Industrial Dynamics, Company Life Histories and the Core-Periphery Dilemma

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Economic development of peripheral regions is a fascinating research theme given the completion of the internal market of the European Community and the diverse position and locational profile of these regions. The present paper is a theoretical and empirical analysis of economic growth of peripheral regions. The first part of the paper deals with various theoretical approaches to regional economic growth and innovation, with a particular focus on peripheral regions in national economies. The second part is an empirical exploration of past economic development in border areas in the Netherlands. This analysis adopts a micro-approach by investigating development trajectories of individual companies. The indigenous growth potential of peripheral regions and their changed position, particularly in relation to new transport and communication functions, then forms the basis for various development scenarios. It is expected that while core-periphery divergences have decreased, new divergences may arise, namely between peripheral regions.

City-regions all over the world are experiencing processes of economic restructuring, accompanied by technological transformation and socio-demographic change. Though regional development is a complex and multidimensional phenomenon, it is increasingly realized that, in addition to demographic, social, environmental and residential quality aspects, also technology and innovation may be regarded as major driving forces behind regional economic dynamics.

A relatively new factor in regional economic development is economic integration. This development is likely to become one of the most prominent stimuli for shifts in international trade flows, labor migration and knowledge transfer. The completion of the internal market in the European Community (EC), the converging East-West developments on the European continent, and the economic integration efforts in North America (through NAFTA) and Southeast Asia (through ASEAN) offer the same picture for the 1990s, namely an unprecedented elimination of unnecessary economic barriers between nations.

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In particular the European countries are showing clear signs of a development towards an integrated (or at least open) *network economy*, in which trade barriers are progressively being removed and spatial interactions of goods, people, and information are increasing. In such a 'borderless' network economy the position of former border regions is likely to change dramatically as a result of a profound change in position and potential of their locational profile.

In classical filtering-down theories, standardized mass production is regarded as the dominant type of manufacturing in border regions. The recently drastically changed position of border regions however, causes a new spectrum of future development potentials, of which the 'backyard function' of mass manufacturing is only one. Even an overturning of the predominance of core-areas by some border regions may become reality. A fundamental question in this respect is concerned with change (increase or decrease) in regional economic inequality in nation-states, in terms of for example employment and wage level.

The above observations focus our attention to the main purpose of this paper: the evaluation of economic development of Dutch border regions in the past decades. It will particularly be assessed which model in terms of regional disparity in innovation applies to the Dutch core and border areas over time. In view of the future, it will additionally be discussed which development scenarios suit the Dutch border regions whose position and potential will be affected by transnational integration.

CONVERGING AND DIVERGING TRENDS IN REGIONAL ECONOMIC DEVELOPMENT

In the past thirty years two schools of theory have been developed in the field of regional development over time (see for a recent interpretation and summary: Lipshitz, 1992). The first is the school of *spatial equilibrium* or convergence in regional development. According to this theory, regional inequality arises in the first stage of national economic growth, as a result of lack of coordination between the spatial system and the national system. In the course of time however, with the increase of free movement of production factors (capital, labor) between the regions, regional inequality will be minimized or eliminated. In this context, the well-known Williamson hypothesis is often referred to, in which increasing interregional disparities are assumed to be an initial result of economic integration, followed in a later stage by convergence of regional welfare positions.

Spatial disequilibrium ('divergence') theories include two different directions. These directions have in common the idea that the spatial flow of production factors increases interregional disparities. However, the first direction postulates that government intervention is able to reduce the interregional gap, while the second or radical approach (at least one particular stream) emphasizes that interregional disparities are inevitably associated with a structural transformation of the modern economy, particularly the decline of mass production.

According to researchers within the recent radical stream, structural transformation of the modern economy includes particularly vertical disintegration and flexible specialization in production processes. Manufacturing using flexible technology, demanding a skilled workforce as well as close information between firms and the market, brings about the return of agglomeration economies in a new form (cf. Piore and Sabel, 1984; Scott and Storper, 1987). Accordingly, on the interregional level spatial disparities seem to continue to exist. Such views on the spatial impact of flexible specialization have however, not remained uncriticized (cf. Amin and Robins, 1990; Gertler, 1992).

INNOVATION AND REGIONAL STRUCTURE

Over the past decades various theories on the relation between innovation and regional growth have been developed and (partially) tested, namely: *innovation theory, bottleneck theory, and urban dynamics theory* (Table 1). The relatively new concept of urban sustainability can be regarded as a variant of the latter theory.

The key concept of *innovation theory* is technological change, being the driving force behind industrial and regional (urban) growth processes. Particularly basic innovations by private entrepreneurs induce processes of economic growth and spatial dynamics, due to input-output linkages and spatial interaction (cf. Van Duijn, 1979; Freeman et al., 1982; Kleinknecht, 1986). Core regions and their urban agglomerations are viewed as offering many external economies to innovative manufacturing and service activities, such as a close orientation towards the consumer market and proximity to (dis)similar economic activities, and a direct accessibility to up-to-date and specialized information (cf. Pred, 1977; Thompson, 1968; Vernon, 1966). In addition to the creation of innovation, the diffusion of innovation is an important element as it leads to spatial spill-over effects. In more recently developed innovation theory, the emphasis is on the 'local milieu' (which is not necessarily metropolitan) and its opportunities for the reduction of uncertainty (Camagni, 1991).

