This book introduces a new perspective on the knowledge economy and the learning challenge it presents for individuals, communities and societies. It demonstrates that the debate about the role of knowledge in the economy has been framed in terms of Cartesian notions of objective and subjective knowledge and human capital notions that the aim of learning is to support people to adapt to a pre-given economic reality. The book argues that these framings rest on questionable assumptions about knowledge and learning and, in the process, deflect us from asking questions about our future economic, political and social direction. Taking ideas from Cultural Historical Activity Theory (CHAT), Social Theory and the Philosophy of Mind as its starting point, the book rethinks the relation between knowledge, learning and human activity. It explores this rethinking through the form of learning – Professional, Vocational and Workplace – most closely associated with the use of knowledge for economic, political and social purposes. The book will be of interest to: (i) social scientists concerned with debates about the knowledge economy/society; (ii) educational researchers/policymakers concerned with the relation between education and knowledge economy; (iii) anyone interested in CHAT; and (iv) undergraduate, Master and Doctoral students studying any of the above issues.
The Learning Challenge of the Knowledge Economy
The Knowledge Economy and Education
Volume 3

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Scope:
The aim of this series is to provide a focus for writers and readers interested in exploring the relation between the knowledge economy and education or an aspect of that relation, for example, vocational and professional education theorised critically.

It seeks authors who are keen to question conceptually and empirically the causal link that policymakers globally assume exists between education and the knowledge economy by raising: (i) epistemological issues as regards the concepts and types of and the relations between knowledge, the knowledge economy and education; (ii) sociological and political economic issues as regards the changing nature of work, the role of learning in workplaces, the relation between work, formal and informal learning and competing and contending visions of what a knowledge economy/knowledge society might look like; and (iii) pedagogic issues as regards the relationship between knowledge and learning in educational, community and workplace contexts.

The series is particularly aimed at researchers, policymakers, practitioners and students who wish to read texts and engage with researchers who call into question the current conventional wisdom that the knowledge economy is a new global reality to which all individuals and societies must adjust, and that lifelong learning is the strategy to secure such an adjustment. The series hopes to stimulate debate amongst this diverse audience by publishing books that: (i) articulate alternative visions of the relation between education and the knowledge economy; (ii) offer new insights into the extent, modes, and effectiveness of people’s acquisition of knowledge and skill in the new circumstances that they face in the developed and developing world, (iii) and suggest how changes in both work conditions and curriculum and pedagogy can led to new relations between work and education.
The Learning Challenge of the Knowledge Economy

David Guile
Institute of Education, University of London, UK
DEDICATION

TO MICHAEL
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Our common interest at that time – the theory–practice interface – is the central concern of this book, and continues to inform our, all too often, highly animated, conversations about this issue. This interest is primarily a product of our shared sociological and educational curiosity about the ways in which different forms of knowledge contribute to the continuing economic, political and social development of human societies and human beings. In particular, we both agree that it is important to distinguish between forms of knowledge in terms of their similarities and differences, and to use this differentiation as the basis for addressing the theory–practice relation, rather than to elide them in an attempt to eradicate the theory–practice divide. Where Michael and I tend to differ is over the extent to which this is primarily an epistemological as opposed to a joint epistemological and ontological project.

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knowledge economy – recognising that we live in a mediated rather than a natural world and learning how to work with others and use different forms of knowledge to contribute to the continual transformation of that world – and to outline a framework that educational institutions and workplaces could use to support people who are working in the rough ground to address that challenge.

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CHAPTER 1

THE KNOWLEDGE ECONOMY AND THE CHALLENGE FOR EDUCATION

INTRODUCTION

This is a book about arguments. One argument – that the emergence of the knowledge economy poses a new challenge for education – is likely to be very familiar to readers, because it has been extensively aired in a number of popular texts (Gladwell, 2005; Leadbetter, 1999; Wolf, 2002) and well-publicised policy documents (European Commission, 2000; OECD, 1996; World Bank, 2003). Though couched in quasi-Enlightenment terms that stress the importance of knowledge as the key economic resource to support the future development of societies and, as such, undoubtedly reflecting a genuine attempt by policymakers worldwide to foster a more informed populace, it is in essence a narrowly conceived economic argument. This conventional argument treats people as forms of human capital that can be rendered more or less productive in the economy depending on the extent of their knowledge, as represented by the level and domain of their qualifications.

The alternative argument, whilst accepting the premise of the former, maintains that the new role of knowledge in economies of advanced industrial societies has been unconsciously framed in terms of what the book calls, ‘the two worlds view of knowledge’ (that is, objective knowledge of natural, physical and social structures, or subjective knowledge of feelings, emotions and conditions), and that this framing is based on unexplicated epistemological, ontological assumptions that raise pedagogic questions and issues that have not yet been addressed by researchers and policymakers, and so this discussion is likely to be new to readers.

In making its argument, the book draws on a number of writers from different disciplines whose work either pre-dated the discussion about the new role of knowledge in the economy, or who have never engaged with that debate, or have drawn radically different conclusions about the implications of the knowledge economy. In bringing their work together, what emerges is the cultural entailment of the economic account of the role of knowledge in the economy and in society. This argument has affinities with, yet differs from, the recent interest in Sociology (du Gay & Pryke, 2002) and Geography (Thrift & Amin, 2003) in the concept of the ‘cultural economy’. The primary concern of such writers has been to argue that whilst it may be valuable analytically to separate the economic and the cultural, they are nonetheless related fields of human activity. We accept this premise into our argument, although the cultural account of the knowledge economy developed here is based on the tradition of social practice rather than an integrated system. The difference between this approach and the position adopted by the geographers and sociologists is that we maintain that individuals and societies are constituted
rather than influenced by culture. This position enables us to offer a radically different angle on why the emergence of the knowledge economy poses a qualitatively different learning challenge for advanced industrial societies compared with the current conventional wisdom.

_The conventional wisdom about the knowledge economy and education._ The origins of the first argument lie in the widespread consensus amongst many writers that epochal global economic and technological changes have been occurring in advanced industrial economies since the mid-1950s and that, as a result, we now live in a ‘risk society’ (Beck, 1992), an ‘information’ society (Castells, 2000), a ‘knowledge society’ (Stehr, 1994), and so forth. The particular strand of epochalism that has fuelled the first argument is the ‘knowledge economy’ thesis; that is, the claim that knowledge rather than land, labour and capital is now the most important factor of production (Osborne, 1998, p. 17). The term ‘knowledge economy’ was first coined in the late 1960s by Drucker (1969, p. 263) to refer to the application of knowledge from any field or source, new or old, to spur economic development. The subsequent debate about the role of knowledge in the economy, which only took root from the late 1970s, has fractured over the years. One strand follows the argument first promulgated by the social theorist Bell (1973), that theoretical knowledge is the most important form of knowledge in the economy: a position that underpins the current global concern for supporting science, technology, engineering and mathematical (STEM) research. The other strand follows the argument first put forward by the management theorist Lundvall (1996), that tacit knowledge is the most important form of knowledge.

