



SIXTH FRAMEWORK PROGRAMME

PRIORITY 8.1.B.3.5

Information Society Technologies



022780

Benchmarking and Fostering
Transformative Use of ICT in EU Regions

Transformation of Regional Societies Through ICTs: State(s) of the Art(s)

– A DISCUSSION DOCUMENT –

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Report Version: D1.1, Final draft

Report Preparation Date: July, 2006

Classification: Public

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Executive Summary

Substantial territorial disparities continue to exist between Europe's regions. Still today, the nature of the variation across regions is not well understood, neither is the role of information and communication technology (ICT), which could have been expected to eliminate traditional disparities between central and peripheral regions because of its contribution to 'time-space compression'.

Existing evidence suggests that, while the potentials of ICT are available – at least to some degree – to every region, the ways and the effectiveness with which regions exploit these potentials vary hugely across the EU territory. In this context, the notion of *transformation* as a particular kind of change has recently come to the fore in the public debate. We consider transformational change as a change in the form of (regional) society but not its type, and neither its underlying goals and aims. We can thus distinguish transformational change both from the incremental change in degree, on the one hand, and from totalising or revolutionary change, on the other.

Some European regions appear to have the capacity to take the new ICTs which have come onto the market in the last thirty years and use them effectively to create new and successful products and services, organisational and administrative forms, even whole new ways of life. In essence, these regions appear to be able to take up new technologies and use them to change their economic and social prospects in positive ways. Other regions, by contrast, appear to be unable to do more than ineffectually ape the innovations of their more creative neighbours. Why? How can such disparities, which are reflected in the relative success of regions in achieving economic growth and social progress against the backdrop of the upcoming information society / knowledge economy, be explained and understood?

These are questions which this report tries to explore by drawing together insights from a number of diverse theoretical approaches and research areas.

It is a well established thesis, and one with much empirical support, which argues that, in particular in their early stages, the same physical technologies will be taken up in different ways in different places. In understanding why this is so, we have come to pay less attention to the putative meanings of technologies which their designers have given them and more attention to the ways in which the users of technologies 'frame', understand and interpret them in use. To be able to understand what a particular group will do with a particular technology, then, it is necessary to fit that technology in a substantially pre-existing and partially shared social order – in short a *culture*. That is to say, to understand what a particular society or group will do with a particular technology one needs to understand its culture and cultural dynamics. Applied to the analysis of regions, what are called '*regional innovation cultures*' appear to play an important role for the ways and the effectiveness with which regions exploit ICT to achieve their aims and goals.

The agenda which this review addresses, then, can be framed as follows: How does (regional innovation) *culture* figure in enabling individuals, firms and public administrations to use *ICT* to bring about transformative *change*? Based on our literature review, we identify five key "clues" for exploring and understanding the research question at hand:

- the importance of a particular articulation of networks – and in particular, networks that bridge social worlds – for the propagation of meanings and values but also for the construction of such meanings and values;
- the importance of reflection and reflexivity and of shared representation – sometimes reduced to the notion of vision – as the means by which reflexivity can be brought about;
- the significance of learning as a social activity;
- the notion of leadership; and
- the importance of regional openness and closure to the outside world.

The subsequent work to be carried out in TRANSFORM will seek to shed more light on the various ways in which these five notions relate to the transformative use of ICTs in European regions.

Preface

This document is an exploratory review of the literatures relevant to the notion of a regional innovation culture. It has been undertaken for the TRANSFORM project, an EU 6th Framework Strategic Support Action. The TRANSFORM project is led by empirica and the full team includes eris@ (The European Regional Information Society Association), the Centre for Urban and Regional Development Studies (CURDS), CARPAT, and IRISI.

The TRANSFORM project is concerned with Benchmarking and Fostering Transformative Use of ICT in EU Regions. For TRANSFORM, the idea of transformative use of ICT can include:

- at the level of the *individual* the purposeful use of ICTs within everyday life – for example, in work, lifelong learning, health or well being;
- at the level of the *firm*, the purposeful use of ICTs to improve business processes and support working practices;
- at the level of the regional *public sector*, the use of ICTs to bring about strategic changes to the delivery of government and ‘public’ services, and to foster civic participation.

An important element of our argument is that the transformative use of ICT by one such actor is generally dependent on, at the very least, use (if not transformative use) by other social actors. For example, it is not enough for firms sell their consumer goods and service through the web – it is also necessary for households to adopt the appropriate technologies and to use them to buy good and services; it is not enough for governments to offer services via new media and channels – households and businesses must also adopt these new media and new channels. This is, of course, just to take the communicative aspects of ICTs seriously. Because successful communication *always* involves two (or more) actors, its achievement is always a *co-ordinated* activity. The region is, we believe, one, among many, contexts in which such co-ordination can be achieved.

It has been apparent for some time that the simple act of adopting new Information and Communication Technologies (ICTs) does not, *on its own*, lead to the kinds of beneficial outcomes which have been claimed for these technologies. Rather, the beneficial outcomes only flow where there has been significant transformative *use* of these technologies. To use these technologies for transformation requires a wider set of changes to structures, processes and practices. These wider set of changes are sometimes presented as necessary to ‘unlock’ the potential of ICTs. Some individuals, firms, public bodies and regions appear to be better at ‘unlocking’ that potential than others. One aim of TRANSFORM is to develop new indicators for benchmarking this capacity to ‘unlock’ ICTs. The second objective of the project, and the one that is centrally addressed here, is to use the notion of a Regional Innovation Culture to explore the organisational, social and cultural factors that might underpin the capacity to make transformative use of ICTs.

Acknowledgments

Many people have had an input to this paper in addition to the authors listed on the title page. First we should acknowledge the input of the TRANSFORM Regional Innovation Cultures Expert Group (RICEG) for their input, particularly: Pasi Ahonen, Andrey Berdnikovs, Annaflavia Bianchi, Susan Christopherson, Seamus Grimes, Al James, Jeremy Millard, Aiden Roe, Malgorzata Runiewicz, Jon Rutherford, Goncalo Santinha, Tomas Sabol, Laura Satori and Marisa Xuereb .

We should also acknowledge the input of the wider TRANSFORM team, especially Karsten Gareis, Ester Torres, Martin Sirak and Gareth Hughes.

1 Introduction

Information and communication technologies are a powerful driver of growth and employment. A quarter of EU GDP growth and 40% of productivity growth are due to ICT. Differences in economic performances between industrialised countries are largely explained by the level of ICT investment, research, and use, and by the competitiveness of information society and media industries. ICT services, skills, media and content are a growing part of the economy and society (European Commission 2005: 3; see also Colecchia and Schreyer, 2002).

How can we foster transformative use of ICTs in Europe's regions? What indicators can we use to benchmark current transformative activity in the regions? What evidence can we reliably use to guide policy? If we take the opening quotation from the European Commission as a statement of fact, then two important questions emerge immediately.

- Can we also say that substantial portions of GDP and productivity growth at the regional level are also explained by 'ICT investment, research and use, and by the competitiveness of information society and media industries'
- What is it that determines 'ICT investment, research and use', and 'the competitiveness of information society and media industries' at the regional level?

We need to note here that growth and productivity increases are related a range of ICT related factors – ICT investment, ICT research and ICT use together with the competitiveness of ICT-intensive 'information society' and media industries. The i2010 High Level Expert Group (2006), reviewing the evidence on the economic impact of ICTs has delineated three main 'channels' through which ICTs have a beneficial impact:

- First, efficiencies are realised through rapid *technological progress in the production of ICT goods and services in ICT producing industries*. Thus, the ICT sector is a driver of productivity growth for the whole economy. Efficiency gains in the ICT sector are also reflected in the fast price declines of ICT products.
- Second, *investments in ICTs* provide more capital for workers, which raises their productivity.
- Third, *greater use of ICTs* in all sectors in the economy helps firms to increase their efficiency.

The study states boldly that 'the EU invests less in ICTs, the ICT sector is less efficient, and the performance has been disappointing in ICT-using sectors' (p.6, emphasis added). For us, it is this last issue that is of paradigmatic importance – the performance of the ICT using sector and its capacity to effectively utilise ICTs. For us, the ICT-using sectors of society are not just firms but also households, government agencies and other organisational forms (the third sector).

Perhaps surprisingly, this issue of effective or transformative use of ICT is, as we shall see, not often directly addressed in the regional economic and social development literature. Much of the literature on ICTs and regional development has been essentially concerned with the location and growth dynamics of ICT producing industries. The paradigm here is the vast number of studies of Silicon Valley. The awe inspiring productivity increases in some portions of the ICT producing sector have, on their own, had a significant impact on growth and productivity (see e.g., Gordon, 2000). Given the powerful forces for agglomeration which these studies have uncovered and described, the concentration of ICT producing industries in a few regions appears to be the logical outcome. The picture that emerges (e.g., Saxenian, 2005) is of a set of increasingly interconnected high technology regions which dominate high value added ICT R&D, design and production activity. In spite of the proliferation of 'silicon spaces', not every region can have a successful ICT producing sector.

For most regions, and in particular for less favoured, peripheral, older industrial, rural and underdeveloped regions, it is the second two of the i2010 High Level Expert Group's 'channels' that are likely to be important: ICTs as capital (used to do things more efficiently) and the effective use of ICTs to do new things. As the Expert Group point out, these are likely to be longer term effects, when compared with the impact of the rapid growth of the ICT-producing sector. Yet these effects are, surely, in the longer run more important to growth, productivity and social cohesion. The Expert Group

point to some of the factors which evidence suggests enable more effective use of ICTs. Specifically (2006: 12-14), they highlight:

- Effective use of ICT requires appropriate skills
- Organisational change is key to making ICT work
- Scope for experimentation may help in seizing benefits from ICT and other new technologies
- ICT use is closely linked to innovation
- Management plays a role

They also caution that impacts only emerge over time. While we would not disagree with any of these statements, we would make two further points: first, we would note that, while these features may be the proximate features of effective ICT use, they need themselves to be explained; and second, we would argue that they are not necessarily discrete issues.

- What underpins these factors? What is it, we ask, that influences the propensity of managers and workers to invest their money, time and effort in acquiring appropriate skills? What is it that enables effective organisational change to enable the effective use of ICT in some companies, cities, regions, societies and not others? Why is experimentation seen so positively by some and more negatively by others? And so on.
- These are not discrete issues. Changes in skills imply changes in organisation and vice versa. Innovation and experimentation are similarly linked together and, of course, interact with questions of skills and organisation. And, of course, management is a central issue for each of these. The picture is, in fact more complex. For example, experimentation may be required to identify what the 'appropriate' skills are for effective use of ICT, and that experimentation may include organisational change.

This paper is predicated on the notion that some, but not all, answers to these questions can be found in the notion of a regional innovation culture.

The agenda which this review addresses, then, can be framed as follows.

- What are the characteristics of regional innovation cultures that promote the transformative use of ICTs?

This paper is *not* a premature attempt to find a definitive answer to that question. Rather, what we have done is in the nature of a search for clues. We have searched in some of the usual places, and also in some less obvious places. This paper is not, then, the usual 'state of the art' but rather a focus on the *states* of the *arts*. Some of the clues that we have found may prove to be promising and will be followed up; others will certainly turn out to be red herrings. This is, then, the first stage of a process. Future stages of this process will need to complete, refine and focus the initial work here.

Why do some ICT policies work in some regions and not in others?

A rising tide, the saying goes, raises all ships. But tides can rise in many ways, some gentle and some not so gentle. If the coming of the information society and its related knowledge-based economy is likened to a wave of innovation crashing over the European space economy, it is apparent that some regions are able to surf on this wave, while others are cast about helplessly by it, and a few are, perhaps, drowned by it. That is, some European regions appear to have the capacity to take the new information and communication technologies which have come onto the market in the last thirty years and *use* them effectively to create new and successful products and services, organisational and administrative forms, even whole new ways of life. In essence, these regions appear to be able to take up new technologies and use them to change their economic and social prospects in positive ways. Other regions, by contrast, appear to be unable to do more than ineffectually ape the innovations of their more creative neighbours. Some struggle even to do that. Why?

There is a well established thesis, and one with much empirical support, which argues that, in particular in their early stages, the same physical technologies will be taken up in different ways in different places. In understanding why this is so, we have, under the tutelage of the Social Shaping of Technology or Social Construction of Technology schools of thought (see e.g., MacKenzie and Wacjman, 1999) come to pay less attention to the intended meanings which their designers have given to technologies and more attention to the ways in which the users of technologies 'frame',

understand and interpret them in use. To use Madeline Akrich's (1992) terminology, while the designers of technologies may attempt to 'script' the behaviour of users in certain ways, the users of technologies are quite capable of the 'de-description' of technological artefacts – that is, their reinterpretation. To be able to understand what a particular group will do with a particular technology, then, it is necessary to fit that technology in a substantially pre-existing and partially shared social order, a structure of classification and interpretation – in short a culture. That is to say, to understand what a particular society or group will do with a particular technology one needs to understand its culture and cultural dynamics.

To give just one good example from the geographical literature, Yukio Aoyama (2001), in her discussion of the differences between USA and Japanese e-retailing, has shown how the same basic technologies – the internet and the world wide web – have been applied to retailing in very different ways. In the USA, the dominant approach has been, as she puts it, to "put the store online", essentially establishing an electronic catalogue from which the customer can select and pay for goods with a credit card for subsequent home delivery. By contrast, in Japan, there has been a pattern of e-retailing which she describes as "putting online into the store". In this model, many of Japan's plentiful 7/11 "corner shops" have installed online terminals and customers can order goods from the catalogue, both picking them up and paying for them at the store, rather than at home. According to Aoyama, these variations are related to a range of factors. For example, traditional structures of retailing such as the preponderance of small stores in Japan compared with the USA and the long tradition of catalogue shopping and home delivery in the US favour this model for the adoption of e-retailing. At the same time, the comparatively greater prevalence of credit cards in the USA favours this method of payment. Finally, the relative prevalence of small corner shops in Japan, coupled with much higher average population densities, provides a further source of distinction.

The notion of culture is notoriously difficult to pin down. Raymond Williams (1984) famously defined it as 'one of the two or three most complicated words in the English language.' At the very crudest, we should distinguish between the notion of culture as a sphere of activity, as distinct from politics or the economy for example, and culture as an overarching aspect of all activity (including, for example economics and politics). It is this latter, more anthropological, notion that is invoked when we turn to culture as an explanation of why some societies, at whatever scale, seem able to make effective use of technologies to achieve their aims or goals and others don't. The literatures reviewed in Section 3 below point specifically to the importance of corporate and organisational cultures and political and administrative cultures as well domestic and household cultures. And they point to the extent to which culture both defines the boundaries of, and provides bridges between, the worlds of paid and unpaid work, leisure and learning and politics and civic activity.

Why Has Our Understanding Moved Away From A Technological Determinism and Towards A Social/Cultural Determinism?

Over the past thirty years, the role of new information society technologies and infrastructures in regional development has come to be seen as increasingly mediated through a range of organisational, managerial, social and ultimately cultural factors. Early technological determinism, in which the social consequences could be directly 'read off' from the technical affordances of the technologies, has been increasingly diluted (although, with each new round of technological innovation, it is, to some extent, resurrected). While the basic notion of technologies as the engine of social change has been tenacious in its grip on the minds of policy makers, some have come to understand an ever wider range of mediating social and economic factors as playing a determining role in unlocking ICT-related change. Indeed, in many contemporary accounts, technology itself, while present has been more or less thoroughly decentred from accounts in favour of various socio-economic or cultural factors. For example, writing in the mid 1990s, the European Commission's High Level Expert Group on the social and economic implications of the information society interim report (HLEG, 1996: 1) argued that discussion of the information society in Europe was 'dominated by technological issues... neglecting, by and large, the broader issues in the "society" notion'. Such a claim would be much less likely today. Indeed, if anything a more common observation is that economic geography, at least, is now excessively understood in terms of culture (see e.g., Rodrigues-Pose, 2001; James, 2005).

While this shift from a technological to a social, or cultural, determinist position has been general, albeit highly uneven, in policy and academic debates, it has taken a specific form in the context of European regional policy. Here we want to draw out that history in a rather crudely schematic manner.

