
Introduction

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LOCATION AND INNOVATION

Regional innovation systems thinking has Schumpeterian origins, but Schumpeter never wrote a theory of regional innovation. Nevertheless, many of the theoretical elements Schumpeter did write about, like creative destruction, evolution and entrepreneurship, are of great interest to regional innovation and growth analysts. Part I of this *Handbook* starts with a chapter by Esben Sloth Andersen (Chapter 2) that pieces together Schumpeter's intentions, perspectives and analyses of regional innovation from the whole range of both his German and English written work. Some surprising conclusions can be drawn from this synthesis. For example, it could have been entirely possible for his *Theory of Economic Development* to have been entitled '*Theory of Economic Evolution*', since the German word *entwicklung* translates as either. Accordingly, the predilections of his translator determined that various fields of development studies that he effectively opened up would be denied their evolutionary origins. Does this matter? For at least three reasons, it does. First, evolutionary economic geography, like evolutionary economics, would have a longer, more integrated pedigree. Second, core concepts in evolutionary economic geography like relatedness, path-dependence and creation, and regional absorptive capacity, would have been researched and elaborated to a far greater extent than their currently embryonic state. Third, policy interventions would have been different if informed by sophisticated, well-grounded theory and empirical results. There would have been less 'parachute policy' for needy regions relying mainly on inward investment, and more intervention in support of evolving 'regional relatedness'.

Andersen shows that Schumpeter had ambitions to develop a theory of location that recognized, allowed for and emphasized two dimensions that evolutionary economic geography claims as key conceptual pillars. The first of these is regional variety, while the second is the cultural and institutional distinctiveness that arises from geographical proximity. As discussed in the Introduction to this *Handbook*, B.-Å. Lundvall, one of the founders of neo-Schumpeterian innovation systems thinking, fully recognized precisely these important elements as crucial for successful incremental innovation, and even more for success in radical innovation. But Schumpeter was thwarted in his ambition to achieve a final locational synthesis by his death shortly after he made a public appeal for a large collection of industrial and locational monographs. These were to be researched using a comparative methodology that would explore the continuing innovation of production and consumption functions and the nature and practices of leading stakeholders in these processes, including entrepreneurs. His outline of evolutionary economics would form the analytical template for these case studies of industrial and *locational* evolution. These results could then be formalized to analyse the broader picture of economic evolution, leading to development of general theories of the evolution of the space economy.

A forerunner sketch of key elements of the locational monographs can be visualized in his analysis of 'railroadization'. Andersen shows how Schumpeter emphasized that: 'railroadization is our standard example by which to illustrate the working of our model'. His reason was that many factors 'combine to make the essential features of our evolutionary process more obvious in this than they are in any other case more easily than in any other can the usual objections to our analysis be silenced by a simple reference to obvious facts'. This was particularly intended as a key illustration of the Schumpeterian theory of waveform economic evolution, but he used railroadization more generally, to exemplify nearly all aspects of his evolutionary theory. Hence evolutionary economic geography and regional innovation lay at the heart of Schumpeter's standard model of evolutionary economic growth.

Finally, an aspect of Schumpeter's perspective that remains germane to modern analyses of economic evolution is irreversibility, especially concerning the branching of innovations from platforms of preceding innovations, new path creation or the mutation of clusters by recombination of existing knowledge to form new potential firms, clusters and innovations. Irreversibility as he saw it derives from the imperative for economic agents always to tailor their practice to existing reality. Thus if digitization did not exist there would be no credit cards, mobile telephony or e-mail. Hence it is clear that although the process of economic evolution could have 'searched and selected' myriad trajectories, in reality it only follows one. As Andersen puts it: 'any replay of the film of economic evolution will therefore end up with a different outcome'. This hints at the importance of an evolutionary economics understanding of the mechanisms, capability limitations and institutional blockages that determine the nature and direction of path-dependence in the economic system.