Despite the existence of these two views concerning which type of knowledge is important in the economy, policymakers internationally have tended to accept the former position. At the present time, the most obvious manifestation is the global consensus that science, technology, engineering and mathematics (STEM) subjects are critical to economic prosperity and hence should be the major recipients of research grants.

A major influence on policymakers’ thinking as regards the educational response to the knowledge economy was Robert Reich’s book _The Work of Nations_ (1991). Reich fused the social theorists’ case for the new role of knowledge in the economy and the emerging case for globalisation into a compelling argument that the challenge for advanced industrial nations was to position themselves to secure ‘high skill’ work, because they could no longer compete with newly industrialising nations on the basis of price alone. Reich advanced the distinctive thesis that the economies of the future would be education-led and, as a consequence, that the challenge for national education and training systems would be to develop the new forms of human capital – ‘symbolic analysts’ (i.e. people with the ability to manipulate abstract forms of knowledge) – which he maintained were integral to high-skill work.

The idea that we now live and work in a knowledge economy and/or society has gained increasing prominence over the last decade amongst national and supranational policymakers worldwide (European Commission, 2000; National Committee of Inquiry into Higher Education, 1997) and amongst transnational
organisations concerned with economic growth (OECD, 1996; World Bank, 2003). The concept of the knowledge economy has come to constitute, paradoxically, both an ‘imaginary’ (Jessop et al., 2008) and a ‘pre-given’ reality (Guile, 2006): a quasi-enlightenment vision of economic progress and a new reality that we must adapt to through attaining a higher level of qualification.

One of the most well-known expressions of the ‘learning’ policy position is found in the European Commission’s Lisbon Memorandum (European Commission, 2000). This memorandum led to the concept of a knowledge economy being deployed in European Union (EU) policy literature in two senses. It provided a vision of the purpose of all future European economic activity, but also intertwined this vision with a policy for lifelong learning. The most highly influential expression of the readiness position is the development by the World Bank (2008) of its Knowledge for Development (K4D): Knowledge Assessment Methodology (KAM). The KAM is an interactive, diagnostic and benchmarking tool that the World Bank is actively encouraging countries and regions to use, to provide a preliminary assessment of the knowledge base of their economies. This will be expressed in terms of the volumes of knowledge-based products and services generated by their economies and qualifications held by their populaces (Robertson, forthcoming).

Despite invoking lifelong learning and knowledge-based products and services as the cornerstone of educational and economic policy, the new argument presented here is that policymakers and transnational agencies have only partially understood the new role of knowledge in the economy and, as a result, only partially grasped the learning challenge of the knowledge economy.

Problems with the conventional wisdom. Policymakers and transnational agencies have only partially grasped the implications of the new role of knowledge in the economy (and by extension more widely within society) because they have both concentrated on one aspect of the account of the new role of knowledge. In the process, they have treated knowledge as an abstract entity that is separate from both the social practices responsible for its codification and its deployment as a resource to generate new products and services in the economy. Moreover, on the rare occasions when they do acknowledge the role of tacit knowledge, they quickly fall back on the language of codification to explain the purpose of that form of knowledge in the economy (Allen, 2002). This interpretation of the social and management theorists’ positions about the new role of knowledge in the economy leaves the debate, at the research level, floundering. On one side is the relative importance of theoretical knowledge (Cowan et al., 2000) compared with tacit knowledge (Johnson et al., 2002), and on the other is the extent to which workers are empty vessels who need to be ‘filled up’ with more knowledge or possess ‘hidden’ forms of knowledge that employers are disinterested in acknowledging for financial reasons (Livingstone & Sawchuk, 2003). As a consequence, very few writers have considered the relationship that the philosopher Polanyi (1958) – the figure most commonly cited by management theorists to justify the importance of tacit knowledge – maintained exists between theoretical and tacit knowledge, nor pursued the epistemological and ontological – let alone the pedagogic – implications of that relationship.
At policy level, this has led, despite the concern for STEM subjects over other forms of knowledge, to an attempt to embrace the theoretical and the tacit into a coherent position. One of the best examples of this development is the EU’s three-fold definition of learning: formal learning (i.e. learning that occurs in a structured context and that results in nationally recognised qualifications); non-formal learning (i.e. learning that is embedded in planned activities that are not explicitly designated as learning) and informal learning (i.e. learning that arises from daily life experiences, that traditionally does not lead to certification but may be subject to some form of accreditation/recognition; Colardyn & Bjornavöld, 2004). Although a seemingly progressive development – because it offers a way to acknowledge the importance of different types of knowledge and learning – the EU’s policy amounts in practice to little more than a technical exercise of accrediting or validating forms of knowledge and skill that are gained informally and/or non-formal kinds that were previously disregarded, rather than considering the implications of the relation between these forms of knowledge (Guile, 2006).

What is argued here though is that, as a consequence, policymakers and transnational agencies, along with the social and management theorists, have failed to recognise that knowledge economies and societies pre-suppose the existence of ‘epistemic’ (i.e. knowledge) cultures and activities, which foster both the production and utilisation of knowledge, and agreement about the purpose for using knowledge in economic, social and political contexts (Knorr Cetina, 2006). Hence, it is epistemic cultures and forming agreement about economic, political and social goals, not just knowledge itself, that are central not only to the economy but also to societies that ‘run on’ knowledge and expertise. These cultures constitute the settings in which new theories or new forms of knowledge are produced, and where existing forms of knowledge are recontextualised in new ways to support and/or challenge economic, social and political goals. Without these cultures and goals, there would be no knowledge economy, no experts whose knowledge can be tapped into, nor any debate about the future direction of advanced industrial societies. Furthermore, once we focus on epistemic cultures and practices, we are able to see more clearly than policymakers, transnational agencies and the social and management theorists have previously seen, that what is distinctive about such cultures is that the interdependence between different forms of knowledge – theoretical and tacit, in the same or in different disciplinary fields and professions – and the relation between knowledge and outcomes (i.e. products and services), is more explicit than at any previous point in history.

