IV.1

Information Society Revisited: PICTuring the Information Society

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Introduction

In the mid-1980s, William Melody directed the Programme on Information and Communication Technologies (PICT) (see Dutton 1996; 1999), funded by the United Kingdom's Economic and Social Research Council. Six research centres brought together social scientists with diverse backgrounds to grapple with the challenges of understanding technological change. Lively debate concerned the 'Information Society' – a term then gaining considerable currency, which has since been institutionalised in European Union and United Kingdom policy.

One view expressed within PICT was that the term was anodyne. Information is constitutive of all societies. A more theorised term (for example, post-Fordism) is required to identify new social epochs. Another approach noted that flows of information, and especially the production, ownership and trade in information products and communication media, are of growing economic significance. Thus, Information Economy should mean Economy of Information. A third stream sought to appropriate the terminology of information society/economy (IS), to refer to epochal changes related to the emergence of new information technology. This *socio-technical* approach drew on the work of Christopher Freeman and his associates (see Freeman and Louça 2001), who, in studying major technological revolutions, had pointed to new information technology as being at the core of an ongoing technological revolution.

The IS involves transformations in social and economic affairs associated with the ongoing development and application of the underlying knowledge that underpins new information technology. Widespread social recognition is generated of the scope for using knowledge of new ways of storing, communicating and processing data. The technological innovations involve new trajectories of change based on knowledge of microelectronics, optronics, new generations of software and so on; and social and economic developments go beyond an incremental continuation of established social trends. These actions and counteractions of social actors, wielding (among other resources) differential access to the new knowledge about information processing, produce changes in:

- products and processes (consider industrial automation, in-car electronics);
- working practices and interfirm relationships (consider distance working, interfirm networks);
- the relative influence of firms and sectors (consider Microsoft, the telecom industry);
- the leisure activities and strategies for structuring everyday life (video games, the daily use of mobile phones);
- the understandings and expectations about the costs and opportunities associated with effecting the sorts of transformation permitted by the new technology and associated markets (consider storing and manipulation information about customers as exemplified by data mining);
- expectations about technological improvements, and market responses, leading to focusing of efforts, creating design platforms (for example, the stabilisation of the personal computer and Internet platforms) and technological trajectories (for example, Moore's Law as a description or prediction of decades of improvements in microprocessor power).

In a PICT study, *Mapping and Measuring the Information Economy*, Miles and contributors (1990) explored this approach to the IS through available statistical instruments and in the collection edited by Robins (1992) a variety of qualitative and quantitative indicators were employed. A wide variety of data were brought to bear on the topic, demonstrating extremely rapid development and diffusion of the new technologies in some areas and much more limited uptake in others. A number of questions were raised, and answers suggested.

Questioning Information Society

Does the IS constitute a radical break from the industrial society, just as industrialism displaced agricultural society? Much of what we now see represents an intensification of industrialism – for example, many service industries have adopted Fordist principles of organisation, increasing the spatial and social division of labour of processes, and the standardisation of products. Some developments are better labelled post-Fordism, reshaping of industrialism in manufacturing and service industries alike – with flexible customisation of products, more responsibility and variety in (many, not all!) occupations, and flatter organisational forms. These latter developments have co-evolved with, rather than been caused by, new information technology. Many commentators relate post-Fordism to a crisis in Fordism (which itself co-evolved with earlier generations of information technology, such as the telephone). Management information systems, mobile communication, and data warehousing and mining have rendered new organisational forms more viable. But little can be identified as

an overturning of industrialism – even such widely-touted uses of new information technology as teleworking have taken off much more slowly than proponents expected. Established social, economic and political systems are making use of the new knowledge and technologies. The IS as so far experienced more resembles deep changes within industrial society than revolutionary breaks away from it. Perhaps there will be major discontinuity in the future – but probably by then we will not be calling it the IS.

Can we mark a point at which a society becomes an IS? Some commentators seem to believe that a valid concept identifying an historical period has to be sharply demarcated from other periods. But historical processes may be better described in terms of quantitative change along a series of parameters sharing underlying novelty (such as the new technological knowledge involved in the development and application of new information technology). For some purposes it might make sense to develop a set of indicators of features that characterise the IS, and to seek to compare and contrast societies, sectors, etc. in such terms – just as researchers measure degrees of industrialisation for historical and international development studies. But this is a far cry from identifying the IS with a single parameter, let alone with a threshold point on such a parameter – for example when 50% of firms are using personal computers or when 50% of households are using the Internet.

*Does talk of **the** Information Society, imply that all societies move toward a common model?* Consider the analogy with industrialisation. Industrialisation has been a long process, involving distinct phases of development and taking very different forms in different countries and regions. Countries that have industrialised later than others feature very different socio-economic structures than early industrialisers. The growing pains of industrialisation led to the new political ideologies, and schisms that preoccupied the 20th century – and distinctive modes of capitalist and (state) socialist industrialism. The high levels of international trade and communication may make such schisms (or their informational variants) less likely in the 21st century, though cleavages may occur along lines other than those of nationhood. But informatisation still takes different forms in different societies, where attitudes to freedom of information and privacy, civil liberties and social exclusion, entrepreneurship and regulation, and a host of other relevant elements are very different. Newly industrialising countries are also becoming information societies in forms that are often dramatically different from those seen in the advanced industrial societies. Information societies are liable to vary considerably, and future international conflicts – whether trade or military ones – will often contain divergent views of what an IS should be.

