SOCIAL EUROPE

Supplement on NEW TECHNOLOGIES AND SOCIAL CHANGE

OFFICE AUTOMATION

COMMISSION OF THE EUROPEAN COMMUNITIES

DIRECTORATE-GENERAL FOR EMPLOYMENT,
SOCIAL AFFAIRS AND EDUCATION

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The main theme of this issue of "New Technologies and Social Change" is those aspects of new technology usually referred to as office automation. Office work throughout Europe is currently in the throes of a massive upheaval; and the leading manufacturers of computer hardware are gearing up to play it for all it is worth, as witnessed by the proliferating advertisements for integrated office systems comprising everything from stand-alone word processors to facsimile transmission devices. And across the board, the driving force behind new product development is the omnipresent microchip.

While office automation is clearly making great headway in the Community, it is equally obviously not proceeding at a uniform pace in all Member States. But how exactly does the Community fit into the office revolution? The first section of this issue outlines what the European Social Fund is doing, and what else it could do, in this field, illustrating some of the ESF's concrete achievements with a series of case histories (1). We also provide a general insight into the plans for linking up work stations in the various Community institutions (Commission, Council, Parliament, etc), and into national services operating under the INSIS integrated system (2).

Now is also an approriate moment to reflect on the likely shape of the office of the future - and its inhabitants. This issue also contains a statistical breakdown of the situation in the countries of

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(1) For more detailed information, see Social Europe, May 1984, Social Europe, New Technologies Supplement, special issue.

(2) Interinstitutional services integrated system.

Europe in terms of the installed base of word processors, computers, VDUs and electronic typewriters, and the likely trends.

The implications for employment, qualifications, the organization of work, health and safety, and labour relations are also scrutinized on a country-by-country basis in reports which are condensed versions of more extensive surveys of the national situations in Member States (1).

Special attention is paid to the human relations aspects of INSIS. This is pointed up by the review of recent publications in Part Three of the supplement, dealing with particular facets of the sociological debate which is the undercurrent to the introduction of INSIS. This section also contains information on the findings of a group of major studies on the introduction of new technologies in banking, and the work done in this field by the Dublin-based European Foundation (2). Part Three also contains a bibliography of 'bookware' on office automation.

Finally, the Community needs to concern itself not just with the technical aspects of the spread of new technology, but also with the question of how Europe and the Member States should set about dealing with the social problems raised as millions of workers, men and women, clerical and managerial alike, come face to face with the rapid pace of technological change.

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(1) These reports may be obtained on request.

(2) European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland.

With this in mind, the Commission submitted to the Council of Ministers in January 1984 a communication analysing the principal difficulties of different orders raised by the introduction of new technologies: the general implications and cumulative impact on the labour market, changes in working conditions and the new educational and skilling needs that were developing. The conclusions drawn from this document by the Council of Ministers and the Standing Committee on Employment will form the guidelines on which the Commission will be basing its actions in forthcoming years (1).

It is my hope that the articles in this supplement will fuel the debate amongst those responsible for managing the social problems linked to the introduction of new technologies and technological change.

J. DEGIMBE

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(1) This communication is published separately.

ACTIVITIES OF THE EUROPEAN SOCIAL FUND CONCERNED WITH THE INTRODUCTION OF NEW TECHNOLOGIES INTO OFFICES

The European Social Fund has contributed to a number of projects in the field of new technology. As this issue of the supplement covers various aspects of introducing new technolgy into the office, we will here briefly describe two such projects which were completed in 1983, and one other which terminated in July 1984.

The first project to be described was carried out in Ireland as a pilot project. It was entitled "Pilot programme to assist firms in adapting to new technology with particular reference to training needs". Its objectives were:

- to examine training needs before, during and after the introduction of new technology;
- to investigate human factors, inhibiting achievement of what may be technically feasible;
- to design, test and evaluate a training programme for between 20-30 employees in firms.

The scheme was intended to identify the training and retraining needs associated with the adoption of new technology. A pedagogic programme was to be developed, structured and implemented, and on completion it was to be evaluated to see how effective it was.

The project lasted two years and the Commission has received a report and evaluation. The estimated cost of the project was IRL 44,000 (about 60,000 ECU) of which the Social Fund agreed to contribute 50 %, thus following the normal financing pattern for such projects.

The initial phase of the project involved the identification of the relevant firms, the new technology involved, and the training needs of firms undergoing technological change. The firms considered were in the service industries (insurance), clothing, engineering, chemical, food, textile, construction and distribution industries.

A pilot training course was designed and twenty participants were selected from the firms which had been considered. The objectives of the course were to provide managers and owners of small businesses with:

(i) the skills required to initiate the introduction of micro-computers into their businesses;

(ii) the basis for using effectively the services of a computer consultant.

The course consisted of four parts and lasted 30 hours:

(a) Introduction

(i) Hardware
(ii) Software
(iii) Peripherals

(b) How to use a microcomputer

(i) Operational considerations
(ii) Limitations
(iii) Operating systems and applications

(c) Applications, packages, and "hands-on" experience

(i) File management and spreadsheet systems
(ii) Word processing
(iii) Payroll and stock control

(d) System selection

(i) Defining requirements
(ii) Hardware and software evaluation
(iii) Selection criteria
(iv) Contractual considerations.

The reports produced contain detailed descriptions of the initial phase, and the final repport is to all intents and purposes a hand-book on introducing microcomputers into the office. The intermediate report contains a detailed description of word processing possibilities, and draws many conclusions about the dangers and pitfalls to be avoided by firms who want to introduce new technologies into the office.

The second project took place in Italy from July 1982 until the end of June 1983. It was entitled "Implementation of actions to encourage the modernisation of production and management techniques in small and medium size enterprises". The total estimated cost was LIT 330,400,000 (167,600 ECU), of which the ESF agreed to contribute 50 % from its technical progress budget line. The problem here (the Emilia-Romagna area) was that several agricultural production cooperatives had to cope with an increasing number of members, and rising production. Their management systems needed modernising. So some 80 employees, and a smaller number of unemployed young people

from the area, were given 200 hours of basic training involving the operation of terminals and the use of data banks. The training given was at a comparatively low level but it was so successful that most of the participants asked for further training in information technology. This improvement in the production area no doubt has considerable influence on the management of the cooperatives, and this can only lead to a less laborious system of management. Few problems of implementation were encountered.

The third project is a German one. The one year project ending in July 1984. The total estimated cost is DM 85,958 (37,720 ECU) of which the ESF contributes 50 % from its technical progress budgetary line. It affects 50 people. Its aim is to provide qualifying courses in data processing and micro-electronics for unemployed skilled workers who have lost their jobs in electronic installation and production control. The increasing use of informatics revealed a gap in the practical training available, and this led to a demand for special courses at private training centres. Such courses were not available at public institutions. These courses required new professional trainers. The result has been a demand for a wide-ranging enquiry into the current labour market. The courses now include in addition to the normal programming logic, programme languages and data processing subjects, training in software technology and its applications.

These necessarily brief descriptions of activities financed by the European Social Fund in the field of new technologies in the office do not really convey the impact that such projects can have. It is our intention from time to time to publish in this supplement, and in the main revue "Social Europe", more detailed descriptions of some of the more interesting projects.

R. BETTS

INSIS - HOW THE COMMUNITY CAN MAKE THE BEST OF OFFICE TECHNOLOGY

Computer-based information technology has begun to transform office life. New work procedures and management techniques, new means of communication and new job skills are needed to harness the varied and powerful capabilities of systems that have emerged since the microelectronics revolution of the 1970s. Many computer-based systems, however, have been unsuccessful because they were developed with limited objectives, which gave too much emphasis to how the technical systems work rather than what people wanted to achieve using the systems.

The Commission of the European Communities therefore placed the analysis and forecasting of actual user needs at the heart of its INSIS (Interinstitutional Integrated Services Information System) Programme, which aims to assist the successful introduction of advanced office technology and communications services into the Community Institutions and Member State Administrations.

What is INSIS ?

INSIS is a programme designed to ensure that the European Economic Community gains the maximum benefit from the use and development of information technology. INSIS will achieve its objectives via an action programme within which projects will be initiated that introduce advanced office information systems into public institutions and representative bodies from the Community and its Member States.

INSIS services and projects are characterised by being inter-institutional and multinational. They will involve the integration of a variety of information types (voices, pictures, text, and so on).

INSIS has two major objectives:

- to enhance the operating efficiency of the Community by providing improved communication systems within the Institutions, through the development of comprehensive information systems using modern telematics services which offer better communication between, and with, Community Institutions and Member State executive and legislative bodies;

- to promote the establishment and use of international agreed standards in the application of integrated information systems, thereby strengthening the European informatics industry by opening up a European-wide market based on common standards.

INSIS could be regarded as a child of the economic crises which began in the 1970s. In July 1978, in Bonn, the European council recognised the need to identify new sources of growth and employment to offset the difficult adjustments that traditional industries, such as steel and shipbuilding, were being forced to undergo. At Strasbourg, a year later, it was agreed by the Council that information industries based on new electronic technologies offered a major source of such economic growth and social development. The Commission was asked to study the matter and provide a report on what should be done. The Commission responded quickly and by the European Council meeting in November 1979 in Dublin was able to submit its ideas and proposals in the document entitled, "European society faced with the challenge of new information technologies: a Community response".

This document included the inception of INSIS, which, in achieving its major objective, would also create a user-driven "pull" on the demand side for innovative information systems that would stimulate a technology "push" on the supply side. The proposals and objectives were welcomed by the European Council and an 'ad hoc' inter service team for INSIS was established.

In December 1980, the Commission decided to formalise the INSIS Project Team, giving it a mandate and the go-ahead to establish a temporary project management structure. In April 1981, the Commission designated INSIS as a priority project because its objectives are considered crucial to the future operations of the Community Institution's administrative machinery and to the prosperity of the Community as a whole.

The management of INSIS has been structured in a flexible way, which is sensitive to the multi-faceted requirements of all participants. The Supervisory Board has overall co-ordination responsibilities with the Commission and reports to the Group of Commissioners interested in innovation through the Nucleus for Directors General of Industrial Innovation.

The Council has created a Users' Advisory Committee to ensure close co-operation with other organisations and Member States. In addition, the management is in close touch with the national telecommunications authorities - the PTTs - with a view to their rôle in providing the necessary services.

The INSIS user community is large and varied. Potential users of INSIS services include the staff of all Community Institutions and

tens of thousands of employees working in the Parliaments and Ministries of Member States. This covers a wide range of information handling activities, human interactions, work practices, languages and national characteristics. INSIS will start by introducing a nucleus of office, communications and other systems, which will be carefully evaluated. More advanced information services will then be introduced to a broader range of users in an evolutionary way, building on experiences of earlier phases.

INSIS provides a stable framework in which rapid changes in technology and office routines can be handled at a manageable pace. If technological options are chosen to meet real human and organisational needs, the effective benefits of information services can extend to the widest possible variety of users. INSIS is helping to chart the way ahead for the Community to prosper from information techology into the 21st Century. It is a programme which demands the greatest care and effort to get right.

Why human and organisational aspects are important

When introducing new technology, there is always a temptation to try to gain potential benefits as quickly as possible. The experience of users of computer systems and early office automation, however, clearly indicates that the benefits will fail to materialise if inadequate consideration is given to its broad impact on all aspects of user requirements and working life. INSIS therefore places great emphasis on the context with which particular technologies can be tested, evaluated and introduced. This emphasis gives INSIS a unique direction.

The analysis and forecasting of present and future user needs lies at the heart of the process leading to the achievement of the main benefits of INSIS. There are many other private and public developments in information systems. Very few, however, have a user community of the size, variety and multinational dimension of INSIS, and have placed such commitment from the start to giving priority to user needs and human and organisation aspects.

User requirements' studies form the basis of INSIS experiments and pilot projects. The effectiveness and acceptability of services are evaluated against criteria which meet users' aspirations. The needs of users have a longer life cycle than particular technologies. There is also a great deal in common between users' information management needs in different environments. By emphasising the importance of users in shaping the INSIS strategy, it is therefore likely that findings derived from INSIS experiences will realistically reflect information service requirements over a long period and of relevance outside the INSIS user community.

Studies on how to promote user-friendly or employee-acceptable office systems have been initiated in cooperation with INSIS pilot and development projects. Practical experience gained in these studies will be used as a basis for establishing and publishing guidelines on how organisations should approach topics such as the evolution of new job functions; changing skill requirements; the nature of system design; managing methods; equipment design; industrial relations, and training programmes.

The potential for exciting and efficient new information technologies will be translated into effective systems only if human and organisational aspects are given the same amount of care and priority as the technical design.

In June 1982 a workshop was held in Varese, Italy, to bring together influential people who will be instrumental in shaping how INSIS is implemented in their respective organisations, and examine how new information technology can be successfully implemented in an office environment. The results of the workshop formed the basis of a book "New Office Technology: human and organisation aspects" which is commented on in Part III of this supplement.

The initial 1983-1984 work programme consists of infrastructure projects, investigatory projects and supporting activities. The infrastructure side covers services like electronic mail and video-conferencing with pilot experiments in, for example, the use of local area networks and multi-function work stations. Application projects involve, for instance, applications to the Joint Research Centre, and the electronic transfer of large amounts of paper between administrative departments, known as STRADA. The supporting activities consist of the harmonisation and application of standards and a reference and test centre, the human and organisational aspects themselves, programme management, etc.

PART TWO

ACTIVITIES IN THE MEMBER STATES (*)

(*) The use of this information does not engage the liability of the European Commission.

OFFICE AUTOMATION AND SOCIAL CHANGE IN EUROPE - OVERVIEW OF NATIONAL REPORTS

INTRODUCTION

The "office of the future" is an automated office - a "silent", "paperfree" and "integrated" office. It will be silent, because electronic devices have replaced electro-mechanical typing, reproduction of text and phonecalls, and have made it unnecessary for people to move around. Furthermore, it will be paperfree because the very same electronic devices have made reproduction on paper into a needless luxury, and it will be integrated due to the fact that all office tasks can be carried out at the work-station of each employee.

This will not be the office of the near future - it may even be a Utopia. What we can observe is the application of numerous new technologies aimed at automating office activities - i.e. the production reproduction, processing and communication of textual and numeric information.

The knowledge about these new (micro-) electronic devices is already widely spread. The most important are:

Mini- and Micro-computers: (personal computers): small desk-top computers with a variety of functions.
Word Processors: a "stand alone" system or related to a general computer system ("shared logic"). It comprises an input device (keyboard), a visual display united (VDU), central processor, storage facilities and a printer.
Electronic Typewriters: the most significant difference between these typewriters and traditional electro-mechanical devices, is their ability to store a certain amount of text, which makes possible immediate editing on a limited scale.

