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The global knowledge economy in question

Joanne Roberts

Newcastle University Business School, Newcastle, UK

Abstract

Purpose – The aim of this paper is to bring into question the idea of the global knowledge economy.

Design/methodology/approach – The paper explores the characteristics of the knowledge economy, as elaborated by academics and policy makers concerned with knowledge in the contemporary global business environment. A range of available data is reviewed concerning the global distribution of investments in knowledge, information and communications technologies (ICTs), international transactions in knowledge-intensive services and royalty and licensing fees, employment by sector and literacy rates. Such data provide a basis for an initial critical evaluation of the notion of the global knowledge economy.

Findings – The use of the term “global knowledge economy” fails to acknowledge the uneven distribution of knowledge-based economic activity. Moreover, as currently constituted, the idea of a global knowledge economy, which focuses on knowledge as conceptualised in the commercial activities of advanced countries, overlooks the diversity of knowledges present in the world today.

Originality/value – This paper provides the first attempt to question and critically explore the global knowledge economy.

Keywords Knowledge economy, Communication technologies, Intellectual property, Knowledge management, Globalization

Paper type Viewpoint

Introduction

The term “global knowledge economy” is being increasingly used to describe the contemporary world economy. The term has emerged from the debates on the knowledge economy, which arise from the recognition that advanced economies derive a high proportion of their economic wealth from the creation, exploitation and distribution of knowledge and information. The importance of knowledge in economic activity has received much attention over the past 20 years from policy makers and management scholars (Organisation for Economic Co-operation and Development, 1996; Department for Trade and Industry, 1998; World Bank, 1999; Nonaka and Takeuchi, 1995; Davenport and Prusak, 1997; Boisot, 1998; Alvesson, 2004; Defillippi *et al.*, 2006, *inter alia*). The economic significance of knowledge related to production techniques, resource availability and market conditions is not new. However, today, “knowledge about knowledge” has become a central economic resource. Indeed, it has even been argued that knowledge has become the only resource that can create a continuous competitive advantage for a firm or a nation (Drucker, 1993; Lundvall, 1992; Reich, 1992).

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Within much of the scholarly, policy and practitioner literature there is an implicit assumption that the idea of the knowledge economy, which originates in the advanced countries, can be extended to the global context (Etzkowitz and Leydesdorff, 1997; Neef, 1999; World Bank, 2003; Guruz, 2008; *inter alia*). But can it? In this paper, I want to question the assumptions behind the idea of a “global knowledge economy”. In popular discourse the global knowledge economy is used in a casual manner to refer to the knowledge economy beyond the boundaries of one nation. It is a term produced from the convergence of the knowledge economy and the global economy. However, as yet, to my knowledge there has been no systematic attempt to define the global knowledge economy. Is it possible to extrapolate contemporary definitions of the knowledge economy to the global context? Definitions of the knowledge economy identify a number of specific characteristics. Is it possible to find evidence of these characteristics in a global context? And, if so, would this provide sufficient evidence to support the validity of the existence of a global knowledge economy?

The purpose of this paper is not to provide an exhaustive definition of the global knowledge economy. Rather, it is to question the very idea of a global knowledge economy. In so doing, my aim is to stimulate further critical consideration of knowledge in the global context. The paper begins with an elaboration of the notion of the knowledge economy. The nature of the relationship between globalisation and the knowledge economy is then briefly considered before the key characteristics of the knowledge economy, as elaborated by proponents of the notion, are examined in a global context. In the light of the findings of this exploration, the validity of the idea of the global knowledge economy is then critically evaluated and conclusions drawn about its future prospects.

The knowledge economy

There is no firm consensus on a definition of a knowledge economy. Indeed, some question whether such a phenomenon actually exists or whether it is anything new. After all, the term “knowledge economy” originally emerged in the 1960s with the work of Machlup (1962) and later Bell (1974), and Porat and Rubin (1977) among others. Smith (2002, p. 6) argues that the knowledge economy “is at best a widely-used metaphor, rather than a clear cut concept”, while Roberts and Armitage (2008) question the validity of the notion by suggesting that the contemporary economy is as much characterised by ignorance as by knowledge. Furthermore, Godin (2006) suggests that the knowledge-based economy is simply a concept, promoted mainly by the Organisation for Economic Co-operation and Development (OECD), to direct the attention of policy makers to science and technology issues of relevance to the economy. Indeed, the OECD notes that the term “knowledge-based economy” stems from the fuller recognition of the place of knowledge and technology in modern economies (Organisation for Economic Co-operation and Development, 1996).

Nevertheless, various efforts to define the knowledge economy have been attempted (Organisation for Economic Co-operation and Development, 1996; Department for Trade and Industry, 1998; Smith, 2002; Powell and Snellman, 2004; Brinkley, 2006; *inter alia*). According to the OECD, for instance, knowledge-based economies are those:

... which are directly based on the production, distribution and use of knowledge and information. This is reflected in the trend in OECD economies towards growth in high-technology investments, high-technology industries, more highly-skilled labour and

associated productivity gains (Organisation for Economic Co-operation and Development, 1996, p. 3).

Powell and Snellman (2004, p. 201), on the other hand, define the knowledge economy as:

... production and services based on knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advance as well as equally rapid obsolescence. The key components of a knowledge economy include a greater reliance on intellectual capabilities than on physical inputs or natural resources, combined with efforts to integrate improvements in every stage of the production process, from the R&D lab to the factory floor to the interface with customers.

In line with these definitions, the UK's Economic and Social Research Council (ESRC) argues that the term knowledge economy is used to describe the economic structure emerging in the global information society in which economic success increasingly depends on the effective utilisation of intangible assets such as knowledge, skills and innovative potential (Economic and Social Research Council, 2007).

For the purposes of appreciating the knowledge economy, knowledge is defined here as the application and productive use of information[1]. An important distinction exists between codified and tacit knowledge. Knowledge is codified if it is recorded or transmitted in the form of symbols (e.g. writing or drawings) or embodied in a tangible form (e.g. machinery or tools). Through the process of codification, knowledge is reduced to information that can be transformed into knowledge by those individuals who have access to the appropriate code or framework of analysis. In this way, through codification, knowledge can be disseminated across distance embodied in tangible form or through electronic networks. Tacit knowledge is non-codified knowledge that is acquired via the informal take-up of learning behaviour and procedures (Howells, 1996). Often referred to as know-how, tacit knowledge takes time to acquire and is therefore less easily disseminated than codified knowledge. Hence, while codified knowledge can circulate around the globe, tacit knowledge is likely to be embedded in specific locations or communities.

