Chapter 9
Economic Geography of Innovation and Regional Development

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Introduction: Situating the Authors

The chapter focuses on economic geography in Denmark, Norway and Sweden. It deals with the individual three countries as part of the overall structure, which takes as the point of departure the foreign influences that in different periods shaped the dominant approaches in economic geography in Scandinavia. The chapter discusses how key foreign contributions and approaches were employed on empirical cases in the Scandinavian countries and adapted to specific aspects of Scandinavian society. For example, empirical cases often include engineering and work-to-order manufacturing industries and resource-based industries, operating in a coordinated market economy with a larger role of public policy and with more trust-based cooperation than in contexts in which many key contributions emerged, such as in the US and UK. The chapter highlights regional strongholds and influential individuals that had a role in advancing economic geography of innovation and regional development in the Scandinavian countries. The selection will of course to a certain extent reflect the experiences of the authors. Asheim has been an active participant in Nordic geography from the mid-1970s, while Isaksen and Hansen entered later. Thus, it is the situatedness of the authors that to a large extent has determined the structure and content of the chapter. The chapter covers development trends in Scandinavian economic geography of innovation and regions in the period 1980–2020. It will not

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explicitly deal with Marxist economic geography, which had a stronghold in Denmark in the 1970s (in this book, see Jakobsen & Larsen, 2022). However, it describes the connection and influence of Marxist inspired economic geography, which Asheim was acquainted with during his time working in Denmark at the end of the 1970s and beginning of the 1980s.

Asheim graduated with a Master's degree from the Norwegian School of Economics in Bergen in 1971, with economic geography as a minor subject. After working some years in a governmental study about the level of living in Norway, where he was responsible for the study of regional inequalities in level of living that would later be his PhD thesis, he moved to Lund University as a PhD fellow at the Norwegian School of Economics (NHH) in Bergen to pursue PhD studies under the supervision of Torsten Hägerstrand. He defended his PhD in May 1979. After a shorter stay at Roskilde University as an external lecturer and at Aarhus University as an associate professor (1978–1981), he moved back to Norway to become associate professor in human geography at the University of Oslo in 1981, where he became full professor from 1993 until 1999, when he moved his chair to the newly established Centre for Technology, Innovation and Culture (TIK) at the Social Science Faculty at the University of Oslo. He stayed at TIK until he became professor in economic geography at Lund University in 2001, and from July 2004 also professor at the newly established Centre for Innovation, Research and Competence in the Learning Economy (Circle), where he was deputy director 2004–2011 and director 2011–2013. He moved to the University of Stavanger in the autumn of 2013, where he was full professor in economic geography and innovation theory at the Business School until his retirement in September 2020. Asheim is still affiliated with the Business School at University of Stavanger and Circle at Lund University. Thus, his career started at a business school and ended at a business school, demonstrating also a gradually changed focus from economic geography to innovation studies, but he is still keeping a strong link with economic geography through the continued focus on regional innovation. In connection with Asheim's seventieth birthday in 2018, Arne Isaksen, Roman Martin and Michaela Trippl published a Festschrift (Isaksen et al., 2018).

Isaksen graduated with a Master's degree in human geography from the University of Oslo in 1982 with a thesis on the historical development of the manufacturing industry in the Oslo region. After a few years in the public Labour Market Agency, he worked as a researcher at the applied research institute Agder Research from 1985 to 1995. Here he used results from several Research Council projects in his PhD thesis on regional industrial development and the growth of regional clusters. Using a critical realist approach focusing on theoretically informed empirical studies, three regional cases from Norway were applied as examples of industrial sectors that, according to Scott (1988), introduced flexible production methods and developed different types of new industrial spaces; that is, high-tech industries, craft and design intensive industries, and producer services. Isaksen joined the research institute STEP (Studies in Technology, Innovation and Economic Policy) from 1995 to 2000, and then, together with Asheim and Heidi Wiig, performed empirical studies of regional innovation systems (RISs) and analysed regional innovation policy.

He started in 2000 at the University College of Agder, which became the University of Agder in 2007, and continued studies of regional industrial development and restructuring in many types of regions and industries, often with an evolutionary approach.

Hansen graduated as a geographer specialising in socioeconomic geography from University of Copenhagen in 2001 with a thesis on the relation between knowledge creation and acquisitions within the agricultural machinery production industry in Denmark. In 2008 Hansen got his PhD in economic geography from Lund University on a thesis on knowledge creation, skills, labour mobility and urban and regional development. After being a postdoc at Circle and the Department of Social and Economic Geography in Lund, working on similar issues, Hansen became associate professor in human geography at Department of Geoscience and Natural Resource Management at University of Copenhagen in 2011, primarily occupied with labour market dynamics, firm location, innovation, human capital and migration.

Asheim has worked in all three Scandinavian countries, Hansen in Sweden and Denmark, and Isaksen in Norway, all three with a well-developed network with economic geographers in all Scandinavian countries. Thus, this concrete situatedness represents the pragmatic reasons for the delimitation of topics, places and people in the chapter, but the delimitation is also informed by theoretical and history of ideas arguments.

