WHAT DISTINGUISHES 'GOOD' FROM 'BAD' INDUSTRIAL AGGLOMERATIONS?

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Zusammenfassung: Was unterscheidet ‚gute' von ‚schlechten' Industriedistrikten?

Moderne regionalwirtschaftliche Theorie-Konzepte zielen darauf ab, den wirtschaftlichen Erfolg einer kleinen Gruppe von Regionen zu erklären. Einige von diesen Konzepten sind von Wirtschaftsgeographen und Sozialwissenschaftlern entwickelt worden, die von der Frage ‚warum sind manche Regionen wirtschaftlich erfolgreich?' ausgehen, während andere Konzepte von Wirtschaftswissenschaftlern oder Regionalökonomen entwickelt worden sind, die die Frage ‚warum konzentrieren sich international erfolgreiche Branchen in ein paar Ländern oder Regionen?' als Ausgangspunkt nehmen. Diese Konzepte stimmen bezüglich folgender Aspekte überein: sie versuchen alle, das Entstehen und Entwickeln von Innovationen zu erklären, sie betonen die wichtige Rolle der wirtschaftlichen Organisationsstrukturen für regionale Innovationsprozesse und sie konzentrieren sich auf Erfolgsregionen. Das größte Defizit dieser Konzepte ist jedoch, daß sie nicht in der Lage sind ‚gute' Industriedistrikte, wie das Dritte Italien und Silicon Valley, von ‚schlechten', wie dem Ruhrgebiet und der Route 128 bei Boston, zu unterscheiden.

Hauptziel dieses Aufsatzes ist es herauszufinden, was ‚gute' Industriedistrikte von ‚schlechten' unterscheidet und wann sich die Koordination von Aktivitäten zwischen Akteuren in Industriedistrikten von einer Stärke in eine Schwäche wandelt. Dazu werden erst die modernen Theorie-Konzepte zur regionalwirtschaftlichen Entwicklung kurz präsentiert. Danach wird näher auf Literatur eingegangen, die betont, daß die Kombination von Technologie und räumlicher Ballung wirtschaftlicher Aktivitäten allein keine positiv wirkenden wechselseitigen Abhängigkeitsverhältnisse schafft, sondern daß diese Verhältnisse eher das Resultat von wirtschaftlichen Organisationsstrukturen sind. Diese Literatur unterscheidet zwischen regionalen netzwerkartigen Industriesystemen als Grundlage für ‚gute' Industriedistrikte und unabhängigen großfirmenorientierten Industriesystemen als Grundlage für ‚schlechte' Industriedistrikte.

Summary: Modern theoretical concepts on regional economic development try to explain the economic success of a small group of regions. Some of these concepts are developed by economic geographers and sociologists who take the question 'why are some regions economically successful?' as a starting-point, whereas others are developed by economists who focus on the question 'why do internationally successful industries tend to concentrate in a few nations or regions?' These concepts share the attempt to explain the origin and development of innovation, stress the significance of industrial organisation for regional innovation processes and focus on success stories. The problem with most of these concepts, however, is that their central explanatory aspects cannot distinguish between 'good' industrial agglomerations, such as the Third Italy and Silicon Valley, and 'bad' ones, such as the Ruhr Area and Route 128 near Boston.

The central aim of the article is to find out what distinguishes 'good' from 'bad' industrial agglomerations and at what point co-ordination of activities among the actors in an industry cluster turns from an advantage into a disadvantage. First, it will review modern theoretical concepts on regional economic development on this issue. Secondly, it will go deeper into work that stresses that the combination of technology and spatial clustering alone does not create mutually beneficial interdependencies, but that they are rather the result of organisational structures. This work distinguishes between regional network-based industrial systems as the basis for 'good' agglomerations and independent firm-based industrial systems as the basis for 'bad' ones.

