metropolitan areas studied was undertaken.

The decision to implement such development policies is usually taken by local or national government authorities. It is a difficult choice to make as such policies represent a major challenge, which has a better chance of success if it is part of a collective action programme. A commitment to a cluster-oriented policy amount to accepting innovation, and often needs to be preceded by public debate, during which the advantages and disadvantages are discussed in the light of specific regional characteristics. Such a debate must be as free and open as possible to involve all of the economic agents in the territory or community concerned.

Second stage: identifying clusters

Once the decision has been taken, the next step is to identify all the clusters that exist in each FUR. As mentioned above (see box 1), the statistical data for this task are inadequate. It is therefore necessary to adopt the same participatory approach as before, that is, to obtain the help of cluster participants in identifying the clusters. Once this stage has been completed, it becomes essential to characterise each cluster in terms of geographical spread, core activities, stage of development, functioning, internal and external links, strengths and weaknesses, threats and opportunities, etc.

Next, it is necessary to identify the benefits of each region in terms of location. In so doing, the process particularly emphasises location incentives, such as the availability of universities and vocational training institutes, sources of venture capital, science parks, infrastructural facilities and urban planning. In addition, any disincentives to cluster development should be noted.

The first stage of the overall action framework is an awareness-enhancing process during which the political decision is taken to implement a cluster-oriented policy. It is important that this process should take place at the level of the Functional Urban Region (FUR), that is, on a geographical/spatial scale consistent with the clusters of economic activity concerned.
The four regions studied have adopted this approach of systematically identifying enterprise clusters only quite recently. In the London area, this approach was used in full by the Department of Trade and Industry to produce a national report for the British government. In Dublin and the south of the RhineRuhr region, this systematic approach was implemented as recently as in 2001. And in the Paris Ile-de-France region, all such initiatives have been recent and the results of local initiatives, given that regional studies have been incomplete.

Third stage: defining the policy action framework

Defining the exact role of local government authorities in relation to enterprise clusters is one of the most complex and controversial issues discussed by economists. The content of a governing authority's strategy of support must be a function of the characteristics and dynamics specific to each local cluster.

Before a governing authority takes any political action in favour of clusters, it must first draw up a consistent development strategy based on clear, long-term objectives. Such a strategy must be formulated collectively by means of a participatory process to agree on a shared vision of each cluster in terms of objectives and the operational resources to implement this vision. The strategy must be formulated at FUR level, because it is at this geographical level that such a policy will be most effective.

At this point, it is important to note that clustering policy must not induce specialisation logic. In other words, it must not lead the governing authorities to favour certain clusters by designating them as specialists in a given line of business chosen from the regional portfolio of business lines. International research including work by Porter in the USA rejects such a policy of specialisation, as it risks distorting competition. It can also have very negative repercussions in case of a sharp downturn in the economic cycle.

It is very important that local government authorities should play a supportive and catalysing role in favour of any existing initiatives, rather than a leading role. When a local government authority has played a major part in the start-up of a cluster, it should give way as soon as possible and hand leadership over to the private sector and local institutions. Conversely, local government authorities have a strategic role to play as providers of support for clusters over time and as providers that use the most appropriate tools (see the 4th stage of this overall action framework).

Finally, it is quite rare for the public authorities to create a cluster out of nothing, the only notable exception being Dublin, but it was in a very special economic context. Efforts to foster clustering are expensive and often vain, and very few cluster support policies have been successful in other developed countries. In other words, government authorities should concentrate their support efforts on clusters that are at some early stage of development, including embryonic clusters. This is of strategic importance, because it is at early stages of development that clusters most need help.

Fourth stage: implementing the policy tools

Cluster development policies are a recent phenomenon. The measures taken under such policies can be placed in three categories: direct support for cluster enterprises; improvements to the regional environment; and action in favour of co-ordination.

Direct support first consists of ensuring that cluster enterprises benefit from all existing forms of support, by mobilising and co-ordinating all the aids available.

**BioTeam Paris-Région®, a brand common to the biotechnology growth sector in Ile-de-France**

BioTeam Paris-Région®, a branded biotechnology network in Ile-de-France, aims to promote the regional biotechnology-related sector internationally and to secure its leadership in Europe.

The following are the founding partners of the BioTeam Paris-Région® network:
- the Paris Ile-de-France Regional Development Agency (ARD);
- the Essonne County Economic Development Agency (AEE);
- the Paris Development Agency (PDA).

These three founding partners have registered the BioTeam Paris-Région® brand as an official trademark. The network is open to all potential regional partners from the life sciences sector.

