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# Introduction

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## PROXIMITY AND INNOVATION

Part IV is devoted to understanding the manner in which innovation is facilitated and enhanced by distinctive kinds of proximity in agglomerations. It begins with Chapter 20 on the relationships between proximity and innovation by Christophe Carrincazeaux and Marie Coris, representatives of the French originators of the ‘proximity debate’ in the early 1990s.

This influential approach is consistent with the core theoretical elements underpinning the theoretical frame of this *Handbook*, namely an interest in the interactions between, for example, relatedness, knowledge spillovers and lateral absorptive capacity in agent recombination of knowledge for innovation, on the one hand, and the institutional structure that sustains such interactions systemically, on the other. This is expressly related with the new economic geography (NEG) perspective in its original formulation, being formed in the interplay between agglomeration and dispersion. However, the simplistic and traditional binary division between centripetal and centrifugal forces or ‘core’ and ‘periphery’ thinking is subsequently exposed to critique by the proximity model. For example, what is the extent of proximate technological externalities, that is, how local is local and what are the knowledge transfer mechanisms, and are they always positive in their effect on innovation? Research on this line promises to shed light on the recurrent problem of measurement of regional knowledge spillover leakage (and infusion) with respect to innovation.

One way in which progress is made here is that the Proximity School privileges the coordination of agents over economic geography’s perennial neurosis about scale. This means that spatial configurations are constructed from social interactions, rather than the reverse. It means analysing the interaction between knowledge and its communication space. The former is composed of ‘combinatorial knowledge’ and new or ‘technological knowledge’, both of the Schumpeterian kind. Innovation arises from a double interaction among combinations of pre-existing knowledge and between these and new knowledge, hence the emphasis on coordination skills. Many of these are tacit; accordingly geographic proximity is important up to a point because modes of communication, identification and application may express ‘localized discourses’ among cross-functional ‘communities of practice’. In these respects, geographical proximity is moulded by relational (that is, cognitive) proximity, meaning that the space of innovation may display a variable geometry. This must be analysed in its changing forms by concrete research to identify the dynamic interplay between complementary and substitutable proximities. This requires careful conceptual refinement of the phases of innovation: hence, a science-based sector might privilege geographic proximity for research and development (R&D) but distant networks for innovation and other near-market activities. Contrariwise, a symbolic knowledge sector might privilege distant networks for determination of a

creative artifact's value, but geographic proximity for realization of such value (art auction proximity).

## SOCIAL CAPITAL AND CLUSTER INNOVATION

The idea that knowledge plays a crucial role in proximity dynamics is underlined in Stuart Rosenfeld's Chapter 21 in this *Handbook*, an analysis of the role of social capital in regional innovation. He sets the following agenda for regional development theory and practice. First, to design interventions that develop social capital and increase rates of learning, networking, innovation and sustainable growth, and to ensure inclusivity. Second, and imaginatively, assessing how the geometrically increasing use of social networking is affecting the geography and meaning of social capital. Rosenfeld notes that the concept was popularized (though not invented by) Jane Jacobs as her correlate of the medium by means of which regional diversity stimulated innovation (see Chapter 11 of this *Handbook* by Iammarino for further detail). It could also be observed in the innovation practices of industrial districts in the 'Third Italy' where learning, networking and trust were evident in the interfirm and intracommunity interactions, expressing their high social capital. The 'leakage' of knowledge among agents in the region is discounted by Marshallian gains as employees, if not employers, interact and 'educate one another' through Bellandi's 'underground learning'.

As in Carrincazeaux and Coris's (Chapter 20) perspective on proximity, Rosenfeld, after Maskell, sees the boundaries of the cluster being set by the extent of learning knowledge of consequence to its innovation and renewal. Nevertheless, in US high-tech clusters, social capital is insufficient to prevent interregional leakage of value-adding innovation based on localized knowledge. Whether leakage is significantly moderated by pecuniary R&D and non-pecuniary network inputs to research university locales remains a mystery. The advent of 'social networking' among large swathes of the world's affluent youth, especially, has been a remarkable cultural phenomenon, but does it influence core innovation interactions? The jury is out but, admittedly middle-aged, expert opinion is reported by Rosenfeld as unanimous that that face-to-face interaction reveals more: notably the subtleties of tone, meaning and context crucial to interpretation of uncertain knowledge. Measurement of social capital effects awaits Krugman's hope that dreary old economic measures can be found to measure a phenomenon that leaves no paper trail. The best results emerge from tailored surveys, which are nevertheless resource-intensive but show measurable social capital to be a real presence in market transactions. Indeed, as James (Chapter 19, this *Handbook*) recalls Karl Polanyi's observation, market transactions would not exist in the absence of social capital.

The questions centred upon social capital and agglomeration surface clearly in Arne Isaksen's examination of processes associated with cluster emergence in Chapter 22. This has recently been the subject of a book-length treatment by Dirk Fornahl and colleagues, cited in Chapter 1, 'Introduction', to this *Handbook*. One key issue that had tended to be overlooked in earlier research on the subject was: what is the nature of a cluster, as distinct from an agglomeration, or simple co-location? The answer is that interactions, including but also transcending arm's-length exchange, occur between cluster incumbents. That is, social capital stimulates cooperation, tighter collaboration, formal and

informal networking, and exchange of favours based on trust and reciprocity. Instead of this, questions used typically to be posed regarding the numbers of firms that constitute a cluster, reminiscent of Zeno's paradox of the bees: that is, how many make a swarm? Accordingly, Krugman's above-mentioned desire to find such social interactions in dreary economists' data before handing over to the social anthropologists is likely to remain unfulfilled. Accordingly, Isaksen rightly notes that research has hardly scratched the surface of the issue of cluster evolution, that is, their origins and development over time, compared to the now well-explored question of why industries cluster.