The size and impact of human geography varies between the three Scandinavian countries. Human geography, not least economic geography, is much bigger in Sweden than in the other two Scandinavian countries, and the academic and societal impact is also biggest in Sweden. This has partly to do with the institutionalisation of chairs in economic geography at the two oldest Swedish universities (Uppsala and Lund) in 1953, when the geography departments were split between physical geography, which joined the Faculty of Science, and human geography which joined the Social Science Faculty. Before the separation, geography departments in Sweden had two chairs, one in human and one in physical geography. When splitting up, human geographers took an initiative and argued that human geography should continue to have two chairs, one in human geography and one in economic geography. Sweden has six geography departments that teach and research economic geography, Lund, Gothenburg, Uppsala, Stockholm, Umeå and Karlstad universities.[1] In addition, one finds research in economic geography at the Stockholm School of Economics as well as in research groups such as Circle at Lund University. Due to its size and impact, one also finds internationally leading researchers in Swedish human and economic geography earlier than in the other Scandinavian countries. The most famous name is of course Torsten Hägerstrand, who worked at Lund University. He was, however, not an economic geographer, but a broader human geographer, who also did research of great relevance to economic

[1] The department of Human Geography at Gothenburg University was split up between economic geography, which remained in the Business School, and the rest of human geography that formed a separate department with other topics at the Social Science Faculty.

geography, e.g. in his studies of innovation diffusion. An economic geographer worth mentioning in this context, is Gunnar Törnquist, who was professor and chair in economic geography for 35 years, 1966–2001. Törnquist was a very innovative researcher contributing to a renewal of traditional location theory by taking into consideration the importance of information flows and non-physical communication networks for the locational patterns of economic activity. In this research he already in the mid-1960s in many ways anticipated the role of virtual networks, we observe today. He also worked on the changing economic geography of Europe as a result of economic and political integration, and on the geography of creativity, developed independent of Richard Florida's work, emphasizing the role of top universities and star scientists for regional development (Törnqvist, 2011; Asheim, 1987).

In Norway there are three geography departments at the Universities of Oslo,[2] Bergen and Trondheim that teach economic geography. In addition, economic geographical research (and some teaching) is carried out by a strong research group at University of Agder and now also at the Mohn Centre for innovation and regional development at the Western Norway University of Applied Sciences in Bergen. This has moved the gravity point of economic geographic research in Bergen from the University of Bergen to the Applied University, as well as nationally to a growing research group at the Inland Norway University of Applied Sciences in Lillehammer and to the Centre for Innovation Research at the University of Stavanger. All of these research groups have, as a strategy of development, engaged leading international researchers in II-er (20%) positions. Contributing to the weakening of economic geography at the University of Bergen was the closure of the joint geography department with the Norwegian School of Economics (NHH) in 2004.[3]

In Denmark geography programmes are taught at three universities: Copenhagen, Roskilde and Aalborg. Geography as a master degree is being closed down from the autumn 2022 at Roskilde University. It will still be possible to take a bachelor degree in geography but always in combination with another subject. Moreover, no department of geography can be found any more in Denmark. University of Copenhagen at Department of Geosciences and Natural Resource Management has a Section for Geography, similar to the former Department of Geography that is dedicated to research and teaching within GIS, physical and human geography. At both Roskilde and Aalborg geography is the taught by staff from departments with a broader scientific scope. There used to be a department of human geography at Aarhus University, but it was closed in the mid-1980s. Economic geography in Denmark is strongest at Section for Geography at the Department of Geosciences

[2] Human geography at University of Oslo was originally at the Art Faculty and formed a Department of Geography with Physical Geography from the Science Faculty. In 1994 (when Asheim was Head of Department) Human Geography moved to the Social Science Faculty and joined sociology in a common department.

[3] The joint department was established in 1964, when geography became a topic at the University of Bergen. Economic geography was taught from the start of NHH in 1936 until 1999, when economic geography was integrated with economics at NHH.

and Natural Resource Management at Copenhagen University where geography is traditionally organised by containing both physical and human geography.

The Socio-Spatial Theorisation in (of) Human (Economic) Geography

Asheim started his career by doing research in what internationally become known as welfare geography. This was part of the liberal, non-Marxist reaction to the dominating positivist spatial analysis tradition of the quantitative revolution, which focused on the general trends of spatial structures and spatial processes in societies and left history to historians and society to social scientists. In the late 1960s and beginning of 1970s an increasing demand for social relevance in human geography rose increasingly louder and one manifestation was the growth of welfare geography, which took social problems, not spatial phenomenon, as its point of departure. Thus, the sole dominance of space in human geographic research from the spatial analysis tradition was challenged.

One of the solutions to this problem was to talk about socio-spatial relations, introducing the social as an equal dimension to the spatial in geographic research. This idea was also taken up by Marxist geographers, such as Soja (1980) talking about the socio-spatial dialectic. However, this did not solve the basic problem, as a dialectic relation still consists of two separate objects, and space was in reality often approached in ways similar to the spatial analysis tradition, i.e., as something external to social relations as was conceptualises by the relative concept of space. The solution to this problem was supplied by Harvey in *Social Justice and the City* from 1973 (Harvey, 1973). He introduced the concept of relational space, where space is defined as an intrinsic property of the object studied, which eliminated the distinction between the spatial and the non-spatial. The relational concept of space corresponds to a perception that geography should undertake contextual analysis as opposed to compositional analysis (Hägerstrand, 1974). This perception is basically rooted in the ontological position of geography, following Kant, as a synthetic discipline of a physically defined science (understood as chorology) in opposition to analytical sciences based on their respective objects of study. The ambition of the spatial analysis school was to turn geography into an analytical, nomothetic science by focusing on space as its object of study, in an attempt of making it scientific, in contrast to the earlier dominating, ideographic and descriptive regional geography (Schaefer, 1953). Thus, our position on the question of the socio-spatial theorisation of economic geography, is that we argue that economic geography should do contextual analysis, where space is an analytical, un-separately property of the studied object (Asheim, 2006, 2020; Asheim & Haraldsen, 1991).[4] One implication of this

[4] Asheim used this view on the development of human geography to structure his teaching of history of geographic ideas and philosophy of science at University of Oslo and Lund University in the 1990s and 2000s.

view was that the theoretical work in economic geography became focused on societal objects studied (in context) and not on socio-spatial relationships as such.

