

Introduction: the scale question in knowledge creation, capture and commercialization

Philip Cooke

INTRODUCTION: TOWARDS THE KNOWLEDGE ECONOMY

This book seeks to navigate the sometimes rocky shoals and reefs of the knowledge economy. After the concept was first elucidated by Machlup (1962), progress in developing and operationalizing it was slow. This is partly because of an evolving interest in and study of the role of *information* in the economy. This can be traced back at least to the pioneering research at Bell Laboratories of engineer Claude Shannon (1948, 379–80) who defined information as messages possessing *meaning* for sender and recipient. We might term this the ‘train timetable’ theory, not least as Shannon said that communication’s ‘significant aspect is that the actual message is one *selected from a set* of possible messages’ (1948, 379 original emphasis). This then fuelled research leading to consistent observations that, in the second half of the twentieth century an ‘information explosion’ could be observed, with associated ‘information overload’ (Miller, 1978) from the exponential growth in messages, increasingly diffused by ‘information technology’ (IT, later ICT in recognition of communications technologies; Seely Brown and Duguid, 2002; Lievrouw and Livingstone, 2002) within what was perceived to have become an ‘Information Society’ or the ‘Information Age’ (Castells, 1996; 1997; 1998).

The key question Machlup (1962; see also, 1980) raised long before this began in earnest was as follows: which are the key economic sectors in which such assets are concentrated, and how can a serious attempt be made to map out the production and distribution of knowledge sectors in the (United States) economy, showing where their significance lies? Machlup classified knowledge production into six major sectors: education, R&D, artistic creation, communications media, information services, and information technologies. He showed that these accounted for the largest share in the economy, and predicted that

knowledge production was destined to grow absolutely and relatively over time. A more detailed analytical account emerged with the contribution of Eliasson et al. (1990), not only capturing the shift in intellectual focus in its title (*The Knowledge Based Information Economy*) but bringing an operational measurement method to fruition for economies other than the US. This study was a forerunner leading to adoption by OECD (1996) of the *knowledge economy* concept which was important and useful for its future economic analysis, and for its operationalization into a method for measurement of knowledge economy densities or magnitudes in economies (OECD, 1999).

THE KNOWLEDGE ECONOMY TODAY

However, Eliasson et al. (1990) did not come down clearly on the side of a statistically useful definition of the 'knowledge economy'. Their analysis was experimental, hedged around greatly by trying simultaneously to capture measurement of the 'information economy' by analysis of service sector metrics, the measurement of telecommunication services as part of company and organizational expenditure, and, importantly, discussing measurements based on the labour content of information economy activities. This latter approach was taken up and developed much later by Burton-Jones (1999) who took a strongly labour market and occupational position on how the knowledge economy was to be defined. However, it is difficult to do this nationally across countries, and currently it is largely impossible to do it regionally in a comparatively meaningful way, mainly because of definitional and categorization problems. Hence, while paying lip-service to such elements as qualification density and equipment intensity, OECD (1999) adopted for reasons of practicality a definition that is based on two macro-sectors: 'high technology manufacturing' and 'knowledge intensive services'. The former includes, categories such as: aerospace, computers, communication and office equipment, pharmaceuticals, radio and TV equipment, while knowledge intensive services are communications, software, R&D, financial services, welfare and public administration services. Efforts are being made by OECD to weight such sectors according to Burton-Jones' occupational emphasis to produce a more refined yet practicable measure, albeit still fundamentally sector-based.

Looking at the question not so much cross-sectionally as longitudinally, from an accounting perspective, intangible goods such as knowledge now account for both a greater share by value of corporate assets than hitherto and a greater share than the value of tangible assets. The shift since 1950 is 20:80 to 70:30, at least in the USA, according to Dunning (2000). This, along with huge rises in intellectual labour and patent registration in the last half cen-

ture, leads most observers of economic evolution to assert with confidence that a 'knowledge economy' is present and active in most advanced economies. However, in addition to definitional issues, this also raises others key to the focus of the succeeding chapters of this book. One of these relates to a geographical question that is scale-related.