IRREVERSIBILITY, EXTERNALITIES AND INSTITUTIONAL FIT

It is for reasons such as these, concerning fascination of broad and suggestive theoretical problems – like the role of location in economic evolution, for example how to explain cluster evolution in economic space; regional innovation and systemic evolution, for example what spatial specificities underpin repeated innovation; and irreversibility or path-dependence and branching, for example what is the precise role of relatedness in cluster mutation – that the school of neo-Schumpeterian innovation studies developed. It aims to continue his work and solve the many fascinating problems about evolution that he raised. In David Wolfe's Chapter 3, a biography on the neo-Schumpeterian school's sectors of interest in national, technological, sectoral and regional innovation systems is presented. In this, four key elements are of high importance for the project of this *Handbook*. First, Wolfe stresses the ways in which the co-evolving nature of the global macroeconomy towards a knowledge economy places much more emphasis on the exploitation of initially tacit (creative or scientific), subsequently formalized (codified) knowledge for innovation and growth. Clearly, knowledge was exploited in the Industrial Age, but much of it was workshop-based 'learning by doing'. Nowadays, much of the high-value segment of international trade involves the exchange of innovations. The ability to create these is not so much a product of resource-based or

cost-based comparative advantage, but a more institutionally founded, knowledge-based constructed advantage. Second, Wolfe draws attention to the relationship in the neo-Schumpeterian school's work between market and institutional (that is, non-market, collective provision like public research, education and procurement) dimensions, and particularly the issue of 'institutional fit' in relation to societal and economic needs. This is also a focus of Heidenreich and Koschatzky's Chapter 39 in Part VII of this *Handbook*. Institutional fit facilitates systemic interactive learning, and in the market the kind of collective entrepreneurship through user–producer interactions that Lundvall emphasizes. In respect of regional innovation systems, Wolfe has a useful focus on the 'increasing returns' dimension of path-dependent positive 'lock-in' that reveals the market success of an innovation, but which may turn negative for the region that fails to renew its market advantage or its institutional fit. Finally, he demonstrates the ways in which network interactions are the means of ensuring refreshment of interfirm and interinstitutional fit, and how geographic proximity of the regional kind facilitates that.

Eirik Vatne's Chapter 4 takes these insights forward in mining the theoretical work of the classic location theorists to extract the relatively limited contribution that they made to regional innovation studies. As Wolfe shows, the classical and neoclassical traditions eschewed the study of 'technology', as it would be referred to, since it was impossible to model and was assumed to be a purchased input accordingly. Nevertheless their perspectives had implications for innovation, not least because their work involved explaining agglomeration, which was an innovative outgrowth of early industrialization, notably in mining and other resource-intensive activity. One aspect to note in Vatne's summary of Von Thunen's land rent theory of growth is how automatic agent response is to market signals. There is none of the sense of drama found in Chapter 2, where Andersen imagines the same situation radically changed because an entrepreneur introduces a railroad between two cities, which can be analysed by means of Schumpeter's evolutionary version of comparative statics. He also points out that Marshall, then an embryonic evolutionary economist, recognized three things salient to this *Handbook*: differentiation and integration (relatedness and its socio-technical organization); collective entrepreneurship and firm interdependence; and the market advantage from innovation that exploits these 'external economies'. These were the source of Marshall's theory of innovation, which stemmed from knowledge interchange within the 'industrial district', and between it and its markets. Agglomeration for him stemmed from the interaction of technological, labour pool, and networking 'externalities' (spillovers). Weber's contribution to innovation theory was rather less, but not negligible. Initially innovation, in the guise of technology, was treated as uniform in his partial equilibrium framework. But key 'agglomeration factors' after transport and labour costs included development of new technology and better work organization (that is, process innovations) facilitating external returns to scale. These were differentiated by Hoover into locational and urbanization economies or, as Vatne terms them, 'Romer externalities' and 'Jacobs externalities' in more modern parlance. But it was Francis Perroux who most clearly utilized Schumpeterian disequilibrium and evolutionary perspectives in his regional development model, as also noted in Andersen (Chapter 2 of this *Handbook*) arguing innovation to be the engine of regional growth.

