

The Information Society Revisited

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The term ‘information society’ is widely used both inside academia and in the wider society. One has but to pick up the newspapers or turn on the television to encounter references to a new information age, or to browse the shelves of bookshops to come across titles displaying the words. There are several reasons why this should be so, but most prominent amongst them is surely the prevalence of information itself in the present era. There is simply a very great deal more information about than hitherto: perhaps most obviously in an explosion of media and media products (from cable TV channels to compact disk records, from mobile telephones to the Internet), but also importantly in the rapid and accelerating permeation of computerized technologies throughout society, in the increased provision and take-up of education in most social systems, and in the growth of occupations that deal, for the most part, with information (clerks, professionals, instructors and so on). Experiencing such developments, it is not surprising that many observers have come to describe our age in terms of one of its most palpable features: hence, logically, the information society.

In 1995 I published a book, *Theories of the Information Society*, that brought together a range of social theories which attempted to account for the significance of information over recent decades. The presumption was that in this chapter the book’s arguments would be updated to take account of new thinking that has come from debate on and consideration of the development of more recent phenomena such as cyberspace and cyborgs. It is certain that the rapid development of these new technologies as well as of digital television and mobile telecommunications, and the take-up of personal computers, e-mail and e-commerce, have further stimulated talk of an information age having come

upon us. Again, the fact that there is now a great deal more information around than even a decade ago, and that this is demonstrable from everyday experiences (from watching television round the clock, through electronic banking services, to a significant increase in the information intensity of a good deal of modern-day work), has encouraged commentators to declare, more confidently than ever, that we inhabit an information society.

It is in this context that this chapter reviews and evaluates the concept of an information society. However, it would be less than honest if I did not, at the outset, state plainly my own view on the salience of the term. My conclusion is that the concept ‘information society’ is of little use to social scientists, and still less to the wider public’s understanding of transformations in the world today. The term perhaps has some heuristic value for the social scientist (Lyon, 1988: 8), in so far as it encourages scholars to focus attention on an indisputably important feature of the world today – information. But as a means of understanding and explaining that world I find the conception of information society of limited use. In this I share the view of Manuel Castells when he declares that ‘we should abandon the notion of “information society”’ (2000: 10).

I shall reveal why I have come to this conclusion in the course of this chapter, but the major reasons are as follows. I find the concept of information society unsatisfactory because of:

- inconsistencies and lack of clarity as regards criteria used to distinguish an information society;
- imprecise use of the term ‘information’;
- the unsupportable supposition of information society theorists that quantitative increases in information lead to qualitative social changes.

These objections do not mean that I find information unworthy of study. On the contrary, there seem to me good reasons for close analysis of informational trends. The chief difficulty, however, is with the argument that informational developments signal the emergence of a new type of social system, an information society. It is a proposition which rests on faulty logic and inadequate evidence.

DEFINITIONS OF AN INFORMATION SOCIETY

It is possible to identify six ways of distinguishing an information society. Five of these focus on measures of one or other of the following phenomena:

- technological innovation and diffusion;
- occupational change;
- economic value;
- information flows;
- the expansion of symbols and signs.

These are not mutually exclusive, though scholars place different emphases on each dimension. All of these conceptions rely on a quantitative assessment of a particular phenomenon to argue that its expansion has brought about a qualitatively different form of social organization. In this way each theorization adopts a form of reasoning which is *ex post facto*: there is evidence of there being more information in society today, therefore we have an information society. As we shall see, there are serious difficulties with this form of argument. Nonetheless, it is undeniable that it has an immediate, even commonsensical, appeal, and it is a familiar form of reasoning. For example, it is frequently suggested that, just as a decline in the numbers of farm workers and a rise in factory employment signalled the end of agricultural society and the emergence of industrialism, so too are quantitative changes in information indicative of the coming of an information society. I criticize this form of argument below.

The sixth definition of an information society is singular in that it refers, not to the fact of there being more information, but to changes in the ways in which life is now conducted because of information. The argument offered here, that theoretical information/knowledge is the fulcrum of contemporary life, suggests a distinct conception of the information society. In my view, this is the most persuasive (if the least commonly mooted) argument for the applicability of the concept of information society.

I propose now to examine each of the first five definitions in turn. I then consider the questions of quantity and quality, and the nature of information, before examining the sixth definition.

Technology

Technological conceptions centre on an array of innovations that have appeared over the past 20 years or so. New technologies are one of the most visible indicators of new times, and accordingly are frequently taken to signal the coming of an information society. These include cable and satellite television, computer-to-computer communications, PCs, new office technologies – notably online information services and word processors – and CD-ROM facilities. The suggestion is, simply, that such a volume of technological innovations must lead to a reconstitution of the social world because its impact is so profound.