When considering knowledge in the economy it is also important to recognise that knowledge is different from other commodities in fundamental ways. Importantly, knowledge has a scarcity-defying nature (Stiglitz, 1999). This arises from the public good nature of much knowledge. The consumption of immaterial knowledge, information, ideas, and other abstract objects of thought is non-rivalrous in the sense that if I share my knowledge with you, your gain does not diminish my stock of knowledge. Moreover, once knowledge is discovered and made public, the marginal cost of acquiring the knowledge is virtually zero – because the knowledge is freely available and does not have to be rediscovered by each new consumer. Nevertheless, depending on the nature of the knowledge, the recipient may incur costs in terms of developing the ability to understand and use the knowledge effectively.

The global knowledge economy

To what extent is it possible to extend the definitions of the knowledge economy identified above into the global context? Is the idea of a global knowledge economy logical? Answering these questions raises the issue of defining what a global economy is and, indeed, what is meant by the terms “global” or “globalisation”. Of course, the past 20 years have witnessed much debate about the nature of globalisation (Dicken,

2007; Held *et al.*, 1999; Scholte, 2002; Hirst and Thompson, 1999; *inter alia*). As readers will be familiar with these debates, it is not necessary to rehearse them here.

If the term “global economy” were used to refer to the sum total of economic activity in the world, then the global knowledge economy would merely refer to the sum total of knowledge-based economic activity in the world. However, the term “global economy” is usually associated with the process of economic globalisation. In this sense, the global economy is more than the sum of all economic activity, in that it is associated with the growing economic interdependence and integration between countries brought about through the increasing cross-border mobility of goods, services, capital and people facilitated by technological change, the rise of multinational corporations (MNCs) and the liberalising policies of nation states and international regulatory institutions, including the World Trade Organisation (WTO), the International Monetary Fund (IMF) and the World Bank. As such, the process of globalisation is associated with a neo-liberal economic perspective promoting free national and international markets with minimal state intervention (Harvey, 2005).

Perhaps, then, a global knowledge economy might be defined as a global economy in which transactions are predominantly knowledge-based? Although in the advanced economies of the world knowledge is increasingly dominating economic activity, this is far from the case in developed countries, where there is still a high proportion of people surviving through subsistence farming. Moreover, the knowledge economy is very much associated with high levels of development, yet underdevelopment, and the poverty that accompanies it, remains a dominant feature of the global economy. As Shah (2009, p. 1) notes, over three billion people, almost half the world’s population, live on less than \$2.50 a day[2]. The poor of the world are busy living a hand-to-mouth existence with little opportunity to improve their lot through the acquisition of the skills required to engage in the knowledge economy.

The knowledge economy would, then, seem to be confined to the economically advanced world, with signs of a global knowledge economy only being evident in the cross-border activities of the advanced countries. Nevertheless, while most developing countries may well be on the periphery of any emerging global knowledge economy, they are being affected by the global spread and reach of knowledge-based activity. Whether from the diffusion of Western knowledge in the form of new products and services or the increased competition from knowledge intensive producers in the advanced world, or from the commodification of indigenous knowledge by MNCs or the restricted access to much needed pharmaceutical knowledge, developing countries are being impacted by the trends propagated by the knowledge economy, underpinned as it is by the forces of neo-liberalism.

The global knowledge economy would then seem to be characterised by a core, consisting of the advanced countries, and a periphery comprising the developing countries. The place of developing countries in the global knowledge economy will be further elaborated in the next section where the characteristics commonly identified with the idea of the knowledge economy will be outlined and explored in the global context.

Characteristics of a knowledge economy in a global context

As noted earlier, there have been various attempts to define and elaborate the characteristics of the knowledge economy (Organisation for Economic Co-operation

and Development, 1996; Department for Trade and Industry, 1998; Smith, 2002; Powell and Snellman, 2004; Brinkley, 2006; *inter alia*). From such efforts it is possible to identify eight core features that characterise the knowledge economy (Roberts and Armitage, 2008):

- (1) the growing importance of knowledge as an input into the economy;
- (2) the increasing importance of information and communication technologies (ICTs);
- (3) the rising importance of knowledge as an economic output;
- (4) the growing commercialisation of knowledge through, for instance, intellectual property rights (IRP);
- (5) the growing proportion of knowledge workers;
- (6) the increasing impact of knowledge across all sectors of the economy;
- (7) the rise of knowledge management practices; and
- (8) globalisation as a force driving the expansion of the knowledge economy.

To what extent are these characteristics visible across the globe? Are they confined to the advanced economies or are they more widespread? These questions will be addressed here through an examination of the available evidence drawn from published statistics supplied by international organisations including the United Nations Scientific and Cultural Organisation (UNESCO), the International Telecommunications Union (ITU), the World Trade Organisation (WTO) and the International Labour Organisation (ILO).

Knowledge has always been of significance in economic activity, though in the past it was knowledge of production techniques, resource availability, market demand and supply conditions that were of central importance. Mokyr (2002) traces the historical origins of the knowledge economy, arguing that over the past three centuries there has been a transformation not only in the amount of technical knowledge but also in the accessibility of such knowledge through publishing, universities and professional networks. This improved access stimulated a continuous process of new knowledge production, and with this came sustained economic growth. In addition, during the past three decades there has been an improvement in access to knowledge through the widespread application of ICTs facilitating the acceleration of new knowledge production and the rate of technological change. Investments in the areas of research and development (R&D) and education are often presented as indicators of the growth of knowledge inputs into the economy (see, for example, Organisation for Economic Co-operation and Development, 2007). How significant are investments in R&D and education across the globe?

R&D expenditure as a percentage of gross domestic expenditure varies substantially between countries. Data from UNESCO[3] demonstrates this variability in 2005 with the figure ranging from as much as 4.49 per cent in Israel and 3.33 per cent in Japan to 2.62 per cent in the USA and 2.36 per cent in Singapore, and from 1.78 per cent in the UK and 1.33 per cent in China, to 0.79 in Turkey and 0.23 per cent in Venezuela, and to as little as 0.07 per cent in Algeria and 0.03 per cent in Zambia. Moreover, a UNESCO (2007a, p. 4) survey of R&D trends between 1996 and 2005 found that the percentage of gross domestic product (GDP) devoted to R&D significantly

increased in most countries for which data were available (48 out of 89 countries). R&D intensity[4] more than doubled in 9 per cent of the countries surveyed, including China, Malaysia, Morocco, Pakistan, Thailand and Tunisia. However, the survey also found that R&D intensity had been stable in a third of the countries surveyed and had fallen in 17 per cent of the countries.

The distribution of spending on education is similarly uneven (Figure 1). For instance, in 2004, 55.1 per cent of global public expenditure on education was spent in the combined regions of North America and Western Europe, while 7.6 per cent was spent in Latin America and the Caribbean, and only 2.4 per cent and 0.3 per cent in Sub-Saharan Africa and Central Africa, respectively (UNESCO, 2007b, p. 1). This uneven distribution of spending on education ensures that many individuals and communities in developing countries are devoid of the skills required to access freely available global knowledge resources. Without education, individuals are restricted in their ability to participate in the knowledge economy, whether as consumers of knowledge-intensive products and services or as knowledge workers.