AGGLOMERATION AND INTERNATIONALIZATION

A further model of regional development that was centred upon regional innovation and growth was Vernon's 'product life cycle'. Gunther Tichy, in Chapter 5, dissects it from its origins in practical regional planning to its demise in the face of organizational innovations in the decades since it was introduced in 1960. The basic thesis of the approach, echoing regional industrial organization of the time, was that innovation and manufacturing (product innovation) occurred in high-income lead markets (for example New York or Los Angeles) but manufacturing quickly moved to cheaper labour zones as standardization of production (process innovation) cheapened the product, thereby also enlarging its market. Tichy then traces the mechanisms causing the demise of the model's explanatory power, showing how new agglomerations may concentrate innovative production, dominant designs might undermine innovator regions, and open innovation means that manufacturing establishes only in low-cost regions (for example Apple products like iPhone and iPad at Foxconn in south China).

We conclude this introduction to the 'Regional Innovation Theory' part of the *Handbook* with two takes on the Marshallian and neo-Marshallian perspectives on regional innovation and growth. Accordingly, this provides an elegant balance of the two main theoretical wellsprings of regional innovation theory: the Schumpeterian or neo-Schumpeterian on the one hand, and the Marshallian or neo-Marshallian on the other. In Chapter 6, Marco Bellandi opens the reflections with an analysis of Marshall's analysis of industrial district processes observed partly through the lens of late-developing Italian experience (Third Italy: Chapter 1, 'Introduction' to this *Handbook*). It is immediately noteworthy that this perspective emphasizes the twofold dimensions of: (1) small and medium-sized enterprise networking making for an externalized, local division of labour; and (2) localized cultural bonds embedding economic activity in local society. The first of these furnishes what elsewhere (Chapter 1, 'Introduction' to this *Handbook*) was specified as the innovation paradigm in relation to the second, the innovation regime, institutionally supporting the paradigm. Of interest here is that these had to be mobilized into a 'world of production' (Sunley's Chapter 25 in this *Handbook*), dominated by large multilocal and mass market firms traversing Vernonesque space. This was not the case with the first industrial districts studied by Marshall in Great Britain. Accordingly, 'flexible specialization' often had to outcompete – with economies of scope (variety, innovation, design) – the predominating economic geography of scale. Globalization now challenges the evolution of this model even further. Design-driven innovation is one response to this (Chapter 1, 'Introduction', and Chapter 43 in this *Handbook*). Internationalization of product cycles is another. Organizational innovation (for example 'orchestration' or 'versatile integration' of small and medium-sized enterprise teams) and the elaboration of variety is yet another, moderating path-dependence and associated 'lock-in' practices and mindsets.

Finally, the newer neo-Marshallian practice is evaluated by Fiorenza Belussi in Chapter 7. This is characterized by major outflows and inflows of knowledge, labour, intermediaries and entrepreneurs. Modern districts are more orchestrated into groups with lead firms acting as knowledge gatekeepers, while the 'gardening' practices of localized intermediaries towards their industrial district are replaced by global trade, currency and investment rules. But in districts that embrace this more global regime, innovation

practices are heightened, not least because in some cases (eyeglass frames, kitchenware, ski boots) they seek to maintain global export leadership.

Thus regional innovation theory is found to have firm foundations, notably in the neo-Schumpeterian and neo-Marshallian traditions but also in possibly unsuspected ways through scholars like Hoover, Vernon, Perroux and even Weber. What can be concluded as having a unifying or at least resonating effect upon what are a diverse group of partial equilibrium and disequilibrium evolutionary and classical or neoclassical regional scientists? Three features link them intellectually. First, most obviously for the regional economists, but tellingly also for Schumpeter and Marshall, is a recognition that economic processes interact significantly with geographic and socio-cultural proximity. Second, all are interested in the most pronounced expression of this, which is the nature of agglomeration and the way this evolves in relation to change in innovation paradigms and regimes. Finally, with the exception of the static classicals, there is recognition of the importance and force of innovation as a solvent of path-dependence and a means of accommodating to the turbulence that accompanies economic evolution.