Local Area Networks (LANs): a local circuit linking up a number of workstations.
Private Automatic Branch Exchange (PABX): internal telephone exchange system.
Optical Character Readers (OCRs): devices for converting the image of a page directly into electronic form.
Facsimile: device for converting copies of text or pictures into electronic form which is then transmitted to another location via a telecommunication link, and then reproduced at its destination.

It is becoming increasingly difficult to make the distinction between these various technologies. The differences between electronic typewriters, word processors, mini- and micro-computers disappear; word processors will be able to accept general data-processing software packages, computers will have word processing facilities etc. The technological innovations in this field will therefore go towards the development of intercommunicating multi-function devices.

This specific technological change will radically alter employment and working conditions of all professional groups in offices in the coming years.
It concerns therefore an occupational sector which ever since the last war has been increasing its share in the occupational structure - on average by 2.8 % every five years -. This so-called "information sector" is by now in most industrialised countries the largest occupational sector, accounting for between 32 % (France, 1975) and 41 % (USA, 1975) of the active population (UK 36 %, 1971, F.R.G. 33 %, 1978, Sweden 35 % 1975). (1)

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(1) "Les activités de l'information, de l'électronique et de technologies des télécommunications - Incidences sur l'emploi, la croissance et le commerce", O.C.D.E. Paris, 1981.

In the "information sector" are included not only occupations related to the "production, treatment and distribution of information", but also occupations related to "production and maintenance of information infrastructures".

The national reports on office automation, which are summarised below, deal exclusively with technological developments related to clerical activities and general management, leaving out activities like management of production and sales. Developments within telecommunications are not included either. (1).

The Diffusion of Office Automation

In some sectors, like Banking and Insurance, office automation has for years been a significant feature of technological development in all European countries. The major companies in these sectors computerized their services at a very early stage, and they have also been the pioneers in applying the new office technologies based on micro electronics. However, national divergences became all too apparent if one examines the degree to which office automation is diffused in all sectors of industry and services. In the case of some countries (D, UK, F, NL and DK) one could in fact say, that the "era of office automation" has already commenced - in the case of others (B, I, GR, and Irl) the first steps in this direction have only just been taken (see Table 1).

Table 1 - National Entries to the "Era of Office Automation"

1979	1980	1981	1982	1983	
Germany		France	Belgium		Greece
	U.K.		Netherlands		Ireland
			Denmark	Italy	

(1) References made in this introduction to research projects and research results can be found in the summaries of the national reports hereafter.

The attempt in Table 1, to estimate a rough overall national comparison, is based on all the information provided in the national reports. Precise figures on the spread of specific technologies are extremely scarce. In addition, comparisons based on quantified information are made almost impossible because of varying definitions of technological categories.

Table 2. National Diffusion of Office Automation (rounded figures)

	(UK) 1983	(D) 1982 (≠ 1981)	(F) 1981	(NL) 1980/81	(DK) 1983	(I) 1982	(GR) 1982 (≠1981)
Word Processors	65 500	78 000	21 000		a)8 000		37
Computers			75 000				≠ 828
general computers		14 000			3 000	35 000	
mini computers		43 000			19 000	67 000	
micro computers					54 000	59 000	
small computers + terminals		214 000					

In only one field - word processors - is there really any relatively coherent information. Word processors have in fact been identified by many practitioners as the most important technological device of office automation. In several countries there is a spectacular explosion of these technologies. the number of word processors in (DK), has for example increased by more than 800 % between 1981 and 1983 (950 units in 1981, 8 000 units in 1983). Information on four countries (F, UK, D and DK) shows that for the year 1982, one could count about 200 - 400

white collar workers for each word processor introduced (see Table 3) and 20 - 26 white collar workers for each terminal. In the Danish case, the number of white collar workers per word processor amounted in 1983 to about 145.

In most countries small and medium-sized firms are introducing office automation more rapidly than bigger firms. In (F) it is the smallest firms (less than 50 employees) that have been most active. Italy is an exception to the rule; only 12 % of word processors are here introduced in companies (local units) of less than 500 employees - and only 0.3 % of local units with less than 100 employees have introduced this technology (1982).

Table 3. Number of White Collar Workers per Technology Unit (1982)

	Number of White Collar workers per Word Processor	Number of White Collar workers per Word Processor
France	294	26
United Kingdom	370	26
Germany	196	20
Denmark	364	-

Another characteristic feature of the present spreading of office automation is the fact that these new technologies are diffused more widely in the bigger cities than elsewhere. In most countries companies situated in the metropolis play a dominant role in the field (e.g. F, DK, FR, and B).

Future Diffusion of Office Automation

One word processor for each 6 white collar workers - this has been described as a realistic estimate of the technological profile of the office of the future. It would equal the introduction of 1,6 million word processors in (D) - more than 20 times the number of units introduced in 1982.

In companies which for years have had experience of computerization, there has been a very fast diffusion of office automation. For example in (UK) only 7 % of such companies had introduced word processors in 1977 - three years later, in 1980, 62 % had introduced this technology. The future diffusion of office automation in this category of companies is expected to continue at the same speed, but, if one considers all companies and this includes companies that are making their first steps in the field, the speed of future diffusion will prove to be much slower.

In general, the office automation market is expected to expand in value by 20 - 30 % per year in countries that already have entered the "era of office automation". As to the specific field of software production, a British sutdy (National Economic Development Committee (NEDC), 1982) concludes that the expansion has slowed down since 1981 due to the rapid introduction of mini- and micro-computers. Furthermore, the market for main-frame computers is expected to expand at a relatively slower speed - 10-15 % per year.

Again it should be remarked that information in the field is extremely scarce; in most cases estimates on future diffusion have been presented by producers and distributors of office automation.

Impact on Employment

Taking into account the immense attention that office automation has attracted in the public debate it is astonishing how little specific knowledge actually exists on the employment side. Most forecasts on employment effects are exclusively based on the assumption of significant productivity increase resulting from office automation. It is estimated, for example, that word processors, when applied in a technically optimal way, can normally increase productivity by up to 40 % - an increase which is often translated into forecasts of a similar potential fall in employment. This does not therefore take into account the degree to which productivity increases are achieved in companies, the stronger position on the market due to improvements in service, sales management, decision-making processes, etc. All these potential effects from office automation can affect employment levels - not to mention the fact that employment could be more dependent on other factors ,which are not related to technology and its mode of application. These shortcomings are mainly due to the present lack of knowledge on the diffusion and use of office automation in companies.

Table 4 - Change of Employment Levels due to the Introduction of Word Processors - Experiences

DIF-Data (TH. Skousen) (1980)	(DK)	530 comp. and public institutions	11 % - cases of dismissals 20 % - cases of job-transfer		
Policy Study Institute (PSI) (1983)	(UK)	All sectors	Cases of change in employment levels (%)		
				fall	increase
			Secretaries	14 %	2 %
			Typists	27 %	3 %
			Clerical staff	14 %	0 %

Table 5 - Recent International Forecasts of Employment Effects from the Introduction of Office Automation

Source	Sector	Job Category	Period	Employment effects	Conditions
La Fondation Travail (B) et Université	all sectors	salaried employees	-	35 000 jobs	50% increase of productivity at keyboard work
Ministry of Labour (S)	all sectors	women employees	1985 - 2000	Between 2.3% and 37% of jobs lost	General productivity increase and output increase of between 2 and 3%
Labour Market Council (1982) (NL)	Bank & Insurance / Central administration	all cat.	1982 - 1990	5% of jobs lost / 1,5% of jobs lost	
Netherlands Study Center for Technology Trends (1983) (NL)	all sectors	salaried employees	1983	no major imapcts	

According to surveys on actual experiences (see Table 4), if there is any change in employment levels they usually fall in direct relationship to the introduction of word processors, and less skilled jobs (e.g. typist) are particularly threatened. However, it is significant that in most cases no changes in employment levels have occurred. Long term experiences could be different. In fact in the British survey lower employment levels were expected in the next couple of years - no cases of planned job creation were reported.

As to recent forecasts of employment effects of office automation see Table 5.

It should further be noted that most of the jobs affected by office automation, at its present technological level of development, are the jobs occupied by women. IN (UK), 98 % of secretaries are women, and 78 % of clerical workers (the Netherlands where only half of the secretarial jobs are occupied by women, is an exception to the rule). Due to this heavily sex-segregated labour market, office automation is challenging the occupational situation of a social group which is already affected by low qualifications and unemployment.

Impact on Qualifications

There are no examples of the effects of office automation on qualifications. It is not known therefore to what degree downskilling, upskilling and/or polarization of skills takes place.

Acccording to a study on historial development trends in (DK) (J.F. Christensen, 1981) a certain polarization of skills among salaried employees has taken place, but whether this is accelerated or dampened

down by the introduction of office automation remains unknown. According to another sutdy (Statskonoret (Sweden) 1982) office automation is expected to eliminate certain routine tasks and create a certain demand for new qualifications: in addition, a situation will emerge where the remaining routine tasks can be distributed among all levels of the organization. Office automation could thus result in greater homogeneity between skills - all depending on the actual organization of work involved.

Education and Vocational Training

The educational and vocational training systems are challenged by the introduction of new technologies in all countries. 22 % of employees in (DK) - 500,00 are thought to require training urgently because of the introduction of new office technologies in companies (1983). Schemes for reforming and developing the national systems in order to meet this challenge are surfacing in most countries. However, the problems of limited financial means and a general lack of qualified teachers at all levels are holding back any rapid change of the situation.

Most training is presently carried out by the producers and suppliers of office technologies. Such training, which lasts one to five days, is widely criticized for providing only basic terminal operation skills - the "logic of machines" - and for not giving any general appreciation and conceptual understanding of the systems. Most of the training required takes place therefore during the daily operation of the systems - the training period is estimated to last up to six months.

The general lack of qualifications, resulting from the education and vocational training situation described above, is estimated to be a major constraint on the diffusion and optimal use of office automation. In (UK), for example, the shortage of computer skilled personnel amounted to 25,000 in 1983.

Impact on Organizational Structures

There is no evidence of any significant change of organizational structures related to the introduction of office automation. It is a fact that these new technologies can assist either the centralization or decentralization of decision-making processes and control. Certain experiences indicate, however, that decentralization can only be achieved on the basis of clear policies. If such policies do not exist, centralization will be the rule. According to a (DK) study on management plans for future office systems, 53 % of private firms and public institutions have plans for the development of centralized systems (mainframe computer connected to a net of "unintelligent" terminals) - only 16 % have plans for a genuine decentralized system.

A British study indicates that 12 % of big firms now give their executives the possiblity of working from home, and that 60 % expect that such forms of work organisation would be possible within the coming five years. As to distance-work among salaried employees, only rather marginal experiments exist as yet. Further developments within the telecommunication networks though would render this type of work-organization significantly more widespread.

Impact on Working Time

There is no evidence of any direct impact on working time from the introduction of office automation.

Impact on Health and Safety

One of the major problems related to office automation is the health hazards of work at visual display screens. Although many of the fears expressed at an early stage have proved to be without foundation there remains high level of dissatisfaction about working conditions among terminal operators. In numerous surveys evidence indicates that the majority of operators experience, some kind of health problem - 73 %, in a Danish study (PROSA, 1982); 95 % in a Norwegian study (K. THORENSEN, 1981) etc. They concern headaches, strained muscles in the back of the head, in the back, shoulders and wrists as well as "dry eyes" and various problems of stress - a Swedish study (G.J. HOHANSSON, 1979) shows clearly that terminal workers present higher levels of secretion of adrenalin (indicator of stress) than non-terminal workers in working time as well as during leisure time. Many of these problems could be eliminated by ergonomic means, others by changes in work organization. The daily operating time at visual display screens is known to be of special relevance. Eye-fatigue in fact starts appearing after 1,5 - 2 hours work with VDUs.

It should be noted that certain long term, and until now undetected effects from VDU-work, have been indicated by certain recent scienrific studies. They range from skin diseases to miscarriages, which are caused by the static electricity around the terminals and long-term exposure to low and "danger-free" levels of radiation.
Other surveys however provide evidence in the opposite direction.
The research on this issue is for the time being not conclusive (1).

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(1) See e.g. Canadian Occupational Health and Safety News, Vol. 6, N. 26, July 1983.

Government Policies

Office automation is generally an integral part of governemnt new technology promotion schemes. However, when this specific technological field is promoted as a distinct area, it is only granted marginal financial support (e.g. UK, DK and F). Office automation is not yet understood as a high priority area within new technologies.

Most governmental activities are related to public sector procurement. Let us just mention here the plans for developing and introducing in the Danish public administration, and the activities of the Department of Trade and Industry in (UK) aimed at promoting the application of user-adjusted office automation sytems in public institutions. In addition the National Economic Development Council (NEDC) has recently presented plans for a coordination of the activities of British office equipment manufacturers. Fifty major firms in the field have been asked to explore potential areas for co-operation.

Industrial Relations

The industrial relations systems differ very widely between the European countries. The regulation of technological development has clearly been marked by these differences. In certain countries, statutory regulations are the rule (D, F, S) in others, only regulations by collective agreements exist (e.g. in UK and DK). In some countries central collective agreements are concluded at a confederation level (DK, S and N), in others collective agreements on technological change only exist at firm, company, branch and/or industry level.

In some countries, office automation has been the main field of technological change regulated by collective agreements. About 90 % of technology agreements (in UK) have been concluded by the trade unions of salaried employees (APEX, ASTMS and ACTSS). But in most countries these occupational groups are only taking the first steps in understanding the prospects of future working conditions and in presenting claims.

A.J. HINGEL

BELGIUM*

The term "office automation" is generally taken to extend to the collection of techniques by which unstructured (i.e., not previously encoded) data can be gathered, stored, processed and disseminated. The techniques are equally applicable, therefore, to words, images, photographs, drawings and even human speech. The principal tools of office automation are word processors, electronic mail systems and local networks.

The spread of office automation

It is difficult to estimate the true impact of new office technology on the Belgian office community, due to the lack of available statistics on the size of the installed word processor base. It is also impossible to put precise figures to the proportion of computer time devoted by companies to typically 'office' applications such as word processing in relation to all business applications (accounting, stock control, etc.).