While comprehensive data on R&D and educational expenditure are not available across all nations of the world, the evidence that does exist points to great variability. Such evidence suggests that knowledge, as an input into the production process, is significantly lower in developing countries when compared to the developed countries. Knowledge inputs are then unevenly distributed across the globe.

A related feature of the knowledge economy is its association with the ICT revolution, so much so that they are often thought to be synonymous. Castells (1996) argues that the information technology revolution is central to the rising emphasis being placed on knowledge in economic activity. Although the ICT revolution is not necessarily synonymous with the advent of the knowledge economy, as Foray and Lundvall (1996, pp. 13-14) note, the availability of ICT systems “radically changes the

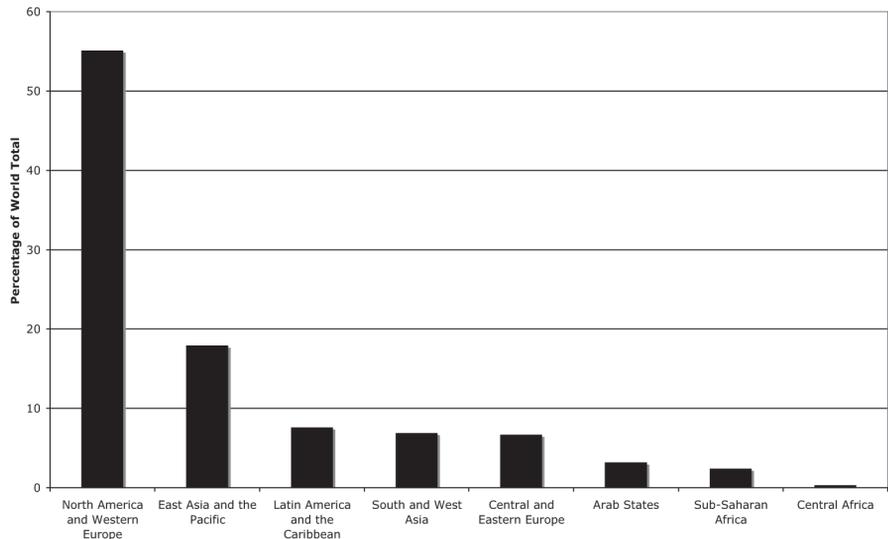


Figure 1.
Global distribution of public expenditure on education by region, 2004

Source: Compiled from UNESCO (2007b)

conditions for the production and distribution of knowledge as well as its coupling to the production system". Without a doubt, ICTs have significantly increased the capacity to rapidly codify knowledge, allowing the widespread diffusion of new production techniques and knowledge-based products. Furthermore, the levels of connectivity facilitated by ICT networks, such as the internet, are allowing the collection and distribution of codified knowledge on an unprecedented scale. When combined with the computational power currently available, the potential for new knowledge creation is expanding rapidly. For instance, the connectivity between scientists spread across the globe, together with growing computational power, facilitated the decoding of the humane genome in 2003 and continues to promote the development of new knowledge about genes and the subsequent production of gene-based medical treatments[5].

Data published by the International Telecommunications Union (2008) provide evidence of the increasing use of ICTs. As we can see from Figure 2, worldwide subscribers to fixed and mobile telephones, international telephone traffic, personal computers, and internet users have all increases between 1997 and 2008. The growth of the use of mobile telephones is particularly marked, with over four billion users in 2008. Indeed, the introduction and global spread of mobile phone usage has facilitated the engagement of poorer, developing, communities in the knowledge economy. For instance, fishermen in Kerala in India are able to improve their earning by accessing price information from various costal markets by mobile phone before selling their fish (Heeks and Jagum, 2007). Access to information through mobile phones is certainly impacting on the livelihoods of individuals in developing countries, not only through access to market information but also through access to mobile banking, and information about employment and entrepreneurial opportunities.

It is, however, also noteworthy from Figure 2 that although telephone subscribers are increasing in number, the level of international telephone traffic measured in minutes is not increasing at anywhere near the same rate. For while telecommunications use is growing, it is confined to national rather than international usage. In this sense, telecommunications usage would seem to be doing more to support national knowledge economies rather than promoting the development of a globally integrated knowledge economy. Moreover, the aggregate data in Figure 2 hide the uneven distribution of access to ICTs.

The internet is at the forefront of the ICT revolution and as such it is a key facilitator of knowledge collaborations, flows and developments in the knowledge economy. The uneven distribution of internet users and broadband subscribers across the key regions of the world brings into question the extent to which the knowledge economy is globally integrated. From Figure 3 it can be seen that there is a significant difference in use of the internet between the regions of Europe and the Americas, where more than 43 per cent of population uses the internet, compared to Asia and Africa, where the figures are 14.43 per cent and 5.48 per cent, respectively. There is a similar marked difference when comparing broadband subscription in these regions, so, not only do they have lower levels of access to the internet, but the access that they do have is significantly slower and of poorer quality than that available in other regions.

A third feature of the knowledge economy is the growing importance of knowledge as a commercial output to be exchanged in the market place, whether this is in terms of, for example, access to databases, research journals, R&D services, educational

