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INFORMATION TECHNOLOGY: OPPORTUNITIES AND CHALLENGES

By

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> "Eons ago, the shrinking seas cast millions of unwilling aquatic creatures onto the newly created beaches. Deprived of their familiar environment, they died, gasping and clawing for each additional instant of eternity. Only a fortunate few, better suited to amphibian existence, survived the shock of change."
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> Alvin Toffler, *Future Shock*, (1970).
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> "Today we are going through a period as traumatic as the evolution of man's predecessors from sea creatures to land creatures… Those who can adapt will; those who can't will either go on surviving somehow at a lower level of development or will perish – washed up on the shores."
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> Laurence Suhm, sociologist (1970).

Introduction

Congratulations to the Irish Congress of Trade Unions on its centennial. You have survived. You have not been washed up on the watery shores of Irish history as a relic of times past.

Cyberspace

We have entered the era of cyberspace. “Cyberspace” is a term used to described a place without physical walls or physical dimensions where telephone conversations occur, where electronic signals are routed, stored and transferred both in real-time and delayed. Cyberspace has another meaning. An expert has described it as “a collective consensual hallucination, a computer-maintained virtual world in which through ideas from scientific visualisation, cognitive entities would take on tangible form to facilitate access and manipulation”. This aspect of cyberspace is known as “virtual reality”. One step further in cyberspace is to incorporate the participants’ thoughts into computer format to solve problems.

Some also use term “cyberspace” to describe certain on-line computer services like the Internet. The Internet is the world’s largest computer network – a prototype of the information superhighway. The Internet is a global network of networks linking computer communications services. Computer users on the Internet are doubling each year. In this context you may hear the expression “wandering, through cyberspace”. An aspect of information technology today is that massive technological changes are developing at a speed faster than any other period of time.

Digitisation

The telephone, television, computers and wireless communication devices are merging into one digital realm. Digitisation is a phenomen of our time. In effect, digitisation involves converting telephone signals, television pictures, movies and magazines into the 1 s and Os of the computer. Semi-conductors, the silicon-based chips facilitate the carrying of data, facilitate computing facilities, the routing of telecommunication traffic, and allow engineers to generate more computer power cheaper in a more abundant and more adaptable manner.

The marriage of light and electricity is known as optoelectronics. Lasers now facilitate the transformation of electrical reproduction of conversations and written data into pulses of light which race through optical fibre cables to recipients where they are converted back into electricity and into their original versions. Optoelectronic devices facilitate storage facilities e.g. shortly 18 trillion bits of data may be stored on a single 12 inch disk.

We have all heard the expression “artificial intelligence”. There are computers that can reason, draw conclusions, make judgments, and even understand the written and spoken word. In fact, the computer can be made to behave in ways that humans recognise as “intelligent” behaviour in each other – hence artificial intelligence. Remember in 1982, *Time* (Magazine) “Man of the Year” for 1982 was not a man at all, but a machine – the computer.

The appearance on earth of a non-human entity with intelligence approaching or exceeding that of mankind would rank with the most significant events in human history. While human beings cannot possibly imagine the full consequences of this development, the effects on technology, science, economics, and in fact the whole intellectual and sociological development of mankind would undoubtedly be momentous. Think of it, many doctors and lawyers make elementary mistakes. Human cognition is far from perfect. “What range of diseases is my patient suffering from”? The answer to questions like this may very well be under our nose, but we cannot see them. Smarter machines with artificial intelligence may provide the answer.

The dream of computer scientists is to be able to talk to your computer. Continuous speech recognition – where you can direct the computer to complete tasks by speech command is on the horizon. Word dictation typewriters – replacing the keyboard, some with a 60,000 word dictation package are already in existence.

There is great promise in wireless communications; the promise is high-quality voice and data service anywhere at any time by-passing the fixed network. Improved software and chip technology will facilitate better communications to persons to transmit at great speed.

Effects of Information Technology at Work.

The effects of information technology on work – at the factory level – range from the automated inventory to computer-aided manufacturing and robotisation resulting in the increase of process efficiency. Obviously this will result in increased speed of production, customisation, communication and inevitably some staff reduction. Staff reduction in one area should provide more opportunities for others elsewhere. By involving employees in general business and services in analysing, synthesising and making decisions on the data, employers can improve the effectiveness of all in the process by discovering new and better ways of doing work.

Shoshana Zuboff, an expert in information technology, calls this process the use of information technology to "informate" employees rather that "automate" them. This is the challenge facing us. We do not want the new technology simply to speed up business practices and reduce staff numbers. Attention must be focused on the relationship between people and process; employee consultation and training must not be an afterthought.

Traditional structures in organisations will undoubtedly be affected by new developments in information technology. The pyramid structure of an organization will need fewer rungs. Experts predicts that the successful information-based organisation of the future will have no middle managers. Thach and Woodman have stated that "information will flow freely between teams of knowledge employees and top management who will determine strategy".

Electronic Medium of Communication

An electronic medium of telecommunication in the next century will incorporate in a single apparatus features of the present telephone, television and computer. The device may well be called "the tellyphone". It will be interactive, function as a transmitter as well as a

receiver and possess a screen. This will facilitate the individual worker to be completely mobile working out of home, bicycle, car, office or on the beach or poker room, and still be in constant touch with customers and suppliers, statistics, electronic mail and the like.

The “tellyphone” will also function as a “knowbot” – kind of personal assistant. You could programme the “knowbot” to scan designated newspapers and journals for trade union matters, for example, and then file them; the “knowbot” would also scan television and radio broadcasts and retain segments with, for example, references to trade unions in them.

