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Regional development and the new economy



Andrew Gillespie

1. Introduction

In this paper we are concerned with the implications of information and communications technologies (ICTs), and the so-called “new economy” with which they are associated, for regional development. As such, we are concerned particularly with examining the ways in which ICTs may “change the balance” between centralising and decentralising dynamics in the space-economy. A number of starkly different spatial expressions of the “new economy” can be postulated, making our task a necessary one to undertake, in that the overall outcomes in terms of spatial organisation and regional development are not self-evident.



Ranald Richardson

One spatial expression of the “new economy” emphasises the strong clustering effect that can be witnessed in those regions most associated with the emergence of the “new economy”, such as Silicon Valley in California, or in the concentration of “dot.com” start-ups in major cities such as London. This version concentrates on a valid, albeit rather narrow conception of the “new economy” as a newly created sector based around a particular technology, that of the Internet.

A second, very different, spatial expression of the “new economy” emerges if we emphasise rather the ways the technologies are used within the economy as a whole, and in particular if we concentrate on the distance-transcending capabilities of technologies such as the Internet. Here then our focus is not with the “new economy” as a discrete sector, but rather with the more widespread transformation of the economy as a result of the rapid adoption and diffusion of a cluster of radical innovations in ICTs. The possibilities of being able to distribute information goods and services instantaneously and almost without cost over electronic networks has led some commentators to herald the “death of distance” or the “end of geography”. It is, unsurprisingly, this “version” of the “new economy” which seems to hold out the most promise in regional development terms, offering the possibility of peripheral regions and rural areas being able to “break free” of the constraints imposed by the “friction of distance”.



James Cornford

There is though another (third) version of the “new economy” which starts from the “use of technology” perspective, but which doesn’t emphasise the decentralising potentiality of the technologies to anything like the same extent, or at least not in the same way. This version is more rooted in a political economy tradition, and examines the way in which large companies use technologies within their production and distribution structures and strategies. There is no inevitability that decentralisation will follow from these competitive strategies; however, in as far as the new technologies permit lower cost locations to be “brought into play”, there is likely to be a strong cost-based decentralising logic at work in this version of the “new economy”.

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In this paper, our intention is, firstly, to explore in more detail these three different “versions” of the “new economy”, highlighting their contrasting developmental dynamics in terms of centripetal and centrifugal forces. Secondly, we attempt to draw out the differing implications for regional development which each version represents, and to consider the constraints on these developmental opportunities being realised, drawing on the results of a number of regional case studies and a review of lessons from policy intervention (1).

2. Locational dynamics in the “new economy”

Communications technologies do not simply pull the balance of centrifugal and centripetal forces in one direction at the expense of the other, but rather simultaneously strengthen both.

Over a century ago, Alfred Marshall drew attention to the battle of centrifugal and centripetal forces in the spatial organisation of the economy, and noted that: *“Every cheapening of the means of communication alters the action of forces that tend to localise industries”*. As we will discuss, the dynamics are complex. Communications technologies should not be seen as simply pulling the balance of centrifugal and centripetal forces in one direction at the expense of the other, but rather as simultaneously strengthening both. The locational outcomes “on the ground” are, as a result, going to be complex.

2.1 The “new economy” as an emergent sector of activity

Communication is, of course, intrinsic to any economy and ICTs have applications across all sectors of the economy. However, new communications technologies not only provide new ways of undertaking existing activities, they also generate a range of more or less new opportunities for economic activity, new products and services. Following an initial interest, in the 1970s, on “high tech” hardware production, various labels have been given to economic activity which has emerged specifically around the capacities of ICTs; the labels have shifted over time from “Multimedia” (associated with CD ROMS and standalone interactive software), through “New Media” (focused on multi-user interactive information services based on the Internet) to “dot.com” activity (focused on the transactional capacities of the Internet). What is common to these labels is their focus on the capture, creation, manipulation and distribution of digital content.

In spite of the supposed ubiquity of the technologies, there are distinct spatial patterns of development of this “digital media sector”. Working from a range of sources and in a range of countries, researchers have documented the tendencies for firms in the digital content-based industries to cluster in a small number of critical locations. For example Scott (1996, 1997, 1998), drawing on trade directories and official data, has focused on the multimedia industry clusters in California - a more entertainment focused cluster in Los Angeles and a more business oriented cluster in San Francisco. Sandberg (1998), has noted a similar concentration in Sweden, in and around Stockholm. Zook (2000), has used Internet registration data to provide maps of “dot.com” addresses across the United States, generating a picture of widespread, but highly uneven distribution of “dot.com” activity, both across city regions and within them. Research at the Centre for Urban and Regional Development Studies, Newcastle, has used trade directories to map the regional patterns of such firms in a number of “New Media” subsectors (games, web-based advertising, etc.) and has shown a clear over-representation of such activities in four more-or-less

1) Four case studies were undertaken as background to this paper. These were Cambridge, the Highlands and Islands of Scotland, the North East of England, and Ireland. In this paper, we draw upon the case study material to provide illustrative examples; the full case studies can be found in the research report upon which this paper is based.

adjacent locations - London, the M4 Corridor, East Sussex and the M11 Corridor (Figure 1). This picture closely matches that created by Dodge and Kitchen (2000), using registered addresses of owners of domain name space.

There is broad agreement about the location of the new digital content sector - it is overwhelmingly a metropolitan phenomenon.

There is, then, broad agreement about the aggregate location of the new digital content sector - it is overwhelmingly a metropolitan phenomenon. There is much less agreement, however, about the reasons for this concentration and the longer-run prospects for the development of the sector. Simple urbanisation economies (the benefits of shared physical and business infrastructures, and labour pool, which all urban, and particularly metropolitan, firms enjoy) obviously play a part in some cases. Yet these, it is felt, do not fully account for the particular patterns of concentration that have been seen.