Arguments for a new learning challenge in the knowledge economy. The above argument implies that firstly, we can no longer conceive of the knowledge economy or society sui generis. Instead we should recognise that the knowledge economy/society exists only where there are cultures concerned with the production of new forms of knowledge, activity, and products and services. Hence it follows that the political challenge is to provide incentives for higher education, firms, professional associations, etc., to create more of these types of culture and/or to support the further spilling-over of extant epistemic cultures into more sections of the
economy/society. Secondly, we can infer that the conventional wisdom about the link between the knowledge economy and lifelong learning has to be rethought. Assuming that the increased demand for the ‘product’ of knowledge in the economy implies only an increased demand for an existing ‘educational product’ – (i.e. more highly qualified people) as expressed by qualifications (Young, 2000) – is unsatisfactory. It is vital to recognise that the knowledge economy/society implies a new learning challenge – the creation of cultures and practices in education and work, which assist people to mediate between different forms of knowledge in order to create new practice and objects – and this, in turn, pre-supposes a concern for pedagogy.

This line of argument entails a new challenge for educational institutions and workplaces. This three-fold challenge is to support people to:
– consider and conceptualise the relation between different forms of knowledge
– develop the cultures and practices to use extant and/or new knowledge to create new forms of economic, political and social activity
– identify the different outcomes associated with such economic, political and social activity.

Structure of the Argument

The three points above constitute the starting issues of this book, argued through a focus on the nature of this learning challenge for three particular aspects of learning – professional, vocational and workplace learning – because these forms of learning are central to transition into, continued employment in, and the transformation of the knowledge economy in a way that primary and secondary education are not. This focus enables us to consider the general issues of the relations between theoretical and tacit knowledge, the cultures and practices that support people to mediate these forms of knowledge, and the economic, social and political outcomes of mediation, through reference to their manifestation in working life.

To sustain this focus, we adopt an interdisciplinary approach. The arguments presented in Chapters 2 and 3 introduce the reader to the social and management theorists’ views about the new role of knowledge in the economies of advanced industrial societies. It also explains why this has resulted in a rather abstract focus on knowledge, separate from the forms of social practice that enable it to function in the economy in the way that the social and management theorists’ claim. We identify the origins of the debate about this new role of knowledge, in Bell’s (1973) highly influential argument that theoretical knowledge constitutes the ‘axial principle’ of innovation and economic growth in such societies. We illustrate how this argument has gained credence in the Social Sciences, as Bell’s original ideas were built on and extended by other sociologists, most notably by Castells’ (1996) treatise on the role of information in networked societies and to a lesser extent by Stehr’s (1994) argument about the role of knowledge work within such societies, and has even informed the critique from Lash and Urry (1994) that cultural knowledge is as important as science in the knowledge economy. We then examine a contrasting view of the new role of knowledge – that it is the tacit
knowledge held by workplace communities of practice that are central to economic development – that has been formulated as an alternative to the Bellian orthodoxy in the Social Sciences. Three expressions of this position, by Gibbons et al., (1994), Lundvall (1996), and Nonaka and Takeuchi (1995), are considered.

Chapter 4 is pivotal in three senses. Firstly, we start to broaden the social–scientific frame of analysis by discussing the philosophical origins of the split between theoretical and tacit knowledge in order to demonstrate why the social and management theorists offered different explanations of the new role of knowledge in the economy. We then move on to explore a hitherto under-appreciated feature of knowledge economies/societies – Knorr Cetina’s (1999) argument about the role of epistemic cultures to the production and utilisation of scientific knowledge, as well as knowledge in other professionals fields – and argue that if we are to understand the new role of knowledge in the economy and the learning challenge posed by that development, then we need to understand the ways in which culture is constitutive of economic and human development. Having noted that the distinction between theoretical and tacit knowledge is a marginal feature of discussions about the implications of knowledge cultures for professional activity, we return to the distinction between these two types of knowledge. We present an interpretation of Polanyi’s ideas about theoretical and tacit knowledge that suggests that they should be seen as interdependent dimensions of, rather than separate types of, knowledge; and we use Zuboff’s (1988) discussion of different forms of skill to consolidate this interpretation. Finally, we conclude by suggesting that we should conceive of theoretical and tacit knowledge as having a mediated (a term that we explain in Chapter 6) as opposed to a binary relation to one another, and arguing that mediation offers a different starting point for considering the learning challenge of the knowledge economy.

Before addressing this issue, it is necessary to consider the main measures that governments have taken to address the conventional wisdom about the knowledge economy. Using the UK government’s policies and measures since the 1980s, Chapter 5 considers how they have repositioned those forms of higher education most closely associated with the knowledge economy, namely professional, vocational and workplace learning (PVWL), to support people to adapt to this new type of economy. It then acknowledges that although many people involved with PVWL have made a determined effort to introduce new pedagogic strategies, referred to here as ‘pedagogies of reflection’, to help people to bridge both forms of knowledge and link them to experience, these new pedagogic strategies end up perpetuating rather than solving the problem that they were designed to address.

Chapter 6 starts with a discussion of John Dewey’s concept of reflection, which is the primary, if under-acknowledged, source of inspiration for the pedagogic developments considered in the previous chapter. The discussion points out that although Dewey had a much more sophisticated conception of reflection than the concept that has been operationalised in the pedagogies of reflection, he conceives of reflection in naturalistic terms. He sees reflection, therefore, as a strategy that we use to transact between the mental and the material, rather than a process that contributes to the development of mind as a conceptually structured capacity that
can be exercised practically and descriptively. Crucially, this means that Dewey is unable to provide us with a way to grasp the mediated relation between theoretical and tacit knowledge.

In light of this conclusion, we turn to Lev Vygotsky’s theory of cultural mediation, and the theoretical tradition that Vygotsky spawned – Cultural–Historical Activity Theory (CHAT) – to show why it constitutes a conceptual foundation that is a significant advance over Dewey’s work in addressing the learning challenge of the knowledge economy. We point out that the philosophical pre-suppositions of Vygotsky’s theory are based on the argument that all we live in a humanised rather than a natural world (i.e. one in which forms of experience are culturally and historically constituted). Hence it provides a way to: (i) overcome the philosophical separation and relation between both mind and world, and theoretical and tacit knowledge; (ii) explain the cultural–historical genesis of mind and action; and (iii) identify the pedagogic practices that facilitate the mediation of different forms of knowledge and action.

The implications of Vygotsky’s theory of cultural mediation for our understanding of learning is extended and elaborated in Chapter 7 through focusing on a number of writers – Aleksei Leont’ev, James Wertsch, Jean Lave and Etienne Wenger, and Yrjö Engeström – who are widely acknowledged in CHAT for having made significant contributions to the development of mediated conceptions of learning. Readers familiar with the field of CHAT may feel that coining the term post-Vygotskians to reflect the idea of this unifying link between Vygotsky and the work of the aforementioned writers is pejorative, since CHAT abounds with a proliferation of terms that have been very carefully defined to demarcate a theoretical position, and there are significant differences of opinion among writers (Cole, 1996; Daniels, 2001). Nevertheless, we show that the post-Vygotskians’ distinction between ‘mediation by activity’ and ‘semiotic mediation’ allows us: firstly to introduce, respectively, the role of objects, practices and discourses more explicitly into our understanding of mediation; secondly to identify a number of ways in which practice can develop and, in the process, make a link between mediation and epistemic cultures; and thirdly to broaden Vygotsky’s original ideas about the mediated basis of learning. We note that in doing so the post-Vygotskians lose sight of Vygotsky’s concern for the central role of reason in the process of mediation.

