The Exaggerated Death of Geography: Localised Learning, Innovation and Uneven Development

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1. Introduction

Rarely more than a minority sport within conventional economics, the spatial dimension of economic analysis is now being written off completely in some quarters on account of the twin processes of digitalisation and globalisation, processes which supposedly signal the 'death of geography'. Even within economic geography itself, some leading practitioners are beginning to question the prominent role which physical proximity was assumed to play in structuring the spatial distribution of economic activity. It is now being suggested, for example, that distance per se is not necessarily an impediment to the acquisition and diffusion of knowledge, even of tacit forms of knowledge, because organisational or relational proximity can act as a surrogate for physical or geographical proximity.

Paradoxically, at the same time as geography is being laid to rest in some conceptions of the 'knowledge economy', its significance is being affirmed elsewhere, especially by evolutionary theorists in the innovation and technology studies literature, where it is deemed to be an important influence on trajectories of learning and innovation.

To explore these competing narratives in more detail the paper aims to address the following inter-related issues. First, it aims to examine the roots of the 'geography is dead' thesis and to argue, among other things, that it grossly over-estimates the distance-destroying capacity of information and communication (ICT) technologies by conflating *spatial* reach with *social* depth. In other words it wrongly assumes that because information diffuses rapidly across organisational and territorial borders, that *understanding* does too.

Second, it argues that the significance of geography can be traced to a number of attributes, principally to: (a) its role as a mediating factor in the highly tacit and context-dependent processes of learning, knowledge exchange and innovation (b) the importance of territorially-bounded innovation systems, be they national, regional or localised clusters and (c) the significance of a territorially-based system of nation-states, cities and regions, a political system which is both cause and consequence of social and cultural specificity, and an important source of cognitive diversity among individuals and organisations.

Finally, and more speculatively, it explores the question as to whether learning and innovation are organic, self-activating processes or whether they can be consciously induced through collective action in the context of less favoured areas. Addressing the new generation of regional innovation policies in the European Union, the paper poses the question as to what 'innovation' and 'catching-up' actually means in practice for less favoured regions, especially when we consider that the prevailing patterns of uneven development – especially as between leading and lagging regions - have been stubbornly durable over time.

2. The Death of Geography?

The 'geography is dead' thesis has much in common with the economistic theories which appear from time to time announcing the death of the nation-state, either because of the growth of multinationals or because of the growth of global markets more generally (Ohmae, 1990). With the advent of ICT, especially the seemingly instantaneous communications capacity of internet and intranet technologies, it is often assumed that space-time relations have been so radically compressed that it is possible to completely annhilate space with time. The rapid diffusion of ICTs (in OECD countries at least) certainly offers firms new and hitherto unavailable opportunities to restructure their activities: for example, to reorganise work practices, to strike a new balance between centralisation and decentralisation of command and control functions and to engage in telemediated products and services.

At the macro level the effects of ICT are potentially even more transformative and, from the standpoint of this paper, two kinds of transformation are worth noting. First, the tradability of output is already changing in new and unpredicatable ways, particularly in the service sector, where a new generation of tradable services is emerging as a result of the ICT-driven separation of production and consumption. This means that many service sector jobs which were once considered to be place-specific, and 'sheltered' from international competition, are becoming less dependent on the places where the service is actually consumed – even electronic surveillance, so it is claimed, can be conducted on the other side of the globe (Cairncross, 1997).

The other major transformation concerns the effects of ICT on the ways in which information and knowledge are produced, stored and diffused. Perhaps the most important part of this transformation is the fact that ICT accelerates the codification of knowledge and modifies the balance between codified and tacit knowledge. Codified knowledge, being explicit and standardised, can be transferred over long distances and across organisational boundaries at low cost and ICT enables such knowledge to be made available more quickly and more cheaply than ever before. In contrast, tacit knowledge, being personal and context-dependent, is difficult to communicate other than through personal interaction in a context of shared experiences. The process of codification is sometimes likened to a spiral movement in which tacit knowledge is transformed into codified knowledge, followed by a movement back to practice where new forms of tacit knowledge are developed and this spiral movement lies at the core of individual and organisational learning (Foray and Lundvall, 1996; Nonaka and Takeuchi, 1995).

The 'death of geography' thesis draws heavily on these two particular transformations: *tradability*, because it allegedly frees the provision of services from their point of consumption; *codification,* because it allegedly reduces knowledge to a universally accessible form of information – and information, for some 'digital beings', is reducible

to bits. One such 'digital being' is Nicholas Negroponte, the director of the MIT Media Laboratory, who champions an extreme version of the thesis when he says:

> *'The digital planet will look and feel like the head of a pin. As we interconnect ourselves, many of the values of a nation-state will give way to those of both larger and smaller electronic communities. We will socialize in digital neighbourhoods in which physical space will be irrelevant and time will play a different role'* (Negoponte, 1995).

These sentiments find echoes in the economic and business school literature in particular (Martin, 1996; Cairncross, 1997). Indeed, as ICTs become more powerful, and as virtual reality becomes more mimetic, this kind of 'spaceless' thinking could gain more credence despite the fact that it is profoundly misplaced. The notion that cyberspace will *ever* evolve into a genuine surrogate for geographic space is at best doubtful and this is fundamentally because it is difficult to imagine the rich diversity of physical proximity, where the nuances of body language and face-to-face communication convey as much as (if not more than) verbal communication, being matched by virtual proximity. This brings us to the most serious shortcoming of the 'geography is dead' thesis, namely that it conflates *spatial* reach with *social* depth and hence fails to recognise that it is the latter, with its wider scope for social reciprocity, which is the essential prerequisite for deep learning. Instructively, while academic theorists continue to debate the relative merits of physical versus virtual proximity, corporate managers seem to have resolved the issue, finding 'the quality of face-to-face interaction higher than the electronic variety, even between people who know each other well' (Lorenz, 1995).

To avoid sterile polarisations between physical and virtual proximity, between geographic space and cyberspace, the most defensible position would be to acknowledge that these intersect with one another in a complex fashion: that is to say, cyberspace is not a paraspace, a separate realm to geographic space, but forms part of 'an experiential continuum in people's lives' (Dodge and Kitchin, 2001). Virtual proximity may well be a surrogate for physical proximity in the context of standardised transactions, but not in the context of transactions which are high in complexity, ambiguity and tacitness. Far from being mutually exclusive, then, ICTs and face-to-face communication will co-evolve as complementary mechanisms (a case of 'emails *and* hallways', 'wheels *and* wires' in other words), with the precise combination depending on the nature of the transaction and the degree of familiarity of the participants. But the fundamental point is this: digital technologies may be adept at maintaining communities that are already formed; they are not so good at creating them in the first place (Brown and Duguid, 2000).