The *bottleneck theory* may be conceived of as a complement to and a generalization of innovation theories. Particular attention is given to agglomeration diseconomies that hamper regional (urban) growth. Bottleneck factors may arise as lower level conditions (threshold values) which are necessary for a start of regional (urban) growth, and as upper level bottlenecks (congestion values) or under-capacities related to a growing demand. The latter type may hamper a continuation of urban growth (Biehl, 1980; Nijkamp and Schubert, 1984).

Concepts of *system analysis* have earlier been applied to urban development by Forrester (1969). Urban system-dynamics theory describes the long-run trajectory of a closed urban system subdivided into various components, each having its own specific time path. Feedback mechanisms (positive and negative) between

these components lead to differential dynamics in an urban system, in such a way that various long-term fluctuations (including stagnation and decay) can be generated. Concepts of *urban sustainability* belong to the class of urban dynamics theory, although in many respects the emphasis is different.

Sustainability is a concept from (eco)-systems dynamics. It refers to the morphogenesis of a dynamic system which is liable to evolutionary changes, i.e., structural changes in which also system parameters may vary (in either a linear or non-linear way). Sustainability in an urban setting describes the potential of a city to reach qualitatively a new level of socio-economic, demographic and technological output which in the long run reinforces the foundation of the urban system, although its evolutionary path may exhibit various stable or unstable temporary fluctuations. A sustainability approach to urban innovation articulates factors such as carrying capacity (resources and land), multifunctionality in terms of a mutual benefit of various activities (urban symbiosis), and interaction networks linking city-systems to cities in other regions (Ewers and Nijkamp, 1990; Nijkamp, 1990; Nijkamp and Reggiani, 1992).

Table 1: Cross comparison of various spatial growth theories.

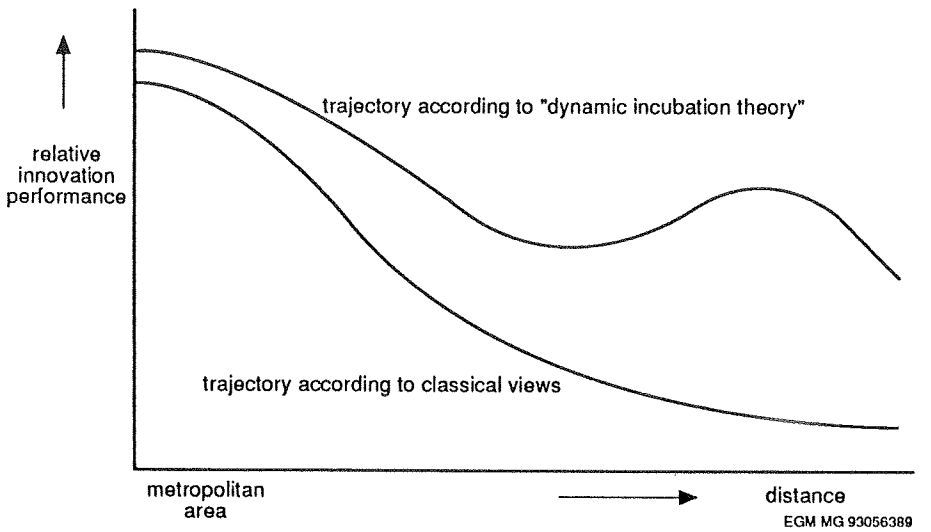
Features	*Innovation Theory*	*Bottleneck Theory*	*Urban Dynamics Theory*	*Urban Sustainability*
Goal	explanatory policy evaluation	explanatory policy evaluation	analytical policy evaluation	analytical policy evaluation
Key Concepts	innovation information agglomeration	thresholds congestion	attractiveness	competition self-organizing capacity
Focus	urban growth	urban growth urban decay	urban growth urban decay	sustainable growth
Urban growth factors	innovation	innovation infrastructure land, labor	industry land use	incubator/adopter potential resources, land multifunction interaction
Modelling	limited	limited	yes	no
Empirical test	yes	hardly	limited	no

Much research on the spatial pattern of innovation draws on the classical incubation and filter-down hypotheses (cf. Leone and Struyck, 1976; Thompson, 1968). In some recent studies, the concept of new technology systems (Freeman et al., 1982) and the related concept of innovation cycle (Abernathy and Utterback, 1978; Rothwell and Zegveld, 1985) have been integrated in a 'dynamic incubation theory' (Davelaar, 1989; Davelaar and Nijkamp, 1992). In this theoretical approach, metropolitan areas are expected to be the 'breeding place' of new innovative activities and firms. By considering technological change how-

ever, as a *continuous* process (cf. Taylor, 1986) the subsequent shifting of these activities to non-metropolitan or border areas often involves the generation or further improvement of new products, and increasingly of new process technologies. The 'dynamic incubation theory' reflects a more optimistic view on non-metropolitan (border) areas than is usually given in conventional filtering-down theory. The latter ignores the creative and innovative role (and competitive power) of border regions during later stages of technology systems (Figure 1).