What figures there are, however, seem to lead to the conclusion that the elctronic office in Belgium is, as yet, very much a tentative affair. DUN AND BRADSTREET estimate that office automation products account for no more than 7 % of the total Belgian market in new technologies, putting it at about the same level as microform information retrieval equipment, for example. A survey conducted by the E. BERNHEIM Centre of the Université Libre de Bruxelles among an unfortunately

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* Summary of a report by P.M. BOULANGER, under the supervision of L. LOHLE-TART, A.D.R.A.S.S. (Association pour le développement de la recherche appliquée en sciences sociales - Association for the development of applied research in social sciences - Ottignies).

very restricted sample of smaller businesses in the Brussels region (published in the computer systems review "Paninformatic") reveals that a mere 25% of the companies interviewed routinelyused their computers for word processing applications. The robust growth of the photocopier market also seems to indicate that word processing, electronic mail and videotex have a long way to go yet before they oust paper as an information carrier. According to the photocopier manufacturers Rank Xerox, the number of plain paper office copiers had grown from 26,000 in 1979 to 44,000 by 1982, with the aggregate number of copies made in Belgium rising from 12.5 billion to 13.1 billion over the period (source: OI Informatique hebdo).

Even the banking and insurance sectors, currently the leading investors in office automation and incontestably pioneers in developing new applications for microelectronic technology, are unable to envisgage a full-scale transition to the electronic office in anything shorter than the medium-term (by 1990), and are still only at the experimental stage themselves in this area. The same is true of public administration, which has launched a few tentative pilot projects in office automation. Despite that, what we can expect from the 'electronic office', (and this is particularly true in banking), is a radical change in the organization and distribution of work.

Production

In any case, a massive expansion in the Belgian market for new office technology at the present time could well pose a serious threat to the country's trade balance, which is currently running an almost BF 30 billion deficit in electronic data processing products. Out of the 50 or so word processing systems currently available in Belgium, only one

(ETAP) is the product of Belgian technology.

Official policy

This is one reason for the major effort mounted by the Belgian public authorities to create a truly competitive office automation industry in Belgium. The "Programme of actions in microelectronic-based technologies" (October 1982) published by the Minister for Scientific Policy sets out explicit objectives: "...to gradually reduce the adverse impact on the balance of payments likely to result from equipping government services with an infrastructure of imported office automation equipment. The production of such systems in Belgium should also help to offset, partially at least, the negative impact which the computerization of office work will have on the level of employment in the public sector". (p. 34).

The Minister of Scientific Policy's plan for office automation is to be implemented in three stages: the first stage consists of preliminary surveys to identify products and systems to receive official backing; stage two sees the development in the strict sense of word- and data-processing, facsimile transmission, electronic storage and printing systems. In the final stage, prototype systems will be installed for on-the-ground testing in selected public administration departments. The central government voted an initial budget of BF 280 million for the plan, matched by a further BF 350 million investment put up by the companies concerned. In its later stages, the plan will also benefit from further funding to the tune of BF 850 million, half of which (BF 425 million) will come from the State coffers. Over the period 1981 to 1986, therefore, the Belgian Government will have invested a total of BF 705 million in office automation alone - a sum equal to one-third of the entire central government

funds allocated to research and development into new technologies.

By the conclusion of the product development stage, the project organizers had come up with an intelligent printer, data switching system, VDU screen, local network, and word processing system (1). The project moved into stage three with the experimental installation of the office system in the Prime Minister's cabinet office, after which it will eventually be extended to all Ministerial departments. The system - baptised B.I.S.T.E.L. - covers four essential applications: data processing, media relations, an information service and a communications service. The different Government Departments will be linked by videotex terminals giving them access to press agency reports via the Prime Minister's cabinet office acting as a clearing house. The main contractor for the project is the company INTERSYS, one of whose mainframes will act as the central processor of the system. BARCO will be supplying 100 intelligent terminals (programmable for four languages), while ETAP will be contributing 12 stand-alone word processors.

The fact that all the companies involved in the office automation programme are located in the Dutch-speaking part of the country has undoubtedly had some influence on the Walloon Regional Executive's recent decision to set up a semi-public company with an initial capital of BF 500 million (BF 400 million from the Region itself), with BF 100 million being put up by the private sector partner, ACEC of Charleroi to develop its own range of office automation products in the field of voice processing, multifunction terminals etc.

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(1) The companies concerned being AGFA-GEVAERT, ATE, BARCO and ETAP, respectively.

The new company was given the evocative name of BUROTEL.

The Executive of the Flemish Region and the Walloon Regional Executive are also both pushing ahead with new technolgy promotion drives, one aspect of which is, of course, office automation, under the banners of "D.I.R.V." and "Operation Athena", respectively.

The impact of office automation on employment and labour

The point was made earlier that the interactive office, as far as Belgium is concerned, is still very much in its infancy. No firm predictions can as yet be made as to its implications for employment and working patterns. The only information that can be given on this aspect, therefore, is in the nature of forecasts rather than the findings of workplace experience, except for the printing industry, where the introduction of new photosetting technology has already led to the shedding of 7,000 jobs over the past 5 years. The view taken by the authors of the report from the Fondation Travail-Université on new technologies (1) is that the development of word processors, automatic sorting equipment, electronic mail systems, etc. may lead to the loss of up to 35,000 office jobs, 16,000 of them among typists. Findings from other countries (2) would seem to indicate that these figures should be read as a conservative estimate.

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(1) VALENDUC (G) and LAFFINEUR (J): Face aux nouvelles technologies, Brussels, Fondation Travail-Université (FTU), Dossier No. 7, March 1982, p. 211.

(2) "Office 1990" by Siemesn, p. 28. C.f. also IBM's forecast that the use of word processors will lead to productivity gains of 100% to 150% among typists. Quoted by Prof. Bundervoet at the "Samenleving en technologie" day.

The 1982 report from the Association of Belgian Banks has this to say: "Electronic-based technology has for years underpinned rapid business growth and been the means of containing the costs of that growth. It has gradually developed into an instrument of rationalization, helping to hold costs down and sustaining an eroding profitability as a priority aim. Its impact on employment in banking may not be the same in the future as it has been thus far... Technological advance will essentially continue to entail changes in the structure and organization of work. Now a new factor has entered the picture: up till now, major efforts have been made, and largely crowned with success, to redeploy affected workers in more sophisticated, sales oriented tasks; the continuing crisis and economic stagnation obliges us to recognize that our needs in this field are not unlimited". (p. 31).

It is interesting to note that the unemployment rate in the banking and insurance sectors is rising (up by 21% in the year from September 1982 to September 1983).

Nor does the design and manufacture of new office technology seem destined to play much of a role in the creation of new jobs, given that the word processing division of ETAP (one of the major beneficiaries of government spending in this field) runs on a workforce of just 32 all told, and that BELL TELEPHONE's constantly rising turnover since 1970 has been accompanied by a steady decline in its total workforce. PHILIPS and SIEMENS are experiencing the same problems.

Women at risk

To all intents and purposes, women will be in the front line of those under threat of technological redundancy from the spreading mechanization of office work. The fact has not escaped the "Commission

on Women's Work" which, in 1981, organized a series of one-day study sessions on the implications of the new technologies for women's employment. The speeches and discussions clearly pointed up the factors which put women's jobs at the sharp end of technological change: the high concentration of women in jobs and fields which are the natural target for office automation products (over 90% of all telephonists, telegraph operators, shorthand-typists and telex operators are women), women tend to include a higher proportion of educational under-achievers than men, and are more susceptible to part-time working schemes... It is also a fact that increased office automation is as likely in ancillary jobs and part-time work. Indeed, it is already happening, and is clearly destined to take on wider dimensions in the future. (It is an established fact recorded in the surveys conducted by Professor MOK of the UFSIA (1), that in the distributive trades the first effect of introducing new technology is an immediate increase in the rate of part-time working - mainly by women).

Quality counts

Considering how new technology for information handling, and office automation products in particular, affect the quality of office life, it seems as a general rule that those who have become involved in current trials have found their jobs enriched by it.

This particular aspect was underscored by the Société Générale de Banque's Director of Social Affairs at the "Samenleving en technologie"

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(1) Antwerp University (Saint Ignatius University Faculty, Antwerp).

day (1), when he attributed the success of the venture with the workforce to the careful preparation which had gone into it. A multi-disciplinary team consisting of an industrial psychologist, sociologist, physician and biotechnologist had done extensive groundwork to lay the foundations of the project (particularly in the adoption of ergonomic standards) and pilot-tested it for three years before moving up to full-scale implementation. It was found that employees who had worked with the new electronic terminal equipment had no wish at all to return to the former methods of working. In many instances they became the most forceful advocates of the new office technology, themselves countering the objections raised by the trade unions. The trade union representative at the SGB conference made no attempt to deny the truth of these observations, although he did not accept the experiment as an unqualified success. Other speakers recounted comparable results from similar experiences (word processing at F.N. (2), PHILIPS, etc.).

A number of negative aspects were also highlighted, however, including the deskilling of certain classes of worker, work becoming more abstract (one employee in an insurance company could no longer remember the premium tariffs after the implementation of an automatic premium calculating system), increased incidences of nervous tension and stress, less scope for personal initiative, etc. It should be borne in mind, however, that the great majority of the experiences recounted here are reports of pilot projects, which have been given close attention and extensively prepared. But experimental conditions do not always apply when a system moves up to full-scale implementation.

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(1) "Society and Technology", VUB, (Free University of Brussels), Brussels, 28.4.83, published in: Berichten No. 41, Tijdschrift Gewestelijke Economische Raad voor Vlaanderen, December 1983, 149 pp.

(2) F.N. : Fabrique Nationale (Herstal).

Health

In the health and hygiene field, the most frequent complaints levelled at new systems were eyestrain and headaches caused by using VDU terminals. It is generally accepted that these particular types of disorder are caused by a combination of the screen itself (glare, brightness, background, clarity) and the type of work done on a VDU, which is too often monotonous or carried on too long without breaks. It is almost certain that the committee of the Ministry of Employment and Labour commissioned by the Hygiene and Industrial Medicine authority to draft regulations covering htis aspect will make screen filters compulsory. A few companies have workplace technology agreements limiting work on VDUs to no more than 4 hours a day and providing their own ergonomic design standards in contracts with office automation equipment suppliers.

Conclusions

Given the productivity-enhancing potential of office automation, particularly in industries which seemed to have reached productivity peaks, and the modest capital investment required, office automation seems assured of a rosy future (from the suppliers' point of view) in Belgium. However, the innovations it brings with it lie firmly in the realm of "process advances" and it is likely to have an extremely important medium-term impact on office jobs, far in excess of that which robotics will have on factory work. That is why the national white-collar union Centrale Nationale des Employées (affiliated to the Confederation of Christian Trade Unions) believes that "urgent steps need to be taken" to avoid seriously jeopardising the future of jobs, particularly women's jobs. There are also deep misgivings among

members of the public employee's union Centrale Générale des Services Publics and the managerial, technical and staff union Syndicat des Employées, Techniciens et Cadres, both affiliated to the General Federation of Workers of Belgium. The debate into which the two sides of industry will enter, with the State being called on to take the umpire's role, will probably focus largely on the precise distribution of the productivity gains arising from the introduction of new office technology.

It will clearly be some years yet before the installed office automation base reaches any appreciable level. Only then will the true benefits and drawbacks start to become clear and quantifiable.

DENMARK*

I. Technical and Economic Aspects of Office Automation

1. The spreading of office automation

A survey on office technology in private firms and public institutions, which was carried out in 1981 in Denmark, concluded:

- that 41% had introduced computers;
- that 62% used computer terminals;
- that 82% used electric typewriters (equipped with correction tape);
- that 22% used word-processors;
- and that 16% of firms and institutions did not use any type of computer equipment at all (1).

In 1981 the number of word processors introduced was estimated to be about 7 000 (90% of these were processors equipped with magnetic tape; 10% were processors with screens). In 1981 the era of word processors had yet to dawn in Denmark. Since then, Denmark has experienced a boom that multiplied the number of word processors introduced by a factor of almost ten:

	1981 (primo)	about 900 units	
Number of word-processors (with	1982	3200 units	(+236%)
screens) introduced in Denmark	1983	6600 units	(+106%)
(1981-83) (2)	1983 (medio)	8000 units	(+ 42%)

At the beginning of 1984 the number of word processors (with screens)

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* Summary of a report prepared by Ander Joest HINGEL, Institute of Work Sociology and Organisation, Copenhagen Schools of Economics and Social Science, Copenhagen.

(1) Th. SKousen "Fremtidens kontor" DIF-Data, Copenhagen, 1981.

(2) Read from graphical presentation: Th. Skousen "Etb på arbejds-pladsen" Kommunetryk; København, 1983

introduced in Danish firms and public institutions was estimated at around 9 000 units. Relatively speaking, twice as many units are introduced in the public sector as in the private. According to Swedish studies, medium sized firms have introduced new technologies in the office faster than small and large firms, and a certain geographically biased development is appearing: new technologies are mainly introduced in bigger cities (1).

As concerns the development of computers there is a polarization in the field: a relatively fast increase of "big general computers" (+ 55% between 1979 and 1983) and of "microcomputers" (+ 470%) and "(business-) microcomputers" (+ 230%) whereas the number of small and medium-sized general computers is stagnant or falling (4).

Although the service and software sectors still only account for about 20% of the turnover in the electronics industry, their relative importance is increasing fast. The outlay of EDP-users in this field increased 150% faster than outlay on EDP hardware between 1979 and 1984.

2. Estimates of the future penetration of office automation

Rampant confusion persists over the question of the future diffusion of various types of office automation equipment. Numerous forecasts have been put forward, but due to the high degree of divergence between them it would be premature to draw clear conclusions. The estimates include

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(1) Ekonom n° 5, 1982

(2) Dansk Databehandlingsforening" Edb-branchens hovedproblemer", 1983.

anything between "the automated office will become a reality by the end of the eighties" and, "the office of the future will, to a considerable degree, look like the office of today".

In general terms a yearly increase of 50% in investments per administrative workplace can be expected in the coming years. The market for mini-computers and terminals will expand by about 20% per year and the market for personal computers and software by about 30% (1).

The development of future administrative "work-stations" in the public sector, (applying EDP-terminals that could include all administrative routines), signifies that the present stock of 5 000 terminals (1983), would reach 11 000 in 1985, and about 24 000 in 1990 (2).

These office automation plans in the Danish public sector go well beyond plans in Sweden where the number of EDP-terminals in the public sector is expected to increase annually bu about 10%.

3. Trade and production

Danish production of office technology increased by more than 200% between 1975 and 1982. This sector represents the fastest growing sector in the electronics industry - but still it only counts for about 10% (DKR 700 mill. (1982)) of the total output of this industry. 90% of the total output of electronic products is exported, but the balance of payments shows a deficit, mainly due to the import of "computers" and "computer equipment". In this latter field, Danish exports represent in value terms only about 25% of imports. A similar picture exists for the Swedish and Norwegian balance of trade in this sector.