To restore reason to our argument about the mediated basis of learning, we consider the work of three philosophers in Chapter 8 – Evald Ilyenkov, John McDowell and Robert Brandom. Despite their historical and intellectual separation, we maintain that they have collectively addressed epistemological and ontological issues about the concept of reason that enable us to: (i) re-establish the relation between mediation by activity and semiotic mediation that was an integral, albeit implicit, feature of Vygotsky’s theory; (ii) identify a number of key facets of mediation – restructuring, repositioning, recontextualisation and reconfiguration – that were either a relatively underdeveloped feature of Vygotsky’s original theory or that arose from the work of the post-Vygotskians; and (iii) identify a number of expressions of the development of activity – evolve, laterally branch and transform – that emerged from that discussion.
We use these four facets of mediation and three expressions of the development of activity, along with our argument about the centrality of reason to mediated thinking and acting, to outline in Chapter 9 a conception of learning that is based on understanding the iterative relation between concepts, reasons and action. We conclude that our mediated expressions of learning will play an invaluable part in our reformulation of PVWL.

In the last chapter, we summarise the ways in which the different strands of the argument presented in the book have turned the conventional wisdom about the learning challenge of the knowledge economy on its head. We then argue that a shift has to occur in the tenets that underpin PVWL. This shift is from a concern for adaptation, reflection and qualifications, and towards mediation, objects and reason. We conclude by highlighting the challenge that those parties involved in PVWL will face if they are to enact those tenets and thus address the learning challenge of the knowledge economy.

Given that the cultural–historical tradition that informs the argument presented in this book has been viewed by some writers as having being superseded by the development of neuroscience, the book contains an Afterword. This Afterword recognises the breakthroughs made in neuroscience but reclarifies why the book’s core concerns are unlikely ever to be addressed by these breakthroughs. These concerns are to support people to:

- consider and conceptualise the relation between different forms of knowledge;
- develop the cultures and practices to use different forms of knowledge to create new forms of economic, political and social activity;
- identify the different outcomes associated with such economic, political and social activity.
CHAPTER 2

SCIENTIFIC KNOWLEDGE AND THE ECONOMY

INTRODUCTION

We start our exploration of the claim that knowledge in the form of science has become the major factor in economic development by discussing Daniel Bell’s book, *The Coming of Post-industrial Society: A Venture in Social Forecasting* (1973), because Bell’s argument that scientific knowledge is now the ‘axial principle of economic development’ has shaped much of the subsequent debate in the Social Sciences about knowledge economies and/or societies. We trace Bell’s legacy in two major contributions to the sociological debate about the knowledge economy – Manuel Castells’ treatise on the emergence of the ‘information age’ (Castells, 1996) and Nico Stehr’s discussion of ‘knowledge work’ (Stehr, 1994) – before concluding by considering the case presented in Scott Lash and John Urry’s book, *Economies of Signs and Spaces* (Lash & Urry, 1994) that cultural knowledge is as important as science in the knowledge economy.

Scientific Knowledge and Industrial Change

*Introduction*

Prior to Bell’s publication, the role of science in the economy was either viewed as an enabling or potentially subversive element in the process of industrialisation (Kumar, 1995; Touraine, 1969). The more Utopian perspectives on industrial society (which are associated with Comtian-influenced sociologists) viewed science as though it constituted some form of ‘enlightenment’ (Osborne, 1998, p. 43). They stressed that the application of the logic of science supports the creation of a rationally organised and planned society and, moreover, that this development leads to the replacement of all irrational and particularistic forms of power. In contrast, the more critical perspectives (which are associated with Marxist-influenced sociologists) viewed science either as a form of ‘exploitation’ or as a form of ‘emancipation’ (Kumar, 1995, p. 5). The former linked science to the economic, political and military power bases in society and argued that this linking provided the ruling elite with a means to legitimate their specific interests. The latter conceived of Marxism as a form of science that provided a framework for predicting the trajectory of change within societies.

Despite the existence of these two radically different interpretations of the contribution that science could make to the development of industrial societies, both the ‘Utopian’ and ‘critical’ theories shared certain assumptions about the character of industrial societies, though they differed about the consequences for economic,
political and social development. They both emphasised that land, labour and capital were the most important factors of production, that industrialisation was dependent on their exploitation to produce surplus value to fuel future investment. Where they clashed was when considering how the fruits of industrialisation should be allocated within society (Kumar, 1995). Consequently, until the 1970s, sociologists concentrated primarily on the industrial relationships that helped to shape or challenge the process of production, rather than on the ‘technological application of science’ that was underpinning the rapid development of new industries.

The shift from an industrial to a post-industrial society. The shift in the sociological debates about the critical resources for economic development started to take place after the publication of Daniel Bell’s (1973) book *The Coming of Post-industrial Society*. Bell used the term ‘post-industrial society’ to explain the trends he believed were responsible for fundamentally changing ‘the social framework of Western society’ in the late 1960s and early 1970s. He described his book as an ‘essay in social forecasting’ (Bell, 1973, p. 3), because it represented an attempt to make sense of the extensive empirical evidence he had amassed about a number of changes in industrial society. Bell drew particular attention to the gradual break-up of what he referred to as ‘family capitalism’ in industrial society and the changing composition of the labour force, as evidenced by growth in the ‘tertiary’ (i.e. leisure, travel and tourism, entertainment), ‘quaternary’ (i.e. education, medicine, social services, environmental health) and ‘quinary’ (i.e. regulatory bodies) sectors. He maintained that such, ‘changes in the social structure posed questions for the rest of (industrial) society’, because these changes were resulting in a highly specialised division of labour, the emergence of a new ‘technical’ mode of management and the escalating influence of science and technology on everyday life in industrial societies (Bell, 1973, p. 13).

Unlike Marx and many other sociologists such as Tocqueville and Weber, who, according to Bell, had sought to provide a ‘general theory of social causation’ (1973, p. 10) that was applicable to all industrial societies, Bell tried to develop an analytical framework that ‘specified not causation but centrality’. In other words, he was positing a method of analysis that allowed him to identify the ‘organising frame’ that enables societies to change without pre-supposing the outcome of that change (Bell, 1973, p. 10).