3. Learning, Knowledge and Distance: Proximity Matters, But What Kind?

Although it remains under-explored, the role of geography is beginning to be more widely appreciated in evolutionary theories of innovation and technological change. In contrast to the traditional neo-classical approach, which takes as resolved some of the biggest questions in economic development – not least what firms know, how they know what they know and how they learn for example – the chief merits of the evolutionary approach are twofold: the *realism* of its core propositions about economic behaviour and its focus on *dynamic* rather than static analysis. By placing learning, knowledge and innovation at the centre of its analytical agenda, evolutionary political economy seeks to understand how this trinity contributes to the uneven processes of capitalist development.

The evolutionary propositions that are most germane to the concerns of this paper can be summarised very briefly as follows:

- That innovation is in general a groping, uncertain, cumulative and path-dependent process (though the last two features are not present where radical discontinuities are involved, a condition which may require a process of 'forgetting')
- That agents, be they individuals, firms or states, are subject to bounded rationality (ie there are limits to what can be known) and their relationships exhibit a wide spectrum of behavioural norms, from high trust at one end to low trust or opportunism at the other
- That tacit capabilities are localised and embedded in individuals and organisational routines, and these capabilities have location-specific as well as firm-specific dimensions
- That firms, and other organisations, display an awesome range of capabilities and cognitive frameworks and that this helps to explain the wide range of behavioural patterns, even in the face of notionally similar opportunities
- That knowledge is spatially 'sticky' and that tacit knowledge, despite the growth of knowledge management tools, is not easily communicated other than through personal interaction in a context of shared experiences (Nelson and Winter, 1982; Dosi et al, 1988; Dosi and Marengo, 1993; Lundvall, 1992; Storper, 1997).

In traditional neo-classical theory all agents are assumed to be equally capable of 'optimising' because economic competence (broadly understood as problem-solving skills) is thought to be relatively abundant, when in actual fact it is scarce, idiosyncratic and unevenly distributed as between individuals and firms (Pelikan, 1988; Foss and Knudsen, 1996). There are significant variations, in other words, in firms' knowledge bases and major differences in their capacity for creating knowledge from within and absorbing it from without the firm. The uneven distribution of economic competence, which is firm-specific and partly tacit, helps to explain the wide variations in corporate

performance and why apparently superior organisational forms diffuse slowly, if at all, within and between sectors, regions and countries (Nelson, 1991; Dosi and Coriat, 1994). In short, while all capitalist firms nominally share the same profit-seeking goals, what differentiates them – in terms of competence, organisation, culture and cognitive frameworks for example – seems so much more striking than what unites them (Cooke and Morgan, 1998).

One of the many paradoxes of the 'knowledge economy' is that it has spawned greater uncertainty, especially for the firm, the key repository of productive knowledge and economic competence. The most palpable sign of this heightened uncertainty is the burgeoning debate about how to measure and report 'intangible assets' (R&D, proprietary know-how, intellectual property, brands, workforce skills, organisational competence, networks of customers and suppliers, goodwill and the like). A growing chorus of critics maintains that conventional 'balance sheet' accounting is based on a fiction – namely that the valuations which auditors produce reflect the real value of the firms they audit (Johnson and Kaplan, 1987; Eustace, 2000). The over-emphasis on physical assets (land, plant, capital etc) and the under-emphasis on intangible assets transmits totally inappropriate signals to managers, employees, shareholders and investors. At one level the information deficiencies can be read as the result of accounting shortcomings (eg the fact that spending on intangibles is treated as a current expense, while spending on physical and financial assets is capitalised). More fundamentally, however, the 'information failures' concerning intangibles are better understood as being rooted in the unique attributes of these assets – like high risk, lack of full control over benefits and absence of markets for example (Lev, 2001).

The pioneering work of Baruch Lev demonstrates the urgent need for improved disclosure requirements for intangible assets because managers and auditors have few incentives to improve the information surrounding these core assets. Although new analytical tools are being developed to value intangible assets, a more open and transparent disclosure system is also necessary because current regulations are based on a superannuated model:

> '*The traditional business model of an introverted, somewhat secretive enterprise, interacting with outsiders mainly through exchanges of property rights (sales, purchases, financial investments) is reasonably well accounted for by traditional, transaction-based accounting. Such an inward-oriented business model is rapidly giving way to an open, extroverted model, where important relationships with customers, suppliers and even competitors are not fully characterised by property right exchanges* (Lev, 2001).

These preliminary points need to be made because glib references to the 'knowledge economy' tend to gloss over the problems facing the firm as it struggles to manage its intangible, relational and knowledge-based assets, particularly how it measures the returns to non-physical investment. And in its more apocalyptic forms, the rhetoric of

the 'knowledge economy' elides the fact that firms have to cost-justify their outlays on knowledge-creating assets, a discipline that is more of an art than a science - but an art which is easier to practice in some countries than in others, as we shall see in the following section.[1]

No less of an art is the task of putting existing, untapped knowledge to better commercial effect, a frustratingly difficult task because it involves the vexed question of *tacit knowledge*. Although this is a recalcitrant asset from a managerial standpoint, the incentives to harness tacit knowledge, through better 'knowledge management' routines for example, are growing and the main incentive was expressed by Lew Platt, the former chief executive of Hewlett-Packard, in the celebrated statement: 'If HP *knew* what HP knows, we would be three times as profitable' (Caulkin, 1998). Here Platt was referring to the untapped (and perhaps the untappable) knowledge in a company which could otherwise claim to be one of the most successful knowledge-creating companies ever.

The renewed interest in tacit knowledge is largely due to its perceived social and spatial significance when learning and innovation are at a premium: *socially,* because tacit capabilities like team skills and organisational routines constitute the core competence of firms; *spatially,* because tacit knowledge, being person-embodied and context dependent, is locationally 'sticky', a characteristic which helps to explain the clustering of knowledge-intensive activities (Storper, 1997; Maskell et al, 1998; Gertler, 2001).

Tacit knowledge was the name given to knowledge that cannot be articulated by Michael Polanyi, who famously captured its essence by saying: 'We can know more than we can tell' (Polanyi, 1966). Tacit knowledge was contrasted to explicit or codified knowledge, a formalised knowledge which could be transferred in a de-personalised manner through technical blueprints and operating manuals etc. Being personal and context-dependent, tacit knowledge represents dis-embodied know-how that is acquired directly through interactive learning (Howells, 1996). Originally designed to contest the notion of a de-personalised exact science which produced a wholly 'objective knowledge', Polanyi's insights had a wider application, and they were successfully applied to the field of organisational capability in Nelson and Winter's truly seminal text on evolutionary economic theory (Nelson and Winter, 1982).

