

"LIVING WITH IT"

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## LIVING WITH INFORMATION TECHNOLOGY

Twenty-five years ago, a discussion of living with information technology would have had to rely on futuristic projections on what might happen if computers ever became widely available in the community. The fast and still accelerating pace of technological change that is commonplace today could not be discerned in those days. A nation that had emerged from wartime austerity into a never had it so good standard of living and would soon enjoy the swinging sixties had no concept of the industrial changes and the economic woes that were laying in wait to confront the nation of the nineteen-eighties. The term Information Technology is used to describe what happens when computers and communications are mixed together. It is rather like mixing hydrogen and oxygen. The resulting chemical becomes a life source.

In these 25 years we have lived through momentous changes. Technology has created many of the issues that are at the heart of today's social, economic and political dilemmas and opportunities, ranging from the displacement of jobs by machines, the acquisition of technology by new countries that has led to destruction or damage to our own industries, the invention of machine-intensive new materials that have replaced old labour-intensive materials, the Bomb and its proliferation, the technology of energy extraction and processing, the disconnection of transportation and communication through the rise of telecommunication, the developments in medical technology, the developments in educational technology, the exploration of space and its use, the growth of television and electronic entertainment and at the heart of much of this technological change, the thundering beat of the ubiquitous computer - ever faster, ever smaller, ever cheaper, ever more reliable and ever more pervasive.

In twenty-five years, a tool that was useful to the community in a peripheral way, has become central to our way of life. Whole new industries have sprung up to make computers and exploit their use. Just as the old industries tended to gather in congenial surroundings, so the new industries have established their silicon valleys, glens and gulches. The old industries relied on raw materials from the earth. The new industries rely heavily on raw material from the mind.

There seems to be hardly a field of activity that the computer has left untouched. We find them in our homes - some 600,000 of them at the end of last year - in our

schools, in libraries, in shops, in hospitals, in police and fire stations, in pubs running games machines, in cars - first the trip computer, then the engine control computer, and now even the talking computer - in factories, in offices, in central government, in local government, in polytechnics and universities. It seems that the very infra-structure support of our civilization is computer-dependent. Take them all away and how would we cope?

Most of this computer penetration has come about in the last few years. The rate of penetration is astonishing. By early 1983, business micro-computer sales were growing at the rate of 50% per quarter while home computer sales were growing at 100% per quarter. We seem to have an insatiable appetite for computers. While a world trade recession damages prospects for most products and services, computer and electronic products continue to expand and By the end of the century the information industry surely will be the world's largest. Using the broad definition of the information industry, by the early eighties it is already second only to oil in total size.

The effects on business are already there to see. Computers are used at every stage in which a business adds value - buying, selling, making, stocking and accounting. But what effect will all these computers have on our communities? How will they interact with other social and economic changes that are in train? What will happen where people live, work and play?

This last question is central to our future. Ultimately it will be the decision of people that will determine the answer but the computer will influence the decision.

Our attitude as to where we live has in the past been largely dictated by where we work. Our cultural ethos is that we work to live - we do not live to work. Without the work consideration we might choose to live elsewhere. For example, senior citizens often choose to move home upon retirement.

The first industrial revolution provoked the movement of population from the country to the towns where energy availability, transportation and communication were conducive to industrial and commercial enterprise. In the beginning, living and working places were entwined and it was only in this century that we started to zone them culminating in the development of the new towns with their clear demarcation of living and working areas.

But in recent years the nature of much work has changed. The dark satanic mills have gone. The great primary and secondary industries - from mining to ship-building - have gone into decline never to retain their former glory. Of the total workforce, some 50% of it is employed in white collar office jobs.

The period 1951 to 1971 in the UK saw the rise of information-related activities which by 1971 had become the major employment sector. Manufacturing had declined as had agriculture. The service industries continued to grow.

| Employment Sectors  | 1951 | 1971 |
|---------------------|------|------|
|                     | %    | %    |
| Information-related | 21   | 35   |
| Manufacturing       | 41   | 30   |
| Agriculture         | 5    | 2    |
| Service             | 33   | 33   |

(England & Wales only)

Source : UK Census.

The change in work, perhaps, can be more readily appreciated with the aid of a statistic. Since 1918, the average working life has reduced by two-thirds. Shorter working hours, longer initial education, longer holidays and earlier retirement are obviously factors of impact.

There is little doubt that there will be further and continuing reductions. Today, for the average person, free time exceeds time in and travelling to and from work. We are moving away from the three 48s to the three 35s - away from the 48 hour week, the 48 week year and the 48 year working life. The growth of leisure and leisure related industries, the growth of home education such as the Open University and the growth of home entertainment through the video revolution, takeaway food and ubiquitous central heating are signs of the social changes that less work has brought.