To clarify his ideas about the transformation that was occurring, Bell contrasted the different types of economic problem faced by an industrial society with the problems faced by what he called the emerging post-industrial society. The chief economic problem that had confronted societies that were beginning to industrialise was that they had to, ‘engage in a game against nature’ (Bell, 1973, p. 116). By this he meant that the process of industrialisation involved societies using steam power to transform the ‘natural environment’ into a ‘technical environment’. This pattern of development implied that the most important sectors in industrialising societies were primary sectors, such as mining and farming, that directly supported the transformation of the environment, rather than secondary sectors, such as engineering and technical or semi-skilled factory work, that were directly involved
with product design and product manufacture. Consequently, for Bell, the chief
economic problem faced by industrial societies was the generation of sufficient
financial capital to produce and manufacture goods and services (Waters, 1996),
since economic development in industrial societies relied on ‘machine technology’,
that is, the application of manufacturing technology within the process of
production.

In contrast, Bell argued that post-industrial societies confronted an entirely
different set of circumstances. The primary reason for this change was that economic
development increasingly rested on ‘intellectual technology’ (Bell, 1973, p. 116).
Intellectual technology had, according to Bell, two distinctive features: the use of
scientific knowledge to specify ways of doing things in a reproducible manner;
and the substitution of problem-solving rules (i.e. algorithms) for intuitive
judgements. What was distinctive about the new intellectual technology, for Bell,
was the collective effort on behalf of policymakers, technocrats and managers
to both define rational action and to identify a means for achieving it. Thus, social
planning was, for Bell (1973, p. 30), a logical, practical and instrumental
process that was determined by the accuracy and precision of the application of
knowledge.

*Scientific knowledge as the ‘axial principle’ of society.* Although he accepted
that some form of knowledge had always been central to the functioning of any
society (in the sense that knowledge is an anthropological universal), Bell (1973,
p. 164) argued that what was distinctive about post-industrial societies was the
change that had occurred in the character of knowledge itself and in the role that
it played. He identified this as the ‘axial principle’ of the post-industrial society,
namely the, ‘centrality of theoretical knowledge as the source of innovation and
policy formation for that society’. This axial principle of the social structure of post-
industrial societies refers to the application of codified knowledge, i.e. theoretical
or scientific knowledge. (Bell employs the terms interchangeably.) The major
change, he claims, is that societies are now dependent on theoretical knowledge
as a source and mode of innovation, a development that was particularly apparent
in the, ‘new science-based industries… computers, telecommunications, optics,
polymers and electronics’ (Bell, 1973, p. 23). Such industries are, in contrast to
erlier models, dependent on the codification of knowledge into abstract systems
of symbols that support further innovation and hence the development of new
goods and services.

Bell justified this claim by arguing that the exponential growth that had occurred
in government-funded research and development (R&D) constituted evidence of the
role of knowledge as the axial principle of economic development. He acknowledged
that, although the conventional wisdom of the late 1960s and early 1970s accepted
that expenditure on R&D constituted a ‘financial’ measure of the growth of science
and technology within society (Bell, 1973, p. 250), there were ‘analytical problems’
if expenditure on R&D was related to economic growth, scientific productivity and
innovation. Nevertheless, Bell (1973, p. 250) argued that it was still possible to
employ ‘a simple indicator’ relating knowledge and economic growth. He defined
CHAPTER 2

this simple indicator as, ‘…the commitment of a country to its scientific and technological potential by the expenditure on R and D [scientific research and development] and, to a secondary extent, on education’.

To illustrate this argument, Bell highlighted how expenditure on R&D in the USA had multiplied by 15 times since the end of the Second World War and argued that this increase had become a symbol to which other countries aspired. Thus Bell concluded that, despite the analytical problems associated with the measurement of knowledge and technology, the revolutionary nature of the new intellectual technology was the driving force behind the shift from industrial to post-industrial societies. This momentum would be sustained, according to Bell, because the sources of innovation were increasingly derived from the research and development agencies. In making this case, Bell extended the factors to be considered within what is referred to as the ‘rational choice framework’ for innovation (Lundvall, 1996). That framework, up until then, consisted of the following inputs – technology, land, labour and capital – Bell now added a fifth factor – knowledge – and, moreover, maintained that it was now the main factor of economic development.

Because he was primarily concerned with what he referred to as, the ‘social utility’ of knowledge, Bell (1973, p. 175) defined knowledge as:

…a set of organised statements of facts or ideas, presenting a reasoned judgement or an experimental result, which is transmitted to others through some communication medium in some systematic form.

This is a fairly ‘restricted definition’ because ‘knowledge’ is limited to a form of ‘intellectual property’ (1973, p. 175) that is either certified by copyright or through some form of social recognition (for example, a publication). This definition is consistent with Bell’s (1973, p. 349) claim that modern societies only survive through a process of constant innovation and by using knowledge to anticipate the future and to plan ahead, because they now have to live by innovation and growth, and theoretical knowledge serves a dual purpose in society. On the one hand, it is central to the process of innovation; on the other hand, it is central to planning and forecasting.

One consequence of the new role of knowledge in society is the change in relative importance of different industrial sectors. Initially, Bell identified two shifts in the division of labour as a result of this trend (Waters, 1996, p. 113). The first shift was a move towards a service economy, that is, a growth in the number of white-collar employers in the ‘co-ordination sectors’ of the economy (for example, banking and finance) and a corresponding growth in the number of people employed in personal and leisure services. The second shift was the emergence of new, specialised enterprises such as computing companies and the corresponding development of new, specialised occupations, for example, software engineers.

Taken in combination, Bell argued that the shift towards a service-sector economy and the increased application of knowledge as a source of economic value constituted a profound transformation in industrial societies. He claimed that instead of the character and wealth of society being determined in terms of a labour
theory of value, as traditionally accepted by social scientists, post-industrial societies
are being determined by a ‘knowledge theory of value’:

...when knowledge becomes involved in some systematic form in the applied
transformation of resources (through invention and design), then one can say
that knowledge, not labour, is the source of value.

(Bell, 1979, pp. 167–8)

Thus, it is the application of knowledge at every stage of the production process
(i.e. conception, realisation and distribution) that is responsible for determining the
value of a particular good or service. Furthermore, unlike many social theorists of
his time or later, Bell raised the implications of his thesis for the content of education.
He argued that national systems of education would have to foster a stronger sense
of scientific inquiry amongst students from primary education onwards.

Bell’s thesis that knowledge constitutes the axial principle of economic
development has, as we are about to see, been recast and reinvigorated over the
subsequent decades. One of the most notable attempts is Manuel Castells’ The Rise
of the Network Society (1996), which moves beyond Bell’s analysis and pins down
the implications of the revolution in information and communication technology
(ICT) for advanced industrial societies.

