II.5

Integrating Social Sciences into Information Society Policy

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Introduction[1]

My central thesis is that, although there are clear limits, the knowledge produced by the social sciences about social dynamics should be an integral and legitimate part of innovation strategies and Information Society policy. To a large degree social scientists seem to avoid this topic. This contribution offers some propositions aimed at optimising the relation between Information Society policy, innovation and the role of the social sciences (see Burgelman 2001a,b for an earlier version). I have had the pleasure of discussing this topic with William Melody whose articles on it were particularly influential in shaping my own thinking and research perspective (Melody and Mansell 1983; Melody 1987b; 1990a).

Innovation Requires More than Technical Know-How

Technology policy, in general, and information society technology (IST) related innovation policy, in particular, is characterised to a great extent by extreme technological determinism or by a technological 'bluff' (Ellul 1990). It is taken for granted that what is technologically feasible simply will occur. Innovation policy should then merely concentrate on the technological performance of systems. Further, as the conventional wisdom goes, the technological impetus for the development of these technologies is unrelated to social forces. This view generates a tendency to accept technical innovative capacities as sufficient and/or necessary conditions for social change. A typical example of this technologically deterministic reasoning is as follows – innovation in IST research should concentrate on technologies that can deliver more bandwidth, because that inevitably leads to more communication and hence to a better life. Put simply, if one wants to realise an Information Society, which it is assumed will embrace a 'higher' level of civilisation than the industrial era, as many technologies as possible must be provided.

This type of technological determinism helps to explain why there is so much IST hype. This hype suggests that each technology that transmits a kind of communication, for example, graphics, sound, text, or data, in a better way than existing technologies must be regarded as being highly successful. The burst of the

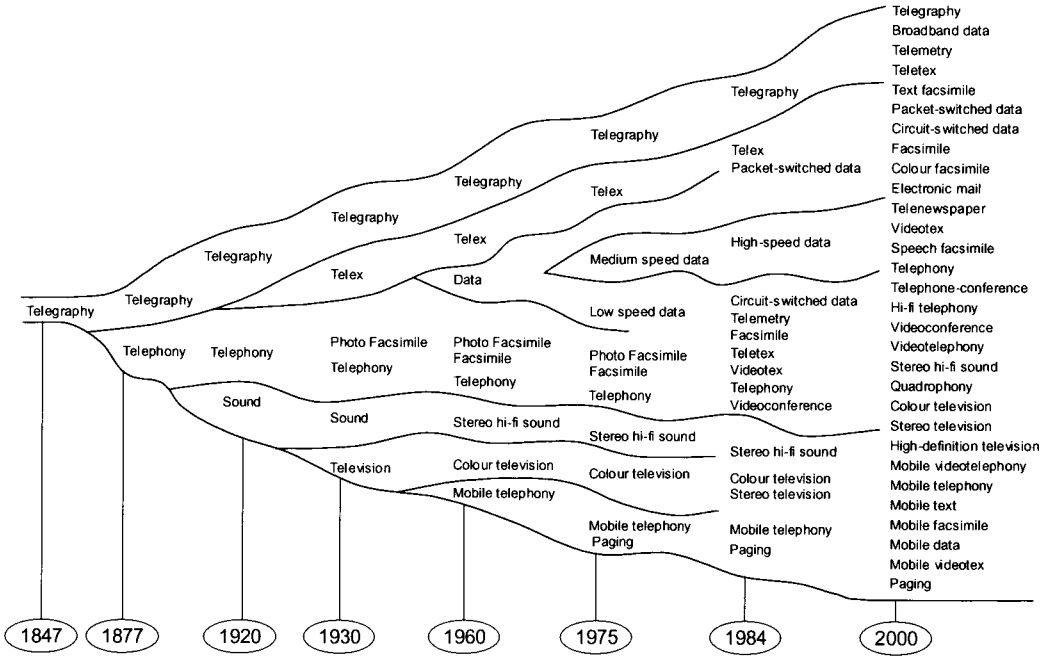
Internet bubble, for example, can be explained as nothing more than the deflation of the belief that new technologies automatically equate with new social practices.

There have been many of these bubbles, although none with the intensity of the dot.com one. Many examples can be given of 'superior' technologies that have failed. The CD-i was assumed to be in great demand in the late 1980s and to be the killer application for the multimedia revolution. But at the end of 1997, after years of fierce marketing and heavy investment, Philips decided to terminate this product line and to close its multimedia division.