Like Polanyi, Nelson and Winter do not draw a hard and fast line between tacit and codified knowledge, stressing instead the need to identify the 'degree of tacitness' involved in a skill or a process. Given current debates about the feasibility and the desirability of codification (Cowan et al, 2000; Johnson and Lundvall, 2001), it is worth recalling Nelson and Winter's judicious observation that costs matter here. That is to say, the relevant question is not whether some knowledge is *in principle* articulable or

[1] Andrew Sayer makes a telling point about the tendency for geographers, after the 'cultural turn', to ignore the bottom line issues of cash, costs and revenues in favour of supposedly more 'sophisticated' explanations of firm behaviour and economic development (Sayer, 1997).

necessarily tacit, but whether the costs of codification are sufficiently high so that the knowledge remains *in fact* tacit. The relative significance of the tacit dimension will depend, therefore, on a combination of costs and context:

> *'The knowledge contained in the how-to-do-it book and its various supplements and analogues tends to be more adequate when the pace of the required performance is slow and pace variations are tolerable, where a standardized, controlled context for the performance is somehow assured, and where the performance as a whole is truly reducible to a set of simple parts that relate to one another only in very simple ways. To the extent that these conditions do not hold, the role of tacit knowledge in the performance may be expected to be large'* (Nelson and Winter, 1982).

The problem of codifying tacit knowledge is further compounded by the metrics used to assess skill, creativity and intelligence: the dilemma here is that the most valuable problem-solving skills (ie 'practical intelligence'), much of which is acquired through everyday activities, often unconsciously, tend to elude conventional tests for academic and emotional intelligence. Psychologists at Yale have now confirmed something that students of tacit knowledge already knew, namely that the best way to promote 'practical intelligence' is to directly observe master practitioners at work, which is the hallmark of traditional apprentice training (Sternberg, 2001).

But the most systematic treatment of tacit knowledge to date is perhaps the work of Nonaka and Takeuchi, who draw on the Japanese corporate experience to develop a theory of 'knowledge conversion' in which tacit knowledge is progressively converted into more widely accessible organisational knowledge through an intensely iterative, spiral-like process of collective learning (Nonaka and Takeuchi, 1995). Although these authors attach a great deal of significance to tacit knowledge - as strong as one will find anywhere in the literature in fact – they never suggest that the tacit realm is unknowable or untappable. But they insist, however, that tapping it is not easy because 'knowledge conversion' is a hugely demanding organisational exercise: in other words, far from being a technical fix for a select few at the top, this process makes enormous demands on the entire workforce, a process which even intrudes on the beliefs and identities of the participants. The key point to emphasise about their theory, given the focus of this paper, is that 'the most powerful learning' comes from direct experience, from face-to-face communication and from the use of the body not just the mind.

Similarly, studies of scientific networks, Polanyi's original reference point, are also impressed by the abiding significance of tacit knowledge and by the imperative of face-to-face contact if it is to be teased out and diffused. The painstaking work of Harry Collins, for example, on how scientists conduct themselves, shows scientific endeavour to be a capricious process because of the influence of things like 'inarticulated knowledge', the 'intangible' and the 'unspeakable' (Collins, 1974). Nearly thirty years later, and notwithstanding the proliferation of ICT networks, bandwidth and 'expert

systems', his work continues to register the significance of tacit knowledge and physical proximity. In a study of an Anglo-Russian project designed to measure the quality factor (Q) of sapphire, Collins identified four categories of tacit knowledge which could frustrate the project even when scientists had no intention to conceal their know-how. The only way to overcome these impediments was through personal laboratory visits, which afforded the opportunity for *direct observation* of the process and the people. As a result of such face-to-face interaction 'the science was slowly emerging and turning knowledge that no one knew they could or should express, into something that could be articulated as the importance of previously unnoticed parts of the procedure became revealed' (Collins, 2001).

Aside from the significance they attach to tacit knowledge, what also unites the work of Collins and Nonaka and Takeuchi is the importance they attach to *trust* among the participants if genuine learning is to occur. Building trust requires 'the use of mutually understandable, explicit language and often prolonged socialization or two-way, face-to-face dialogue that provides reassurance about points of doubt and leads to willingness to respect the other party's sincerity' (Nonaka and Takeuchi, 1995). Although there is a lively debate about trust – in particular about how it is secured in the first place and about how to sustain it given the constraints on exit – the evidence suggests that this relational asset carries costs (like lock-in for example) as well as benefits. The main benefits would seem to be first, that it saves time and effort to be able to rely on others; second, that it reduces risk and uncertainty and reveals possibilities for action which may not be feasible in the absence of trust; and third, it expedites learning because the parties are privy to thicker and richer information flows on account of the fact that people divulge more to those they trust (Arrow, 1974; Storper, 1997; Cooke and Morgan, 1998; Maskell et al, 1998).

The literature on trust and cooperation also suggests that these relational assets are more likely to develop where the participants expect to meet again, in other words where 'the shadow of the future' looms large over the present (Axelrod, 1984). This provides a context for reciprocity: a good deal of informal know-how trading takes place, even among rival firms, precisely because of the expectation that the information which A provides B today will be reciprocated in kind tomorrow (von Hippel, 1987). Although these exchanges can of course take place at a distance, providing the climate of reciprocity exists, they are easier to organise in the context of physical proximity (Malmberg, 1997). [2]

Crucially, however, the significance of physical proximity will ultimately depend on the complexity of the project (eg the degree of tacitness involved) and the socio-spatial context (eg the degree of physical and cultural distance involved). For example, the

[2] The notion that trust requires long-term relationships is challenged by Gernot Grabher in his excellent analysis of communities of practice in the advertising industry, where project teams work on a short-term, task and finish basis. But because these teams can expect to recombine at some point (creating a 'shadow of the future' effect' in our terms), there is a requirement for trust, but it tends to take a diffuse rather than a personal form (Grabher, 2001).

literature on technology transfer is littered with examples of projects which were compromised by a failure to appreciate that users need a good deal more than hardware from suppliers: what is needed above all is mutual understanding, and this requires a common code through which information can be understood (Lundvall, 1988; Gertler, 1995). Most technology transfer research concurs with Teece when he argues that projects with a high tacit component require nothing less than 'intimate personal contact' to succeed (Teece, 1981).

In their different ways these stylised accounts signal a simple, but fundamentally important, truth: namely that something gets lost, or degraded, when individuals and organisations communicate at a distance, even when they know each other well. Although this was well understood in traditional economic geography, in more recent variants the *costs* of a spatially distantiated division of labour have received far less attention than the benefits which are said to accrue to the firm from this form of organisation. For example, Massey's pioneering work on spatial divisions of labour remains a robust statement about the social processes and spatial patterns of uneven economic development, particularly how large firms allocate different corporate functions to different regions, with the result that spatial hierarchies come to mirror corporate hierarchies (Massey, 1984). The corporate benefits may be clear here, but what of the costs? Clearly some of the costs stem from the separation of R&D and production, a division that reflects a deeper, and more debilitating separation in some firms between conception and execution.