We separated living and working places for all manner of reasons - noise, congestion, traffic, dirt, symmetry. The idea of separation manifests itself in dormitory communities - communities that only come awake when the workers return. The social problems so created have been substantial. Why can't people live and work in the same local community?

Let us take the example of office workers. An office is an organization of people that provides a service of communication and recording. It was originally intended to be a place at which people could be found at predictable times - a place to send letters, a phone number to call, a place to go for meetings. The office workers needed to be in one place so that they could work as a team. In the future more of the work of an office will involve the use of computers - not just for today's jobs of processing data and words - but also for communicating with people and other computers. Much office conversation is electronic already - over telephone, through dictating machines, via telex and message systems. New systems are becoming available to file documents and retrieve them electronically in whole or in part and to send electronic images of documents from one place to the next. Like the computers themselves, they are daily becoming cheaper, faster and more effective.

The office as a conjunction of space and time is already fading. Flexi-time, where an employee works flexible hours within a fixed overall time commitment is already commonplace. Flexi-place is in its infancy, but probably unstoppable. The fact of the matter is that technology is already available to transport via telecommunications the office work to the office worker at home. This is the converse of transporting the worker to the work, which has been our historic method.

The concept of telework - working at home through telecommunications - is already being implemented. The main users are technical, professional and managerial staffs. In 1982, Rank Xerox announced a plan to re-locate over a hundred middle managers so that they could work from home. One of the UK's most interesting and talented software houses, 'F' International, is home-based. The coming cable TV networks which will provide two-way data and text communication to the home way well enable telework to be extended economically to clerical workers. This does not mean people will never go to offices. It means that they will go less often because the basic services of communication and recording will have been distributed to their homes. The residual office will be used for social encounter, task distribution and performance review, counselling and appraisal.

The technology for this scenario is on the near horizon. By the early nineties it will be commonplace. The impact on the community will be substantial. Commuter transportation is a problem around the world. Dormitory community isolation is another world problem. However,

houses are not designed for home-working. When does a home become a work-place? How do you zone it and rate it? What about the social issues? Many people will not want to work at home. Is it a better and perhaps cheaper idea to set up local office workshop centres where people can go to do their telework? What will people do with the additional time they will be spending in the local community? Does it mean that the black economy will thrive or that volunteers to help at the local hospital will be more forthcoming or that there will be more domestic traumas because there is more time and opportunity for them? Will the local leisure centre be swamped by new entrants? Will more local service industries develop - shops, restaurants, colleges of adult education and even, perhaps, churches?

The changes cause us to ask profound questions of our value system. If a person works 10 hours per week as a paid accountant, 20 hours per week as an unpaid social worker, 10 hours per week as an unpaid gardener and 5 hours a week as a DIY enthusiast, what is that person's job? What is the answer to the question - "And what do you do?" Occupation is part of our cultural value system. Paid work goes into the Gross Domestic Product - unpaid work doesn't. Are we the most productive or the least productive people in the world? What do we want to be?

Of course you may say that it is all science fiction. Mother will never change her ways. She relies on getting himself out of the house so that she can do her house work. Quite true. The people who will be most receptive to these kind of changes are today's ten year olds in ten years time.

The computers have already penetrated the secondary schools and are fast on their way into the primary schools. Watch the 10 - 12 years old children at the Sinclair counter in W. H. Smith on Saturday and listen to their strange language. They are talking computers. They are swapping stories. They are compiling the future. Assimilation will take time but do not be complacent, a revolution is in the making. Young people will see a future that we probably will not recognise and an opportunity that we have not been able to grasp.

Our gift to them is de-industrialization, poor economic performance and high unemployment on the debit side but also voluntary social cohesion, civic virtues and a sense of solidarity on the credit side. The computer is one of the keys to a new industrialization that can change economic performance and alleviate unemployment. No-one who participated in IT82, visiting schools, further

education colleges and universities can have failed to be impressed by the range, sophistication and ingenuity of computer usage by young people in these establishments.

There is underway a great tide of innovation that will lead firstly to the workshop phase of the new industrialization. It can be seen in embryo in ideas for science and techno-parks adjacent to knowledge sources. This workshop phase will thrive best in the seed-bed of a healthy market economy, where translation of ideas into products and services is quickly rewarded by commercial success. Apple, now one of the world's largest computer companies began in a garage six years ago. Sinclair has now sold over 1 million computers in a little over three years.

Although large numbers of office workers will work from home, manufacturing things will still require people but the mix of people will change from what we have known previously as will the method of manufacture. Manufacturing will be increasingly automated. For example, for a long time it has been uneconomic to design electronics manually. Computer-aided design machines translate concepts into products quickly and cheaply. But they need good engineers to conceive designs and to use and maintain ever more sophisticated machines.