1 Introduction

In economic geography and regional economics interesting thoughts were developed in the second half of the 1980s and the beginning of the 1990s. But since 1992 we are witnessing something like a deadlock. Scholars either criticise recently developed individual concepts, such as the innovative milieu and industrial district approaches, or try to develop an overview in the glut of concepts (STORPER 1995; LAGENDIJK 1996). In this article these exercises will not be repeated. Instead, a serious shortcoming in modern concepts will be stressed and it will be indicated in which direction research has to develop to overcome this shortcoming.

Most modern theoretical concepts on regional economic development revolve around two questions, 'why are some regions economically successful?' and 'why do internationally successful industries tend to concentrate in a few nations or regions?' These concepts, such as industrial districts, innovative milieux, regional production clusters, have certain common features: they all attempt to explain the origin and development of innovation, stress the significance of industrial organisation for regional innovation processes and focus on success stories. The problem with

these concepts, however, is that their central explanatory aspects cannot distinguish 'good' agglomerations, such as the Third Italy and Silicon Valley, from 'bad' ones, such as the Ruhr Area and Route 128 near Boston.

The central aim of this article is to find out what distinguishes 'good' from 'bad' agglomerations and at what point co-ordination of activities among the actors in an industry cluster turns from an advantage to a disadvantage. Before this main question will be dealt with in Section 4, the two following questions shall be explored first:

- why are some regions economically successful? and why do internationally successful industries tend to concentrate in a few nations or regions? (Section 2),
- why may regional production clusters, industrial districts, milieux and the like fail? (Section 3).

2 *Why are some regions economically successful? and why do internationally successful industries tend to concentrate in a few nations or regions?*

In the 1980s concepts were developed by economic geographers and sociologists who asked themselves the classical question in economic geography: why are some regions economically successful? The main change in orientation generated by these new concepts is that scholars no longer just stress the innovativeness of firms and industries in a region (production structure) as explanatory factors of regional economic inequalities. They found out that the correlation between the innovativeness of the regional production structure and regional economic development is not watertight (Läpple 1994 and 1996; Ronneberger 1995; Malecki 1991; Steiner 1985). In order to explain regional economic inequalities it is not so much important *what* is produced in a region (the production structure), but *how* and under which conditions (Läpple 1996; Fromhold-Eisebith 1995; Krätke 1996). These conditions might be the modes of inter-firm co-operation, the functional division of labour, the position of firms in the supply pyramid, the qualification of the workforce, the institutional fabric, social and technical infrastructures, economic history and cultural traditions in the region. The individual firm is no longer seen as an isolated actor, but the dependence of the firm on its direct regional environment is stressed (Kilper a. Latniak 1996).

The above-mentioned conditions are important for the diffusion of new technologies. In combination with fundamental changes in production organisation, these conditions have been taken up by many scholars in the 1980s to explain the rise of high-tech regions and industrial districts in the USA and Western Europe. They have come up with flexible specialisation, industrial districts and innovative milieu approaches.

The flexible specialisation approach, indicating the shift from mass production to a new organisation of production, re-discovered some industrial districts, mainly districts in the Third Italy and Baden-Württemberg, in which it found the clearest example of the new organisation form in a regionally-clustered form (Piore a. Sabel 1984; Pyke a. Sengenberger 1992; Sabel 1989; Sabel et al. 1987; Scott a. Storper 1987; Scott a. Storper 1992; Storper a. Scott 1995; Läpple 1996). Important elements of these districts are networks between flexible SMEs and a wide range of institutions.

The industrial district scholars use three arguments to support their hypothesis of regional clustering. First, the increased out-sourcing by firms to suppliers and other partners should take place in close proximity to enable face-to-face interaction and thus to avoid high transaction costs (Saxenian 1994 and Economist 1996a with regard to Silicon Valley). Secondly, new logistic strategies, mainly just-in-time, which aim at reducing stocks, compel suppliers to locate not too far from their customers (OECD 1994). Thirdly, multinational corporations increasingly tend to decentralise boundary-spanning functions previously done by headquarters to divisional offices and production units, so that sub-units become more anchored in the region than in earlier times (Dicken et al. 1994; Hirst a. Zeitlin 1991; Sabel 1989).