Regarding empirical research on spatial innovation, much early work has supported conventional incubation and filter-down theories (cf. Erickson and Leinbach, 1979; Ewers and Wettman, 1980; Oakey et al., 1980). However, various other (later) research has come to opposing conclusions, in that central parts or core-regions are by no means more innovative than other parts of (national) city-systems. In these particular cases the spatial distribution of innovation tends to show a spread pattern from the economic center towards intermediate and border areas (cf. Davelaar and Nijkamp, 1992; Howells, 1983; Kleinknecht and Poot, 1990; Van Geenhuizen, 1993), and indeed some empirical evidence is given for a spatial shift of innovation as suggested in the 'dynamic incubation framework'.

Figure 1: Space-time trajectory of new economic sectors: Two views.



The previous discussion indicates that the relationship between urban and regional structure and industrial dynamics has become rather more complex and needs an in-depth clarification on the micro-level. The methodological approach to such a clarification will be discussed in Section 5. First, we will consider various theoretical approaches to border region development in a concise way.

THEORY OF BORDER REGION DEVELOPMENT

Conventional theoretical approaches to border region development often regard border regions as being economically penalized (Ratti, 1993; Ratti and Reichman, 1994). This situation stems from a specific configuration of political-institutional and socio-economic factors. In early contributions, borders are viewed as artificial distorting elements of market areas, causing an absence of cities as central places (cf. Christaller). In addition, it is emphasized that the development of border regions is dominated by conflicting interests between economic and political objectives (cf. Loesch). For example, custom taxes may separate various potentially complementary economic areas. The above theoretical perspectives on border region development are basically static in character.

A further conventional approach can be viewed as more promising (Ratti and Reichman, 1994). By means of a dynamic orientation, this approach enables an interpretation of the development process of border regions. It considers not only national spaces but also the wider context of the world economy, particularly accounting for the spatial division of labor. In this line of thinking, border regions offer various attractive features for the location of specific segments of production activities. The reasons for this are threefold. First, border areas anticipate on both sides the proximity of the other country. Accordingly, there may be benefits from proximity, such as the presence of economic operators from two or more political-institutional systems. A second attractive feature of border regions concerns the availability of border labor force, which may be cheaper, more flexible and have a different motivation of workmanship. The third reason is essentially cultural. Border regions have a greater 'permeability' of the local societies, due to the need for an adaptive spirit, frequent migratory phenomena, and specific values on identities. The above circumstances may lead to differences in revenue due to divergences in wages, labor productivity and rent.

A recently introduced theoretical direction involves essentially a dynamic *micro-approach* (Ratti and Reichman, 1994). It combines the study of the border with the analysis of strategic behavior of companies in these regions, while articulating the removal of barriers and the construction of *contact-spaces*. The approach includes three major components, i.e., inter-firm cooperation, uncertainty reducing behavior and the concept of transactions costs. Uncertainty follows for example, from a difference in legal and fiscal systems, and regulatory systems. Bridging the border may however, involve considerable opportunities, ranging from benefits of simple joint ventures to horizontal integration by means of acquisition. Accordingly, the degree of transborder inter-firm cooperation can be viewed as a function of the transaction costs (or market access costs), or of the control costs of the established inter-firm organization, and also of a preference (demand) curve for integration.

The above frameworks need further empirical work on development trajectories of individual firms in relevant regions. This will be the subject matter of subsequent sections.

A LONGITUDINAL COMPANY PERSPECTIVE

Much of the empirical research on innovation has been conducted on a cross section basis. The use of cross section data may however, have neglected the fact that different types of innovation follow diverse space-time trajectories, depending inter alia on their position in the innovation cycle. An alternative approach to industrial dynamics involves an actor-oriented longitudinal analysis, meaning that the focus is on development trajectories of individual companies. For understanding corporate development trajectories it is useful to make a distinction between four components:

- Competitive strategy, which refers to the basis of competitive advantage.
- Growth direction, which refers to the product-market combination.
- Method of growth, which includes the way in which new competitive strategies or growth directions are undertaken, for example, through acquisition.
- Organizational mode, which includes a range from 'Fordist' production to a complete flexible production organization.

In order to achieve in-depth insights into industrial dynamics by means of a micro-approach, this paper makes use of *'Company Life History Analysis'* (Van Geenhuizen et al., 1992; Van Geenhuizen, 1993). The major features of this approach can be summarized as follows: micro-analytical, longitudinal, qualitative and spatially oriented. The micro-approach means that the unit of analysis is the company, preferably the decision unit. In a retrospective analysis, the company is 'observed' for a period of usually 20 to 40 years in order to depict long to medium-term changes. The results achieved in company life-history analysis are largely qualitative, in-depth insights. Particular attention is given to the key decisions (and their background) which have led to significant actual corporate change. Regarding the time of actual strategic change, the analysis enables to identify early and late adoption of innovation, and 'offensive' and more 'defensive' strategic action. The *spatial* perspective may include a comparative analysis of companies in different regions, and an analysis of the actual relevance of regional (urban) attributes for innovation.

