

Information and Communications

Generic technological revolutions are all accompanied by revolutions in the way information is generated and processed, and the way goods, people, energy, and information travel. This reflects the fact that each generic revolution increases the complexity of economic and social systems and widens their geographic range. In many cases the generic technology has been the communications technology (railways in the second surge, steel steamships and the electricity grid in the third, automobiles in the fourth).

There have been contemporaneous bursts in associated technology and institutions. In the second surge the transformation of printing technology led to a steep rise in newspaper and book publishing. The new telegraph lines ran side by side with the railways. The penny post multiplied the volume of letters eightfold from 4 million to 32 million between 1839 and 1871. Print became part of mass culture for the first time in the second surge.

The third surge was marked by the invention and expansion of the telephone and the global growth of print, the fourth by the dramatic development of audio visual technology, first radio then television. Each of these became shapers of culture and platforms for advertising. They helped to create first a national, then an international market. And they were part of a family of hard and soft technologies that transformed the way businesses processed their own financial and production information to meet the expanding complexity and range that each surge opened up.

The fifth surge of information and communication technology (ICT) is distinct in being the first generic technology to centre on the generation and processing of information and its communication. It has profoundly affected the way in which science and technology are themselves conducted. It has increased the accessibility, the velocity, and range of communication, and the speed of processing, the searchability, and storage of information. It has dramatically cut the cost and improved the quality of ICT, and in doing so has provided the basis for a new organisational, spatial and cultural paradigm to emerge.

There are six key features of this paradigm:

- a shift from centralised to distributed systems
- a growth of self organisation (within firms, in public services and in cyberspace) and of produsage (where the users are also producers).
- the decomposition of projects, products, processes, and markets into bits, and their re-assembly into differentiated wholes (the Lego principle)
- a strengthening of collaboration within and across traditional boundaries (within and between individual firms, governments, households and civil society) (the principle of 'with' rather than 'to' and 'from')
- an increased capacity for cross system synchronisation and flow across space and time
- a shift from centralised hierarchy to multi-nodal networks

Together these are changing the contours of the economic & political landscape.

Finance and Banking

After a period of financial frenzy when finance dominates production, the challenge posed during the slump that follows is how to restructure the banking system so that finance is subordinate to production and services the expansion of the generic technology throughout the economy.

In the first surge of the industrial revolution the critical requirements was for working capital which was provided by the growth of country banking that issued their own bank notes and developed the practice of discounting. Most of the industrial investment was through re-invested profits or short term credit rolled over. By the second surge this system of private banks was being replaced by joint stock banks – which expanded in range and scope from the mid 1850s – but for the most part remained subordinate to the requirements of production, leaving the finance of the railway boom largely to consortia organised by new investment banks many of them shaped by the continental tradition of merchant banks, and which then acted as intermediaries for the finance of the international expansion of railways in the second half of the 19th century.

This was the structure of finance in the dominant economy of the first two waves. But on the continent – faced with British competition – a different tradition evolved, with a so called three pillar system of local, regional and national state banks, commercial banks and an extensive mutual sector in both the countryside and the cities. For well over a century the public and mutual banks remained as key support services to the financial needs of households and industry until pressure for privatisation removed the public banking pillar in a number of countries from the 1990s. In spite of the banking liberalisation of the EU, three pillar systems remain strong in Germany, Austria, France and the Netherlands, with the German local quasi public savings banks and mutual banks being central to the success of the small and medium enterprises of the Mittelstand. There are certain parts of North America (notably Quebec and North Dakota) where similar banking systems have provided the backbone of the regional economies.

With respect to the financing of production in the deployment period, particularly with respect to environmental and social innovation, there are five potential paths for development:

- the introduction of regulation to curb the speculative behaviour of mainstream commercial banking
- the expansion of range and representation of the European Investment Bank
- the expansion of specialist quasi public banks (like the Dutch Water Bank) operating both locally and nationally, particularly for green investment
- the use of state development procurement to provide guaranteed income as a basis for raising finance on mainstream financial markets
- the expansion of mutual banks and credit unions

Work and Welfare

The radical innovations of each surge have tended to destroy many traditional forms of work and the conditions of life, resulting in large scale migration, and/or resistance by civil political movements demanding a new social compact. These social compacts provide the conditions for the spread of the benefits of the new generic technology during the deployment period. They secure a certain measure of social welfare and distribute the gains in productivity and therefore demand more equitably.

In some cases, as during the second surge, the social innovations come from changes in state regulation and the simultaneous growth of new forms of autonomous self provision (as with the friendly societies, mutual banks, and the co-operative retail societies). In others, such as the third and fourth waves, there was a mixture of strong labour unions and direct state welfare provisions.