Before addressing the key question of this section – namely the extent to which organisational proximity can substitute for physical or geographical proximity – it is worth probing further into this problem of distantiation because it involves far more than spatial distance. With the professionalisation of the R&D function the 'lab' became more socially exclusive and more spatially separate from other corporate functions, and the shortcomings of the linear model of innovation owe a lot to this separate identity. The barriers to learning and innovation in the linear model were actually exposed forty years ago, when spatial distantiation was less pronounced (Burns and Stalker, 1961). Here we encounter some familiar problems:

- The 'one-way traffic of designs from laboratories to production shops'
- The divisions between engineers, production and sales staff had features 'which can best be called linguistic'
- Development engineers freely conceded that, for them at least, the production workshop was 'a terra incognita'

Anticipating a whole series of contemporary themes they observed that 'as laboratories grow larger, and specialist groups multiply, there is a danger of some essential channels of communication becoming attenuated or severed merely because of the presence of so many channels of communication around the individual'. This led them to conclude that 'the fewer the links in the chain from development to production, the more, that is,

development and production were forced to learn each other's language, the more effective, speedy and trouble-free was the passage through of designs'. The fact that this prescient observation was first made over four decades ago illustrates the point that recognising a problem does not dispose of it – that is to say, organisational innovations do not diffuse as quickly as we think.

Perhaps what resonates most deeply today about the Burns and Stalker study is their emphasis on innovation as a kind of 'linguistic' project, in which language, meaning, identity and direct communication were the most essential elements of successful 'knowledge management'. In other words they were arguing for a 'shared language' through which the different functions of the firm could talk *and understand* each other and through which the firm could secure organisational coherence and some commonality of purpose. Subsequently, this critically important point would be re-stated in many different ways: for example, Arrow spoke of 'the need for codes which are mutually understandable', codes which imposed 'a uniformity requirement' (Arrow, 1974); Nelson and Winter thought of 'prevailing routines' as a 'truce' which helped to regulate potentially destructive conflict within the firm (Nelson and Winter, 1982); and more recently Dosi and Marengo have underlined the significance of a 'common language' through which members of the firm can develop a shared cognitive framework for the purposes of communication and coordination (Dosi and Marengo, 1994).

If this is what constitutes 'organisational proximity' then we need to remember that it is a moving target, a process not an event, an aspiration which is never wholly attained because, in practice, the large firm is too heterogeneous to meet Arrow's 'uniformity requirement'. Large firms face enormous problems when they seek to create and sustain a 'shared language' throughout the organisation, especially between R&D and so-called 'downstream' functions. To illustrate the problem, and what firms are doing to address it, let us very briefly consider three corporate cases: Xerox is used to highlight the basic problem and GE and BMW highlight the organisational innovations being used to overcome such problems.

Creating a 'shared language' across the firm is not easy at the best of times, but it is especially difficult on the cusp of a new technological era, a problem which is perfectly illustrated by the story of how *Xerox* supposedly 'fumbled the future'. As we know, it was a group of pioneering scientists at Xerox's Palo Alto Research Center (PARC) that first developed the elements of the personal computer in the 1970s. Despite this major technical achievement 'most of the extraordinary knowledge generated at PARC never crossed the boundary between the scientists in Palo Alto, and the development engineers in Dallas or the management in Stamford. The engineers found the scientists arrogant, and almost unintelligible. Management found them naïve and unrealistic. The scientists, for their part, regarded almost everyone in the corporation outside their own community as 'toner heads' – unable to think of the world beyond photocopiers' (Brown and Duguid, 2000). That it was Apple, not Xerox, which developed the PC was largely

due to the fact that, during a visit to PARC, one of Apple's founders 'was able to see what Xerox management could not, the potential of what PARC had generated. So Apple licensed what it could and replicated what it could not. The knowledge that stuck within Xerox leaked readily through its front door' (Brown and Duguid, 2000). One of the many implications of this classic case study is that, instead of having a 'shared language', Xerox had *multiple* languages, each being the preserve of a particular community of practice, and cognitive distance was in this case compounded by the physical distance between the sites. Erica Schoenberger has convincingly demonstrated that Xerox was organisationally unable to learn from its 'peripheral' R&D teams, whether these were based in California or Japan (Schoenberger, 1999).

GE is instructive because, over the past decade, it has sought to avoid the problems at Xerox by embedding R&D in a wider strategy designed to create a 'boundaryless organisation'. In fact the key aim is to create new incentives for sharing ideas so that information and knowledge circulate more freely rather than being hoarded for personal gain. While each of GE's operating divisions has its own R&D facility, the corporate R&D centre at Schenectady, in New York state, is the intellectual hub of the company. Before the reforms of the 1990s Schenectady culture was akin to a campus-style lab, in which scientists had little or no incentive to commercialise their technical projects: indeed, it was not uncommon for them to 'throw an idea over the wall to the business division, sit back and say my job is done' (Dickson, 1992). When exhortation failed to change the culture, GE introduced two structural changes to the way central R&D operated. First, the operating divisions have to directly fund more R&D projects at the centre, giving them a stronger vested interest in what happens at Schenectady. Second, the centre's staff have to spend more time in the divisions, where they get to know each other in *face-to-face* situations. The combined effect of these two reforms was to create more of a shared destiny, and therefore a 'shared language', between the R&D centre and the operating divisions.

The *BMW* case highlights an even more extreme way to achieve a 'shared language', namely co-location. To ensure that the product development process is as integrated as possible BMW embarked upon a radical experiment in which some 6000 professional staff are co-located at its Research and Engineering Centre, to the north Munich, in what is the largest single concentration of vehicle engineering expertise in Europe. In the belief that R&D staff are most productive when they can interact on a *face-to-face* basis, the architecture of the Centre has been designed in such a way that no one has to walk more than 50 metres to meet a colleague. Despite its name the Centre is much more than a conventional R&D facility because it represents an unprecedented co-mingling of skills, including research, design, development, manufacturing, personnel, procurement and patents. Such extreme co-location is designed to achieve one fundamental goal – to reduce the development cycle of new models. This is the process where iteration between different disciplines is most important and where tacit knowledge is most pronounced, and co-location is deemed to be the key mechanism for

tapping these intangible assets and for developing a 'shared language' through which to do so (Cooke and Morgan, 1998).

Since Xerox is not an isolated case, it's clear that informal divisions within the large firm are not a sign of organisational abnormality, on the contrary they are part of the *normal* state of affairs, an issue which is fruitfully explained by reference to the literature on 'communities of practice'. The latter are close-knit, practice-based groups in which ideas and tacit knowledge diffuse rapidly because members are bound by a shared understanding and a common identity (Brown and Duguid, 1991; Wenger, 1998). Although these practice-based communities are in the vanguard of learning and knowledge diffusion in the firm, their codes and practices are often at variance with official codes and practices, and the PARC vignette is a pronounced example of how debilitating these internal divisions can become. Potentially powerful conduits of innovation, communities of practice are also a potential source of instability, hence they are a mixed blessing in governance terms.

The 'communities of practice' concept now lies at the heart of a new debate in economic geography – the terms of which have been admirably laid out by Meric Gertler - and it concerns the question as to whether organisational proximity can be a surrogate for geographical proximity as a means of producing and diffusing tacit knowledge (Gertler, 2001a; 2001b). In a recent series of papers Ash Amin and others have questioned some of the conventional wisdom and 'taken for granted' propositions which appear in economic geography and evolutionary economic theory. Although these arguments do not seek to pronounce the 'death of geography', they do in fact devalue the significance of geography. In a concise formulation Amin asks: 'Is it not 'relational proximity – more specifically, ongoing organisational routines and the social practices of collectives implicated in a common venture – rather than geographical proximity, that constitutes the 'soft' architecture of learning? Such relational proximity might, of course, draw on face-to-face contact, but it can also be achieved at a distance' (Amin, 2000; Amin and Cohendet, 1999; Oinas, 2000).