By coming together, the BioTeam Paris-Région® partners wished to pool their resources under a single brand name. This pooling of resources makes for the more effective promotion of the biotechnology sector internationally and the development of a joint strategic approach by the partners involved.

More specifically, the BioTeam Paris-Région® network has set itself short and medium term objectives:
- short-term objectives: to build up a consistent image of the biotechnology-related sector in Ile-de-France by advertising it under the single BioTeam Paris-Région® brand name. The presentation document is a good illustration of this policy. This consistent image will give France's leading biotechnology hub a higher international profile.
- medium-term objectives: to deploy and sustain the BioTeam Paris-Région® network; to implement a missionary selling plan; to attend all major biotechnology-related international events; to foster mergers, acquisitions, and joint ventures between biotech firms; and to support the growth of biotech firms in Ile-de-France.

Source: BioTeam Paris Region®, 2002
Such action also aims to facilitate the creation of start-ups and the location/relocation of enterprises in clusters through the development of specialised organisations (company incubator in Evry, Ile-de-France, London Bioscience Innovation Centre, the Media Park in Dortmund, etc.). It includes the attraction of international companies by the economic development agencies in the four regions. In some cases, the authorities even create a common brand for their region (see box 2). The arrival of start-ups or existing companies in a cluster fosters a spirit of competition, a key driver of innovation. Enterprises in a cluster can also benefit from certain services provided via an internet portal or the provision of customised information about economic or technological developments.

Improving the regional environment is achieved through a series of measures that have an indirect impact, such as enhancing the business climate, fostering innovation and technology transfers, urban planning, local infrastructure development (roads, telecom networks, etc.), encouraging training, improving security, easier access to capital and better local governance. The initiatives taken by local authorities in the four regions studied have included the implementation of local urban development plans favouring the growth of enterprise clusters. Thus, the Digital Media Hub project in Dublin has aimed to foster the development of information technology (IT) companies and other companies with high growth potential in a 2.8 hectare site situated in the historic city centre near the Guinness brewery and Christchurch cathedral. The Media Lab Europe joint venture between the government of Ireland and MIT in the United States will be located on this site, in which the Irish government will invest 130 million euros.

Action in favour of co-ordination is also a core element of enterprise clustering policies. The aim is to stimulate cluster development by a regional strategy of fostering links between cluster players. This is where development agencies have an important role to play. Such a strategy may be implemented at local level by specialised bodies, such as the “Net Sentier” association in Paris for multimedia and Internet development, the financial centre in Dublin and the Media Park in Dortmund. The policy of fostering the development of links between cluster actors may lead to direct financial support for bodies that play a leadership role in local cluster development, as has been the practice in Ile-de-France and Dublin. There is also an international dimension to policies for fostering co-operation by the development of international links for enterprise clusters in each region. Thus, for example, the “Net Sentier” association in Paris visited the Lebanon early in 2002 with the support of the French DATAR regional development agency.

Fifth stage: evaluating policies

The last stage is essential as it consists of evaluating the results of the measures taken in order to correct and improve them. This evaluation must cover all the policy-making stages to understand what may have gone wrong. This is the only way to ensure the optimal effectiveness of any improvements. An evaluation based on results alone would not be sufficient due to the structural complexity of clusters and the mechanisms that affect their development.

The participatory evaluation method proposed by Diez and Esteban is particularly suitable for the process of evaluating clusters. All cluster participants contribute to the evaluation of the cluster-oriented policies, which makes for a constructive approach to their improvement. This also calls for the formation of an evaluation committee made up of representatives of private sector companies, public sector actors, the chambers of commerce, etc.

The evaluation of enterprise cluster policies can be based on several performance indicators:

- results;
- the dynamics of co-operation;
- entrepreneurship;
- trends in enterprise locations and relocations.
In addition to drawing up an overall action framework, the GEMACA team produced policy recommendations specific to each of the four European regions studied.

Policy recommendations for Dublin
In Dublin, cluster-oriented policies have been essential to the creation and development of IT and financial services companies, notably by attracting a very large number of international firms.

To enhance public policy in favour of clustering, the following are considered necessary.
- To strengthen academic research in order to make it 100% world-class.
- To facilitate the transfer of knowledge between research organisations and companies.
- To foster the existence of a better trained workforce with a broader range of skills.
- To develop a base of sub-contractors that can support and service the appropriate sectors in each cluster.
- To provide appropriate industrial infrastructure.
- To implement an economic policy that is more favourable to the targeted sector(s).
- To protect intellectual property rights.
- To offer access to equity and other sources of financing.