By *scale*-related is meant, primarily, distinctions between the supranational, national and sub-national, including the meso-level and below. This is of course germane to the content of a book the focus of which is *regional economies*. While this is clearly a governance issue (in Europe, this means the EU, member state, regional and local levels of governance), it is also, importantly, an industrial organization issue such as that outlined in the economic integration literature which analyses interactions among 'global value networks' and 'local clusters' as a specific form of globalization (Gereffi, 1999; UNIDO, 2002; Henderson et al., 2002). It is necessary, therefore, to situate the meaning of *regional economies* in an at least partial relationship to a 'debate' that has arisen in economic geography to define clearly what is meant here, in contradistinction to aspects of the debate that, in tune with a conservative political economy tradition (for example List, 1841) asserted that only national economies matter.

REGIONAL ECONOMIES AND THE QUESTION OF 'SCALE'

As with many things, such as a historic failure to provide a convincing theory of location and city formation (on this, and a solution, see Krugman, 1995) there has been since the dawning of modern geography an inability by its practitioners to carve out a core area of theoretical competence of the status of, say 'class' or 'structuration' in sociology, the 'Phillips curve' explanation of the relation between unemployment and inflation in economics, or 'multi-level governance' in political science. The last-named is of direct relevance to issues tackled in this book, so what do its leading propositions say? First that different levels of governance relate not in a linear, power-imposing manner, but by evolving spheres of capability among which interactions occur by negotiation between parties of consequence to specific competence areas. Study then focuses on change or evolution, including devolution, of such competences and capabilities as political systems mature. This allows contrasts of the following kind to be drawn with confidence by exponents of multi-level governance, in this case referring to the relations between national and regional electoral outcomes. Germany demonstrates a predictable relationship between regional and national outcomes since strong regional differentiation in voting is exceptional. Spain's relationship of regional to

national elections is complex due to distinctive regional electoral dynamics arising from historical, cultural and linguistic expressions of difference in specific regions. Canada's regional and national electoral dynamics are mostly decoupled because of historical, cultural and linguistic expressions of difference (Hough and Jeffery, 2003). The explanation is that there is geographical variation in what counts as first and second order political issues for the electorate. In other words, the larger 'scale' does not always, or indeed ever, impose its will on the lesser. For how, as an abstraction, could it?

Contrast this with an eclectic mixture of critique, comment and conceptualization on the issue of 'scale' emanating from contemporary economic geography. Already attacked by Dicken et al. (1997) for a conservative, linear determinism that sees 'globalization' as a totalizing, relentless and inevitable power, it proceeds in an all-encompassing way to deny capability to other 'scales'. Trying to escape this we see, for example, Bunnell and Coe (2001) and Mackinnon et al. (2002) saying it is both wrong to emphasize the regional level and wrong to overlook regional specificity. Scale clearly does not exclude presence of fences for sitting on. This is an improvement upon Listian positions such as that of Bathelt (2003) writing in the same journal that only nations have specificity and that they may also be *closed* systems, which in a world of liberal free trade and widespread immigration may serve only to unite in scepticism the 'glocalists' (for example Swyngedouw, 1997), with those whose interests are expressed in this book. This latter commentary on *closure*, albeit moderated in ways that still privilege the national over any other scale, is especially curious, for it manages both to advocate a nineteenth century view of the contemporary relation of the nation (state) to its regions that equates, in effect, to annihilation, and attack for inattention to scale issues, authors who have empirically demonstrated precisely the presence of regional governance capabilities. These exist even where regional 'government' is absent, and display accomplishment at managing economic development and innovation support actions where national governments may have been inactive in such spheres (for example Asheim and Isaksen, 2002).

REASSERTING THE REGIONAL ECONOMY AS A SPATIAL CONSTRUCT

So, to be clear, in this book we do not align with the geographical perspective that stresses linear hierarchy as the power vector for innovation. We are closer to the multi-level governance school of thought, taking our definition of 'region' as a governance level above the local and beneath the national. This also rejects a weak usage of 'regional' that crops up journalistically to describe, for example, the Middle East, the Baltic States or South East Asia

(which increasingly incorporates China – some region!). We advocate for geopolitical usage the term ‘georegion’ instead. Nor, it will be clear, does this book support the linear, hierarchical determinism of the ‘scalar envelope’ approach with its weak grasp upon ‘agency’. For this flies in the face of research that shows sub-national policy mobilization regarding shaping of innovation capabilities to be common, if not yet ubiquitous (for a progenitor of spatial ‘enveloping’, see Brenner, 2001).