From Marxist Economic Geography to Industrial Districts and New Industrial Spaces

This section considers the developments from Marxist economic geography to studies of industrial districts, regional clusters, and new industrial spaces, which represented a departure from a strict Marxist perspective to a broader radical, structural perspective, building on Massey's (1979, 1984, 1985) theoretical critique and Sayer's (1984) critical realism. Key points in these writings were Massey's criticism of the lack of contextual analysis in Marxist economic geography, and Sayer's contribution to solve the contradiction of ideographic vs. nomothetic approaches by applying the realist distinction between abstract and concrete research.

Asheim was inspired by the version of Marxism that informed students at Roskilde University working on their master theses, which he supervised as an external lecturer. This was a version developed in Germany that represented a re-reading of Marx through the glasses of Hegel, influenced also by the old Frankfurt school of Adorno and Horkheimer. This new version of Marxism was called 'West-European left Marxism' and in Denmark (somewhat confusingly) 'Kapitallogik' (Capital logic), pioneered by the historian of ideas at Aarhus University, Hans-Jørgen Schanz. This variant of Marxism is clearly different from the rather orthodox historical materialist interpretation of the territorial structure geography, then practiced at the Department of Geography at Copenhagen University. The 'West-European left Marxism' represents a non-deductive and non-reductionist approach by emphasizing that the abstract theoretical level of the critique of the political economy (*Grundrisse* and *Capital*) represents a specific level of Marxist analysis, which cannot be used in a deductive way to explain concrete societal phenomena (Asheim, 2006). This opens for contextual economic geography studies of concrete regional problems, inspired by abstract Marxist theory but further informed by social science theories of relevance to the problems studied.

This distinction between an abstract and a concrete theoretical level, which epistemologically in many ways parallels the nomothetic and ideographic distinction, represented methodological challenges, which Marx could not offer much solution to. In this situation, the publication of Sayer's book in 1984 on critical realism was extremely helpful. First, the distinction between abstract and concrete research transcends the distinction between nomothetic and idiographic approaches. Second, in a parallel way to 'West-European left-Marxism', it argues that in an ontologically stratified world – critical realism's distinction between the real, the actual and the empirical – one level cannot be reduced to the next. Third, it argues that space can only be theorised in concrete research and then represent an explanatory factor (Asheim, 2006). Sayer underlines that 'even though concrete studies may not be

interested in spatial form per se, it must be taken into account if the contingencies of the concrete and the differences they make to outcomes are to be understood' (Sayer, 1992, p. 150). This position is consistent with an understanding of economic geographical analysis as contextual. However, it is important to underline that Sayer's position on space, which we used to qualify Harvey's relational concept of space, does not imply that space is wholly reducible to the constituent objects, as Harvey himself has been doing with his ambition of formulating an abstract, general theory of the capitalist space economy (Harvey, 1982). This position makes it 'impossible to see how space make a difference' (Sayer, 1992, p. 148).

This critique of Harvey and others was also raised by Doreen Massey, who argued that '"geography" was underestimated; it was underestimated as distance, and it was underestimated in terms of local variation and uniqueness' (Massey, 1985, p. 12). This and other contributions promoted what was called the 'new' regional geography, which came close to solving the problems of geography basically being a synthetic discipline, but with theoretical ambitions of providing causal explanations by applying a realist approach of combining abstract and concrete research in theoretically informed case studies as contextual analysis (Asheim, 2006).

In addition to Massey and Sayer, who both visited Scandinavia several times, another major source of inspiration for this new research orientation was Piore and Sabel's (1984) *The Second Industrial Divide*, Scott's (1988) *New Industrial Spaces* and Italian researchers' studies of industrial districts in the so-called Third Italy (Becattini, 1990; Brusco, 1990). This was expanded by Porter's (1990) book on clusters, as well as Saxenian's (1994) *Regional Advantage*. This inspired work at the Geography Department in Oslo by students supervised by Asheim. Arne Isaksen and Knut Onsager were two of these students, who later worked as researchers in applied research institutes on research inspired by the cluster-type literature, before defending their PhDs in 1995 and 1998. Stig-Erik Jakobsen (with a PhD from University of Bergen in 1997) had a parallel research career in Bergen, focusing on studies as well as evaluations of cluster policy.

