**Journal of Economic Geography Special Issue**

Innovation and Economic Geography: A Review and Analysis

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*Abstract*

This paper reviews the developing links between economic geography and innovation theory and practical management in terms of research and literature. The paper identifies five main themes where this has been most evident, namely: coordination issues; proximity and geographical environment (including clusters, spillovers, agglomerations and networks); flows and connections: transactions and trade; enterprise and entrepreneurship; and, innovation and knowledge. The paper positions the papers in this Special Issue within this framework and identifies areas for future research between the two fields.

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1. **Introduction**

There has long been a close association and interest between issues that have been covered by economic geographers and those from the management and business disciplines, and one key area has been around the theme of innovation. Indeed the Journal of Economic Geography has played a key role as a catalyst in bringing these two worlds closer, both through its editorial policy (for example, see editorials by Wrigley and Overman, 2010 and Wrigley and Puga, 2005) and in the form of a number of Special Issues. However, this overlap of interest has not always been replicated in terms of cross-referencing of the literature between the two fields, with the exception of literature relating to specific corporate locational behaviour and international business development (see Beugelsdijk et al., 2010). This is now changing as certain themes within the management literature involving a geographical dimension have become more prominent. These include key issues centred on clusters and networks and how this influences firm survival and performance, but the discussion also goes back to issues of collaboration and coordination over distance, which replicated earlier work on multinational businesses. Similarly, there are certain areas where geographers have long had a certain hold and expertise, which has shaped and influenced the management and business literature. Examples here include, most notably, research on services, retailing, entrepreneurship, innovation and technology development (including diffusion) together with more expected crossovers relating to transport and logistics and corporate location decision-making. This Special Issue has sought to focus on contributions with a particular focus on innovation and knowledge and how the research field can be influenced by, but also influence, developments in the two major extant fields of economic geography and management.

The drive towards closer collaboration may also have arisen through more indirect mutually reinforcing influences. Firstly, with the growing number of economists and geographers who are working within business and management schools and, secondly, through research funding which in many developed economies is seeking to address ‘big challenge’ research questions, which require multi-disciplinary approaches to providing research solutions. This may be more apparent in a European context where there has been arguably more intermingling of business and management schools with other social science disciplines than North America where business schools have been both much larger, longer established and arguably more exclusive in terms of disciplinary focus. More subtly, the study of geography (as with engineering), in common with management and business studies, has also been seen as a more pragmatic, open and approachable discipline that is more interested in the art of the possible rather than the traditionally more aloof and classical approach of the economists. The major influence in economic geography of behavioural studies in the 1960s and 1970s, followed by organisational approaches in industrial geography in the 1980s is just one example of this openness and fixity in trying to explain what was happening in the real world.

What have been the most significant areas of cross-fertilisation between the two core bodies of knowledge? We suggest that there are five key areas where this interchange has been most influential and which also cover the remit of the papers in this Special Issue, although noting that the particular underlying focus on the papers has been on innovation and knowledge and it is this latter theme where arguably much of the cross-fertilisation of research has been active recently. The five areas are:

1. coordination issues;
2. proximity and geographical environment (including clusters, spillovers, agglomerations and networks);
3. flows and connections: transactions, trade and chains;
4. enterprise; and,
5. innovation and knowledge.

Each of these themes will discussed in turn, but as noted above much of the research and papers cited cover more than one of the categories identified above.

**2. Coordination, Structure and Control**

Unless one assumes a neo-classical, single site firm existing in a homogenous, aspatial world, real world firms encounter problems operating in geographical space. These issues are perhaps most profound on an international level, and hence early interest and cross-fertilisation between geographers and management academics under this realm. However, how to organise, coordinate and control activities in a context involving more than one site immediately raises a number of complex, non-trivial issues. This includes a series of questions: ‘Where?’ (if we leave aside the original location of the firm) ‘How many?’ ‘What size?’ and ‘What functions where?’ An example, is the location of research and development (R&D) units within multi-site and especially multi-national companies raises a whole of set of questions associated with locational preference (proximity to headquarters units, manufacturing plants, key customers and markets, and research and technological expertise), number and related to this minimum and maximum laboratory size (for best innovative performance), regulatory or market variations between different national territories influencing returns to R&D (see, for example, Malecki, 1980; Howells, 1984). Increasing emphasis on the opportunities opened up by more distributed innovation processes in a knowledge-rich environment – the ‘open innovation’ challenge (Chesbrough, 2003; Howells et. al. 2008) – has raised questions about extended R&D operations and the co-ordination of core-periphery relationships and knowledge flows (Alnuaimi et al, 2012).