The current surge has been marked by three major changes:

- the globalisation of particular segments of the labour market, from senior professional and technical staff to unskilled migrant labour, and the increased geographical flexibility of production. Both have served to undercut regimes of labour regulation and bargaining based on national labour markets.
- the increased pace of technical and organisational change, resulting in a continuing re-definition of work and structures of employment.
- the shift to distributed systems of production reflected in the growth of sub-contracting by major corporations and by the state.

These features of modern just-in-time distributed production not only weaken traditional forms of labour organisation, but help explain the growth of what Guy Standing has termed 'the precariat' – part-time, temporary, self-employed, irregular, and informal labour. In Spain half the workforce are on temporary contracts. In South Korea the figure is more than half, in Japan it is a third. In the US nearly half the workforce change jobs at least once a year. Labour intermediaries like Pasana, the Japanese staffing agency that places 250,000 workers daily have grown in response to this ever more fluid labour market.

A new social compact will have to be international. It will need to establish a floor for wages and financial security, and greater access to lifelong learning that can be dovetailed in to fluctuating employment. There is scope for the development of social labour intermediaries and associations of temporary workers that reduce the transaction costs and improve the outcomes of fluid labour markets, and at the same time secure conditions for such things as child care and pensions normally associated with permanent jobs. There are working models that can be generalised in all these fields from Brazil's monthly cash payments now made to 50 million people, to German Guilds, Dutch working time regulations & India's million strong Self Employed Women's Association.

Taxation

During the 19th century, taxation in Europe was largely indirect. This began to change in the 1890s with the introduction of a progressive income tax first on the continent, then in the UK and the United States, to fund the expansion of welfare services. Yet even by the time of the 2nd world war only 4 million people were paying income tax in the UK. By 1948 this number had risen to 14.5 million and by 1990 to 21.5 million. Income tax (along with national insurance contributions) was the principle form of taxation during the Golden Era of Mass Production, and taxation in non federal countries like the UK became increasingly centralised (local taxes in the 1900s accounted for one third of public revenue, and are now 3-4%). Today central government taxes on income plus contributions account for 2/3 of government revenues.

Globalisation and changes in industrial structure have put pressure on this 20th century model of government funding. On the one hand increased multinationalisation and intra-firm trade since the 1960s has reduced the tax raised on the incomes and capital gains of many major corporations (and on many of those individuals with the highest earnings). On the other there has been the growth of self employment, part time and informal work which has been more difficult to tax than the full time employees. As a result there has been a shift in the relative burden of taxation onto those employees and businesses in the formal national economy, and at the same time pressure to introduce selectivity into welfare services. As a result both in the UK and more widely where similar trends have been observed, there has been growing political resistance to direct taxation and an erosion of support for universal welfare.

How then can governments fund their expenditure in a globalised and more distributed economy? There have been four principal proposed directions:

- international taxation and distribution (such as the Tobin tax, or resources royalties)
- increased hypothecation of taxation. This would include greater localisation of taxation, the restoration of the direct link between contributions and benefits, the connection of carbon taxes to environmental spending, and the restoration of government and local government bonds for particular investments.
- the increase of state revenue from utilities, communications and natural resources notably land rents.
- a redesign of capital taxation to raise income from short term capital gains while encouraging long term investment

New forms and the social economy.

The proposition is that in periods of deployment, the new generic technology can spread from the sectors that developed and were associated with it in the installation period, to those which have not realised the transformative potential of the new technologies and the diffusion of its gains to meet the problems that have proved increasingly intractable within the old paradigm.

In the current period, these problems are primarily associated with growing social issues such as ageing, care, and chronic disease, and the many facets of the gathering environmental crisis. In all these cases, the past ten years has seen a wave of social innovation both from within the civil and public economies that exemplify the new paradigm and suggest paths for its diffusion.

In place of the command and control model of centralised institutions delivering standardised services and utilities, the emerging ICT model as applied to public and environmental utilities is characterised by:

- a new focus on prevention
- the shift from passive consumption to active 'prosumption'
- the development of a support economy, assembling services around the particular needs of households, enterprises and neighbourhoods
- the design of distributed systems (of energy, water, health and care services, educational support, and finance)
- system integration through shared purposes, common protocols, standards and data generation and circulation. System economies replace scale economies as the dominant economic principle.

Such a model requires:

- new infrastructure, both physical (such as a smart grid) and in formation (platforms, tools, protocols and resources for collaborative organisation)
- new systems of user centred information as well as open information and transparency to ensure accountability for public funds
- more porous interfaces between different parts of the social economy, including public/social partnerships, collaborative contracting, and participatory budgeting.
- further development of appropriate organisational forms such as multi-stakeholder mutuals in relational services, community land trusts, community of interest companies, one click associations, environmental mutuals and trusts (such as wind and energy co-ops), and inter-enterprise consortia.
- further innovations in public finance, (extending Invest to Save budgeting, public service agreements, public challenge funds and social impact bonds) and in social resource exchange (such the furei kippu care currencies in Japan, the local Labour notes developed in Austria and the US in the 1930s, Landshare, and similar schemes).