Company life-history analysis makes use of a limited number of case studies in the first stages of research, in order to reach sufficient in-depth detail and explanatory background (Van Geenhuizen et al., 1992; Schoenberger, 1991). In later stages, a large number of observations may be included in view of a generalization of results in a statistical sense. In the data collection, a *multiple source*

approach is often used. Such an approach is essential because covering the data demand with one single source is practically impossible. The second reason for the use of different sources is the opportunity for verification. A multiple evidence approach is generally advocated as a means of increasing accuracy and validity of case study results (Yin, 1991). The data sources in the current research included annual reports, in-depth corporate interviews (semi-structured), and external sources, such as branch journals.

RESEARCH DESIGN

This analysis will explore the position of core- and border areas in the Netherlands over the past decades regarding corporate adjustment. In addition, based upon past development and future potentials a number of development scenarios for border regions will be discussed.

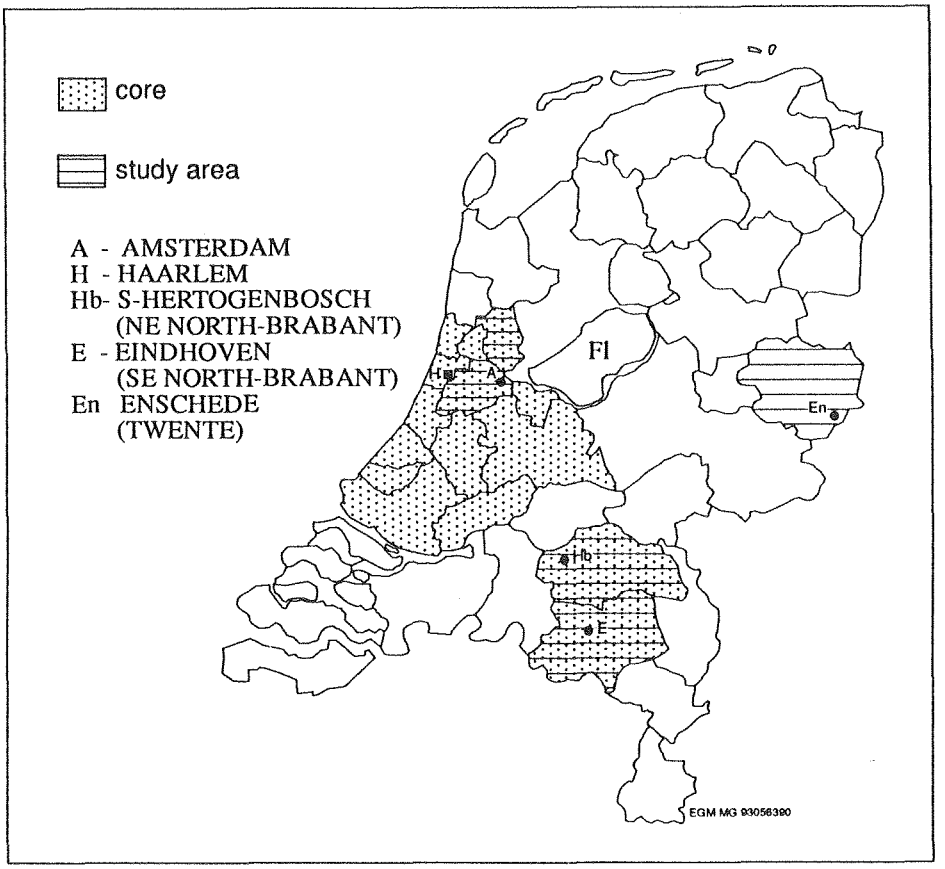
In order to include a sufficient level of differentiation regarding old and new economic activity, the analysis will focus on textile industry (old sector), pharmaceutical industry (modern sector) and computer services (totally new activity). The spatial perspective of the analysis includes two approaches, namely (1) a spatial contrast analysis and (2) an assessment of the relevance of urban (regional) attributes. In order to investigate a regionally different development of companies, the contrast analysis includes the Dutch Core (Randstad) and a number of Southern and Eastern border regions, adjacent to the Core (Intermediate Zone) and in the Outer Zone (Figure 2, Table 2).

Table 2: Contrast analysis matrix.

		Sector		
		Manufacturing		*Services*
		Old	*Modern*	*New*
Region	Core	–	X	X
	Border (interm. Zone)	X	X	X
	Border (Outer Zone)	X	–	–

It should also be emphasized that, although the insights of the retrospective research clearly hold for *survivors*, they go far beyond solely 'success stories'. Various companies (particularly in the textile industry) experienced to be close to death, in such a way that they clearly illustrate strategic changes undertaken by non-survivors.

Figure 2: The Netherlands, including the study regions.