There is a long history of policy and research on the relationship between information and communication technologies and regional social and economic development (see e.g., Cornford, Gillespie and Richardson, 2000; Gillespie, Richardson and Cornford, 2001; Cornford, 2003a). Early explorations of the geography of new technology production – silicon landscapes, to use the title of Hall and Markusen's path breaking work – revealed a quite traditional pattern with high value added research, design and development mainly located in core regions – what is Europe became known as the 'archipelago of innovation' – and low value added assembly distributed to the less favoured regions. This focus on the geography of ICT *production* became progressively more concerned with 'softer', social and cultural factors. By the time of AnnaLee Saxenian's contrast of Route128 and Silicon Valley in *Regional Advantage* (see below for more detail), the focus was increasingly strongly on social factors such as social networks. This trend has become even more pronounced in recent work on Learning Regions. While this focus on ICT producing industries has strongly shaped the general debate on ICTs and regional development, it has also seen a powerful critique emerge. Criticised for its manufacturing, or at least ICT productionist, bias, it has been likened seeing the principal impact of the railways as pertaining to the location of locomotive manufacture.

As a result of this critique, a second phase of research and policy emerged that was much more strongly focused on new telecommunications services – in Europe particularly ISDN – and a putative 'death of distance' (Cairncross, 1997). This tradition found that telecommunication services, while not completely ineffective, certainly did not lead to a 'death of distance' and, further, that distance from core markets and services was only a (minor) part of the problem of firms in less favoured regions. The mere presence of telecommunications services, or even connection to such services was not panacea. The metaphor now was of the provision of roads to individuals with no cars to drive on them. Within this tradition of research, the move has been away from extolling the technological capacities of the telecommunication networks and towards trying to understand why the take up and use of these technologies has been so varied and how it can be best supported. And, as with the studies of ICT production, social and cultural factors have become more prominent. More centrally, the tradition of telecommunications research moved away from stressing the abstract new capacity to communicate digitally around the world and began to focus how such intra- and inter-firm communication capacity might fit with the information processing capabilities of new Management Information Systems to create a new category of 'telematics applications'. The focus moved from the ability to communicate over (large) distances, to trying to find out *what* one might want of communication over such a distance.

In large firms, sophisticated 'telematics' applications enabled the firm to dramatically expand the range of activities which could be relocated to less favoured regions. For smaller firms, the diffusion of new applications was expected to support indigenous businesses in the less favoured regions. This tradition of policy development and research increasingly understood the problems of making such applications work in organisational and managerial, rather than strictly technical, terms – above all in the notion of business process re-engineering, or similar concepts, as the key bridge between new technological capabilities and actual increases in flexibility and productivity. Again success was limited. The less favoured regions have generally failed to receive substantial relocation of anything but lower value added activities and native small and medium sized enterprises proved extremely resistant to the new organisational and managerial concepts and models deemed necessary to make the IST applications work. To return to the metaphor used above, even when both roads (telecommunication networks) and cars (telematics applications) were present, local businesses often lacked the skill or the will use them.

Most recently, attention was refocused directly on these questions of why certain regions, often but not always less favoured regions, were so resistant to the kinds of organisational and institutional change necessary to unlock the potential of IS technologies. Here the notion of the learning region, or rather the non-learning region, is perhaps the clearest construct, building on the rise of 'knowledge management' in the business world. A range of other approaches, discussed in detail below – regional innovation cultures, social capital, the rise of the creative class – have also helped to shed light on this question. What this tradition of policy experimentation and research has pointed towards is the notion of a culture of innovation or learning as the central key to unlocking the transformative potential of ICTs in the regions.

As has been suggested, then, the dialectic of technological possibility and social constraint appears to have run its course with the antithetical 'social' side of the dialectic proving dominant (Cornford, 2003a). Far from being able to read off the social implications of technologies from their technical affordances, we are much more likely to see the outcomes of technology initiatives as shaped, if only

negatively, by social and cultural factors. This is, of course, increasingly also the conventional wisdom of the IT community – the technology is easy, it's changes in society, and above all culture, that are so difficult to 're-engineer', manage or lead. It is, of course, important not to over play this argument. With each new technology the journey from technological capacity to social constraint is, it seems, relearned; the empirical inquiry again reprises the journey from simple research into the presence or absence of technologies through questions about use to those about meaning. But we should not, we think, feel that there has been no progress in understanding. Rather we should picture this development as 'fractal' with the long term shifts towards social and cultural understandings comprised themselves of the same pattern on a smaller scale.

At the end of the twentieth century, after the experience of the, so called, dot.com boom and its subsequent bust, there was, perhaps strangely, a new realism about the relationship between new technologies and social change emerging. This 'new realism' saw the role of technologies in social change as significant, but complex, strongly mediated by cultural and organisational features, unpredictable and chaotic, at some times moving at glacial speeds and at other moving incredibly swiftly. As the central 'technology question' moved from 'what have you got/adopted' to 'what are you doing with it', to 'what does it mean to you' the clear pathways in the models of causality have become more muddled and crisscrossed with short cuts and diversions.

2 Transformation As A Particular Kind of Change

Just because everything is different doesn't mean that everything has changed.
(Irene Peter, American Epigrammist)

All is flux; nothing stays still. (Heraclitus)

Change is, as Heraclitus knew some 2,500 years ago, a constant. But change comes in many forms. The notion of transformation as a particular kind of change has recently come to the fore in private business and in public sector and institutional agendas and it usually includes a strong, if complex ambiguous, reference to ICT as a key enabler of (if sometime also a barrier to) transformational change. For example, the UK government's latest e-government document is entitled *Transformational Government* (Cabinet Office, 2005). The most extensive literature on change and transformation is found in relation to (mainly large) firms. The, perhaps misleading, notion of Change Management and its more recent (and perhaps more realistic) offspring Change Leadership are increasingly comprehensively covered in the literature. This literature, is closely linked with the world of business consulting: indeed the notion of 'transformational change' substantively emerged from the practice of one consulting company, Gemini, now part of CapGeminiSogati/Ernst and Young, which introduced the term to distinguish it from other firms promoting a more generic Business Process Engineering approach in the 1990s (See O'Shea and Madigan, 1999).

But what is transformation? A change of speed, a change of gear, a change of direction or a change in the mode of transportation are all changes but they vary dramatically. In particular, it is important to delimit what we mean by 'transformational' change in this context. As a first step we could simply focus on the etymology of the word transformation – a change in *form*. By implication, something stronger and more radical is envisaged than a simple change in *degree* (and perhaps less radical than a change in *type*). The transformed object is still recognisably related to its predecessor, in spite of its change in form. Transformational change preserves the *identity* of the changed object, while changing its form. Thus, transformational change might be thought, in this context, to be a change in the form or structure of (regional) society but not its type (it remains a regional society). We can thus distinguish transformational change both from the incremental change in degree, on the one hand, and from totalising or revolutionary change, on the other.

A second abstract approach, drawing on systems theory, distinguishes between 'first' and 'second' order change (Watzlawick, Weakland and Fisch, 1974). First order change envisions a change in a well established component of a system; second order change envisages a change at the level of the system itself. Thus for example, first order change involves changing the way you play within the rules of the game; second order change implies changing the rules of the game itself. Alternatively, an example of first order change would be the warming or cooling of water while an example of second order change would be represented by the transformation of water into steam or ice. Transformation is clearly positioned in the domain of second order change. An important point follows here in terms of the frame of reference through which change is understood. First order change does not require any

shift in the frame of reference adopted by actors – second order change does require a new interpretative frame. Because it upsets the conventional ‘common sense’ it requires considerable efforts to be given over to ‘sensemaking’ (Weick, 1995).

Another useful distinction in working with notions of change is that between top-down, or planned, change and bottom up or emergent change. The early post WWII period literature on change stressed planned or controlled change, figured against a static or equilibrium background (e.g., Lewin, 1952). Change was then seen as an exceptional ‘event’ brought about by the destabilisation of the equilibrium. This view has been formalised in the well known change equation which is usually expressed as:

$$D \times V \times F > R$$

Three factors are seen as necessary for meaningful organisational change to take place. These factors are: D = dissatisfaction with how things are now; V = vision of what is possible; F = initial, concrete steps that can be taken towards the vision. If the product of these three factors is greater than R (= resistance to change), then change is possible. Because of the multiplication of D, V and F, if any one is absent or low, then the product will be low and therefore not capable of overcoming the resistance.

More recently the emphasis has moved from the management of change to the notion of leading change. Perhaps the best known author in this field is John Kotter (1990). Kotter argues that change leadership requires eight steps, followed in this precise order:

1. Establish a sense of urgency.
2. Create the guiding coalition.
3. Develop a vision and strategy.
4. Communicate the change vision.
5. Empower employees for broad-based action.
6. Generate short-term wins.
7. Consolidate gains and produce more change.
8. Anchor new approaches in the culture.

Over time research has come to stress the lack of direct control of the change process and has rather stressed bottom up initiated change that emerges from the interaction of individuals and organisational units. With this new attention to bottom up, or emergent, change came a related shift from notions of managing change to those of leading change (e.g., Kotter, 1990).

Building on these kinds of distinctions Wanda Orlikowski and colleagues have developed an improvisational model of change, derived from studies of IT-enabled change in organisations. Orlikowski distinguishes between planned change, emergent change and opportunistic change (Orlikowski, 1996; Orlikowski and Hofman, 1997). Orlikowski starts from the critique of Karl Lewin’s (1952) ‘event’ model of change. Lewin, operating with an equilibrium notion of the organisation, saw change as consisting of three phases – unfreezing (upsetting the equilibrium), changing (bringing about the desired changes) and then re-freezing (establishing a new equilibrium to keep the changes in place). Orlikowski can accept neither the equilibrium premise nor ‘event’ framing of change in Lewin’s model. Rather she proposes an improvisational change model which recognizes three different types of change: anticipated, emergent, and opportunity-based. These can be defined as follows:

- *anticipated* changes – changes that are planned ahead of time and occur as intended;
- *emergent* changes – changes that arise spontaneously out of local innovation and which are not originally anticipated or intended; and,
- *opportunity-based* changes – changes that are not anticipated ahead of time but are introduced purposefully and intentionally during the change process in response to an unexpected opportunity, event, or breakdown.

The management or leadership of change is about dealing with all three of these kinds of change sequentially and as they arise, rather than just the detailed planning of anticipated change. Importantly, Orlikowski sees the flexible and customisable nature of modern information technology as making this improvisational model, with its emphasis on recognising and reacting to emergent change

and awareness of and ability to exploit opportunity-based change, ever more important. It is because information technology projects have so many repercussions and unexpected effects that change leadership must become more agile. For Orlikowski, attempts to implement ICTs in routine managerial way will generally result in disaster (See also Ciborra, 2000 for some empirical verification).

Figure 1: A Typology of Change

Step-Change	Surgery	Transformation
Incremental	Operational Gain	Evolutionary Learning
	Directive	Organic/Emergent

Source: adapted from Audit Commission (2001)

Orlikowski's model, useful as it is, does not, however, allow us to identify the category of transformative or transformational change. The UK Audit Commission (2001), the body charged with inspecting management performance in local government and other public services, classifies two change dimensions. First, they distinguish between directive (or planned) change and organic change (close to Orlikowski's emergent category). Second, they distinguish between incremental change and step change. This produces a four cell matrix enabling us to distinguish, crudely, between four types of change which they label as follows:

- Operational Gain;
- Surgery;
- Evolutionary learning; and
- Transformation.

Transformational change, then, is never *just* the outcome of directed change programmes, although they might be significant within such a change. Rather transformational change is presented as a much more open-ended conception of change in which the outcome cannot be foreseen at the beginning. And transformation is not, then some thing that can be unambiguously 'done to' an individual or organisation. Rather transformation, in the sense that we are putting it forward here, requires at very least the passive acquiescence of organisational members if not their active involvement and co-operation (however qualified). While transformation might require leadership, it most certainly requires some reciprocal followership.

But how can we know that transformation has taken place? The idea of transformative change raises a set of significant problems for measurement indicators. Performance indicators are always selected with regard to some theory of what constitutes good performance. But transformational change implies a change in the ways in which we make sense of the world (Weick, 1995), a change in that theory, and thus a change in what are the appropriate indicators. This phenomenon is familiar to anyone who has struggled with using statistical categorisations designed for an industrial society to benchmark or measure performance within a post-industrial or knowledge-based society.

A final problem which we should confront concerns the desirability of transformational change. The business notion of transformation which we are drawing on strongly presumes that the transformed organisation is in a 'better' state after being transformed. Of course, not all change is desirable. Indeed most complex socio-economic change creates at least some 'losers' as well as 'winners'. And it is seldom clear who should be permitted to judge the desirability or otherwise of particular outcomes. Transformative change is generally presented as, at the very least, stressful (if also exhilarating).

We can pull together the points made in the last paragraphs to note that, in so far as there are well established and relatively non-contentious measures of improvement –Gross Domestic/Regional Product per capita, various measures of productivity (output per worker or per worker hour), levels of unemployment and underemployment, levels of social exclusion for example, life expectancy, perhaps even happiness (Layard, 2005) – we would see transformation making the positive contribution. However, we should note that these objectives can be ranked or treated in a range of ways and we should ensure that we are clear about both who is judging change to be transformative and how that judgement is supported by evidence.

3 Regional Cultures of Innovation

What culture does, in this sense, is to create a way of life. (Schoenberger, 1997: 121)

The analysis indicates that “closeness” between user and producer, defined physically, organizationally, and “culturally,” is important for the successful implementation of these advanced technologies... it offers an interpretation of “culture” that goes beyond common language, codes of communication, and norms to incorporate shared workplace practices and training regimes. (Gertler, 1995: 1).

In 1994 AnnaLee Saxenian published *Regional Advantage*. This seminal work by Saxenian sought to develop a new concept to help understand different economic outcomes in different regions. It focuses on Silicon Valley and Route 128, two USA regions, that were heralded as the world innovation centres in electronics during the 1970s, but that have been following divergent paths since the crisis that struck both in the 1980s. Although it builds on previous studies about the dynamics of regional-based industrial systems, it seeks to go beyond the narrow concept of external economies as a set of comparative advantages that lie outside the individual firm. Instead it considers that the economic structure of a region is embedded in a social and institutional framework, and cannot be understood without considering this framework, idea that had already been developed by Polanyi (Gertler 2002).

The analytical framework to understand the regional industrial structure is divided into three dimensions: local institutions and culture, industrial structure and corporate organization (Saxenian 1994a). The institutions include public and private organizations that create and support patterns of social interaction and are seen as the creators and the outcomes of local cultures, due to a dialectic process of social interaction that influences change over time. The industrial structure comprises the social division of labour and the links established by the economic actors in a region. And finally, the internal firm organization measures the dichotomies hierarchic vs. horizontal coordination, concentration vs. decentralization and the distribution of tasks and specialization inside firm structures. These three indicators should be analysed in conjunction as being closely interconnected, because in Saxenian's view none of them has a causal nature.

The main conclusion of this research is that Silicon Valley' economic structure has been able to reinvent itself and to resist crisis (something that Route 128 has not been capable of doing) due to its regional network-based industrial system, that stimulates flexible adjustment and the ability to learn collectively. The network practices together with open labour markets have been able to stimulate entrepreneurship that has been essential to the development of new areas of activity. At the firm level, this overall framework is combined with porous functional boundaries, stimulating learning inside the organization and at the same time encouraging the same type of practices with external entities.

The stream of research established by Saxenian has parallels with concepts such as the 'learning region', 'collective learning', and 'regional innovation systems', that have moved to the forefront of economic geography in the past decade (MacKinnon, Cumbers et al. 2002; see below). Her ideas can also be inserted into a broader field of research often termed new institutionalism, that aims to build comprehensive theoretical frameworks to understand contemporary regional economic structures (Amin 1999). This body of thought sees institutions (both in the sense of formal organisations and as a set of self-reinforcing rules and norms) at the core of social processes of adaptation and evolution. It considers that the regions that perform better have an open institutional environment, which, mirroring Silicon Valley's example, makes them able to adapt and to be leaders in innovation processes. This ability has further been explored by Saxenian, by focusing on the openness of this Californian region to integrate immigrants in its networks (although with some remarked reluctances such as the 'glass ceilings' that sometimes apparently inhibit the professional progression of foreigners).