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(1) Veckans Affærer NÆ 30, 1983

(2) I/S Datacentralen af 1959 "Forvaltningens Administrative Arbeijsplads" 2. ed., Copenhagen, 1983

It would be out of place here to describe in detail the complex structural features of the Scandinavian producers of office automation. In very general terms the market is characterised by many sales from foreign firms and few from national producers. Let us just mention the best known, like the Danish firm Christian Rovsing A/S (turnover: DKR 414 mill. (1982)), a firm which has increased its sales (mini- and micro-computers, and data communication networks) by about 40% per year over the last five years; and the Swedish firm Ericsson Information Systems, EIS, (turnover: SKR 2.4 bn (1982)), which produces communication systems, electronic switchboards (PABX) and has recently launched a major development programme in office automation on the basis of its mini-computer ("Serie 2000"). The Norwegian mini-computer manufacturer, Norsk data, is also a prominent force.

II. Social Impact of Office Automation

1. Impact on employment

Empirical knowledge on the impact of office automation on employment is extremely limited. Reference is mostly made to foreign studies.

A recent Swedish study concludes that women employed in offices are especially threatened - not because of "technically related reasons", but because of a highly "sex-segregated labour market" (1). Women are occupied in 84% of all office jobs in Sweden. According to a statistical analysis of a large number of future scenarios, it is further estimated that between 2.3% and 37% of women employed in offices

(1) Arbetsmarknadsdepartementet "Kontorautomation och Kvinnors Framtida Arbetsmarknads" DsA 1983; 9, Stockholm, 1983

wil lose their jobs between 1985 and 2000, due to the introduction of office automation (1). Less general information is provided in a Danish study on the basis of data from 530 private firms and public institutions: dismissals occurred in connection with the introduction of office automation in 11% of the cases (none in the public sector), and in 26%, job-transfers had taken place (2).

2. Impact on qualifications

Because of the relatively non-formalised features of the qualification demands and structures in offices, it is difficult to forecast the impact of office automation in this area. In general certain routine tasks will probably disappear while certain new demands for qualification will grow. Moreover the new technology will bring about conditions for a re-distribution of the remaining routine tasks at all organizational levels. Experiences to date indicate, however, that office automation often breaks down the employees' previous understanding of their total work situation leaving them only with an understanding of "the logic of the machines" and of "an abstract processing of information" (3).

Apart from the directly task-related qualification demands, the debate revolves around the qualifications needed in order for the employees to

(1) Arbetsmarknadsdepartementet "Effekter av Ny Teknik på Produktivitet, Sysselsætning och Arbetsted" DsA 1983:1, Stockholm, 1983.

(2) Th. Skousen (1981), op. cit.

(3) B. Göranzon et al. "Job design and Automation in Sweden" Center for Working Life, Stockholm, 1982.

participate in decisions on the introduction and application of new office technologies. Surveys show clearly that these decision-making processes rest with the technical experts (1) leaving only minor matters open to influence from white collar workers. The question is: what are the competences needed in order to specify the demands of employees and to increase their say in decisions ? Research is carried out on the kinds of skill needed to give employees a greater say, but a clear answer to the problem has yet to be found. The general lack of competence, at all levels, has been pointed out by professionals as the main reason for the large number of idle office machines in companies. In fact it is estimated that for example 20 000 mini computers stand idle in Swedish firms - 50% of the total number introduced (2).

3. Education and vocational training

Half a million employees in Denmark (1983) (3) and one million in Sweden (1981) urgently need vocational training due to new technologies in offices, but the vocational training systems are far from adapted to meet such a challenge. Most training is undertaken by the firms selling equipment, but these courses are heavily critized for only teaching terminal operation skills; leaving out total overviews and the conceptual understanding of the systems. Individual learning on the job remains the main way of learning: it requires a period of 6-12 months(4).

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(1) M. Lie, B. Rasmussen, "Kontorautomatisering og Kninnearbejdsplasser", IFIM, Trondheim, 1981 (mimeo)

(2) Dataværlden 18/1983

(3) Arbeitslederen 5/1983

(4) Arbetsmarknadsdepartementet "Kontorens Datorisering - Effekter på sysselsättning och arbetsmiljö" DsA1983:16, Stockholm, 1983

4. Impact on organizational structures

As mentioned above, a certain "polarization" of computer capacity taking place: the big central mainframe computers are complemented by decentralized computer capacity. Currently the most prevalent systems architecture (78% of firms and public institutions) consists of "a central mainframe computer connected to a net of unintelligent terminals", and although this type will maintain its predominance in the future more decentralized systems will increase their relative importance (1). A Swedish study on future systems design indicated that 91% of companies have future plans for office automation; that 35% of these plans concern "mainly centralized systems"; 21% "decentralized systems" and 44%, "distributed systems" (2).

5. Health, safety and general working conditions

The dissatisfaction by employees with working conditions connected with visual display screens is stressed in most surveys; 95% of operators experienced some kind of health problems according to one study (3) - in another study, 73% suffered from strained muscles or visual discomfort (4). But psychological hazards are also causing concern. A Swedish survey shows that VDU-operators present significantly higher levels of "secretion of adrenalin" (indicator of stress) than non-VDU-operators (5). One of the main background variables for these hazards,

(1) Th. Skousen (1981) op. cit.

(2) AR-Bolaget "Datautvecklingen i Sverige 1983-85" Stockholm, 1983

(3) K. Thorensen "Terminalarbeidsplasser", Oslo, 1981

(4) PROSA "Tasteoperatørrapporten", København, 1982

(5) G.J. Johansson "Stressreaktioner i arbete vid bildskærmsterminal" Stockholm, 1979 (mimeo).

has apparently been the total daily working hours on VDU's. Visual discomfort is experienced by 75% of employees when the daily VDU-working time is equal to 7.5 hours - this drops to 47% when the daily VDU-working time equals 3.5 hours, Swedish studies show. Eye-fatigue is considered to begin after only 1.5 - 2 hours' daily VDU-work (1).

III. Government Innovation Programme

Office automation does not play a major role in the government innovation schemes proposed in Sweden (SKR 714 mill over 5 years) and Denmark (DKR 1.5 bn over 4 years). The major promotional schemes in the field are related to the development of the future "administrative work-station" in the public sector: in Norway, a scheme administered by the Department of Administration (NKR 14 mill (1983/86)) and in Denmark, the so called "EDP-Fund" (The Ministry of Industry and the Ministry of Budget) promotes R&D in "EDP, telecommunications and office automation" related to future needs of the public sector (DKR 130 mill (1982/86)).

IV. Social Groups

1. Employer and Trade Union Policies

Like "new technologies" in general, office automation is a means of improving working conditions and work efficiency, but according to the trade unions not all technologies are directed to these ends, and not all ways of introducing them represent the best possible practice. The trade unions therefore demand a say in strategic decisions. Employers in Scandinavia are to a certain degree sympathetic to such arguments and consider technological development within the firm as an important item which should be subject to co-determination.

2. Collective agreements

Central technology framework agreements have been signed in both the private and the public sectors in all Scandinavian countries (private sectors, agreements in Norway in 1977, in Denmark, 1981 and in Sweden, 1982).

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(1) Arbeidervern 3/1980; Pas På 1/1982

These central agreements have been complemented especially in Norway and Denmark, by numerous local agreements (over 100 in Denmark and more than 700 in Norway). Many of the agreements concern the introduction of new technology in offices. Without any significant exceptions all such agreements contain guidelines for the regulation of the social changes which are directly related to the introduction of new technology, and for the information and rights to consultation of employees and their representatives. They do not afford the employees a say in the decisions. Certain trade unions have reacted to this situation by adopting rather militant attitudes. The Swedish Organization of Civil Servants (ST) has for example demanded a right of veto on all questions related to new technology, and the Danish Central Organization of Salaried Employees and Civil Servants (FTF) has denounced the "failures" of "mending" the social consequences of new technology, and demanded a government intervention. Employers in both countries reject such demands.

THE FEDERAL REPUBLIC OF GERMANY*

A large amount of research work has been carried out in the Federal Republic of Germany on office automation. Much of this research however, is of a rather general character and more concerned with qualitative aspects rather than with quantitative information on the diffusion of the technology and on its economic and social consequences. Most specific data on the extent of the introduction can be traced to a few main sources, namely Diebold (1) and Siemens (2) as well as some data from a few years ago. Even among the larger amount of qualitative studies, a large part consists of either scattered information which might not be representative or is too speculative in nature. An overall picture of what office automation really means for the quantity of jobs in the country is therefore still not available.

To define office automation means defining both office work and automation. the Fraunhofer Institute writes that between German speaking experts no uniform definition is used on what office work actually is (3). Many researchers are of the opinion that office work is not to be equated with the premises where office work is done, but should be seen as a grouping of mental activities with regard to production processes such as communicating, storing of data, planning and decision taking. Such activities are not necessarily done at the office desk or at the office premises, but can (at least partly) be done everywhere (4).

Such an analytical definition hardly tallies with more pragmatic views, also widely used in German literature, in which an office is seen as a room with a desk and telephone (5). If such different definitions are used, one can hardly expect uniform data on the extent and impact of the introduction of new technology in offices. On the other hand it should

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* Summary of a report prepared by Dirk van der WERF, Ministry of Social Affairs and Employment, The Hague.

(1) Diebold, Diebold-Statistik über der BRD installierte Computer, in Diebold Management Report, Okt. 1981

(2) Siemens (ed.): Büro 1990. München, 1976. Siemens (ed.): Internal Report on the influence of office technologies, 1978.

(3) Bullinger, H.J., Fähnlich, K.P., Fauser A., Heller H. : The Extent of Introduction of Electronic Machinery in the Office. Fraunhofer Institute, Stuggart, 1982.

(4) Syperski, Grochla, Höring, Schmitz: Bürosysteme in der Entwicklung. Studien zur Typologie und Gestaltung von Büroarbeitsplatzen. Wiesbaden, 1981

(5) See for instance Morgenbrod, Schwärzel: Informations- und Kommunikationstechnik verändern den Büroarbeitsplatz. In: Data Report 13, Nr. 6, 1978

be made clear what is meant by the word automation, if we consider office automation. A number of activities in offices, mainly recurring operations like liquidity, stock and supply management, routing of product and parts, delivery, etc., are increasingly managed automatically, and may logically be considered office automation. But a number of other activities, in particular communications, planning and decision taking are not being automated as such; but are more and more aided by (micro-) electronic devices in the office. The Fraunhofer Institute for instance takes both forms of "office automation" together, when it confines its research to the use of electronic devices in the office.

Recent market data on the spreading of modern electronic equipment in offices are scarce. Data for the total numbers of word-processors in the Federal Republic of Germany are given for 1982 by Nixdorf - Diebold, which reckons on 77,616 word-processors installed for a total value of DM 1,760.9 million, working out at about DM 23,000 a piece. Nixdorf Diebold assume that by 1982 only 6% of the market was satisfied. So the potential market would amount to about 1,3 million word-processors, about one to very 6 workers employed today (1978 figures) in office professions. Data for other hardware installed is available for telecommunication, including an estimation for growth up to 1985.

For the total impact on employment in the office sector or on employment in office professions, no clearcut or readymade estimates are available. Available quantitative data refer to the impact of equipment where it is installed, the type of equipment and the numbers of people working in office jobs or in office professions. The available data are in fact rather weak, but make it possible to arrive at a provisional guess at the potential total employment impact. Such a guess was made by Siemens in 1978. Siemens estimated that by 1990, 40% of office jobs in the Federal Republic of Germany would be taken over, which would imply a loss of 2 million jobs (1).

Compared to other studies on the employment impact of office technology, an estimated overall 40% impact seems rather high. Impact estimates from international sources run from about 15% to 40%, depending on definitions. If we compare the 2 million estimate of Siemens with the

(1) Siemens, Op. cit.

total number working in office jobs in 1978 (about 8 million) the overall impact comes out at only 25%, a figure much more in line with international experience. As for word-processors specifically, 40% extra productivity of secretarial work seems very likely if various sources are to be believed. In a potential market of 1,3 million word-processors this would imply a loss of half a million jobs caused by word-processing alone. As we may assume that only part of these word-processors will be used full time, such an estimate would represent a maximum. The number of secretaries and typists who occasionally or frequently use typewriters is estimated by Scholz to number 2,4 million (1).

On the disappearance and creation of skills it is very difficult to find hard evidence that is representative and does not take on the appearance of generalities. There is little doubt that the general features of the impact on work of, for instance, word-processors, which are found elsewhere will be also apparent in the Federal Republic of Germany, like a general upgrading of skills for those working with the new equipment. In other fields, such as data-processing, sources are contradictory. Electronic Data Processing for instance is reported to eliminate jobs requiring intermediate levels of training, which would mean a polarisation of skills. (2) However, this is not the finding of other research, which shows both downskilling and upskilling and concluding that downskilling and resulting polarisation cannot be clearly established, neither for data-processing nor for word-processing (3). There is a direct correlation between the introduction of new equipment in offices and changes in work organisation, the use of new equipment being more often than not the consequences of the need for a better organisation of work and production in general. This implies centralisation of decisions in some places and decentralisation in other places, depending on the sort of activity and the tradition of the business. No general conclusions can be drawn here.

One of the specific factors reported for the Federal Republic of Germany is the storage of personnel data or data related to the work done by employees, which is only possible in centralised computer administrations.

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(1) Scholz, (Eckhard): Office Technology: Employment Implications. Paper for the Trade Section Conference of Salaried Employees in Industry. Brussels, FIET, 1982.

(2) See evidence reported in Metra Consulting Ltd.: The Impact of Chip Technology on conditions and Quality of Work. London, 1982.

(3) Dirrheimer (Angela): Der Einfluss des Einsatzes neuer Informationstechnik auf programmierter Tätigkeiten in der Verwaltung. Eine empirische Untersuchung. International Institute of Management, discussion paper, Berlin, 1981.

Such centralisation of data storage tends to lead to greater centralisation of planning and decision taking, though it need not be if this trend is countered by a stronger wish to decentralise.

Working conditions are affected in two distinct ways by the use of new technology: by the equipment itself and by changes in the work situation due to the introduction of new equipment. Directly related to the equipment used are e.g. complaints on the working with screens (VDU's). A study carried out on this found alarmingly high figures of complaints of aches and pains in the lumbar region, the back generally, and neck. In another study, (of typists working on a bonus scheme), reported complaints maybe due to changes in the workload, leading to symptoms of stress. In this study comparably alarming figures are to be found on stomach trouble, cardiovascular disturbance, nervous problems, and exhaustion/excessive fatigue (1). Of course these study findings need not be representative of the general situation in the Federal Republic of Germany. They however, warn that both the equipment and the conditions under which the equipment has to be worked may be responsible for a worsening of the work situation.