But we go further in reasserting the relevance of the ‘regional’, as denoted above, to the study of innovation and recent extensions of analysis of the processes involved, backwards along the knowledge value change into knowledge exploration and production itself, by speaking of ‘regional economies’. This contested term is considered an artifice principally by those wedded to an increasingly questionable notion that economies are only characteristic of a national scalar envelope (for example Brenner, 2001; Bathelt, 2003; for a penetrative critique, see Nielsen and Simonsen, 2003). However, we have seen how the now settled ‘globalization’ debate undermined that comforting presumption by demonstrating the significance of the greater extensive and intensive integration of global value chains and industry organization occasioned by the intersection of multinational firms and local–regional clusters on a worldwide basis (see, for example, Gereffi, 1999; Henderson et al., 2002; UNIDO, 2002). Thus, it is unexceptional to conceive of the global economy, and more exceptional than it was to conceive of economies as only national phenomena. Thus what is an economy? Of the innumerable definitions, the two that follow, one from the Collins (2000) dictionary, the other from the Internet investment glossary service investorwords.com, are as useful as any:

the complex of human activities concerned with the production, distribution and consumption of goods and services. (Collins, 2000)

and, perhaps surprisingly:

activities related to the production and distribution of goods and services in a particular geographic region. (<http://www.investorwords.com/1652/economy.html>)

Clearly, the Collins definition is preferable given the argument above, but the key point is that it contains no scalar restrictions, unlike the second definition. In statistical terms, if measures of the variables are available, as they are in many accounting frameworks based on, say, regional input–output tables, the key elements of the regional, or even urban or county economy can be apprehended. Of course this does not imply any ‘containerized’ notion of economic flows. For example, we disagree with Bathelt (2003) that: ‘only a few regions can be characterised as being economically self-sufficient host-

ing a full ensemble of related industries and services which could serve as a basis for the establishment of an innovation system.’ (Bathelt, 2003, 796) because it is impossible, in a globalized world economy, to envisage a *country*, including, for example, the USA, in that happy position, let alone a region as defined here as a sub-national governance entity. In January 2002 the US began running, for the first time, a monthly trade deficit in advanced technology products like biotechnology and other leading edge technologies (Library of Congress, 2003). It has, of course, imported a massive amount of intellectual capital since time immemorial (Saxenian, 2000). Hence, to complete this part of the justification for treating regional economies as conceptual and real open systems with meaning for governance relations, we propose to combine those given above in a definition of regional economy as:

the complex of human activities concerned with the production, distribution and consumption of goods and services in a particular geographic region.

This now leaves us the task of defining and justifying the second key term in our title ‘knowledge laboratories’. To begin, recall our earlier discussion of the knowledge economy. We said this refers to an economy and its sectors in relation to the intensity of human knowledge capital employed and of technological inputs purchased. At the present unsatisfactory stage of statistical refinement, this was shown to comprise defined International Standard Industrial Statistical categories denoted by the OECD definition of ‘high technology manufacturing’ and ‘knowledge intensive services’. Now we will make a further elaboration on this in light of the foregoing discussion of ‘regional economies’. That is by *knowledge economy* as utilized here, we now mean two things: first, industries that embody significant intellectual capital and high value-added, in manufacturing (high technology) and services (knowledge intensive; OECD, 1999); and, second, places (largely lower scale, for example regions, localities) with at least 40 per cent of employment in such economic activities. The reason for selecting 40 per cent is explained in Cooke and De Laurentis (2002). In brief, examining such data for European Union regions, it captures most EU regions not in receipt of EU Regional Policy Structural Funds and contains very few that thus qualify. In that respect, it is a reasonably precise measure of regional development. Hence we shall occasionally refer to regions of that kind as already displaying the characteristics of ‘knowledge economies’ (for further discussion, see Cooke, 2002).