Virtual Reality

Advanced forms of multi-media will be available to train persons. Virtual reality will assist both individual and group procedures. For example, an employee could put his or her hand and arm in a “data-arm” connected to a computer to make a mechanical adjustment for a particular machine. The employee will “feel” and “see” the faulty screw and complete the adjustment process as if he or she were there in reality. Virtual reality will enable a person to “sample” a new home or holiday destination or any transaction that now requires a personal examination. This may all be achieved from the home. Medical doctors will be able to perform operations by virtual reality from afar.

Electronic Data Interchange (EDI)

Electronic Data Interchange (EDI) – a paperless transaction recording system – will link manufacturing, servicing and inventory facilities; EDI will automatically execute an electronic purchase order when a company is running low or retail outlet needs additional supply (or through computerized bar-code reading systems). Overheads will be

reduced; it will no longer be necessary to maintain large unwanted stocks.

Voice Recording Systems and Videoconferencing

Automated customer response systems will take orders and direct customers to the appropriate department through voice-recognition. Group video-conferencing will allow persons to come together to see and hear each other – saving travel and time.

Language speech translators will facilitate translation of the language of the user into a foreign language and vice versa.

Telepresence

The concept of telepresence is on the horizon with persons radiating their images into a distant meeting room in another part of the country or world as a holographic form. Although the person may not be physically there, his or her 3-D representation will mean that a person will be talking, seeing, hearing and moving as if he or she were there.

Surveillance

Big Brother, in some shape or form will always be with us. George Orwell wrote in Nineteen Eighty Four (1949):

> "Behind Winston's back, the voice from the telescreen was still babbling away about pig iron and the over fulfillment of the Ninth Three-Year Plan. The telescreen received and transmitted simultaneously…There was of course no way of knowing whether you were being watched at any given moment. How often or on what system, the Thought Police plugged in on any individual wire was guesswork. It was even conceivable that they watched everybody all the time."

Personal surveillance of persons will be facilitated by developments in information technology. Prior to the outbreak of the last war, the Irish Department of Finance in a confidential memorandum for the Government estimated that 350 civil servants would be required to examine letters in the post and that additional persons (number unspecified) would be required for telegraph censorship. But financial cutbacks ensured that nothing like 350 persons were ever employed. In a secret memorandum for the Government in 1941 the Controller of Censorship admitted that it was possible by 1941 to avoid censorship altogether in Ireland by using the telephone service between Great British and Ireland. An effective "one hundred per cent censorship control of every cross-channel and trans-border telephone conversation" was ruled out as being "impractical" because of lack of staff. As an aside, one wonders why surveillance was necessary on such a scale at that time. Dr. Leon O Broin, a former Secretary of the Department of Posts and Telegraphs, provided an answer when he stated in his book Just Like Yesterday that the Irish Administration was, in this context, "more than fair" during the war years. "[A]djustments [were made] at the outbreak of the war to suit the British and during the war to avoid leaks of information and criticism". Doctor O Broin recorded that in February 1945 the British request to establish a radar station on Irish territory for use in detecting German submarine activity was approved.

It must be stated that it would require a large army of "surveillers" to make it possible for the "official thought police" to monitor our behaviour on a constant basis, particularly our telephone calls. However, control of data is an issue of concern. Who will have access? What measure will be taken to protect sensitive data and protect private details of our lives? We will need to balance performance appraisal – the monitoring of employees – with privacy right of workers.

Surveillance at Work

There is a significant shift in surveillance activities from the State to the individual's employer. One American fast-food chain admitted this year that hundreds of its franchises had hidden secret microphones in

the ceiling. The firm stated that the devices were installed to keep workers on their toes and to protect against theft. A case recently came to attention where all electronic mail messages leaving various terminals in a company were read by the company manager. This was done by mean of a telecommunications switch. Several reasons are advanced for workplace-surveillance by employers: these include productivity, performance appraisal, insurance liability and leaking of information.

The Geneva based International Labour Organisation (ILO) has concluded that "monitoring and surveillance techniques available as a result of advances in technology make methods of control more pervasive than ever and raise serious questions of human rights." Computer programmes exist to record every keystroke made by a data entry employee so that a worker's performance may be compared with a benchmark. It is not uncommon, particularly in the United States for managers to search workers' computer files, voice mail and electronic mail. An employer seeks to create value for the organisation; so he monitors the length of each telephone call from an employee and compares that with fellow employees on a benchmark basis. Employers state that electronic monitoring enhances customer satisfaction and facilitates work being distributed more evenly.

Trade Unionists and privacy advocates argue that such systems are often used to control labour not save it. There is more monitoring of the worker than monitoring of the work.

In Ireland there is a constitutional right to marital privacy. There is also a constitutional right not to have one's telephone tapped unreasonably by the State. But privacy at work is not constitutionally protected. Michael Shrage, a researched associate at the Massachusetts Institute of Technology noted in 1994: "In terms of the future of surveillance, the battle has already been lost. Privacy on the job is gone, technically, legally and culturally."

Conclusion

No profound change in evolution has ever been completely benign. Remember the quotation at the start of this paper with some creature being washed up on the shores, dead in a metaphorical sense, because they could not adapt to the process of change. The increase in knowledge and information by the orders of magnitude we are talking about will undoubtedly effect profound change. Some will always believe they were better off in the “old days”. Superiority in information technology will provide tremendous advantages whether in terms of factory power, personal power or national power.

In the end most of us will have no choice. Hopefully, by virtue of our participation in the new information technologies, we will have a universal opulent society, a condition of plenty that frees people from dependence to exercise true independence of spirit. The shadows, however dark and menancing, must not deter us from seeking the light.

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