For large multi-site companies operating in different markets, technologies and locations can make such decisions extremely complicated and, once decided upon, difficult to operate and coordinate effectively (Dunning, 1994). This can be seen as a central firm capability in terms of how it manages its structural arrangements across organizational (and locational) space (Chandler, 1962; Bartlett and Ghoshal, 1989). Organizational coordination across function and geography is one of the key essences of a firm’s set of core competences (Aoki, 1990). The internal organisation of firms and how they are coordinated and managed over space remains a major concern for managers and their frameworks for doing this are key to understanding in how they break into new markets and territories (Lowe, Williams and Shaw, 2012), but also how certain sectors have definable preferences for certain knowledge locations (Tether et al., 2012).

**3. Proximity, Location and Environment: Clusters, Spillovers, Agglomerations and Networks**

If coordination, structure and control are difficult enough when considering how to spatially structure itself most efficiently for long-term performance and development, it becomes even tougher when considering other firms, organisations and consumers (competitors, collaborators, suppliers, customers, governments and agencies) in this process. Here the geographical environment in which the firm is located can have an important effect on its growth, profit and overall development, including survival and innovative performance. The long established notion of industrial agglomeration within economic geography, for example, from Marshall (1890), Weber (1909), Hoover (1947; Hoover and Vernon, 1962) and Isard (Isard and Schooler, 1959) gained further momentum within the concept of industrial quarters (Wise, 1949) and districts (Sunley, 1992; Amin, 1999; Håkanson, 2005), spatial clusters (Maskell, 2001) and networks (Håkansson, 1987) and this crossed over to the policy domain in the 1990s (Breschi and Malerba, 2001) which then was picked up by economists (Jaffe, 1993) and management scientists (Porter, 1988; Pouder and St. John, 1996).

For geographers, clusters, although seen as increasingly popular concept, were often treated in a casual uncritical way frequently misinterpreted or conflated with simple spatial concentration of particular activities, let alone more complex agglomeration effects (see, for example, Martin and Sunley, 2003; 2011). Above all, although there was much discussion, specific and clear evidence was lacking and this has lead a reinvigoration of both analysis (Baptista and Swann, 1998; Tappeiner et al., 2008) and conceptualisation of key concepts (see, for example, Rosenthal and Strange, 2001; Pinch et al., 2003; McCann and Folta, 2009). One of these topics has been in the interpretation of spillovers and whether their characteristics and effects are influenced by location and national territory. Breschi and Lissoni (2009) have highlighted the importance of spatial scale of co-innovation networks in influencing the depth and extent to which knowledge spillovers are localised or not. The study by Crescenzi et al. (2012) of China and India in addition suggests that where this happening can have a big impact on the nature and extent of these outcomes. Thus, they have revealed that there are strong backwash effects for innovative centres in China, whereas in India innovation centres generate positive knowledge spillovers to adjacent regions. Clearly location matters in terms of defining spillover effects, as does the contrasting picture between India and China in terms of levels of concentration and pattern of innovation.

The notion that networks have important social and cultural dimensions has been an ongoing area of cross-fertilisation between researchers in management and geography. One such example has been in the development of the concept of the communities of practice (Wenger, 1988), which has been articulated and developed by geographers (Amin and Roberts, 2006; Roberts 2006). These links are further exemplified in the paper by Lowe, Williams and Shaw (2012) which analyses the development of the hotel chain, Hotel du Vin, both within the context of informal, self organising networks and the role of social capital but also the role of individuals in the diffusion of knowledge and of an innovation. They develop the concept of ‘diasporas’, originally outlined by Clifford (1994), to articulate the replication and fragmentation of an original concept and creative innovation, a new hotel chain, into a set of spin-off and follow-on enterprises. The study introduces new insights into how a new conception, such as an innovative hotel chain, both diffuses but also changes over time. It also raises the more fundamental issue in diffusion studies of tracking a phenomenon, which is itself changing and evolving over time.