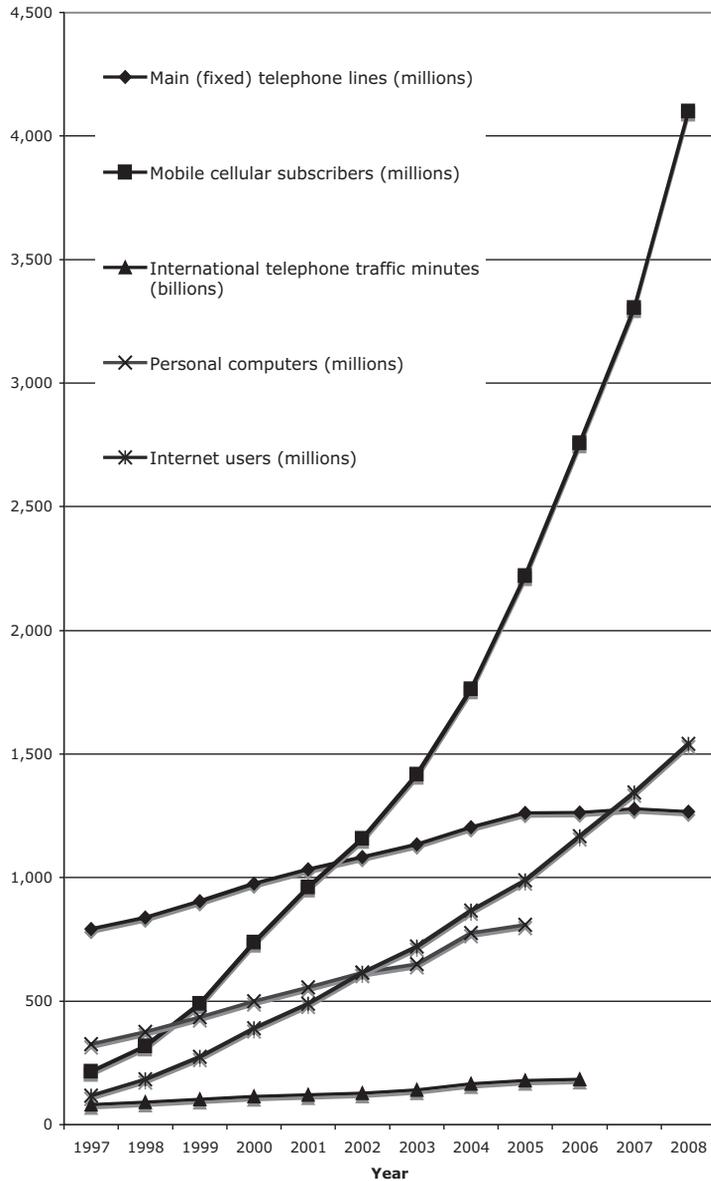
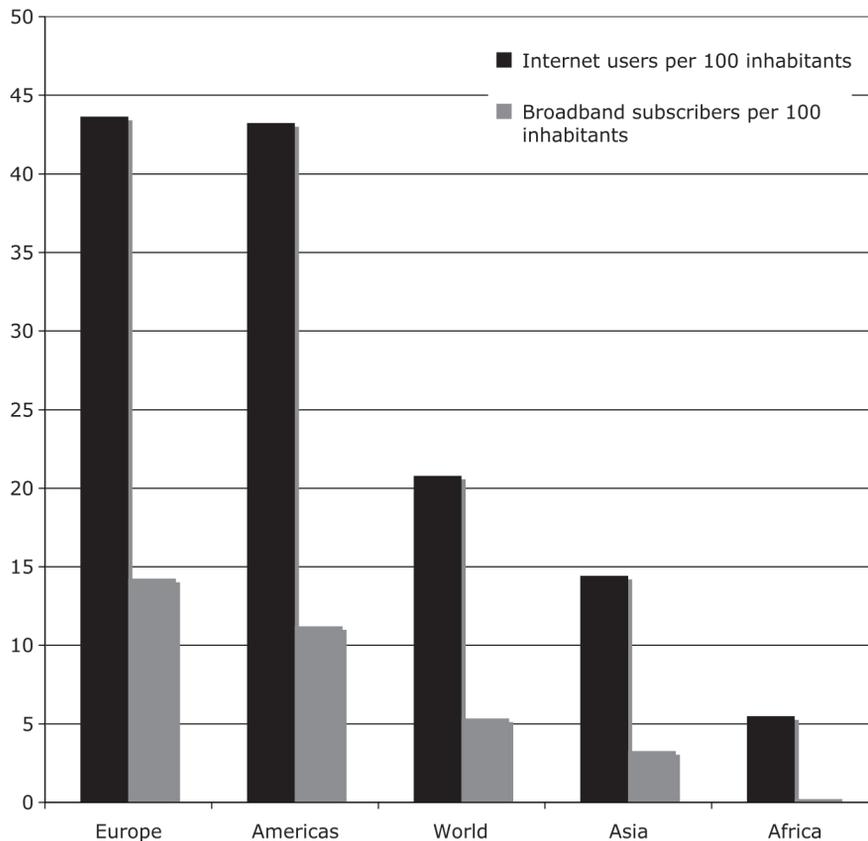


Figure 2. World fixed and mobile telephone subscribers, international telephone traffic, personal computers, and internet users 1997-2008

Notes: Data for 2008 are estimates. Data for personal computers and international telephone traffic only available up to 2005 and 2006 respectively

Source: Compiled by the author from data presented by the International Telecommunications Union in a table entitled “Key global telecom indicators for the world telecommunication service sector” (2009), available at: www.itu.int/ITU-D/ict/statistics/at_glance/KeyTelecom99.html, (accessed 13 April 2009)



Source: Compiled from International Telecommunications Union data available at: www.itu.int/ITU-D/icteye/Reporting/ShowReportFrame.aspx?ReportName=/WTI/InformationTechnologyPublic&RP_intYear=2007&RP_intLanguageID=1 (accessed 13 April 2009)

Figure 3.
Internet users and
broadband subscribers by
region, 2007

services, consultancy services, licensing of technological know-how and so on. As the advanced countries develop their knowledge intensive sectors, there can be no doubt that at a global level knowledge as an output is increasing. To explore the growth of knowledge outputs across a number of regions of the world it is possible to examine world trade data concerning the category of other commercial services[6]. Other commercial services largely consist of knowledge intensive services. An indication of the relative competitive capacities of knowledge intensive services production across regions can then be gleaned from an examination of the available trade data (Table I).

It is evident that Europe dominates the trade in commercial services, with a 54.0 per cent share of world exports and a 51.1 per cent share of world imports in 2006. North America and Asia are also important contributors to this trade, but regions such as South and Central America, the Commonwealth of Independent States, Africa and the Middle East have significantly lower shares, with, for instance, their shares of exports ranging from 1.2 per cent to 2.1 per cent in 2006.

	2006 value (billions of dollars)	2006 share (percent)	Annual percentage change, 2000-2006
<i>Exports</i>			
World	1,380	100.0	13
North America	247	17.9	8
South and Central America	24	1.7	10
Europe	744	54.0	14
European Union (25)	684	49.6	14
Commonwealth of Independent States (CIS)	17	1.3	27
Africa	16	1.2	10
Middle East	29	2.1	14
Asia	301	21.8	14
<i>Imports</i>			
World	1,205	100.0	12
North America	183	15.2	9
South and Central America	32	2.6	8
Europe	614	51.1	12
European Union (25)	580	48.2	12
Commonwealth of Independent States (CIS)	32	2.6	23
Africa	32	2.7	13
Middle East	31	2.6	12
Asia	279	23.2	11

Table I.
World trade in other
commercial services by
region, 2006

Source: Adapted from World Trade Organisation (2008)

A further characteristic of the knowledge economy is the increasing commodification of knowledge in the form of, for instance, IPRs. As the importance of knowledge to the competitiveness of firms grows, so too does the incentive to protect commercially valuable knowledge. Ownership of knowledge may be secured in a number of ways, from secrecy to copyrights, trademarks and patents. The increasing number of US patents provides one illustration of the growing commodification of knowledge (Roberts and Armitage, 2008, p. 343). Through the use of IPR knowledge is being increasingly privatised and monopolised, such that its benefits are restricted to those who can afford to participate in knowledge markets. Moreover, the appropriation of knowledge previously freely available is a global phenomenon with major socio-economic consequences. Well-known examples include the patenting of the components of traditional medicines from developing countries by the large pharmaceutical companies and the promotion of patented seed varieties by agri-business (Shiva *et al.*, 2002; Shiva, 2007; Alonso, 2007).