During the late 1970s and early 1980s commentators got excited about the ‘mighty micro’s’ capacity to revolutionize our way of life (McHale, 1976; Martin, 1978; Evans, 1979), and none more so than the world’s leading futurist, Alvin Toffler (1980). His suggestion, in a memorable metaphor, is that, over time, the world has been decisively shaped by three waves of technological innovation, each as unstoppable as the mightiest tidal force. The first was the agricultural revolution and the second the industrial revolution. The third is the information revolution that is engulfing us now and which presages a new way of living (which, attests Toffler, will turn out fine if only we ride with the wave).

More recently, futurism’s enthusiasms have been boosted by computing’s capacity to transform telecommunications, to in effect merge the two technologies (Toffler, 1990). It is this spread of computer communications technologies (e-mail, data and text communications, online information exchange, etc.) that currently inspires most speculation about a new society in the making (Gates, 1995; Negroponte, 1995; Dertouzos, 1997). The rapid growth of the Internet especially, with its capacities for simultaneously promoting economic success, education and the democratic process, has stimulated much commentary. Media regularly feature accounts of the arrival of an information ‘superhighway’ on which the populace must become adept at driving. Authoritative voices are raised to announce that ‘a new order ... is being forced upon an unsuspecting world by advances in telecommunications. The future is being born in the so-called *Information Superhighways* ... [and] anyone bypassed by these highways faces ruin’ (Angell, 1995: 10).

More soberly, the spread of national, international and genuinely global information exchanges between and within banks, corporations, governments, universities and voluntary bodies indicates a similar trend towards the establishment of a technological infrastructure that allows instant computer communications at any time of day in any place that is suitably equipped (Connors, 1993).

Most academic analysts, while avoiding the exaggerated language of futurists and politicians,

have nonetheless adopted what is at root a similar approach (Feather, 1998). For instance, from Japan there have been attempts to measure the growth of *joho shakai* (information society) since the 1960s (Duff et al., 1996). The Japanese Ministry of Posts and Telecommunications (MPT) commenced a census in 1975 which endeavours to track changes in the volume (e.g. numbers of telephone messages) and vehicles (e.g. penetration of telecommunications equipment) of information using sophisticated techniques (Ito, 1991; 1994). In Britain, a much respected school of thought has devised a neo-Schumpeterian approach to change. Combining Schumpeter's argument that major technological innovations bring about 'creative destruction' with Kondratieff's theme of 'long waves' of economic development, these researchers contend that information and communications technologies represent the establishment of a new epoch (Freeman, 1987) which will be uncomfortable during its earlier phases, but over the longer term will be economically beneficial. This new 'technoeconomic paradigm' constitutes the 'information age' which is set to mature early in this new century (cf. Hall and Preston, 1988).

Occupational Change

This is the approach most favoured by sociologists. It is also one closely associated, with good reason, with the work of Daniel Bell (1973) who is the most important theorist of 'post-industrial society' (a term virtually synonymous with information society, and used as such in much of Bell's own writing). Here the occupational structure is examined over time and patterns of change are observed. The suggestion is that we have achieved an information society when the preponderance of occupations is found in information work. The decline of manufacturing employment and the rise of service sector employment is interpreted as the loss of manual jobs and its replacement with white-collar work. Since the raw material of non-manual labour is information (as opposed to the brawn and dexterity plus machinery characteristic of manual labour), substantial increases in such informational work can be said to announce the arrival of an information society.

There is *prima facie* evidence for this: in Western European and North American nations over 70 per cent of the workforce is now found in the service sector of the economy, and white-collar occupations are now a majority. On these grounds alone it would seem plausible to argue that we inhabit an information society since the 'predominant group (of occupations) consists of information workers' (Bell, 1979: 183).

An emphasis on occupational change as the marker of an information society has displaced once

dominant concerns with technology in recent years. It should also be understood that this conception of the 'information society' is quite different from that which suggests it is information and communications *technologies* which distinguish the new age. A focus on occupational change is one which stresses the transformative power of information itself rather than the influence of information technologies, information being what is drawn upon and generated in occupations or embodied in people through education and experiences. Charles Leadbetter (1999) titled a book to highlight the insight that it is information which is foundational in the present epoch. 'Living on thin air' was once a familiar admonition by the worldly-wise to those reluctant to earn a living by the sweat of their brows. But all such advice is now outdated, Leadbetter arguing that this is exactly how to make one's livelihood in the information age. *Living on Thin Air* proclaims that 'thinking smart', being 'inventive', and having the capacity to develop and exploit 'networks' are actually the key to the new 'weightless' economy (Coyne, 1997; Dertouzos, 1997), since wealth production comes, not from physical effort, but from 'ideas, knowledge, skills, talent and creativity' (Leadbetter, 1999: 18). His book highlights examples of such successes: designers, deal-makers, image-creators, musicians, biotechnologists, genetic engineers and niche-finders abound.

Leadbetter puts into popular parlance what many thinkers now argue as a matter of course. A range of influential writers, from Robert Reich (1992) and Peter Drucker (1993) to Manuel Castells (1996-8), suggest that the economy today is led and energized by people whose major characteristic is the capacity to manipulate information. Preferred terms vary between authors, from 'symbolic analysts' and 'knowledge experts' to 'informational labour', but in all one message is constant: today's movers and shakers are those whose work involves creating and using information. Twenty per cent (and expanding) of the US workforce (Reich, 1992: 179) is constituted by this group which manages, designs, creates and refines information, this being the raw material of our globalized and fast-changing world.