Two researchers who have had great international impact on the theoretical understanding of regional clusters are Peter Maskell and Anders Malmberg. Peter Maskell, who has a master in geography from University of Copenhagen and a PhD and a dr.merc. degree from Copenhagen Business School, studied the geography of reindustrialisation, and how this process led to relocation of industrial production away from the larger cities in Denmark to the more peripheral located towns (e.g. Maskell, 1986). Anders Malmberg defended his PhD in 1988 at Uppsala University and did research on agglomeration and reindustrialisation. Especially Maskell and Malmberg's conceptualisation of localised learning and ubiquitous and localised resources when analysing firm location and competitiveness (Maskell & Malmberg, 1999a, b) was an inspiration for many research environments, not only in Scandinavia but also in the Anglo-American economic geography community. Their book with colleagues from Finland, Iceland, Sweden and Norway, *Competitiveness, Localised Learning and Regional Development*, provided a thorough introduction to theoretical approaches and was illustrated with examples from industries in the Nordic countries (Maskell et al., 1998). Malmberg and Maskell contributed much to the

conceptual development related to clusters and regional economic development (Malmberg & Maskell, 2002). They focused early on the role of knowledge and localised learning for spatial clustering and helped to clarify the cluster concept, for example in a chapter about 'True clusters' by Malmberg and Power (2006). They also contributed to an increased attention to the importance of global networks for cluster and regional economic development, popularised (together with Harald Bathelt) through the concepts of local buzz and global pipelines (Bathelt et al., 2004).

Another important inspiration for studies of regional development by many Scandinavian economic geographers were the transition from Fordism to Post-Fordism, conceptualised and popularised amongst others by Piore and Sabel (1984). The transition represented a re-focus on the importance of agglomerations of networked small and medium-sized firms (SMEs) based on a flexible production system through vertical disintegration, originally observed by Alfred Marshall. These agglomerated systems of SMEs were, following Marshall, in Italy called industrial districts, which produced specialised, semi-customised products replacing the standardised mass production of vertical integrated large firms of the Fordist period. These changes in production and consumption are all about contingencies, for example in relation to technology, market trends and consumer preferences. This increased importance of networking and cooperation also highlights other contingencies in the form of non-economic factors such as culture, social capital and formal and informal institutions (Asheim, 2006). The importance of such factors helps to explain why the research on industrial districts, regional clusters and similar phenomena was met with great interest among economic geographers in Scandinavia, which were and are societies with comparatively high trust and cooperation between actors in the business sector and other parts of society.

Asheim's own interests in industrial districts as a paradigmatic example of post-Fordist new economic spaces started in the early 1980s, after his move to Oslo, where it inspired several students to study regional networks of SMEs. Asheim spent some months in Rome in 1983–84, travelling around in the Third Italy and met with researchers of industrial districts such as Garofoli in Pavia and Brusco in Modena. This resulted in several comparative research projects of industrial districts in Italy and the Nordic countries, as well as of districts within the Nordic countries (Asheim, 1992, 1994). The theoretical work focused on developing a concise conceptualisation of industrial districts that distinguished them from other forms of territorial agglomerations such as clusters and growth poles (Asheim, 2000, 2006). The empirical analysis turned his interest towards the innovative capacity of industrial districts, questioning if they had the capacity of moving beyond incremental innovations. The original rationale of industrial districts was the creation of external economies of scale of the systems of firms. Thus, it was the productivity of the system of firms and not the innovative capacity that represented the competitive advantage of industrial districts. One of the constraining structural factors of industrial districts with respect to its innovative capacity was the fierce competition between a large number of small subcontractors specialising in the same products or phases of production, and vertically linked to the leading firms. This structure promotes cost efficiency but does not represent a very innovative

milieu, especially if the majority of the small firms are capacity subcontractors and not specialised suppliers (Asheim, 1996, 2000, 2006).

In a Nordic comparative study of the industrial districts of Jæren, south of Stavanger, and Gnosjö in Småland, published in a book edited by Isaksen (1993), Asheim observed differences in the innovative capacity between the districts. While Jæren for many years had demonstrated a rather impressive innovative capacity (including radical innovations), especially in the area of robot technology, Gnosjö had shown a low capacity for moving beyond incremental innovations. These differences in innovative capacity were related to the competence basis of the firms in the districts, with a much higher share of engineers in Jæren, and consequently a higher absorptive capacity, than in Gnosjö, which again was due to the different industrial history of the two districts (Asheim, 1993, 1994, 2006). In Denmark, Mark Lorenzen, who did his PhD under supervision of Maskell, studied localised learning in the furniture industry in Northern Jutland and found that the ability to adapt to a changing market and the cooperation between local firms made the industry innovative and competitive (Lorenzen, 1999).

Different industrial histories and different industrial and regional contexts are also evident in a comparative study from 1999 of innovation activity and interactive learning in ten regional industrial milieus in Norway (Isaksen, 1999). It is striking that the study was largely carried out by researchers from applied research institutes.[5] They are researchers who worked in cross-disciplinary milieus, who were concerned with, and accustomed to, performing socially and policy relevant studies, but not involved in discussions of the relevance of their research for the theorisation of geography and territory.

The regional industrial milieus were different in many ways but included three main types: (i) research-intensive industrial milieus, (ii) mechanical engineering milieus, and (iii) industrial milieus in the food industry. The study revealed that many firms increasingly applied extra-regional resources in their innovation activity. This included extensive cooperation with national and to some extent international R&D-institutes, with key customers, and with research departments and other firms in the owner companies. This finding opposed, as regards to Norway, the view of industrial districts of SMEs as co-located production networks supported by regional 'business centres'. The study was carried out for the Research Council of Norway as a background for policy development and contributed to several research programs and policy initiatives that aimed at increasing innovation collaboration between industry (and subsequently the public sector) and regional knowledge organisations such as universities and university colleges.