BRATISLAVA / Slovakia

The region of Bratislava, capital of Slovakia, represents an interesting case through which opportunities and challenges of transformative change in the new Member States of the EU can be explored. Indeed, the collapse of state-socialism in late 1980s and the removal of the 'Iron Curtain' have opened up an unforeseen opportunities for this small city-region (population 0.5 million), while at the same time creating a set of challenges. In early 1990s Western observers tipped the Bratislava region, situated at the border with Austria, as the future 'Silicon Valley' of the East-Central Europe (Trend, 1993; OECD, 1996, 76). Factors such as labour cost, productivity, quality of life, R&D level, proximity to Vienna (60km or 40miles) and strategic geographical position in the heart of the continent with easy access to markets were supposed to spur the creation of a dynamic and innovative region. Local experts, meanwhile, saw Bratislava as a key element 'for the creation and diffusion of innovation and successful passage of Slovakia to an information-oriented and knowledge-based society (Ivanicka, 1996, 91).

A decade later, Bratislava emerged as one of the most prosperous regions in East-Central Europe (see Dunford and Smith, 2000; ES, 2000). However, 'Silicon Valley' dreams have not fully materialised (Sokol, 2003). Indeed, local innovation capacity remains limited and transformation to a 'learning region' hampered not least because of challenges and dilemmas associated with the simultaneous transformation to the market economy. For instance, local R&D capacity has been eroded during a painful economic transition and imposed national budgetary constraints. Also, institutional landscape under transition has been characterised by turbulence in which the search for an 'animateur' have proved to be rather challenging (Sokol, 2003). Combined with on-going struggles over policy direction at the national level, still relatively weak institutional capacity at the regional level and the overall lack of financial resources, the environment for the creation of a 'learning region' is far from optimal. It remains to be seen, whether the inflow of Structural Funds stemming from the EU membership, more recent national policies to foster knowledge-based economy, initiatives to accelerate informatisation of society, improving institutional frameworks at national and regional levels, and growing co-operation with neighbouring Vienna will help to unlock the full potential of the Bratislava region.

The concepts deployed here have not passed without criticisms however. One of the main critiques is the lack of attention provided to the role of nation-state policies (Gertler, Oinas et al. 1995; Lovering 1999). The origins of Silicon Valley and Route 128, as Saxenian clearly shows, need to be traced back to the high levels of investment made by the US government in its defence policy during the cold-war. This raises a question about the plausibility of seeking to replicate the success of Silicon Valley elsewhere without the same amount of support from central government. Even if this fact would not be enough to explain the subsequent growth of this region, when the flow of money for defence matters started decreasing, there is still space to evaluate the role of the national government in defining research budgets for universities or in promoting specific industries. Also, the focus of new institutionalist accounts in successful regions such as Silicon Valley, has led to the emergence of narratives about development detached from reality in the majority of the world's regions (Lovering 1999). The idea that every region can become an international high technology centre as long as it develops the right institutional structure seems to be pervasive, albeit a difficult one to implement. Finally, we should note that Saxenian's focus remains principally on the *ICT producing* regions of Route 128 and Silicon Valley (albeit in its newly global relationship to China, Taiwan and India). It is not clear to what extent Saxenian's approach, suggestive as it is, can help us with the question of *ICT use* in regional settings.

In this section we review a number of approaches which seek to explore or explain national or regional differences in economic and social performance. This review is, as we have already said, in the nature of a search for clues which might help in understanding why some regions seem better at making ICTs work beneficially for them than others. What, exactly, we mean by culture here is of course an

important issue. What for one school of thought is a clear distinction between institutions and culture is, for another school, a tautology. What we have done at this stage is simply to accept a diversity of definitions. What we have not done here is limit ourselves to the accepted 'regional' literature on cultures of innovation but have looked more widely at social science approaches which seek to relate, in some way, concepts of culture with those of innovation and change.

3.1 From Regional Systems and Networks of Innovation to Learning Regions

The existing theories about the functioning of regional systems and networks of innovation can help us to understand why some regions are more open to take advantage of the transformative uses of ICT. These concepts usually consider the existence of two main regional building blocks of innovation: the knowledge generation system, composed of Universities, R&D centres, schools, etc; and the knowledge exploitation system, constituted by the private sector. Todtling and Trippl (2005) also added to the model the regional policy dimension, in order to give more prominence to the impact of the public sector. The underlying idea in this approach is that innovation processes have changed from a linear process, where investment in science was expected to produce new potentially profitable inventions, to a systemic approach, where innovation is the outcome of a process of interaction and cooperation. This networking may either be localized around specialized clusters or in areas where different firms meet to solve mutual problems and therefore generate new solutions that are then expected to trickle down to the regional partners through processes of knowledge spillovers.

According to this perspective a region will be more prone to change when there is a balance between the closure of regional actors that allows them to have a closely knit cooperation structure, and their openness to external knowledge that prevents the region from falling into situations of lock-in and path dependency. On the other hand, this approach considers that the processes of networking happen in a wider institutional framework that will determine the characteristics and the success or failure of the region. Understood here in its anthropological meaning, "institutions" reflect persistent and connected sets of rules, formal and informal, that prescribe behavioural roles, constrain activity and shape expectations (Wolfe and Gertler, 2002). Therefore, to understand how open to change is a region it is essential to understand if the institutional environment that supports that region favours and promotes change or if on the other hand it favours and promotes traditional structures and conformity to the existing social order.

As a general idea, lagging regions are seen as the least open to change. There are, however, different situations, depending on the causes of their relative underperformance. According to Todtling and Trippl there are three main weaknesses in the innovation capabilities of less favoured regions: organizational thinness (peripheral regions), lock-in (old industrial areas) and fragmentation (lagging metropolitan regions). Although the authors connect each of these weaknesses with a specific type of situation, it does not mean that they are exclusive of the regions to which they are matched, because a certain locality may actually 'suffer' from these three weaknesses. It is also important to have in mind that the fear of change may also exist in more advanced regions. In the book *Regional Innovation Systems* (Cooke *et al.* 2004) Philip Cooke identified three main governance structures to which corresponded three different innovation patterns – grassroots, dirigiste and networked. The grassroots and the dirigiste structures were seen as the least successful, in the former due to the excessive regionalism of firms and institutions and the latter due to an excessive concentration of powers in central governments. However, in the network mode of governance (seen as the most successful) the author identified the present success of some regions as the main cause of resistance to change in the future. This was due to the fear among the local stakeholders that new innovations could destroy the existing socio-economic structure that was built on the improvement of traditional activities and not on the development of new ones.

The term 'learning region' (LR) has become one of the most used concepts in economic geography over the last decade or so. In addition to extensive proliferation in academic literature it also became hugely influential in policy terms. Indeed, for some, the LR concept is part of a 'revolution in thinking' in regional policy (Armstrong and Taylor, 2000: 292). While building on, and overlapping with, the earlier work on Regional Innovation Networks and Regional Systems of Innovation, the LR concept offers some new, innovative ways of looking at the economic transformation at the regional level deserving closer inspection.

3.1.1 Learning Regions and Transformative Change

Broadly speaking, the LR concept could be seen as a culminating point of the 'resurgent region' debate and as part of the 'cultural turn' in economic geography and social sciences more generally. In comparison to the literature concerned with Regional Innovation Networks and Regional Systems of Innovation, the LR approach shifts the focus from technology, technological innovation and R&D to wider socio-economic change and institutional and cultural factors that underpin such a change.

Rather than being a monolithic concept with universally agreed terms and definitions, the LR approach revolves around an extensive and diverse set of literatures (e.g. (Florida, 1995a; Asheim, 1996; Morgan, 1997; see also Amin and Thrift, 1994a, 1994b, 1999; Amin, 1999; Amin and Cohendet, 1999; Amin and Hausner, 1997; Storper, 1995a, 1995b, 1997a, 1997b, 1999; Storper and Scott, 1995; Maskell *et al.*, 1998; Maskell and Malmberg, 1999; Lagendijk, 2000; Hassink, 1997, 1999; Landabaso and Reid, 1999; Landabaso, 2000; Bellini, 2000; Boekema *et al.*, 2000a, 2000b; Cooke and Morgan, 1998; Cooke, 2002; *inter alia*). We have no space here to explore all versions and nuances of these literatures (see Sokol, 2003 for a detailed review) and we focus on some key distinctive propositions they seem to share:

- The starting point of the LR conceptualisation is a common acceptance that the advanced economies are being transformed into the 'knowledge-intensive' or 'knowledge-driven economies'. Following evolutionary economists such as Lundvall and Johnson (1994), it is argued that if *knowledge* is the most fundamental resource in the contemporary knowledge-intensive economy, then *learning* is the most important process. It is important to highlight the fact that both knowledge and learning are defined very broadly here. *Knowledge* encompasses, not only *know-how*, but also *know-what*, *know-why*, *know-who*, *know-when*, *know-where*. Consequently *learning* is not understood just as a simple absorption of scientific and technical knowledge, but is defined more broadly and is used as a metaphor to describe changes in organisational and institutional forms and economic structures. Thus economic systems that are able to ensure permanent renewal (transformation) of their economic structures and adapt to changes in economic environment could be conceptualised as 'learning economies' (Lundvall and Johnson, 1994). Interestingly, for Lundvall and Johnson (1994: 41) learning economy is a 'mixed economy' (between hierarchies and markets) in a 'very fundamental sense' where a strong private sector coexists alongside (and is supported by) a strong public sector.
- Indeed, learning is a collective and interactive process – it is not confined to individual firms, rather it is conceptualised as occurring between firms, between firms and consumers and between firms and other public and private institutions. It argued that such learning is the most efficient and best instituted at the *local* or *regional* level. Consequently, the *region* is seen as the key element of the transformation towards 'learning economy' or 'knowledge economy'.
- Successful regions are 'learning regions' where learning is supported by a plethora of local and regional institutions. These institutions can be both formal and informal. *Formal* institutions usually include firms, financial institutions, local chambers of commerce, training agencies, trade associations, local authorities, development agencies, innovation centres, clerical bodies, unions, government agencies, business service organisation, market boards etc. (e.g. Amin and Thrift, 1994b: 14). *Informal* institutions usually refer to habits, conventions and rules of conduct, lubricated by co-operative culture and trust (e.g. Saxenian, 1994; Storper, 1997a; Maskell *et al.*, 1998; Maskell and Malmberg, 1999). At this point the LR approach overlaps strongly with the notion of 'social capital'.
- Successful regions are characterised not only by strong 'institutional presence' or 'institutional thickness', but also by 'high levels of interaction' among their institutions, 'pattern of coalition' and mutual awareness among actors that they are involved in a 'common enterprise' (Amin and Thrift, 1994b).
- Knowledge resulting from collective learning is a 'leaky phenomenon'. As soon as it is *codified*, the global knowledge economy renders such knowledge ubiquitous and makes it open to competitors' appropriation and replication. Therefore, it is *non-codified* or *tacit* knowledge that is a crucial source of competitive advantage (Maskell *et al.*, 1998; Maskell and Malmberg, 1999; see also Storper, 1995b). Tacit knowledge requires regular face-to-face contacts of actors involved and these are best sustained within a certain spatial proximity, i.e. within a region. Such contacts can also be described in terms of 'untraded interdependencies' (Storper, 1995a, 1995b, 1997a, 1999) representing 'soft' externalities or complex networks of interdependencies that go will beyond market transactions and formal relationships within a regional economy. (A related concept is that of 'embeddedness'; Grabher, 1993a).

- Some authors have argued that successful learning regions should not only be able to respond to changing economic environment through continuous innovation and renewal but also have an ability to 'learn ahead' or to change 'ahead of the game'. (see Storper and Scott, 1995; Amin and Cohendet, 1999; Hudson et al, 1997; Hudson, 1998). For Hudson et al (1997: 371) 'learning ahead' refers to the collective capability of regions 'not so much to adapt to change as to anticipate it and change accordingly'.

GRENOBLE / France

Grenoble, a city-region of a half a million people, is one of the most successful high-tech regions in Europe and the world, and is often compared with legendary Route 128 and Silicon Valley (see Sternberg, 1996). Importantly, 'Grenoble Valley' (Valeria, 2004) is an example of a traditionally successful region that keeps reinventing itself. A particular strength of this region is said to emanate from strong collaborative links between local universities, research laboratories and local enterprises. Such collaborative links have long tradition in Grenoble (Valeria, 2004, 307) and they 'developed organically in the course of many decades' (Sternberg, 1996, 213). Early industrial and technological strengths in hydroelectric engineering evolved into cutting-edge competences in electric engineering, microelectronics, physics of metals, nuclear engineering, biotechnology, medical sciences and nanotechnology (Sternberg, 1996; Lawton Smith, 2003; Valeria, 2004). Importantly, local players were also successful in securing the state investment in several prestigious public research institutions of national and international significance, thus enhancing, complementing and expanding local strengths, and becoming 'the second French research pole after Paris' (Lawton Smith, 2003, 903).

The culture of co-operation between industry and research has been actively promoted by local and regional authorities for decades. An early example of this was the creation of the science park ZIRST in the 1970s in an attempt to mimic the success of the Boston's Route 128 (Benko, 1991, 159). ZIRST became one of the oldest and most successful science parks in France, encouraging spin-offs from the neighbouring university and promoting technological innovation. Later the policy evolved into wider territorial scale with 'Tétrapôle' strategy aiming to promote four key specialisms in the Grenoble agglomeration: electronics, communications, materials and biomedical sciences (Benko, 1991, 164). Currently, the local development agency (AEPI) is involved in further strengthening synergies between academia, research and businesses through a number of local, regional and international programmes and initiatives (see www.grenoble-isere.com). In doing so, Grenoble's 'high-tech valley' keeps maintaining and enhancing its competitive edge in the globally challenging economic environment.

Importantly, the LR approach bears an additional meaning in relation to the transformative change of lagging regions or less favoured regions. Indeed, *learning* has also been used as a metaphor for regional 'trajectory switching' (see Cooke and Morgan, 1998: 78). This is of particular relevance to old industrial regions willing to 'learn' new developmental trajectories in the post-industrial economy (see Cooke, 1995a, 1995b, 1995c; Florida, 1995b; Grabher, 1993b; Hudson, 1994; Morgan, 1997, 1998; Morgan and Nauwelaers, 1999a, 1999b; Storper and Scott, 1995; Storper, 1995b; see also Halkier et al., 1998; Giunta et al., 2000; Lagendijk, 2000; inter alia). While it has been acknowledged that old industrial regions 'are hard to turn round' (Cooke, 1995c: 243) the change of fortunes *is* apparently possible by 'turning rustbelt regions into *learning regions*' (ibid: 236). The aim of such endeavour would be to avoid the 'low road' of development (low skills, low value added and low wages) and to fully embark on the 'high-road strategy' (ibid: 236) delivering a high-skill, high-wage, high-value added regional economy.

The idea that less favoured regions can themselves determine their economic destiny by mimicking institutional environments of successful regions is, of course, a highly attractive one. However, in less favoured regions 'private institutions are often thin on the ground', and therefore public sector agencies 'invariably have to assume the leading role in animating economic development' (Morgan,

1998: 229). According to Morgan (1997, 1998), such a leading role in animating the regional economy can be played by a regional development agency (RDA). Morgan (1995, 1997, 1998) attempted to illustrate the case of such an *animateur* through the example of the Welsh Development Agency (WDA) an organisation that shifted its policy focus from 'hard' infrastructure to 'soft' infrastructure or 'info-structure' – business services, skills and social capital. WDA also facilitated the creation of several associations targeted at endogenous SMEs, hoping that these firms would engage in networking and thus facilitate the processes of trust-building and 'collective learning' (Morgan, 1997, 1998). While this shift in emphasis by the WDA is clear, it is less clear how successful their latter strategy has been. Wales remains the worst performing region in the mainland UK on a number of indicators. Furthermore, the WDA was scrapped in 2005, though this may be reflective of tensions between the newly constituted elected Regional Assembly and the Agency as of any objective analysis of its performance. Other putative successful examples of transformation of old industrial regions into competitive learning regions described in literature include the Great Lakes Region, an old industrial heartland of USA (see Florida, 1995b) and Boston, Massachusetts (see Malecki, 2000).