Finally, the GEMACA team would recommend increasing access to economic data specific to clusters and enhancing the tracking of clusters in order to have a more thorough understanding of their trends and dynamics.

Policy Recommendations for London
The GEMACA studies confirmed that London has numerous assets that are highly conducive to the formation and development of clusters. The recommended strategy for London would be to remove the barriers to clustering created by the government itself, notably by reducing the policy and budgetary uncertainties that adversely affect large economic and urban development projects. The state of chronic underinvestment and indecision in public transport is also a major drag on the development of enterprise clusters.

One of the fundamental requirements for a successful cluster policy in London is a better understanding of the competitive advantages they generate. It is also necessary to avoid favouring a particular cluster at the expense of the others. The best policy is to improve London's general business environment. The role of the local government authority should be to support local activity by providing efficient public institutions, infrastructure and urban services such as education, transport and security, and by reducing uncertainty in the decision-making process.

Policy recommendations for Paris
One of the distinctive features of the Paris Ile-de-France region has been the apparently “spontaneous” development of activities with a high growth potential. In fact, this development has been due to several factors that have favoured this region: its economic and demographic strength; its high concentration of public and private sector research centres; the large number of high-tech companies that make up its economic fabric; the presence of a well qualified workforce; and, last but not least, its inhabitants' taste for innovation and their openness to new practices.

Enterprise cluster-oriented policies are still not very well developed in the Paris Ile-de-France region, a situation which could have very negative repercussions if it continued. Hence the need to take more action.

Based on previous experiences of measures taken in Ile-de-France to promote local clusters (optics valley, the genetics hub or “génopôle” in Evry, the multimedia hub in Montreuil, the image hub in Seine-Saint-Denis, etc.), the following recommendations have been put forward:

- To build on ongoing experiences in the Ile-de-France region by comparing them with other initiatives taken in France or abroad.
- To pool the expertise, skills and know-how of companies with similar economic or technological interests to enhance their competitiveness.
- To create a “tool box” of good and bad practices for inclusion in cluster-oriented policies.
- To use this toolbox to increase the chances of success of the local clusters in progress in the Ile-de-France region.
- To sustain and capitalise on initiatives taken by local clusters at county (departmental) and regional level, in particular as part of action taken by the ARD Ile-de-France regional development agency.

Specific cluster policy recommendations

Policy Recommendations for the RhineRuhr region
As part of a cluster-oriented policy, five priorities have been identified for the RhineRuhr region.

- First, there is a need to make all the actors concerned more aware of the advantages and disadvantages of cluster policies, because they are still little known or misunderstood in this region. It is therefore necessary to initiate and co-ordinate efforts to communicate more on the potential benefits of cluster-oriented policies.
- A cluster-oriented policy should develop new or existing local skills in at least five priority areas: location marketing of the Ruhr region; human resource management; innovation and technology management; internal and external networking and knowledge management.
- The launch of a common learning process strongly involving the participation of companies.
- These policies should be part of an overall strategy of enhancing the economic and business environment, which goes well beyond the focus on cluster management as such.
- Finally, cluster-oriented policies should use new evaluation methods.

Notes:
1. The faster growth of the internet in Ile-de-France compared with the rest of France can be explained by the fact that the inhabitants of this region have a greater ability to adopt the innovations generated by information technology. Source: GEMACA II reports, December 2001.
Conclusion

Located in core parts of the regions concerned, clusters are playing an increasingly important role with regard to identifying economic strengths and weaknesses as well as development strategies. However, implementing the clustering approach is a complex process in terms of cluster identification and cluster-oriented policies.

Thanks to the studies it has conducted, the GEMACA team has highlighted a number of key factors of success regarding the implementation of cluster-oriented policies.
- It is important to choose the right spatial boundaries for analysing and shaping clusters, the most suitable geographical scale being that of the functional urban region (FUR).
- The importance of designing and developing suitable analytical tools. An economic analysis of a given territory based on the enterprise cluster concept is an attractive approach, but it soon comes up against a series of difficulties. Hence, the need to create and use ad hoc tools, including statistical instruments, to analyze the reality of clusters. This approach has been adopted recently internationally including by some States in the USA, which have set up analytical structures that suited the scale of clusters. This initiative made for a more refined analysis of clustering and the inner workings of clusters, thereby allowing the State authorities to act more effectively.
- At the heart of a successful overall action framework is the need for a collective (community/cluster-based) process involving the active participation of all the actors concerned;
- Good integrated regional governance has an important role to play in mobilising existing skills and resources for the benefit of the economic development strategy that most favours business, employment and the economic welfare of the inhabitants of major urban areas.

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