All analysts agree that information operatives vary enormously in what they actually do. For instance, many manage corporate affairs in various capacities, some handle financial networks, others work in a burgeoning media sector, or in the law, or higher education, or accounting, or public relations, or local government, while still others are in design where they are occupied with adding value to mundane materials. Despite such diversity, all share a propensity to reskill themselves as a matter of routine. In this way they are at one with the flexible world economy which demands constant change on all sides. This commitment to what others have called 'lifelong learning' ensures that informational

labour keeps ahead of the game, capable of building a portfolio of experience on various projects while ever ready to adapt positively to novel situations.

A corollary of this is that informational labour, whatever particular differences are in evidence, shares talents most commonly nurtured in higher education. Specific skills learned in universities do matter, but they quickly date and the graduate must constantly retrain to keep abreast of things. Much more important than is the 'human capital' nurtured in the experience of higher education, something which expresses itself in a heightened capacity to communicate effectively, to analyse situations dispassionately, to come up with a strategy for advance, to broker deals with other actors, to identify strengths and weaknesses in a given milieu, and so on (Reich, 1992: 178–9). The inculcation of such qualities places an especial premium on higher education and, in this light, it is scarcely surprising that the calibre and capabilities of a nation's education system have become central to government policy (Brown and Lauder, 1995). The *leitmotiv* of Blair's UK administration is 'education, education, education', a litany repeated in all advanced nations which intend to see their citizenry capture a high proportion of 'symbolic analysis' jobs in the future (Seltzer and Bentley, 1999). Not surprisingly, then, a system of mass higher education is taken to be an indicator of an information society.

Economy

This approach charts the growth in economic worth of informational activities. If one is able to plot an increase in the proportion of gross national product (GNP) accounted for by the information business then logically there comes a point at which one may declare the achievement of an information economy. Once the greater part of economic activity is taken up by information activity rather than say subsistence agriculture or industrial manufacture, then it follows that we may speak of an information society (Jonscher, 1999).

In principle straightforward, but in practice an extraordinarily complex econometric exercise, much of the pioneering work was done by Fritz Machlup (1902–83) of Princeton University (Machlup, 1962). His identification of information industries such as education, law, publishing, media and computer manufacture, and his attempt to estimate their changing economic worth, have been refined by Marc Porat (1977a; 1977b).

Porat distinguished the primary and secondary information sectors of the economy, the former being susceptible to ready economic valuation since it had an ascribable market price, the latter being harder to price but nonetheless essential to all modern-day organizations, involving informational activities within companies and state institutions

(for example, the personnel wings of a company, the research and development sections of a business). In this way Porat is able to distinguish the two informational sectors, then to consolidate them, to separate out the non-informational elements of the economy and, by reaggregating national economic statistics, to conclude that, with almost half the US's GNP accounted for by these combined informational sectors, 'the United States is now an information-based economy'. As such it is an 'information society [where] the major arenas of economic activity are the information goods and service producers, and the public and private (secondary information sector) bureaucracies' (Porat, 1978: 32).

Space

This conception of the information society, while it does draw on economics and sociology, has at its core the geographer's distinctive stress on space. Here the major emphasis is on information networks which connect locations and in consequence can have profound effects on the organization of time and space. It has become an especially popular index of the information society throughout the 1990s as information networks have become increasingly prominent features of social organization.

It is usual to stress the centrality of information networks that may link together different locations within and between an office, a town, a region, a continent and indeed the entire world. As the electricity grid runs through an entire country to be accessed at will by individuals with the appropriate connections, so too may we imagine now a 'wired society' operating at the national, international and global level to provide an 'information ring main' (Barron and Curnow, 1979) to each home, shop, university and office – and even to the mobile individual who has his laptop and modem in his briefcase.

Increasingly we are all connected to networks of one sort or another – and they themselves are expanding their reach and capabilities in an exponential manner (Urry, 2000). We come across them personally at many levels: in electronic point of sale terminals in shops and restaurants, in accessing data across continents, in e-mailing colleagues, or in exchanging information on the Internet. We may not personally have experienced this realm of 'cyberspace', but the information ring main functions still more frantically at the level of international banks, intergovernmental agencies and corporate relationships.

A popular idea here is that the electronic highways result in a new emphasis on the flow of information (Castells, 1996–8), something which leads to a radical revision of time/space relations. In a 'network society' constraints of the clock and of

distance have been radically relieved, the corporations and even the individual being capable of managing their affairs effectively on a global scale. The academic researcher no longer needs to travel from the university to consult the Library of Congress since she can interrogate it on the Internet; the business corporation no longer needs to fly out its managers to find out what is happening in their Far East outlets because computer communications enable routine and systematic surveillance from afar. The suggestion of many is that this heralds a major transformation of our social order (Mulgan, 1991), sufficient to mark even a revolutionary change.