This introduces a further element where there has been much cross-cutting research between the two communities, that of the role of learning and trust. In geography this has been led by Asheim (1996), Morgan (1997), Lawson et al. (1999) and Cooke (2000) who in turn have been influenced by the role of learning in economic and management studies (Brown and Duguid, 1991). The paper by Bessant et al. (2012) seeks to articulate and develop the notion and policy option of learning networks, which seek to mobilise, shared peer-to-peer learning in groups of organisations. This links with Granovetter (1973) and his notion of ‘weak ties’ in terms of providing opportunities for development and the need for support of brokers to bridge ‘structural holes’ (Burt, 2005) in networks. Capabilities to exploit, but also overcome, problems within networks are therefore seen as a crucial capability for firms working in an environment of open innovation (Section 6).

**4. Flows and Connections: Transactions, Trade and Chains**

The key interest for academics in management was in the effects of location on firm performance (see, for example, Porter, 1995) and how collaboration and networks within specific spatial realms could support, or hinder, the growth of a firm. For firms (especially multinational firms), how they could leverage these network and spillover effects across borders was seen as a key competitive advantage (Cantwell and Iammarino, 2001). For management, though, this interest had also gained momentum separately through researchers such as Pfeffer (1972) who recognised that inter-firm relationships especially in particular localities could lead to significant flows of knowledge and other resources that are crucial to firm development and how this reflected more generally on organization theory and strategic management. More fundamentally, apart from their economic effects on performance through externalities and spillovers, clusters and networks were perceived to have important theoretical implications in organizational theory. In short, collaborations, networks and clusters were seen to be, in effect, resources in their own right (Freeman and Bailey, 1990). The focus here shifts from nodes and localities to the connections between them and back to how these are coordinated (Section 2), but more generally their effects on firm organization, management and structure.

The effective management of international business is an enduring theme and of central interest to researchers in management in an increasingly globalised world. The work of Dicken (1992) in particular has had a major impact on the management literature through its clear articulation of the complexities of geographical and spatial structures. The emergence of globalisation both as phenomenon, but also one that multinational companies were shaping through their strategic responses to it (Dicken, 1994), became a topic that had strong cross-overs in the two research communities (see, for example, Wrigley et al., 2003). The relationship between trade and foreign direct investment and how firms served particular overseas markets was one such ongoing theme, linked in turn with models of multinational behaviour and internationalisation (Michie, 2011). A Special Issue of this journal looked at aspects of this related to retail services (Wrigley and Lowe, 2007) and the issue was explored further in a major OECD report (Wrigley and Lowe, 2010).

Thus, the ongoing debate concerning vertical and horizontal resource and rent seeking strategies is important here (Grossman et al., 1996). This is linked to the degree of autonomy overseas subsidiary companies have (Birkinshaw and Morrison, 1995), their relationship and structure with regard to the headquarters of the firm (Cantwell and Mudambi, 2005) and crucially how this relationship evolves over time. How multinationals structured their world and operated and responded within it, remains a key strategic interest of which the two communities help inform each other, particularly with regard to managing innovation (Ghoshal and Bartlett, 1987). The work therefore by Lowe, George and Alexy (2012) has sought to outline how capability development and the implementation of routines around them have been crucial in Tesco’s expansion into the United States. The three capabilities identified in the paper: transference, splicing and enhanced imitation are vital elements in Tesco’s capability set and the process that it seeks leverage and deploy its competitive advantage in overseas markets.

More recently, the analysis has moved beyond the largely internal focus of the firm to how it manages its relationships and boundaries beyond the firm (Richardson, 1972) within a geographical context (particularly within an international context). This means that firms have to consider both the geographical location of *internal* functions as well as manage their *external* relations associated with, for example, customer-supplier relations (Lamming, 1993; Christopher and Towill, 2001; Bessant et. al. 2003; Miozzo and Walsh, 2006). This can be seen most directly in managing the supply chain as it moved from regional and national spheres to international ones (Gereffi, 1995; Ivarsson and Alvstam, 2010). Some of this work echoed the linkage studies of industrial geography in the 1970s and 1980s (Taylor, 1975), but was overlain with the more direct urgency of and how this could be done in an era which increasingly also required ‘just in time’ methods (Stalk and Hout, 1990). Here the problems and complexities of managing both space and time with shrinking horizons on both dimensions provided a topic of ongoing debate and concern. The challenge of operating and upgrading the performance of such extended supply networks has led firms to develop a variety of strategies to build robust but flexible governance and learning structures (Dyer and Nobeoka, 2000), deploying a similar mix of capabilities to those identified by Lowe, George and Alexy (2012).