Stimulating as it is, this argument is problematical in at least three ways. First, it tends to juxtapose relational and organisational proximity on the one hand with geographical proximity on the other, a form of spatial fetishism which the authors endeavour to contest in every other respect. The spatial fetishism lies in the assumption that there is something called 'geographical proximity' which does not involve *relational* proximity, implying that the social interactions which constitute 'local' action are somehow natural, primordial or automatic, when in fact they have to be actively constructed like any other relational asset, whatever the spatial scale (Cooke and Morgan, 1998).

The second problem is an over-exaggerated sense of what can be accomplished at a distance, whether it is through the virtual proximity of digital technology or the occasional proximity associated with business travel. Although there is a mechanism for transferring tacit knowledge across organisational boundaries and national borders

(namely internationally mobile communities of practice), the latter do not offer the same scope for reciprocity, serendipity and trust that is afforded by sustained face-to-face contact, a point freely conceded by some of the originators of the communities of practice concept (Brown and Duguid, 2000; Gertler, 2001b).

Thirdly, to the extent that communities of practice are confined within the firm, their learning opportunities would seem to be narrower than the opportunities on offer in the *ecologies of knowledge* which characterise advanced regional clusters. Writing of Silicon Valley, one of the most celebrated ecologies, Brown and Duguid (2000) make a more general point about the intersection of locality and organisation:

> *'For the ecology to flourish, however, it evidently needs not just a range of capabilities, but a* ***close*** *range. The informal links…develop directly and in close quarters. In the Valley, people live in and out of each other's pockets, and this helps them see what's doing, what's doable, and what's not being done. This close proximity not only shows how to attack a particular niche, it provides the ability to see a niche before it is visible to most eyes…Density of firms, practices, and practitioners also promotes reliable risk- and trust-assessment…****So distance is far from dead, even where distance technology is at its most advanced'*** (emphasis added).

The spatial *core* of these ecologies of knowledge may be a regional cluster, but the outer *boundaries* might straddle multiple spatial scales, from the local to the global, because some of the firms which constitute the ecology will be multi-locational organisations. This point certainly merits more attention because there is a tendency to juxtapose, as alternative models of learning and innovation, the localised business networks of the industrial district model with the more formal and distantiated networks of the large firm.

It is also important to be clear about what this defence of geography does *not* entail. It does not mean that tacit and codified knowledge are being treated as separable entities, nor does it portray the local as 'a unique source of tacit knowledge for competitive advantage' (Amin, 2000). Still less does it mean that the tacit-codified distinction corresponds, spatially, to the local-global dichotomy (Allen, 2000). The majoritarian view of tacit knowledge is not that it is immobile and confined to the 'local', but that it is person-embodied, context-dependent, spatially sticky and socially accessible only through direct physical interaction.

These are the special features of tacit knowledge which help us to explain what otherwise looks like a remarkable aberration in a supposedly 'hyper-mobile' global economy, that is the phenomenal spatial concentration of R&D activities in the home base of the innovating firm – memorably referred to as 'an important case of non-globalisation' (Pavitt and Patel, 1991). Equally instructive, this SPRU study also found that the proportion of innovative firms' activities which were performed at home tended

to increase with the technological intensity of the industry and the firm, a sign of the premium which firms attach to having highly tacit activities co-located at the early stages of a major innovation (Patel, 1995; Feldman, 1994; Audretsch, 1998; Malmberg, 1997).

Admittedly, the spatial pattern of corporate R&D is becoming less starkly concentrated, as firms perform more of their innovative activities abroad, but this should not be construed to mean that these knowledge-intensive functions are becoming impervious to geography. Rather than being binary opposities, globalisation and localisation in this respect tend to be complementary processes because overseas affiliates seek to tap into local clusters of expertise, a process which tends to enhance rather than erode national and sub-national patterns of specialisation (Cantwell, 1995; Archibugi and Michie, 1997).

Aided and abetted by ever more sophisticated digital technology, travel and a modicum of cross-cultural 'fusion', organisational proximity may be a partial substitute for geographical proximity, especially for people who are already part of a community of practice, but *partial* is the operative word (Blanc and Sierra, 1999). A key question for future research therefore is not which proximity is better, because both are necessary, but rather how will they co-evolve in practice at a time when 'localised' learning and knowledge networks are evolving into complex ecologies composed of different organisations and straddling multiple spatial scales?

4. Geography Matters: Territorial Innovation Systems

If geography is being buried in some quarters it seems to be undergoing a remarkable re-birth in others. That two radically different narratives can co-exist seems untenable until one realises that they tend to be addressing different aspects of the same picture. The 'death of geography' school is fixated by the pace and scale of globalisation, with its standardising imprint; the 'geography matters' school, on the other hand, is impressed by the tenacity of spatial differentiation, with its national, regional and local nuances. These two tendencies - standardisation and differentiation – constitute a permanent dialectic in the spatial economy, making 'geographical outcomes a two-way street between localisation and diffusion, not a one-way highway to dispersion' (Storper, 1997).

If the 'forces of globalisation' were as ineluctable as they are sometimes claimed to be, then national patterns of development might be expected to converge around some world norm. But historical reality tells a different story. Far from converging around some bloodless norm, the advanced OECD countries actually exhibit very different sectoral patterns of technological and trade specialisation, and these patterns show considerable stability over time, with little or no sign of convergence, which suggests that 'geographical proximity continues to play a very significant role for knowledge flows' (Guerrieri, 1999; see also Verspagen, 1993; Patel and Pavitt, 1994). Specialisation itself seems to confer certain advantages, so that 'being specialised appears to be even more important than choosing the 'right' field' (Archibugi and Pianta, 1992). Such high levels of specialisation help countries to secure leading or even dominant positions in sectors where they have developed a finely-honed expertise, like pharmaceuticals in the UK, machinery in Germany, fine chemicals in Switzerland, mechanical engineering in Italy and electronics in the US for example.

These national forms of specialisation and comparative advantage are very often based on distinctive *sub-national* formations, be they localised clusters or core regions, some of which have more in common with their counterparts in other countries than with peripheral regions in their own country. In the European Union for example, just twelve core regions account for nearly half of all research and technological development, and these 'islands of innovation' as they are called, represent the core regions of the advanced member states. This pronounced regional pattern of specialisation appears to be even more durable than the national patterns referred to earlier (Cooke and Morgan, 1998; Breschi, 2000).

Whatever the spatial scale, these deeply-embedded patterns of specialisation reflect the fact that the growth of know-how (managerial, technological and organisational) is a profoundly cumulative, path dependent process – a process shaped less and less by natural endowments and more and more by competencies and capabilities built over time and 'channelled into specific trajectories by increasing returns' (Maskell et al, 1998).