There is also much debate about the validity, nature and scope of IPRs (Boldrin and Levine, 2008; Drahos and Braithwaite, 2002; Lessig, 2004; *inter alia*). The high cost of securing and protecting IPRs under the current regulatory system gives large MNCs an advantage over smaller firms in the race to commodify knowledge. Moreover, as Lessig (2004) demonstrates in relation to the passage of the Sonny Bono Copyright Term

Extension Act in the USA, the lobbying activities of large MNCs, like the Disney Corporation, have been influential in the development of IPR law.

The data on world receipts of royalties and license fees, presented in Table II, provide an indication of the geographic spread of ownership of commodified knowledge circulating in the global economy. In 2005 North America had the largest share of total receipts (44.2 per cent) in this area, followed by Europe (36.9 per cent). South and Central America and the Commonwealth of Independent States fared less well with only 0.4 per cent and 0.2 per cent of world receipts. No data are provided for the region of Africa. Data on foreign patents registered in the US would suggest a very low level of formal IPRs held by the region of Africa relative to other regions of the world[7]. Over the period from 2000 to 2005 Europe has increased its share of receipts at the expense of North America, while South and Central America have seen a decline in their share. As with other features of the knowledge economy, the advanced countries hold a dominant share of the world's commodified knowledge.

A further characteristic of the knowledge economy is the significance of knowledge workers as an essential resource necessary for nations and firms to secure global competitiveness. Reich (1992) refers to such workers as "symbolic analysts", who include engineers, attorneys, scientists, professors, executives, journalists, consultants and other "mind workers" who engage in processing information and symbols for a living. The rise of the knowledge economy consequently produces a growing demand for highly educated workers necessitating an increasing investment in education, and, in particular, higher education.

How prevalent are Reich's (1992) "symbolic analysts" on a global scale? A review of the International Labour Organisation's data on employment by sector by region (Table III), suggests that knowledge work is unevenly distributed across the globe. Knowledge-intensive work is associated with high-tech manufacturing and the service sector. While 71.2 per cent of employment is in the services sector in developed economies and the European Union, the figure is as little as 29.6 per cent and 24.1 per cent in the regions of South Asia and Sub-Saharan Africa. In these latter regions agriculture dominates employment, accounting for 49.4 per cent and 65.7 per cent of the total employment respectively. Nevertheless, it is evident that employment in the

	2005 value (billions of dollars)	2005 share (per cent)	Annual percentage change, 2000-2005
<i>Exports</i>			
World	135	100.0	11
North America	60	44.2	6
South and Central America	1	0.4	3
Europe	50	36.9	18
European Union (25)	48	35.1	–
Commonwealth of Independent States (CIS)	0	0.2	22
Asia	22	16.0	12

Source: Adapted from World Trade Organisation (2008)

Table II.
World receipts of
royalties and license fees
by region, 2005

Table III.
World and regional
estimates of employment
by sector

	Employment in agriculture (per cent)		Employment in industry (per cent)		Employment in services	
	1996	2006 ^a	1996	2006 ^a	1996	2006 ^a
World	41.9	36.1	21.1	21.9	37.0	37.0
Developed economies and European Union	6.2	4.2	28.5	24.7	65.3	71.2
Central and South-Eastern Europe (non-EU) and CIS	27.2	20.3	28.7	25.8	44.1	53.8
East Asia	48.5	40.9	24.3	25.6	27.2	33.5
South-East Asia and the Pacific	51.0	45.4	16.5	18.6	32.5	36.0
South Asia	59.7	49.4	15.2	21.0	25.1	29.6
Latin America and the Caribbean	23.1	19.6	20.7	20.8	56.1	59.6
North Africa	36.5	34.4	19.8	20.0	43.7	45.6
Sub-Saharan Africa	74.4	65.9	7.5	10.0	18.1	24.1
Middle East	21.2	18.1	25.2	25.6	53.7	56.3

Note: ^a2006 preliminary estimates.

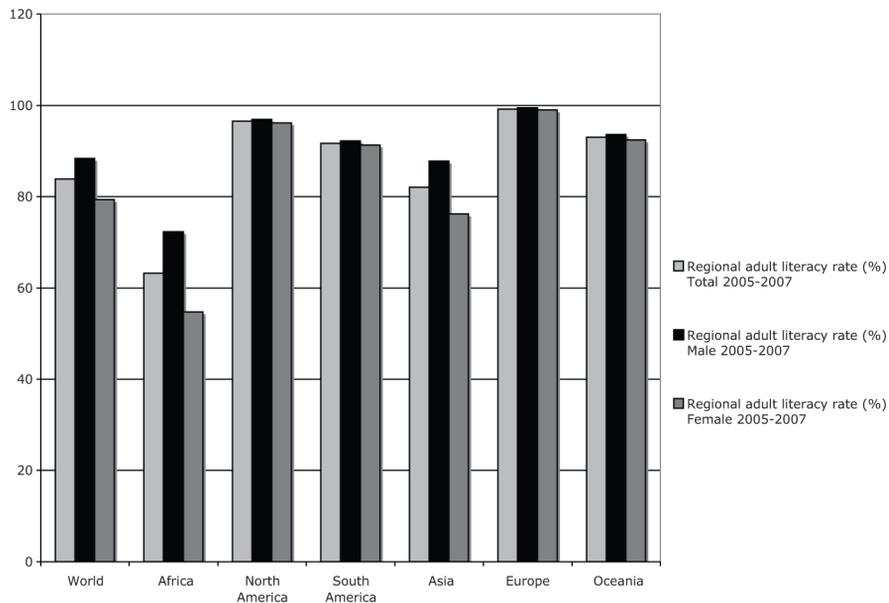
Source: Compiled from data presented in International Labour Organisation (2007)

service sector as a percentage of total employment increased across all of the regions between 1996 and 2006.

While workers located in the cities of some developing countries, like Bangalore, Hyderabad and Mumbai in India, are benefiting from the outsourcing and offshoring of certain types of knowledge work (Farrell *et al.*, 2005), many workers across the globe continue to be occupied in the agricultural sector, often in the form of subsistence farming. Clearly, such groups are largely excluded from accounts of knowledge economy. A fundamental indicator of the ability of people to participate in the knowledge economy is the literacy rate. Those who lack the ability to decipher codified knowledge embedded in the written word are therefore restricted in their ability to engage in much knowledge-based activity. The UNESCO data, presented in Figure 4, demonstrate the variations that exist between the regions of the world in terms of the rates of adult literacy. The region of Africa has the lowest rate of total adult literacy. Furthermore, the data highlight the discrepancy between male and female rates of adult literacy in all regions; these are particularly marked in Africa and Asia. While the ability to participate in the global knowledge economy depends on location, it is clear from this evidence that it also depends on gender.