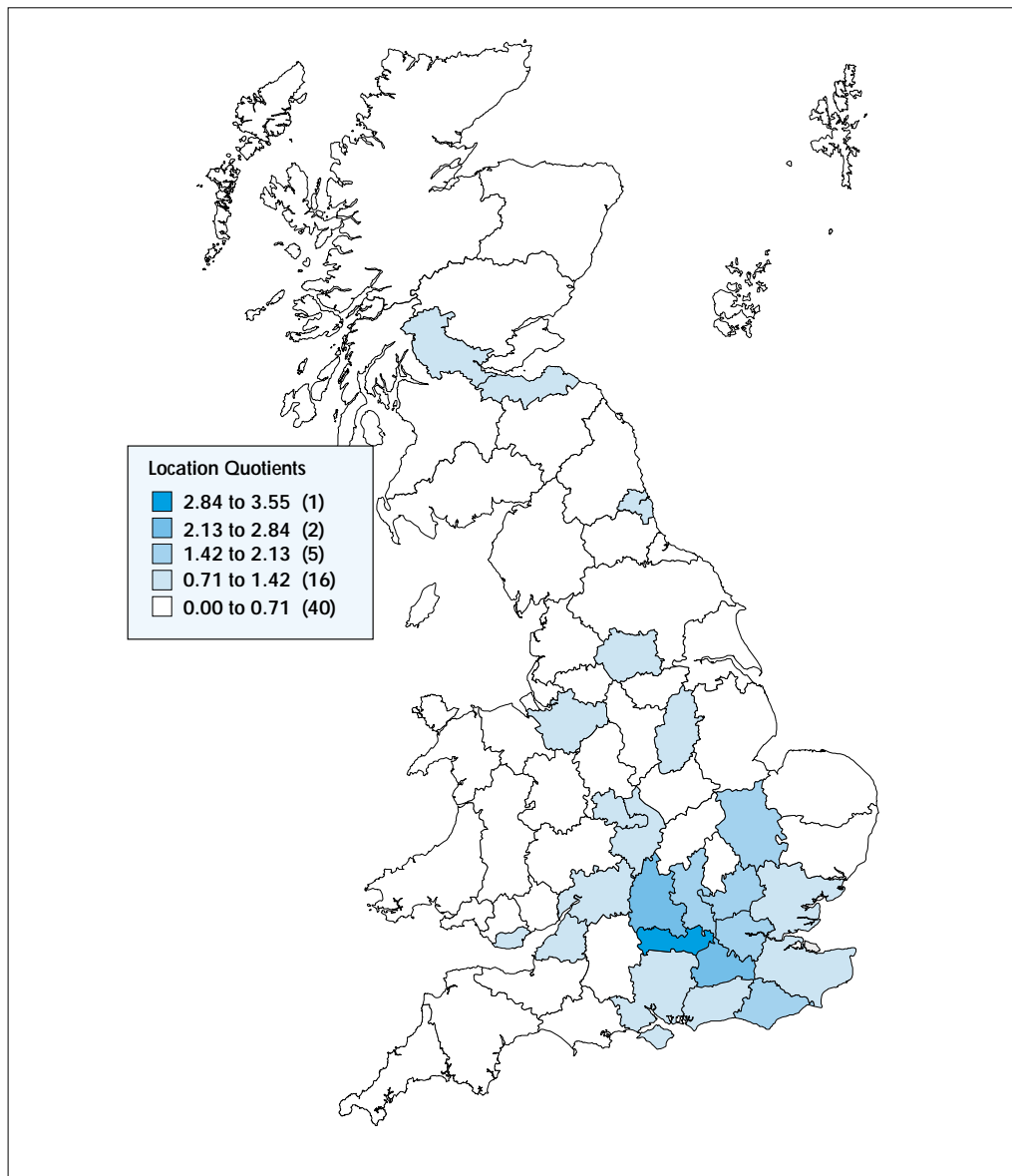
One set of arguments which seek to explain the agglomeration of such activity has stressed the relationships among such firms. Their constant need for innovation, coupled with the high risks involved with unstable markets and highly differentiated products, it is argued, results in an organisation of new media production focused upon "industrial districts", predominantly comprised of small firms. The agglomeration economies derived from such territorially-based clusters ensure that all producers benefit from localised externalities (Scott, 1995, 1996). In short, such activity clusters around itself.

A second approach has stressed the role of the market for these companies. For much of the digital content industry, the market for their services is predominantly large firms and organisations, led by a few sectors (financial services, media, telecommunications, publishing, etc.). From this point of view, "New Media" are not primarily clustered around each other, but are rather clustered around the key gatekeepers in the large firms that are their main clients. More recently, the emergence of "dot com" companies, focused not on fee-based work for large companies, but rather on venture capital financed development of Internet-based retail and wholesale concepts, has led to the suggestion that the focus of clustering has shifted from customers to financiers.

2.2 The "end of geography" version of the "new economy"

Without a doubt, the strongest thesis that has been advanced with respect to the impact of the "new economy" on the balance between centripetal and centrifugal forces is that the latter will come to predominate, once the *raison d'être* for agglomerated spatial forms is rendered obsolete through distance-shrinking technologies. This thesis has a long lineage, with its exponents seeing the very existence of the city itself as being under threat. Marshall McLuhan, for example, predicted in the 1960s that: "*with instant electric technology, (the) very nature of the city as a form of major dimensions must inevitably dissolve like a fading shot in a movie*" (McLuhan, 1964, p.366). In the 1990s, the advent of the Internet excited a new round of commentators to speculate upon spatial outcomes, with, *inter alia*, Negroponce (1995), stating that "*the post-information age will remove the limitations of geography*", Gilder (1996, quoted in Moss and Townsend, 2000), asserting that "*cities are leftover baggage from the industrial era*", and Cairncross (1997), heralding the "death of distance".

Figure 1. Location quotients for “New Media” firms



Notes: County Level Location Quotients for 4 136 “New Media” firms (1998-9 data from trade directories against 1996 VAT registrations).

Source: CURDS Research.

There are a number of inter-related reasons that explain why ICT appear not to undermine existing urban agglomerations.

Beyond these anti-urban assertions, the question remains of how exactly might the city be rendered unnecessary by ICTs? The answer lies in a particular conception of the city’s *raison d’être*, which is that “to avoid transportation, mankind invented the city” (Schaeffer and Sclar, 1975). Quite simply, the argument is that electronic technologies are destroying the spatial monopolies of information and knowledge which have accrued to cities as a result of the difficulties of conveying such information and knowledge other than through face-to-face interaction. With inter-connected computer networks, and vast stores of information in digital form, it is thus argued that conveying

and/or obtaining information no longer depends on face-to-face interaction, and that as a result participation in the knowledge economy becomes, to all intents and purposes, location-independent.

There are, however, a number of inter-related reasons that help to explain why ICTs appear not to inevitably undermine existing urban agglomerations. These include the metropolitan bias in telecommunications infrastructure provision; the role of ICT in contributing to the strengthening of "global cities"; and the persistence, despite electronic networks, of what has been termed "the compulsion of proximity". Below we outline each of these explanations in turn.

Metropolitan "bias" in the provision of telecommunications infrastructures

ICT can contribute to both centralisation and decentralisation of economic activity, depending on the nature of the activity concerned.