KNOWLEDGE LABORATORIES

But what about ‘knowledge laboratories’? This is perhaps a neologism in the economic geography literature, although such institutes exist with that name, notably that in the University of South Denmark at Odense where it combines literary criticism and new media research. In Stanford University, it conducts research in the key Artificial Intelligence fields of ‘knowledge representation’ and ‘knowledge reasoning’. In Harvard Medical School, it is the name of the Countaway Medicinal Library. In New Zealand, it is an innovation service and place for experimentation in theory and practice of innovation in a firm or organization, facilitated by the service provider known by the name in question. In the regional science field, the idea was mooted in relevant language by Sabel (1995). He wrote of the desirability in experimental policy of ‘decentralized co-ordination’, later referred to by economic theorists as ‘autopoiesis’ and complexity theorists as ‘self-organizing systems’ or ‘complex adaptive systems’ (see Curzio and Fortis, 2002). Sabel himself developed aspects of this theorization in his discussion of the use by epistemic scientific communities (Haas, 1992) exchanging knowledge across disciplinary boundaries, of informally developing hybrid or ‘pidgin’ vocabularies (Sabel, 2002 after Galison, 1997). Galison (1997) refers to these as ‘contact languages’ occurring in what Nowotny et al. (2001) call ‘trading zones’ and ‘transaction spaces’. This demands high levels of cognitive reflexivity, monitoring and learning to cross boundaries while avoiding conflict with valued potential partners.

There is a clear connection here to literature recognizing interdisciplinary interaction as a key feature perceived to characterize emergent ‘Mode 2’ knowledge production (Gibbons et al., 1994). Traditional scholastic disciplines rooted in large-scale teaching departments of universities (Mode 1) were observed to be breaking down with the growth of funded academic research. Diversification of knowledge production in specialist Research Centres that were at arm’s length from normal pedagogic activity, capable of bridging industry–academe boundaries, as occurred most fully in the Stanford University model described by Gibbons (2000), but also closely in touch with problem-focused researchers from other disciplines, characterized Mode 2 ‘transdisciplinarity’. Further ingredients included also reflexivity, and networking to tackle knowledge ‘heterogeneity’. This influential and somewhat prescient perspective was criticized later, not least by some of its authors (in Nowotny et al., 2001) because it remained rather lofty and science-centric whereas the socioeconomic context is rather seen to be causing science and society to ‘co-evolve’ in their development. Thus, for example, as society turned against nuclear physics because of its unsolved pollution problems, and sought greater resource attention for healthcare, so science policy shifted from physics and chemistry to biosciences. Thus in this context *a knowledge*

laboratory is a process with institutional and organizational presence that integrates transdisciplinary communities of practice to form knowledge for policy learning and innovation.

Examples of this way of thinking and operating are touched upon at various points in this book, most notably in Sotarauta's in-depth study of knowledge laboratory exploration for purposes of regional development in rural Finland. Thus *Epanet* in Finland's Vaasa-Suomi region connects 20 new Chairs and Research Centres in collaborating counties, *none of which has a university*. This *Filial* model affiliates professors and centres to at least six universities elsewhere, thus negating the sunk costs, inertia and vested interests of traditional 'bricks and mortar' academe. In Italy, disappointment with traditional universities as regional development engines has led to diffusion of the *Pisa* model of *Scuoli Superiore*, or Advanced Study Institutes, to five 'laboratory' regions (Puglia, Umbria, Marche, Lombardia and Campania) to emulate Pisa's Institute-Corporate-Spinout system that has been judged a success (OECD, 2001). These new approaches recognize the weakness of universities per se as knowledge transceivers, but the centrality of research knowledge to future regional development potential. Tavoletti's study in this book also addresses certain failures of the university *qua* developmental institution in its own right by reference to the low marketability of doctoral 'talent' where boundaries between scholarship and the labour market are unusually severe, as they are in Italy.