Although the question of cluster emergence suggests a facile adaptation of product life-cycle theory to a new problem, in fact what is called for is further reflection upon path-dependence and, indeed, diversified path-interdependence (Martin's Chapter 15 in this *Handbook*) to try to unpick the evolutionary mechanisms involved. Nevertheless emergence, growth, maturity and decay or renewal make evolutionary life-cycle reasoning to some degree unavoidable, moderated by recognition of the indeterminacy of outcomes and avoidance of all teleologies. This is achieved by adoption of a regional innovation systems frame of reference regarding interactions between 'innovation paradigm' and 'regional innovation regime'. Logically speaking 'regional regime' variety is a powerful intervening variable in the key inflections of cluster evolution. This would be especially true in 'episodic' radical innovation contexts that renew paradigms, and even in 'epochal' innovation contexts, though more dependently. Here, Isaksen stresses two initiating conditions: first, certain prerequisites or assets exist; second, triggering events stimulate entrepreneurship. In the 'Third Italy', prerequisites included the onset of the 'flight from the soil' by artisan farmers, on the one hand, and economic modernization (housing, automation and urbanization) on the other.

The 'Tuscan', 'Emilian' and 'Marche' models displayed the response of many of the former (artisan farmers) turning to innovative opportunities in the latter (ceramics, white goods, furniture, leather) aided by the European Common Market and US demand. Yet their regional regimes have ranged from left centralism to left decentralism to relative conservatism, and clusters and districts also displayed paradigm variety. The Emilian model is represented by varieties of fine engineering districts and decentralized support services; the Tuscan model had a 'counter-regime' character of entrepreneurship in the face of 'democratic centralism' and official disdain for small businesses; while the 'Marche model' evolved with a responsive regional regime and strong, often religious, conduits to regional credit. The last-named fared badly in 2008–09 when private credit froze, whereas the Emilian model was more resilient because of its cooperative financing traditions. The 'Tuscan model' is different, declining in employment due to varieties of 'hollowing-out' in production, but experiencing innovative bank financing to bolster its interlocking equity model of 'directed networks'. These are all mature cluster regions facing decline or renewal; as such they continue to represent an invaluable laboratory for the study of regional diversity in cluster life cycles. Isaksen illustrates this stage of the cluster life cycle by reference to the end of Oslo's offshore engineering due to cognitive lock-in favouring traditional oil-rigs over an innovative submarine robotics paradigm. Accordingly, cluster renewal seems intimately bound up with regional regime governance of either the 'anchor firm' kind denoted in De Propriis and Crevoisier's Chapter 13 in this *Handbook*, or more public orchestration to increase 'relatedness'.

## TRANSVERSALITY AND TECHNOLOGY

This is more deeply examined in Philip Cooke's Chapter 23 on transversality in this *Handbook*. Transversality is the regional regime or regional economic governance methodology for securing regional innovation by enhancing relatedness. It embraces the intermediary concept of 'innovative platform' that refers to the combination of interacting regional clusters and/or other forms of related regional industrial organization (for example oligopolies, supply-chains, networks). Transversality not only refers to recombinant regional innovations arising from cross-fertilization of knowledge among distinct industries, but it also embraces the idea of 'joined-up governance' among distinctive policy jurisdictions of relevance to regional innovation and growth. A variety of regional regimes for promoting transversality can be identified on the basis of regionally informed economic governance research. These range from the reactive, seeking solutions to the loss of a core cluster; to varying degrees of proactivity, either seeking to variegate a specific path-dependence or deal with a temporary regional paradigm shock; to committed proactivity to furthering regional innovation by stimulating cross-sectoral knowledge recombinations. Of special interest to the regional innovation and growth interest of this *Handbook* is the repositioning of regional regime governance towards the centre of the regional innovation process. From being a passive 'supporter', 'promoter', 'encourager', 'assistant' or 'partner' in the old rhetoric of supply-side regional economic assistance, the regional regime becomes more of a demand-side 'catalyst' for regional innovation.

Finally, in Chapter 24 we come to Edward Malecki's take on the position of technology clusters in the menagerie of organizational forms taken, notably at the leading edge in this case, of regional innovation and growth. The 'red thread' running through Part IV of the *Handbook* is the role of human organizational capability in fruitfully coordinating knowledge, utilizing social capital in geographic proximity, to evolve, refresh and retain spatial agglomerations with the characteristics of 'innovative clusters'. The technology cluster is the apotheosis of that exercise in spatial complexity, combining as it does both the 'networks' (social capital) and 'scaffolds' (coordination, proximity) that complexity theorists habitually see as separating order from chaos in natural and social scientific affairs. As Malecki states, technology clusters are different from the rest because they remain in relatively immature stages of the 'cluster life cycle'. They are also highly research- and knowledge-absorbent, a further differentiating feature. They vary in assets like entrepreneurship or networking propensity according to national and regional regimes as well as the innovation paradigm to which they belong. They can generally be distinguished by their 'entrepreneurial ecosystem' of research and technology; sources of risk finance; and an entrepreneurial or technical culture. Their success often means that they suffer 'diseconomies of agglomeration' in congestion and other infrastructural inefficiencies. Start-up and spin-off activity tends to be rife at the cluster emergence and early growth stages of technology cluster life cycles. Some display advanced learning in recombinatorial knowledge skills; others are advanced in complex system integration. On the question of transferability of such entrepreneurial ecosystems, Malecki is agnostic, but it could be argued that with advanced knowledge plus venture capital and talent, it can be emulated in a different form, perhaps best exemplified by the Israeli experience of evolving high-tech mini-clusters (see Chapter 38 on incubation policy by Shefer and Frenkel in this *Handbook*).