Although modern communications appear to be so pervasive as to be literally "everywhere", in fact they rely completely on the presence of fixed telecommunications infrastructures, such as switches, wires, dishes and masts. These infrastructures are not provided everywhere, and certainly not everywhere at the same quality, and there is a strong, economic logic to infrastructure provision - a logic in which concentrations of demand attract suppliers - which is serving to reinforce the communications pre-eminence of major urban areas. Far from equalising the supply of telecommunications services across space, the interplay of rapid technological advance, the increasing specialisation of customer demand and the liberalisation of telecommunications provision has led to an increasingly differentiated geography of telecommunications (Gillespie and Robins, 1991). As Moss (1987, p. 536), first pointed out, these developments are leading to "*the creation of a new telecommunications infrastructure designed to serve the information-intensive activities of large metropolitan regions*".

ICTs and the strengthening of "global cities"

ICTs can contribute to both centralisation and decentralisation of economic activity, depending on the nature of the activity concerned. One set of economic activities where ICTs appear to be underpinning a process of centralisation, however, are those referred to as "command and control" functions (2). Knowledge based activities are becoming scattered across the globe, but the upper tier of such activities are being spatially concentrated in what have become known as "global cities". The main motor of this process of concentration, paradoxically, is globalisation.

Crucially then, advances in information and telecommunications technologies are contributing to both the *dispersal* of productive capacity and to the *centralisation* of command and control functions. Thus according to Sassen (1991, p. 5), it is "*precisely because of the territorial dispersal facilitated by telecommunications that agglomeration of certain centralising activities has sharply increased*".

The persistence of the "compulsion of proximity"

There is though an even more fundamental reason why new technologies are not undermining spatial agglomerations, and that is that the assumed substitution of face-to-face communication by electronic communications, on which the urban dissolution argument rests, appears not to be taking

2) See, for example, Amin and Graham, 1997; Amin and Thrift, 1992; Castells 1996; Sassen, 1991; and Thrift, 1996.

Electronic communications appear to be complementing, rather than replacing, face-to-face communication.

place. Electronic communications appear to be complementing, rather than replacing, face-to-face communication. According to Boden and Molotch (1994, p. 258), *“although in some instances communication is best done by more impersonal means, modernity implies no dilution in the degree that face-to-face - or, more precisely, “copresent” - interaction is both preferred and necessary across a wide range of tasks”*. They term this “the compulsion of proximity”, and recognise that it provides a strong continuing impetus to agglomeration. As Tony Fitzpatrick, the Director of Ove Arup puts it:

“Remote working from self-sufficient farmsteads via the Internet cannot replace the powerhouses of personal interaction which drives teamwork and creativity. These are the cornerstones of how professional people add value to their work. Besides, you cannot look into someone’s eyes and see that they are trustworthy over the Internet” (quoted in Amin and Graham, 1997, p. 413).

What of activities in which knowledge can be relatively easily routinised and embodied in technological systems of software and communications technologies? In such cases, there would appear to be more likelihood of technological advances contributing to dispersal. It is to a consideration of such activities that we turn in the next section.

2.3 The corporate spatial organisation perspective on the “new economy”

Beginning in the 1980s and accelerating considerably in the 1990s, large firms have pursued (for reasons including cost-reduction, improved efficiency and market extension) ICT-facilitated spatial re-organisation strategies (3). Although these strategies have resulted, in differing circumstances, in both the centralisation and the dispersal of activities, the overall spatial logic has been that of exploiting the locational flexibility ICTs open up in order to reduce costs through the re-location of “service” activities to lower cost locations. In this sense, ICTs have had similar effects with respect to services as did earlier transport and communication improvements with respect to production activities, enabling new “spatial divisions of labour” (Massey, 1984) to emerge, at both international and intra-national scales. In this process, certain locations previously defined as “peripheries” can become incorporated, given the right attributes in terms of the availability and cost of factors of production, into corporate structures of production.

Telecommunication-based information systems lie at the heart of such processes of re-organisation, enabling the re-location of activities whilst maintaining corporate control over them. In terms of the re-organisation of service activities, so-called “back office” functions, such as payroll and order processing, were first either “hived off” from the head office and located in lower cost locations, or were “stripped out” of branch offices and aggregated into dedicated back office facilities, which could then be optimally located, using telecommunications to link these back offices to corporate headquarters and branch offices. In both cases, these developments can be seen as part of a process of technology-facilitated “industrialisation” of service functions, in that they were associated with the standardisation of operating procedures and working practises, mediated via increasingly powerful information systems.

More recently, in the 1990s, a major new phase of service re-organisation has occurred in those service industries in which face-to-face contact with the customer has been augmented, or even

3) See Hepworth, 1987; Gillespie, 1993; Goddard, 1992; and Li Feng, 1995.

replaced altogether, by tele-mediation (via, in the first instance the telephone), of the customer delivery channel. Since the first teleservice operations began in Europe a decade ago, in activities such as consumer financial services the “front office” function of servicing customers has increasingly been “back-officed” (Richardson, 1994), through the innovation of the telephone call centre.

Again, the separation of production from consumption, the exploitation of economies of scale in “factory-style” environments, and the routinisation and codification of procedures, amount to the “industrialisation” of customer service delivery channels. In locational terms, call centres open up radically new locational possibilities. Services, such as banking, which were previously delivered to customers through branch offices, can be re-organised completely and delivered through far fewer customer service factories, which can then be optimally located in order to exploit spatial divisions of labour and other spatially-differentiated costs, notably land and property.

Call centres generally have high levels of locational mobility therefore, though it needs to be stressed that they are not homogenous in terms of their locational requirements, with those activities requiring multi-lingual or technically-skilled staff (e.g. IT help-desks) being considerably more constrained in their locational options than call centres with more routine skill requirements. Overall, however, the locational outcomes point firmly in the direction of decentralisation from high cost locations. Given the availability of a sufficiently high-grade telecommunications infrastructure to provide intelligent network services across national territories, or at least the more urbanised parts of these territories, other factors - notably labour, property, incentives and welcoming development agencies - all tend to favour non-central, non-capital city locations (4). This is certainly true of the UK where regions such as Scotland, North East England and North West England have attracted a large number of call centres relative to their size and traditional employment structures (Richardson *et al.*, 2000; Richardson and Belt, 2001). This also seems to be the case in other European countries such as Germany and Sweden (Graef, 1998; Lorentzon, 1998).

What ICT has done is to render a greater proportion of the economy footloose, with a key innovation being tele-mediation of service delivery channels.

For those activities at least at the lower end of the tacit knowledge spectrum, such as call centres, the “new economy” is not necessarily very different from the “old” in terms of the locational decision-making calculus of firms (i.e. infrastructure, labour, property, incentives and institutional support). What the “new economy” element of ICTs has done is to render a greater proportion of the economy *footloose*, with a key innovation being tele-mediation of service delivery channels. For relatively routine knowledge-based activities then, there is a strong, cost-based, impetus to dispersal, a process which is both made possible and enormously facilitated by ICTs. This dispersal is taking place from high cost metropolitan regions to lower cost metropolitan regions, and, within metropolitan regions, from urban cores to suburban or exurban peripheries.