Despite the popularity of the industrial district approach during the second half of the 1980s, several authors distrust the relevance of this approach to explain present regional economic inequalities (Malmberg 1990). They point at three broad weaknesses. First, the most fundamental criticism concerns the trend of re-regionalisation of production systems (Amin a. Robins 1990; Kilper a. Latniak 1996; Grotz a. Braun 1993; Lagendijk 1996). As multinationals with their global networks have by far more impact on the world economy than locally embedded firms, flexibility is more a matter of industrial organisation on a global rather than on a local or regional scale (Ronneberger 1995; OECD 1994). Secondly, since only a few success regions are analysed in an anecdotal way, there is a lack of evidence to speak about a theory which has general validity (Staber 1996; Krätke 1996; Tödtling 1994; Ronneberger 1995; Lagendijk 1996). Even the highlighted success regions Emilia-Romagna, Baden-Württemberg and

Silicon Valley differ concerning a whole range of fundamental aspects (Heidenreich 1996; Digiovanna 1996). Thirdly, more detailed, the trend of subcontracting to suppliers in close proximity is doubted (Malecki 1991; Mair 1992; Bertram 1992; Morgan 1996).

Despite the criticism, some points of the flexible specialisation approach remain unchallenged (Storper 1995; Döhl a. Sauer 1995). Flexibility and specialisation can be regarded as fundamental alternatives to mass production. There is also broad agreement on both the fact that dynamic forces in contemporary capitalist development are both localised and territorially specific and on the increasing importance of institutionalised networks. Therefore, regional co-makership (especially with regard to R&D) and global-sourcing strategies (mainly low-value production) generate at the same time an internationalising and a re-agglomeration of modern economies (Malmberg 1990; Saxenian 1994; Morgan 1995).

Compared with the industrial district approach, advocates of the innovative milieu approach place greater stress on socio-cultural factors and interpersonal relationships as the basis for inter-firm relationships, collective learning processes and thus for regional economic growth (Aydalot a. Keeble 1988). In contrast to industrial district scholars, they do not strictly define the spatial borders of the milieu and even stress that having some actors with outside contacts is an important prerequisite for long-term innovativeness of the milieu (Fromhold-Eisebith 1995). They also stress the encouraging role of proximity for collective learning (Castells a. Hall 1994). Advocates of the approach believe that firms are the product of their environment so that the innovativeness of this environment determines the innovativeness of the firms (Aydalot a. Keeble 1988; Tödtling 1990). The milieu approach, however, has been criticised for its lack of capacity to operationalise and lack of empirical evidence (Sternberg 1995a, 58). Moreover, neither the term 'milieu' nor its spatial implications have been clearly defined ("innovation occurs because of a milieu, and a milieu is what exists in regions where there is innovation" Storper 1995, 203; see also Sternberg 1995b; Tödtling 1990; Lagendijk 1996).

Recently some well-known economists have been dealing with the question why internationally successful industries tend to concentrate in a few nations or regions. Porter (1990), Enright (1995b) and Krugman (1991), contribute in their theoretical concepts around networking and clustering much attention to agglomeration effects and regional economic development. They stress two striking features. First, they state that internationally successful industries are exceptional in the way firms within these industries are related with each other, namely through network relations. The content of these relations cannot be confined to prices and quantities alone: it is richer and encompasses trust, experience and history (Lambooy 1994). Compared with markets (where trust is at a minimum) and hierarchies (where knowledge is power), networking is more efficient in realising the potential for creating and diffusing economically exploitable knowledge as the key to competitive success (Cooke 1995). Secondly, they focus on geographic clustering of industries. Krugman (1991) points to the fact that the historical process of industrialisation in the USA and Europe is marked by stories of small accidents leading to the establishment of one or two persistent centres of production (see also Enright 1994 and OECD 1994). Thereafter cumulative processes can generate a geographical structure of production which may be stable for long periods of time. Enright (1994) emphasises spin-off firms within regional clusters as an ability of such clusters to foster new companies and to enhance innovation (see also OECD 1994).