Although the knowledge economy is most evident in knowledge intensive and high technology sectors, the transformations arising from the greater emphasis placed on knowledge are brought about across all sectors of the economy. So while the production of tangible low-tech products, such as textiles and clothing, may seem to be outside of the knowledge economy, the use of knowledge-based production, inventory, marketing and sales systems to improve competitiveness ensure that such sectors are also drawn into the knowledge economy.

Even though many people are excluded from knowledge work, it is fair to say that the low-tech manufacturing and agricultural sectors have been transformed by the growing knowledge intensity of markets and inputs. The incomes earned by individuals working in these sectors in developing countries will be influenced by knowledge intensive activities in other parts of the world and other parts of the supply



Source: Compiled from data available from UNESCO's Key Statistical Indicators on Education, available at: <http://stats.uis.unesco.org/unesco/> (accessed 17 August 2009)

Figure 4.
Regional literacy rates for
adults (15 years +)

chain. For those in the developing countries whose existence depends on meagre incomes, from agriculture or low tech manufacturing, the application of knowledge intensive production techniques in far away countries can, through the reduction of global prices, diminish their ability to improve their incomes no matter how hard they work.

The emergence of new knowledge management techniques, developed to help private and public sector organisations maximise their return from knowledge assets and to develop their ability to produce new knowledge, is evident across the world. Initially focused on the management of codified knowledge through the application of ICTs to construct sophisticated information systems (Davenport and Prusak, 1997), knowledge management techniques have more recently turned to the management of tacit knowledge through practice based models of knowledge creation and distribution. In particular, the concept and reality of "communities of practice" has attracted a great deal of attention (Wenger *et al.*, 2002; Amin and Roberts, 2008), and there is now widespread recognition of the role of communities of practice as facilitators of knowledge creation and transfer. While ICT-based knowledge management systems may be confined to those regions of the world that have the required technological resources, communities of practice type knowledge management approaches, depending as they do on people and their interaction, offer universal opportunities to share and create knowledge. Indeed, knowledge management practices are being used to promote efficiency and progress in developing country enterprises as well as in aid and development agencies (see, for example, *Knowledge for Development Journal*, 2005-2008)[8].

The process of globalisation has undoubtedly contributed to the development of knowledge economies. For instance, the rise of cross-border trade and MNCs has

facilitated the widespread distribution of knowledge (Archibugi *et al.*, 1999). Globalisation and the associated deregulation and privatisation programmes of various nation states have resulted in an intensification of competition between firms, stimulating innovation, and technological change (Dicken, 2007). The economic impetus to push forward the boundaries of knowledge and to use existing knowledge more effectively is certainly heightened because of the forces of globalisation.

However, on a global scale, the hegemony of Northern epistemologies is leading to the homogenisation of knowledge and to restricted access to knowledge (de Sousa Santos, 2007). For instance, Jeanneney (2007) raises concerns about the dominance of the English language in relation to Google's Library Project, arguing that its unsystematic digitisation of works predominantly written in English and from a few partner libraries misrepresents the complexity of the world's cultural heritage. Such developments are leading to the monopolisation of knowledge by MNCs assisted by global regulatory regimes like the WTO's Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), which effectively provides a global set of intellectual property principles (Drahos and Braithwaite, 2002). Local knowledge embodied in non-codified and tacit forms, passed on through learning by doing and oral traditions, are overlooked by the institutions of the knowledge economy, which focus on codified knowledge, often given value by the activities, and in the interests, of big business. In this way, knowledge embedded in the everyday practices of communities across the globe is not attributed value, unless, and until, it is appropriated by organisations for application in commercial enterprises.

Discussion and conclusion

Institutions like the Organisation for Economic Co-operation and Development (2007) are able to marshal ample evidence to support the validity of the notion of the knowledge economy in the advanced nations. Yet when looking at the worldwide evidence, an uneven distribution of knowledge is evident. This suggests that the notion of a global knowledge economy as used in contemporary business and management discourse refers to a core and periphery configuration of knowledge-based economic activity.

Moreover, understandings of knowledge in a global context bring into question what is valued as knowledge and who determines the value of that knowledge. In the advanced economies, knowledge is valued more often than not merely as an economic resource. Even so, not all of the value of knowledge can be accounted for in economic terms. This is true in the advanced and the developing worlds. For instance, my knowledge of my family traditions and history may be of great personal value to me, yet of no economic value, unless, of course, I can use it to produce a commercially successful biography. Similarly, the knowledge of plant remedies held by the natives living in the Malaysian highlands is of little commercial value unless, and until, pharmaceutical companies can convert this knowledge into viable market products. Yet knowledge has value, whether it is commercialised or not. Importantly, knowledge, through its social, cultural and historical value, impacts on the economic context. For instance, social knowledge related to reputation and trust, while of no direct commercial value, is a vital component of the social capital that actually underpins economic relationships and reduces the transaction costs incurred in economic exchange (Adler and Kwon, 2002).

The shift towards knowledge as a key economic resource, together with its public good nature, has great potential to alleviate poverty and to help to ensure that the benefits of economic and technological progress are widely distributed. Even so, as demonstrated above, there are some regions of the world that are so poor that their ability to participate in a global knowledge economy is very limited. In part this is what the World Bank's 1998/9 *World Development Report*, with its theme of "Knowledge for Development" sought to address. The *Report* began:

Knowledge is like light. Weightless and intangible, it can easily travel around the world, enlightening the lives of people everywhere. Yet billions of people still live in the darkness of poverty – unnecessarily. Knowledge about how to treat such a simple ailment as diarrhoea has existed for centuries – but millions of children continue to die from it because their parents do not know how to save them (World Bank, 1999, p. 1).

By focusing on knowledge gaps and information problems the report sought to address the problem of development from a knowledge perspective. Moreover, the report marked a new strategy for the World Bank, with a shift from a bank focused on infrastructure finance to one focused on knowledge. The World Bank became a knowledge bank concerned with education, knowledge, institutions, and culture. However, as the evidence presented in this paper demonstrates, ten years after this reorientation of the World Bank the potential of knowledge to overcome poverty has yet to be realised.