The policy of the Federal Government in matters of technology is generally directed towards promotion of research, development and application of new equipment in production and in offices. As to the impact of office automation on the labour market and on the quality of working life, government policy follows four interconnected lines:

1 - promoting and co-financing labour market and quality of working life research;
2 - stimulating work sharing;
3 - promoting the humanisation of work;
4 - watching the right and lawful application of the workers' representation legislation to ensure the smooth introduction of new technology.

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(1) Scholz, Eckhard: Office Technology: Employment Implications. Paper for the Trade Section Conference of Salaried Employees in Industry. Brussels, FIET, 1982

In the field of employer policies, one may distinguish the official position of employers' associations from that of employers individually. The official position of the German Employers' Association supports Government policy towards a fast and smooth introduction of new technology in the office. The official position respects existing legislation on labour conditions and workers' representations, but is not in favour of any extension of workers' rights.

Individual employers make efforts to increase their word-processing and data-processing capacities and competence. Rationalisation is found necessary by management, to keep their place in a competitive market and generally any reasonable policy to get a fast agreement of workers' representatives in this respect is welcome. Of course this atittude sometimes clashes with employees' interests, as unions see them.

Trade unions are fully aware of this and defend the rights entitled to workers' representations in works councils and/or in the field of quality of working life questions. Legislation gives employees a stronger position than in many other countries. The legislation on workers' representation provides that "the works council has to be informed comprehensively and well in advance" of planned changes which could have a negative impact on the workforce or large parts of it. The employer has to consult the works council on such changes, which may be brought about by office automation. Legislagion also calls for the establishment of a central works council (CWC in companies with several works councils), in theory with the same prerogatives.

GREECE*

I. The technical and economic aspects of office automation

Office automation is very little spread in Greece and statistical data are very scarce indeed. Computers are nowadays in use in particular in some ministries, banks, the army and some agricultural cooperatives. In the private sector computers are mainly used in insurance companies, hotels, tourist tourist enterprises and in some of the large Greek or foreign-owned manufacturing companies.

75% of the total number of computers was in 1982 to be found in the Greater Athens Area. However, seven years earlier, in 1975, 91% of the computers in use were in that geographic area. A certain geographic spreading is thus clearly taking place. The Public Sector accounted in 1980 for 23% of new computers intalled, while its share in the stock of existing computers is only 6%. The private sector has, in the past few years, been much more innovative in this field, and as a result it accounts for 70.3% of the total number of companies equipped with a computer. The total number of computers in Greece is estimated to amount to 1844 in December 1982.

Word processors are a fairly new product on the Greek market - only 40 units were sold during the year 1982. As to small business systems the market is more developed. 1300 such systems were in use in 1982.

According to market estimates the potential market for word processors in Greece will correspond to about 500 per year, which includes about 400 per year for text processing in business and other offices, about 60 per year for notaries employing 2 or more typists and about 40 per year for insurance companies.

Gigatronics is the only Greek company of computer hardware/software research, development and manufacture. Gigatronics was established in April 1980 with a turnover of 1 million Drachmas. The company experienced a rapid

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* Summary of a report preprared by Marios NIKOLINAKOS, I.M.E.O., Institute for the Study of the Greek Economy, Athens.

growth, and in 1983 its turnover reached 70 million drachmas. Gigatronics employs today 31 people andgives subcontracting work to six Greek companies.

Gigatronics is producing two main micro-computer systems, namely "Hermes" and the "G-200". Even though these systems are small in comparison to their well known competitors, nevertheless they possess a unique operating system design which improves their capabilities and makes them attractive to potential buyers. This is accompanied by the low and steady prices of the products. To date, the company has installed 80 computer systems in the Greek market; most of the parts are locally produced and imports account for only 20% of the total value of the products. For all other products, however, Greece is heavily import-dependent: in 1982, of a total estimated value of the market for informatics products of 3.5 billion DRs, 72-78% was supplied by imports, while domestic production accounted for 21-27%. Export are almost non-existent.

II. Social impact

There are no precise data available on the effects of the introduction of advanced office automation on employment. A survey was carried out on the basis of a questionnaire by the Greek Productivity Centre comprising 210 companies using computers.

Half the companies did not replace their personnel. In the remaining half, nearly 70% of the staff was transferred to another department or was used by the Electronics Data Processing (EDP) department.

However, 15% were dismissed and about the same number resigned. The percentage of those retiring earlier than expected is virtually negligible. Women constitute 98% of the secretaries.

Most of these work in the operational level of the hierarchy. From the same sample on the effects of employment the following results were obtained: From the 2461 (61% of the total) employees in the companies in question, the male population constituted 1544 (39%). It is interesting to note that the percentage of women in the supervision or management level constituted only 1% of their population.

III. Government policy

Government policy is explicitly positive towards promoting both the application and the production of office automation equipment in the general frame of a development policy aiming at restructing the Greek industry.

The development and application of new technology is being promoted. The new Five-Year Plan of Economic and Social Development 1983-87 forsees the creation of a National Informatics Council as well as a data bank. In this respect the Ministry of Research and Technology is promoting at present the renewal of the administration in general through the application of office automation equipment. Governmental organizations like the National Organization of small and medium size Enterprises (EOMMEX) or the Greek Productivity Centre (ELKEPA) operate in the same direction. Incentives are given to small and medium sized enterprises to introduce office automation, while the Greek Productivity Centre has created a special department to deal with office automation systems. Formal education in the field of Informatics (Information science) is very limited indeed. There is a computers engineering Faculty at the University of Patras, a post-graduate course at the school of Economics and the courses offered by the Greek Productivity Centre. The five year Plan of Economic and Social Development 1983-1987 tries to fill this gap in University and Technical education. Thus, in 1983 the Institute of Informatics was founded in Heraklion (Crete) which forms part of the Research Centre of Crete and reports to the Ministry of Research and Technology. The aim of this institute is the application and technological research, the development of Informatics appplications and the spread of knowledge as regards computers.

IV. Social groups

None of the unions is, in principle, opposed to new technology.Furthermore, there is a lack of interest of many clerical workers in union affairs. Neither trade unions nor the Greek employers' organizations have until now presented any policy statement in the field of office automation.

FRANCE*

Any consideration of the phenomenon of the automation of office work today must be part of a strategic vision both of its political and its economic and social consequences. A development of unprecedented breadth and scope, office automation is systematizing the organization of office work. the extent to which the French economy is becoming dominated by its service sector and the generally low productivity levels of office work offer a fertile breeding ground for the widescale spread of new office technology. But no one is claiming that the path of mechanizing clerical work will be either smooth or without social implications. Once we have clarified what we mean by office automation, then, the next thing to do is delimit it and analyze the tools available for pursuing a genuine social policy in the field.

While office automation can be defined in many different ways, the essential element seems to be that it consists of the collection of means by which work is mechanized. The notion exists only in relation to the effecting of changes in the organization of office work. Behind the phrase 'office automation', indeed, lies the will to extend the rationalization of office work. With the explosion in service activities, enhancing the productivity of office workers has become an essential precondition if companies are to remain efficient and profitable.

1. The spread of office automation in France

Before the 1980s, office automation made very little headway in France for two principal reasons:

- few steps had been taken to organize office work on a systematic basis;
- lack of understanding of the cost issues involved kept demand slack.

A number of indicators, however, now point to a situation poised on the threshold of change. The proportion of certain information-handling products in the total installed office machine base has increased at a

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* This article is extracted from the report by Bertrand QUELIN and O. PASTRE, Centre de Recherche en Economie Industrielle, Univeristé de Paris Nord, Villetaneuse.

substantial rate in recent years (see Table I), with the installed office machine base forecast to grow by 20% a year over the period 1985-1990.

Table 1

Installed office machine base

	1979	1981 (1st quarter)
Reprographics	458,862	538,643
Typewriters	1,993,386	2,057,675
Word processors	12,390	21,271
Telex	104,223	107,210
Telecopiers	5,371	8,223
Computers	57,972	75,287
Terminals	93,482	234,159
Accounting and invoicing machines	27,955	41,897

Source: Institut Remy Genton, Key data on office automation in France, 1981; The tools of the service industries and their market, 1983 (1).

The breakdown by industrial sector shows manufacturing industry as being better equipped with information processing technology than the average; in the service sector, banks and insurance companies have the most highly-mechanized work environments, while automation has gained least foothold of all in public administration (see Table II). Since 1979, the most sustained rate of acquisition of office automation products has been among computer services companies.

A breakdown of the figures by size of company shows that office automation has received the most enthusiastic welcome among smaller businesses: in 1981, 63.5% of the installed base of office machinery was in companies employing less than 50 office workers, against only 20.6% for companies with over 200 white-collar workers. However, this breakdown includes

(1) Estimates from different sources may, of course, vary by substantial margins according to the definition of equipment, sample population, etc. A more recently-published article offers more conservative figures for 1983, for example: C.f. the article 'Bureautique' in Economie-Géographie N° 209, November 1983.

Table 1

Rate of diffusion of main office automation technologies in small local units (% of local units adopting that technology)

Technologies	Rates of diffusion	Number of L.U.
Accounting equipment	2.2	42.528
Electronic typewriter	1.7	35.500
Word processor	0.3	6.167
Photocopier	12.0	251.534
Telefax	0.2	3.421
Microfilm equipment	0.3	7.000
Off-set equipment	0.3	7.000
Switchboard	2.0	42.484
Computer systems	1.3	26.398
Automatic answering service	3.0	63.513
Telex	1.6	n.a.

Table 2

The distribution of local units by technology classes (% of local units in the population in each class)

Class 0	62.1%)	87.8%
Class 1	25.7%)	
Class 2	8.3%	
Class 3	2.3%	
Class 4	1.6%	

Source: SISDO CONSULT 1983

Table II

INSTALLED BASE OF OFFICE MACHINES AND COMPUTERS IN FRANCE

by economic sector (end of 1st quarter 1981)

%	Conventional typewriters	Word processors	Repro-graphic	Telex	Tele-copier	Micro-filming	Comp-uters	Ter-minals	Accounting machines
Industry	35.5	31.4	31.8	38.8	41.9	32.9	38.0	35.9	37.9
Commerce	17.0	9.6	19.2	24.6	8.8	15.7	25.2	15.5	37.1
Public Services	9.7	4.8	7.5	15.5	6.2	5.8	7.6	11.0	4.6
Banking, Insurance	6.1	3.9	3.0	4.3	4.6	26.1	2.9	18.9	3.8
Administration	13.8	13.3	18.2	3.5	6.0	14.9	10.3	8.9	9.8
Computer Service Cos.	17.9	37.0	20.3	13.3	32.5	4.6	16.0	9.8	6.8
TOTAL	100	100	100	100	100	100	100	100	100

Source: Institut Remy Genton, 1983

"conventional" mechanical office equipment; the greatest concentration of microelectronic equipment (computers, terminals, accounting machines) is clearly with the larger companies (1). In addition to that, there is also a marked difference in the types of equipment installed, with smaller businesses opting for stand-alone items rather than the 'systems' approach, and the easy-to-operate rather than the complex.

The sustained spread of office automation could well heighten France's dependence on imported products, pushing the office equipment industry's trade balance, which stood at FF 2,500 million in 1982, even deeper into the red. France has no manufacturing presence in the word processing or reprographic equipment markets, and French companies hold little of the domestic market in other products with the exception of telephone systems and telex/telecopying equipment (of which France is a net exporter) (2).

2. The social implications of office automation

Opinion is divided as to whether office automation will have positive or negative consequences for employment, qualifications and working conditions. What does appear certain, however, is that wide margins for manoeuvre exist, which may allow us to shape the social consequences ourselves through the definition of the practical conditions in which companies are to introduce new technologies.

(i) Employment

The probable number of people occupationally affected by office automation varies according to how you define it: from a top figure of 9.5 million (1975) embracing all activities in the entire tertiary sector without differentiation (3), to 5.6 million according to a field survey (1979) (4), down to 4.8 million, taking into account only that part of the total labour force engaged in administrative work (1979) (5).

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(1) 36.4% for small companies and 43.3% for large companies, respectively (Source: Institut Remy Genton, 1983)

(2) Report of the mission on the electronics industry (the FARNOUX Report) La Documentation Française, 1982

(3) J. Martineau, La bureautique, McGraw Hill, 1983 - Includes professional categories such as physicians, armed forces and the police who are not principally concerned with office automation

(4) Institut Remy Genton, quoted by J. Martineau, La bureautique, op. cit.

(5) Bureau Gestion, N° 28, October 1980

Broadly-speaking, the percentages of those affected could break down as follows: senior administrators/management, 13-14%; middle management 25%; clerical workers: 60-62%.

Following the early, pessimistic and somewhat mechanistic, forecasts as to the impact of office automation on employment (e.g. the loss of 82,000 office jobs by 1985, forecast by the IRIS Report in 1979), there have been no more recent attempts to quantify the impact of transforming office procedures.

What is certain is that the replacement of labour by capital resources introduced by office automation offers up potential for realizing substantial productivity gains. Electronic assistance reduces the number of slack periods and completely automates entire sections of the work process. It has been estimated, for example, that from 25% to 30% of routine office work can usefully be computer-mediated, and that a word processor can increase the user's productivity by more than 35% (1). The problem is that, in the midst of a recession the introduction of new office technology unaccompanied by a reduction in working hours may simply save too much work. Room for manoeuvre still exists, however. But if we fail to take advantage of it, office automation may become more of a threat than pa promise.

Three categories of worker are particularly vulnerable: older workers, middle management, and women. As far as the first category is concerned, the introduction of new information systems has always been accompanied in every case by a drop in the average age of the company's workforce. The sheer breadth and particularity of the role of middle managers makes them particularly vulnerable to the infiltration of office technology. Their control functions are under threat of being by-passed by customized software packages and multifunction information systems. Finally, the majority of working women (almost 75%) are engaged in service occupations, the principal target for the development of the OA infrastructure. In France, women tend to be found in the more vulnerable types of employment (2), which are likely to be made more precarious still by the advent of the interactive office.

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(1) Huet Report, L'informatisation et aménagement du territoire (computerization and regional development), La Documentation Française, 1981.

(2) Generally-speaking, four times more women than men work part-time; 66.5% of all fixed-contract workers are women, as are 70.4% of all 'temps'.

(ii) The organization of work

One of the recent results of the rationalization of office work has been that the office as information processing centre has come to dominate the French economy. New information technology contributes to a re-definition of how work should be organized. The discussion demands that the analysis be placed in its historical context of the interaction between the rate of technology infusion and the forms into which work is organized. Two developmental stages in the rationalization of office work can be identified. The first is characterized by the mechanization and sex-stereotyping of clerical tasks as 'women's work'. Functional specialization developed alongside the chain of command structure, along the principles propounded by Fayol. Work began to take on a 'professional' character.