REGIONAL ECONOMY AS KNOWLEDGE LABORATORY

So we may think of the regional economy that embraces a 'knowledge laboratory' capability as one that is more highly evolved than, for example, a 'learning region', the key functionaries in which seek to capture knowledge and information from more accomplished institutional settings and try to apply it, not always appropriately and probably not swiftly, to problems of development, 'lock-in' and path dependence currently confronting them. The 'knowledge laboratory' epithet denotes exploration, the quest for new knowledge, the testing of that knowledge, reflection upon it and practical application suitably shaped to enhance the capabilities of institutions and organizations, especially firms in that region. This implies making optimal use of 'Constructed Advantage' (Foray and Freeman, 1993; de la Mothe and Mallory, 2003) from collaboration and networking across institutional boundaries that exist in the transdisciplinary mix of communities of practice. This further implies the presence of institutional innovation networks integrating regional institutions to each other and beyond to other regions, national systems and globally located knowledge network nodes:

'Knowledge' refers not only to research and development in the natural sciences and engineering, but also to related scientific activities (surveys, statistics, mapping, etc.) as well as a full range of technical, managerial, and social skills and cultural contexts... The way in which institutions can identify, appropriate, apply and disseminate knowledge is by acting as part of an innovation system. These systems include knowledge producers (such as laboratories), knowledge users and applicers (such as firms), knowledge regulators (such as food and drug inspection agencies, intellectual property agencies), knowledge diffusers (including such smart infrastructure as information highways), knowledge funders (such as granting agencies), and so on. (de la Mothe, 2003)

Knowledge laboratory functions become the key elements of regional innovation systems in formation or already formed. This suggests new kinds of benchmarking and indicator measurement in order for regional knowledge laboratories to know more about their internal capabilities and the relations of capable knowledge teams in science, management and culture with such teams elsewhere in the world. The chapter in this book by Frenken and van Oort represents a first research effort to discuss 'hybrid' 'transaction space' collaborations and measure regional and urban capabilities in terms of specific knowledge generation (here biotechnology) measured in the publications of authors recorded in the Science Citation Index.

That knowledge and those that explore, examine and exploit it in ways that are of consequence to regional economic development is not confined to scientific knowledge is testified to in the chapter by Aslesen. This looks thoroughly into Knowledge Intensive Business Services, asking how and for what kinds of firms such capabilities contribute to regional development. The focus is on consultants' economic activity and competence generating processes and the evidence is from a survey of both consultancy firms and consultancy users in the largest city regions in Norway. Consultants are found to be key to innovation since they diffuse capabilities through markets globally and locally. They are 'light institutions' operating with contact languages in innovative transaction spaces.

This opens up a question regarding such transaction spaces or milieux. This is whether it is the relational space in which such actors and others in a putative innovation system combine to create the knowledge surpluses that arise from 'localized knowledge spillovers', or the firms displaying capabilities in regard to the exploitation of localized knowledge spillovers that cluster in proximity to gain from this 'constructed advantage'. This is the subject of the chapters by Lorenzen and Maskell and by Poma and Sacchetti. Basically two positions have emerged, represented to a considerable degree in these chapters. The first and strongest is that of Jaffe et al. (1993), Audretsch and Feldman (1996) and Malmberg and Maskell (2002) who argue in favour of the power of localized knowledge spillovers as drivers of innovation, especially in knowledge-based clusters. Breschi and Lissoni (2001) have argued

that there is no convincing evidence that non-pecuniary spillovers have displaced Marshallian pecuniary (market) advantages. Interestingly both sides argue their cases in respect of the meso-level of analysis.

The critique (well-represented in work by Caniëls and Romijn, 2004) is thus of both sides for ascribing too much influence to regional *milieux* and too little to firm *capabilities* or what may also be referred to as *entrepreneurship* (on firm resources as capabilities see Penrose, 1959; on *dynamic capabilities*, see Teece and Pisano, 1994). The current position in regard to the development of clearer understanding of regional accomplishment, at least in so far as externalities (static or dynamic) are concerned, is that what is needed is more penetrative analysis of the firm-level contribution to regional *capabilities*. The default conclusion, itself a series of hypotheses, is that further work is required on types of agglomeration advantage, ranging from static to dynamic spillovers, pecuniary to non-pecuniary, and pure versus impure knowledge spillovers at the firm level but aggregated up to at least the regional level.