An interesting question is, of course, why industries tend to cluster geographically. Krugman (1991, 98) and other economists stress transaction costs as a general explanation for geographic clustering: "Because of the costs of transacting across distance, the preferred locations for each individual producer are those where demand is large or supply of inputs is particularly convenient – which in general are the locations chosen by other producers." Or as Saxenian (1994, 173) puts it: "producers benefit from sharing the costs of common external resources such as infrastructure and services, skilled labor pools, specialized suppliers, and a common knowledge base . . . When these factors of production are geographically concentrated, firms gain the additional benefits of spatial proximity, or 'economies of agglomeration'."

In addition to these general explanations, more specific factors explain why geographical concentration is good for competitiveness (Krugman 1991; Porter 1990; Enright 1995a). First, internationally successful industries tend to concentrate because (informal) information flows locally more easily than over greater distances, and industrial centres generate technological spillovers (Economist 1996b). Therefore, geographical concentration can stimulate a fast diffusion of new technologies. Enright (1994, 4): "Even in the age of rapid communication and advanced information systems, it appears that impor-

tant forms of information are still best transmitted when the parties are in close geographic proximity." Secondly, geographical clustering can help firms to achieve vertical and horizontal disintegration (ENRIGHT 1995a; LAMBOOY 1994). In fact, firms within a geographic cluster often exhibit lower levels of vertical integration than their dispersed counterparts, since transaction costs tend to be lower in close proximity. SOKOLOFF (1995), however, points to the fact that proximity is only one of many factors that influence the degree of vertical integration. Thirdly, geographical concentration stimulates competition between rivals. The regional press continually compares firms, people know each other and want to enjoy high prestige (ENRIGHT 1995a). Competition, on its turn, combined with intensive R&D-co-operation with customers, helps to upgrade suppliers technologically. Fourthly, geographical concentration stimulates firms both to fund local training and research centres and to put pressure on political support in creating specialised factors, such as specific training and research centres.

Paradoxically, regional clusters entail both greater co-operation and greater competition among direct competitors than geographically dispersed industries (ENRIGHT 1995b). Co-operation in vertical relationships (buyer-suppliers), however, is easier to understand than co-operation in horizontal relationships (those with direct competitors). In many successful clusters, there is co-operation on a horizontal level in some activities, such as lobbying, while other activities, such as company-specific marketing, tend to be done in a competitive manner (ENRIGHT 1994).

Authors of the regulation school have criticised most of the above-mentioned approaches as being technologically and economically deterministic and have tried to put the explanations for regional economic development in a broader social, cultural and political context, often at a national level (KRÄTKE 1996; MARSHALL 1987; MOULAERT a. SWYNGEDOUW 1991).

In a recent review article on the above-mentioned concepts, STORPER (1995) tries to bring together economic geography with the neo-Schumpeterian or evolutionary school of technological change, an attempt that has also been undertaken by MORGAN (1995) and MASKELL and MALMBERG (1995). This school regards the mutual relations between innovations, firms and the political and socio-institutional forces as conditions for an optimal diffusion process and thus for economic growth (DAVELAAR 1989). It does not consider the innovation process as a linear model, but as an interactive process in which interactive learning and feedback loops take place on a continuous basis (MALECKI 1991; ASHEIM 1996). Furthermore, the school stresses that innovation is shaped by a variety of institutional routines and social conventions (tacit knowledge; trust, which cannot be bought, but has to be earned through repeated transactions; social capital). Key part of STORPER's (1995) explanation of regional economic growth is the association between organisational and technological learning and agglomeration, which has two roots, namely localised input-output relations of traded interdependencies and, more important, *untraded interdependencies* (labour market, regional conventions, norms and values, institutions, knowledge systems, tacit knowledge). These untraded interdependencies attach to the process of economic and organisational learning and coordination and where they are localised the region is a key, necessary element in the 'supply architecture' for learning and innovation (STORPER 1995).