In the aftermath of World War II, the advent of punch cards paved the way for a partial transformation of administrative work. The punch card system brought the principles of Taylorism to bear in the office. But specialized expertise developed only sporadically and work assignments remained fractionalized. The infiltration of Taylorist theory was slowed down by a number of factors:

- the comparative homogeneity of office workers as a class;
- a general lack of interest in management science among businessmen;
- the specific characteristics of the office production line.

Prior to the onset of the recession in the 1970s, no overall vision of the organization of administrative work existed. But with the crisis, automation became the key strategic element of the rationalization of office work.

So office automation brought into being specific forms of organization destined to enhance productivity and eliminate slack periods, as soaring costs led businesses to step up their quest for a more systematic organization of work.

But the introduction of new office technology implies a general debate on information-handling channels.

While multi-function equipment may lead to greater integration and decentralization of tasks and to the development of the multiskilled worker, the dominant trend still seems to be towards the rationalization of work; and on this reasoning, diversification of skills may also favour the fragmentation of duties and the reduction of the work process to incremental steps.

(iii) Working conditions

Reports of field surveys and interviews indicate four outstanding problems: eyestrain, noise, nervous tension and backache.

Much remains to be done to counter these problems, and the answer seems to lie principally in the realm of ergonomics. The analysis and design of automated information-processing systems taking into account ergonomic considerations should help make them more "human"-oriented. The influence of biotechnology on the design and installation of compuer-mediated working procedures is of pivotal importance. The real place for ergonomics is upstream of the automation process.

The definition of ergonomic standards is largely inseparable from the question of standardization of equipment. France lags seriously behind in this respect, particularly in the field of VDU screens.

3. Training

The reshaping of France's industrial base has pushed training to the forefront of concerns.

The training needs revealed by the computer-mediation of work (office work in particular) are immense, while the job market is expanding vigorously.

The most glaring inadequacies in training lie both with the country's engineers and technicians (stunting industry's capacity for innovation) and with end-users. The introduction of computer science options into the national initial training structure was too little too late, propelling the development of continuing vocational training into the private sector.

Training programmes in office automation techniques abound on the market; in many cases, however, they are too costly and place too much emphasis on shaping people's tasks to the needs of the machine, reinforcing the Taylorist creed of the division of labour and responsibility. Government intervention is essential, therefore, particularly through further education programmes.

Any new training initiative must have its parameters set by reference to the particular constraints of office automation: training in small systems and in-service training.

4. Government action

Amongst the various activities of the Agence pour le Développement de l'Informatique (ADI) (data-procesisng development agency), one of its principal ongoing experiments over the past several years has been the KAYACK pilot project on integrated office automation systems. The main contractor for the project is the Institut National de Recherche en Informatique et en Automatique (INRIA) (national institute for research into electronic data processing and automation). The Centre d'Etudes des Systèmes d'Information des Administrations (CESIA) (centre of studies into public administration information systems) has been running a number of experimental standard applications for public administration featuring electronic terminal equipment and telecommunications-based office systems, amongst other things. The Agence Nationale de Valorisation de la Recherche (ANVAR) (national research development agency) acts as a clearing house for financial initiatives aimed at the development of hi-tech industries, including office automation products.

Finally, the programmes of the telecommunications Ministry directed towards fostering the development of information technology for business will have an important spin-off office automation, to the extent that they may lead to the development of advanced terminals and voice processing systems with a range of office applications. Much less attention is being paid to working conditions. Only two public bodies (1), are at all active in this field, publishing information and financing work improvement schemes. But none of their work is targeted specifically at office automation and both are operating on fairly reduced budgets.

Conclusion

Four points stand out as of particular importance:

(1) ANACT (Agence nationale pour l'amélioration des conditions de travail) whose members are drawn from government and both sides of industry, and FACT (Fonds pour l'amélioration des conditions de travail) (National Agency and Fund for the improvement of working conditions, respectively)

- alone among the new technologies, office automation is the one likely to have the greatest social impact in the near term;

- considerable dysfunctions may be created if the pace of development of office automation is not matched by a radical transformation in the organization of work;

- the wide margin for manoeuvre still existing means that spreading automation of office work must act as a catalyst for social advance

- the social costs of office automation can be attenuated by a genuine social policy.

IRELAND*

Office work is characterised by the generation and processing of information and Office Automation is people using technology to manage and communicate this information more effectively. As understood in this report an office worker is one who works under the direction of a professional worker and with information specified by the latter. Attention is given to office work within the services sector only, which include financial institutions communication and transport groups, professional bodies and public administration services.

The adoption of office automation

1. Text handling and graphics

The majority of the development effort in Office Automation in Ireland has been concentrated in this area which encompasses the data processing and image processing functions. The main impact of developments within this area is the dramatic increase in the use of visual display units and the subsequent increase of productivity in typing tasks: it has been shown that productivity gains in excess of 100% are made possible (1).

2. Communications

Among the options availed of in Ireland, TELEX is a well established piece of office equipment; FACSIMILE TRANSMISSION uses in Ireland mostly analog transmission techniques, the main users being subsidiaries of multi-national corporations; COMPUTER BASED MESSAGE SYSTEMS have on the contrary a very limited diffusion (2).

3. Data storage

With electronic filing vast amounts of data may be stored in easily accessible data banks. The possibility of having public data banks has been explored. 'VIDEOTEX' is one development in this area : in Ireland there is one private videotex service and one public service, the latter is the result

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* Summary of a report prepared by A. COLL, L. BRENNAN, J. O'KELLY, Department of Industrial Engineering, Univeristy College, Galway

(1) Study of the Implications of Microelectronic Technology forthe Irish Economy. Supplementary Volume; Office and Administartive Work. National Board for Science and Technology, Janaury 1981

(2) Reynolds, Berry: Electronic mail - which destination ? Technology Ireland, Vol. 15, n. 4, August 1983

of a pilot scheme set up by a number of public institutes. It provides economic, industrial, technical and agricultural information to a pool of approximately 50 users. The application of developments in communications and data storage will be facilitated by the decision, taken in 1978 by the Department of Posts and Telegraph, to use digital technology in the development of the telecommunications network. A major study on the implications of microelectronics for Ireland identifies the following considerations which may retard the spread of office automation (1).

(i) The size of Irish organizations

Most organisations are small by international standards. It is only organisations with significant numbers of routine typing and clerical staff that will feel any major impact from the new technology. Two additional points are worth considering

- Organisations which employ a large work force are more likely to be able to redeploy people into other information processing activities;
- the size of a company will determine the extent of time and money that can be devoted to the development of the more sophisticated aspects of office automation.

(ii) A highly unionised work force

The influence of trade unions in Ireland and the perceived need for a negotiated introduction of new technology means that any adverse effects will be considerably lessened and reinforces the necessity for a planned and gradual approach to change.

(iii) Telecommunications

Once the introduction of Office Automation extends beyond the confines of an organisation, telecommunication facilities become vitally important. As a result the rate of advance towards the automated office in Ireland will be significantly influenced by the state of the telecommunications system. The technology is available to establish a communications network within a single network. However a telecommunications system which would facilitate communication on a national and international level is unlikely to become available in Ireland until the latter half of the 1980's.
In summary it appears likely that the spread of microelectronics for office applications will be slower here than in other countries.

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(1) Microelectronics - the implications for Ireland. National Board for Science and Technology, July, 1981.

Employment

In Ireland, the service sector accounts for approximately one half of the total employed work force of 1,150,700 people. As concerns office work, estimated figures for 1981 indicate a total of 162,000 people employed, of which clerks account for 112,000 and typists for 23,000. Unfortunately no scientifically based studies of the impact of office automation on either the qualitative or quantitative aspects of employment have been undertaken.

The likely impact of new technology in the area of office work will be twofold:

- If the full potential of office automation is to be realised, organisational and managerial structural changes are essential. When office personnel are relieved of routine tasks they will have greater opportunities to deal with problems where more individual decision-making capabilities are required.

- Clerical and typing staff will be affected by office automation earlier than others and to a greater degree. Their work by its nature, can be easily automated and technology can be introduced in this work area with minimal organisational change.

Even though employment in the information industries is likely to increase, jobs will be lost due to displacement effects. The jobs most likely to be affected are those of typists and clerks, jobs traditionally held by women. In the context of women's work two problems will arise, women with traditional skills who are seeking to join or rejoin the work force will find it increasingly difficult to do so. Secondly traditional job segregation may be reinforced by office automation since the new technology is highly dependent on people with keyboard skills. This has been a prominent feature of 'women's work' and may serve to limit the potential work areas open to women (1).

Social consequences

In the area of health and safety the advent of the automated office has caused concern to be expressed over the possible attendant health hazards

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(1) Irish Transport and General Workers Union: Discussion Deocument on New Technology in Ireland, 1981.

to those who continuously use such equipment as visual display units and microfiches.

No specific legislation relating to new technology has been proposed to or passed through the Irish House of Parliament. No VDU design standards exist in Ireland and there is no legislation covering new technology work station design.

The Federate Union of Employers (FUE) refers its members to the legislation in existence dealing with the safe use of various materials and types of equipment. In this respect the safety in Industry Act (1981) established comprehensive procedures to ensure that statutory requirements are carefully respected.

The Association of Scientific, Technical and Managerial Staff (ASTMS), a union representing white collar workers, has produced a booklet entitled "Health and Safety Guidelines on Visual Display Units and Microfiche viewers" which recommends that periods of work on VDU's should not exceed two hours without a half hour break and that the maximum work in one day should be no more than four hours.

Work organisation and working time changes may also be brought about by Office Automation. Distributed data processing and electronic mail facilitate the decentralization of office work. In effect, the need for all office workers in a single organisation to physically occupy one location is removed. A limited number of cases of office workers doing a large proportion of their work via a computer terminal being based at home are already reported. A possibility brought about by the increase in productivity, and made feasible by electronic equipment, is that of reduced working hours while maintaining the same output.

In the long term this would seem to be a valid proposition but is unlikely to arise in Ireland in the short term.

The need for the retraining of personnel to ensure optimum use of the facilities made possible by office automation has been recognised by ANCO, the Industrial Training Authority and such a training programme

has been initiated. A pilot project "to help enterprises to adapt to new technologies" is under way; it is addressed to managers and supervisors in organisations in which some degree of office automation is about to or has already taken place. The completion of the project will be the production of "Guidelines for Enterprises introducing New Technology".

In conclusion technological change is taking place in Ireland and affecting office work, in particular within subsidiaries of large multinational corporations. At this stage the level of application is still uneven but significant changes are expected over the next few years.

ITALY*

Office automation is a network of electronic equipment which stores, processes, retrieves and communicates information in support of office activities (1). Automation in the office does not involve a direct link between information processing and control. Contrary to what happens in process automation - there is no immediate feedback from information processing to real-time control of productive activities (2).

The office of the future, as it may be planned or at least imagined on the basis of already feasible electronic technologies, permits a direct interface of office workers through the electronic equipment both within and outside the office. But the spreading of this automated pilot office of the future seems to be much slower than is often forecast. (3) It often happens that new office automation technologies are applied in limited areas of office work or just to special tasks, without involving all office activities.

Office work in the average firm or corporation never did undergo a "Taylorian" revolution, as happened for productive processes at the beginning of the century. Procedures and tasks in a typical office are - in most cases - the complex result of a long process of change, where successive layers of administrative criteria overlap and live together (4). Whenever the managers of the firm make the decision to automate the office, the opportunity arises to rationalize all office work and to rebuild the list of procedures and tasks under some optimization criteria. This may, paradoxically, be where one of the main obstacles to office automation lies, since very often the resistance to such big changes in the organization both by managers and workers, is strong. Potentially, it is also where the main gains of efficiency and productivity could be reached.

A study of ofice automation is also, largely, a study of new services

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* Summary of a report prepared by Bruna INGRAO, Istituto di Economia, Università di Roma

(1) Martin A.: Office automation: issues and strategies, SRI International, Business Intelligence Program, Report N. 645, 1981

(2) ENI: Tecnologie elettroniche e organizzazione del lavoro, a cura di R. Merli, mimeo, 1982.

(3) Mumby S.: le pianificazione dell'automazione d'ufficio, The Butler Cox Foundation in collaborazione con SISDO Consult, rapporto N. 19, 1981

(4) De Ambrogio W.O.A.: strumento e oggetto del processo decisionale, Data Manager, 1982

provided through electronic equipment. In many cases the most promising applications of office automation equipment are linked to the development of new telematic services and so is their rate of diffusion. Also in the service sector the potential impact of office automation is possibly at a maximum.

In the sample surveys, that form the basis of Italian data on office automation, the spreading of office automation is evaluated either measuring the rate of diffusion of single technologies (e.g. word processors) or evaluating the number of offices that have reached an advanced technological level, where the technological levels are classed by standard technology mixes.

In the Italian economy the spreading of office automation seems to be slow. The Italian economy has an exceedingly large number of firms, both in industry and trade, that are of very small size. The number of small firms is especially high in the retail trade, where the traditional shop is still widespread. In industtry, on the contrary, small firms are often at an advanced technological level.

A sample survey of a very large number of firms was conducted by SISDO CONSULT in 1982 (1) . The results of this sample survey should be read as a unique picture of the spreading of office automation in small-medium sized firms in industries, retail trade and of the service sectors (banking excluded). The picture is indeed quite bleak: the spread of office automation comes out to be very limited in extent even for the most standardized and well-known techniques, more than 80% of local unites surveyed belong to the lower levels of technology, with no automation at all (class 0 and 1). See tables 1 and 2.

In local units at level 3 there is a relevant diffusion of telex machines (23%), automatic answering services (10,6%) and accounting machines (20,7%) but the rate of diffusion of word processors (2,3%),telefax (1%) and microfilm

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(1) SISDO-CONSULT: Situazione Italia: analisis degli uffici e dello Stato di automazione. Primo Censimento, 1983

equipment (0.9%) is still very low.

Only local units of level 4 seem to be properly involved in office automation since in this technology class firms already use computer systems. Also the rate of diffusion of office automation technologies are often above the average in the professional services.

A sample survey of the Italian market in information technologies is yearly provided by Honeywell Information Systems Italia (HISI). According to the HISI report for 1982 (1), banks are one of the most active clients in the information technology market. Some banks (6%) are also involved in large scale projects to integrate word processing, electronic mail and information retrieval through minicomputer systems.

In the insurance companies, the HISI report forecasts a rapid spread of minicomputers at local branches of large companies, to provide offices all over the country with autonomous capability in data processing.