Lorenzen and Maskell explore this new space and suggest that the industrial cluster firm is efficient compared to single, integrated firms because different simultaneous knowledge creation spillovers occur allowing for both knowledge exploitation and exploration. Exemplifying this suggestion with case studies of the popular music and furniture industries, the chapter concludes that proximity works for firms in clusters through weak ties, low information cost and trust advantages. Poma and Sacchetti also address these key knowledge processes within firms and territories. The study balances knowledge dynamics between firms and local economic systems with knowledge dynamics inside firms. Poma and Sacchetti introduce a concept of *knowledge life cycles*, addressing fluctuation in flows of knowledge. Survey work in two Italian regions reveals knowledge decay as a source of lock-in only to be defended against by constant renewal.

WHATEVER HAPPENED TO CLUSTERS?

Moving on, these lines of reasoning and research arrive at another interesting question. It is whether the newly realized importance, not so much of macro-institutional functionalism as represented by 'Triple Helix' thinking as inspired by Etkowitz and Leydesdorff (1997; but see Etkowitz, 2003 for a more nuanced view that highlights Research and Centres of Excellence as key bridging entities) but of refinements to it that take us forward. That is, we now recognize that, for instance, it is particular research 'stars' and/or types of graduate 'talent' that are important direct factors in economic added value and 'constructed advantage'. Along with more closely focused study of firm

capabilities and interactions within and beyond market exchange, such as that conducted in this book by Wolter, again investigating biotechnology, this leads to an inversion, to some extent, of the intellectual primacy in policy and, less, academe of the Porterian notion of the cluster as the driving force of growth through competitiveness, productivity and innovation (otherwise known as ‘The Washington Consensus’; Capra, 2002; Kay, 2003).

Recently, recognition has grown among academic specialists and policy advocates that cluster policy as proposed by the likes of Porter (1998) isn’t working. On the surface this is because of economic downturn (scarcer venture capital, fewer spinouts), but the dominant approach to analysis of past successes was both superficial and time-discounted. It has proven superficial because its underlying notion of competitiveness is that of markets, something Wolter highlights as a weakness for science-driven industry analysis, and pays little or no attention to sources of advantage that arise from investment in *capabilities* such as those not susceptible to ‘markets’ but arising from large scale, increasingly public investments in research – of the kind that is increasingly conducted not even in typical university departments, but in specialized Centres of Excellence or Expertise.

The cluster approach also tends to discount time in its accumulation and representation of cases (wine clusters, agricultural implements clusters, carpet clusters). Some of these began in the nineteenth century or earlier and some are in decline. Nevertheless they are bracketed alongside newer, high technology clusters (venture capital in Boston, electronics in San Francisco) whose origins may also often be traced back half a century or even longer in the case of Silicon Valley (Kenney and Florida, 2000; Sturgeon, 2000) as if they were identical, generic and instant. Hence after a decade of studies during which a few market-driven clusters like Silicon Valley soared Icarus-like before crashing and burning, leaving the wreckage of 400 000 job-losses, national and regional cluster-building strategies are under critical review or are being superseded.

Creating more systemic networks amongst key ‘transaction space’ institutions and organizations like firms, incubators, research centres, investors and consultants at the regional level is a process explored in fine detail in Kitagawa’s chapter on industry–science relationships in Japan and the UK from a comparative institutional perspective, highlighting different processes of *regionalization* in the two countries. This study particularly highlights the role of universities as part of national ‘industry–science relationships’ in which substantial resources are being invested in enhancing regional knowledge economies. Recognition of multi-level interactions among organizations and institutions of different capabilities in such systems is a valuable finding, as is recognition of invisible but nevertheless real boundaries that persist between distinct corporate forms, like universities, compared to their lesser

prominence among inter-personal networks competent in contact languages. Carlsson (2004) has shown that empirical research into regional innovation systems had outpaced that by other innovation systems approaches together by 2000. The importance of this concept following an 'open systems' operational existence is testified to in White and Grimes' chapter, which shows how a combination of endogenous and exogenous influences secured Ireland's emerging knowledge economy. Thus although Ireland is not on a par with the world's most advanced knowledge economies, subsequent policy investments in support of more intensive knowledge-driven activities have followed.

