

# **INFORMATION AND THE TRANSFORMATION OF SOCIETY**

**G.P. Sweeney Editor**

# INFORMATION AND THE TRANSFORMATION OF SOCIETY

Papers from the First Joint International Conference of the  
Institute of Information Scientists and the  
American Society for Information Science  
held at St. Patrick's College, Dublin, Ireland,  
28-30 June, 1982

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1982

NORTH-HOLLAND PUBLISHING COMPANY  
AMSTERDAM • NEW YORK • OXFORD

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ISBN: 0 444 86505 5

*Publishers:*

**NORTH-HOLLAND PUBLISHING COMPANY  
AMSTERDAM • NEW YORK • OXFORD**

*Sole distributors for the U.S.A. and Canada:*

**ELSEVIER SCIENCE PUBLISHING COMPANY, INC.  
52 VANDERBILT AVENUE  
NEW YORK, N.Y. 10017**

**Library of Congress Cataloging in Publication Data**

Main entry under title:

Information and the transformation of society.

(Contemporary topics in information transfer ;

v. 2)

Papers from the Conference on Information and the Transformation of Society.

1. Information science--Social aspects--Congresses.
  2. Information services--Social aspects--Congresses.
  - I. Sweeney, G. P. (Gerald Patrick), 1928-
  - II. Institute of Information Scientists.
  - III. American Society for Information Science.
  - IV. Conference on Information and the Transformation of Society (1st : 1982 : St. Patrick's College, Dublin) V. Series.
- Z665.I578 1982 020 82-14527  
ISBN 0-444-86505-5

**PRINTED IN THE NETHERLANDS**

## FOREWORD

This Conference on Information and the Transformation of Society was unique in several ways. It was the first time that the Institute of Information Scientists and the American Association for Information Science had met in a joint Conference, it was the first occasion on which either had met in Ireland and it was the first major international conference on information to be held in Ireland. Ireland seemed a natural location for a "Mid-Atlantic" Conference on issues facing Europe and North America as both enter the Information Society and on issues facing the professions of the "information providers".

The speakers virtually all took for granted the title of the Conference. Society is in a state of transformation as information handling becomes the occupation of a majority of the working population and the information technologies penetrate every office and factory. Information is becoming visibly pervasive of every human activity.

Information enables an individual, a community or an organisation to solve its own problems, reach its own solutions, decide for itself. The pervasive and distributed nature of the technology is such that this power of decision-making can be decentralised and there are indications of a widespread pressure for local decision-making and control, including the new information media. Unfortunately, focus on provision of availability, various aspects of information system design, dominance of large organisations, conflict between concepts of information as as resource or as a commodity to be bought and sold and other factors indicate dangers of a widening gap between the elite providers and managers of information, the information rich, and those with problems, the information poor. It is a social and economic phenomenon which may partly be resolved by widespread education not only in use of information technology but also in evaluation of information. It will also depend on new approaches by governments which control so much of information activity to information policy and by organisations private and public, to information resource management.

Whether the transformation from the industrial society to the information society will be a smooth and progressive evolution or one beset by economic and social disruption and unrest will depend on imaginative initiatives.

G.P. SWEENEY

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## **KEYNOTE ADDRESS**

### **INFORMATION MANAGEMENT AS AN ESSENTIAL RESOURCE FOR THE 80's**

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Ten years ago only a few experts were aware of the importance of information and its technologies for the further development of advanced, industrial society. Today, this notion is hardly contested, and there is a flood of articles and books on the subject. But the fact that information technology is so increasingly and widely used in the office, on the factory floor and even by the public, means that new emphasis must be laid on the management of this information resource. It has vast implications on educational and training systems, the behaviour of the users of modern computer and communications systems, indeed, on the organisational structure of companies and governments. During the 70s there was a constant flood of innovations in computer and also in communication technologies. By and large they were, however, confined to rather large and, hence, expensive systems. The 1980s witness the democratisation of computer technology, as personal computers, videotex terminals, off-the-shelf software packages, etc., are produced by the electronics and information industry which increasingly takes on the nature of a major economic sector.