Culture

The final conception of an information society is easily acknowledged. Each of us is aware from our everyday lives that there has been an extraordinary increase in the information in social circulation. For instance, television programming is round-the-clock. There are also several broadcast channels available, and the TV receiver has been enhanced to incorporate video technologies, cable and satellite, and even computerized information services. More recently, an avalanche of computerized games has become attached to PCs and 'virtual reality' products have begun to enter the home. There is very much more radio output available now than even a decade ago, at local, national and international level. And radios are no longer fixed in the front room, but spread through the home, in the car, in the office and, with the walkman, everywhere. Movies have long been an important part of people's information environment. Though over the years attendances at cinemas have declined, movies are today very much more prevalent than ever: available still at cinema outlets, broadcast on television, readily borrowed from video rental shops, cheaply purchased from the shelves of chain stores. Walk along any street and it is almost impossible to miss the advertising hoardings, the billboards, the window displays in shops. Visit any railway or bus station and one cannot but be struck by the widespread availability of paperback books and inexpensive magazines. In addition, audiotape, compact disk and radio all offer more, and more readily available, music, poetry, drama, humour and education to the general public. Newspapers are extensively available and a good many new titles fall on our doorsteps as free sheets. Junk mail is delivered daily. And so forth.

The informational features of our world are more thoroughly penetrative than a short list of television, radio and other media systems suggests. This sort of listing implies that new media surround us, presenting us with messages to which we may or may not respond. In truth the informational environment is a great deal more intimate, more constitutive of us, than this suggests. One may

consider, for example, the informational dimensions of the clothes we wear, the styling of our hair and faces, the very ways in which nowadays we work at our image (from body shape to speech, people are intensely aware of the messages they may be projecting and how they feel about themselves in certain clothes, with a particular hairstyle, etc.). Reflection on the complexities of fashion, the intricacy of the ways in which we design ourselves for everyday presentation, makes one well aware that social intercourse nowadays involves a greater degree of informational content than previously.

Contemporary culture is manifestly more heavily information laden than any of its predecessors. We exist in a media-saturated environment which means that life is quintessentially about symbolization, about exchanging and receiving – or trying to exchange and resisting reception of – messages about ourselves and others. It is in acknowledgement of this explosion of signification that many writers conceive of our having entered an information society, one where everything that we see and do is simulated (Poster, 1990; 1995).

FROM QUANTITY TO QUALITY?

Critiques of information society scenarios revolve around a discontent with quantitative measures when they are used to designate profound, systemic change. The central criticism is that quantitative indices of the spread of information and information technologies cannot be interpreted as evidence of really deep-seated social change. On the contrary, they can be regarded as the consolidation and extension of established patterns of interest and control (Beniger, 1986; Webster and Robins, 1986).

Definitions of the information society offer a quantitative measure (numbers of white-collar workers, percentage of GNP devoted to information, etc.) and assume that, at some unspecified point, we enter an information society when this begins to predominate. But there are no clear grounds for designating as a new type of society one in which all we witness is greater quantities of information in circulation and storage. If there is just more information then it is hard to understand why anyone should suggest that we have before us something radically new. This is a point made well by Anthony Giddens (1985: 178) when he observes that all societies, as soon as they are formed into nation-states, are information societies in so far as routine gathering, storage and control of information about population and resources are essential to their operation. On this axis all that differentiates the present era from, say, seventeenth-century England, is much greater quantities of information that are amassed, dissembled and processed. If what we are experiencing in the informational realm

today is but an extrapolation and intensification of trends established long ago, then it is hard to see on what basis it can be alleged that these developments are bringing about a new sort of society.

Furthermore, it is at least intellectually possible to imagine a radically different sort of society coming into being, one that may even merit the title 'information society', though this transformation may be manifested in only small quantitative increases of information. That is, it may be feasible to describe as a new sort of society one in which it is possible to locate information of a qualitatively different order, though the information changes appear quantitatively minor. This does not require that we discover that a majority of the workforce is engaged in information occupations or that the economy generates a specified sum from informational activity. For example, it is theoretically possible to imagine an information society where only a small minority of information experts hold decisive power. On a quantitative measure, say of occupational patterns, this would not qualify for information society status, but we could feel impelled to so designate it because of the decisive role of information/knowledge in the power structure and direction of social change.

Bluntly, quantitative measures – simply more information – cannot of themselves identify a break with previous systems, while it is at least theoretically possible to regard small but decisive qualitative changes as marking a system break. Further, it is especially odd that so many of those who identify an information society as a new type of society do so by presuming that this qualitative change can be defined simply by calculating how much information is in circulation, how many people work in information jobs and so on. What we have here is the assumption that quantitative increases transform – in unspecified ways – into qualitative changes in the social system. But to argue that a plethora of personal computers or a preponderance of white-collar occupations means we have an information society is tautologous. We have been presented with no argument as to why more information should result in the coming of a new era; we have had only the unfounded assertion that more information defines a new society.