Evolutionary political economy rightly allots an important role to the institutions which shape, and which are in turn shaped by, these deep developmental processes. Like all structures, these institutions are both the medium for, and the result of social action: in other words they enable *and* constrain what firms and other agents wish to accomplish. Although the evolutionary account remains the most convincing of all the stylised accounts of learning and innovation, it nevertheless leaves much to be desired as regards the interplay between its macro- and micro-level narratives. Exactly how, for example, does a national system of innovation influence the behaviour of its firms? And to what extent do innovative firms modify the attributes of their national system? To examine these questions this section looks at the received wisdom on *territorial innovation systems* to see what, if anything, they imply for less favoured regions.

Contrary to fashionable notions of 'techno-globalism' and 'borderless worlds' the national environment remains a highly significant operating milieu for firms, even for so-called multinational firms. Simply consider the following for example: in the main OECD countries some 90% of production is for the home market; domestic investment by domestic capital far exceeds direct investment overseas plus foreign investment at home; national stock exchanges tend to trade in domestic stock; multinational firms are more accurately referred to as national firms with international operations; labour markets and industrial relations are largely governed by nationally-specific regulatory regimes; and national borders are proxies for cultural, political, linguistic and cognitive affinity (Wade, 1996; Berger and Dore, 1996). It is against this background that the concept of a *national system of innovation* (NSI) was developed, a concept which has been defined in narrow technological terms (Freeman, 1987) and more broadly as a nationally-structured social system of interactive learning (Lundvall, 1992). Whatever the nuances the key elements of such a system tend to include some or all of the following:

- the R&D system, particularly its sectoral composition and the division of labour between publicly-funded and business-funded R&D spending
- the education and training system, particularly the division between academic and vocational skills
- the financial system, particularly the interface with industry and its capacity to provide 'patient capital'
- the network of user-producer relationships and the norms of interaction (eg exit versus voice-based relations)
- the associational capacity of the system, that is the extent to which firms forge dynamic linkages with their institutional milieu, be it local, regional, national or international (Cooke and Morgan, 1998).

The NSI helps to explain why firms, even multinational firms, tend to have a 'national imprimatur', a cognitive framework which influences the way they look at the world, the way they do things, how they discount time and therefore how they calculate opportunity and risk. Although the NSI does not in any sense determine corporate

behaviour, it certainly renders some *courses of action* more attractive than others. A classic example here would be the differences between the national systems in Germany and the UK: the financial system in the UK, being more 'short-termist' and less 'patient' than in Germany, helps to privilege short-term divided payments over long-term R&D outlays. Another contrast would be skills: a woefully inadequate vocational training system makes it more difficult for UK manufacturing firms to emulate German productivity levels or German quality product strategies for example. This is not to say that some UK firms cannot equal or surpass their German counterparts, rather that certain courses of action are encouraged, and thus easier to adopt, in some national systems than in others.

Although it demonstrates why national patterns of development remain important, the NSI literature leaves a number of questions unanswered, four in particular. Firstly, this literature tends to focus on the formal science and technology system, as though learning was synonymous with and confined to R&D activities. This bias makes it difficult to pick up the very important processes of *informal* learning and organisational innovation which take place in traditional sectors in large countries like Italy or in small countries like the Nordic countries (Maskell et al, 1998).

Secondly, the relationship between national and *sectoral* patterns of innovation is still under-developed despite some promising work on 'systems of innovation' (Edquist, 1997). In particular we need a much better understanding as to why strong sectors manage to develop in weak national systems, like pharmaceuticals in the UK for example, and how national systems interact with sector-specific 'technological regimes' (Malerba and Orsenigo, 1994).

Thirdly, the dichotomy between macro- and micro-level narratives cries out for more attention because we simply don't know enough about the different ways in which firms actually *use* their national systems. The uneven distribution of economic competence means that wide variations in firm behaviour will co-exist in each national system, but what does the system do for 'laggard' firms? Conversely, do 'leading' firms compensate for deficiencies in their national system by doing more in-house or by using alternative national systems for certain activities? Multinationals, for example, are trying to 'graft' some features from their domestic system on to their new system, and we need to know if this 'mix and match' strategy is leading to more hybrid national systems.

Finally, just as firms behave differently within each national system, so do the localities and regions which compose the 'national' economy. One of the most serious gaps in the classical NSI literature was its silence on *sub-national* institutions, mechanisms which can play an important role as bridging institutions in diffusing knowledge and keeping local firms abreast of new practices (Cooke and Morgan, 1994; 1998).

Over the past decade this sub-national level has attracted considerable attention, even from some mainstream economists who, having discovered 'geography', have

proclaimed it to be alive, well and an important factor in understanding a country's growth dynamics (Porter, 1990; Krugman 1991). The recent literature on sub-national territorial development has spawned a bewildering array of terms to cover the different permutations that are claimed to exist, from informally arranged local clusters to formally constituted regional innovation systems. Originally triggered by the discovery of 'industrial districts' in Italy, mono-industrial areas where dense local networks seemed to confer scale and scope advantages to small firms acting in concert, the sub-national realm has opened up new perspectives on learning and innovation as interactive and reflexive processes (Camagni, 1991; Maskell et al, 1998).

Indeed, the most sophisticated attempt to explicate the *territorial* dimension of these twin processes suggests that the guiding metaphor of economic development needs to be revised. Instead of it being cast in exclusively mechanical terms, with hard inputs and outputs, it should also be viewed as a process of 'conversation and coordination', where economies are understood as 'stocks of relational assets' in which 'untraded interdependencies' (the conventions and informal rules that coordinate economic life) need to be introduced to help explain the phenomenon of localisation (Storper, 1997).

Building on Marshall's notion of 'localisation economies' (pools of skilled labour, specialised intermediate inputs, knowledge spillovers and a supportive industrial atmosphere) Porter has done most to popularise these ideas under the rubric of spatial clusters, which he defines as:

> '*geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialised inputs such as components, machinery, and services, and providers of specialised infrastructure…Finally, many clusters include governmental and other institutions – such as universities, standards-setting agencies, think-tanks, vocational training providers, and trade associations – that provide specialised training, education, information, research, and technical support'* (Porter, 1998).