OLD AND NEW MANUFACTURING: TECHNOLOGICAL INNOVATION

This section will explore the development trajectories of large to medium-sized companies in the textile industry and pharmaceutical industry. For confidentiality reasons, the examples are denoted by T1 and T2, and P1 to P4.

Merging has been a very common strategy in the textile industry in the late 1950s and early 1960s (Table 3). The major aim in this respect was to achieve economies of scale and further market access. Subsequent acquisitions were however, based upon divergent growth directions. Since the early 1970s, various companies were successfully producing in the market for (upgraded) interior textiles and printed fabrics (such as T1), whereas others were less successfully spinning and weaving for the highly competitive market of garment cloth. These

different output markets *within* the sector explain why various companies aimed at a sustained manufacturing of traditional textiles, and why others withdrew from the market or aimed at a structural reorientation towards new technical textiles and advanced materials (such as T2) (Van Geenhuizen and Van der Knaap, 1994). The development trajectory of T2 indicates that a successful introduction of major new product technology may take a long 'gestation period',

Table 3: Key decisions of large textile companies.

T1 (SE North-Brabant)	
From 1957	Increased market penetration of interior textiles
1964	Merger
1969	Merger
1975–84	Increased market penetration of interior textiles (carpets, wall paper)
1984	Small emphasis on technical fabrics; also, forward integration in interior textiles (retailing)
1985	Persistent growth in traditional textiles (increasingly abroad)
1990	Increased penetration of foreign (European) markets.
T2 (Twente)	
1957	Merger
1960	Adoption/generation of new technology, e.g., via strong R&D networks (abroad)
1969	Product development in advanced technical textiles and materials
1976/8	Withdrawal from spinning, stepwise withdrawal from weaving (garment cloth)
From 1980	Persistent growth in technical textiles; also, diversification beyond textiles
1991	Increased growth in technical textiles; also, withdrawal (divestment) from consumer textiles.

in which knowledge achieved in early joint ventures (1960s) was combined with internal R & D. Such an 'offensive' major reorientation was evident in the border region of Twente, where the textile industry strongly contracted but also moved towards advanced materials and synthetical products. A clearly different trajectory, in view of the introduction of largely new process technology (printing) and upgraded product quality and design, was found in another Dutch border region, namely Southeast North-Brabant.

With regard to urban (regional) attributes, no direct influence on innovation trajectories could be observed. Influences working in an indirect way, were found

to be largely similar in the two border regions, i.e., between the late 1950s and early 1970s a structural shortage of *labor force*. This bottleneck has slowed down corporate expansion and upgrading of production quality, and caused an incomplete use of the production capacity.

In view of an evaluation of corporate trajectories in the textile industry, it can be stated that these do not comply very well with classical innovation theories. This holds in particular for the early shift towards innovative technical textiles in the border region of Twente. The remaining part of this section will explore development trajectories of pharmaceutical companies. Unlike the previous part, the spatial contrast analysis deals with both core-regions and border areas.

Various major shifts have occurred in the life of pharmaceutical companies in the core-regions (Table 4), such as withdrawal from manufacturing of human drugs (P1), complete withdrawal from manufacturing (P3), and a strong penetration of the market of specifically generic drugs (P2). By focusing on the level of innovation, also a large variety of trajectories can be observed, such as a decrease from a high level (P1, P3) and a small increase following an absence of basic innovation (P2). Our in-depth analysis has yielded the following background for a decreased innovation: it is related to a 'small' company size (compared with competitors) and to a previous strategy of unrelated diversification. At the same time, the conditions in the highly innovative pharmaceutical industry have become less favorable since the early 1970s. For example, the Dutch government advanced the prescription of generic drugs (often produced by low innovative companies), whereas rules in innovative R & D were made increasingly tight (Van Geenhuizen and Van der Knaap, 1993). The only Dutch company which could maintain a high level of basic innovation is located outside the core-regions. This company merged in the late 1960s and joined a large chemical company shortly thereafter. The relatively large size and the 'backing' of a medium-sized multinational enabled the company to control the increased risk of basic R & D better than smaller companies.

An evaluation of *spatial* influences on innovation in the pharmaceutical industry has brought the following to light. Whereas a shortage of *labor force* could be observed both in core-regions and border areas, its direct effect on innovation was only found in the former. The expansion of internal R & D was clearly frustrated in the region of Amsterdam in the late 1960s, due to a shortage of academic researchers and chemical analysts. A further bottleneck factor appeared to be the shortage of suitable land (for sale), which urged various companies to relocate outside the metropolitan area. At the same time, the knowledge infrastructure (research institutes) and the air traffic infrastructure have clearly remained very attractive assets in the Northern Core-region. Exactly for these reasons, it (and adjacent Intermediate Zone) have large potentials for attracting small foreign and indigenous firms of a new (but related) technology system: modern biotechnology (Van Geenhuizen and Van der Knaap, 1993).

Table 4: Key decisions of medium-sized to large pharmaceutical companies.