Moreover, quantitative measures tend to homogenize highly disparate activities. For example, in totalling the value of information activities in the economy and arriving at a given sum, information society theorists arguably overlook crucial qualitative differences within information. For instance, sales of a single tabloid newspaper in Britain are vastly greater than those of all the quality broadsheets combined. But who would suggest that these newspapers can be lumped together in the same category? The crucial issue to most observers is the quality of the information, of news, reportage and opinion, that these newspapers

contain. Indeed, so crucial is the issue of quality here that it is possible to present a credible argument that contends that a mass circulation tabloid or entertainment-dominated television represents the very antithesis of an information society, with a 'dumbed down' audience being swamped by garbage information (Postman, 1985; Washburn and Thornton, 1996).

This example alerts us to a related matter, the tendency for quantitative measures to overlook strategic issues. For instance, a raw count of information occupations is blind to the differences between groups, equating, say, social workers and stock exchange dealers, schoolteachers and corporate executives, clerks and lawyers. All are, of course, information workers, and hence equal in terms of the statistician's categories, but some of them clearly are very much more equal than others. In a cognate manner, postmodernist Jean Baudrillard's (1983) willingness to announce the 'implosion' of meaning in the realm of the sign in effect puts light entertainment, news and documentary programming on the same plane – all artifacts that can be experienced by audiences in any way they feel disposed.

There are a good many criticisms to be made of the methods used to measure an information society. All return to the issue that, while finished statistics may appear precise and firm, behind them lies a great deal of subjectivity and variable interpretation. For instance, discriminating between informational and non-informational occupations is a difficult task, involving distinctions of degree rather than of kind. Thus a photocopier repair person is deemed to be an information worker by virtue of working with advanced technologies, while the farmhand is seen as merely manual, though it is likely that a good deal of information will be required in the performance of their duties. The point is, we need to be sceptical of apparently conclusive figures which are the outcomes of researchers' perceptions of where occupations are to be most appropriately categorized.

There are related complaints to be made about technological measures of the information society. At first sight technologies seem to be especially robust measures, but what is to count as a relevant technology? PCs, computer-to-computer facilities, video, telephone exchanges, cable, camcorders, satellites, Gameboy toys, Exocet missiles, CD players – as soon as one begins the list, problems arise. Again, which of the long list of potential technologies might take priority over others? Networked systems over free-standing PCs? Further, how is one to count computers: by processing power, by use (machines in larger offices are likely to be much more exactly used than those in the home), or by cost? And how can one assess the role of software packages in the expansion of information technology?

Finally, but by no means least, even when one is alert to the difficulties that come with trying to establish what technologies are to be counted and how they are to be weighted against one another, there looms the vexing question: how much technology must there be in place to enable commentators to describe something as an information society? It is not frivolous to ask whether an information society is one in which everyone has a PC in the home, or whether it is more appropriate to designate this as three-quarters of the way towards a mature information society compared with those that have an established information network in place (but then again, when is a network a network?).

A connected and familiar criticism of technological conceptions of an information society is that they are determinist (Dickson, 1974). First, they assume that technology is the major force in social change – hence arguments which refer to the ‘world the steam engine made’, ‘the atomic age’, the ‘computer society’. A moment’s reflection reveals that history is much more complicated. For example, it is clearly the case that climate, mineralogical deposits, economics, education, war and a host of other factors have contributed to social change, some of these being, at the least, powerful forces influencing technological innovation itself (consider, for example, the influence of war and defence pressures on the development of high technology). Second, technological determinists work with a model which holds to a clear separation of technology and society, the former being in some way apart from social influence yet destined to have the most profound social effects. Technology here is at once sealed from the social world yet capable of shattering established social relations. Perhaps for this reason, technological development is frequently presented as an unworldly thing, led by eccentric inventors or possessed boffins, which yet impacts society dramatically when it is launched on the unsuspecting public. Again, however, it is not difficult to appreciate that technology is a part of society, subject to social shaping by factors such as investment priorities from corporate and government bodies, market opportunities and value commitments. Accepting this position casts doubt on those thinkers who would have it that technological innovations are such as to define a new type of information society (MacKenzie, 1996).

WHAT IS INFORMATION?

When one first encounters statistical series which chart increases in information, it might appear that we are using a term that is precise and widely understood. Initially at least it does seem unproblematic to observe that information increase is identifiable in, say, growth in numbers of magazine

titles available, in book issues from public libraries, in the volume of telephone traffic, in enrolment on advanced education courses, in television sales, in hits on websites, in the scale of exchange rate flows, in the expansion of online databases, in take-up of PCs and so forth.