Whereas economic geographers tended to treat clusters as a special case of economic development, Porter claims that clusters are 'a striking feature of virtually every national, regional, state, and even metropolitan economy' (Porter, 1998). This brings us to an intriguing paradox: the burgeoning literature on clusters masks a growing ambiguity about the evidence base. One recent argument, for example, suggests that the cluster literature has failed to substantiate its claims about extensive locally-traded transactions, with the result that the concept of localisation economies remains 'elusive' (Malmberg and Maskell, 2001). These authors introduce a more rigorous dimension to the cluster debate by distinguishing between horizontal and vertical relationships and by demonstrating that localisation economies can be independent of the degree of internal interaction. In other words clusters can exist even if there are no locally traded transactions (the vertical dimension) because a more important dimension may be the

knowledge-creating effect of similar firms being able to monitor each other at little or no cost (the horizontal dimension). Far from challenging the existence of spatial clustering, this important argument highlights the need for a more rigorous analysis as to why the cluster exists and what benefits it confers on firms – and they suggest that clusters exist less because of cost reduction or input-output reasons, but primarily because of the scope for enhanced knowledge creation:

> *'When firms co-locate, a spatially defined community is usually formed that makes it easier for them to bridge communication gaps resulting from heterogeneous knowledge endowments. The innovative capabilities of firms are enhanced because co-location can provide them with an arsenal of instruments to obtain and understand even the most subtle, elusive and complex information of possible relevance…Hence the process of clustering tilts the balance between advantages of specialization and costs of coordination so that a higher level of knowledge creation can be obtained. The ability to de-code and utilise knowledge residing elsewhere is not a phenomenon to be captured by input/output analyses of trade flows or accounts of business contact patterns'* (Malmberg and Maskell, 2001).

If the nature of inter-firm relations needs to be better understood in the cluster debate, so too does the role of 'territorial innovation systems'. To the extent that we can speak of local or regional innovation systems – which essentially consist of the firm and its sub-national network of institutional support – we need to remember that these are not national systems writ small, though they might involve elements of a national system which have been regionalised, like research laboratories for example. Generally speaking the smaller the spatial scale of the 'system' the more open and porous it will be, with the result that local firms will have many non-local interactions (Howells, 1999).

Despite Porter's deceptively simple definition of clusters, there is no such thing as a standard cluster, hence the hazards of generalising from a small number of celebrated cases. For example, at one end of the cluster spectrum we might locate 'technology districts', rapidly evolving production systems engaged in product-based technological learning, like Silicon Valley or Greater Boston, which are said to be 'the most important form of territorial economy that exists today' (Storper, 1997). At the other end of the spectrum we might locate a mono-industrial district which is based on a relatively stable technology, like the artisanal production system associated with Parmigiano-Reggiano (P-R) cheese for example. Given the biases to the former in the literature let us briefly consider the latter because it is a significant cluster in its own right.

Thanks to Kees de Roest, who has written a short masterpiece on the subject, we are now able to appreciate what a highly sophisticated socio-spatial system the P-R system is, despite the apparent simplicity of the final product. The basic features of the cluster are as follows:

The Parmigiano-Reggiano Cluster

The first known reference to the product was in the Commune of Florence in 1344, but the official birth of the P-R name came in 1934, the same year that the Consorzio was formed, the key regulatory body which is today responsible for quality control, legal protection and promotion of a product which commands a premium price on account of its natural qualities and because the ripening period takes up to 2 years.

The production chain is a vertically-integrated chain embracing dairy farms, cheese dairies and cheese maturing firms and the labour process is largely artisanal: in processing the milk for P-R cheese the human element is critical, and here the cheese-maker's role is central since the raw milk varies greatly in composition from one producer to another and from one day to the next. The cheese-maker's skill lies in the ability to control the fermentation process, a skill which takes years of experience to acquire and which has been passed on through the medium of oral communication and learning by doing.

A government decree in 1955 defined the P-R production area as being the provinces of Parma, Reggio Emilia and Modena, with small portions of the provinces of Bologna and Mantua, an area of 1.02 million hectares in total.

The regulations which govern production techniques are very stringent and, despite significant technological change in the industrial dairy industry, the basic rules for producing and processing milk for P-R cheese have not changed. This is attributed to two factors: first, to the severity of the regulations and second, to the strength of the common culture of the actors involved in implementing these regulations. The consciousness of belonging to the PR system, and of sharing this common culture, is the single most important factor maintaining the system.

One of the problems of the Consorzio is to maintain its autonomy in a region like Emilia, where the division between 'whites' and 'reds' (Catholics and Communists) runs very deep, to the point where a 'white' farmer will ignore a nearby 'red' dairy and take his milk much further away to a 'white' dairy to 'do the right thing', and 'reds' do the same of course.

The strong integration of milk production and milk processing significantly reduces transaction costs and mutual trust and loyalty to the cheese dairy on the part of its members are the basic forces which hold this social system together.

Local research centres, university departments, representative bodies and the regional government help to steer the technological trajectory of the system: although production and processing costs have to be kept down, the main focus of technological innovation is to maintain the quality difference with competitor cheeses like Grana Padano, a cheaper rival which is produced by means of an industrial process dominated by artificial milk standardising techniques and the use of additives (de Roest, 2000).

It is difficult to imagine a more deeply embedded spatial cluster than the P-R cluster: the product is inextricably linked to the region; the link is decreed by law; the cluster is based on a relatively stable technology; and the product holds a premium position in its market. As unique as it is, the P-R case illustrates three wider points that need to be made about clusters.

First, sustaining the system requires enormous effort and commitment from the members because there are many potential threats to the integrity of the system – in this case for example from the larger, more intensive farms on the one hand, and on the other from the maturing firms which are not fully integrated into the system as they deal with other cheeses. As de Roest rightly says, 'there is no quality certification body able to control the compliance of actors with product regulations if the actors themselves do not identify themselves with the product'. If such a stable system takes so much effort to sustain, how much more effort is required to sustain technologically dynamic clusters? But the key point is that no amount of 'institutional thickness' can save a cluster if the firms at the heart of it do not *identify* with it and derive practical benefits from doing so.

Second, as localised and autonomous as it would appear to be, the P-R cluster remains dependent on *non-local* factors. Leaving aside changing market trends, the most important external influence on the system, the P-R cluster draws enormous support from its PDO status in the European Union. Protected designation of origin (PDO) status, the strongest regulatory protection afforded to products in the EU, is awarded to foodstuffs which are produced, processed or prepared in a given geographical area using recognised know-how. On a recent visit to the P-R system the Consorzio said that one of the biggest threats facing the cluster came from EU member states who were challenging the PDO status of P-R cheese in the hope of reproducing it in a cheaper, more standardised version elsewhere. Here we have a classic example of the tensions noted earlier, between standardisation and differentiation, between codified and tacit knowledge, where the status of a differentiated product will depend on a combination of regulatory support and the willingness of consumers to pay a premium for a quality product.

Thirdly, as a learning network the P-R cluster embodies both vertical and horizontal dimensions: interactive learning takes place vertically among research institutes, dairy farms, cheese dairies and maturing firms as well as horizontally among dairy farms for example, where 'styles of farming' are more diverse than one might imagine. In other words in this relatively self-contained cluster one can begin to specify not only *how* firms learn but also *what* they learn, something which is conspicuous by its absence in most of the cluster literature today.

The implication here is that we actually know much less than we think we know about how firms learn, particularly as regards the interplay between proximity and learning, so much so that 'the process of learning as a contagious, place-bound activity becomes

questionable' (Glasmeier and Fuellhart, 1996). At the very least we can say that the literature on spatial clustering reveals a remarkable and indeed disturbing paradox: the growing interest in clusters, among theorists and policy-makers, seems to be paralleled by an increasingly ambiguous evidence base.