A second main conclusion from the ten cases were that specific regional resources stimulate firms' innovation activity, and that regional innovation cooperation were increasing. The regional resources included unique combinations of knowledge and skills in the workforce and in many specialised firms, and local learning were

[5] These were Nordland Research (Asbjørn Karlsen and Åge Mariussen), NIBR (Knut Omsager) and the STEP group (Arne Isaksen and also Bjørn Asheim).

backed by geographical, social and institutional proximity and by formal collaborative organisations. Studies of clusters and similar phenomena in Scandinavia have shown the importance of historical and contextual conditions for understanding regions' industrial development, but also that regions are 'open' and that their industries are influenced by a number of national and international conditions, such as political decisions, market and technological development.

Regional Innovation Systems

The focus on the innovative capacity of industrial districts, regional clusters and innovative milieus was subsequently, in the Scandinavian research environment, complemented with studies of regional innovation systems and learning regions focusing on mechanisms for upgrading the innovative capacity of SMEs as well as of districts and clusters – linking economic geography and innovation studies. This was relatively easy to do in economic geography, as two of the pioneers of the regional innovation system approach, Phil Cooke and Bjørn Asheim, both are economic geographers. This stream of research overlaps with the previous one. Maskell and Malmberg continued with cluster research and linked this more explicitly with innovation research. Later Dominic Power in Uppsala, now at Stockholm University, and Mark Lorenzen at Copenhagen Business School, joined and started focusing on creative industries. Power undertook studies on cultural and creative industries and the cultural economy (Power & Scott, 2004), while Lorenzen researched relationships between innovation and economic organisation in networks, projects and clusters with a special attention to the creative industries (Lorenzen, 2018).

Regional innovation studies and cluster research were also carried out in Norway by Isaksen at the University of Agder, Stig-Erik Jakobsen and colleagues at the Mohn centre in Bergen, Asbjørn Karlsen at the Norwegian University of Science and Technology (NTNU) in Trondheim and Heidi Wiig at BI – Norwegian Business School; researchers who collaborated in several projects and with co-publications. In Denmark this research was, as mentioned, mostly carried out by Maskell and Lorenzen at the Copenhagen Business School, although the late Chris Jensen-Butler and Lars Winther in Copenhagen made a few contributions to this literature.

The interests in regional innovation systems (RIS) and learning regions started to increase around the mid-1990s. A RIS is defined as a long term and systemic interaction between an explorative, knowledge generating (university and research organisations) and an exploitative (firms in regional clusters) subsystem in a region supported by an organisational and institutional framework, and linked to non-regional actors, organisations and knowledge flows. A RIS is not identical to a cluster, as a RIS normally supports more than one cluster (Asheim et al., 2019). The first publication on RIS came in 1992 by Philip Cooke (1992), while Asheim was central to the application of the concept in Scandinavian, and also in international, research on regional industrial development and policymaking. The first time Asheim used the concept was in 1995 (Asheim, 1995). Another early contribution was an article

by Asheim and Isaksen (1997). The article distinguishes two different types of RIS; (i) territorially embedded, regional innovation systems, which support localised learning processes, and (ii) regionalized national innovation systems based on the linear model of innovation. This distinction again reflects knowledge about the organisation of innovation processes in Norwegian industry, influenced by a few strong national research actors. A territorially embedded RIS was exemplified by the mechanical engineering industry in Jæren where the organisation TESA (Technical Cooperation) as a 'Business Service Centre' was the core of the system. The electronics industry in Horten (south of Oslo), on the other hand, was part of a national, and to some extent an international, innovation system. Later this typology was extended with a third type, networked regional innovation systems, which was seen as the ideal type of a RIS (Asheim & Isaksen, 2002).

Asheim's own studies of RIS were initiated when he (in addition to being professor at University of Oslo) was associated with the STEP Group in Oslo as a part-time senior researcher and scientific advisor. At this time Isaksen worked as a senior researcher at STEP, which was an independent 'think tank', established in 1993. The STEP Group built up research on regional innovation systems, clusters and innovation policy towards SMEs resulting in many large national and one EU funded project running from 1998 to 2000. This project, 'SME Policy and the Regional Dimension of Innovation' (SMEPOL), conducted a comparative analysis of innovation policies for SMEs in eight European countries in cooperation with researchers from Norway, Austria, Denmark, Italy, the Netherlands, Spain and UK (Asheim et al., 2003). The project identified five main types of innovation policy tools and discussed good practice in different kinds of regions, which points to the focus on policy relevant research. The RIS research continued when Asheim moved his chair to the newly established Centre for Technology, Innovation and Culture in 1999, and finally when he moved to Lund in 2001. After moving to Lund, he got a large Nordic research project on SME and regional innovation systems, where Lars Coenen, who was just recruited as a PhD student, was the principal investigator (Asheim & Coenen, 2005).