3 Why may industrial districts, production clusters, innovative milieux and the like fail?

In a recent article the Economist (1996b, 66) stresses only one side of the clustering coin as it concludes an article on this issue as follows: "it seems that, just like everything else, success tends to cluster". SAXENIAN (1994, 161) considers this topic more carefully where she states: "spatial clustering alone does not create mutually beneficial interdependencies. An industrial system may be geographically agglomerated and yet have limited capacity for adaption. This is overwhelmingly a function of organizational structure, not of technology or firm size."

Since 1992 the explanatory power of many of the above-mentioned modern theoretical concepts that are based on the economic success of some industrial districts is put into question since some of these districts are faced with severe economic problems (BRACZYK et al. 1996; STABER 1996; GROTZ a. BRAUN 1993, 160 with regard to Baden-Württemberg). BRACZYK et al. (1996) question whether these concepts have overlooked important points or whether they only had explanatory power in the 1980s or whether both aspects count. They and also STABER (1996) convincingly unravel the theoretical myth of Baden-Württemberg as being an industrial district and its economy as being characterised by flexible specialisation.

Although most authors hail clustering in one way or another as an explanation for national or regional competitive advantage, there are also many scholars who stress that the same phenomenon, clustering,

may be responsible for the loss of national or regional competitive advantage (ENRIGHT 1995 b; GRABHER 1993 and 1994; GLASMEIER 1994; BUTZIN 1991; REHFELD 1994; PORTER 1990; BRACZYK et al. 1996; ASHEIM 1996). Geographically concentrated clusters can become insular, inward-looking systems, as many old industrial areas have shown (HALL et al. 1987; GLASMEIER 1994; BUTZIN 1991).

So what are the reasons then for the failure of some regional production clusters? GRABHER (1990, 3) gives us a first broad explanation for the problem, as he states: "the initial strengths of the industrial districts of the past, the industrial atmosphere, the highly developed and specialised infrastructure, the intense inter-firm linkages, and the strong political support by regional institutions turned into heavy obstacles to innovation (the 'rigid specialization' trap)".

There are some more specific failure mechanisms of regional clusters, as well.

First, many authors point to the decrease of competition and domestic rivalry through ossification that might occur in regional production clusters (PORTER 1990; ENRIGHT 1995 b). If co-operation in regional production clusters is going too far and co-ordination is allowed to insulate firms from competitive pressures, incentives can become skewed, and the localised industry can lose its vitality (ENRIGHT 1995 a). Mergers and concentration can be responsible for this dwindling of competition. Close relationships between firms may eliminate the need for firms to develop certain functional specialties, such as marketing, that are carried out through personal relationships within clusters. The same geographically impacted information may prevent firms from reacting quickly and effectively to stimulus from outside the cluster. GRABHER (1993) has defined these kinds of failures as functional lock-in (inter-firm relationships) and cognitive lock-in (a common world-view that might confuse secular trends with cyclical downturns). These lock-ins were not only observed in old industrial areas such as the Ruhr Area (GRABHER 1993), but they are also partly responsible for the inflexibility of modern industrial districts in Baden-Württemberg (BRACZYK et al. 1996; MORGAN 1996; HERRIGEL 1996). Although many regional production clusters might fall apart because of a decrease in competition within the cluster, others might decline through competition from other clusters (Sheffield's cutlery industry, for instance, was overtaken by Solingen, whereas Solingen is now challenged by the 'Japanese Solingen', Seki) (ENRIGHT 1995 b, 15).

Secondly, closely related to the decreasing competition and dynamism is the possibility of a political lock-in or institutional sclerosis that might come up in a regional production cluster (HAMM a. WIENERT 1989; GRABHER 1994; STORPER 1995; KLEMMER 1988; STORPER a. SCOTT 1995; LÄPPLE 1994 and 1996). The particular and dense regional institutional tissue together with the firms and workers can form a so-called self-sustaining coalition or "preperestroika consensus culture" (GRABHER 1990, 11; HUDSON 1994; KUNZMANN 1996). This coalition aims at preserving existing structures and causes a loss of creativity and indigenous development potential. Large companies do not want to give up sites for the attraction of inward investment, as they are afraid to lose qualified employees to competitors. Local authorities do not see the point in attracting inward investment or in promoting restructuring in another way, as large tax incomes are paid by traditional industries. The self-sustaining coalition also lobbies for sectoral interventions, which hamper the restructuring process more than they support it, as they remove the incentives to take initiatives for entrepreneurs and thus paralyse competition and tranquillise large industries (HAMM a. WIENERT 1989).