However, a difficulty here is the profligate way in which the term ‘information’ is used. When bundled in this manner, different definitions of the word are collapsed. The closer one looks at what is meant by ‘information’, the more awkward does it seem to find a precise and unambiguous definition. Commentators write as if the meaning of the term is self-evident, but in this they are mistaken. Indeed, Norman Stevens concludes that ‘so diverse are the definitions of information today ... that it is impossible to reconcile them’, and, he continues, ‘there is little consistency in the way in which the term information is used ... resulting in an assumption, probably incorrect, that there is a broad underlying definition of information that encompasses all uses of the term in all fields that is commonly and directly understood’ (1986: 5).

Amongst the diversity of definitions of information in play, Zhang Yuexiao (1988: 400) reports that there have been identified some 400 conceptions of information presented by researchers in various fields and cultures. Most significant is the divide between those approaches which conceive of information in non-semantic ways and those which insist in its being something that has meaning. The latter is the most widely understood lay definition, information being regarded as data and ideas that are identifiable, organized in some way, often communicated, stored in various forms (books, television, etc.) and used in a meaningful way (Stevens, 1986: 9). However, it is important to appreciate that this is not the engineer’s understanding of information, which is a matter of measuring signals (Shannon and Weaver, 1964 [1949]). Thus measures of information increase that concern themselves with the processing power of computers or the acceleration of transmission rates by telecommunications exchanges invoke one definition of the term, that of the technologist which evacuates content. Commentators who define information in semantic terms, and perhaps look to the extension of signs and symbols in advertising and on television, are operationalizing a quite different conception of information. Elsewhere, those who take the growth in economic import of information – say, the expansion of the publishing business or trading in video materials – adopt a conception of the subject that is amenable to assessment by price, but which is a definition that elides questions of semantics. Again, one of the most common ways of identifying an information society is by counting the number of information workers in employment, a definition of information which centres on a process rather than a product, focusing on what people do

rather than on what is produced. This may be intrinsically interesting, but it is a quite different notion of information from one which would emphasize its expression in artifacts such as books and computers.

This lack of precision, and the habit of aggregating highly diverse conceptions into the single category, ought to encourage closer scrutiny of a blanket term that has been used rather promiscuously in recent years. That said, Theodore Roszak's (1986: x) observation that it is the 'very emptiness' of the word 'information' which paradoxically has allowed it 'to be filled with mesmerizing glamour' merits serious consideration. Indeed, when one encounters writers who insist that more information makes for an information society, it is as well to query just what it is they are counting as information here. Michel Foucault (1980) urged scholars to scrutinize ways in which things get talked about, arguing that examination of the construction of 'discourses' can be illuminating as well as somewhat subversive. A Foucauldian account of the genealogy of 'information', one which looks attentively at variable ways in which the term is conceived and applied by information theorists, computer scientists, semiologists, librarians, sociologists and economists, would make for an instructive read. Not least, it would lead one to hesitate before making sweeping statements along the lines that 'information' is transforming the very foundations of life as we know it.

THEORETICAL KNOWLEDGE

There is another suggestion, intriguing if imprecise, which contends that we are on the point of entry into a distinctly novel information society, yet without a need to reflect on the meanings of the information so developed. This proposition has it that we no longer need to seek quantitative measures of information expansion (information employees, tradeable information, etc.), because a decisive qualitative change has taken place as regards the ways in which information is used. This marks such a break with the past that we may legitimately refer to the coming of an information society.

From this point of view an information society is regarded as one in which theoretical knowledge takes on a pre-eminence which it has hitherto lacked. The theme which unites what is in fact rather a disparate range of thinkers is that, in this information society (though frequently 'knowledge society' is preferred, for the obvious reason that it conjures much more than agglomerated bits of information), affairs are organized and arranged in such a way as to prioritize theory.

It is worth noting that Daniel Bell presents this as an 'axial principle' of post-industrial society and

that, although the weight of his analysis leans towards quantitative increases in service (i.e. information) occupations as indicators of post-industrialism, he is emphatic that 'what is radically new today is the codification of theoretical knowledge and its centrality for innovation' (1979: 189).

It is easy enough to understand what Bell means by this when we contrast today's post-industrialism with its predecessor industrial society. In the past, it is argued, innovations were made, on the whole, by 'inspired and talented tinkerers who were indifferent to science and the fundamental laws underlying their investigations' (Bell, 1973: 20). In contrast to this decidedly practical and problem-solving orientation, it is suggested by Bell that nowadays innovations start from theoretical premises. That is, now that we have arrived at a situation in which it is possible to codify known scientific principles, our knowledge of these becomes the starting point of action. In this way, what was once dismissed as useless – as just 'theory' – has become the axis of practical innovations.

Again, it is not difficult to find illustrations of this 'change in the character of knowledge itself' (1973: 20). For instance, Alan Turing's paper 'On computable numbers', published in 1937, set out mathematical principles which underpin later applications in computer science; the development of integrated circuits that enabled the 'microelectronics revolution' to get under way in the late 1970s was founded on known principles of solid-state physics; and innovations in areas as diverse as compact disk technology, lasers and nuclear energy were reliant on breakthroughs in theoretical physics which were regarded, initially at least, as being without practical consequence. In fact, it is rather difficult to think of technological applications nowadays which do not hinge on theoretical knowledge, whether it is calculating the needs of households for supply of potable water, constructing aircraft, building bridges or generating energy. Not surprisingly, perhaps, we find historian Eric Hobsbawm confirming Bell's perception, concluding that during this century 'the theorists [have been] in the driving seat ... telling the practitioners what they were to look for and should find in the light of their theories' (1994: 534–5).