The changing boundaries of the firm and how this intersects with geography has also been prominent in the phenomenon of outsourcing and offshoring (see below), which have now become major topics in their own right and has stimulated research from both sides. The study by Alnuaimi et al. (2012) stresses the role that international R&D collaboration is an important mechanism for generating new ideas through cross-border integration of knowledge. They also seek to highlight the long term effect on the performance of foreign inventors, allowing them to generate high-impact patents and explore new technological opportunities on their own. However, the new capabilities that foreign inventors are exposed were found not translate to subsidiary-level capabilities highlighting an important disconnect in how such capabilities diffused internally and externally to the firm.

**5. Enterprise and Entrepreneurship**

In terms of enterprise and entrepreneurship economic geographers have long seen as new firm creation and the role of Small- and Medium-sized Enterprises (SMEs) as important to overall local and regional growth. For economic geographers, firm formation, survival and growth rates were in aggregate important in shaping regional development, but were also shaped by regional conditions associated with, for example, branch plant syndrome where large plants owned by large multi-site firms depressed entrepreneurial activity within a locality (Firn, 1975). Interest, because of the growth implications, also centred on new technology-based firms (NTBFs) and this was developed by researchers who were working in both sets of arenas (see, for example, Oakey, 1995).

Attention has shifted from the formation of new firms to their overall growth and survival rates, especially high growth firms (see, for example, Storey, 1992; Vaessen and Keeble, 1995). For management examining these external conditioning factors can help identify ways to remove barriers to growth and also provide insights on ways to better manage new and small firms. This theme is, for example, taken by Bessant and Tidd (2007, 54-66) in seeking to outline the importance of the external task and geographical environment to the fledgling firm. It has also been developed in relation to how new firms and their network relationships in terms of finance, such as the role of business angels (Mason and Harrison, 2000), supply chains Shaw, 1991; 1994) or in the replication and fragmentation of networks tied together by individuals from shared groups and histories (Lowe, Williams and Shaw, 2012).

Van de Ven (1993) has outlined the notion of ‘infrastructure for entrepreneurship’ to provide a framework of support to firms for entrepreneurial success. This infrastructure can be seen to sit beside, but also to compensate for, local or regional environments that do not provide the right ‘milieu’ for entrepreneurial development or innovation. Studies that help inform the policy context for new and small firms development, but also offer practical support, remains an important theme for both disciplines in approaching this theme.

**6. Innovation and Knowledge**

Innovation and knowledge has emerged as a research arena, which has seen some of the most significant elements of cross-over research in recent years (see, for example, Pittaway et al., 2004; Huber, 2012). Interest in innovation and its implications for spatial change have long interested geographers and two particular foci of research have been the diffusion process (Hagerstrand, 1959; see, for example, more recently in the context of clusters Baptista, 2000; 2001), and how changes in technology may shift locational preferences in both manufacturing and service industries (and indeed in their consumers). Innovation has, therefore, represented an important dynamic change agent constantly altering the equilibrium in patterns of production and shifting the dynamics of competition. Although perhaps unrecognised (Boschma and Franken, 2006; 2011) this evolutionary pattern can be seen in the earlier product life cycle models (Vernon, 1966; Markusen, 1985) and how this may effect change on locational preferences and hence localities.

An emergent theme is the role played by emerging market contexts in shaping innovation not only to meet local needs but as a source of radical new trajectories with the potential for ‘innovation blowback’ or ‘reverse innovation’ (Seely-Brown and Hagel, 2005). Originating in the work of Prahalad (2006) the idea of the ‘bottom of the pyramid’ as a source of innovation is gaining momentum, in part because it forces the development of new and potentially disruptive approaches through interaction with users with very different needs (Christensen, 2007).

The explosion in knowledge production has been accompanied by a significant widening of the distribution of sources on a geographical basis (Bessant and Venables, 2008) and this raises questions about how firms become aware of and access new knowledge. Arguably the opportunities offered by ‘open innovation’ (Chesbrough, 2003) will require modification and extension of the core organizational routines which constitute absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002) to enable ‘finding, forming and performing’ in new knowledge networks (Birkinshaw et. al. 2007). One significant, and as yet under-explored, dimension of this is the role played by the internet, both as a source of brokerage opportunities which enable and accelerate such connectivity, and also as a space within which online communities can gather and co-create innovation (Von Hippel, 2006; Dahlander and Gann, 2010).