Technology and Societal Change Society

Introduction

Two decades passed between the publication of Bell’s book and Castells’ The Rise
of the Network Society. This trilogy has been heralded as the single most important
analysis of the state of the world produced by a sociologist in at least a generation
(Calhoun, 2000; Lyon, 2000; Touraine, 2000; Webster, 1997a). It contains three main
lines of argument. The first is a continuation of Bell’s argument that knowledge
(in Castells’ terms, information generation, processing and transmission) has
superseded land, labour and capital as the fundamental sources of productivity and
power. Castells goes a step further than Bell and maintains that this has resulted in
the emergence of a new economic paradigm – an ‘informational’ economy. The second
extends his analysis by introducing two further propositions about this new
paradigm: it is ‘global’ and ‘networked’. Thirdly he argues that the emergence of
this global and networked informational paradigm is simultaneously hastening an
integration of world affairs and bringing about increased social fragmentation,
since it has a very uneven impact within and between societies and regions.

Castells’ debt to Bell. Castells traces the emergence of the ‘information age’ to
the period of economic crisis in the 1970s, which marked the end of what has often
been referred to as the ‘post-war’ settlement (Webster 1997a, p. 71). By taking this
period as his starting point, Castells recognises that he is entering similar territory
to that covered by a:

...well-established tradition in theories of postindustrialism and informationalism,
starting with Alain Touraine and Daniel Bell, [of placing] the distinction between
pre-industrialism, industrialism, and informationalism (or postindustrialism) on a different axis than the one opposing capitalism and statism (or collectivism, in Bell’s terms)... [in order to] maintain analytical distance and empirical interrelation between modes of production (capitalism, statism) and modes of development (industrialism, informationalism).

(Castells, 1996, p. 14)

Castells takes great pains to acknowledge the affinities between the theoretical and empirical basis of Bell’s analysis of the contribution of theoretical knowledge to the development of the post-industrial society and his own analysis of the contribution of information to the development of networked societies. He demonstrates his indebtedness to Bell in three ways. He acknowledges Bell as a ‘forebear of informationalism’ (Castells, 1996, p. 26). He also adopts explicitly Bell’s definition of knowledge as a set of organised statements of facts or ideas that have been worked up through a process of reasoned judgement or empirical study and communicated in some systematic form:

I have no compelling reason to improve on Daniel Bell’s own definition of knowledge.

(Castells, 1996, p. 17)

Finally, he consolidates his debt to Bell’s fairly traditional conception of knowledge by adopting a definition of information that is more or less congruent with Bell’s use of the term, when he defines information as, ‘data that have been organised and communicated’ (1996, p. 17). Castells, however, relates the increased demand for knowledge and information (and also its increased production) to the revolution that has occurred in information and technology. Although he acknowledges the key role of science in generating the theories and concepts that are responsible for the ‘technology revolution’ (Castells, 2000, pp. 6–7), Castells is chiefly concerned with, ‘the secondary elaboration of data (information) rather than its genesis in scientific activity’ (Muller, 2001, p. 287).

Castells is interested in the continued application of science in the form of technology because post-industrial societies were characterised by tremendous advances in computing technology. There are similarities between his views and Bell’s view of technological change, because Castells accepted Bell’s definition of technology as, ‘the use of scientific knowledge to specify ways of doing things in a reproducible manner’ (1996, p. 30). Nevertheless, writing twenty years after Bell, Castells focuses on the impact of ICT on society rather than on the automation of production. In common with other writers (Forrester, 1985; Lash & Urry, 1994; Dosi, 1988), Castells argued that ICT was characterised by:

...incomparable memory storage capacity and speed of combination and transmission of bits... [thus, they offer] ...substantially greater flexibility, feedback, interaction and reconfiguration of data, [and] on-line communication, combined with flexibility of text, allows for ubiquitous space/time programming.

(Castells, 2000, p. 30)
It is the knowledge and information (Castells often uses the terms interchangeably or together, i.e. as ‘knowledge-based information’) generated by ICT that constitute the critical resource to transform economic activity.

*Information as the mode of development.* Castells, like Bell, firstly insists that social and economic change can be analysed by looking at the relationship between production and development, and secondly develops his position in opposition to his own Marxist past (Webster, 1997b, p. 79). He contrasts the Marxist concept of the capitalist mode of production with his own concept of the ‘ informational mode of development’ to argue that a dual shift has occurred in capitalist economies. The first is the move away from a mode of production whose primary aim was to maximise output in order to produce surplus profit, towards a new sociotechnical paradigm – an ‘ informational mode of development’ (Castells, 1996, pp. 61–5). Castells claims that this presents modern economies with a new way of creating a given level of wealth, because it is based upon new principles that have led to changes in the organisation of work. The second shift is that, whereas industrialism was focused on maximising output, informationalism is focused on technological development and the generation of data. In other words, ‘ informationalism’ is concerned with the accumulation of wealth through the continuous transformation of existing technologies themselves and through the generation of data that can be used to enhance the performance of those technologies. Informationalism presupposes the constant development of knowledge. This process, according to Castells (1996, p. 17), not only supports technological innovation, the ever-increasing application of technology and higher levels of complexity in information processing, but also supports increased productivity and profitability.

Castells rests his case for the informational paradigm on five specific features of the new information and communication technologies. The features of these new technologies can be summarised as follows. They:
- act on information, the new raw material of economic activity, not just technology as in earlier technological revolutions;
- are pervasive: they become an integral part of all human activity since all processes (i.e. economic, social, cultural, political) are shaped by the new technology;
- extend the possibility of the networking logic to all parts of the economy;
- can be used flexibly, thus allowing organisations to fundamentally alter, re-arrange and modify technological components;
- engender industrial and technological convergence, since new integrated information systems are emerging that embody computing and telecommunication technology and are leading to the creation of new industries, new products and new forms of knowledge.

*(summarised from Castells, 1996, p. 61; 2000, pp. 70–71)*

Hence Castells argues that the new information technologies provide the technological basis for a new type of economy. Initially, in the first edition of *The Rise of the Network Society*, he claimed that this new economy had two intertwined
and distinguishing features. It was informational: the productivity of the units or agents in this economy, whether firms, regions or nations, fundamentally depends on their capacity to generate, process and apply knowledge-based information efficiently. Hence, the economic challenge is to find ways to realise more of the productive potential in mature industries and economic activities, such as car manufacturing, or in emerging scientific fields, such as genetic engineering (Castells, 1996, pp. 47–50); and, it was global: the core activities of production, consumption and circulation, as well as their components – capital, labour, raw materials management, information technology and markets – were organised on a global scale. In the second edition of the book, Castells introduces a third feature by explicitly developing a theme that was an implicit aspect of his earlier argument. He argues that the new economy is also a networked economy, because in the new informational paradigm, productivity is generated through, and played out in, a global network of interaction and not just a national context. Castells acknowledges though that this informational and networked pattern is an inherently uneven phenomenon often exacerbating existing differences between regional economies (Calhoun, 2000, p. 35).