Bell takes his argument for what he terms the 'primacy of theoretical knowledge' considerably further, to suggest that it is pre-eminent not only in the realm of technological innovation, but even in social and political affairs. For instance, governments today introduce policies based on theoretical models of the economy. These are variable – Keynesian, monetarist, supply side, *laissez-faire*, collectivist – but each underpins the day-to-day decisions that ministers may make in response to practical exigencies. Alternatively, it is salutary to reflect on contemporary policies oriented towards resolving environmental problems. It quickly

becomes evident that these are not merely responses to particularly pressing problems (an oil spillage at sea, desertification). They do involve such contingencies, of course, but they are also proposals developed on the basis of theoretical models of the ecosystem's sustainability. Thus, for instance, environmental debates are routinely informed by theoretical projections on matters such as population growth, fish stocks and the condition of the ozone layer. Practical policies are only imaginable on the basis of these sorts of theoretical model: for example, appropriate reactions to a noticeably dry or warmer summer in the UK are comprehensible only in a context of theoretical models of the long-term likelihood of and consequences of global warming. To be sure, such models are at present inchoate and unrefined, but they and other instances help us to appreciate that, while theoretical knowledge does not have to be 'true' in any absolute sense, it does play a decisive part in our lives.

Theoretical knowledge is undeniably an arresting idea, one which *prima facie* defines a new type of society which hinges on the generation and use of information/knowledge. If theory is at the point of initiation of developments, in contrast to one-time practical demands, then such knowledge could be said to herald a new sort of society. Moreover, we are talking here not merely of more white-collar workers or more bits of information being produced, but of a new foundational principle of social life.

Nonetheless, a major difficulty with this notion is defining with any precision what is meant by theoretical knowledge (Kumar, 1978: 219–30). Theory evokes abstract and generalizable rules, laws and procedures and, with this, there can be agreement that advances, especially in scientific knowledge, have resulted in their codification in texts which are learned by would-be practitioners and which in turn become integrated into their practical work. This principle can reasonably be thought to be at the heart of research and development projects at the forefront of innovations, but it is clearly in evidence too in a large range of professions such as architecture, building, handling of food and even the design of much clothing.

However, there are those who would extend the notion of theoretical knowledge to encompass a much vaster range, all of which could be cited as evidence of a knowledge-based society. Here, for example, one might include the training of many white-collar employees in law, social services, accountancy, etc. as evidence of the primacy of knowledge in the contemporary world. Indeed, one might argue that the whole of higher education, at the least, is concerned with transmitting theoretical knowledge. After all, it is a common refrain, in Britain at least, that the rapid transition to mass higher education (with about 30 per cent of the age group attending universities) has been required by the need to equip appropriately large numbers

of people to operate successfully in the 'knowledge society' (Webster, 2000). Such knowledge as is transmitted is undoubtedly codified and generally abstracted from practical applications, and it is even generalizable, though it is surely of a different order of magnitude to the theoretical knowledge expounded in sciences such as chemistry and physics.

Nico Stehr (1994), proposing that we now inhabit a 'knowledge society', does extend the definition of theory in such a way, arguing that nowadays knowledge has come to be constitutive of the way that we live. Recourse to theoretical knowledge is now central to virtually everything that we do, from designing new technologies and producing everyday artifacts to making sense of our own lives when we draw upon large repositories of knowledge to help us better understand our own location.

Here we are extending the idea of theoretical knowledge a very great deal, but it is helpful in so far as Stehr echoes themes in the work of social theorist Anthony Giddens that merit comment. Stehr proposes a threefold typology of the development of knowledge: *meaningful*, that is the Enlightenment ideal of knowledge for better understanding; *productive*, that is knowledge applied to industry; and *action*, where knowledge is intimately connected to production with, for example, the inclusion of intelligent devices, and where it influences the performance of one's everyday activities. This last form of knowledge appears close to Giddens' emphasis on what he refers to as the *intensified reflexivity* of 'late modern' existence. What Giddens highlights here is that, increasingly, modernity has been a story of people's release from the strictures of nature and certain forms of community, where it appeared that one had to do what one did as it was a matter of 'fate', towards individuals and groups making choices about their own and collective destinies in circumstances of 'manufactured uncertainty'. That is, the world increasingly is not bounded by fixed and unchangeable limits, but is rather recognized as malleable and the outcome of human decisions. A requisite of this is heightened self and collective interrogation, otherwise reflexivity, though this is not to be perceived as some trend towards self-absorption. Quite the contrary, it is premised on openness to ideas, information and theories from very diverse realms, which are examined and incorporated as circumstances and people so decide.