Perhaps uniquely, economic geographers have had a long interest in the services, and within this retailing, perhaps reflecting sector in its how these services were configured over space (Christaller, 1966). It has also been in the context of how innovation and technical change may impact on such as a major sector of the economy. This major contribution to the study of services and, more recently, knowledge intensive business services (KIBS; Miles et al. 1995) continues (Wood, 1991; Bryson and Daniels, 2008; Gallouj and Gallouj, 2009; Doloreux and Shearmur, 2012). The research by Tether et al. (2012) continues this tradition highlighting the subtle, but important differences in the knowledge bases of what traditionally seen as two closely related UK technical-based KIBS (t-KIBS) sectors, architects and engineers, but which show divergent patterns in terms of locational preferences. This is also replicated in differences in impacts on firm size, professionalization and specialisation. Above all, they suggest this has much to do with the different knowledge bases of the two sectors which influences’ their preferences and sensitivities to location and knowledge interaction.

However, interconnectedness and role of collaboration, networks, clusters and the wider impacts associated with spillovers are topics of central concern in innovation studies which have used, and combined, research from both economic geography and management (and have infused the other four main themes listed above). The role of innovation, and behind this knowledge (Coe, 2005; Ibert, 2007), can be seen to be a key driver in competitive change and performance. Thus the way knowledge is configured and recombined has a central role in forming the key strategic capability of the firm (Grant, 1996; Galunic and Rodan, 1998; Yanow, 2004) and a key element to this success is that of geographical coordination of knowledge (Gertler, 2003; Wainwright, 2011). How we perceive knowledge is crucial in how we understand and manage it. Howells (2012) seeks to stress the role of the individual in knowledge creation and transference (see Lowe, Williams and Shaw, 2012 on this as well), but also warns against conflating the increasing ubiquity and sharing of information in the internet age with necessarily a similar trend in knowledge, especially in terms of particular types of specialist knowledge. How technology such as the internet and high speed broadband is changing information flows and knowledge sharing (Zook, 2000), the abolition of space and the relevance of proximity is one set of issues that has received close attention from both sides of the research community. More generally, the role and relevance of proximity is an ongoing issue in terms of how significant it is; how it is articulated; and how it influences, and is influenced by, other cultural, cognitive and social processes (Boschma, 2003).

**7. Conclusions and New Directions**

This paper has sought to show the important co-evolving and inter-twined trajectory of economic geography and management studies in the field of innovation. It has been beneficial in allowing different perspectives and methodologies in providing insights and models, that combined help describe, articulate and manage the same phenomenon. What themes are likely to describe future patterns of mutual collaboration and interest? It is proposed that three ongoing arenas are going to remain significant here: the shifting geographical and organisational boundaries of the firm; the role of knowledge and innovation interactions over space and time; and, lastly, how changing geography (and responses to it) will shape future patterns of firm development and growth.

Thus the shifting boundaries of the firm can be seen most evidently within the innovation framework underpinning the rise of the ‘open innovation’ agenda which has strong geographical contexts and drivers (Chesbrough, 2003; 2005; Howells et al., 2003; Enkel et al., 2009; Dahlander and Gann, 2010) through, for example, the rise of R&D outsourcing and offshoring (Fifarek and Veloso, 2010), but also how the firm manages these relations over space (see, for example, Puranam et al., 2006). The ‘flexing’, management and development of the boundaries of the firm over geographical space (Lowe, George and Alexy, 2012) will remain an important and enduring theme for both sets of research communities over the coming years and one where genuinely inter-disciplinary will prove valuable and necessary.

A second theme will be articulating in detail the innovation and knowledge interactions of particular sectors (Tether et al., 2012), network communities (Bessant et al., 2012) and locations (Crescenzi et al., 2012). A number of economic and management studies which make broad generalisations about certain sectors (for example, KIBS) or types of countries (for example, the Brazil, Russia, India and China (BRIC) nations) may hide or ignore key differences which do not fit with reality. However, more profoundly they may blind researchers from picking up key nuances and differences in innovation, knowledge or business activities and hinder our understanding of the phenomenon we are seeking to study. Geography still matters for business and the ability of firms to overcome the complexities of geography can form a crucial core competence and competitive advantage for firms that undertake these successfully.

A third and final area here is how geography is changing. A key and ongoing fixity here is the role of technology in shaping and overcoming space. Predictions about overcoming distance, the need for spatial proximity and the rise of a flat world have not turned out, at least in the ways that were suggested. Up until recently, the focus here has been on the impact and use of ‘hard’ technologies on managing and overcoming space, much less attention on ‘soft’ innovations and the new mechanisms, strategies and routines that firms invent and deploy to ‘redirect’ space.

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