Making computers is not labour intensive. Robots and clever machine tool do most of the boring work. Computers are also necessary to test computers. Unskilled jobs are scarce, semi-skilled are available but not in great volume and skilled support jobs are there in some number. Overall, volume production is capital rather than labour-intensive. The nature of production will change. The old idea of mass production of a single, standard product brilliantly executed by the Japanese in their single product, short lifetime, mass production philosophy will probably give way to increasing product personalization.

This is probably best illustrated by the car industry where there is no such thing as a standard car - buyers choose a package of personalized options - quickly assembled and delivered. Flexible manufacturing will be the order of the day with automation keeping the costs and reactive times down and marketing sensitivity making sure the packages are attractive. Exploiting technology to the full will be a critical success factor.

The factories will still be there. They will be cleaner and more quiet than heretofore. Some of them may be acceptable in a suburban housing estate. But when the

factory workers go home, they will find their computer terminals waiting. What will they use them for?

There is no sure answer but reasonable supposition would be to inform, to educate, to entertain, to make and to buy and sell goods and services. For a long time we have separated producers and consumers just as we separated working and living. It was always a false separation. A producer is invariably a consumer and a consumer is often a producer. With new telecommunication systems in our electronic house or cottage the distinction might fade completely. The weekday factory worker might become a weekend software producer or even handicraft producer.

What might these home information services be? Let us look at some simple examples.

The factory worker might decide to do some teleshopping by dialling his home terminal into the local Superwarehouse, ordering some goods (that would be automatically picked and packed) for collection or home delivery. His bank or credit card account would be automatically debited. As a sports fan, he might then dial into his local leisure centre to book the squash court and then send a message to friends confirming that he had booked the court. (These examples have been chosen because industrial and commercial teleshopping is already with us and one local authority has already installed a leisure centre computerised reservation service).

The home terminal would also provide his electronic messages - from the plumber who is coming tomorrow to fix the central heating to the gas board which now sends the final reminders electronically. He has his message service set-up, of course, to exclude as much junk mail as possible. (Again the example has been chosen because home messaging services have already been established by commercial organizations for their employees). He then decides to book his Spring holiday through the terminal (Such systems already exist for business use).

Finally, one of the children tells him there is a new video game on the cable service. So they dial in, select the game and play together. He loses again, of course. Some things will never change.

His daughter has always been good at computers. Though still at school, she spends evenings and weekends working on computer programmes for the local micro-computer shop,



as do most of the sixth form. Pocket money is a supplement rather than a staple. Her ambition is to be an information librarian. They used to be called librarians.

The local library has changed somewhat. The books are as plentiful as ever but there is now an information centre where they used to keep the old photocopier. In this centre there are a dozen computer terminals in little booths, all connected into a copier/printer machine. From the terminals one can roam the databases of the world making connections from one subject to another, printing out relevant information along the way.

Some of the databases are subject specific - law, history, medicine, but some of them are encyclopaedic offering fascinating connections between subjects. They are much loved by schoolchildren writing essays such as:-

"As a poet, he founded the tradition of letters and arts upon which capital city became the Athens of the North. Please discuss." Computer system will select and retrieve textual information such as "Athens of the North" and provide the context of the phrase. Clever databases will allow ideas to be connected in intriguing ways.

The technology so far discussed, already exists today albeit not necessarily used in the form suggested. Later this decade, totally new types of computer systems will start to appear. We are today at the beginning of the computer era - the Model T Ford stage. Today's computers are stupid. Tomorrow's computers will have the ability to reason, to use natural language, to parse sentences, to draw inferences and to connect items together and to relate them each to the other. We might call them Artificial Intelligence or Expert Systems. Whatever, they will further extend the use of computers, and bring new opportunities.

In the interim, the computers that are already in the community and those soon coming will start the transformation of our economic and social life. From computer-unaware we will become computer literate. The buzz-words of hardware, software, disks, computer languages, information technology no longer provoke the gagging incomprehension of a few years ago. Before too long, rather like the electronic calculator, our children will be using their second computer before they are ten years old. We will have several computers in the home that we know about (others will be buried in dishwashers, timers, televisions, cookers and washing machines) and one of them will be indispensable.

Our major objective must be to bind this great computing knowledge resource into our social fabric bringing together people of like interests - in the designing, making and use of these new tools - the civic authorities in creating the climate of encouragement for new ideas and enterprises, the academics and teachers in generating enthusiasm and knowledge, the entrepreneurs to invest in activities of the future, and the merchant adventurers to go forth upon the world and sell our new products. We have become aware of the technology but we are not yet organised to exploit it for the benefit of the community. We need to form clubs where like-minded people can meet to exchange ideas, information and assistance. We need to understand the technology and its opportunities and constraints. It has to be a self-help process, springing from people not imposed by Government and institutions.

We have been in the post-industrial age for at least a decade without knowing it. Information technology is the resource that transforms knowledge into output. The skill base for this new era is the scientific, technical and professional occupations.

They will create it. We will live with it.

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