P1 (N Core)	
1954	Established (subsidiary)
1957	*Relocation* from Amsterdam to Haarlem
From 1957	Increased market penetration in Northwestern Europe
1977	Major process innovations (advanced warehouse, internal logistic system)
From 1981	Stepwise withdrawal from manufacturing of human drugs and shift to animal drugs (sales and marketing continued)
From 1988	Increasing manufacturing of crop protection chemicals
P2 (N Core)	
1952	*Merger* (expansion in sales —distribution)
1962	Further expansion in sales—distribution
From 1977	Strong market penetration of human drugs (generics), and sales-distribution; small rise of innovation level
From 1985	Penetration of markets in the United States and England (generics)
1991	Withdrawal from activities abroad (forced by danger of liquidation)
P3 (N Core)	
From 1950	Increased market penetration (world) with intermediate products; continuous high level of product innovation
1967	*Merger* (horizontal integration)
1960s-1970s	Stepwise relocation from Amsterdam to (suburban) Maarssen
From 1969	Expansion in sales—distribution and manufacturing of related products
1976	Reduction of R&D effort
1978	*Unrelated* diversification (manufacturing of technical products, e.g., electronics)
From 1989	Withdrawal from manufacturing; sales—distribution continued.
P4 (NE North-Brabant)	
From 1950	Increased market penetration (world) with human drugs; continuous
From 1962	Horizontal and vertical integration in intermediate products and human drugs; also, diversification into chemical industry
1967	*Merger* (horizontal integration in various industry branches)
1969	*Merger* (within chemical industry); high level of product innovation continued
1980s	Increased expansion in new geographical markets; high level of product innovation continued, also via strong R & D networks abroad.

This section can be concluded with the remark that a 'sustained' high level of innovation outside the Dutch Core and a strong potential for biotechnology in border regions adjacent to this area do not comply very well with classical spatial innovation theory.

THE RISE OF NEW SERVICES

This section will explore the rise of computer services in core-regions and border areas, as well as the relevance of urban attributes for this rise and subsequent growth. Activities in computer services in fact took off in the Netherlands in the late 1950s.

Based upon location quotients concerning the entire sector, a hierarchical diffusion process of computer services is apparent in the Netherlands (Table 5). A strong overrepresentation of older (pre-1972) firms is clearly found in large agglomerations and remaining core-regions. When moving towards younger firms, the difference between the Core-area and the adjacent Intermediate Zone decreases particularly regarding the years before 1984. After 1984, a small reversal seems to take place indicating that spatial diffusion of economic sectors is a rather complex process. It may involve shifts in company types, ranging from subsidiaries (former computing departments) of large Dutch companies and subsidiaries of foreign companies (first 'generations'), to independently established small software producers (last 'generation') (Van Geenhuizen, 1993).

Table 5: Foundation of software firms in the Netherlands (location quotients).

	Pre-1972	*Pre-1976*	*Pre-1980*	*Pre-1984*	*Pre-1987*	*Pre-1990*
Large Cities	169	163	170	148	147	152
Remaining Core	141	120	109	129	132	129
Border (Interm. Zone)	75	83	89	95	91	86
Border (Outer Zone)	41	49	41	45	49	50

Source: Bleichrodt et al. (1992), pp. 70–71.

When exploring the relevance of urban attributes for the growth of computer services, it becomes clear that most factors are broadly equally (un)important in core-regions and border areas (Van Geenhuizen, 1993). A major difference seems to concern the information availability which is considered more important in border regions. Regarding the perceived *quality* of urban attributes, a very relevant difference between core-regions and border areas is brought to light by computer service firms. This difference involves particularly bottlenecks in the *labor market* (shortages associated with a lack of high-level residential areas) and *traffic infrastructure* (congestion) in the Dutch Core.

TRANSNATIONAL NETWORKING

The main economic advantage of networking stems from synergy through which companies are able to generate positive externalities. This section will dis-

cuss in what way manufacturing companies have managed to ensure continuity by way of transnational networking. It should be emphasized that only large and medium-sized companies are taken into consideration and it is reasonable to assume that these categories have used transnational networking to a larger degree than small companies. The focus will be on two types of 'formal' networking, namely joint ventures and takeovers. Particularly the changing spatial scale of networking and the rationale behind networking in terms of growth direction and innovation, will be considered. Regarding the scale, the term *transborder* networking indicates networking abroad at a relatively short distance.

Our longitudinal investigation of textile companies indicates that early forms of transnational networking (1960s) have been undertaken for a variety of reasons, including increase of market share and increase of production capacity (Table 6). The latter strategy was often undertaken in Belgium, which can be illustrated with T4 (carpet manufacturer). This company acquired two factories in order to avoid a long construction time (procedures), as well as labor shortages in the Netherlands. It is surprising to note that already in the 1960s transnational networking (joint ventures) was also aimed at capturing new technology (and products), as indicated by T2 and T3. In the 1970s and 1980s, a further growth in established output markets became progressively important as a motive for transnational networking, as illustrated by T1. Particularly in the late 1980s, this strategy became vital for companies aiming at a place among the largest textile producers in an integrated EC.