One of the defining features of the new paradigm in Castells’ (1996, p. 67) view is that the products of the new information technology industries are information-processing devices or information processing itself: ‘the action of knowledge upon knowledge itself (is now) the main source of productivity’. Thus, from his perspective, a decisive shift has occurred in the nature of economic activity and the role of knowledge within that activity. However, instead of perceiving economic activity as relying primarily on the theoretical knowledge produced in universities and research institutes, as Bell postulated, Castells introduces a new focus. He argues that economic activity is inextricably tied up with the tremendous advances that are continually occurring in information-processing technology. Information processing in the private and public sectors, as he explains, focuses on:

...improving the technology of information processing as a source of productivity, in a virtuous circle of interaction between the knowledge sources of technology and the application of technology to improve knowledge generation and information processing.

(Castells, 1996, p. 17)

The result, for Castells, is that the spatial and temporal nature of work is being profoundly transformed because the new technologies serve as a conduit to transmit and process information in a rapid but fairly unproblematic way. He points out that until the information technology revolution occurred, human experience had been historically rooted, socially organised and constrained by spatial location. He maintains that space and time have been radically transformed by the combined effect of informationalism and the new economic activities associated with that paradigm. Castells (1996, p. 412) invokes the term the ‘space of flows’ to encapsulate the idea of the ‘material organization of the time-sharing social practices that work flows through’. By ‘flows’, Castells means the purposeful, programmable sequences of exchange and interaction that are experienced as occurring horizontally between
communities and individuals. The phrase ‘time-sharing social practices’ refers to the way in which distinctive types of social practice, R&D, production and distribution, have been brought together in such a way that they come to share a work culture and instrumental goals aimed at producing new knowledge, new processes and new products.

He notes that this development has had a number of effects and is contributing to the transformation of economic activity. Instead of companies specialising in all aspects of production, distribution and marketing, corporations form strategic alliances, enter into licensing and subcontracting arrangements and either transform operating units into networks or create temporary networks to create new products and services (Castells, 1996, p. 65). It is also resulting in networks becoming the context for the exchange of commodities such as ‘know-how’, technological capability or a particular approach or style of production whose value is not easily measured. This is partially happening because it is not always easy in the market to exchange novel technological know-how, consequently the locus of innovation lies ever more in inter-organisational relationships that are based not on written contracts but on the norms of reciprocity that reflect the, ‘complementarity of the knowledge, resources and interests of the actors’ (Powell, Koput & Smith, 1996, p. 119). The space of flows is also contributing to the creation of a culture of ‘real virtuality’, where all manner of media are combined into a single hypertext system – text, visual image, aural communications – and become the basis of new products and/or new services; for example, MySpace, which can be endlessly reconfigured by producers and users, and Facebook, which can support virtual social networking.

The significance of the preceding discussion for our argument is to show why Castells’ three interconnected concepts – informationalism, globalisation and networks – constitute a compelling series of metaphors that can be used to identify the changing character of the global economy and work in that economy. The latter issue is however treated at a very general level in Castells’ trilogy (Thrift, 2004). For this reason, we now consider the work of Nico Stehr.

Knowledge Societies and Knowledge Work

Introduction

Writing, like Castells, twenty years after Bell’s thesis about the onset of the post-industrial society, Stehr highlights another manifestation of Bell’s argument that theoretical knowledge constitutes the axial principle of economic development. Instead of following Bell and concentrating on the current ways in which science and scientific research are applied to the organisation of production, Stehr draws attention to two subsequent developments. First, the ways in which governments and corporations have organised societies to support the further production and application of scientific knowledge. Second, the way in which this development has impacted on the organisation of work.

Knowledge and knowledge work. The outcomes of scientific research (for example, the data and systems that emerge from natural and physical sciences as much as social
and human sciences) produce and reproduce the knowledge structure of society, and Stehr describes this process as the ‘scientisation’ of production and consumption (Stehr, 1994, pp. 10–11). The idea that theoretical knowledge has now penetrated into every sphere of modern society and, in doing so, has dramatically enlarged the available options for social action in cultural, economic, political and social life, paves the way for Stehr to discuss the role of knowledge work in advanced industrial societies.

The term ‘knowledge work’ was originally coined by Machlup in the early 1960s to distinguish knowledge work from other forms of work. Machlup is often wrongly interpreted as arguing that knowledge work was a new phenomenon; the substance of his argument was, however, that there were now more knowledge workers than ever before (Cortada, 1998, p. xvi). He defined knowledge work as those forms of work that were responsible for processing and transmitting types of knowledge, and which helped people to learn something they had not known previously. Thus Machlup operated with a very broad definition and this led him to, for example, count a clerical worker as a ‘knowledge worker’.

Based on his argument about the scientisation of society, Stehr (1994, p. 179) questions whether it is meaningful to identify clerical or similar types of work as knowledge work. He further argues that we should define knowledge work by differentiating between the extent to which such work involves the production of new theoretical knowledge, or the accumulation of additional information in a given occupational field, to either improve or monitor the productive process, rather than continuing to use definitions of knowledge work that are merely concerned with the processing and transmission of such knowledge.

Although couched in different language, Stehr’s ideas about knowledge work have many affinities with Beck, Giddens and Lash’s argument (1994, p. vi) about the development of a much more ‘reflexive’ global culture. For them, national institutions such as universities, corporations and individuals use knowledge to reflect critically on their own social practices and the wider social practices in which they are inevitably bound up, as well as to continue the traditional scientific/social scientific approach of the radical problematising of pre-suppositions and practices.

For Stehr, Giddens’ (1990, p. 17) notion of ‘expert-systems’ offers a way to pursue the implications of these developments. Giddens uses this term to explain the growth of systems of technical and/or professional expertise that are responsible for either organising large areas of the material and social environments in which we live in traditional institutional settings, for example, government agencies, or in emerging institutional settings, for example, counselling and therapy services that assist us to survive in that environment. Such knowledge workers are, according to Stehr, differentiated from other types of workers by the purpose of their work, such as the principles behind the application of knowledge, rather than broad-based measures, like job descriptions. Based on this line of reasoning, Stehr (1994, p. 183) concludes that knowledge work can be defined in terms of those who:

…consult, provide guidance to others, counsel, or give expert advice, as the group of occupations engaged in the transmitting and applying of knowledge.
This definition reflects not only Stehr’s (1994, p. 95) idea that knowledge constitutes a ‘capacity for action’, but also Giddens’ idea that certain forms of work have developed to assist people use knowledge reflexively (i.e. consider options) to address political, professional and personal issues – a paradigmatic example would be management consultants. As a consequence, both writers adhere to an intra-professional conception of knowledge work. From this perspective, knowledge work pre-supposes that experts use the principles that underpin the technical content of a field of knowledge to explain its relevance to the task in hand, that we use those principles to guide our application of that knowledge, and to appraise critically the implications of the course of action we adopt.