LR theorists also contributed to the debates about regional governance, democratic control and social inequalities. Indeed, for Amin and Thrift (1999) the 'learning region' and other 'associationist' models represent a 'radical democratic agenda' (Amin and Thrift, 1999: 308) that would ensure that *economic efficiency* is combined with *social equity* (ibid: 306-308; see also Cooke and Morgan, 1998 for similar arguments). This agenda includes giving 'voice' to previously excluded or marginalised groups and implies a boost of 'active participation across economy, state and civil society (Amin and Thrift, 1999: 308). Such a stratagem envisages 'political empowerment' at the regional level (ibid: 308, 310) which links the 'associationist' regional agenda with the voices that regional, democratically elected government should be built as part of the 'learning region' (Landabaso, 2000; Bellini, 2000).

LR approach proved to be highly attractive for policy makers, not least because, in comparison to the 'old style' regional policies, it effectively promises better outcomes for less money. It is therefore no surprise that 'learning regions' have become the 'best practice' in local and regional development (Malecki, 2000, p.114) and quickly proliferated among academic and policy-making circles (Lagendijk, 1999; Lagendijk and Cornford, 2000).

However, the LR concept has also attracted an important critique (e.g. Hudson, 1999, 2002; Lovering, 1999; Markusen, 1999a; Martin and Sunley, 2001a, 2001b; MacKinnon et al., 2002). This critique highlighted the gaps and contradictions in its conceptual framework, limited supporting empirical evidence and problematic implementation (see Sokol, 2003 for a detailed review). For many critics, the LR concept is blurring rather than elucidating the processes of regional development. Some conceptual points raised against the LR approach include the following:

- Overall 'fuzzy' conceptualisation, with vague terms and definitions (e.g. Markusen, 1999a; Lovering, 1999).
- Uncritical acceptance of the dictum that *knowledge* is the most important economic resource and that *learning* the most important (that is, downplaying other important factors that continue to play an important role in economic development as well as neglecting the possibility that knowledge creation and wealth creation may engage in a mutually reinforcing relationship).
- *Intra-regional business linkages* are overemphasised at the expense of neglecting the role of 'external linkages' (Markusen, 1999b; MacKinnon et al., 2002; Oinas, 2000; Smith et al., 1999; Simmie, 2002a; Simmie, 2002b; more recently also Amin and Thrift, 2002).
- An overemphasis on *institutions* and their role in promoting regional economy (institutions may well be both the cause and consequence of economic success).
- Overall, a neglect of powerful forces in the *wider political economy* that impinge upon regional fortunes. Importantly, this involves a failure to recognise the power of the *nation-state* in shaping regional trajectories as well as the role of supra-national and international governance bodies.
- Possibly an overstated importance of '*soft*' *cultural factors* in explaining economic success (Markusen, 1999a; Martin and Sunley, 2001b; Mohan and Mohan, 2002; Rodrigues-Pose, 2001).

To conclude, it could be argued that while the LR represents an interesting and inspiring metaphor of regional development, it is perhaps too a simplistic one. The limitations of the LR approach need to be kept in mind when assessing its usefulness for understanding of regional economic transformations and constructing meaningful indicators.

3.1.2 Learning Regions and ICT

LR literature displays a certain lacuna with respect to ICTs. LR theorists do not engage directly with the issues related to ICTs and their relevance to regional development.

3.1.3 Learning Region and Culture

The notion of regional culture is a central (albeit disputed) part of the LR conceptualisation. Indeed, according to LR protagonists, it is regional *culture* or identity that helps to create the sense of 'common enterprise' and provide a 'glue' for regional actors to act together. 'Soft factors' such as habits, conventions, rules of conduct, trust or social capital are believed to be place-specific and ingrained in regional culture. In this sense culture is directly linked to success or failure of regional economies. Some successful regions (such as oft cited Silicon Valley) are claimed to possess the right regional culture conducive to entrepreneurialism, innovation, learning and knowledge creation. On the other hand, some old industrial regions are said to have strong institutional presence, but unsuitable (rigid) cultures that prohibit organisational, policy or economic innovations. The resulting 'lock-in' (Grabher, 1993b) basically reflects an inability of such regions to 'forget' the old trajectories and to 'learn' new developmental paths. The implication of this line of reasoning could be that a change in regional culture/institutions is needed to initiate transformative economic change in less favoured regions, including those associated with the adoption and use of ICTs.

3.1.4 Learning Region and Indicators

Several difficulties are present if one is to benchmark a progress towards a Learning Region:

- Assessing the impact for the regional economy of LR-type interventions has proved difficult so far, 'not least because the [perceived] benefits are so intangible' (Morgan, 1998: 242).
- Whereas, indicators are generally measured according to how present they are when considering the development of learning regions 'more' does not mean 'better'. Rather, some sort of right balance is often seen as desirable (e.g.: between hierarchy and markets; between cooperation and competition; between strong and loose ties; or in the case of 'institutional thickness': neither the lack of it nor too much of it). This would imply a move away from one-directional indicators.
- Regional cultures are place-specific and, by implication, it is difficult (or even impossible) to compare or measure them between places in a benchmarking sense.
- Assessment of institutional characteristics - such as (1) formal institutional presence, (2) institutional networking, (3) institutional coalitions, sense of common enterprise or clear regional agenda, (4) collective action or ability to implement regional agenda, (5) presence and effectiveness of institutions that 'look ahead' and to change regional agenda accordingly – is complicated but probably possible. However, one has to keep in mind that the link between regional 'institutional thickness' and regional economic success may be less straightforward than suggested by the LR literature. Importantly, regional institutions may emerge as an outcome, rather than cause of economic success. More generally, the process of the emergence of regional institutions may be more complex than implied in the LR literature.
- Measuring and benchmarking 'untraded interdependencies' is probably impossible and can only be examined through extensive in-depth case studies.
- Measuring social inclusion at the regional level is possible using standard socio-economic indicators. However, the measurement of effectiveness of democratically elected regional institutions in promoting social inclusion may be more difficult to achieve.
- In addition (and beyond the LR approach), a certain measure of a 'mixed economy' where strong private sector coexists alongside (and is supported by) strong public sector can also be imagined (following the argument of Lundvall and Johnson, 1994: 41, that learning economy is a mixed economy in a 'very fundamental sense').

3.2 Social Networks, Civic Engagement and Social Capital

3.2.1 Defining Social Capital

The concept is used in different ways and with diverse meanings (Trigilia, 2001).

The concept of social capital has been adopted by a range of disciplines to help explain relationships and changing relationships in society. As with so many other concepts in the social sciences there are multiple definitions and understanding of what social capital is. It is, for example, used to:

- refer to the capacity for and ‘civicness’ in a society;
- as a synthetic indicator of rich tangible and intangible external economies; and,
- to describe networks of relations which bind individual and collective actors, and which can promote cooperation and trust but can also create obstacles to local development (Trigilia, 2001).

Recently scientists interested in local and community development (community regeneration) and those interested in regional development, particularly from the perspective of innovation, have begun to apply the concept to their areas of interest. There is also interest from those scholars and policymakers who are interested in the role of ICTs in development.

Field identifies three intellectual sources for current debates on social capital:

- Bourdieu – who comes from the perspective of power structures and the role of social capital in sustaining the *status quo*. Social capital is ‘owned’ by the dominant class – privileged individuals retain their position through their connection to other privileged people.
- Coleman – who suggests that social capital is resource available to all, including marginalised communities. Coleman suggests that social capital is a resource because it involves the expectation of reciprocity, and goes beyond any given individual to involve wider networks whose relationships are governed by a high degree of trust and shared values. This requires closed networks. He assumes that in line with rationale choice theory people pursue their own interests and social interaction involves exchange. So Coleman essentially takes an individualistic view of society and assumes that social capital arises as an unintended consequence of other actions.
- Putnam – who comes from an interest in the (alleged) decline of community especially in USA is most concerned with civic engagement. “Social capital refers to features of social organisation, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions” (Putnam, 1993: 167. Cited in Field, 2003: 31). He is concerned with associational activity which bring together relative strangers on a regular basis helping to build and sustain a wider set of networks and values which foster reciprocity and trust, and facilitate collaboration (Field, 2003: 32).

Each of these authors has a different understanding of the concept of social capital and the role it plays in society. Trigilia (2001) points to the dual use of the term. On the one hand it is used to emphasise ‘shared culture, trust and civicness’ (e.g., Putnam and Fukuyama). This approach is most concerned with social solidarity, with social capital being a public good. On the other hand ‘social networks’ (Coleman) focus on how individuals can benefit from their placing within those networks, although trust and reciprocity are also required to ensure that these networks can be sustained. There are, however, a number of elements common to each of them, notably the role of *trust* and *norms*, the role of networks in relating individuals to wider society, and (and Field suggests this is what differentiates social capital from other analytical concepts) the fact that networks and relationships are seen as a *resource*. Tura and Harmaakorpi (2005: 1116) seek a more precise definition of social capital and suggest that it should not be used to describe social cohesion or integration, but to describe the ‘action or action capabilities of an actor’ which are located in the social relations of the actor. This, in line with Coleman, is a more individualistic conception of social capital.

Putnam makes a distinction between two types of social capital:

- Bonding social capital which refers to relationships and networks of individuals who share the same interests and background (homogeneous social groups); and,
- Bridging social capital refers to relationships and networks of people who differ from each other (heterogeneous social groups)

Woolcock suggests an additional form of social capital, namely linking capital, which reaches out to unlike people in dissimilar situations, such as those who are entirely outside the community, thus enabling members to leverage a far wider range of resources than are available within the community (see Field 2003, p42). Western et al (2005) suggest that linking social capital is merely a special case of bridging capital, where people have bridges with authoritative organisations. Another notion of social capital - vertical social capital - seems very close to that of linking social capital and is generally used to refer to ties which link citizens and community leaders. It can also be used to consider links between links within firms, for example, the role of trades union representatives. It seems to assume the possibility of an intermediate set of actors who, either as a result of their institutional position or some special personal characteristics, can bridge the gap between individuals and communities and those who have access to the levers of power. As with all forms of social capital the key questions around vertical social capital is how to develop it in the first place and, in the post-modern economy, how to reintroduce it when key pillars (such as trade unions appear to be in decline). The notion also fails to take into account the differentiated distribution of power within society.

The concept of social capital is said to have several strengths, particularly in bridging across various disciplinary barriers and in drawing attention to the non-economic forms of capital “and underlines their nature as sources of power and capabilities, as well as sources of power and action capabilities” (Tura and Harmaakorpi, 2005: 1112).

However, one of the issues which is not resolved, and which has implications for research and for policy recommendations, is how social capital actually comes about. Maskell (2001) suggests that:

We still know very little about the actual process by which social capital is produced and accumulated, beyond suspecting that it might be a mainly unanticipated consequence of doing something else (p114).

These multiple definitions of social capital, the different expectations of social capital – social solidarity on the one hand and actors seeking individual benefits, through social networks on the other – and the uncertainty as to how social capital comes about places limitations on both how we use the concept to explore regional development and how we explore the interrelationship(s) between ICT and social capital.

3.2.2 Social Capital and Local and Regional Development

Notwithstanding the difficulties described in the previous section the concept of social capital has been adopted by many of those interested in both local and regional development. There is considerable debate as to whether and to what extent social capital is a ‘good thing’ in terms of economic development. The emerging consensus seems to be that there must be a mixture of bonding social capital and bridging capital for economic development. If the former is too strong at the expense of the latter a locality or region will become too closed thus restricting access and openness to new information.[^]

Gallois and Schmitt (2005) employ the concepts of bonding and bridging social capital.¹ As with the other authors they suggest that at the local and regional level a mixture of these two forms of social capital are required. Interestingly, when discussing bridging capital they distinguish three different mechanisms that can bring new information and opportunities to a region: migration, business networks, and political relationships (Gallois and Schmitt, 2005, p3).

- Migration is important because emigrants can send new information (as well as economic resources) to family, friends and colleagues. Immigrants bring with them forms of knowledge which may not have been available locally: this, of course, assumes that immigrants can be integrated (or shared spaces of interaction can be constructed).
- The arguments around business networks are similar though the relationship is more narrowly focused around wealth creation.
- ‘Political relationships’ extends beyond simply political leaders to also cover others who have political influence at levels outside a region.

¹ The authors suggest that it is difficult to distinguish empirically between bonding social capital and linking social capital at the regional level.

WALES / United Kingdom

Old industrial or 'rustbelt' regions face particular problems in transforming themselves into knowledge-based economies (Cooke, 1995c), not least because 'private institutions are often thin on the ground' (Morgan, 1998, 229). Public sector agencies, therefore, 'invariably have to assume the leading role in animating economic development' (Morgan, 1998, 229).

Morgan (1997; 1998) has demonstrated the potential role of the public sector *animateur* through the example of the Welsh Development Agency (WDA) which, with an annual budget of some £170 million and around 300 staff, was (in 1997) 'one of the largest and most experienced regional development agencies in the EU' (Morgan, 1997, p.498). The WDA adapted its strategy in the mid-1990s from 'hard' infrastructure projects (land reclamation, advance factory building, inward investment attraction) to 'soft' infrastructure provision (Morgan, 1997; 1998) thought more appropriate to the emerging economy. This 'soft' infrastructure or '*info-structure*' (Morgan, 1998, 230) is primarily concerned with business services, skills and social capital. In line with the view that 'firms learn best from other firms – be they customers, suppliers or competitors' (ibid, p.239), the WDA facilitated the creation of several associations targeted at endogenous SMEs. The hope was that these firms would engage in networking and thus facilitate the processes of trust-building and 'collective learning'. As well as targeting endogenous SMEs, the agency sought to embed inward investing plants (many of them Japanese) into the regional economy by promoting their long-term partnerships with local firms.

The WDA also engaged in the creation of technology support programmes aimed at enhancing the capacity for product, process and organisational innovation in the SME sector (Morgan, 1997, 499) delivered through 'technical centres' largely based at Welsh universities. Further to this, the spectrum of 'new' activities of the WDA also include more active intervention in the skills formation process through co-operation with further education colleges, and by encouraging 'training consortia' (Morgan, 1997, p.499-450).

Although Morgan does not see the implementation of the above process as an unproblematic one, he nonetheless believes that the WDA as *animateur* engaged with the right targets, 'namely the institutional inertia' (Morgan, 1997, 497). While the view may not be universally shared, for Morgan (1997) at least, Wales represents an example of an old industrial region successfully managing its transformation into a 'learning region'.

There is now an emerging literature which applies the concept of social capital to the the regional 'knowledge economy', where innovation, and especially endogenously driven innovation, is regarded as crucial to competitiveness. Here, it is now widely accepted that social capital plays a significant role, though, again, some authors strike a note of caution. Tura and Harmaakorpi (2005: 1112) for example comment:

It is accepted that social capital plays an important role in creating regional innovative capability. However, it is still far from clear what this role is exactly, and its relation to other relevant concepts has not been examined deeply.

The interest can in part be seen as an element in the institutional and cultural turn in policy which stresses "social communications" and "cooperative behaviour". It is argued that:

..well performing regions are the nexus of dense networks of associations and groups, providing public goods and information channels and working through cooperation rather than hierarchical command (Beugelsdijk and Van Schaik, 2005: 1053).

Trigilia equates social capital with the post-Keynesian new economy where flexibility – rapid adaptation to the market which is increasingly fragmented and variable – is key:

Social capital facilitates the development of tacit knowledge as a competitive resource because it fosters the circulation of information and trusting relations between subjects within the firms between different firms. In other words, social capital allows tacit knowledge and human capital to be exploited as a competitive advantage tied to productive specialisation (Trigilia, 2001: 431).

Maskell (2000) argues that firms by proving their continued trustworthiness produce or reproduce a local climate of *mutual* trust. He argues that *trust*, which he defines as 'the commitment of resources to an activity where the outcome depends upon the cooperative behaviour of others' (*ibid.*: 113) is at the core of relationships.