Thirdly, in some regional production clusters the spirit of the Schumpeterian entrepreneur might dwindle due to an increasing industrial concentration and the domination of large companies. The number of management functions will decrease, social structures will homogenise and the gap between workers and management will widen (HUDSON 1994; MAILLAT 1988). Since the workers are used to be cared for from the cradle to the grave, they lack entrepreneurial spirit (KUNZMANN 1996).

Fourthly, falling demand for a cluster's product might turn a structurally strong regional economy into a weak one. This might particularly be the case in strongly defence-dependent regions. The decline of the minicomputer and lower defence spending, for instance, has put the Massachusetts economy or the military aerospace cluster of South California in difficulties (ENRIGHT 1995 b, 15).

4 What distinguishes 'good' from 'bad' agglomerations?

Why one regional production cluster may flourish 'for ever' and another may suffer from decline is a problem modern theoretical concepts in economic geography have not sufficiently dealt with. That is not to say that there are no people who have tried to explain the decline of old industrial clusters (see for instance STEINER 1985; HÄUSSERMANN 1992; HAMM a. WIENERT 1989; HUDSON 1994; KLEMMER 1988;

TICHY 1985). In economic geography either popular concepts take 'good' agglomerations as their starting-point, such as the concepts presented in Section 2, or scholars work on explaining the decline of old industrial areas. Few, however, have done work on distinguishing 'good' from 'bad' agglomerations (STABER 1996, 312; SAXENIAN 1994, 6; STORPER 1995, 201; HEIDENREICH 1996, 402).

In the literature some authors distinguish 'good' from 'bad' agglomerations in a general way. Interestingly, LÄPPLE (1994) uses the milieu concept, which is based on innovative and successful regions, to explain the lack of innovativeness in declining old industrial areas. Milieux can have both a function as 'amplifier' of existing positive developments and as a 'filter' which keeps external information and new actors, which are both important for continuing renewal, outside. He points at the thin line that exists between milieux that strengthen regional economic growth and sclerotic milieux causing regional economic decline. As milieux tend to change more slowly than industries, a sclerotic milieu can remain in a region even after the industrial structure to which it belonged already has disappeared. FROMHOLD-EISEBITH (1995) distinguishes between 'creative milieux', in which innovative effects are gained from learning processes, and 'milieux' which are not necessarily positive in their effects. The main difference between creative milieux and sclerotic milieux is their openness or lack of openness towards the outward world. FROMHOLD-EISEBITH (1995, 35) also points to the dynamic character of milieux, which go through their own life cycle. Different kind of milieux can even be found in one region at the same time, all in their own life cycle stage. MASKELL and MALMBERG (1995) distinguish 'good' from 'bad' agglomerations by pointing at their ability to 'un-learn'. The regions that are able to adjust their institutional endowment to meet contemporary demands of the firms require 'un-learning'. The process of 'un-learning' necessitates the disintegration and removal of formerly significant institutions which now act as a hindrance to further development. There appears a great variation in the ability of regions to 'un-learn', "which makes it possible in some regions but not in others to inaugurate new and simultaneously dissolve impeding old institutions" (MASKELL a. MALMBERG 1995, 25). ASHEIM (1996, 40), finally, is speaking about turning "traditional" industrial districts into "learning regions" in order to avoid "lock-in" of development caused by localised path-dependency.

Some other studies present more in-depth comparisons of 'good' and 'bad' agglomerations. They focus on the conditions regions possess for the diffusion of technologies. These conditions, in turn, are often related to the functional specialisation of the division of labour and particularly to the economic history (crafts tradition) of a region (HÄUSSERMANN 1992).