The videodisc was forecast to become a very successful technology that would push its competitor, the Video Cassette Recorder, out of the market. The videodisc disappeared together with RCA, which had developed it at an extremely high cost. Similarly, cable television, launched in the 1950s and 1960s, was regarded in the same way as the Internet is today, that is, as a technical channel which could lead to a social (r)evolution. The social revolution has not occurred. But something has changed. The number of television channels has multiplied by a very significant factor. In short, technological know-how and technological superiority are not the sole determinants of the success or failure of an IST. These are only two of the factors that influence whether a certain innovation breaks through.

An example from European Union (EU) policy offers another illustration of this point. At the end of the 1980s in Europe an often-discussed book within EU policy circles was *Telecommunications in Europe* (Ungerer and Costello 1988). Ungerer, an EU official, was regarded as one of the most important 'brains' in matters of telecom policy and was influential in Directorate General XIII's (now the Information Society directorate) liberalisation policy decisions. In this book it was predicted, on basis of forecasts for the development of microelectronics, that the number of available ISTs would multiply exponentially by the beginning of the millennium. A comparison with the development of automobile technology was used to illustrate the breathtaking technological advances in the personal computing world. The book predicted numerous intelligent applications of the new technologies (see Figure II.5.1).

Figure II.5.1 Telecommunications Prospects for 2000



Source: Ungerer and Costello 1988

Considering this forecast in retrospect teaches us that most of what was predicted for the market by 2000 either still does not exist, already existed at the time of the prediction, or that the technology in question simply failed. Most strikingly, the one technology that was not foreseen was the Internet and its percolating

capabilities that are transforming most of the ways in which we live, do business and work. This omission of what may be one of the most important IST-related innovations ever, shows that extrapolation on the basis of a limited technological paradigm, oversimplifies the whole business of innovation. Indeed, the Internet appears as a technology that became an overnight success by sheer accident. But a closer look reveals that it was not accidental or sudden at all. In fact, the Internet's history dates from its conception as a military technology in the 1960s. The breakthrough for the Internet's growth was the introduction of the World Wide Web interface which triggered the important social factor of improved user-friendliness of computer communication systems. Equally important were the reduced telecom prices induced by state-led liberalisation policies. The Internet's success was preceded by 20 years of (military) government subsidies, academic R&D, and a considerable policy initiative.

Social and economic 'engineering' surrounded the breakthrough, growth and success of the Internet. Contrary to the dominant view that the government should not play a vital role in the innovation process, in the Internet case, government policy was essential in encouraging technical innovations which allowed this platform to develop. All major breakthroughs involving IST innovations are characterised by a long-term view or vision. Much time and money are devoted to allowing experiments to learn from mistakes and to strong enabling policy, without knowing the direction that innovative activity should follow.

If the aim is to assess future technology developments as accurately as possible, it does not suffice to keep an eye only on the technological capacities of certain innovations. ISTs are only the carriers of communication processes. The latter are exclusively human affairs and are influenced by people's social, economic and political incentives. Innovations in IST do not occur in a vacuum. They are closely embedded in human action and they are very strongly influenced by social and economic contextual forces.

Full Substitution or Sudden Explosions

Older information and communication technologies are rarely fully substituted by newer ones. The television industry has not ousted the film industry in contrast to what had been predicted initially. In fact, the film industry is one of the most important actors in the multimedia business. Likewise, e-mail and other forms of electronic communication do not appear to be supplanting the postal service. On the contrary, a complementary co-evolution between these two channels is taking shape. In the same manner, the massive introduction of the personal computer has not led to the disappearance of printed-paper or the arrival of the paperless office.

This general rule of complementary co-evolution (or creative destruction in Schumpeterian terms) (Schumpeter 1943) is an exception as far as innovations in processes or procedures are concerned. In this type of process or procedure innovation, the innovation cycles tend to be rather short (10 to 15 years) before full substitution occurs and markets support the innovative activity. In contrast, complementary co-evolution occurs in the case of a radical innovation – in the neo-Schumpeterian sense. The innovation introduces new modes of operating, it generates new social relationships and it takes place in technological clusters as in the case of the combustion engine or the Internet. The innovation process is often more laborious; often taking 20 to 30 years requiring a supportive policy environment.