The pharmaceutical industry compares with textile industry in that the spatial scale of transnational networking was large already in the 1960s (Table 7). Regarding the motive of market share increase, transnational networking (particularly joint ventures) aimed to circumvent trade-barriers in foreign countries and to avoid difficulties regarding domestic registration of drugs and rules on production practices. A further motive was the need for vertical backward integration, i.e., ensuring the supply of raw materials produced in politically unstable countries (such as kinine) (exemplified by P3 and P4 regarding acquisitions in Central Africa and Central America). Similar to the textile industry, increase of market share became the dominant motive in the 1970s and 1980s. In addition, capturing new technology abroad was also an important strategy for highly innovative companies, such as for P4 in the United States (new diagnostics).

When we come to the question whether Dutch border regions are in a relatively favorable position in view of transborder networking, the following tentative conclusion can be drawn. When new technology is involved, the distance to be bridged is not important. But when increase of production capacity and market share plays a prominent role, companies in border regions may be in a favorable position, provided that the regional economic structure at both sides of the border is similar leading to opportunities for acquisition.

Table 6: Transnational networking in textile industry.

	Year	*Country*	*Strategic Context*
East North-Brabant			
T1	1963 (jv)	Spain	Market share increase
	1973 (jv)	Japan	Distribution channels
	1974, 1976	Germany	Market share increase
	1985, 1990	United Kingdom	Market share increase
	1990	Belgium	Market share increase
T4	1963, 1964	Belgium	Production capacity increase
	1975 (jv)	Belgium	New technology
Twente			
T2	1960 (jv)	United States and France	Partly new technology
	1970 (jv)	Greece	Various motives
	1970 (jv)	United States	New product
	1973 (jv)	United States	Market share increase
	1979 (jv)	United States	Market share increase, new technology
	1985, 1986	United States	Market share increase
	1988	United Kingdom	Market share increase
	1988,1989(2x)	United States	New product
	1989 (jv)	United States	New technology
	1989 (jv)	France	Market share increase
T3	1964 (jv)	United States	New products
	1986	United States	Distribution channels
	1986	United States	New technology
	1990 (jv)	Japan	Distribution channel

jv means a joint venture.

Table 7: Transnational networking in pharmaceutical industry.

	Year	*Country*	*Strategic Context*
NW Core			
P2	1977	Germany	Market share increase
	1978 (jv)	United States	Market share increase
	1985, 1987	United States	Market share increase
	1989, 1990	United Kingdom	Distribution channels
P3	1962	Zaire	Specific raw materials
	1963	Rwanda	Specific raw materials
	1987	Italy	Market share increase
NE North-Brabant			
P4[a]	1960s (jv)	Various	Market share increase
	1969	Mexico	Specific raw materials
	1972	Spain	Market share increase
	1972	Canada	Market share increase
	1980	France	Market share increase, new products
	1982 (jv)	Nigeria	Market share increase
	1982 (jv)	South Korea	Market share increase
	1985 (2x)	United States	Market share increase, new technology
	1986 (2x)	United States	Market share increase

[a] No complete review.

DUTCH BORDER AREAS: RETROSPECT AND PROSPECT

Our analysis of the way in which Dutch companies have ensured their continuity in the past decades has yielded various interesting results regarding the role of the selection environment. In certain core-regions spatial limiting (bottleneck) factors have become evident, for example concerning specific labor market segments, quality of residential areas and traffic congestion. Particularly the latter two factors seem to be absent in border regions, whereas information availability which is essential for the incubation function, seems to increase in importance in certain parts here. It can thus be concluded that various border regions have *gained* in competitive strength compared with core-regions in the past decades. This holds particularly for the region of Eindhoven, although the level of economic activity here tends to exhibit a short-term downfall recently. At the same

time, core-regions have remained attractive in various unique respects, for example based upon a 'dense' knowledge infrastructure and proximity to mainports such as Amsterdam International Airport and Rotterdam Harbor.

In view of *development scenarios* for the future of border regions, it is important to emphasize that apart from indigenous growth potentials, various external factors ('megatrends') will have an impact on border regions. Major examples of such trends are the emergence of large-scale competitive metropolitan areas (London, Paris, Frankfurt, Milan, the Randstad, for instance) connected by advanced infrastructure corridors, and the massive increase of traffic between these areas (cf. Masser et al., 1992; Nijkamp, 1993). At the same time, regional identity (and perhaps autonomy) will become more important after the elimination of frontiers in the European network economy.

The scenarios in this section form in fact contrasting options for the development potential of border areas, in which certain key features and opportunities are emphasized (cf. Suarez-Villa and Cuadrado Roura, 1993). Because there is a certain divergence in structure and potentials between the Dutch Eastern and Southern border provinces, it goes without saying that the scope and content of the scenarios will differ for each individual province. For example, Overijssel and Gelderland have a strategic position towards the East as a transit area (Figure 3).

The first three scenarios for the Dutch border are only weakly connected with a new transport and communication function, whereas the last two scenarios accentuate the potentials of border areas in terms of their new positioning. The scenarios can be summarized as follows:

1) Sub-core: This scenario assumes the reinforcement of a current (small) role of 'breeding place', independently from the Dutch Core (Randstad).