In discussing locational dynamics in the “new economy”, therefore, we need to place this “alternative” perspective alongside both the knowledge-based clusters leading to agglomeration interpretation and the (somewhat overstated) “end-of-geography” interpretation. This third interpretation of locational dynamics in the “new economy” has emphasised the greatly increased range of locational configurations and options which ICTs are offering corporate organisations in

4) The exception is for call centres requiring multilingual labour, where a capital city may provide higher levels of availability of such labour than can be found in other parts of the national territory. The concentration of Ireland’s pan-European call centres in Dublin is a good example of this effect.

their management of territory and in their market-serving strategies. The outcome of this enhanced locational flexibility appears to be resulting in ICT-facilitated decentralisation, both between and within regions.

3. Regional development in the “new economy”: Lessons from policy interventions

Each of the three perspectives on the “new economy” outlined above is associated with differing opportunities for regional development, with differing constraints on realising these opportunities, and with differing policy approaches and outcomes. Our purpose in this section is to examine these contrasting opportunities, constraints and policy approaches, for each of the three “new economy” perspectives considered in the previous chapter.

3.1 Regional development and “new economy” activities

The first phase of regional policy engagement within the “new economy”, which we can trace back to the late 1970s or early 1980s, but which is still alive and well in many regions, is founded on the notion of the “new economy” as being concerned with the emergence of a new sector, or more extensively a new and propulsive socio-technical wave of innovation, built around digital technologies. The notion of “new” that is invoked has, of course, developed over the last quarter century as the novelty of particular sets of economic activity waxes and wanes. Broadly, we can see a shift of emphasis over time, in part driven by the changing technological background, from a focus on computer and communications hardware, through software, to information, and most recently Internet-based transactional services. Through each of these phases the regional development opportunity was understood to arise from the very novelty of the sector. The inherited historical competitive advantage of the core regions in established sectors, was (mistakenly) seen as weakened in the context of new activities, “levelling the playing-field” between core and periphery, between favoured and less favoured regions. What was envisaged was a “window of opportunity” through which to capture a rapidly growing sector of economic activity that was, as a result of its very novelty, understood to be more or less footloose, in that it was not already tied into an established geographical pattern.

Two main variants of this approach emerged. One more or less based on (an image of) the model of Silicon Valley, focused on the clustering of generally indigenous “high tech” activities, both hardware and software, in an innovative milieu. The second, perhaps best exemplified in Europe by the central belt of Scotland, focused more on the attraction of branch plants of the major IT producers.

Europe has repeatedly proved to have a remarkably old geography, with patterns of innovation that date back to the 1930s at least.

In the first variant, policy has focused on recreating the dense networks of linkages - in terms of labour (shared pools of skilled workers), capital (venture capital and cross holdings) and knowledge and information - that have been observed in many of the successful centres of innovation elsewhere (see the Cambridge case study in Box 1) through the creation of various forms of institutional structure (associations, clubs, networks) and the spatial context for such interaction (science parks and incubators). Such policies have sought to build on local indigenous entrepreneurial activity in the “new economy” and, where key elements have been lacking (such as venture capital activity, a skilled workforce or advanced research capacity) to attract in, or create substitutes for, these missing elements.

Box 1. The Cambridge “high tech” cluster

The growth of a number of distinct but often inter-linked “high tech” clusters in and around Cambridge, in the East Anglian region of England, has been termed the “Cambridge Phenomenon”, and, more recently, “Silicon Fen”. With its proximity to London and its prestigious university, Cambridge has long been a centre of research and development; indeed, the origins of the Cambridge Phenomenon can be traced back to the formation in 1881, by two Cambridge graduates, of the company which later became Cambridge Instruments, which developed the first seismograph. However, it was not until the establishment of Cambridge Science Park in 1970, coinciding with the advent of the microelectronics revolution, that a high tech cluster of economic activities came into being. Early growth was rapid, such that by 1986, 16 500 workers were employed in high tech industries in Cambridge. In 1997, there were approximately 26 000 high tech jobs in Cambridge, with a further 11 000 in the surrounding areas of Cambridgeshire. In computer software alone, there were 4 900 jobs in Cambridgeshire in 1997, with the cluster comprising some 315 firms, many of them small.

There are a number of factors which have underpinned the formation of the software cluster in Cambridge, or which have contributed to its continuing success. The most significant such factors are:

- The University - although few software firms use the university for research purposes, it was a dominant factor in the initiation of the cluster. Further, the prestige of the university, in international terms, has helped in marketing firms operating within the cluster. Although the cluster was initiated by graduates from the university, this is no longer the predominant source of labour supply; indeed, many skilled people have moved to the area to be part of the cluster. It is now only the most technically-oriented companies, having strong links with the university's engineering and computing departments, that rely on the recruitment of Cambridge graduates. For these companies, however, this is a major attraction of the area.
- Proximity to market - the importance of this factor varies according to the nature of a company's business. For Internet-based companies, a significant proportion of their work is generated, by means of contacts and informal networks, through the cluster, and many companies consider that a location in the heart of Cambridge is important to maintain these contacts. More generally, the proximity of companies involved in related activities has been a major factor in the development of the cluster. Indeed, several companies have come to Cambridge to be part of the “scene” or “phenomenon”.
- Infrastructure for business - Cambridge offers advantages to small businesses in the form of serviced accommodation sites, and business parks, such as the St. John's Innovation Centre, which offers business advice and acts as an incubation unit for small but rapidly expanding businesses. The plethora of experienced business people around Cambridge is also an attraction. There are also well established formal and informal networks, such as the Cambridge Network, established in 1998 to link the business community in Cambridge to the global high tech community.

The Cambridge Phenomenon illustrates the continuing need for direct physical presence within dynamic knowledge-based clusters, even in industries based upon the most advanced ICTs. Further, it highlights the importance of factors - notably the prestige and research excellence of Cambridge University - which would be very difficult to replicate in other locations.