Like clusters, sub-national territorial innovation systems may also be more exceptional than we think, at least if we distinguish between genuine innovation processes that have assumed a territorial form and the more common situation whereby localities and regions have created an enterprise support system for the express purpose of promoting innovation. Many 'regional innovation systems' seem to fall into the latter category and, once again, there is no such thing as a standard system (Braczyk et al, 1998; Cooke et al, 1998). The specification of territorial innovation systems needs to be more than an inventory of the institutions and the interactions considered necessary for success. Studies which have examined 'micro-innovation systems' from the bottom-up standpoint of the firm suggest that some or all of the following conditions need to be present to sustain the claims: localised patterns of communication, search, learning, knowledge-sharing and innovation. Having examined the evidence the sobering conclusion was that these systems were not common because 'there are many sub-regions (and indeed regions) which lack these concentration and localisation benefits because of low density, peripherality, lack of dynamic, innovative firms and institutions and being simply knowledge and information poor' (Howells, 1999).

Just as Hayek considered it a 'fatal conceit' to think the state could be a surrogate for the market, because the latter was by its nature a *de-centralised* discovery mechanism, so it may be a planner's conceit to think that 'institutional thickness' is always necessary for successful innovation. Some technology districts are not thickly constituted or top-heavy with supporting institutions, whether public or private. In some of these technology districts the burden of innovation is largely carried by highly competent, leading-edge firms, in association with other like-minded firms. This helps to explain the 'mystery' as to why some highly successful technology districts, like Silicon Valley for example, seem to be so 'under-populated' with supporting institutions (Saxenian, 1994).

Prosaic as it sounds, this point needs to be made for two reasons. Firstly, because the recent 'institutional turn' in economic geography is wont to give the impression that supporting institutions matter as much, if not more than, the firms at the heart of the innovation process, when the causality tends if anything to run the other way. Secondly, because a new generation of regional innovation policy is being developed for Europe's less favoured regions (the design of which is strongly influenced by new narratives about learning and innovation) and this needs to be 'earthed' in a realistic assessment of the problem and the prospects. The key question here is what, if anything, does 'the learning economy' mean for our less favoured regions?

Though it is not set in aspic, the geography of innovation in the EU has been remarkably stable over time, a testament to the cumulative and path-dependent nature

of economic competence and technological change. More by default than design this 'core-periphery' pattern has been reinforced by *public policy* as well as by private practice: the national system of innovation tends to be strongly biased on the supply side to core regions in each country and the R&D programmes of the EU privilege core over less favoured regions because these learning and innovation funds are allocated on the basis of 'excellence' not 'need'.

The notion that the Structural Funds, the EU support programme for poor regions, might compensate for these deep developmental trajectories is comical, so the gap between leaders and laggards seems set to continue. So far as innovation is concerned (as opposed to welfare, well-being for example) the problem is not just a matter of resources: such is the problem of absorptive capacity in poor regions, especially in the private sector, that they have a genuine problem spending money on innovation projects – so where the need is greatest, so too are the barriers, a problem known as the regional innovation paradox (Oughton et al, 2001; Landabaso, 2001).

Notwithstanding these problems a radically different type of regional policy is beginning to emerge in the EU, addressed less to physical infrastructures like roads and more to innovation networks, sustainable development, equal opportunities and other relational assets, the intangible factors which are deemed to play an important role in the learning economy (Morgan, 1997). In contrast to the early generation of regional innovation policy, which was driven by purely supply-side considerations, the Regional Innovation Strategies (RIS) programme, signals some important changes:

- it focuses on the *demand* side, particularly the demand for information and knowledge within the firm
- it works to a broad conception of innovation as a *socially interactive* process rather than a narrow technology-based conception
- it highlights the importance of social capital, understood as a *relational* infrastructure for collective learning which requires trust, reciprocity and a disposition to collaborate for mutually beneficial ends
- most important of all, the RIS process is a socially *iterative* and *inclusive* process in which regional actors themselves define the content of the programme and manage the implementation process (Henderson and Morgan, 2001).

Despite these positive features the RIS programme remains a modest programme: it is too small to have much strategic impact; it has yet to be fully mainstreamed into the Structural Funds; and some less favoured regions do not have the governance structures to manage the process in an open and inclusive manner. Above all, though, the potential benefits of raising the innovative capacity of less favoured regions are necessarily long term, hardly an inspiring message for a poor region, especially for politicians who control the budgets and whose time horizons are short term. What these experiences affirm more than anything else is this: if less favoured regions are to become something more than they are today, in terms of innovation and social

cohesion, then they cannot do it without bolder and more imaginative national and EU support (Morgan and Nauwelaers, 1999).

Along with sustainability, the issues of innovation and cohesion are arguably the most pressing challenges facing the EU as it prepares to embrace new member states in central and eastern Europe, an enlargement like no other. Although geography will continue to matter in the restricted 'economic' sense that has been used up to now, it is in the larger, geo-political sense that it matters most of all. There are signs that the richest regions are becoming ever more reluctant to sustain less favoured regions within their own borders, still less to support poor regions elsewhere in the EU. A more devolved European Union, in which subsidiarity is extolled over solidarity, could lead to the worst outcome of all, namely an autarky of the rich. The greatest geo-political question of all in Europe is whether the twin principles of solidarity and subsidiarity (or what we used to call equality and democracy) can be sustained in the context of an increasingly devolved polity (Morgan, 2001).

5. Conclusions

The key conclusions from this discussion can be painfully condensed as follows:

- the notion that 'geography is dead' rests on broader claims about the effects of globalisation on the one hand and digitalisation on the other, neither of which can be sustained. The key problems with these claims are: they conflate spatial reach with social depth; they forget that the rapid diffusion of information and codified knowledge does not mean that tacit knowledge and understanding are also so freely available; and finally, they treat geography as simply physical space, when it needs to be understood as *relational* space.
- a new and important debate has emerged in economic geography and innovation studies as to whether organisational proximity can be a surrogate for geographical proximity. Stressing the richer learning potential of direct, face-to-face communication, perhaps the only sure medium for exchanging tacit forms of knowledge, it was argued that organisational proximity is at best only a partial substitute
- the burgeoning literature on clusters and territorial innovation systems contains a strange paradox: growing interest is paralleled by a diminishing evidence base. This evidence deficit needs to be redressed if we are to have a more robust understanding of how firms learn, what they learn and how they combine local and non-local sources of learning
- it was argued that the geography of innovation in Europe has been remarkably stable over time, a testament to the cumulative and path-dependent nature of economic competence and technological learning. Although a new generation of regional innovation policy is emerging, based on the evolutionary narratives of learning and innovation, it was argued that

these policies are far too modest to counteract the more powerful forces making for leaders and laggards

- finally it was argued that geo-political questions pose the greatest challenges for the new EU, particularly how it manages the twin claims of solidarity and subsidiarity (equality and democracy). Extolling subsidiarity over solidarity would lead to the worst scenario of all – namely an autarky of the rich.

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