The key point about social capital from an innovation perspective is that there must be 'bridging ties' that span different communities and allow the introduction of 'dissonant information and ideas' which provoke the richest learning. Tura and Harmaakorpi (2005, 1120) suggest that it is the diversity of social relations which 'enhances the regional ability to take advantages of different sources of information, and thus promotes successful regional innovation processes'. There also, however, needs to be a mechanism for bringing these 'field-specific' social resources together and 'license to combine' Tura and Harmaakorpi (2005: 1119).

Duguid (2003:82), coming from a Communities of Practice perspective suggests that the concept of social capital has several limitations in accounting for innovation processes: it focuses on 'rational actors', it portrays social groups as little more than "combinations" of individuals, and attempts to extend its explanatory powers too widely. Further, it underestimates the challenge of sharing knowledge and fails to predict where knowledge "sticks".

Field (2006) suggests two other elements are important in developing regional innovation. First, a shared sense of regional identity which are more likely to command widespread support "and to be inclusive in approach." Second, devolved local-regional governance structures.

Beyond the conceptual literature, a small number of empirical studies have emerged in recent years which are relevant to regional development questions. One group of studies seek to explore (though not yet explain) differences in social capital between places, as measured by citizen's levels of social capital and to test these differences against economic performance (e.g., Beugelsdijk and Van Schaik (2005); Iyer *et al.*, 2005). A second group seek to gauge the relationship between social capital and SME performance (e.g., Cooke, *et al.* (2005). The surveys suggest that there are large regional differences in social capital in western Europe and that (preliminary) results suggest that a positive relationship exists between social capital and regional economic development, though Iyer *et al.* (2005: 136) comment that 'the mechanisms through which this may happen may be complex and vary over space and time.'

3.2.3 Social Capital and ICTs

Very few things can yet be said with any confidence about the connection between social capital and Internet technology (Putnam, 2000: 170).

There has been significant interest in the impact of ICTs on social capital since Putnam's statement in 2000 and a number of leading commentators on social capital have stressed its potential importance. Field suggests that:

In examining the impact of the networked society, it is essential to consider how the rise of online communication is affecting people's networks. Above all, is the Internet reducing people's reliance on face-to-face interaction, or does it provide a complementary means of communicating? (Field, 2003: 93)

Valerie Frissen (2003) argues that in a network society, ICTs play a key role in building and maintaining social relationships and networks. ICT are more and more used by individuals to build, (re)shape and maintain their social networks both in private and in working life (p24).

The main focus of writing on the role of ICTs from a *social capital perspective* has been at the citizen-individual level rather than the firm level. Lin (2001)² argues that if we think of social capital as embedded resources in networks, then, "there is clear evidence that social capital has been on the

² Lin, N. (2000), *Social Capital: A Theory of Social Structure and Action*. Cambridge: Cambridge University Press.

ascent in the past decade – in the form of networks in cyberspace” (Lin 1999a). Further, this ascent has consequences beyond community or national boundaries. Lin puts forward two hypotheses: (1) social capital in the form of cybernetworks is clearly on the rise in many parts of the world, and (2) the rise of cybernetworks transcends national or local community boundaries; therefore, its consequences (both positive and negative) must be assessed in the global context. (p. 212).

BLEKINGE / Sweden

Blekinge, a small region of some 150,000 inhabitants in the south-east tip of Sweden, could be seen as an example of a ‘successful transformation into a modern knowledge based information society’ (Blom, 2006, 10). Following a collapse of heavy industries and military downsizing in the 1980s, the regional economy faced major crisis and a dilemma over its future direction. According to regional leaders, it was the wise investment in ‘modern technology, education and competence’ (Blom, 2006, 10) that triggered a spectacular economic turnaround of the Blekinge region. Much of the transformation can be attributed to a successful application of the ‘triple helix’ concept (see Etzkowitz, 2001a, 2001b) that advocates localised synergies within the university-business-government ‘triad’. The ‘triple helix’ could be seen as a backbone of a ‘learning region’.

In the case of Blekinge, this translates into a fruitful co-operation between local and regional authorities, a local university (The Blekinge Institute of Technology, BTH) and the private sector. Much of this regional co-operation focuses on development of ICT and its applications in eGovernment, eHealth and eEducation (see Blom, 2006), contributing to both economic development and the quality of life in the region. A concrete example of the ‘triple helix’ approach at the local level is an initiative ‘Telecom City’. ‘Telecom City’ is a cluster or network of 50 companies (small and large), BTH and the municipality of Karlskrona working jointly to create a business growth environment in the area of applied IT and wireless services (TelecomCity, 2005, 33). One of the initiatives currently under development by the ‘Telecom City’ is a ‘Mobile Turismo’ – a concept consisting of a range of services designed to develop the tourist and visitor business by using mobile telephone as an information and multimedia channel (Mobile Turismo, n.d.).

Lin argues that “we are witnessing a *revolutionary rise in social capital*, as represented by cybernetworks. In fact, we are witnessing a new era in which social capital will soon supersede personal capital in significance and effect.” (p. 214-15). Lin argues that:

cybernetworks represent a new era of democratic and entrepreneur networks and relations in which resources flow and are shared by a large number of participants with new rules and practices, many of which are devoid of colonial intent or capability.

Although Lin is largely positive about the potential of ICTs in terms of enhancing human capital he suggests that the globalizations of cybernetworks is a double-edge sword which potentially demarcates the haves and the have-nots in terms of accessing capital embedded in cyberspace (p. 215-16).

Putnam (2001, pp 174-180) lists four ‘serious challenges’ to the hope that computer-mediated communication will breed new and improved communities:

- The digital divide, with differentiated access and use potentially reinforcing culturally dominant social networks (see also Castells)
- The technical difficulty (or impossibility) of replicating non-verbal communication which is a key feature of face-to-face communications and therefore there is greater potential for cheating and so on. In business, at least, there may be a need for more frequent face-to-face encounters. Putnam (2000, p177) suggests that “social capital may turn out to be a prerequisite for, rather than a consequence of, effective computer-mediated communication.”
- ‘Cyberbalkanisation’ where interest-based communities replace place-based communities. “Interaction in cyberspace is typically single stranded”, though it is possible to be a member of

multiple 'cyberclubs' with partial overlapping memberships (p178) and the weak ties created could provide bridges to an interwoven community of communities.

- The Internet might become a means of passive access rather than active participation.

Frissen summarising Quan–Haase and Wellman (2002) hypothesizes three directions in which the Internet might impact on social capital:

- The Internet *transforms* social capital: The Internet provides a cheap and simple way to build relationships with others on the basis of shared interests, not hindered by the limitations of time and space. This may lead to a major transformation in social contact and civic involvement away from local and group-based solidarities and towards more spatially-dispersed and sparsely-knit interest-based social networks.
- The Internet *diminishes* social capital: Just like television was assumed to do earlier in the media history, the Internet draws people away from real-life contacts with family and friends. Further, by facilitating global communication and involvement, it reduces interest in the local community.
- The Internet *supplements* social capital: the Internet is just another means of communication to facilitate existing social relationships and forms of civic engagement. People use the Internet to maintain existing social contacts by adding electronic contact to telephone and face-to-face contact. Further, it adds an online social dimension to existing social networks in the offline world. In this sense the Internet gives an extra impulse to existing patterns of social contact and civic involvement (Frissen, 2003: 24).

Although Putnam insisted that the jury was still out on ICTs and social capital drawing on several early studies (2000: 179-180), he concluded that up to that time electronic connections were largely complementary to other social connections, that they reinforce and overlap other connections, that they are often local and are seldom likely to replace social connections – digital technologies are adept at maintaining communities already formed but are less good at making them.

The majority of survey based studies since Putnam's comments suggest benign to positive outcomes of ICT use in terms of social capital. Reviewing a number of surveys carried out in the US and Europe in the late 1990s and early 2000s, Field (drawing on Wellman, 2001) suggests that research broadly shows that "those who develop connections through the Internet are neither devious individualists nor the shock troops of hypermodernity". Rather, "most survey-based evidence shows that those who are most active online tend to be people who already have plenty of face-to-face connections, and they complement rather than replace these by interaction in cyberspace." Other findings include:

- Internet users are at least as likely to be involved in social groups and activities, though not necessarily the same ones.
- There is generally a positive association between on-line and off-line activities.
- Whilst the *proportionate* gain is in contact at a distance there is an increase in on-line and offline interaction with local contacts amongst new Internet users
- Television watching and other isolated pastimes are at least as likely to be given up for computing time as are more social activities
- On-line interaction complements face-to-face engagement and even supplement it.

Wellman and Hampton (1999, cited in Field, 2003: 104) suggest that the Internet allows the proliferation of weak ties and the maintenance of spatially distant strong ties. The findings outlined above are supported by a number of surveys over the past few years under the PEW Internet and American Life Project. The authors of the latest report in the series (Boase *et al.*, 2006) do, however, suggest that as the Internet presence has grown and people have incorporated it into their lives and are utilising the technology to build social networks new patterns of behaviour are emerging which have impacts on the nature of social capital. They report that new networks and relationships are emerging through the use of the Internet and email, that new '*glocalised*' patterns of behaviour are emerging, in particular the rise of the '*networked individual*', but these are not having particularly deleterious effects on local non-virtual networks.

The traditional human orientation to the neighbourhood-and village-based groups is moving towards communities that are oriented around geographically dispersed social networks. People communicate and manoeuvre in these networks rather than being bound up in one solitary community. Yet people's networks continue to have substantial

numbers of relatives and neighbours – the traditional bases of community – as well friends and workmates (ibid.: i)

According to Boase *et al.* (2006), there is a ‘media multiplexity’:

The more that people see each other and talk on the phone, the more they use the internet. The connectedness the Internet and other media foster within social networks has real payoffs: People use the Internet to seek out others in their networks of contacts when they need help (ibid.: i).

They sum up their findings (2006: 51) as shown in the table below.

Table 1: The Strength of Internet Ties: Summary of Findings from Pew Internet Study

The internet helps build social capital.
The internet plays socially beneficial roles in a world moving towards “networked individualism.”
Email allows people to get help from their social networks and the web lets them gather information and find support and information as they face important decisions.
The internet supports social networks.
Email is more capable than in-person or phone communication of facilitating regular contact with large networks.
Email is a tool of “glocalization.” It connects distant friends and relatives, yet it also connects those who live nearby.
Email does not seduce people away from in-person and phone contact.
People use the internet to put their social networks into motion when they need help with important issues in their lives.
The internet’s role is important in explaining the greater likelihood of online users getting help as compared to non-users.
Americans’ use of a range of information technologies smooths their paths to getting help.
Those with many significant ties and access to people with a variety of different occupations are more likely to get help from their networks.
Internet users have somewhat larger social networks than non-users. The median size of an American’s network of core and significant ties is 35. For internet users, the median network size is 37; for non-users it is 30.
About 60 million Americans say the internet has played an important or crucial role in helping them deal with at least one major life decision in the past two years.
The number of Americans relying on the internet for major life decisions has increased by one-third since 2002.
At major moments, some people say the internet helps them connect with other people and experts who help them make choices. Others say that the web helps them get information and compare options as they face decisions.

Source: Boase et al. 2006.

Boase *et al.*, (2006), Frissen (2003) and Field (2006) all suggest that the impacts of the Internet must be seen in the context of wider changes occurring in society, with more individualised approaches to living and greater mobility and comment that the technology should not be viewed in isolation. Frissen argues (2003: 28-29) that:

the characteristics of the Internet more or less reflect these changes in the nature of civic engagement. The Internet functions as the backbone for these new and divers forms of connecting with others, connections which are not dependent anymore on real-life, face-to-face interactions, are much less restricted by the boundaries of time and space. The Internet can be seen as one of the problems where the paradox of individual commitment visibly taking place and form.

There remain a number of questions which the extensive surveys cannot answer: why the patterns observed occur, if they are the same for all users, and how face-to-face interactions, and associated social capital, differ from those undertaken on-line (Field, 2003). Van Bavel *et al.* (2004)³ discuss how 'communities of interest' have been facilitated by the Internet. They argue that people have a chance to take part in multiple communities and select their own identity. They warn that taking part in too many such groups can lead to 'multiple community disorder'. It is not clear why this should be the case given that participation in multiple groups in the non-virtual world is usually regarded as good thing. More pertinently they point out that participation in virtual groups often does not mean commitment to ideas, projects, etc. and may not yield to the will of the majority. They suggest it will be a challenge to find ways of ensuring 'sticky participation' through ICTs.

Field concludes:

At this stage, it seems that there is no real basis in principle for viewing online interaction and face-to-face relationships as incompatible. The Internet is not as yet demonstrably harming people's social capital. Rather it seems to be complementing it, and allowing them to extend their existing networks in ways which enrich and build upon face-to-face connections. Yet neither does the evidence suggest that the Internet is the basis for an entirely new form of active citizenship. If they are helping to open up the social space in the ways Castells prophecies (sic), they are doing so unevenly and incrementally rather than in huge bounds. Rather than seeing the Internet as somehow marking a completely new departure, which may be seen as destroying existing reserves of social capital, it may be better to view it as one of many factors which are eroding some types of social solidarity and promoting a turn to more openly bounded, loosely knit and provisional forms of engagement (Field, 2003: 105-106).

Frissen argues that it is the *nature* of civic involvement rather than the amount which has changed – individual, temporary and volatile. "Participation is less rooted in face-to-face interactions between citizens and less based on formal membership. What we see here is a paradoxical combination of a tendency towards individualisation on the one hand and the blooming of all kinds of social involvement and participation on the other hand". She calls this the 'paradox of individual commitment' (Frissen, 2003).

Gaved and Anderson (2006)⁴ consider how local initiatives to stimulate the use of ICTs (community networks, etc.) increase or maintain social capital (both bridging and bonding capital) and aspects of quality of life. They are rather hampered in their analysis by the fact that, as they admit, there are very few high quality attempts to assess the long term effects of these initiatives and the "analyses that do exist are often too shallow and too soon" (2006: 8):

The scarcity of data available examining specific communities over the long periods of time is compounded by the rapidly changing internet and wider social environment which makes it difficult to make many meaningful longer term comparisons (2006: 14).

Gaved and Anderson thus confine themselves to some 'initial observations':

- ICT usage is often reported to increase measured social capital, both in existing and newly populated communities of locality (sic).
- Both bonding and bridging capital can be promoted
- The process of engaging in the community around ICTs will 'result in the increase of some measures of social capital
- The ending of an ICT initiative can cause difficulties and the withdrawal of support may lead to reverses in social capital
- High levels of social capital may be a prerequisite for, rather than a result of, effective computer mediated communication.

³ Van Bavel, R. Punie, Y. Burgelman, J-C, Tuomi, I. and B. Clements (2004) ICTs and Social Capital in the Knowledge Society. Report on a Joint DG JRC/DG Employment Workshop IPTS, Sevilla, 3-4 November 2003. ECDG JRC (Technical Report EUR 21064 EN.

⁴ The authors draw on early findings (lit review) of SOCQUIT an EUFP6 IST Programme SSA(FP6-507753, www.socquit.net)

Reflecting on bonding capital Gaved and Anderson (2006: 20) conclude that:

Earlier concerns that online access would detract from face to face appear to be unfounded, and more recent studies of IST usage finds that this is assimilated into the wider range of tools used by individuals to support their social circles (2006: 20).

One question which appears not to have received much coverage is the role of ICTs in vertical or linking capital. Clearly, for those who have the technology there is increased access to government and other services. It is not clear, however, whether and to what extent ICTs would provide forms of access to politicians or other decision makers which would allow them to exert influence on decisions.

3.2.4 Indicators and Benchmarking Social Capital

There are now a number of widely accepted indicators for gauging social capital, mainly around trust and civic values, though these are not without their critics. From a regional perspective questions have been raised about the appropriate spatial scale at which social capital can be measured (e.g., Gallois and Schmitt, 2005). A number of studies have now been carried out to explore the relationship between social capital and ICTs (see above). Again, a range of indicators have been developed.