In terms of the vision of an innovative milieu of indigenous firms, anything like Silicon Valley has proved almost impossible to recreate in Europe (in large part because Silicon Valley already exists, enjoying some unique first mover advantages). Further, the indigenous “new economy” in Europe has repeatedly proved to have a remarkably old geography, with patterns of innovative activity that date back to the 1930s at least (the dominance of regions such as the south of England in the UK, the Ile de France, south and south western Germany, Catalonia in Spain, and the northern regions of Italy). This pattern of “innovative”, “high tech” or “creative” milieux that exists across Europe - the so called “archipelago” of high tech Europe - appears highly stable. Neither the “greenfield” (generally peripheral) regions that escaped industrialisation in the 19th and early 20th centuries, nor the “brownfield, older industrial, regions with their legacy of earlier rounds of investment in heavy industry, mining and textiles have seen the development of significant indigenous clusters of high tech, software or multimedia-based development.

Recreating the conditions for the development of innovate milieux in less favoured regions has proved exceptionally difficult.

Recreating the conditions for the development of such innovative milieux in less favoured regions has proved exceptionally difficult, in part because those conditions were both difficult to specify and, where they were identified, have tended to have a long historical gestation and/or require the co-ordination of policy in a wide range of areas (from university-based research through land and property, training, venture capital and banking, to the establishment of inter-firm networks for information exchange). The lack of much indigenous entrepreneurship, or knowledge base, to build around has often hampered these initiatives, blunting their “high tech” edge, with science parks ending up filled with a much more diverse set of clients. There are, nevertheless, possible exceptions, for example in the Scandinavian countries, in particular Sweden and Finland, although these appear to be highly reliant on individual national champions (Ericsson and Nokia respectively) and their strategic position in the cellular telecoms boom. In general, research has tended to confirm that an indigenous approach to establishing clusters of leading-edge technology-based businesses, where these do not already exist, has failed.

If less favoured regions lack many of the preconditions of establishing an indigenous “new economy” sector, an alternative has been to import some of the most important elements - above all capital and knowledge - from the core regions in the form of inward investment. With large national or multinational corporations providing these key ingredients, the region’s contribution has generally been to provide suitable land (usually in the form of the ubiquitous greenfield business or science park), suitable lower cost/turnover labour (through the training system) and a lower cost of capital (though grants and other financial inducements).

This inward investment-oriented route has recorded some successes, at least in terms of IT manufacturing, in particular in central Scotland (“Silicon Glen”) and perhaps also Ireland, where (generally US) “high tech” multinationals have located a large number of branch plants. It is not yet clear, however, to what extent these branch plants are any different to (or more sustainable than) earlier rounds of branch plant investment, or the degree to which a more sustainable growth pattern with supporting indigenous activity has been established. There is often a lack of linkage between these branch plants and local suppliers, limiting the capacity for knowledge transfer as well as simple multipliers, and such branch plants have only slowly gained any local autonomy in terms of higher value adding activities (such as research and development). While these branch plants might be seen to have got their regions on the “first rungs of the high tech ladder”, enabling them to move slowly up the value chain, there is little conclusive evidence that any region - with Ireland perhaps being the exception - has successfully managed to achieve this upward trajectory.

What are the lessons that can be drawn from this account? Three points appear to be critical. The first concerns the remarkable stability of the geography of innovation within Europe and scale of the task that one is attempting in seeking to radically change that geography. The second point is that it appears impossible to conjure up advanced industrial activity in less favoured regions where there is no substantial knowledge-base or appropriate competencies to build on. Third, in the early stages of development at least, external involvement (in the form of major state and/or multinational investment) is vital to establish the basic competencies and knowledge base on which development can take place.

3.2 Regional development and the “death of distance”

The second “new economy” perspective is concerned with the regional development opportunities associated with the distance-transcending capabilities of telecommunications networks. These opportunities can be taken to include:

- *Access to markets*: through ICT innovations, notably the Internet, enterprises in peripheral regions and rural areas could gain access to markets in core regions and metropolitan areas;
- *Access to business services*: electronic delivery mechanisms could help such peripherally-located enterprises to gain access to higher quality and/or lower cost business services;
- *Access to public services*: citizens in remote and rural areas could gain improved access to the public services - such as health and education services - available in metropolitan areas, through telematics innovations such as distance-learning or tele-medicine.

Understandably, regional disparities in levels of telecommunications infrastructure provision have been assumed to impose significant limitations on these regional development opportunities being realised. The “gap” in telecommunications infrastructure provision between core regions and peripheral and/or low density regions has long been of concern to regional policy-makers, and has been the subject of policy intervention (see the Highlands and Islands of Scotland case study in Box 2).

Within the context of increasingly liberalised telecommunications environments, the European Union’s strategy with respect to closing the regional telecommunications infrastructure gap has three main elements (European Commission 1997):

- Using regulation, and in particular the Universal Service Obligation to promote cohesion;
- Completing the basic telecommunications network, and,
- Stimulating demands for telecommunications services to pull through supply.

The emphasis in the last point on demand stimulation reflects a broader understanding that “*infrastructural difficulties are no longer a major obstacle*” to the use of ICTs (Mitchell and Clark, 1999, p. 447). Although policy-makers initially believed that telecommunications infrastructure investment alone would be sufficient for peripheral and less favoured regions to overcome their (assumed) distance-related developmental constraints, all the evidence suggests that such regions make less use of ICTs than their core region counterparts, and that although telecommunications infrastructure is undoubtedly *necessary* to regional development, it is not *sufficient*.

Box 2. The Highlands and Islands of Scotland

Addressing the “infrastructure gap”

The economic development of the Highlands and Islands of Scotland has always been handicapped by the geographical realities of distance and terrain. It is remote from the urban centres of the UK, is one of the most sparsely populated parts of the European Union (on a par with the northern parts of Sweden and Finland), and has 30% of its population living on islands. In the mid-1980s, the organisation charged with the economic development of the region, the Highlands and Islands Development Board (which became subsequently Highlands and Islands Enterprise, HIE), decided that telecommunications could help overcome the physical barriers that were perceived as obstructing the region's development.

It became apparent that British Telecom (BT), the newly privatised monopoly provider of telecommunications services in the region, had no plans to up-grade the network in the area, seeing little prospect of an adequate commercial return (Richardson and Gillespie, 1996). Following negotiations between HIE and BT it was agreed that HIE would contribute GBP 5 million towards the cost of a GBP 16 million upgrade of the region's infrastructure, with the rest provided by BT. The infrastructure investment programme initially covered three areas of work:

- Improving data transfer services with the area, and making them available at local call rates rather than at trunk call rates;
- Upgrading 43 exchanges to support ISDN services, later amended to 70;
- Establishing a “network services agency” in Inverness, to provide value-added services (such as computer conferencing, e-mail, and bureau facilities) and access to national databases.

Although this meant that around 80% of business lines were connected to Digital Local Exchanges (DLEs), areas outside the main centres of population remained reliant on older exchanges, providing a more limited range of digital services. Research suggested that this left a number of businesses which, taken together, were significant to the region's growth, being without access to advanced services (Richardson and Gillespie, 1996). In addition distances between some customers and their closest exchange prevented full service provision; for example, basic rate ISDN becomes unavailable once the “line loss” is too great, typically beyond 4-5 km of a DLE .