In this research project the idea of knowledge bases emerged. Asheim was puzzled why RIS seemed to operate differently according to the type of industry which was the focus of the RIS. In incumbent, engineering-based industries, such as various manufacturing industries (automotive, shipbuilding, food production etc.), RIS developed in an organic way, often in connection with firms' need to upgrade from being only dependent on experienced based knowledge to also needing access to research based knowledge to increase their competitiveness. This required a closer cooperation with universities and research organisations, which is the main function of a RIS. Contrary to this was new emerging industries, often established as spin-offs from university research or by university graduates with science degrees. Examples of such firms can be found within ICT, biotech and nanotech. Such firms needed, after often being born in incubators and science parks, to be supported by a RIS for their continued growth. Thus, what was to be called 'the differentiated knowledge base approach' represented a further development of the RIS concept, and qualified partly the relationships between different specialised industrial

clusters and a RIS, and partly added nuances to the importance of the heterogeneity between firms that goes beyond the sectoral dimension. Originally a distinction was drawn between analytical, science based and synthetic, engineering-based knowledge (Asheim & Coenen, 2005; Asheim & Gertler, 2005), and later symbolic, art-based knowledge was added, to cater for the growing importance of creative and cultural industries, where intangible knowledge is key to understanding the competitive edge of firms in these industries (Asheim, 2007). The key idea is that determined by the knowledge base, firms innovate in different ways and need different forms of support, but that all types of industries can be innovative, not only science-based industries. The importance of proximity and geography varies also between the knowledge bases depending on the share of tacit knowledge in the respective knowledge base, with analytical knowledge being more 'placeless' than synthetic and symbolic (Martin & Moodysson, 2012). Research informed by the knowledge base approach also becomes more sensitive to local contingencies and place-specific conditions (Gong & Hassink, 2020), thus being more well-suited for doing contextual analysis. Later the knowledge base approach was further developed to investigate how knowledge bases combine in various industries over time (Asheim et al., 2017).

This research on knowledge bases was, after its establishment in 2004, concentrated at Circle, where the group in regional innovation research, organised by Asheim, developed to become one of the strongest in Europe. Other core members of this group were Lars Coenen (now Western Norway University of Applied Sciences and University of Oslo), Jerker Moodysson (now Jönköping International Business School), Høgni Kalsø Hansen, Jan Vang (now Southern Denmark University) and Roman Martin (now Gothenburg University), all of them PhD students at Circle, Lund University with Asheim as supervisor. These individual careers illustrate how research on knowledge bases and related topics have diffused from the strong research milieu at Circle into research environments elsewhere in Scandinavia.

Constructing Regional Advantage

The research on RISs and on knowledge bases exemplifies that economic geographers in Scandinavia not only acquire and adapt theoretical ideas, concepts and approaches from other countries, but also influence the subject internationally, the research by Malmberg and Maskell being another example. One important step in the development of the knowledge base approach and its relevance for informing regional innovation policy was Asheim's participation in a DG Research initiated expert group in EU on 'Constructing Regional Advantage' (CRA) (Asheim et al., 2011). This was a forerunner for EU's new policy for regional development, 'Smart Specialisation' (Boschma, 2014). The CRA approach advocates an active role of policy and a broad-based innovation policy to promote innovation-based, new regional path development. The knowledge base approach was a key analytical

dimension in this study used to argue that innovation can take place in all kinds of industries in all types of regions (Asheim et al., 2011).

The idea of constructed regional advantage was taken further in a European comparative research project 'Constructed Regional Advantage: Towards State-of-the-Art Regional Innovation System Policies in Europe?', funded by the European Science Foundation (ESF) in the years 2007–2010, and with Asheim as the coordinator. In addition to a core group of researchers from Lund and Circle (Asheim, Lars Coenen and Jerker Moodysson) the project included Finland (Markuu Sotarauta), Norway (Isaksen and James Karlsen), in addition to Austria, Check Republic, the Netherlands, and Turkey, which demonstrate how these concepts travelled beyond its core research milieu.[6] The comparative approach meant that the highly developed innovation systems of Finland, Norway and Sweden could be seen in relation to other 'coordinated' economies (in the Variety of Capitalism approach) of the Netherland and Austria, the transformation economy of the Czech Republic and emerging economy of Turkey (Tödtling et al., 2013). A key dimension in organising the comparative study was the knowledge base approach, looking at industries belonging to the three knowledge bases in seven countries to analyse their innovativeness and competitiveness. These regional cases revealed that the combination of knowledge bases of industries and the institutional and organisational contexts of the RISs could explain much of the distinct pattern of knowledge sourcing and innovation processes in various regions. The findings demonstrated that firms use a variety of knowledge sources while one type of knowledge base is often necessary for conducting innovation activity. Geographical proximity turned out to be most relevant for industries based on synthetic (experienced based) and symbolic (cultural based) knowledge, while industries building on analytical (scientific) knowledge had the most global knowledge interactions.

Another comparative research project, also coordinated by Asheim investigated the relevance of Richard Florida's (2002) creative class ideas in Europe (2004–2006).[7] In this project the knowledge base approach was also applied (Asheim & Hansen, 2009). One aspect of this project analysed to what extent the creative class approach is applicable in the Nordic context, drawing on comparative studies in Denmark, Finland, Norway and Sweden (Andersen et al., 2010a, b). The approach originates from studies in USA with about 50 cities with more than one million people, which means that similar jobs are most often available in many places, making 'people climate' an important factor in choosing where to move and stay. The Nordic countries have comparatively small cities and regions. Nevertheless, the Nordic study found people climate of importance to explaining the migration pattern for creative workers and partly for people working within professions based on analytical

[6] Results from the project were reported in a special issue of European Planning Studies (No. 7, Vol. 19) in 2011 and a special issue of European Urban and Regional Studies (No. 2, Vol. 20) in 2013.