3.3 Creativity, Creative Cities and the Creative Class

While research on technical innovation has provided one lens on the relationship of culture to regional change, an alternative tradition, sometimes complementary, sometimes not, has developed around a different notion of inventiveness – creativity. Where one tradition has focused on what we might think of as innovation and the patent industries (although of course, the role of patents is highly contested), the other tradition focuses more on creativity and the copyright industries. More recently, for example in, the work of Peter Hall (1998) and Richard Florida (2002), the role of creativity and its relationship with localised cultures, technological innovation and political governance structures has been considerably developed.⁵

Perhaps the most important inspiration for this work is the work of the late Jane Jacobs, in particular her *Economy of Cities* (1970). Jacobs was particularly interested in how novelty arose in the world, and in particular the roles of cities in the creation of novelty. Her theorisation of the way the mixing of “old kinds” of work could generate “new work”, and thus the significance of cities as locations in which such mixing was particularly facilitated, was a key early contribution to internalising technological innovation in economic development models. The innovative potential of the large city is at the heart of Jacobs work. The sheer scale of cities is of course one feature favouring the mixing of old forms of work to create novelty. In particular, Jacobs identified the “great” city – rather than the specialised company town – as the crucible of innovation precisely because different lines of trade could mix.

This tradition has also begun to take up the developments in our understanding of creativity over the past thirty years. At the start of that period, studies of creativity were still dominated by a tradition which saw creativity as the personal possession of a small number of great men. As time has gone by, this vision has been demolished (see *inter alia*, Weisberg 1993; Gardner 1993; Csikzentmihalyi, 1988; Becker, 1986; Runco, 2004). Firstly, creativity has ceased to be seen as an exceptionally rare commodity, but rather as a generalised, if unevenly distributed, one. Second, creativity has come to be seen as a much more social, team or collective product. Finally, creativity is increasingly seen in a “systems” perspective in which the critics, audience and other judges of creativity are seen as having a vital role in creativity. These changes are best seen as setting up a number of tensions in research on creativity: between creativity as exceptional and as ordinary; between creativity as an individual property or social property; and between creativity as being a property of things, people, organisations and places and its being a judgement about those things, people, organisations and places.

Within these broad outlines about how to conceive of creativity, there is much agreement about more substantive questions. For example, one recent review in the business and management literature concludes with the following questions.

How does creativity connect with innovation? Are there negative unintended consequences of creativity? Under what conditions do employees choose to take creative

⁵ We could also include here the recent work of Allen Scott (1996, 1997 and 2000) although it has rather different emphases.

action? Under what conditions are creative ideas more likely to be valued rather than ignored? (Shalley, Zhou and Oldham, 2004: 952).

Richard Florida (2002: 132) in his discussion of the new workplace argues that, while ‘the fundamental fact about this new workplace is ... that it’s geared to harness creativity,’ nevertheless ‘the best ways to do this are still being worked out.’ Indeed, Shalley *et al.* (2004) note that ‘we have discussed creativity as though it were a desirable outcome that had many benefits for organizations....However, few studies have systematically investigated these potential benefits (Shalley, Zhou and Oldham, 2004: 952; cf. Osborn, 2003).

DUBLIN/Ireland

Ireland, a small open economy in a geographical periphery of Europe provides an interesting example of spectacular economic change. Historically poor, agriculturally-based, and lagging behind its Western European counterparts, it was transformed in 1990s into one of the wealthiest economies of Europe (Ó Gráda, 1997; O’Hogan, 2000; Kirby, 2002; Clinch *et al.*, 2002). Not surprisingly, Ireland became a ‘role model’ (see Kirby, 2002, 1) for other less favoured countries and regions in the EU and beyond. Importantly, much of the growth experienced in Ireland has been driven by the Dublin region. The regional economy boosts high-tech manufacturing (ICT industry, pharmaceuticals/biometrics) and internationally traded services (e.g. financial services, software industry) thus contributing to the Ireland’s reputation as a ‘thriving knowledge-driven economy’ (IDA, 2003, 6; see also Grimes, 2003; White and Grimes, 2004; Grimes and White, 2005). Dublin has been labelled as a ‘new knowledge-based agglomeration’ (O’Gorman and Kautonen, 2004), although the jury is still out whether it can be seen as a successful ‘learning region’ too.

Indeed, much of the success of Dublin can be attributed to wider structural advantages, national policy and EU intervention, rather than to localised learning. The success of creating a ‘knowledge-based agglomeration’ in the software industry, for instance, can be attributed to low corporate taxes, generous employment grants, and a readily available highly skilled but relatively low cost workforce (O’Gorman and Kautonen, 2004, 468) facilitating the arrival of major foreign investors. The ICT infrastructure in Dublin also played a role. The availability of a sophisticated telecommunications system was a necessary (although not sufficient) condition for the creation of the International Financial Services Centre, for instance, making Dublin a financial centre of European and international significance (Sokol, 2006). It remains to be seen, however, whether a transformative use of ICT will occur in the wider regional economy. As White and Grimes (2004, 176) noted, ‘[t]ransforming peripheral European regions into dynamic “learning regions” remains a formidable challenge’ and Dublin and Ireland are no exception. Indeed, the very success of Dublin is undermining its competitive position (e.g. in terms of labour cost, housing cost and congestion) making future advances towards a knowledge economy challenging indeed. However, as White and Grimes (2004, 177) contend, a ‘solid foundation for a knowledge driven economy has been constructed’ in Ireland and Dublin.

Richard Florida is undoubtedly the highest profile author to take on this new interest in creativity in the regional arena. The central argument of Florida’s influential book has the following form. First, Florida argues that creativity has become *the* critical economic resource in the twenty first century. Creativity is distinguished from classical factors of production – land capital and labour – and given an apparently equal status. As in classical political economy, each factor of production supports a discrete social class – the landlord, the worker, the capitalist – to which must be added the creative class. ‘The distinguishing characteristic of the creative class is that its members engage in work whose function is to “create meaningful new forms”’ (Florida, 2004a: 68). As such Florida’s creative class have much in common with David Brooks (2001) “Bobos” (Bohemian Bourgeoisie), Ray and Anderson’s (2000) “Cultural Creatives” or even, perhaps, Robert Reich’s (1991) “Symbolic Analysts”. Importantly, the creative class should not be confused with the other “post classical” social grouping,

the managerial or organisational class. Indeed, Florida is highly conscious of the parallels between his (2004) work and William H. Whyte's 1956 classic *The Organisation Man* (see Bhagat, 2004 on this parallel). In practice Florida distinguishes between the 'super creative core'⁶ and a supporting cast of 'Creative Professionals'⁷. Taken jointly, Florida argues, these two groups are already larger than the classical (factory-based) working class and are rapidly catching up with the other large social group – the service class.

The next assertion in the argument is that *economic development and prosperity*, at national, regional and urban levels *is now dependent* on developing, but more so attracting, this creative class. Thus Florida (2004; 2005) has more recently argued that it is the attraction of immigrant talent that has powered the economic development of the United States (and of specific regions) and, further, that recent attempts to stem the inflow of individuals to the US threatens to choke of this source of talent. The next step in the argument is once again redolent of classic political economy. Florida's next step is to assert that the creative class is now setting the *norms and cultural values* for the wider society. Florida's final step is to argue that the necessary values of the creative class are *individuality, self expression and openness to difference*. These values, the values of the creative class, are not, of course, arbitrary, but are rather grounded in the day to day practice of members of that class. These are the *necessary* values, Florida argues, for the creative class because they are functional for the creation of new ideas – the *raison d'être* of the creative class.

On this basis Florida identifies the triple conditions for urban and regional economic success in an environment dominated by the creative class as three Ts: talent, technology and tolerance. He has developed a number of sometime controversial ways of measuring these three dimensions. For example, Florida has used indices of the size of local gay populations as a proxy for a wider tolerance as well as more traditional measures of diversity. While Florida's original work was carried out in the US, he has, with Irene Tinagli (Florida and Tinagli, 2004) done some indicator work at the national level within Europe. This indicator work has focused on the key three terms. The 'talent' index is made up of three sources of data: first, the proportion of the creative class in the workforce; second a raw human capital score based on the proportion of the working age population with a degree; and third, the number of scientists and engineers per thousand workers. The second compound index is a Euro-Technology Index. This is again based on three separate measures: an R&D Index based on research and development expenditures as a percent of Gross Domestic Product; an Innovation Index based on the number of patent applications per million population; and, a High-Tech Innovation Index based on the number of high technology patents in fields such as biotechnology, information technology, pharmaceuticals and aerospace, again expressed per million population. Finally, unlike the US work which used measures of immigrants, ethnic minorities, gays and 'bohemians', Florida and Tinagli draw on attitude surveys (in particular the Inglehart world values survey – see below) for data on values for self expression, tolerant attitudes and modern and secular values. Florida is clear about the argument here: 'the point here is not that immigrants, gays or bohemians literally "cause" economic growth. Rather, their presence in large numbers is an indicator of an underlying culture that's open and conducive to creativity' (Florida and Tinagli, 2004: 25).

Florida and Tinagli (2004) bring all of these measures together to create a Euro-creativity index. This ranks 14 EU countries (Luxemburg is omitted) and the US on a composite measure scaled between 0 and 1. The highest 'creativity' score goes to Sweden (0.81) with the US (0.73) and Finland (0.72) in second and third place. At the bottom of the table are Italy (0.34) Greece (0.31) and Portugal (0.19).

Similar themes to those raised by Florida and colleagues dominate a very different book, Peter Hall's (1998) *Cities and Civilization*. Hall's huge *magnum opus* is really four books in one: the first book views the city as a cultural crucible; in book two the city features as an innovative milieu; book three focuses on governance and the urban order; the final book looks to the future and is entitled 'Culture, Innovation and Urban Order.' The essential argument of Hall's book, captured in the last book, is that the linkages between cultural creativity, technological innovation and governance and order have always been there, but urban success has been possible on the basis of just one or two of them. In future, however, Hall argues, they are increasingly tightly bound together imperative for success cities. And, very importantly for us, Hall sees ICTs, and the digital media in particular, as the central locus drawing these three themes together. Indeed, there is a sense in which Hall's identification of

⁶ Defined as: Computer and Mathematical Occ; Architecture and Engineering Occ; Life, Physical and Social Science Occ; Education Training and Library Occ; Arts, Design, Entertainment, Sports and Media.

⁷ Defined as Management Occs; Business and Financial Occ; Legal Occ Healthcare and Technical Occ; High End sales and Sales Management.

technological innovation and cultural creativity within the urban order creates a trio that looks very like Florida's 'magic triangle' talent, tolerance and technology.

Hall focuses on cultural creativity in the first book. Theoretically Hall draws on a bewildering set of precedents including Sigmund Freud and Howard Gardner (in psychology), Karl Marx, Theodore Adorno and Walter Benjamin in the Marxist tradition of cultural analysis, Thomas Kuhn's notion of revolutions, and Michel Foucault's concept of 'the order of things', finally focusing on the Swedish tradition of Torsten Hägerstrand, Gunnar Törnqvist and Åke Andersson. Hall even goes back to Hippolyte Taine's *Philosophie de l'Art* (1865) to trace the routes of the notion of "Creative Milieu". This theoretical armoury is then deployed on a set of historical case studies of creative cities: Athens (500-400BC); Florence (1400-1500 AD); London (1570-1620); Vienna (1780-1910); Paris (1870-1910); and Berlin (1918- 1933). Hall's conclusions strongly echo many of Jane Jacobs' original observations about the economy of cities. The features that support (but do not determine) such centres of exceptional cultural creativity are: size – all are large for their day; rapid economic and social transformation; magnets for immigration from near and far creating a cosmopolitan population; wealthy, with effective patronage of artistic creation from either the public or private purse; and social and intellectual turbulence, generating the conflict of ideas. Finally and most importantly, Hall draws attention to the role of "outsiders" in the generation of cultural vitality. Here Hall draws strongly on the social psychology of Howard Gardner (1993) and his notion of the 'exemplary creator' as a person who is, to some extent a "misfit" in their social situation and therefore has a 'privileged' insight.

The kind of city Hall envisions as particularly creative is one that is prone to some extreme social stresses and strains. Hall emphasises the need for a governance structure that can manage to provide just the right degree of (in)stability.

Kicking over the traces: that means that there must be traces to kick over. Conservative, stable societies will not prove creative; but neither will societies in which all order, all points of reference, have disappeared (Hall 1998: 286).

However, beyond these cautionary words it is hard to identify how exactly such a degree of (in)stability can be measured and managed.

At the heart of both of Hall and Florida's view is Jane Jacobs' original concern with importance of diversity over specialisation in economic development. This notion has recently been examined by Pierre Desrocher who concludes, with Jacobs, that 'problems are solved through the combination of previously unrelated things and that promoting regional specialisation at the expense of spontaneously evolved local diversity might be counter productive' (Desrocher, 2001: 369). However, he goes on to warn that 'specific firms, networks, and regions create an environment that influences individual creativity, but they are components of the setting of the creative process, not its active agents' (*ibid.* 385). This links to a second core theme in both Hall and Florida's work – the key role of (individual) migrants in creativity-based economic growth and the consequent importance of some kind of openness to outsiders within the urban culture. For both writers it is as much the case that immigration is the cause of economic growth as its effect: growth may 'suck in' talent, but sucked in talent may contribute disproportionately to economic growth.

The most tantalizing, but least well developed portion of Hall's work is in the final book in which he allows himself to look forward rather than back. What Hall foresees is the increasing coming together and co-mingling of technological innovation and cultural creativity as the driving force of urban development in the twenty-first century. The socio-economic success, once possible on the basis of technology or culture, is increasingly dependent on their joint development. The paradigm which Hall put forward for this is the development of the new- and multi-media industries which bring together technological skills in programming, animation, chip and systems design, with more cultural skills of narrative, story telling, characterisation and so forth.

3.3.1 Critique

Both Hall and Florida have been widely criticised for having much too 'rosy' a view of the development process. Hall's book has generally been criticised for failing to make much of the conflicts in great city development and of paying too little attention to the losers in these processes (a charge which has also been levelled at Florida – see e.g., Scott 2006). It is, however, Florida, in particular, who has been hugely influential among US cities, and more broadly, in influencing policy, who has drawn most attention. At the most critical end, Jamie Peck, in a review of the wider creative cities literature, has argued that:

for all their performative display of liberal cultural innovation, creativity strategies barely disrupt extant urban-policy orthodoxies, based on interlocal competition, place marketing, property- and market-led development, gentrification, and normalized sociospatial inequality (2005: 1).

More sympathetic critics such as Ed Glaeser (2004) have argued that, while Florida is right in his general argument, there is nothing special about the creative class and that contemporary urban development can be more economically and consistently explained by traditional human capital theory. It's not the creative class but the educated class that matters. Other sympathetic critiques have suggested that Florida's thesis is in need considerable development. For example, (Kalsø Hansen, Vang, J. and Asheim, 2005), argue for the disaggregation of 'the creative class' into a number of discrete groupings grounded in specific knowledge bases – specifically the synthetic (Engineering); the analytical (Scientific), and the symbolic (Creative) (See also Markusen, 2006; Osborn, 2005).

ICTs – in the forms of specific technologies and ICT companies – are frequently mentioned in this literature but their specific role is never really made clear. The creative class is clearly linked to a notion of a knowledge (or better idea) driven economy. ICTs clearly have a role, in the storage and circulation of ideas. However, there seems to be an unwillingness to address these technologies directly, perhaps for fear of seeming to be guilty of technological determinism. Where ICTs do get a mention most clearly is in the context of the electronic media. In particular, in Hall the electronic media are identified as *the* locus of the ever more significant interaction of culture/creativity and technology/innovation.

Florida, who has been most active in the use of indicators, has come in for significant criticism. In particular, in addition to the eye-catching (but methodologically dubious) production of league tables, Florida has been taken to task for his assumptions about the direction of causality.

Cultural ephemera may follow growth, rather than cause it. And loose correlations between economic development and certain cultural traits may be no more than contingent, or easily challenged by counterfactual cases. This is the Las Vegas critique: high growth, lousy culture, how come? (Peck 2005: 20)

3.3.2 Conclusions

The notion of creative cities and of the conditions of creativity represents an interesting development in regional development theory and policy. This strand, taken broadly, has opened up some new and useful issues and questions. The most interesting for our concern with regional innovation cultures is the key role of in-migration (or more generally the flows of labour), the attention given to governance—either as the urban order (Hall) or as issues around tolerance (Florida) – and the attention it pays to issues of citizens/households, public bodies and industrial structures.