CONCLUSION

We have seen that the social theorists discussed in this chapter have generated a number of new concepts, such as post-industrial society, network society and knowledge society, to explain the new type of societies that they claimed were emerging. They have also introduced a number of new ideas about the role of knowledge in the economy, such as axial principle and informationalism, and for work. Our discussion has allowed us to see that the unifying link between Bell, Castells and Stehr’s argument, that theoretical knowledge is the critical form of knowledge for economic development, is that they all assumed that knowledge is a discernible cultural object. Further, they accepted that knowledge can be transferred unproblematically from one context to another to facilitate economic, political and social development, and that knowledge workers were central to this process.

This emphasis on the primacy of theoretical knowledge as the critical resource within the knowledge economy underpins the ‘strong’ argument about the knowledge economy, that it is dependent on exponential investment in and exploitation of science to create the key knowledge-based industries of the 21st century such as nanotechnology and robotics (Thurow, 1997) that surfaced during the 1990s. This view is supported by the transnational consensus about the importance of supporting R&D in the fields of science, technology, engineering and mathematics (STEM). This argument is, however, hotly contested by other social theorists and in other branches of the Social Sciences.

In the case of the former, the focus on science and technology was first challenged by Lash and Urry in the early 1990s, by acknowledging the contribution that the cultural sector – for example, advertising, performing arts, film, television and new media – made to the economy, and that cultural knowledge made to production of ‘design intensive’ goods and services in all spheres of economic activity:

…production has become not just more knowledge infused, but more generally cultural; that it has become not just a question of a new primacy of information-processing, but of a more generic symbol-processing capacities. In the culture industries the input is aesthetic rather than cognitive in quality.

(Lash & Urry, 1994, p. 123)
Furthermore, Lash and Urry (1994, p. 108) argued that the growing importance accorded to such signifying practices in the production process has started to have an effect on the internal life of organisations as well. It has, in part, heralded a ‘turn to culture’ in the world of business and organisation, premised on the belief that competing in the global economy is influenced by the ways in which people conduct themselves in organisations and when working with clients. In making this dual argument, Lash and Urry have broadened the social theorists’ argument about both the role of theoretical knowledge within the economy and within society: they have acknowledged the increased importance of aesthetic knowledge to the design of new products and services, and added a cultural dimension to Bell, Castells and Stehr’s technicist account of knowledge work.

In the case of the latter, there is a considerable body of thought that affirms that another form of knowledge – tacit knowledge – is at least as, if not more, important than science to economic development. This issue is discussed in the next chapter.

NOTES

1 The contribution of knowledge as a factor in production has had a fairly ‘hidden’ history in Economics. For a recent assessment, see the special issue of The International Social Science Journal, 171 (Feb–March 2002).

2 One of the main influences on Bell’s thinking was the collection of theoretical and empirical studies produced by the highly celebrated American economist Robert Solow (1957) on the contribution of technology to productivity. Solow described the fundamental sources of long-run growth in terms of the link between capital accumulation, labour-force growth and technical progress. From Solow’s perspective, increases in productivity are a result of the increased technological application of science in the economy that leads to shifts in the ratio between labour and capital. Thus, unlike earlier generations of economists, Solow acknowledged that factors such as technology, which are exogenous to the basic components of economic theory (i.e. investment in capital and the growth rate of the labour force), carry equal importance with those components in raising levels of productivity.

3 It is important to note that Bell claims that Castells has not advanced significantly his thesis about the role of knowledge within the economy, nor distinguished between the different functions knowledge and information serve in the economy (Bell, 1999, pp. xxiii–xxiv).

4 In the second edition of The Rise of the Network Society, Castells links his argument about informationalism to the debate in contemporary economics about the emergence of the ‘new economy’ (2000, pp. 77–147). His intention, as he makes clear, is to demonstrate the similarity between the two arguments. He argues that his thesis, the ‘informational age’, is based on three assumptions about the economy: that it is global, informational and networked. In contrast, he argues that the proponents of the new economy mainly focus on the accelerating impact of globalisation and the deployment of ICT, and tend to play down the ‘networked’ dimension of the new economic conditions. The exposition of Castells’ analysis in this chapter concentrates on his argument around the impact of ICT on economic activity. It does not stray into the ‘new economy’ debate.

5 The account presented in this chapter of Castells’ thinking concentrates mainly on the implications of ‘informationalism’ in relation to economic activity; an argument he presented in the first volume of his trilogy, and in the revised second edition (2000).

6 Having originally adopted a Marxist mode of analysis, Bell rejected this theoretical tradition. He conceived of his work from the early 1960s as an attempt to go beyond what he felt were the theoretical weaknesses of Marxist preoccupations with general theories of social causation (Bell, 1973, p. 10). Castells, however, has continually endeavoured to rethink the relationship between his developing scholarship and particular Marxist concepts, such as the mode of production. The Rise of
the Network Society (1996) attempts to spell out the advantages as well as the inequities and injustices of a ‘networked’ world.

7 One of the main reasons that Castells often conflates knowledge and information throughout the three volumes of The Rise of the Network Society is that he is mainly interested in identifying the economic effects of knowledge/information. Thus, he never discusses the social practices that enable knowledge/information to support economic development; an issue that will be addressed in Chapter 4.

8 In a later book The Fragility of Modern Societies (2001), Stehr discusses the implication of this development for the ‘governance’ (Stehr, 2001, p. 71) of ‘knowledge societies’ (Stehr, 2001, p. 93), for the ‘policing’ of knowledge (Stehr, 2001, p. 114) to protect different communities’ (i.e. religious, political, etc.) interests, values and beliefs.

9 The creative and cultural sector spans traditional craft and artisan industries, such as craft, design and fashion, as well as longstanding professionalised industries, such as TV and radio, and new-media industries, such as video games and web design. The UK is ranked third in the global creative economy, behind America and Japan. The UK’s creative and cultural sector generates revenues of around £115 billion and employs 1.3 million people. They contribute over £10 billion in exports and account for over five per cent of Gross Domestic Product (GDP). Moreover, output from these sectors grew by more than twice that of the economy as a whole in the late 1990s (DCMS, 2001).

10 Their argument has also served as a forerunner for, what became known in the early 2000s as, the ‘Florida thesis’ (Florida, 2002), that is, the idea that the creative and cultural sector constituted the major source of growth and renewal for advanced industrial economies, and resulted in a worldwide clamour to establish creative ‘hubs’ and ‘cities’ to provide the conditions to attract and retain ‘creative’ people.