A key point here is that a 'post-traditional' (Giddens, 1994) society which is characterized by intensified reflexivity of actors and institutions hinges on information/knowledge. Of course, some of this is local and particular (one's biography reflected upon, a company carefully scrutinizing its sales and stock records), but a great deal is also abstract, emanating especially from electronic media and from other, notably educational, institutions.

If one accepts Giddens' argument that we do inhabit a world of 'high modernity' in which reflexivity is much more pronounced than hitherto, then it is feasible to conceive of this as heightening the import of information and knowledge in contemporary life. A world of choices, for both organizations and individuals, is reliant on the availability and generation of detailed and rich information. If one follows Giddens' contention that ours is an era of intensified reflexivity on the basis of which we forge our material as well as social conditions, then it follows that this will sustain and will demand a complex and deep information environment. It is perhaps not quite the same sort of theoretical knowledge as that which Daniel Bell has proposed, but in so far as it is abstract and codified then it could find inclusion in a suitably widened category.

Nevertheless, there are reasons why we should hesitate to depict any novel information society in these terms. Not least is that Anthony Giddens himself is reluctant to do so. While he does emphasize that a 'world of intensified reflexivity is a world of *clever people*' (1994: 7), he appears unwilling to present this as other than an extension of long-term trends. Life today is certainly more information intensive, but this is not sufficient to justify projections that it represents a new sort of society.

In addition, Giddens has also raised doubts about the novelty of theoretical knowledge. Several years ago he observed that 'there is nothing which is specifically new in the application of "theoretical knowledge"... Indeed ... rationality of technique ... is the primary factor which from the beginning has distinguished industrialism from all preceding forms of social order' (1981: 262). This being so, we return to the problem of designating as novel today's society in which theoretical knowledge is prevalent.

Giddens' objection also begs the key question: just what do commentators mean by theoretical knowledge? It is clear, from the quotation above, that Giddens feels that the classical sociologist Max Weber's conception of formal rationality which underpins purposive action (most famously manifested in the growth of bureaucratic structures) might apply on one definition. After all, it involves abstract and codifiable principles, rules and regulations (the entire bureaucratic machine), as well as requiring from participants the command of abstract knowledge (how the system works). Theoretical knowledge, in these terms, is not much more than learning the rules and procedures of how bureaucracies function. If so, then one is forced also to ask what is especially new about this.

This leads us to the wider complaint about the imprecision of the term 'theoretical knowledge'. If, for instance, the 'primacy of theoretical knowledge' is taken to refer to known scientific principles (the boiling point of water, the conductivity of elements

etc.) which are codified in texts, then this is one matter. However, if theoretical knowledge is taken to include hypothetical models such as the relation between inflation and unemployment, poverty and life chances, or social class and educational opportunity, then this surely is another matter. It may be that such theoretical knowledge is distinguishable from laws of physics only by degree, but this remains an important difference nonetheless. If theoretical knowledge is perceived as the prominence in modern life of expert systems that operate services such as water and sewerage, air traffic control and the telephone networks, through the systematic monitoring of activities which are (re)organized on the basis of established principles (of toxicity, safety of margins and so forth), then this too is another thing. Alternatively, if theoretical knowledge is to be understood as a trend towards very much more intensified reflexivity amongst individuals as well as institutions, on the basis of which they then shape their future courses of action, then this is another thing again. Finally, if the rise of theoretical knowledge is to be chartered by the spread of educational certification – a common strategy – then this is to introduce still another significantly different definition. Such imprecisions must lead one to be wary of theoretical knowledge as a sound means of distinguishing an information society, albeit that a shift towards the primacy of theory does appear to be a marked feature of recent history.

CONCLUSION

This chapter has examined six analytically separable conceptions of the information society. It has argued that all are suspect to a greater or lesser degree, so much so that the idea of an information society cannot be sustained. In each case defining criteria are imprecise and vague. Moreover, the claim that the information society marks a profound transformation in our ways of life cannot be supported on the basis of the quantitative indices that are typically advanced. There can be no doubt that, in advanced nations, information and communication technologies are now pervasive and that information has grown in economic significance, as the substance of much work, and in amounts of symbolic output. But the idea that all such might signal the shift towards a new society, an information society, is mistaken. Indeed, what is most striking are the continuities of the present age with previous social and economic arrangements, informational developments being heavily influenced by familiar constraints and priorities (H. Schiller, 1981; 1984; 1996; D. Schiller, 1999). As Krishan Kumar has concluded, the information explosion 'has not produced a radical shift in the way industrial societies are organized, or in the direction in which they have

been moving. The imperatives of profit, power and control seem as predominant now as they have ever been in the history of capitalist industrialism. The difference lies in the greater range and intensity of their applications ... not in any change in the principles themselves' (1995: 154). It is ironic that the most persuasive conception of an information society, that which centres on the role of theoretical knowledge, is the least commonly suggested by information society adherents.

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