It became clear that further intervention would be required to secure the upgrading of infrastructure in the more rural parts of the region. BT had no intention of upgrading these areas and no competitor provider was emerging. In 1997, therefore, HIE negotiated a joint programme with BT to upgrade coverage to the 20% of the population which had not been upgraded in the original programme. This upgrade cost GBP 4.8 million, with GBP 1.7 million coming as public subsidy.

A further intervention was made in order to secure the infrastructural investment to secure wide coverage in the field of mobile telephony. HIE, together with Cellnet and Vodafone undertook a GBP 46 million project, with GBP 4 million of public money, to install cells to enlarge mobile coverage, with the aim of bringing coverage to 95% of the population. By autumn 2000 the process was almost complete. Take up of mobile has been rapid in the region, and new cells are being installed or upgraded because of the scale of demand.

This case study demonstrates that on-going constraints exist on market-led telecommunications being able to deliver high quality telecommunications services in remote and low population density regions. Public intervention has been necessary on a repeated basis in the Highlands and Islands of Scotland to ensure that particular network up-grades take place within the region, and this situation is unlikely to ease over time. Each new technology will be first deployed in metropolitan and core region markets, and remote and rural regions will be a long way down the “roll-out” queue, and perhaps unable to justify the investment at all. Public intervention - in the form of direct subsidy - can prove successful in modifying these investment decisions such that remote areas benefit from new services earlier than they could justify on commercial grounds alone.

Raising awareness of the potential of infrastructure

It was clear from the beginning that infrastructure, though crucial, would not of itself lead to economic development and a programme to raise awareness of the technology and to accelerate its take-up was established. A central element of this programme was a series of road shows aimed at closing the awareness gap amongst SMEs. Since then a range of awareness measures have been taken. Examples of support initiatives in which HIE have been involved during the 1990s include:

- Financial support to micro and small businesses engaged in tele-activities;
- A strategy to encourage food and drink manufacturers to adopt electronic data interchange (EDI) applications;
- A Business Information Source providing a one-stop shop business information service to firms throughout the region;
- Establishing a number of Community Telecottage Centres to provide training, shared access to ICTs and a site for teleworking;
- Establishing websites such as those on the Islands of Islay and Jura, which allow businesses to promote themselves worldwide.

Investments in digitalisation and other new telecommunications infrastructures generally presupposed a ready and willing source of demand for the new services available. In many cases, the intended uses and users of these infrastructures have simply failed to materialise, at least as quickly as was hoped. The much forecast explosions in teleworking, tele-medicine, tele-education and so forth have not happened (or not as expected and not in the less favoured regions). Indigenous firms in the less favoured regions, and in particular the SMEs sectors, have proved particularly slow adopters of the new communications technologies (Ilbery *et al.*, 1995; Richardson and Gillespie, 1996). And in instances when they have adopted such technologies, the translation from adoption into effective use and competitive advantage does not automatically follow (Capello, 1994; Grimes, 2000).

In part, the disappointment with the outcomes of policy intervention is due to the nature of regional development problems being mis-specified in the first place. In particular, the problems ascribed to “peripherality” or “remoteness” have been misinterpreted as being amenable to solution by

technologies, which can eradicate the effects of distance. A good example is provided by the Internet, which appears to offer SMEs in peripheral regions and rural areas the possibility of “breaking free” of the market-access limitations imposed by remoteness. However, although the Internet will undoubtedly become a widely-used business tool, it is not likely, in any generalisable sense, to transform the market access opportunities of SMEs, most of whom are selling to local markets and do not have the managerial or market-serving capacity to efficiently serve remote markets.

Geographical distance is not the main barrier facing peripherally located SMEs wishing to gain access to core markets, rather it is their inability to compete in these markets.

The two mis-specifications here are firstly that the main barrier to peripheral SMEs gaining access to core markets is geographical distance, and secondly that this distance barrier can be overcome by ICTs. We would contend that geographical distance per se is not the main barrier facing peripherally-located SMEs wishing to gain access to core markets, rather it is their inability to compete in these markets, due either to problems of price (by definition, small firms will often not be able to reap the economies of scale which larger firms can exploit) or to problems of product/service quality or design; evidence suggests that high rates of innovation and achieving high quality are likely to be associated with having particularly demanding customers, which most peripheral and non-metropolitan areas are unlikely to have the benefit of.

For the relatively few rural SMEs which *do* have competitive products or services in metropolitan or even global terms, the problem of access to geographically distant markets is not likely to be overcome by technological solutions, such as the Internet, alone. The ability to serve a remote market will usually require both distribution networks and direct market presence, due to the requirements for negotiation in the selling process and for after-sales support. ICTs can usefully supplement the type of direct market presence that is usually required; only in a limited range of products/services can it substitute entirely for such presence. It follows that policies to stimulate the up-take of such ICT applications and services by SMEs located in peripheral regions with the specific aim of helping them to gain access to remote markets will often have disappointing or limited results; many of the firms concerned will have products or services which are not competitive outside the local market, and others will need to put in place mechanisms for providing them with direct presence in remote markets if they wish to compete effectively in such markets.

3.3 The attraction of information-intensive inward investment

As was illustrated in Section 2.3, the growth of ICTs, taken together with a number of other inter-related factors including globalisation, liberalisation of trade and markets, and the growing importance of services is increasing the number of footloose economic activities. These range from fairly basic, low-skilled activities, to relatively skilled functions, and include data processing, call centres and multi-media customer service centres, software production, shared service centres, and regional head offices (continental-wide or sub-continental hubs). However, they rarely include strategic activities.

A relatively common approach to attracting information intensive inward investment has emerged throughout the advanced industrialised world and competition is now intense. It includes the following policy levers:

Telecommunications infrastructure as an inward investment strategy

As economic activities become more and more dependent upon high-grade telecommunications networks, and as the focus of inward investment attention shifts towards information-intensive services, so the quality of telecommunications infrastructure becomes an increasingly influential location factor. This is well illustrated by the Irish example (see Box 3).

A number of lessons regarding the telecommunications infrastructure and services emerge with regard to attracting inward investors. Firstly, investment in ICTs cannot be a one off. Unlike other forms of infrastructure investment, which regional agencies have traditionally used as development levers, such as roads and real estate, the “shelf life” of particular information and communications technologies is short. Continuous updating is required in order to retain competitive advantage.