Are distinctive forms of IS evolving over time? Just as there have been earlier periods of industrialism (sometimes defined in terms of technology, such as the steam age, sometimes in terms of social organisation, such as Fordism or the welfare state), can the IS similarly be characterised as undergoing its own evolutionary phases? In *Mapping and Measuring*, the problem of dealing with different generations of new information technology was taken up only briefly, discussing the problems from freezing indicators around extremely fluid technologies, and noting the generations of equipment identified by industry experts. Subsequent work (Miles 2001; 2002 forthcoming) has gone on to identify several phases in the development of the IS over the last few decades: *island, archipelago,* and *continental* phases. They are distinctive in many ways (though not as dramatically different as the great phases of earlier industrialism). The steps reflect the social and organisational learning processes that have informed the application of continually accumulating new technological knowledge. Here, I can only give a brief flavour of this approach.

Phases of Information Society

In the *island* phase, up to, say, the late 1970s, the computer, telecom, and broadcasting systems were highly distinctive. Information technology facilities during this early phase of the IS were few, physically large and cumbersome, but very low in terms of power compared to modern systems. Mainframe and minicomputers were used mainly in very large enterprises and government. Each computer served a large number of users, but only experts were doing more than data entry. High levels of expertise were required to operate computers, and the visual displays and keyboard interfaces were very basic. Public attitudes to the new technology were very mixed. Fears about the dehumanising effect of large databases coexisted with awe of computers. Government policies typically supported national champions (with their own designs and standards). Organisations concentrated information technology facilities in data processing centres, centralising information processing.

In the 1980s, the *archipelago* is characterised by a proliferation of devices of many sizes, usually with limited (two-way) communications. Telecom deregulation and support for strategic research programmes on satellite television were introduced in many countries. At the same time, many new industrial and consumer products using microelectronics were widely diffused. The personal computer found large markets in offices and homes, though early online information systems were (with a few exceptions) disappointing. Public fears about the impact of information technology use on employment were joined by the concern about deskilling. In fact, in the workplace the trend was more one of upgrading of work; isolated

components of the existing division of labour were frequently automated, but there was much less systematic reorganisation of work structures and integration of different functions. The decentralised use of personal computers (mainly as stand-alone devices) caused problems for corporate data processing managers. Equally, economists were puzzled by the lack of reflection of information technology investment in productivity statistics.

In the 1990s the *continent* was criss-crossed by information superhighways, networks bridging islands of automation. The Internet became a near-universal medium for computer linkages, and mobile systems of many sorts became prominent for voice and data communication. This is not to say that networking was universally diffused – many computer systems remained stand-alone. And the Internet was not particularly easy to use – many organisations required new skills in the form of network administrators and managers, website authors and editors, etc. – and *effective use* required considerable change in organisational practices. But as access to the Internet became widespread, and the Web provided a design paradigm for information exchange, the online transfer of data mushroomed. Existing services migrated to these media *en masse* – reaching out to broader and less specialised user bases, exploiting the lessened learning costs of a common interface. Electronic commerce applied new information technology to the transactional elements of economic activities; and, despite the stock market boom-bust frenzy, it does represent significant network integration across the islands of automation of factory floor production, warehouses, offices, etc. It offers scope for new modes of doing business, for integration of internal and external processes and restructuring of supply chains. This requires considerable organisational learning and re-engineering. By the turn of the millennium, there was evidence of performance improvements in information technology-using firms and of new trends in the United States economy, suggesting that increasing networking and/or organisational learning were beginning to overcome the productivity paradox.

What Next?

PICT made progress along several different approaches to understanding the IS. The socio-technical view of the IS, and the mapping and measuring project, could valuably be revisited – for example, to examine what indicators we might use to illuminate the different phases of the IS. The utility of distinguishing such phases for examining evolving policy challenges and policy learning that are posed by distinctive configurations of the IS is substantial. And, if the approach is even approximately valid, it suggests that there would be much mileage in a new PICT programme.

It is very difficult to generalise about *the* Information Society, despite shared novel features (the use of certain new knowledge). Even during the distinctive phases of the IS, very different patterns emerge in different regions, countries, cultures and social groups. Generalisations based on one phase may not apply to others – they vary in the ways in which organisations use new information technology to transform their relations with staff, clients, etc. Much of the theoretical apparatus developed in PICT to understand the social shaping of technology remains valid; but evolving empirical circumstances mean new relationships and practices – new complexities. Thus, productivity or employment trends, challenges to civil liberties or media quality – these may have very different manifestations over social times and spaces.

The immediate implication is that simple extrapolation is insufficient. We cannot assume that the new technologies have the same meaning today that they had yesterday. We are in the business of generating better ways of understanding what these meanings are and why they take the forms they do. There remains a need for more sustained analysis of underlying relations and processes, and how these are mediated by the continued application of human creativity in generating social and technical innovations, in applying strategies and counterstrategies in the pursuit of their (emergent, and only partly consciously articulated) objectives.

These complexities, and the elaboration of strategies and innovations generated by numerous parties (possessed of imperfect knowledge), create considerable uncertainty in the systems; but leave much to play for. Controlling the future is not possible. Even if others did not seek alternative futures, our knowledge is very limited, and practically the only certainty we can have about our choices is that unintended consequences are inevitable. An active and better-informed role in shaping the future is an option, however. It requires an experimental attitude, open to more intensive and extensive processes of learning. Organisational strategies (and structures to facilitate learning) remain crucial in the shaping of future phases of the IS, as they have been in the past. Information technology can enable the more rapid exchange of intelligence about good and bad practice, winners and losers, emerging problems and challenges, unexpected consequences and opportunities. Thus awareness of the potential significance of information and information technology strategies will grow, implying increasingly wide participation in the shaping of the IS at local levels. It is easier to predict this than it is to anticipate the approaches that will be adopted, and the winners and losers. Future phases of the IS (the *ecosystem* phase, perhaps) will continue to be worthy of close attention – and to require analyses from social scientists, such as the PICT Programme developed under Melody's stewardship.