[7] In addition to the four Nordic countries, the UK, Germany, Netherlands and Switzerland took part in the study. Results from the study were reported in a special issue of Economic Geography (No. 4, Vol. 85) in 2009.

knowledge (e.g. researchers) as well as for economic development, but mostly as regards the Nordic capital regions that often compete when it comes to recruiting creative people. People climate was seen as secondary compared to business climate to explain regional industrial development in the Nordic countries, which also implies that for people with a synthetic knowledge base (e.g. engineers) an interesting job was more important than people climate of the place (Asheim, 2009; Hansen & Niedomysl, 2009; Eriksson et al., 2014). These results demonstrate that theoretical reasoning, empirical results, and policy implication regarding regional development cannot be transferred to a Scandinavian context without further modifications.

An important vehicle for studies of regional innovation systems and policy in Norway was the Research Council Norway funded program on 'Policy for regional research and innovation' (VRI in Norwegian). It was a large program running from 2007 to 2016, focusing on the building of regional innovation systems in Norwegian regions to strengthen the innovativeness and competitiveness of their industry. The program underlines again the vitality of RIS as a policy concept, the importance of contextual analyses and adaptation of RIS policy to different regional contexts.[8] A VRI-project led by Asheim ('Exploring the role of VRI in regional innovation system formation and new path development') found that, apart from the Agder region, it was difficult to find examples of well-functioning (networked) RIS in Norway. This is partly due to the dual structure in the Norwegian economy of decentralised industry and centralised HEIs, with the universities in Trondheim and Oslo as strongholds, and partly due to the fact that the economic support for firm oriented research programs, which mostly go to the large, incumbent firms, by far outstrips the funding for building RISs.

The VRI projects organised by Isaksen were carried out in cooperation between several research institutes. An important aspect was to broaden the view on innovation activity from the linear model focused on the STI (Science, Technology, Innovation) mode to the interactive model more focused on the experienced based DUI (Doing, Using, Interacting) innovation mode, and to discuss with policy makers what this changed view could mean for knowledge brooking and innovation policy. Moreover, research in the VRI-program focused on regional industrial restructuring in Norway, building on the regional industrial path development view. Results revealed that regional conditions often support industrial path extensions as Norway has some strong industries and (national) innovation systems that attract a lot of resources. The analyses demonstrated that many regional networks, entrepreneurial activities and activities by the financial sector are strengthening existing, strong regional industries rather than stimulating growth of new regional industries. These results point to some general lessons for policy for restructuring and renewal of regional industry: there is a need for both private entrepreneurs, innovative firms,

[8] Isaksen lead projects in the two last phases (2010–2016) and Asheim a project in the last phase 2014–16, after his move to Stavanger.

development of regional innovation systems, new educational programs, and support adapted to emerging industries.

Evolutionary Economic Geography

In the beginning of the 2000s, Evolutionary Economic Geography (EEG), developed in Utrecht by Ron Boschma and colleagues as well as in Cambridge by Ron Martin and economic geographers at Newcastle University at CURDS (Centre for Urban and Regional Development Studies), entered and influenced economic geography research in Scandinavia. The strongest single environment was located at the Geography Department at Umeå University with Urban Lindgren and Rikard Eriksson as the leading researchers, but also research by Lars Olof Olander, Karl-Johan Lundquist and Martin Henning at the Geography Department in Lund developed in this direction, in particular the research undertaken by Henning who later moved to Gothenburg, in close cooperation with researchers from Utrecht (Boschma and Neffke) and Umeå. Malmberg and Maskell also made early contribution to EEG regarding cluster development (Maskell & Malmberg, 2007) and localised learning (Malmberg & Maskell, 2010).

One of the major stepping stones in the development of evolutionary economic geography in Scandinavia has been a detailed and rich register data setup by the national statistical bureaus. In a study from 2009 Boschma, Eriksson and Lindgren used register data to examine linkages between composition of skills at firm level and labour mobility and plant performance in Sweden in a long-term perspective. They found that a portfolio of related competences at the plant level did increase productivity growth of plants. Moreover, the study found that inflows of skills that was related to the existing knowledge base of the plant had a positive effect on plant performance, while the inflow of new employees with skills that were already present in the plant had a negative impact (Boschma et al., 2009). Similar detailed data allowed Neffke et al. (2011) to study technological relatedness of firms in the manufacturing industries in 70 Swedish regions from 1969 to 2002. The analyses demonstrated that the long-term evolution of the economic landscape in Sweden is subject to strong path dependencies.

In the early 1980s, Chris Jensen-Butler was one of the first economic geographers in Denmark to perform regional analysis on the Danish regional economy using register data. Following this lead, Winther (1996) provided an early attempt to understand industrial and technological change in Denmark in an evolutionary framework using detailed register data from Statistics Denmark. At this point, in 1994, Michael Storper received a Fulbright grant and had a stay at the geography department in Copenhagen, where he among other things was writing on chapters that later were included in his famous book, *The Regional World* (Storper, 1997). Winther continued working on the economic geography of Denmark exploring the evolution of technological change in the food industry together with Essletzbichler (Essletzbichler & Winther, 1999) and a study on the evolution variety of