By analysing regional economic history in regions in Germany, HERRIGEL (1990) creates some very original and convincing explanations of regional economic growth and decline. He distinguishes two industrial orders ("the sum of practices, rules and institutions that constitute and shape the way that the production of goods and its administration takes place"), which appeared in different regions of West Germany to a varying extent.

First, the *decentralised-region-based industrial order* emerged in regions where pre-industrial crafts formed the basis for further economic development, such as Baden-Württemberg. A wide range of specialised SMEs supported by regional institutions provided a fruitful base for the current fluent diffusion process of new technologies, vertical disintegration and externalisation (bottom-up networks) (see also SABEL et al. 1987; HERRIGEL 1990; PIORE a. SABEL 1984).

Secondly, the *autarkic-firm-based industrial order,* on the other hand, emerged in regions where no pre-industrial crafts existed, such as the Ruhr Area. The business starters in this area had to generate their own infrastructure and supply inside the company. Consequently, some large companies or 'cathedrals in the desert' dominated the regional labour market, the infrastructure and institutes and did not leave space for the development of SMEs (GRABHER 1989; TICHY 1985). Of course, gradually large firms started to hive off functions to suppliers and some small firms were set up to supply large concerns. This emerged network economy, however, was dominated and initiated by large concerns so that it can be characterised as a top-down network. This hierarchical organisation structure inhibits the diffusion of knowledge and the innovativeness of firms outside the complex (see also LÄPPLE 1994, 43). It causes small firms to supply large firms by blueprint production. This makes in-house marketing and extensive R&D unnecessary. Hence, these suppliers are restrained from shifting to more promising markets (GRABHER 1990).

Similar to HERRIGEL's (1990) explanations for regional economic growth differences in Germany are SAXENIAN's (1994) explanations for the differences in development between Silicon Valley and Route 128 in the USA. These leading centres of innovation in electronics in the 1970s shared two common origins: university-based research and postwar defence spend-

ing. In the early 1980s, they both came into crisis. In Silicon Valley a new surge of computer start-ups emerged alongside established companies, such as Hewlett-Packard, and the region regained its former vitality. Route 128, in contrast, did not recover from the crisis. In contrast to their counterparts in Silicon Valley, start-ups in Route 128 were isolated from sources of essential market information, technology and skill.

What were the reasons for these differences in development in the 1980s? According to SAXENIAN (1994) the answer can be found in the distinct industrial systems, which consist of local institutions (such as universities), culture, industrial structure (degree of vertical integration; extent and nature of links between firms) and corporate organisation. Silicon Valley has a *regional network-based industrial system* that promotes collective learning and flexible adjustment among specialist producers of a complex of related technologies. Dense social networks and open labour markets encourage entrepreneurship ("... foundations of a decentralised industrial system that blurred the boundaries between social life and work, between firms, between firms and local institutions, and between managers and workers" SAXENIAN 1994, 56). Route 128, in contrast, is dominated by a small number of relatively integrated corporations (vertical integration of a wide range of activities; centralised and hierarchical organisation; lack of social or commercial interdependencies; the main example is Digital), which form an *independent firm-based industrial system.* The latter system is a typical mass production, Fordist type of production organisation; hierarchical structures limit the ability to adapt quickly as conditions change and risk-avoidance becomes self-reinforcing as there are only a handful of successful role models to inspire potential entrepreneurs. The geography of the regions reinforced these divergent industrial systems. Technology companies in Massachusetts were scattered widely along the Route 128 corridor, whereas in Silicon Valley, due to the valley, firms clustered in close proximity to one another (SAXENIAN 1994, 60).

In contrast to the German situation explained by HERRIGEL (1990), where BadenWürttemberg's network-based industrial system emerged in a region with pre-industrial crafts and the Ruhr's autarkic-firm-based industrial system emerged in a region with no preindustrial crafts, this relationship is just the other way around in the two US high-tech regions explained by SAXENIAN (1994). Silicon Valley's regional network-based industrial system emerged in an agricultural, rural area, "an environment that lacked indigenous industrial traditions and experienced managers," in which "Silicon Valley's pioneers explicitly sought to avoid the hierarchical structures of East Coast companies" (SAXENIAN 1994, 50). Route 128's independent firm-based industrial system, instead, emerged in a region with a long industrial (textile, armaments, machine tool industry and later on car industry and electrical manufacturing) and cultural tradition (New England society; conservative traditions; hierarchical and authoritarian ethic of Puritanism; identities shaped by family and class backgrounds).