According to this source, new office automation technologies have a much higher rate of diffusion than that detected in the SISDO-CONSULT survey of small sized firms. Among large users of computer systems in industry, 33% of users have word processros, either stand alone or shared-logic. Notice, however, that 63% of the total number of word processors installed are in forms with over 1000 employees; only 12% are in forms with less than 500 employees and 25% in firms with 500 to 1000 employees. Also 6% of users have software programs for word processing on computer systems.

Among large users there is a widespread use of data-base for information retrieval: 64% of firms are using data-base to organise their files. In this area, too, the percentage is higher for users that use very large systems.

In the Public Administrations the HISI report evaluates the stage of development of information technologies to be that of "primary automation"

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(1) Honeywell Italia, L'evoluzione del mercato EDP in Italia nel 1982, 1983.

having the following characteristics:

(i) main focus on automation of administrative and accountancy procedures ;
(ii) centralized approach with limited attention to the dislocation of information technologies and limited availability of data;
(iii) limited number of applications and a very low rate of diffusion of advanced applications such as systems of office automation on G.P. computers or systems of information retrieval.

Impact on employment

In evaluating the impact of office automation on employment, it is necessary to divide public from private employment. Since the process of automation in Public Admnistration proceeds slowly, the main problem in the public sector is one of efficiency, not of unemployment. Public Administration is already overmanned, without considering a more widespread application of the new information technologies. In the near future, this sector will no longer play the role of absorption of unemployment that it so largely played in the fifties and sixties; but the social and political climate of the country will surely resist any programme of reduction of existing levels of public employment.

However, the problems of adjustment to the new information technologies remain. They may be especially acute in crucial areas such as Tax Administration, the Post Office, the Treasury or, in social services, the National Health Care System. So, the price to be paid for this too slow diffusion of office automation in Public Administration may be an even larger gap between the quality of public services and the need of an advanced industrial society. That could be a crucial handicap to the Italian economy in the next decade.

As far as the private sector is concerned, existing estimates seem to be rather optimistic about the employment growth potential of the services sector. ISRI, a research institute, gave a forecast of 18.7% growth of employment in the services sector in Italy, between 1980 and 1990 (1). The estimated rate of growth of employment in this decade is very high

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(1) Cacace N.: Professioni e mestieri nel 2000, Milano, F. Angeli, 1983.

for the finance sector (60%) and "other services" (35%) being on average 22.8% in the private service sector. So, even if office positions such as typists, secretaries, filing clerks, etc. are considered to be in decline, the forecast is for a growth of employment in other positions which will compensate for possible losses.

A very optimistic forecast in the same vein has been elaborated by Italtel, the main Italian supplier of telephone equipment (1). Experts of the firm estimated that employees in information processing activities are on average at a much lower level in Italy than in other European countries. For 1981 they estimated a figure of 2.470.000 "information processing employees". Reducing the gap with other industrialized countries will push the total number of "information processing employees" to 4.170.000 in 1991, even considering a 40% increase in productivity.

THese estimates seem to be overtly optimistic, even if it is true that the gap between Italy and other major European countries has to be narrowed, since large productivity gains could be obtained by reducing the over-expanded inefficient retail trade sector, the cumbersome State bureaucracy or even overmanned offices in industry.

As far as large organizations are concerned, from the few case studies and large scale experiences so far known, it seems that office automation projects have not involved serious losses of employment: large projects have been oriented towards the supply of higher quality services to clients, better standards of work, the management of complex information retrieval or editing problems no longer manageable at a less automated level (2).

Skills

As concerns changes in skills induced by office automation, a recent survey based on the analysis of case studies points to the following broad conclusions: tasks relying on traditional skills are progressively disappearing, whereas new skills requested are the ones related to the utilisation of different types of equipment and hardware, and to the

(1) Sarati, L.: L'innovazione telematica, Italtel, 1983

(2) SISDO CONSULT, Gruppo di lavoro sulla Automazione d'Ufficio, mimeo, 1982; and ELEA-OLIVETTI, Ricerca sullo stato della automazione dell'ufficio in Italia, mimeo, Milano, 1983.

understanding of data processing and transmission. The degree of integration of individual tasks in the global activity of the office increases: the traditional employee performing repetitively the same task no longer needed, while each activity is now more closely interlinked with the activity of the office as a whole (1).

Training

Training being the responsibility of regional authorities, there are no nationwide programmes in office automation. Some regions, namely Piedmont, Lombardy and Latium have been more prompt in creating specific training courses while others are lagging behind. The emphasis of such courses is not so much on initial training, but rather on continuous and supplementary training.

Work conditions

A few sectoral unions have carried out surveys of working conditions and health problems related to the introduction of new technologies in offices. Such surveys refer to telephone and banking workers and they focus on work orgaisation and health hazards brought about by the utilisation of VDUs. They have, for the time being, a limited scope and coverage and do not allow general conclusions to be drawn.

Policies towards office automation

There is no specific government strategy on office automation, beside the general technology progammes (2) and broad guidelines on economic policy.

As far as trade unions are concerned, no comprehensive position or statement can be recorded at confederation level; sectoral unions are devoting more attention to the issue, but only in some sectors (banks, telephone, printing) and on specific themes (work organisation, health and safety problems).

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(1) BURERA F., MONTOBBIO P., Office Automation: come progrettare armonicamente tecnologie, organizzazione e formazione professionale, in Studi Organizzativi n. 3-4, 1982

(2) See Report on Italy in New Technology and Social Change, Social Europe, Supplement, Special Number 1983/1984.

Summing up, the Italian experience suggests neither the triumphant, utopian prospect of the "telematic society" where white collar workers communicate from their homes with other employees or clients, nor the gloomy prospect of mass unemployment in office working positions. The spread of office automation is slow, offices are often very backward and the new technologies meet difficulties and obstacles even in large organisations (1). An aspect of this state of things is the lag in the diffusion of an information technology culture, in the private as well as in the public sector of the economy. Another important aspect is the vast small unit structure of the retail trade and even of industry.

Other obstacles to a more rapid spread seem to be: the slowing down of investment in the last two years in conjunction with the end of the 1979-1980 expansion; the state of industrial relations in the country that often suggests to large firms to be very cautious in introducing big changes in the organization of work; the lags in the development of networks for new telematic services; last but not least, the inertia of a sluggish Public Administration that cannot play the role of a promoter.

A few sectors of the economy, like finance and the professional services, are by the nature of their services and by their market structure more ready to apply the new technologies. Public Administration, with a few exceptions, lags behind.

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(1) ZUCCA T., Sarà cauto ma deciso l'ingresso del personal negli uffici FIAT-Auto, Il Sole 24 ore, 1983.

THE NETHERLANDS*

To define office automation means defining offices and defining automation. This paper sees offices as centres of communication, planning and decision taking and of administrative processes. "Automation is to have machines do what human labour did before" (1). The difficulty with office automation is, that not all office functions are liable to automation. In particular communication, planning and decision taking are human activities, that cannot be left to predetermined programmes, which is a condition for full automation. Administrative processes are much more liable to full automation and for a great deal have been automated in the more or less recent past.

On the spreading of modern electronic equipment in offices data is available for 1980-81. The amount of electronic equipment amounts to Hfl. 4500 per employee, which is three times as much as the amount of conventional equipment (2). Most of the value installed has to do with computers, either memories and peripherical hardware or VDU's. In the field of conventional office machines most of the expenditure goes on copiers. On future growth until 1990 and the trade and commercial balance very few estimates are available.

Estimates of the impact on employment data from 1981-1982

The recent report on the employment effects of microelectronics in the Netherlands of the Labour Market Council gives estimates for sectors with office operations such as banks and insurance companies (- 5% up to 1990) and government (- 1.5%), but does not give estimates for all office-related work in the economy (3). Specialized sources on office work, on the contrary, confine their estimates to general statements as "jobs will get lost, but also new jobs will be created". One of the more recent reports suggest that the use of information technology

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* Summary of a report prepared by Dirk van der WERF, Ministry of Social Affairs and Employment, The Hague

(1) Metra Consulting Ltd.: The Impact of Chip Technology on Conditions and Quality of Work. Den Haag, Ministerie van Sociale Zaken en Werkgelegenheid, 1982

(2) Fransen, F.G.J., Seegers, H.J.L., Vollebergh, J.A.A.; De mate van invoering van electronische apparatuur in het kantoor. Nijmegen, G.I.T.P. 1982

(3) Raad voor de Arbeidsmarkt: Rapport Werkgelegenheidseffecten microelectronica. Den Haag, Sociaal Economische Raad, 1982.

in the office will be no major cause of unemployment (1). Time consuming activities will become less time consuming. But what will be done with the less time consumed ? Experience suggests productivity gains of 10 to 30% in word processing (2). Comparable results will be obtained in the storage and retrieval of information, planning by models, modern means of communication. The result - as is reported - is often a gain in the quality of office performance instead of a gain in time. This increase in quality performance is often as welcome as cost performance. Therefore it is very difficult to predict to what extent the automation of these activities will lead to fewer jobs. Probably the reduction of jobs will be rather limited here. However, where complete administrative processes are automated it is a different story. Such automation is more comparable to the automation of production processes in manufacturing; automation and increased performance go hand in hand and are not alternatives. The manpower effects may be more straightforward, and although many administrations have already been automated in the past, it is in particular the integration of separate administrative processes which may have the greater impact in the years ahead. One example of this is the possible integration of the giro payments system with banking and company administrations. The employment impact really is an issue here, and it is estimated to be far more important by unions than the official estimates by the steering group, made up of banks' representatives.

A more detailed analysis of the effects of office automation indicates that word-processing productivity increase will become manifest in secretarial functions, and probably in particular those functions where women work (women secretaries make up about 9% of the total 1.4 million officeworkers, women are however more than 50% of office workers performing secretarial functions). As concerns administrative jobs, the automation of administrative processes will affect all employees, both men and women; and in these jobs there is a much larger proportion of men than of women. The statement often heard that office automation will affect more women than men might be true only in the sense that a larger proportion of working women is employed in office jobs than is the case with men.

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(1) Stichting Toekomstbeeld der Techniek (STT) : Microelectronica in beroep en bedrijf. Het kantoor. Den Haag, 1983

(2)

In absolute figures, however, men outnumber women in office jobs (73% the former, 27% the latter) and consequently it is likely that job losses affecting men will be more important than the ones displacing their female colleagues.

On the disappearance and creation of skills very little information is available. Disappearance of skills could be the result of the use of word processors and the concentration of word processing in pools. In rare cases (the case of a research laboratory for example) (1) some de-skilling is reported by concentration of typing work in pools. Upskilling of secretarial or other office work is seldom reported but must also take place. However, the number of wordprocessors is still rather limited. This might be the reason for the hazy picture of the impact on secretarial functions, where influence of word processors should be apparent. The servicing of computers and the production of the necessary software is likely to lead to a net creation of skills. However, economies of scale are increasingly taking their toll in reducing the number of softwarehouses, which would imply redundancy of skilled labour or at least less creation and use of skills. On average there is some upgrading in offices, as employees mostly have to master both old and new skills.

Regarding the impact on work organization more interesting information is available. For instance it is reported that the new technology enables both a further centralisation and further decentralisation of decisions to take place at all levels (2). A second important point is that changes in work organization in one section or level of an organization have their consequences elsewhere in the organization. Even the organizational concept of a whole company might have to be adapted. So far the use of electronics in the office has not had a major impact on work organization, at least in seven cases investigated. This is explained by the moderate use of this new equipment until recently. Long term automation plans will obviously make their impact felt in the future (3).

In the field of working conditions two distinct issues are at stake: working with screens and the pressure of work (stress). As regards working with

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(1) STT, Op. cit.

(2) STT, Op. cit.

(3) STT, Op. cit. - van Dam, B., Wentink, A., Zanders, H., : Management en automatisering : kansen en bedreigingen; een opinie onderzoek bij managers over de gevolgen van automatisering. Den Haag, VIFKA, 1982.

screens a literature search on "Micro-electronics and Women's labour" (1) reports complaints throughout the world but underlines that probably the work-circumstances in which the VDU's are used, constitute the root cause of the complaints, and not the VDU's as such. Field research will have to show whether this applies to the situation in the Netherlands. The pressure of work is often a question of cost consciousness in these times of hard competition and budgetary restraint. This is actually reported as a cause of complaints (2).

Governemnt policies towards office innovation has two aspects: promoting the application of new equipment in industry and promoting the consultation of employees in the planning and implementation stages, thus attenuating the effects on working conditions.

In the field of employers' policies there is the distinction between policies of employers' associations and those of individual employers. The policies of the collectivity of employers in the Netherlands are basically intended to give employers as free a hand as possible in the application of new technology in offices, the collective view being that existing legislation and government intervention to protect employees is certainly sufficiient, possibly veering towards being too much so. Individually, there are as many policies as there are employers. Satisfactory application of new technology from a point of view of labour relations are reported (3) as well as cases of very unsatisfactory introduction (4). From the controversies one might conclude that the view of existing legislation being (over) sufficient could appear somewhat one-sided.

Trade unions try to serve employees' interests also by two distinct lines. One is the conclusions of the principle of work-sharing in collective bargaining. Some of the successes in this respect agreement on a 5% reduction of working-time in the banking sector and a promotion of part-time work on its own premises by the central government.

The other line is to use the instruments of industrial democracy (work councils) in the interest of good working conditions in private business. While one could point to examples where good industrial relations exist in this field, a number of press reports also point to some of the difficulties encountered by employees in being informed of and consulted on company plans.

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(1) Meurs, P. Rohling, M. Weggelaar, M. : Microelectronica en vrouwenarbeid. Den Haag, Ministerie van Sociale Zaken en Werkgelegenheid, 1982.

(2) Vereniging van Kaderpersoneel Bank- en Verzekeringsbedrijf : Automatisering en Organisatie. Den Haag, 1983.

(3) STT, Op. cit. - Fransen, Seegers, Vollebergh, Op. cit.

(4) Vereniging van Kaderpersoneel Bank- en Verzekeringsbedrijf, Op. cit.

UNITED KINGDOM*

Diffusion of office automation

Much of the information about diffusion has been obtained from specific surveys which may be considered reliable within the context of their own terms of reference but cannot be considered typical. The Policy Studies Institute (PSI) conducted a survey of 231 offices known to have an established computer base "and which might therefore be expected to include a relatively high proportion already using electronic office systems" (1). Keith Wharton Consultants Ltd. produced figures referring specifically to the installed base of text processing equipment (2); and Korn Ferry International surveyed some 250 companies with a turnover in excess of £ 1 m. (3)

The PSI study indicated that some 62% of companies used word processors; 80% used telex; 64% used private automatic branch exchange (pabx); 60% used microfilm, 39% used facsimile; 19% had executive workstations; 19% used viewdata; 15% had local area networks (LANs); 12% had electronic mail. The Korn Ferry figures were less comprehensive but suggested that some 98% of companies in their survey had photocopiers; 85% had electronic typewriters;79% had word processors; and 77% had microprocessors.

