
Introduction to the relationships between economic geography and industries: theory, empirics and modes of analysis

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The broad field of economic geography and spatial economics, comprising areas such as regional science, urban economics, new economic geography as well as traditional economic geography, is a research arena which has burgeoned since the early 1990s. Much of the current conceptual and methodological framework of the field has a long tradition dating back well into the mid-twentieth century. However, the renewed surge of interest in the field during the early 1990s was largely in response to the analytical work of various seminal authors including Allan Scott (1988), Michael Porter (1990), Paul Krugman (1991), and Edward Glaeser (Glaeser et al., 1992), as well as the empirical work of Luc Anselin (1988), whose ideas and arguments reignited investigations in all aspects of spatial-economic phenomena ranging from the role of cities and regions in economic growth, to factor mobility, knowledge spillovers and firm strategy.

As well as providing novel analytical arguments for numerous scholars to build on, the importance of the work of these commentators is twofold, namely awareness and timing. First, their arguments attracted the attention of a wide range of scholars from many different disciplines, and in particular: business and management studies; organizational studies; political science and sociology; as well as from the established audiences within economics and geography. As such, the potential interactions between geography and economics became topics for discussion and analysis from a greater variety of perspectives. A broader range of debates and an increased dissemination of ideas across broader constituencies all contributed to richer discussions, and also led to a greater awareness of these issues within both national and international policy-making circles.

Second, the timing of the work of these commentators was unexpectedly fortuitous. The onset of the modern era of globalization was driven by the enormous institutional and technological changes which took place between 1988 and 1994, including the creation of the EU Single Market, NAFTA, the fall of the Berlin Wall, the rapid institutional reform and opening up of China, India, South Africa, Indonesia and Brazil, and the invention of the World Wide Web (McCann, 2008). While the global transformations wrought collectively by these individual changes were obviously unforeseen by these various authors, the issues they raised and the questions they posed proved to be highly pertinent and timely with regard to the nature of many of the changes which were about to unfold. Many firms and industries in different parts of the world were catapulted into a fast-changing competitive environment for which many were prepared, but also for which many were not prepared.

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As such, both awareness and timing played a key role in re-establishing spatial-economic phenomena as central to discussions of economic growth and development, as had been the case in the late 1950s and early 1960s. A greater awareness of the role played by geography in economic growth does not imply, however, that firms and industries are somehow less important in driving growth. On the contrary, the behaviour of firms is central to all of these discussions, but by the early 1990s the contextual and decision-making issues associated with geography were increasingly understood as being essential elements of any firm-level analysis. This line of thinking is consistent with the longstanding tradition within regional economics. Indeed, the growth role played by firms and industries and their interactions with geography has a long pedigree dating back many decades, based around the seminal insights of authors such as Ed Hoover (1948), Walter Isard and Bob Kuenne (1953), Robert Lichtenberg (1960), Raymond Vernon (1960) and Ben Chinitz (1961). In addition, outside of geography and also many areas of economics, the 1980s and early 1990s also saw important developments within international business and management studies which led to a renewed thinking of the nature of the growth role of firms and industries (Nelson and Winter, 1982; Piore and Sabel, 1984; Best, 1990; Williamson and Winter, 1991; Pitelis, 1993; Dunning, 2000). Moving away from idealized notions of a representative profit-maximizing agent, these lines of enquiry instead focused attention on the contemporary organizational and strategic challenges faced by different firms and industries in response to the new technologies on offer and the transaction costs and hierarchical systems within which firms operate. As such, these developments paved the way for much of the thinking of Scott (1988) and Porter (1990) in particular, and provided a complementary and alternative line of analysis to the more orthodox approaches of Krugman (1991) and Glaeser (Glaeser et al., 1992).

As noted above, the broad field of economic geography has burgeoned since the early 1990s, as evidenced by the enormous increase in the number of scholarly articles, journals and books published on these issues. New empirical approaches using micro-econometric techniques which aim to distinguish between firm- and geography-specific aspects have been developed. At the same time, it is possible to argue that the various lines of enquiry offered by Krugman, Porter, Glaeser and Scott have not converged, or at least not been integrated, quite to the extent that might have been expected at the time. The various lines of enquiry have tended to run alongside each other rather in parallel, at times complementing and at times somewhat conflicting with each other. Various possible reasons can be offered for this, including simply the internal sociology of the academic world. However, for our purposes, one such reason is that the fundamental organizational changes brought by the modern era of globalization – including outsourcing, offshoring and technological restructuring, all of which are central to discussions of geography – do not translate smoothly into the representative-firm construction characterized in formal economic models. Similarly, even where firm-specific heterogeneity is explicitly modelled (Melitz, 2003), fixed-effects-type regressions are unable to capture the reasons for the observed heterogeneity between industries and firms. The result is that in terms of the broad field of economic geography, the analysis of firm- and industry-specific issues tends to be something of a hybrid construction, drawing insights from various methodological approaches and traditions.