2) Backyard area: In this scenario it is assumed that low-innovative manufacturing activities will increasingly filter down from the Dutch Core towards the South and East, and concomitantly will leave more space for advanced (producer) services in the Core.

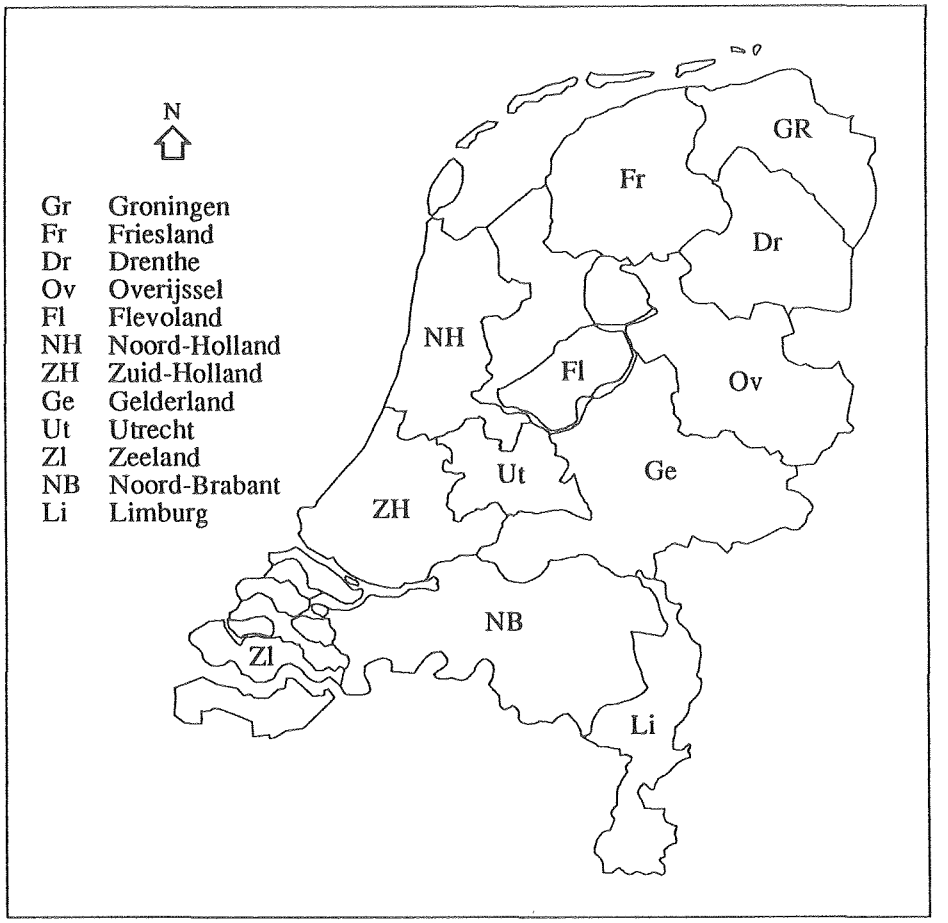
3) 'Green-tech'area: In this scenario the strong manufacturing tradition in border regions will be used as a basis for technologically advanced activities which would at the same time be compatible with strict environmental constraints.

4) Corridor area: Border areas with a favorable geographical location will be used as a transit zone, without generating significant benefits for them (causing instead a heavy burden of congestion and pollution).

5) Gatekeeper area: This future image of border areas is also based on an extension of European transport. It is aimed at generating extra benefits from transportation growth by offering sophisticated distributional functions, such as logistic platforms and telematic centers, with a high value added.

It is clear than an assessment of the locational and industrial opportunities of such scenarios would be necessary, in order to evaluate the relative merits of each of them.

Figure 3: Provinces of the Netherlands.



EPILOGUE

The recent revival of *Schumpeterian* views on current spatial economic restructuring phenomena has increasingly induced scientific interest in innovation and economic transformation. Both the behavioral stimuli and the selection environment for the creation and adoption of technological and organizational change in companies have become a subject of intensive research. The retrospective analysis presented in this paper, clearly belongs to this stream of research.

Advanced industrial nations have developed a clear pattern of economic core-areas and peripheral regions over the past centuries. This paper has discussed various factors which have contributed (and will contribute) to a reshaping of this pattern. First, in various regions outside the Dutch Core, clusters of innovative

companies have emerged in recent times. This endogenous potential is based on 'offensive' corporate strategies and availability of important urban assets which contribute to the success of these strategies. The Dutch Core on the other hand, suffers from various bottleneck factors but benefits at the same time from some unique urban qualities. Secondly, the current economic integration is likely to become a major stimulus in the reshaping of national core -periphery patterns. In this respect, the Dutch border areas face different opportunities for economic growth. Some of them have strong potentials as their location has become more central within European markets. Others may benefit from their strategic location with regard to major transport flows and supply of sophisticated distributional functions. A few more remotely located border areas however, miss these types of favorable outlooks.

It can be concluded that the core-periphery dichotomy in advanced economies has weakened over the past decades but that new divergencies may arise between peripheral regions.

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