Strikingly, policy-discussions about IST-related innovations often mix both these types of innovation. For instance, a new stage in the evolutionary process leading to the IS by means of innovations in information networks suggests a classical neo-Schumpeterian perspective, but the policy framework to realise this often proposes to let market forces play. This is counterproductive because it is unlikely to enable a flourishing innovation process. The way the Universal Mobile Telecommunication Service (UMTS) licences were granted is a good example of this. This new technology which enables mobile Internet services is a radical innovation which needs time to achieve widespread take up. Most west European countries auctioned these licences at very high prices. With no time to experiment because the licensees must recover the costs of the licences, the companies are incurring debts substantial enough to cause the Bank of England and the Bank of France to issue debt warnings. Japan chose not to follow the auction path, deciding instead to grant licences to the most competent bidders or the winners of the 'beauty contest'. The Japanese UMTS operators can now concentrate on deploying the (expensive) network and the services over a longer period of experimentation and with the support of government policy.

Breakthroughs and Emergent Qualities

There are limitations to the foregoing argument, however. If one studies the greatest or most radical breakthroughs in the field of ISTs (such as the telephone, radio, or the Internet), it is clear that they are all marked by certain emergent characteristics. Borrowing from evolutionary biology, this concept suggests that an innovation is often unexpectedly and unintentionally more than the sum of its parts (Calvin 1992: 109):

> Things can have certain qualities in combination, qualities which they do not have taken separately. The additional features are derived from the

> osmosis of the separate parts. We call them 'emergent qualities'. ... The flying of birds was probably the result of the simple invention of applying feathers for insulation. We cannot always predict what will happen. Most new acquisitions in evolution are probably the result of these emergent qualities.

Breakthroughs in ISTs can be seen as emergent qualities. This means that, depending on the socio-economic context and with variations through time and space, completely unexpected applications of technologies may pop up. For instance, the invention of the telegraph was an accidental spin-off during the search for a more efficient means of railroad management. Radio was discovered when researchers were side-tracked in their search for a better telegraph system. The Internet was a spin-off of the search for an efficient and less vulnerable military communication system. These spin-offs were unintentional and could not have been planned. But they can be explained in terms of a technical emergence within the context of their socio-economic dynamic. The emergent qualities principle is very important because it implies that radical changes are unpredictable.

The emergent qualities principle also implies that social knowledge has limits and that we should avoid a socially deterministic approach as well. Fine-tuning research in line with existing demand cannot be effective. The engineer's argument that social scientists failed to foresee the success of the personal computer and that it would have been wrong to stop research in this area is correct. But that does not mean that forecasting is pointless. Forecasting can be used to consider counterfactual developments and to ask, on the basis of past experience, what developments are least likely to achieve a breakthrough.

Where are the Social Scientists?

The IST industry has worked within a strong 'technology push' paradigm and policy orientation. Non-technical scientists have been asked mainly to write business plans or to provide regulatory advice. But the policy spectrum is changing. The demand for social science is rising in policy circles and within firms. Unfortunately, the social sciences are not well-prepared for this, at least not in Europe. The reason seems to be that a lot of social science research on ISTs simply misses the boat. Many European Union studies on the impact of ISTs on employment, on the competitiveness of the consumer electronics industry in Europe, and on the relevance of these technologies for the accession countries joining the EU are important for social and economical policy. But it is extremely difficult to find good, comparative data and analysis. It is particularly amazing

that good social research is missing on the development and prospects of the content industries in Europe because the communication studies field is one of the most popular and fastest growing areas in academic research. But the more technologically complex the topic is, the less attention it seems to receive.

This tendency towards a lack of theory on technology or towards non-empirically based theory is certainly a reflection of the fact that ISTs are emerging in a complex world. Therefore, social science analysis of ISTs requires the addition of:

- Motivation: It is easier and more productive in terms of academic publications to study the impact of 'Baywatch' than to study broadband communication;

- Scale and multi-disciplinarity: Studying ISTs involves at least economic, social, legal, linguistics and ergonomic perspectives;

- Considerable resources: Teams and networks are needed and research is costly. Other costs include those for data gathering for reports and attending industrial conferences in the IST area. These costs must be incurred as this is the only way to keep abreast of this fast changing field.

The reasons that the social sciences are not delivering enough of what IST policy makers need can be attributed mainly to disciplinary lock in, on the one hand, and to the costs of research, on the other.

Conclusion: Shortening the Long Way Ahead

In order to become more relevant for IST policy, social scientists should, in the first place, produce good research. To facilitate this there is a need for specific structural conditions. Much more money should be made available for the social sciences in order to research the sector and to build interdisciplinary teams. The speed of change of the sector and its intrinsic complexity create the need for large research groups. Successful places where social science research in support of IST policy is produced has these characteristics as did the Programme on Information and Communication Technologies (PICT) in the United Kingdom, directed at the outset by Melody. It showed that significant results could be achieved quickly and that the spin off effects for the wider academic community could be large. Indeed, thanks to PICT, the United Kingdom has now a lead in social science IST research.