These decentralisation trends are not only important in information technology, but also in the information content; while the 70s were dominated by large information systems which were rather clumsy to handle and to use, the 80s are increasingly the decade of the terminal by which individual users can access large data files, but in a very selective way. This has implications for the management of these data bases, because there are many users and their needs have to be satisfied in a varying way. An extreme example, perhaps, is the information provided on videotex systems, which can be very varied indeed and is provided from a wide variety of information sources. The management of such an information system is obviously very different from that of ten years ago when one single computer provided data and information which was used by rather few users with similar

interest profiles. The integration of several functions in management, research, even at home, corresponds to an integration of the information sources which might need completely different approaches than those used some years ago.

Another difference is the growing inter-connection of data bases and networks, not only at the national, but also at the international level. The so-called transborder data flows between countries mean different things; they can mean data communications between headquarters of multinational firms and their branches in other countries; they can mean access of data bases in a certain country by users in another country, and they can mean provision of computer services providing on-line access from terminals situated in another country. The relative high cost of communications have held the growth of transborder data flows to about 20 per cent per year, which of itself is an impressive growth rate. But if in the coming years communication costs through economies of scale, increasing competition between carriers, and especially through new software development in services and new technologies such as PCM or fibre-optics will decrease further, quite naturally the use of international data networks and data bases will increase probably more exponentially than they have so far.

In the present situation of an economically depressed climate and high rates of unemployment, it is interesting to note that by and large the information industries such as computer, telecommunications, software have enjoyed almost continuous growth in recent years, and did not seem to be affected very much by the generally poor climate for investment. What are the reasons for this exceptional market behaviour? This question is difficult to answer, but in my opinion one of the answers may be that many people making decisions on investment, in both the private and the public sectors, consider that information technologies present great potential to enhance productivity, and hence are a profitable

investment. Computers, word processors, terminals, communication equipment with the necessary software to keep it going, all have benefited from a general belief that the use of such equipment is an important cost-saving factor. They also provide the possibility of doing new things which could not be done previously, and result in increases of quality of services; and last but not least they still constitute a prestige item although this aspect has declined in importance given the widespread diffusion of these technologies. Another aspect which has kept the information technology field expanding is the gradual diffusion of computer systems throughout the economy. First to be found in large firms, universities and government agencies, they have reached medium-sized and small companies, professional people such as lawyers and doctors, and are now reaching homes and desks of individual information workers in the form of personal computers. The spread of hardware was not the only part of this success story, increasingly software projects became important, and were the basis of a new economic activity. But while the cost of hardware has been decreasing dramatically, the cost of software has not kept pace with this downward development, and in some cases actually has increased in price; this gap is increasingly considered as a bottleneck to further expansion.

Now that our countries are equipped with these information machines, it is time to reconsider whether the advances in the management of the information content have kept pace with the information technologies. In my opinion, this has not been the case. There is probably a renewed emphasis to be given to solving some problems on the information content side, such as:

- (a) retrieval of relevant information;
- (b) growing difficulty of intellectual property protection;

- (c) the attitude of the public and the need for better training.

#### A. Retrieval of Relevant Information

The problem of accessing and identifying the data and information a user needs for a particular purpose is a very old one. In the past, it was necessary to consult libraries, groups of peers, buy or borrow books etc. Today, this is still necessary, but the existence of computerised data bases, and information retrieval systems has increased the availability of data and references by:

1. considerably shortening access times to information;
2. enabling the user, for the sake of completeness, to list all the references, thus making his list of sources even longer - this might contribute to a snowball effect and to a further increase of the information avalanche;

However, the decision of what data are included in the data bases is made by the data base provider. Hence the base may not contain a complete list of all relevant data on a particular subject, but only those considered to be useful by the Information Provider.

While data bases containing numerical data (statistics, physical measurements, chemical formulae etc.) are relatively straightforward, the situation of non-numerical information retrieval systems (books, reports, articles etc.) still remains unsatisfactory, since in many cases only abstracts can be retrieved, not the full text. No doubt in the future with further declining memory costs full-text

retrieval will become generalised; but for the years to come the situation will remain unsatisfactory from a user standpoint. Maybe a general agreement to include not only an abstract, but also the table of contents with exact page numbers of a publication or report might improve somewhat the ability of the user to better assess the structure and length of the various chapters of such a report. It remains that before full test on-line storage and retrieval will become generally available, the paper-based book will retain its importance, for some so-far unmatched advantages:

1. good permanent storage medium;
2. once you have it, easy access to information contained in the book;
3. ease of reading while away from home or office (during commuting, travel, or holidays);
4. still comparatively inexpensive medium, if all overheads are compared.