Although the idea of knowledge intensive activity dominating the global economy may be premature, there is much potential for the benefits of knowledge to be more widely distributed. With the provision of some basic information resources, those currently excluded from the knowledge economy can quickly develop the necessary skills to participate in the consumption and production of knowledge. For instance, the "Hole in the Wall"[9] project, created by Dr Sugata Mitra, (Mitra *et al.* 2005), demonstrates the enormous appetite for education and knowledge among the children of poor communities in developing countries. Children provided with computer terminals are able, with minimum intervention, to teach themselves and others a range of skills required to access information.

Nevertheless, the efforts of those disenfranchised by a poverty of resources to engage constructively in the global knowledge economy are often frustrated by the strategies of knowledge accumulation pursued by corporations in the advanced world. The enforcement of IPRs not only impacts on the rights of citizens of the advanced world to share copyrighted entertainment materials with friends but also, crucially, the ability of those in the developing world to access affordable resources for education and healthcare. As new knowledge is created, so, too are new strategies to maximise the appropriable returns. In the process, new barriers are constructed against the distribution of knowledge for development. Until the public good nature of knowledge, both in the economic and the moral sense, is recognised, the global knowledge economy will remain merely an idea rather than a reality.

Notes

1. Knowledge is more than information, since it involves an awareness or understanding gained through experience, familiarity or learning. However, the relationship between knowledge and information is symbiotic. Knowledge creation is dependent upon information, yet relevant information can only be collected with the application of knowledge.

2. Indeed, Chen and Ravallion (2008, p. 19) estimate that in 2005 1.4 billion people, or one quarter of the population of the developing world, lived on less than \$1.25 a day.
3. UNESCO Data centre, available at: http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx?IF_ActivePath = P,54&IF_Language = eng (accessed 17 August 2009).
4. R&D intensity is measured as the ratio of gross expenditure on R&D to gross domestic product.
5. Human Genome Project Information, available at: www.ornl.gov/sci/techresources/Human_Genome/home.shtml (accessed 12 April 2009).
6. Other commercial services are made up of the following services: communications services; construction; insurance services; financial services; computer and information services royalties and license fees; other business services; and personal, cultural and recreational services.
7. Data available from the US Patent and Trademark Office: see www.uspto.gov/ (accessed 17 August 2009)
8. See also USAID for an example of the promotion of knowledge management practices by an aid agency: <http://knowledge.usaid.gov/> (accessed 17 August 2009).
9. Information on the Hole in the Wall project is available from: www.hole-in-the-wall.com/abouthiwel.html (accessed 17 August 2009). The project has recently gained attention for its role in inspiring the book *Q&A* by Vikas Swarup, published in 2005, upon which the successful British film *Slumdog Millionaire* is based.

References

- Adler, P. and Kwon, S.-W. (2002), "Social capital: prospects for a new concept", *Academy of Management Review*, Vol. 27 No. 1, pp. 17-40.
- Alonso, M.F. (2007), "Can we protect traditional knowledge?", in de Sousa Santos, B. (Ed.), *Another Knowledge is Possible: Beyond Northern Epistemologies*, Verso, London/New York, NY, pp. 249-71.
- Alvesson, M. (2004), *Knowledge Work and Knowledge-intensive Firms*, Oxford University Press, Oxford.
- Amin, A. and Roberts, J. (2008), *Community, Economic Creativity and Organization*, Oxford University Press, Oxford.
- Archibugi, D., Howells, J. and Michie, J. (1999), "Innovation systems in a global economy", in Archibugi, D., Howells, J. and Michie, J. (Eds), *Innovation Policy in a Global Economy*, Cambridge University Press, Cambridge.
- Bell, D. (1974), *The Coming of Post-industrial Society*, Heinemann, London.
- Boisot, M. (1998), *Knowledge Assets: Securing Competitive Advantage in the Information Economy*, Oxford University Press, Oxford.
- Boldrin, M. and Levine, D.K. (2008), *Against Intellectual Monopoly*, Cambridge University Press, New York, NY.
- Brinkley, I. (2006), "Defining the knowledge economy: Knowledge Economy Programme report", The Work Foundation, London, available at: www.theworkfoundation.com/research/publications/publicationdetail.aspx?oItemId=65 (accessed 17 August 2009).
- Castells, M. (1996), *The Information Age: Economy, Society and Culture Volume I: The Rise of the Network Society*, Blackwell, Oxford.

-
- Chen, S. and Ravallion, M. (2009), "The developing world is poorer than we thought, but no less successful in the fight against poverty", Policy Research Working Paper No. 4703, World Bank Development Research Group, World Bank, Washington, DC, August, available at: http://econ.worldbank.org/external/default/main?pagePK=64165259&piPK=64165421&theSitePK=469372&menuPK=64166093&entityID=000158349_20080826113239 (accessed 18 April 2009).
- Davenport, T.H. and Prusak, L. (1997), *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School Press, Cambridge, MA.
- de Sousa Santos, B. (Ed.) (2007), *Another Knowledge is Possible: Beyond Northern Epistemologies*, Verso, London/New York, NY.
- Defillippi, R.J., Arthur, M.B. and Lindsay, V.J. (2006), *Knowledge at Work: Creative Collaboration in the Global Economy*, Blackwell, Oxford.
- Department for Trade and Industry (1998), *Our Competitive Future: Building the Knowledge-driven Economy*, Cm 4176, Department for Trade and Industry, London.
- Dicken, P. (2007), *Global Shift: Mapping the Changing Contours of the World Economy*, 5th ed., Sage Publications, London.
- Drahos, P. and Braithwaite, J. (2002), *Information Feudalism: Who Owns the Knowledge Economy?*, The New Press, New York, NY/London.
- Drucker, P. (1993), *Post-Capitalist Society*, Harper Business, New York, NY.
- Economic and Social Research Council (2007), "ESRC Society Today – Knowledge Economy Fact Sheet", available at: www.esrcsocietytoday.ac.uk/ESRCInfoCentre/facts/index4.aspx (accessed 12 April 2009).
- Etzkowitz, H. and Leydesdorff, L. (Eds) (1997), *Universities and the Global Knowledge Economy: A Triple Helix of University-Industry-Government Relations*, Thomson Learning, London.
- Farrell, D., Kaka, N. and Stürze, S. (2005), "Ensuring India's offshoring future", *The McKinsey Quarterly*, September, pp. 75-83.
- Foray, D. and Lundvall, B.-Å. (1996), *Employment and Growth in the Knowledge-based Economy*, Organisation for Economic Co-operation and Development, Paris, pp. 11-32.
- Godin, B. (2006), "The knowledge-based economy: conceptual framework or buzzword?", *The Journal of Technology Transfer*, Vol. 31 No. 1, pp. 17-30.
- Guruz, K. (2008), *Higher Education and International Student Mobility in the Global Knowledge Economy*, State University of New York Press, New York, NY.
- Harvey, D. (2005), *A Brief History of Neoliberalism*, Oxford University Press, Oxford.
- Heeks, R. and Jagum, A. (2007), "Mobile phones and development", *id21 insights*, 69, November, available at: www.id21.org/insights/insights69/insights69.pdf (accessed 14 April 2009).
- Held, D., McGrew, A., Goldblatt, D. and Perraton, J. (1999), *Global Transformations: Politics, Economics and Culture*, Polity Press, Cambridge.
- Hirst, P. and Thompson, G. (1999), *Globalization in Question: The International Economy and the Possibilities of Governance*, 2nd ed., Polity Press, Cambridge.
- Howells, J. (1996), "Tacit knowledge, innovation and technology transfer", *Technology Analysis and Strategic Management*, Vol. 8 No. 2, pp. 91-106.
- International Labour Organisation (2007), "KILM 4: Employment by sector", *Key Indicators of the Labour Market (KILM)*, 5th ed., available at: www.ilo.org/public/english/employment/strat/kilm/index.htm (accessed 14 April 2009).
- International Telecommunications Union (2008), "Market information and statistics (STAT)", available at: www.itu.int/ITU-D/ict/statistics/maps.html (accessed 13 April 2009).