On the one hand, this multiplicity of approaches could be interpreted as a weakness of the field, undermining its ability to provide durable insights. On the other, however,

this could also be interpreted as an opportunity to provide a deeper understanding of the issues at hand. Increasingly, in many fields of social science, ‘big’ issues such as the environment, well-being, governance, innovation and ageing, are increasingly understood as being inherently multidimensional in nature, and individual methodological frameworks are incapable of capturing all, or even a majority, of the features of the phenomena being investigated. As such, a multimethod approach offers insights which individual approaches may find difficult to realize, and this is also the case for the relationships among firms, industries and geography.

In terms of the variety of issues surrounding firm and industry behaviour and performance, the establishment of the Industry Studies Association¹ in 2008 was explicitly designed to spur more of a multi-thematic approach to firm and industry issues combining qualitative and in-depth case-study approaches to firm research with applied quantitative approaches, and to foster a greater awareness among scholars from many arenas as to the importance of industry- and firm-specific characteristics. The potential importance of this approach for economic geography research is obvious given the different lines of enquiry which are already evident in the field and indeed, this premise regarding the opportunities afforded by multidimensional research underscores the logic of this Handbook.

The individually commissioned chapters which comprise this volume are the product of a series of seminars and meetings which were co-convened between the Industry Studies Association and the North American Regional Science Association, and also between the British and Irish Sections of the Regional Science Association International and the Regional Studies Association. At these meetings the various authors discussed the issues facing the firms and industry they were examining, and also their ideas regarding how such issues can best be analysed. Importantly, all chapters are written by authors with a deep understanding of the specific mechanics and technological, organizational and strategic features of each industry, including the historical and technological evolution of the sectors. Many of the issues raised in this book will be entirely new to the majority of economic geographers, while at the same time many of the geographical issues uncovered here will be largely new to industry studies as well as to business and management scholars. Indeed, producing and editing this volume has been a deeply rewarding intellectual experience in its own right, demonstrating the importance of industry-specific knowledge in influencing spatial-economic behaviour, as well as the importance of geography in influencing firm- and industry-specific behaviour.

The Handbook comprises five parts made up of 20 chapters. The five parts reflect broadly different types of industries grouped around the themes of *Heavy Industries*, *Creative and Cultural Industries*, *High technology Sectors*, *Resource-based Sectors*, and *Knowledge- and Network-based Activities*. In terms of industrial classifications these groupings are neither exhaustive nor exclusive, but rather in thematic terms reflect the dominant types of characteristics, modes of operation, and key elements evident in groups of activities.

In Part I, which deals with what are traditionally often described as ‘heavy industries’, Frank Giarratani, Ravi Madhavan and Gene Gruver examine (Chapter 1) the economic and geographical evolution of the modern steel industry. Competition and niche opportunities offered by different types of technology, operations and infrastructure have transformed the modern steel industry, leading to fundamental processes

of industry restructuring and locational adjustment. Similarly dramatic spatial reconfigurations are evident in the automobile industries of North America and Europe. The spatial-economic analysis of the US automobile industry by Thomas Klier and James Rubenstein (Chapter 2) and structural analysis of the European automobile industry by Gill Bentley, David Bailey and Stewart MacNeill (Chapter 3) demonstrate that a combination of the global changes in demand, emerging competition, excess capacity problems, and supply chain realignments both globally and locally, have driven enormous changes in the geographies of these sectors, changing the competitive advantage of different regions as potential production sites.

In Part II, a variety of sectors and activities which are nowadays often grouped under the common theme of 'creative and cultural industries' are examined. Peter Doeringer, Pacey Foster, Stephan Manning and David Terkla (Chapter 4) provide an in-depth examination of sectors which are characterized by project- and craft-based activities. Location is an essential element in these sectors, but the ways in which location matters differ according to exactly which operations and activities are being undertaken, and also result from the evolution of the industry itself. The importance of understanding an industry evolution is also discussed in detail by Yuko Aoyama and Hiro Izushi (Chapter 5), who show that within the video games sector, many of the current international differences in the sector result directly from the different domestic national conditions which fostered quite different historical evolutionary trajectories within broadly the same types of activities. However, as Ann Markusen and Anne Gadwa Nicodemus (Chapter 6) argue, many of these creative and cultural industries can be rather difficult to identify within standard industry classification schemes, so the empirical analysis of the scale and shifts in these sectors requires a careful decomposition and interpretation of the different activities, roles and services evident within these sectors. Similarly, in terms of the economic outcomes of these creative and cultural sectors, as Stephen Sheppard (Chapter 7) demonstrates, the impacts of cultural infrastructure investments may be multidimensional, impacting on both productivity and also amenity values.