3.4 Sociology of Culture and Cultural Values

Finally we examine recent development in the comparative sociology of culture. This loose tradition of work draws inspiration from two classics of sociology, Max Weber's *The Protestant Ethic and the Spirit of Capitalism* and Emile Durkheim's *Elementary Forms of the Religious Life*. As should be quickly apparent, this tradition of thought is centrally concerned with religion and its "other" – secularisation. Very crudely, while Weber stressed the role of Protestantism in economic development, Durkheim was more concerned with the role of religion in what we would call today social cohesion. They have thus jointly imparted both concerns into contemporary debates about culture more broadly.

3.4.1 Neo Weberian Cultural Theory

Geert Hofstede is perhaps the best known contemporary comparative analyst of national and corporate cultures. For Hofstede (1991), in spite of superficial similarities, people from different cultural groups really are different. Culture, in this framework is seen as a nested set of levels, often described as the 'onion' (see Figure 2) building out from Values, through Rituals and Heros to symbols. The latter three layers of the onion he labels as 'practices', which he contrasts with values. His specific arguments is that, while corporate cultures are best analysed in terms of practices, national cultures are best analysed in terms of values.

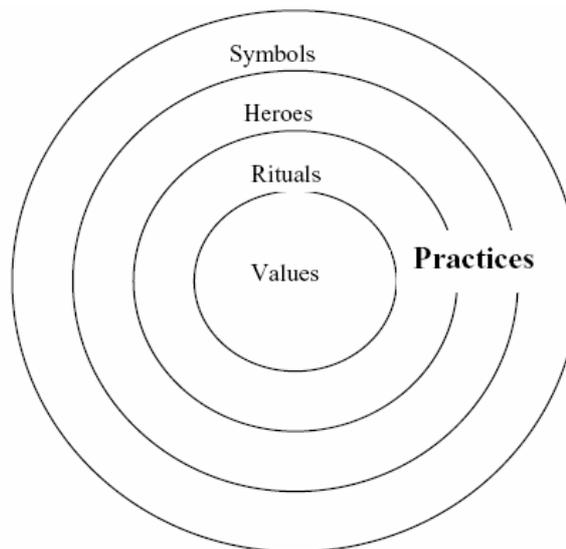
Hofstede (1991; 1998; 2001)⁸ has tended to analyse cultures at the national or broader cultural group level. His analysis is focused around five indicators:

- Power Distance Index (PDI). This focuses on the degree of equality, or inequality, between people in the country's society.
- Individualism (IDV). This focuses on the degree the society reinforces individual or collective achievement and interpersonal relationships.
- Masculinity (MAS). This focuses on the degree the society reinforces, or does not reinforce, the traditional masculine work role model of male achievement, control, and power.
- Uncertainty Avoidance Index (UAI). This focuses on the level of tolerance for uncertainty and ambiguity within the society - i.e. unstructured situations.
- Long-Term Orientation (LTO). This explains the extent to which a society exhibits a pragmatic future oriented perspective rather than a conventional historic or short term point of view.

Hofstede's model is often compared with that of Charles Hampden-Turner and Fons Trompenaars (1993; 1997). They identify seven significant cultural dimensions:

- Universalism versus particularism
- Communitarianism versus individualism
- Neutral versus emotional
- Defuse versus specific cultures
- Achievement versus ascription
- Human-Time relationship and
- Human-Nature relationship

Figure 2: The Culture 'Onion'



Source: Hofstede (1991)

Hofstede's model has been criticised on a range of counts. Theoretically, it has been seen as incoherent, inconsistent, unilinear and methodologically flawed (e.g., Haller, 2002). There have been some attempts to deploy Hofstede's model in the context of regional development-related fields. For example, Mueller and Thomas (2001) relate Hofstede's models of culture to Entrepreneurship. They summarise their findings as follows:

Culture, it appears, may condition potential for entrepreneurship, generating differences across national and regional boundaries. One tentative conclusion is that a "supportive"

⁸ See also <http://www.geert-hofstede.com/>

national culture will, ceteris paribus, increase the entrepreneurial potential of a country. This suggests that in addition to support from political, social, and business leaders, there needs to be a supportive culture to cultivate the mind and character of the potential entrepreneur (2001: 51).

However, as they also note, culture is just one of many variables which are important in explaining spatial differences in Entrepreneurialism.

Perhaps the most interesting writer in this cultural values tradition is Ronald Inglehart, a political scientist, who has also worked extensively on national differences in cultures but has focused more on (inter-generational and gender-related) cultural change than Hofstede (see Inglehart, 1997; Inglehart and Norris, 2003). Inglehart's work has led to the creation of the 'Inglehart Values Map' which plots national cultures on two dimensions – from traditional to secular rational values; and, from survival values to self expression values.⁹ Inglehart's thesis is broadly that industrialization was associated with the movement from traditional values towards more rational and non-religious values, while in the present post-industrialization era there is a movement of survival values toward those of self-expression. The linkage with economic development is broadly summarised by Inglehart and Baker as follows: 'economic development is associated with shifts away from absolute norms and values toward values that are increasingly rational, tolerant, trusting, and participatory' (2000: 19). For Inglehart, though, the relationship between culture and development is two way, although the sense that development is the dominant motor of change while culture is more concerned with steering the direction and shaping the form of change. Inglehart and Baker again: 'Economic development tends to push societies in a common direction, but rather than converging, they seem to move on parallel trajectories shaped by their cultural heritage' (*ibid.*: 49).

This theoretical model of Inglehart and Baker has been tested at the European regional level by Beugelsdijk, van Schaik and Arts (2006) using data from the European Values Survey.¹⁰ These authors draw in Inglehart's attempted synthesis of modernisation theory, with the expectation of value convergence, and culturalist theories which generate expectations of path dependence and continued differences in regional values. In line with Inglehart, they show that both effects are present: 'the regression analysis and robustness tests show that modernization, i.e. economic development, is an important driver of value change in these regions, but also that there are cultural processes of path dependency at work' (*ibid.*: 325). Jackman and Miller (1996), using Italian data to compare and critique both Inglehart and Putnam in relation to cultural values, find little empirical support for either approach and identify many theoretical and methodological problems.

Information and communications technologies do feature in these theories but they are often seen simply as correlates of wider posited processes of (post)modernisation. In short, these literatures have, as yet, had little specific to say about the relationship between culture and the *transformative use* of information and communications technologies.

3.4.2 Neo-Durkheimian Cultural Theory

Neo-Durkheimian 'Grid/Group' Cultural Theory (CT) represents another approach to understanding cultures rooted in classical sociology. It was originally developed by the anthropologist Mary Douglas (1970) and developed by, among others, Aaron Wildavsky (Wildavsky, Thompson and Ellis, 1990) and Christopher Hood (1998) in the realm of organisational research and public administration (See Douglas 2005 for a useful history of the origin of the concept). Douglas distinguished between two dimensions for any given society, Group and Grid. "Group" referred to the degree to which a given society subordinated the individual will to that of the group and established a strong boundary around the group distinguishing members from others. "Grid" referred to the basic systems of classification utilised within the group and to make sense of the world, where high grid implied a low level of ambiguity and an elaborate rigid set of social conventions.

Taking the Grid and Group dimensions and plotting them at right angles creates the following 2x2 matrix. This provides four cultural archetypes, or models for making sense of the world – the hierarchical, the communal, the individualist and the fatalist.

⁹ See http://www.worldvaluessurvey.org/library/set_illustrations.html

¹⁰ <http://spitswww.uvt.nl/web/fsw/evs/index2.htm>

Figure 3: Four Cultures: Grid and Group

High Grid	Fatalism	Hierarchy
Low Grid	Individualism	Communalism
	Low Group	High Group

Source: The authors¹¹

The strong claim of CT is that these four positions constitute the only 'viable' cultural frames and that all groups will be, at a given time, in one of these segments. In policy analysis, this has led to a powerful explanation of the familiar pattern of policy cycles. Each of these models has its characteristic strengths and weaknesses, and as a result, over time the disbenefits of a particular cultural model come to fore and it is abandoned for one of the other models which corrects for the defect in the abandoned model but introduces its own problems which, in turn, lead to another change of policy direction.

Some attempts to apply CT in the context of technology use have been attempted in the public sector (6 et al, 2002). Each cultural group 'sees' information and communication technology in a different way: for the hierarchical it is a means to control, for the communal it is a means of communication, for the individual it is a means of transactions and for the fatalist it is a 'force of nature' to be accepted (see e.g., Hood, 1998). From this point of view, then, we might look to a particular cultural 'fit' (or fits) between dominant regional cultures and particular technologies. Thus, we might argue, regions find it easy to assimilate technologies which are congruent with their cultural understanding of the world, while finding it difficult to assimilate technologies founded on, or embedding, alternative views. Thus, the original internet technologies, which were developed in the communal world of higher education, appear to have been taken up more rapidly in that world because it found it easy to make sense of them. The more commercial (individualist) world found it harder to make sense of these technologies, with their essentially reciprocal business model, but by the late 1990s, had fully assimilated them to their world view within the notions of e-commerce and the resulting dot.com boom. Hierarchical cultures – the state and large corporations – were even slower to be able to assimilate internet technologies with their lack of hierarchical structure.

3.5 Comparison and Discussion

What can these four traditions teach us about regional innovation cultures? What clues can they provide? As Al James (2005) has suggested: 'while there is a growing consensus that distinctive regional 'cultures' play a vital role in facilitating innovation, these links are poorly understood'; further, he argues that 'culture has become a kind of 'dustbin category' in regional studies for anything one cannot explain', and that is in consequence it is "in dire need of demystification'. How can these four literatures contribute to that de-mystification?

We can attempt to formally compare these literatures. Firstly, they vary significantly in terms of their spatial focus. On the learning region literature is explicitly focused on 'the region' – the social capital literature is highly varied in its spatial focus, sometimes focusing on the regional level, but often being applied at the national (or indeed the urban) level. The creative cities literature is, of course, focused at the urban scale, and the cultural values approaches are most often presented at a national or 'religio-cultural block' level. What we would emphasise about this diversity is that we need to be cautious about fetishising the regional level in understanding how cultures of innovation might support the transformative use of ICTs. regional innovation cultures sit within larger cultural entities (and interact with more territorially dispersed organisational forms, each with its own culture).

Here we have done no more than compare these literatures on a number of key points. Our provisional attempt is summarised in the table below. What is strikingly apparent, however, is that none of these literatures directly provides more than clues about how a regional innovation culture might underpin transformative use of ICT in individuals, firms and public agencies. We therefore need to focus much more closely on the literature on ICT and change in the public sector, corporate and domestic environments.

¹¹ Note that the terms used here are derived from Hood. Others, including Douglas, have labelled the cells differently.

In terms of the methodologies which have been adopted in developing these literatures, and in the context of a benchmarking project the use of quantitative indicators, there is again diversity. While some of these approaches have attempted to use extensive and quantitative research techniques, the choice of indicators and the uses to which they have been put has always proved controversial. As these have come to stress more and more the interpretative nature of culture, its tendency to throw up unique and discrete ways of seeing and knowing, many researchers have drawn back from quantitative studies to pay more attention to qualitative understandings.

Another point of contrast lies in which parts of society the theories focus on. This is in large part a reflection of their histories. The learning regions literature focuses most strongly on firms and (some) public institutions, paying little attention generally to household structures and cultures (reflecting its origins in industrial sociology and economic geography). The Social Capital literature, by contrast, has less to say about firms and is much more strongly focused on the interaction between individuals and households through civic associations and civil society, (reflecting its background in political science and sociology). The Creative City/Class literature focuses mainly on the interaction of households/individuals and firms, although public agencies have a large part to play here too (reflecting the background in economics and planning). Finally, the classic sociology of values and culture is focused mainly on households and (a small set of) institutions. The simple lesson we would take here is that we need, at least in principle, to keep a focus across all of these actors.

Table 2: Summary of research approaches

	Innovation Systems to Learning Regions	Civic Engagement to Social Capital	Creativity and the Creative Class	The Sociology of Culture and Values
Primary Inspiration	Lundvall and Johnson (the Learning Economy)	Putnam (Bowling Alone); Coleman (Social capital in the creation of human capital); Bourdieu (The forms of capital)	Jane Jacobs (Economy of Cities)	Weber (Protestantism and the spirit of Capitalism) Durkheim (Elementary Forms of Religious Life)
Primary Spatial Focus	National and Regional	Regional and National	Cities/ City Regions/ National	National/ Cultural Group
Primary Methodology	Intensive Case Study	Originally Extensive tending to Intensive case study	Mixed	Extensive survey based
Use of Indicators	Limited	Yes	Yes	Yes
Primary Actors	Firms and Public Institutions	Citizens/ Households/ Civic associations/ Public Institutions	Households and Firms and public institutions	Households and some institutions
Culture understood as	Institutions and Routines	Norms and Routines	Practice and Performance	Values and Sense Making
Model of Change	Mainly evolutionary	Mainly evolutionary	Mainly evolutionary	Evolutionary
Explicit ICT Use Focus	No	Yes (mainly households)	No	No

Source: The authors

A further field of variation, again crudely delineated here, concerns the model of culture deployed. This varies from the those approaches which stress individual values, through more cognitive approaches focused on sense- and meaning-making, to those which stress more norms of behaviour and habits or simply routines.

Finally, we want to stress two, perhaps surprising, points. Firstly, these theories all appear to stress the incremental nature of most change. Things change, but they change slowly and are always under the influence of the past. Indeed in reading the literature, it sometimes appears that the reason that 'culture change' is so often invoked is precisely because it is so hard to do. The second point we want to stress is the very limited connection between much of the literature and the notion of transformative

use of ICTs. The literatures reviewed here are either silent about ICT use (as opposed to ICT production) or, in the case of the Social Capital literature, they are more concerned with the impact of ICT use on Social Capital than on the impact of social Capital on ICT use.

4 ICTs and Transformative Change

One thing that is clear is that none of the four literatures above provide a particularly sophisticated analysis of ICTs, in particular as they relate to transformative change. However, looking more broadly we might find some clues in the wider literature on ICTs and change.

The relationship between ICTs and transformative social (organisational, cultural, political, economic) change is a complex field of study. For example, focusing only on the contribution of economists, there are studies at the level of whole national economies, individual sectors or at that of individual firms. Within sociology, social psychology and political science, studies have focused on the individual, the family or household and the various larger social collectivities or groups. Finally, there has been growing interest in the potential for radical transformation through ICTs in the state, public services and public agencies. In each of these fields we can trace a similar trajectory of research in which the solution to each problem generates a new puzzle to be analysed. The general form of this development seems to take the following shape.

- First, there is a general hype and level of expectation about the impact of ICT on the relevant social structure (economy, organisation, household, group).
- This transformation then fails to occur, the puzzle is to explain the lack of transformation (generating a range of possible explanations including problems of measurement, the need for various complimentary organisational changes, time required for learning, etc.) .
- Subsequently, after some period of time, significant evidence of the kinds of effects first envisioned in the hype phase, together with some unexpected effects, appear; the puzzle now is to explain the delay in appearance of these effects.
- Further evidence shows the uneven impact of these effects with their appearance in some countries/sectors/firms/regions and not in others; the puzzle is now to explain this variation.

Let us take the paradigm case of macro-economics. Very crudely, early assumptions that new technological capacities and capabilities would be unproblematically translated into social change have been dramatically revised. For much of the last two decades the major problem for social scientists concerned with economic growth has been to explain why the massive investments in new information and communications technologies have *not* resulted in measured improvements in productivity (see e.g., Brynjolfson, 1994; Brynjolfsson and Hitt, 1998; 2000; Jorgenson, 2001) This was the so called “productivity paradox” first labelled as such by Robert Solow.¹² These debates cast a great deal of light on the many problems of measuring information technology investment and, even more so, productivity, especially in services. Beyond the measurement problems, attention focused on a range of complementary organisational and managerial changes that, it was argued, were required to “mobilise” information technology to achieve improvements in productivity. In particular, drawing on the historical example of the electricity industry, Paul David (1990), argued that there was a significant time lag between the diffusion of basic technologies and their economic impact associated with experimentation and learning concerning the most effective ways to integrate technologies in the production process.