#### B. Growing Difficulty of Intellectual Property Protection

It is a fact that modern information technology has greatly increased the possibilities of copying information products. The photocopying machine, the cassette audio and video recorder are clear examples, but even software programmes can be copied with growing ease. There are several trends:

1. the cost of paper and printing is constantly increasing;
2. the cost of magnetic information supports is declining, as is the price of copying machines,

while their availability spreads; this means growing opportunities for copying;

3. many users are only interested in parts of an information product, and hence are satisfied to accept excerpts of it in photocopy form, or a cassette extract, if that means speedy inexpensive access;
4. the number of unpublished reports, mimeographs etc. is also increasing; one of the few ways to multiply their circulation is by photocopy.

There have been attempts to stem the growing tide:

1. taxation of copying machines, and giving proceeds to authors' rights institutions;
2. reform of copyright laws, and making photocopying for re-sale illegal;
3. price reductions in sales of software packages or records sold to the public.

The first is a fiscal, the second a legislative, the third a market-response measure. But they all are symptoms, not the root of the problem. The fundamental question is:

What new effective ways can be found as we enter the information age, to protect the intellectual property of information?

One way could be a universal identification of copies and copying devices. In my opinion, the protection of intellectual property, so necessary to keep the market mechanism for information products going, must start at the moment when an information product (book, data base, record, film, software programme) comes on the market, and is recognised

by the market as a product for sale. Every time such an information product is copied, a trace should be left enabling the identification of the copying device. In photocopying equipment, this is easy to implement, and is in fact often done: each copying machine carries an identification number, which is engraved in the mirror or lens of the machine, and is reproduced on the copy. An identification is more difficult in cassette-recorders, but could be easily implemented. Computer programmes can have identification procedures built in to the programme; there are even programme instructions which self-destroy a programme when it is copied. Once the copies are marked, it should be easier to develop procedures ensuring that an adequate fee goes to the author or the copyright holder. Maybe some universal identification procedures such as the ISBN could help in this respect; perhaps such a number for each photocopying device should be issued?

Another (better) way would be to avoid any new regulations and constraint. But for the moment, no brilliant idea to implement a no-regulation scheme is in sight. Maybe a new Information Nobel Prize should be awarded to those individuals or organisations which have produced outstanding research or organisation proposals on how to foster the development and use of information products with no extra regulations?

#### C. Attitude of the Public and Need for Better Training

It is often argued that a gap exists in information use between the United States and European countries. It is said that the Americans are readier to pay for useful information than the Europeans, still somehow inhibited by tradition and believing that information has a strong cultural dimension, can be picked up in some library, and therefore should be free or almost free.

No doubt this view is exaggerated, but maybe contains some distant truth. The attitude to consider relevant, up-to-date information (structured in some form, that means printed



on paper or displayed at a terminal) as a valuable resource, hence as an investment which is worthwhile, is still more widespread in the United States than in Europe. While behaviour is probably similar in transnational companies on both sides of the Atlantic, in medium-sized or small firms (especially in high technology) there might be considerable differences concerning business information and maybe also scientific and technical information. This may be one of the reasons for the later development in Europe of data bases accessed on-line. On the other hand, videotex information services first started in Europe; (Prestel, Teletel, Bildschirmtext etc.) but their slow acceptance by the general public may well be another confirmation of the greater reluctance in Europe to pay for electronically up-dated information.

Education of the public, and especially of young people, and putting at their disposal the necessary information retrieval instruments may bring this change of attitude about. The general spread of microcomputers and terminals from which to access information services may greatly help in this respect. On the other side, excessive television watching by youngsters might affect, in a negative way, their interest (or ability) in reading books or using information contained in such books. It is therefore urgent that awareness campaigns be organised with students, school teachers and, if possible, the general public to sensibillize them with the general importance of information both as a cultural and an economic resource, and to teach them how to evaluate the information per se, irrespective of whether it comes printed on paper, is displayed on a computer terminal or heard in voice form over a telephone line.

\* \* \*

As long as the vital role of information as the instrument of a better management and co-ordination of highly complex social functions is not understood by the public at large, the management of information as a resource will remain confined to