Part III examines different types of high-technology sectors. High-technology sectors are extremely varied in their nature, activities, organization, behaviour and outcomes, but following on from some popular descriptions of Silicon Valley, much of the economic geography literature has tended to treat these sectors as being either largely a homogeneous entity, or at least exhibiting an idealized typology towards which all high-technology subsectors should converge. This has been a rather unfortunate development in the literature as it has tended to mask many of the interesting and important features of these sectors. Indeed, the mechanics of high-technology sectors differ markedly according to geography, nationality and history. Heike Mayer's analysis (Chapter 8) shows that the evolution of high-technology activities in so-called 'second-tier' regions develops along rather different lines from many of the popular descriptions evident in the literature. The interactions between history, geography and technology matter, and as both Ram Mudambi (Chapter 9) and Chris Forman (Chapter 10) demonstrate, this is also the case for the processes of international and national economic restructuring, as firms take advantage of the opportunities afforded by new technologies to reconfigure their activities. Furthermore, the importance of high-technology sectors in the modern economy also means that historical and geographical differences in the evolutionary processes

of these sectors have profound implications for aggregate economic performance. As Raquel Ortega-Argilés (Chapter 11) explains, many of the clues as to the productivity gap which emerged between the US and Europe are related both to the evolution of these sectors and also to their impacts on other non-high-technology sectors.

Part IV examines different aspects of resource-based sectors. In standard industrial classification terms these resource-based sectors represent a diverse group of activities and industries. However, they are sectors and activities which face common challenges in that environmental and natural resource management considerations dominate all aspects of their behaviour and underpin the logic of all of their actions. At the global scale, agribusiness is dominated by major international multinational companies linking suppliers to customers. As Ruth Rama and Catalina Martínez (Chapter 12) explain, the importance of global players in linking local and global suppliers and customers is particularly important in the food-related sectors, in which the development of systems of coordination are paramount. However, the research and policy intervention work of Michael Carroll and Neil Reid (Chapter 13) demonstrates that the development of such systems is also important at a local and regional scale, and the coordination challenges at this local scale for resource-based sectors are often at least as great as those at the international scale. At the same time, however, as environmental concerns are becoming important for many sectors, for resource-based sectors they also offer opportunities for the provision of new services with wider benefits across other sectors. This is clearly evident for the recycling and remanufacturing services examined by Joyce Cooper, Randall Jackson and Nancey Green Leigh (Chapter 14), and also for the case of the water management systems discussed by Frank Bruinsma and Mark Bokhorst (Chapter 15). Indeed, as environmental concerns move up the policy and competition agendas, the challenges and opportunities afforded by the emerging systems and services within resource-based sectors will become increasingly relevant for a wider range of sectors than the resource-based industries themselves.

Part V analyses different types of knowledge-related and network-based activities. It is now widely accepted that knowledge-related activities, sectors and modes of operation dominate the economies of developed economies, and increasingly so also in newly industrializing economies. Moreover, the geography of knowledge activities is complex, with many knowledge-related activities appearing on the one hand to be rather 'sticky' in certain places, exactly as Kristy Buzard and Gerald Carlino (Chapter 16) observe for US research and development activities, while also increasingly dispersed internationally via outsourcing and offshoring, exactly as described in the Latin American case by Elsie Echeverri-Carroll (Chapter 17). These spatial transitions reflect complex changes in the spatial patterns of communication possibilities and opportunities as mediated by key sectors such as the global airline industry. As Aisling Reynolds-Feighan (Chapter 18) demonstrates, the geography of these interaction and communication services exhibits clear hub-and-spoke-type features, leading to knowledge-related core and periphery structures which favour certain locations over others. As Hong Shangqin, Philip McCann and Les Oxley argue, (Chapter 19), this means that small and isolated regions face immense challenges in today's global economy, irrespective of the quality of the local and institutional environment and policy-setting arena. As national and international knowledge networks evolve, changing regional knowledge systems may also lead to newly emerging activities even within largely the same geographical and industrial

structure, as is clearly documented for the case of Italy by Fiorenza Belussi and Lisa De Propris (Chapter 20).

Geography and industry are interrelated in many different ways, and the significant analytical and empirical developments over the last two decades have pushed our understanding forward markedly. However, as we move forward, more questions become uncovered, many of which are difficult to answer using orthodox models alone. In particular, different industries and firm types exhibit very different behaviour in terms of economic geography, and these are differences which are difficult to capture or categorize simply in terms of broad dichotomies such as the distinctions between urban and rural regions, or between diversified or specialized regions. Moreover, as globalization continues, the heterogeneity of places implies that many of these differences may well increase rather than decrease, and without a detailed understanding of the industries and firms we are dealing with, it is very difficult to generalize. Rather, a more varied and interdisciplinary approach is able to offer new insights and ways forward for understanding these relationships and as such, a more heterodox approach can complement more formal and orthodox approaches. This Handbook makes progress towards these goals by providing detailed industry-based analyses of the economic geography issues facing different sectors, and the impacts of different technologies, institutions and transaction cost challenges on the behaviour of the firms.

NOTE

1. For a history of the Industry Studies Association, see <http://www.industrystudies.org>.

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