The work of David and others, who stressed the need for complementary organisational change to ‘unlock’ the powers of information technologies, shifted attention away from the simple presence of technologies – adoption – and refocused attention on what organisations were actually doing with the technologies. From this point of view, the information society was not something that would just happen, but rather, in Mansell and Steinmueller’s (2000) phrase, something that needed to be ‘mobilized’. It was not just a technology but rather a new *socio-technical* configuration that could lead to development and growth. The question was not “What have you got?” but rather “What do you do with it?” or “How do you do *that* with it?” And building on this insight it became apparent that what you did with information technology interacted strongly with what others did with it. In this sense

¹² For more paradoxes of the information age, see Woolgar 2002.

Information and Communication Technologies are (particularly) social technologies and their full power is only unlocked in a broader social context. Phenomena such as e-government or e-business cannot be undertaken by state agencies or individual businesses alone, they require the co-ordinated adoption of technologies and standards by these actors and others (households, intermediaries, brokers, etc.). From this point of view, the object of technology “adoption” is not the firm or the household but rather a wider “social” entity – perhaps the supply chain, the cluster, or the sectoral business community. This insight has recently pointed attention at what has become known as the ‘business ecology’ (O’Callaghan, 2004; Nachira, 2002). Of course, not all of these multi-organisational entities are tightly regionally bounded, but they do all have strong spatial characteristics. Developing this insight, Steinfield (2004: 210), for example, has argued that ‘if geographically defined business clusters are of increasing significance, the electronic marketplaces that fail to take location and social relationships into account will be of little use in these contexts’. What these perspectives reinforce is the need to understand information and communication technologies we need to understand what John Seely Brown and Paul Duguid (2000) have so eloquently called ‘the social life of information’.

These insights led to strands of research which have produced what Ed Steinmueller (2003: 8) calls the ‘theoretical vocabulary of change’ in relation to the information society. Specifically, Steinmueller identifies six interlinked ‘ideas’ which have dominated thinking about information society related change: diffusion; network effects; user-producer interaction; standardisation and inter-operability; situated theories (the process of technology creation and adoption is viewed as being contingent upon localised or situated social processes); and, structural theories. To these he adds three new contenders: globalisation theory (or more precisely ‘glocalisation’ theories); (social) network oriented approaches; and ‘virtualisation’ models. These various elements have been combined in a number of ways leading to variety of Theories of the Information Society (to use the title of Frank Webster’s 2002 book).

What, we might argue, is common across these various ideas is the notion of joint production and regulation of information society good and services, but also the joint production and regulation of the possible meanings and values which those technologies have: what Janice Mclaughlin and her co-authors called the process of “valuing technology” (Mclaughlin, *et al.*, 1999). Probing behind the raw behavioural question of what individuals and households, firms and other organisations (public and voluntary) do with technologies, we find the question of what kinds of meanings and values they are able to ascribe to the technologies. Of course, these meanings operate at the level of the individual and of the individual organisation. But what is important for our purposes here is that it is not solely at this level that they operate, but rather that they are (partially) shared understandings and evaluations which each individual both draws on and to which each individual also contributes. Much of the time, but not always, this borrowing from the common pool of meanings and evaluations is undertaken in an unreflecting manner and such meanings change only slowly. But sometimes, this process can be undertaken reflexively and then there is the possibility, not the certainty, of a much more radical form of change.

Why should new ICTs be particularly important for transformative change? From crude a technological determinist perspective ICTs represent just one of a range of important technologies. Are ICTs more important than technical innovations in energy, transportation, medicine, military affairs and human fertility, to name just a few significant fields?

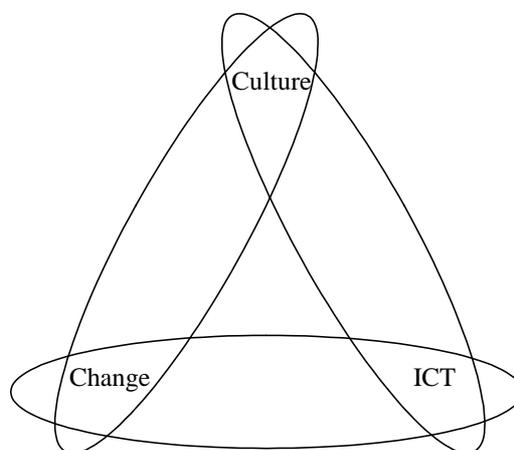
What seems to be particularly important about ICTs from the point of view of transformative change is that they are **both the focus for developing new meanings and values and (increasingly) the medium through which much of that process of reflexive development takes place**. The critical input to this social process is the building of some kind of material, shared representation of the state of the world and the role of the individual, organisation or group within it. That is to say, to be reflexive, there needs to be some external object to reflect on. The capacity to achieve the kind of collective ‘improvisational’ change management that appears to be the hallmark of successful individuals, households, firms, governmental institutions and perhaps regions is related to the capacity to build, share and maintain effective representations of the world. We say *effective* representations (and not for example accurate representations) because there is no requirement that these representations be accurate to be effective (except, perhaps, in the very long run). Myths can, of course, be highly functional; they can even, if widely enough believed, become true (Cornford, 2003b). Sometimes, as in the business world these representation may take the form of “vision” statements, but we are concerned here with a much broader notion of representations.

5 Conclusions

What kind of indicators could possibly measure the capacity to develop and share new meanings? What clues have we found that might help us construct better indicators for policy makers seeking to mobilize the information society in the regions? And what clues can we identify to help to guide the TRANSFORM case studies and to help us to understand how regional innovation cultures sustain transformative use of ICTs?

In this paper we have been concerned with three critical terms: culture; change; and, ICT. Our problematic can be (re)stated as follows: how (regional innovation) *culture* figures in enabling individuals, firms and public administrations to use *ICTs* to bring about transformative *change*? Each of these key terms is particularly tricky. Culture is a notoriously difficult notion to define and to translate. Change is, as we have seen, no less tricky. Finally, ICTs can, and usually are, grouped together, but they are in fact a diverse set of technologies which are constantly developing. Each of these key terms supports a substantial literature on its own. Rather than start with each of these literatures, we have begun to focus on the three overlaps: culture and ICT; ICT and Change; Change and Culture (see figure 5 below).

Figure 4: Three Terms, Three Conversations



Source: The authors

There are many gaps and lacunae in the literature. Some literatures have much to say about firms and public institutions but little to say about households and individuals. Others focus almost exclusively on households and individuals at the expense of firms and institutions. Some literatures have developed sophisticated analysis of culture and change, but treat ICTs as an incidental or contingent factor. Others focus on ICTs and change, with only cursory reference to culture. What can we extract from the literatures we have reviewed here.

We might identify five key “clues” for exploring and understanding why some regions, but not others, seem to be able to use ICTs so much more effectively to achieve their goals. For us, then, these are five dimensions of a regional innovation culture:

- First, we might note the importance of a particular articulation of networks – and in particular, networks that bridge social worlds – for the propagation of meanings and values but also for the construction of such meanings and values.
- Second, we might note the importance of reflection and reflexivity and of shared representation – sometimes reduced to the notion of vision – as the means by which reflexivity can be brought about.
- A third key concept that comes through is the significance of learning as a social activity.
- Fourth, we might note drawing on the wider organisational change literature that the notion of leadership is major lacunae in most of these models as they apply to the regional level.
- Fifth, the importance of regional openness and closure to the outside world?

We will address these in turn.

5.1.1 Forms of Networks

Perhaps the least contentious theme here is the significance of certain types of networks. The notion of the network, which can be opposed to both hierarchies and atomised markets, is, perhaps, the obvious metaphor. Indeed, for Manuel Castells (1996), for example, it defines the Age. Notions of 'network' are central elements in both the Learning Region and the Social Capital Literatures and they have a significant role in the creative cities literature.

Networks, and the quality of network linkages, have long been used as an explanatory variable for success or failure in *ICT producing* regions. AnnaLee Saxenian's (1994) classic studies of Silicon Valley and Route 128 made extensive use of the notion of social networks to explain the relative success of Silicon Valley compared with Route 128. Saxenian summarises the differences between Silicon Valley Route 128 as follows:

Silicon Valley has a regional network-based industrial system that promotes learning and mutual adjustment among specialist producers of a complex of related technologies. The region's dense social networks and open labor markets encourage entrepreneurship and experimentation. Companies compete intensely while at the same time learning from each other about changing markets and technologies through informal communications and collaborative practices. Loosely linked team structures encourage horizontal communication among firm divisions and with outside suppliers and customers. The functional boundaries within firms are porous in the network-based system, as are the boundaries between firms and between firms and local institutions such as trade associations and universities.

The Route 128 region, in contrast, is dominated by autarkic (self-sufficient) corporations that internalize a wide range of productive activities. Practices of secrecy and corporate loyalty govern relations between firms and their customers, suppliers, and competitors, reinforcing a regional culture that encourages stability and self-reliance. Corporate hierarchies ensure that authority remains centralized and information tends to flow vertically. Social and technical networks are largely internal to the firm, and the boundaries between firms and between firms and local institutions remain far more distinct in this independent firm-based system.

More recently, Saxenian (2005), in her continuing work on Silicon Valley, has come to stress not only the quality of these intra regional networks but also the inter-regional networks between Silicon Valley and regions in Israel, China, Taiwan and India (see below).

Yet what is apparent is that it is not any type of network that appears to be important to the capacity to innovate with ICTs. Rather, it is the proliferation of relatively loosely articulated networks that span social words – bridging, rather than binding, in the language of social capital – that is important here. Here we might go back to Mark Granovetter's original (1973) observation of the 'strength of weak ties' – the way in which new information comes from the edge of contact networks (and the converse notion of 'the weakness of strong ties' – Grabher, 1993b). This characteristics of network approach can have a powerful explanatory impact, at least at the corporate level (e.g., Burt, 2004). The precise problem here, though, is to define the exact parameters which might enable us to distinguish between those forms of network that are beneficial and those that are not.

We might, then, hypothesise that an effective regional innovation culture is one that equips individuals, firms and institutions for this kind of open network structure. How we might describe or measure this is a major task for the TRANSFORM case studies.

5.1.2 Learning

A second theme, and one that is well developed in the learning regions literature is the need for individual, institutional and collective learning in an effective culture of innovation. The implications of this, however, are far from clear as learning takes a number of forms – formal and informal, accredited and unacknowledged - and thus we cannot speak of a single culture of learning. *What appears to be important here is the complex mixing of theoretical and practical knowledge in networks and communities of practice* (see Brown and Duguid, 2000; Wenger, 1998). In this context, experimentation and 'learning by doing' or 'learning by innovating' are at least as important as more formal notions of the diffusion of 'best practice' in relation to ICT usage. Quite what cultural values

might sustain such learning, and their precise institutional expression, is not wholly clear. The tolerance of ambiguity and willingness to take risks, for example, seem important places to start. This is perhaps not best thought of as a matter of a particular list of cultural attitudes but rather an *articulation* of those attitudes against each other. The problem for TRANSFORM is identifying more precisely this articulation.

5.1.3 Reflexivity and Representation

Linked to the focus on learning is a concern with reflexivity and representation that is perhaps closer to traditional notions of culture. Issue here, poorly articulated in most of the literatures reviewed, concerns the development of shared representations of 'possible futures', routemaps, collective vision, and so on. These need not, of course, be universally shared representations and may be highly contested, yet they structure the interaction between social actors, setting expectations, upsetting assumptions and orienting attention to particular goals. These representations might be more or less formally expressed – projects, plans, surveys, debates, strategies – or they may be tacit, part of the 'mental furniture'. And this is not just a matter for public agencies. Indeed, we know that state agencies seem to have certain 'blind spots' in their vision (Scott, 1998). Private actors too will build partial, and self serving, visions. Yet this realm of representation, in particular of possible futures, appears to be significant in the transformative use of ICTs.

Linked to this notion of representation, is the idea of reflexivity. This could be linked to the notion of reflexive modernisation (Beck, Bonss and Lau, 2003) at the societal level, or individual level reflexivity à la Giddens (see e.g. Webb, 2004). Reflexivity has, of course, a number of possible meanings (Lynch, 2000) and can be very easily overplayed. However, it does seem that some kind capacity to contemplate, to reflect on, not just the technology but the self – individual and institutional – is important for effective use of ICT.

What TRANSFORM will need to do is to identify much more precisely how we might capture this dimension.

5.1.4 Leadership

A further theme, and one that the urban and regional development literatures have been highly wary of, is leadership (see Sotarouta, 2001; forthcoming). Instead we have to look to management studies for models. Contemporary theories of leadership have developed considerably, for example, increasingly seeing it as a collective, rather than an individual, quality. These shifts are well summarised in a recent UK government report as follows:

- From self-isolating individual leaders to self-supporting leadership teams
- From individual leaders to leadership institutions
- From cult control to cultural coherence
- From rules to principles
- From naivety to complexity
- From similarity to diversity
- From private interest to public service
- From inherited trait to acquired skill to deployed will
- From win/lose arguments to win/win negotiations (Cabinet Office Performance and Innovation Unit, 2001: Annex D)

These changes have led to a new interest in leadership not just within organisations but also leadership 'between' organizations or the leadership of multi-agency change programmes. Indeed, regional development itself can be seen as a particularly complex multi-agency change problem.

Leadership may be particularly important to effective use of ICTs at the regional scale because they have important threshold effects and first-mover disadvantages – in short, the effective use of ICTs is a collective action problem. The development of a shared vision and some cultural values which preclude purely predatory and opportunistic behaviour are important here.

5.1.5 Openness and Closure

Finally, across these literatures we can see a focus on both openness and closure to the outside world. Such regional permeability can take many forms although the critical element appears to be the capacity to support flows of skilled individuals into and out of the region. Again this is a theme in the broad developing creative cities literature (Hall, 1998; Scott, 2006; Florida 2002). And again, this is at the heart of Castell's (1996) vision of a Network Age. In her most recent work, AnnaLee Saxenian has identified a shift in the ways in which high tech districts – and above all Silicon Valley – relate to other emerging high tech regions in Taiwan, India and China. What once was identified as a 'brain drain' from the (underdeveloped) periphery to the (developed) core has been transformed into 'brain circulation' between these two locations:

The old pattern of one-way flows of technology and capital from the core to the periphery is being replaced by a far more complex and decentralized two-way flow of skill, capital, and technology between differently specialized regional economies. (Saxenian, 2005: 20)

Although Silicon Valley remains at the heart of these flows, its relative (but not absolute) dominant position is being slowly diminished. What seems important here is that the region is both open to the flows of people, technologies, ideas and images, but also capable of keeping a certain distance from that circulation, the capacity to distinguish between those, globalised, ways of doing things and 'the way we do things here.'

5.1.6 Last Words

These five notions remain, at the moment, just clues – each in need of development and following up in the TRANSFORM case studies. Yet they seem, to us at least, the most promising leads that we have. What is clear about these five notions is that they relate to the transformative use of ICTs in very complex ways. There is no simple causality. What is more each of these areas interacts with the others. Networks form channels of communication that are essential to learning, reflection and leadership. Active learning is a much prized aspect leadership. Both openness and closure are essential to effective learning from the outside world (if it is to be more than just copying of routines). These elements can, of course, be combined in different ways and different actors can take on key roles. Public agencies, for example, may provide leadership and vision or these may come from (usually) large firms. Large firms may, again, be the key vectors for the importation of new ideas and new ways of organising and working; or this function may be taken up by other institutions such as universities or research laboratories, effectively managing the interaction between the region and its environment.

The increasingly widespread use of 'culture' in the corporate world can be divided into two ideal typical models. The first posits an idealised corporate culture in which everyone is 'on board' and 'pulling in the same direction'. The task for the manager of the 'culture change' project, then, is to bring about this state of affairs, to engineer this beneficial culture. A more realistic view of culture change, however, has developed which sees culture not as something to change (except in extremis) but rather as something to know, to understand and to work with. From this point of view the task of the manager is to be sensitive to the shared understandings and ways of doing things 'around here'. This task is more akin to gardening (true culturing), where one must know the soil, the weather, the *terroir*, rather than the engineer. It is in this latter sense that we feel the notion of innovation culture will be most useful. What policy makers will need to do is to understand their regional innovation cultures and try to make ICT policies work, as far as possible, with the grain of that culture.

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