manufacturing in Copenhagen in 2001 (Winther, 2001). Access to micro data had also contributed to creating a strong milieu around Einar Holm and colleagues in Umeå. Here economic geographers developed leading skills in micro simulation of regional development by looking at firm data, employment data and population data. Particularly in Sweden, but also in Denmark and Norway, economic geographers pioneered the use of microdata to analyse regional development dynamics allowing for longitudinal analysis of economic shifts and changes and how this has affected the regional level. With a significant development in statistical software over the last decades possibilities of exploring data have just increased, leading to a large volume of studies benefitting from the rich time series of data that has allowed for very detailed long circle studies, for instance of obsolete industries (Henning et al., 2016) or of economic restructuring and urban development (Hansen & Winther, 2007, 2010, 2012). In Norway, EEG approaches were mostly integrated in ongoing studies of regional economic development, for example in the previous mentioned projects in the Research Council Norway program on 'Policy for regional R&D and innovation'. Projects which were led by Asheim and Isaksen, included researchers with an EEG approach, such as Stig-Erik Jakobsen and Rune Njøs at the Western Norway University of Applied Sciences in Bergen. Their studies focused particularly on types of new path development in different regions (Isaksen, 2014; Njøs et al., 2020). Asheim also undertook such studies, in cooperation with Markus Grillitsch and Sverre Herstad, and additionally inspired by neo-Schumpeterian thinking of Chris Freeman investigated the potential of unrelated diversification (Grillitsch et al., 2018; Asheim & Herstad, 2021).

Other researchers in Norway have followed a broader approach of regional industrial development and restructuring inspired by the EEG approach, focusing on, for example, old industrial towns, resource based rural areas, growth of the oil and gas supplier industry, the importance of non-local relations for firm innovation and labour market mobility and innovation. Such studies were carried out by amongst others Asbjørn Karlsen at the NTNU in Trondheim, Bjørnar Sæther and Sverre Herstad at the University of Oslo, Eirik Vatne at NHH in Bergen, and Rune Dahl Fitjar at University of Stavanger.

During the last 10 years sustainable transition research has gradually made a noticeable impact also on research in economic geography, where especially Lars Coenen pioneered the regional dimension of this research (Coenen et al., 2012). This research has expanded the understanding that regional economic development consists of the development of all parts of a region (and society in large), including informal institutions in terms of norms and attitudes. There is an understanding, that also exists in the RIS approach, that a region's industry is embedded in historically created structures and institutions in a region. Coenen was originally part of the regional innovation research group at Circle. After a 3 years' stint at University of Melbourne, he moved back to Scandinavia to the Western Norway University of Applied Sciences in Bergen. Markus Steen and Asbjørn Karlsen in Trondheim has also studied the geography of sustainable transition, focusing particularly on development of offshore wind. Moreover, Teis Hansen with a PhD in Geography from University of Copenhagen, who was affiliated with Circle and the Department of

Human Geography at Lund University for 8 years, and now is professor at Department of Food and Resource Economics at University of Copenhagen, has worked on the geography of innovation and sustainable transformation (Hansen & Coenen, 2015).

The latest developments in Scandinavian economic geography are the beginning of a turn away from structural approaches to a stronger focus on actors and agencies in regional development, for example represented by Markus Grillitsch in Lund and Markku Sotarauta in Tampere (Grillitsch & Sotarauta, 2020), and a somewhat comparable approach in Agder with Isaksen and colleagues (Isaksen et al., 2019). From focusing on cities and economic growth in the 2000s in the last half decade economic geography research has begun addressing (challenged) peripheral regions in the Nordic countries and their economic potential (Hansen & Aner, 2017; Rekers & Stihl, 2021; Grillitsch et al., 2021).

Conclusion: Impacts on Innovation and Regional Development

Economic geography research in Scandinavia on clusters and regional innovation systems has had a strong impact on policy development nationally and partly on the EU-level as well as on research internationally. Research by Malmberg and Maskell on clusters has already been mentioned, as has research on regional innovation systems by Asheim and Isaksen. Also some of the EEG research by people such as Henning and Eriksson has got international attention. The same is the case with Coenen and T. Hansen's works on sustainable transitions. Another manifestation of the collective breadth and depth of Scandinavian economic geography is the participation at international conferences. One example would be the Regional Innovation Policy conferences, where participants from Scandinavia not only have had a strong presence but where almost 1/3 of these conferences, originally established in 2006, has been organised in Norway, Sweden and Denmark.

The raison d'etre for research in social science is to contribute to understanding and solving societal problems. This has specifically been the case for economic geography. The discipline has had significant societal impact due to its theoretical informed and empirical based contextual analysis. Economic geography research has developed in close interaction with regional and societal challenges, and the research has to a large extend been integrated into local and regional development policies. This is strengthened by economic geographic research, in Norway in particular, being carried out in applied, cross disciplinary research institutes. Examples of policy relevant research has been mentioned in the chapter, such as the CRA project, which had its origin in policy research for the EU. A lot of the research undertaken at Circle was funded by Vinnova, the Swedish agency for innovation, through two 6 years Centre of Excellence grants. In Norway a couple of examples would be the research project organised by Isaksen in 1999 on innovation activity and interactive learning in regions, which became part of the theoretical foundation of the 10 years Research Council project on Regional Research and Innovation,

which also worked closely with regional policy makers and other stakeholders. Economic geography as an academic field is co-evolving with the most present issues and challenges in our society. Research on deindustrialisation, clusters, industrial restructuring, labour market dynamics, sustainable transition and innovation processes has always mirrored contemporary societal challenges and political agendas. Theoretical development and empirical studies are based on an ambition to understand contemporary trends in society and seek to find answers to how local, regional, national and international government levels can develop and underpin policies to react to contemporary economic and societal problems. This demonstrates that the often claimed conflict and contradiction between scientific excellence and societal relevance is a myth, and that it is possible to combine these aims and achieve important results in both dimensions. At least Scandinavian economic geography on innovation and regional development has demonstrated that.

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