CRITIQUE

We come finally to three papers that ask fundamental questions about the key assumptions which much of the foregoing discussion and supporting chapters tend to take for granted. The first is the chapter by Rutten and Boekema who argue and demonstrate that regions may be important for reasons given in the above review, but we must always be conscious that 'scalar envelopers' will inevitably accuse work that is interested in the field of ignoring the fact that many innovations do not take place in regional networks. They remind us that many companies do not think in terms of region when they innovate, but they do they think in terms of networks, sometimes regional ones. Why? The chapter aims to explain when proximity occurs in inter-firm knowledge transfer and when not. This leads to a conceptualization of the relation between learning and proximity in which the region is not always helpful in explaining the role of proximity in inter-firm learning.

The second corrective to a perspective that can be misinterpreted in facile ways to caricature a 'regional container' view of innovation, knowledge generation, or economic development is provided in the chapter by Etxebarria. Pointing out that knowledge management is centrally concerned with management of human relationships, a view is developed to focus on stakeholders to gain understanding of how a company based on relationships with its environment works. Relationships may be embedded in a specific, non-reproducible social framework imbued with specific, historically formed values (trust, collaboration, solidarity; Uzzi, 1996). Hence, relationships among stakeholders and social responsibility of firms suffer less 'noise' in transmission than normal and accordingly have the same meaning for firms and communities. However, this is not permanent; again Poma and Sacchetti's observations about fluctuations in knowledge and meanings, their decay and renewal, perhaps through system shocks, comes to mind. These questions are pursued by reference to one of the world's most localized industrial systems, Mondragon, whose long-term success has pulled its key economic activities

out into the wider Spanish, European and world markets with fascinating implications arising from the clash in codes between a social production ethic and one rooted in market exchange, entrepreneurship and profit.

In this vein, the final chapter acts as a further corrective to over-rosy views about the synergetic surpluses presumed to arise from consensual interactions, whether between macro-institutions with divergent perspectives, core competencies and missions or more localized forms of benign collaboration among networks of innovators. The chapter by Sokol is a critique of the notion of a 'knowledge economy' and the various conceptual appurtenances that attend regional science research and scholarship in relation to it. Sokol thus first critically examines the concepts associated with the argument that there is a macroeconomic transformation towards the 'knowledge economy'. In the process, he justifiably raises questions about the problematic nature of such a transformation, particularly its implications for social and economic cohesion. He suggests strongly that within the constraints of the current profit-driven political economy, knowledge processing and accumulation will stimulate the process of reproducing existing inequalities. Finally he suggests that an analysis rooted in the ideas of global socio-spatial divisions of labour and value networks may be a superior and preferable way to conceptualize whatever socioeconomic transformation may be ongoing.

CONCLUSIONS

It will be evident that the contributors to this book, many representing a new generation of regional scientists, have written stimulating and challenging accounts of the current condition of regional and supra-regional economic interactions as they affect many parts of the contemporary space economy. There are new accounts of policy interventions, methodologies for measuring, detailed analyses of local-regional inter-firm, intra-firm and transaction space interactions mainly around knowledge generation, transformation and commercialization in the form of innovations that should meet the appreciation of a wide audience. There are also critical perspectives that warn of the importance of maintaining a balanced perspective in trying to assess the depth and reach of the presently upward slope of change that revalues the role of knowledge in market competition. Once more, not all members of society participate equally, and institutions that were founded to secure a more egalitarian society are under severe strain. Nevertheless, in delineating the key features of contemporary thinking about regional economies and introducing the idea of knowledge laboratories, the intention behind the book is to supply an alternative way of thinking and acting upon the regional problem. This means fostering an appreciation of the importance, not of borrowing yester-

day's tired development recipes, but of creating relevant futures from the transdisciplinary interaction of local and global knowledges, embracing the key idea of modern regional analysis and policy being guided metaphorically by an image perhaps inspiring the institutionalization of laboratory experimentation of an open, social scientific kind.

ACKNOWLEDGEMENTS

Thanks to Sally Hardy and the Regional Studies Association (RSA) for inviting me to be a gatekeeper for the 'Knowledge Economy' track at the RSA Pisa Conference in April, 2003. Thanks also to Andrea Piccaluga for sharing the burden of running the track and editing this book. Nicola Bellini and Daphne Kooistra were fine hosts on my arrival in Pisa. I was personally delighted to meet so many old friends and make some new ones at the conference. Finally, I'd like to thank Roel Rutten for sending improving comments on this introductory chapter.

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