-
- Jeanneney, J.-N. (2007), *Google and the Myth of Universal Knowledge*, (trans. by Fagan, T.L.), The University of Chicago Press, Chicago, IL/London.
- Knowledge for Development Journal (2005-2008), available at: www.km4dev.org/journal/index.php/km4dj/index (last accessed 14 April 2009).
- Lessig, L. (2004), *Free Culture: The Nature and Future of Creativity*, Penguin Books, London.
- Lundvall, B.-Å. (1992), *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, Pinter, London, pp. 1-19.
- Machlup, F. (1962), *The Production and Distribution of Knowledge in the United States*, Princeton University Press, Princeton, NJ.
- Mitra, S., Dangwal, R., Chatterjee, S., Swati, J., Bisht, R.S. and Kapur, P. (2005), "Acquisition of computing literacy on shared public computers: children and the 'hole in the wall'", *Australasian Journal of Educational Technology*, Vol. 21 No. 3, pp. 407-26.
- Mokyr, J. (2002), *The Gifts of Athena: Historical Origins of the Knowledge Economy*, Princeton University Press, Princeton, NJ/Oxford.
- Neef, D. (1999), *A Little Knowledge Is a Dangerous Thing: Understanding Our Global Knowledge Economy*, Butterworth-Heinemann, London.
- Nonaka, I. and Takeuchi, H. (1995), *The Knowledge-creating Company: How Japanese Companies Create Dynamic Innovation*, Oxford University Press, Oxford.
- Organisation for Economic Co-operation and Development (1996), *The Knowledge-based Economy*, OCDE/GD(96)102, Organisation for Economic Co-operation and Development, Paris.
- Organisation for Economic Co-operation and Development (2007), *Science, Technology and Industry Scoreboard 2007*, Organisation for Economic Co-operation and Development, Paris.
- Porat, M.U. and Rubin, M. (1977), *The Information Economy: Development and Measurement*, Office of Telecommunications/US Government Printing Office, Washington, DC.
- Powell, W.W. and Snellman, K. (2004), "The knowledge economy", *Annual Review of Sociology*, Vol. 30, pp. 199-220.
- Reich, R.R. (1992), *The Work of Nations: Preparing Ourselves for 21st Century Capitalism*, Vintage Books, New York, NY.
- Roberts, J. and Armitage, J. (2008), "The ignorance economy", *Prometheus: The Journal of Issues in Technological Change, Innovation, Information Economics, Communications and Science Policy*, Vol. 26 No. 4, pp. 335-54.
- Shah, A. (2009), "Poverty facts and stats", 22 March, available at: www.globalissues.org/print/article/26 (accessed 18 April 2009).
- Shiva, V. (2007), "Biodiversity, intellectual property rights, and globalization", in de Sousa Santos, B. (Ed.), *Another Knowledge Is Possible: Beyond Northern Epistemologies*, Vol. 272, Verso, London/New York, NY.
- Shiva, V., Jafri, A.H., Emani, A. and Pande, M. (2002), *Seeds of Suicide: The Ecological and Human Costs of Globalisation of Agriculture*, 2nd ed., Research Foundation for Science, Technology and Ecology, New Delhi.
- Scholte, J.A. (2002), "What is globalization? The definitional issue – again", CSGR Working Paper No. 109/02, available at: www2.warwick.ac.uk/fac/soc/csgr/research/workingpapers/jascholte/ (accessed 9 April 2009).

-
- Smith, K. (2002), "What is the knowledge economy? Knowledge intensity and distributed knowledge bases", discussion paper, United Nations University/Institute for New Technologies, Tokyo.
- Stiglitz, J.E. (1999), "Public policy for a knowledge economy", speech delivered to the Department of Trade and Industry and the Centre for Economic Policy Research, London, January, available at: www.worldbank.org/html/extdr/extme/jssp012799a.htm (accessed 12 April 2009).
- UNESCO (2007a), "A global perspective on research and development", Fact Sheet, No. 5, October, UNESCO Institute for Statistics, available at: www.uis.unesco.org/ev.php?URL_ID=3755&URL_DO=DO_TOPIC&URL_SECTION=201 (accessed 14 April 2009).
- UNESCO (2007b), "Global education spending concentrated in a handful of countries", Fact Sheet, No. 3, October, UNESCO Institute for Statistics, available at: www.uis.unesco.org/ev.php?URL_ID=5495&URL_DO=DO_TOPIC&URL_SECTION=201 (accessed 14 April 2009).
- Wenger, E., McDermott, R. and Snyder, W.M. (2002), *Cultivating Communities of Practice: A Guide to Managing Knowledge*, Harvard Business School Press, Boston, MA.
- World Bank (1999), *Knowledge for Development: World Development Report*, Oxford University Press, New York, NY.
- World Bank (2003), *Lifelong Learning in the Global Knowledge Economy: Challenges for Developing Countries*, World Bank, Washington, DC.
- World Trade Organisation (2008), "International trade statistics: trade in commercial services by category", available at: www.wto.org/english/res_e/statis_e/its2007_e/its07_trade_category_e.htm (accessed 14 April 2009).

About the author

Joanne Roberts is a Senior Lecturer in Management at Newcastle University Business School and a member of the Centre for Knowledge, Innovation, Technology and Enterprise, Newcastle University, UK. Her current research is focused on two areas: the role of business services in the transfer of knowledge, and critiques of knowledge in contemporary economy and organisation. She is a member of the Dynamics of Institutions and Markets in Europe (DIME) Network of Excellence and co-editor, with Ash Amin, of *Community, Economic Creativity and Organization* (Oxford University Press, 2008). Joanne Roberts can be contacted at: Joanne.Roberts@ncl.ac.uk