Despite the fruitful work that has recently been done on distinguishing 'good' from 'bad' agglomerations, it should be realised, however, that there is no deterministic relationship between the organisational form of inter-firm and firm-institution relationships in a region, on the one hand, and regional economic development on the other hand[1]. The idea of this deterministic relationship, although seductive to economic geographers because it makes advising policymakers much easier, is wrong, since the conditions under which a particular organisational network form will be successful constantly change in a rapid pace. In today's successful showpiece Silicon Valley, for instance, a different kind of network relationships might be used than yesterday's.

5 Conclusions

Modern theoretical concepts around networking and clustering share with each other the focus on the origin and development of innovation and the significance of industrial organisation and inter-firm linkages for regional competitiveness and regional innovation processes (STERNBERG 1995 b; REHFELD 1994). These concepts increasingly turned from 'economic' reasons for growth of new industrial agglomerations, such as product specialisation and vertical disintegration of the division of labour, to 'social' and 'cultural' reasons such as intense levels of inter-firm collaboration, a strong sense of common industrial purpose, social consensus and extensive institutional support for innovation, skill formation and the circulation of ideas (AMIN a. THRIFT 1994).

STERNBERG (1995 a, 1995 b) and TÖDTLING (1992), however, empirically proved the limited general value of these concepts to explain regional economic development. After careful and thorough research, STERNBERG (1995 b) stated that no single modern

[1] I owe thanks to RALF SPIELBERG for this eye-opening comment.

theoretical concept, that is product life cycle, long waves, flexible specialisation, milieux and networks, could explain the genesis and development of the main high-tech regions in the world to a satisfying extent. Also TÖDTLING (1992) had to apply different theoretical concepts of technological change to explain the innovativeness of different Austrian regional economies.

The main shortcoming of these concepts is that they all try to explain the surge of some archetypes of industrial districts, and by doing so they have put few regions too much in the limelight so that general lessons can only be drawn to a limited extent. They depend too much on dense and historical institutional contexts to become useful as a general theory (STORPER 1995). As a reaction, the globalisation argument has been put forward, and subsequently the globalisation-regionalisation debate.

Another important shortcoming of these concepts, which formed the core topic of this article, is that they cannot distinguish between 'good' and 'bad' agglomerations. In the literature work has been done on explaining either the growth of economically successful regions or the decline of old industrial areas, but little research has been done on distinguishing 'good' from 'bad' agglomerations. There are some promising exceptions, mainly work recently done on the diverging development of regional production clusters in Germany and the USA. These studies come up with regional network-based industrial systems as the basis for 'good' agglomerations, such as Silicon Valley and the Third Italy, and independent firm-based industrial systems as the basis for 'bad' ones, such as Route 128 and the Ruhr Area. Further research is needed in this direction, particularly on the origin of functional, cognitive and political lock-ins in 'bad' agglomerations and on how to avoid them. Answers to these questions are needed in order to be able to warn regions of future problems, rather than to provide them with lessons learnt from current or even past success stories.

However, a whole series of recently published articles on the crisis of the Baden-Württemberg industrial districts, not only show the limited explanatory power of theoretical concepts explaining regional economic change due to their static character (HEIDENREICH 1996; HERRIGEL 1996; STABER 1996; BRACZYK et al. 1996), but also show the thin line that exists between 'good' and 'bad' agglomerations, between creative milieux and sclerotic milieux. Moreover, they demonstrate how dependent the functioning of particular forms of networks and milieux are on conditions that mainly lie outside the regions, such as global competition, and how careful one should be in correlating particular forms of networks and milieux with regional economic success or failure.

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