Secondly, for most urban regions at least a liberalised market is likely to be the best mechanism for ensuring investment in advanced technologies. Increasingly short ICT product cycles and the increasing variety of services on offer makes it unlikely that public agencies will have the finances or expertise to make large-scale public investment sustainable in the long-term. The Irish experience in accelerating telecommunications liberalisation in response to the demands of US companies is instructive in this regard.

Thirdly, the market will not automatically provide a high-grade infrastructure in all areas; in low-density rural regions such as the Highlands and Islands of Scotland, the liberalisation process has not attracted competitor telecommunication supplier to the dominant (former state) monopoly provider. Where new entrants do emerge, either in fixed or mobile services, they tend to require public subsidy (see Box 2 above). Rural regions thus face a vicious circle. They are unable to secure telecommunications investment ahead of demand in order to attract inward investors and by failing to attract inward investors they are unable to create the critical mass of information intensive firms required in order to make it commercially viable for telecommunications providers to invest in infrastructure.

Labour markets, education and training

A crucial factor in attracting or limiting the attraction of inward investment is, of course, the availability of a suitable pool of labour that is sufficiently skilled to enable firms to obtain the staff that they require at a reasonable price. The attributes of a particular region’s labour force will, of course, be a function of a range of factors, not least of which is its historical industrial structure. Many of those regions that are currently attempting to attract information intensive inward investment tend to have been reliant on heavy manufacturing industries. In such circumstances, a change to the skill base and to cultural attitudes is likely to be required. Education and training are thus key elements for such regions.

Box 3. Telecommunications in Ireland

The role of telecoms infrastructure in attracting inward investment

The Republic of Ireland has been seen by many as a European success story over the past few years and has been termed the “Celtic Tiger” in recognition of the way its growth has mirrored that of the rapidly growing economies of South-East Asia. This success has largely been based on the sustained attraction of foreign direct investment in a number of industries. Over the past 15 or so years emphasis has been placed on the attraction of IT firms and on “knowledge-based” firms in areas such as financial services, particularly from the United States.

As Ireland sought to attract more sophisticated and knowledge intensive businesses the need for more advanced information and telecommunications services became apparent. As early as the late 1970s, it had become apparent that the existing electro-mechanical telecommunications system was unsuited to the demands of the electronics and software companies and the poor state of the telephone system was cited as the greatest single complaint from foreign industrialists (MacSharry and White, 2000). In response the government established a new state agency, Telecom Eireann, and committed to build a digital-based network. This investment came on stream in the 1980s and by the early 1990s it was claimed that USD 4 billion had been spent on modernisation (IDA Ireland, 1995). The availability of advanced infrastructure and services became a central plank in the Irish Development Agency’s marketing efforts (Grimes, 2000; MacSharry and White, 2000). Additionally, services and tariffs appear to have been designed by the state-owned Telecom Eireann to benefit large internationally oriented firms. The cost of digital circuits between Ireland and the US were reduced to make Ireland a cost effective location for branches, which had heavy traffic with their parent organisations. In order to attract telemarketing firms volume discounts were introduced, as were low incoming toll free and international dial direct tariffs.

A number of reports suggest that this strategy presented Ireland with a competitive advantage over other countries, particularly in the area of pan-European telemarketing (ACT, 1999; Richardson and Marshall, 1999; Breathnach, 2000a). The same is likely to be true of other information activities such as software production and financial services.

Liberalisation as a means of meeting the needs of inward investors

Despite the undoubted success of the Irish strategy, it also underscores the lesson that investment in telecommunications infrastructure is a continuous process. Despite large-scale modernisation of the infrastructure throughout the 1980s, by the mid-1990s inward investors were expressing frustration about the lack of competition in the Irish telecommunications market, and the effect of this on investment in that market. Partial liberalisation commenced in Ireland in 1992, but was not due to be completed until the year 2000. The Advisory Committee for Telecommunications (ACT, 1999), a committee composed of representatives of US firms (and thus unsurprisingly favouring a US rather than a European model) and Irish representatives concluded that there were a number of deficiencies, namely:

- an absence of competitive, high capacity, Internet-capable international connectivity linking Ireland to the US and key European centres at prices that were less than or, at worst, no more than best international practice;

- a lack of competition in the provision of high speed Internet services and the absence of both a recognised Internet peering facility and of global Internet service providers in the Irish market;
- the availability and pricing of broadband connections to businesses throughout Ireland was deficient in comparison with the best international benchmarks (the absence of tariffed ATM and xDSL services and the high prices for primary rate ISDN and leased lines were seen as particular shortcomings in this regard);
- Internet charges were significantly higher than the best global benchmark (i.e., US).
- the high interconnection costs in Ireland and the absence of a standard of service agreement between the incumbent and new telecommunications operators.

The response to these criticisms was two-fold. First, the timetable for full liberalisation of telecommunications services was brought forward to the end of 1998. Second, a further round of public investment in advanced infrastructure was announced in the National Development Plan for 2000 - 2006 "to promote investment in advanced communications and e-commerce infrastructure where it is clear that the market will not deliver sufficient investment, and to support the acceleration of the Information Society and e-commerce" (SFD, p2). Thus, although the need for a more liberalised market environment to attract FDI was acknowledged it was recognised that the market by itself would not promote investment in all regions of Ireland.

Many regions, at least initially, can only hope to target lower-value-added information intensive jobs such as call centres. Even these jobs, however, require new skills and cultural attitudes. The evidence suggests that many regions are rapidly adapting their training systems to take into account the demands of organisations offering these jobs. Training courses are increasingly being tailored to meet these demands. It should be noted that the main demands, which these firms make, are not for ICT literate staff. It is generally felt that ICT skills can easily be taught. Rather these firms require that workers are equipped with a set of social and interpersonal skills - what they often term "people skills" - which might be seen as socially constructed personality traits rather than skills *per se*. These generic requirements need a very different approach and put a considerable pressure on training agencies.

The North East of England provides a good example of a region in which labour availability has played an important role in attracting call centres, and in which the local training system has responded to the needs of call centre inward investors (see Box 4).

Real Estate

In spite of the rhetoric of a "weightless" information economy, the importance of traditional physical (one might even say concrete) factors such as real estate and transport infrastructures appear to remain crucially important. However, the form and location of the real estate required in the information economy is often very different from that required previously. One obvious change is the growing importance of offices as opposed to factories. Further, office provision is changing. For smaller information intensive firms the demand is now for open plan, flexible, modular, wired office space. For the more industrialised office processes (such as call centres) large single or two storey

office spaces are required. In each case access to road networks and plentiful car parking are also required, such access allows firms to draw upon a wider pool of office workers and also facilitates ease of access for and to external clients. In all our case study regions, the provision of space, often ahead of demand was crucial to attracting information intensive firms. The ability to respond rapidly in providing built space also seems to be becoming more important.

Box 4. Labour market factors in the attraction of call centres to North East England

The availability of a sufficient pool of quality labour at a lower cost than other regions is a crucial factor behind the location of call centres in the North East of England. (Richardson and Marshall, 1996; Richardson and Belt, 2001). Call centre pay in the region is consistently the lowest (or amongst the lowest) in Britain. This is reflective of the generally low average earnings in the region. In addition to low wages, the region offers relatively low labour turnover rates as a result of the high levels of unemployment and lack of alternative jobs. Clearly these factors are the result of the region's poor economic position rather than the (intentional) outcome of economic development policy.

However, the economic development community has taken steps to further improve the flow of labour to the call centre sector through a series of training initiatives. Most training agencies and colleges have reconfigured their programmes to take the needs of call centres into account. Sunderland has been particularly pro-active, establishing a call centre college, an up-stream call centre course for basic training, and a course for the long-term unemployed and other socially disadvantaged groups. The latter training is located in "electronic village halls" based in housing estates in which the residents suffer from social exclusion. The inward investment community has also used the fact of low wages and low turnover as part of its place marketing strategy, albeit also emphasising the quality of labour.

Subsidies

Real estate and infrastructure subsidies remain a key weapon in the armoury of the development agencies. To take one example, in the North East of England a number of Enterprise Zones have been created which provide subsidy through grants and tax holidays. Around 60 per cent of new inward investments in call centres have located in these zones. A number of other information intensive businesses have also located here. This suggests that subsidy remains important, though it should be noted that it is difficult to disentangle the attractions of subsidy from the effects of the ready availability of customised, readily available property, with room to expand. Similar subsidies, as well as less direct subsidies associated with land reclamation were also crucial to the success of the Highlands and Islands and the Republic of Ireland in attracting inward investment.

Building institutional capacity

A further factor, which helps explain the success of certain regions in attracting ICT-intensive inward investors, is the institutional capacity that they have developed over the years. These institutions engage heavily in intelligence gathering, place marketing and company support. Ironically, of course, the success of these regions in developing inward investment agencies reflects to some extent their relative lack of success in developing a self-sustaining endogenous economic motor and

although efforts have been made to overcome over-dependence on inward investment, these regions remain heavily reliant on this form of investment.

Some problems with inward investment

Just as inward investment based regional development strategies in the industrial era had a number of problems associated with them, so do those in the information age.

For many regions, the reality of their current position dictates that inward investment is the most viable, or perhaps the only option for economic growth. However, just as inward investment based regional development strategies in the industrial era had a number of problems associated with them, so do those in the information age. Typically these include the following:

- Many inward investments to less favoured regions, even those associated with ICT-intensive work, will tend to be stand-alone operations, with a restricted range of activities. They will thus call on a limited range of skills. They are likely to have few linkages within the host region, tending to be vertically integrated with their parent organisations in core regions.
- The limited nature of many inward investments also means that there is only a limited management capacity. There is thus little prospect of spin-off activities by managers.
- The footloose nature of the operations, which come to be located in less favoured regions, suggest that they may also easily move on to other locations. This may be particularly the case where they have been attracted by financial incentives, which run for only a limited period. Other regions may well offer the same type of incentives and may also offer lower labour costs. There is, of course, already anecdotal evidence to suggest that information intensive work is going “off-shore” from Europe and US facilitated by growing global telecommunications networks.

* Finally, and perhaps most crucially, is the impact of further rounds of technological investment. For example, in the case of call centres, which were perhaps the fastest single area of employment generation in the 1990s, we are already seeing a range of technologies emerging which potentially make many of the activities which these centres host redundant. The growth of the Internet, and truly electronic real-time interaction between the consumers’ PC and the firms’ databanks may accelerate this process. The transition towards electronically mediated self-service, of course, is unlikely to be a smooth one and there still may activities where consumers demand a human interface. Further new activities may emerge as new services emerge. If less favoured regions can build on existing inward investments to capture these activities then they do not necessarily face a technologically imposed jobs meltdown. For those regions which become over-reliant on a narrow base of lower skilled information intensive jobs, however, technological change may well lead to large scale employment losses in the future.

4. Conclusions

This paper has attempted to demonstrate that the “new economy” has a number of differing implications for the location of activities and for regional development prospects.

One aspect of the “new economy”, the emergence of a new set of economic activities around the capabilities of the Internet, of which “dot.com” start-ups (and, in many cases, close-downs!) are the most dynamic expression, was observed to have a strong tendency towards agglomeration. This fits the more general pattern of knowledge-based clusters, and is unlikely to be undermined by ICTs.

In fast-moving knowledge-based activities, the advantages of agglomeration, first noted by Alfred Marshall, remain overwhelming. From a regional development point of view, it cannot be assumed that “new economy” clusters are replicable in any location; firstly because there are substantial first-mover advantages, and secondly because such clusters are invariably based upon pre-existing ensembles of knowledge activity. Silicon Valley, in other words, has proved very difficult to clone, and strategies to develop knowledge-based clusters, where these are not already established, have had disappointing results.

Much of the interest in the “new economy” from a regional development point of view has centred on the potential for ICTs to bring about the “death of distance”, and, hence, to liberate peripheral regions from the (assumed) distance-related barriers from which they suffer. We attempted to demonstrate that the pronouncement of the “death of distance” was premature, and that there remain strong reasons why face-to-face or “co-present” interaction is unlikely to be systematically undermined by electronic communications, which are tending to complement, rather than substitute for, face-to-face interaction. Further, we suggested that the economic development problems of peripheral and less-favoured regions may be being wrongly ascribed to geographical distance, and that, in consequence, it is unsurprising that the results of policy initiatives to help firms overcome distance by means of electronic communications have proved disappointing.

ICT innovations are making many routine services “footloose”, though the extent to which these jobs provide the basis for long-term development remains open to question.

Finally, we suggested that ICT-based innovations in the organisation and delivery of service activities are having potentially radical implications for the locational dynamics of services. These innovations - notably the tele-mediation of service delivery through telephone call centres and the Internet - are making possible the “industrialisation” of services production and, at the same time, are making many routine services locationally “footloose”. There is a strong, cost-based logic leading to the decentralisation of such activities, both between and within regions, in order to exploit factor-cost differentials. In one sense then the “new economy” is not that different from the old. From a regional development perspective, the footloose nature of routine services is providing opportunities for regions to attract telephone call centres (which have been termed “customer services factories”). A number of regions have benefited from the attraction of such jobs, though the extent to which these relatively routine and highly mobile service activities provide the basis for long-term regional development remains open to question.

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