It is likely that these are much higher percentages than would be found in a cross section of all offices. The Keith Wharton figures refer to installed base rather than percentages in specific surveys. These suggest that there were some 120,000 electronic typewriters, 65,500 word processors and 5,000 personal computers installed in the UK by 1983.

Top priority for future investment is likely to be for computerised telephone exchanges, word processors, microcomputers, computer networking and electronic mail according to Korn Ferry although Wharton suggests that many firms may opt for the simpler route of electronic typewriters as opposed to word processors.

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* Summary of a report prepared by Marion TARBUCK, Science Policy Research Unit, Sussex

(1) John Steffens, The Electronic Office - Progress and Problems Policy Studies Institute, April 1983

(2) Keith Wharton, "The hughe learning curve required for office of the future", in Computing 19th May 1983

(3) Results of the Korn Ferry International survey summarised in The Guardian and the Financial Times, 1 September 1983

The UK supplier industry

A recent NEDO report (1) has noted that in the field of information technology products "areas of overall strength are few and relatively specialised". The UK position can be summarized as follows. For mainframe computers only the ICL/Fujitsu joint venture and IBM produce in this country. Several UK firms (2) manufacture minicomputers, and a number of multinationals (3) have manufacturing units in the UK although they also import from the USA. A similar situation can be found in microcomputers (4). The major UK owned manufacturer of peripherals is Newbury Laboratories although there are several other small national producers , and several US firms with UK-based peripheral manufacturing units (5).

In office equipment Gestetner is the only major supplier of photocopiers, although the UK-based Rank Xerox and Roneo Alcatel have about 50% of the home market. There are only four UK firms of any size in word processing - Logica VTS, Data Recall, Systime and ICL.

Trade and commercial balance

The UK market is dominated by overseas manufacturers in almost all sectors of office automation equipment. In computers, for example, the market is dominated by US multinationals, with British companies only having a 30% share. The market for office equipment is the stronghold of US and Japanese companies, who have over 90% of the photocopying market and about 80% of the facsimile market. In the word processing market UK companies only have about 7% of the market, with IBM, Wang, Philipps and Olivetti among the foreign companies who dominate.
In the peripheral market the UK supply industry is very weak and once again US and Japanese firms - the latter particularly in the printer market - have been the main suppliers.
The one area where the UK has fared better is the software market. In addition to the large multinationals which have increased their investment in UK software, there are a large number of indigenous companies including Logica, CAP, and Hoskyns.

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(1) National Economic Development Corporation Information Technology SWP, Policy for the UK Information Technology Industry NEDO London 1982

(2) They include GEC, ICL, Systime, Ferranti and Rediffusion

(3) IBM, Burroughs, Honeywell, control Data and NRC

(4) National producers include ICL, Acorn, Research Machines, Lucas-Nason, CPU, Rair and CTL, while IBM, Hewlett Packard and Phillips also have UK based manufacturing operations

(5) IBM, CDC, ITT, Texas Instruments, Rodime, DEC and UPI.

Impact on employment and working conditions

One of the problems of assessing the employment and organisational effects of office automation is that other than data processing the diffusion process has yet to really take off. The other problem is the usual one of trying to establish which effects are due to the change in technology and which are due to other causes. There are also two cases to be considered - the employment in sectors manufacturing the equipment and employment in those sectors using the equipment.

The former is easier to comment on due to the way that statistics are compiled. Apart from a couple of minor upturns in 1977 and 1979, employment in computer and peripheral eqiupment manufacture has declined from 51,000 in 1970 to 42,000 in 1981. In office equipment and systems, employment dropped from 35,000 in 1970 to 24,000 in 1980. The software sector has shown some expansion from 15,000 in 1971 to 26,000 in 1981 (1).

During the same period output has increased in all areas suggesting that developments in production technology or reorganization of work may be responsible for much of the reduction in employment.

On the user side, much of the available evidence refers to the effects of word processing on employment levels. Automation of typing and secretarial fuctions has an impact on job content, and depending on how the work is organised, on job numbers also. At the very least, word processors are likely to reverse the upward trend in typing and secretarial jobs witnessed during the 1970s (from 750,000 in 1971 to 1.3 million now). The introduction of word processors used to be sold on the basis of staff reduction savings but currently the suppliers concentrate on the increases in productivity that are possible - i.e. jobless growth. The study of the Policy Studies Institute found that often the introduction of word processors had resulted in no change of employment. However, this may disguise the fact that adopting companies may be relying on natural wastage to reduce staff numbers. In those companies where changes had occured, they were usually in a downwards direction - 14% of the companies with word processors had reduced the number of secretaries; 27% had reduced the number of typists; and 14% had reduced the number of clerical staff. They survey also noted that in the next 18 months, firms only expected to decrease staff.

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(1) Source: Business Monitor, Overseas Trade Statistics

The effects on work organisation differ according to the degree of automation - i.e. whether stand-alone units are introduced or complete networked systems. Much of the hardware available makes it possible for each company to introduce the items appropriate to their individual requirements. The organisation of work at the departmental level will depend directly on company policy towards automation. There is evidence that poorer working conditions can be experienced at the level of the individual. One example is when word processing is centralised so that word processing operators are segregated from other staff with work being sent ot them via internal mail or dictated by telephone. In this case typists no longer work in, or for, a particular department. They lose personal contact with the authors and, in addition, the work may become machine-paced - especially if it is simply keying-in text. The increasing use of micro computers by executives or others higher up the office hierarchy could eventually result in text originators keying-in their own work. This could remove the need for typing assistance altogether in certain circumstances eliminating some clerical jobs and substantially changing the job content and routines of the remaining staff.

Until fully electric office systems are introduced and have been working for some time, it will not be possible to assess the full impact of office automation on working conditions.

Health and Safety

There has been considerable debate about the health and safety aspects of working with VDUs. The potential hazards have included possible eye damage from gazing at cathode ray screens for long periods, posture problems, and stress from machine pacing of work. The clerical unions have produced guidelines for their negotiators with respect to the ergonomic and health factors relating to the introduction of new technology in offices (1).

Policies towards office automation

(i) Government Policies

The Department of Trade and Industry (DoTI) is largely responsible for

(1) Association of Professional, Executive, Clerical and Computer Staff, The Impact of New Technology in the London and Home Counties Area.

office automation policies of the government which are seen as just one strand in the policy towards information technology as a whole. The DoTI policy has been directed towards assisting both manufacturers and consumers and has been based on a five-point promotion strategy consisting of awareness; sectoral consultancies; product development; public sector procurement; and pilot and demonstration systems. In addition to this, they have set up a series of local microsystems centres throughout the country to assist smaller businesses in their choice of office automation systems.

The DoTI policy of sectoral consultancy work is based on the assumption that in areas of office automation the problems and requirements are similar for all companies in one sector. They have pursued three approaches. The first has involved commissioning consultancy studies; one of user requirements and one attempting to establish the common needs of the rpofessions. The third is the pilot systems which it is hoped will show how different systems are applicable to different circumstances. So far there are about twenty such pilot systems in operation funded by the DoIT to the tune of £ 250,000 which is technically on loan. If the establishments wish to keep the system after the experimental period, they will have to pay for it, probably at a modest secondhand price.

(ii) Employers' Policies

There is no central policy on office automation from employers' organisations. The PSI and Korn Ferry studies mentioned earlier included some mention of employers' policies. PSI found that a quarter of the companies were contemplating investing in word processing systems and other equipment on a piecemeal basis, with no expectation of developing full electronic office systems. A further quarter considered their current intallations as pilot projects with an expectation of large scale investment in the future, and another quarter were fully committed to developing extensive electronic office systems. A small minority had no plans beyond the introduction of electronic typewriters and telex machines. It was the larger organisations, and particularly offices in finance, law, transport and communications that were likely to be working towards full electronic office systems.

The Korn Ferry survey found that nearly half of the companies did not have a full understanding of the impact of new technology on their business.

(iii) Trade Union Policies

The unions most concerned with the effects of office automation include the general clerical unions, the civil and public service unions, the telecommunications and postal workers unions. None of the unions nor the TUC are opposed to new technology in principle. The majority see its introduction as inevitable but all are concerned about its effect on their members, and have therefore drawn up New Technology Agreements incorporating consultation procedures and no-redundancy clauses. Despite these model agreements APEX, for example, found that nearly half of the respondents in their survey of new technology in the South-east had not attempted to get any formal agreement with their company when new technology was introduced (1). Many appeared to rely on informal arrangements rather than formal written agreements.

(1) Association of Professional, Executive, Clerical and Computer Staff, op. cit.

THIRD PART
STUDIES
AND
BIBLIOGRAPHY

PRESENTATION

This section is aimed at supplying readers with information on recent studies and publications in the field of social effects of new technology.
In the present issue, it focusses on office automation and related fields, particularly the banking sector. Studies presented have been prepared for the Commission of the European Communities and the European Foundation for the Improvement of Living and Working Conditions. They are, or will soon be, available in a published form.

The bibliography presents some recent publications on the subject. It has no pretentions to being fully comprehensive.

Further information about studies and recent publications can be obtaining by writing to: The Editor, Social Europe, Directorate-General 5, Commission of the European Communities, rue de la Loi 200, B-1049 Brussels.

BOOK REVIEW "New Office Technology: Human and Organizational Aspects"

(ed. Dr. Harry J. Otway and malcolm Peltu (Frances Pinter, London and Ablex U.S.A. 1983)

While there is a great deal of published information on what the technology can do, there is little that explores the human dimension in a systematic way for a non-specialist audience. Nevertheless, a growing body of research and experiences in these subjects is being accumulated which could be of practical benefit to anyone involved in making decisions about implementing new office technology. As a contribution both to the implementation of information systems within the INSIS Programme and to applications of the technology in general, an INSIS project was established which resulted in the publication of this 'state-of-the-art' book.

The book draws together experts from within the EEC augmented by two contributions from the USA. Its core developed from a workshop held in Varese, Italy in June 1982 which was attended by almost 80 people from the Community Institutions and Member States who were responsible for implementing new office systems. Together with other co-ordination meetings, the contributors to the book were able to combine their expertise within a co-ordinated framework.

André Danzin sets the scene in the book by giving a description of the nature of the technology. After giving a succint overview of the new capabilities, he stresses the importance of preparing staff for the changes by providing adequate training and introducing systems gradually. "The technology may have made progress at a revolutionary pace since the 1950s but new systems should be introduced item by item, without submerging staff under an unreasonable flood of difficult new procedures all at once", he comments. "New office technology will

eventually force us to rethink all our systems of interpersonal relationships and other aspects of office work".

Antony Hopwood, examines how to evaluate the real benefits of new systems. He provides examples that illustrate some of the mistakes that have resulted from making narrow and shortsighted evaluations of computer-based information systems. He stresses that the process of change involves 'political' interests within an organisation -- shifts of power between departments, in-fighting between managers, the extension of centralised control or the encouragement of decentralisation, and so on. He recommands that the horizons of assessments of benefits and costs of introducing new office technology should be extended to encompass qualitative social and organisational criteria as well as more quantifiable economic and technical aspects.

Peter Keen, provides advice on how to develop a strategic plan which takes into account the full range of issues involved. Top management, he says, must play an active role in creating, implementing and monitoring the strategy, which should include detailed plans for a phased implementation of new systems. "Effective change occurs only at an evolutionary place; ambitious 'all-or-nothing' projects, with a delivery many years in the future, rarely work" he says, concluding: "Organisations should not shrink from setting ambitious goals for office technology but these should be achieved in a phased manner".

The techniques of systems design used to create the computer-based system determine the overall effectiveness of the final service. enid Mumford, discusses the background of the two main streams of systems design that have emerged this century. Scientific Management or 'Taylorism' has been influential in the development of the creation of production-line jobs in manufacturing industry and in the methods adopted by technical computing systems designers. She believes such methods are too limited and technology-oriented and generally lead to unsatisfying jobs. She therefore suggests a socio-technical approach which blends social and technical needs in a better balance.

World-renowned sociologist Michel Crozier, examines the effect of new office technology on the ability of organisations to survive in an ever-changing environment. He warns that computer systems can lead to over-formalisation and rigidity which can limit an organisation's flexibility and ability to adapt to new circumstances. He stresses the importance of allowing the opportunity for systems to change their behaviour according to lessons learnt from experience.

More detailed advice on how to design an appropriate organisational environment to encourage successful innovation in offices is provided by Federico Butera and Emilio Bartezzaghi. They give examples of how systems have failed because of poor organisational design and discuss the characteristics of office work, recommending techniques and principles for office systems design.

Moving from questions relating to the organisation as a whole, the book then examines specific aspects of changes in job roles and functions, trade union responses, the ergonomic design of systems

and training requirements. For example, Niels Bjorn-Andersen, looks at the impact of technology on the roles of secretaries and clerks, where the most popular symbol of the electronic office, the word processor, has a major impact. He discusses why there may be resistance to new office technology and describes the factors that could make an 'ideal' office job which will be welcomed by all staff.

New office technology is not confined to secretariat and clerical staff. Brian Wynne explores possible changes in the roles of managers. He provides evidence of detrimental results of some systems and gives advice on systems which enlarge the scope and interest of management jobs.

John Evans draws on experience in Western Europe, the United States and Japan to identify the main types of law, regulation and negotiation procedure that have been adopted in labour relations negotiations governing new office technology. One of the key issues taken up by unions has been the health and safety implications of working with new systems, and here Albert Armbruster, offers detailed guidelines on ergonomic requirements for physical equipment and the working environment, an area for which there is firm evidence of what should be done. Sigurd Jensen tackles the equally important subject of the way software affects the job satisfaction of users. As this relates to subjective, psychological perceptions it is less amenable to quantified guidelines than are the physical requirements, but he describes steps that can be taken to create software designed to assist and motivate its users.

If ergonomic guidelines are followed, less training will be required by users. This is one point made by Jacques Hebenstreit when discussing new skills needed for the electronic office and how training should be provided. "We are facing a massive and unprecedented challenge: whole nations must be trained and retrained before the end of the twentieth century", he warns.

Drawing together the themes of the book, Rob Kling explains how to plan and develop new office systems which incorporate explicit social goals and help to resolve conflicts between different groups. Such planning, he accepts, may be a fragile process but is vital to the long-term success of organisations using the new technology. "Hope and luck are the only alternatives to a systematic attempt to plan for social as well as technical and economic aspects", he states.

The introduction of new office technology with its exciting potential is inevitable. There is no inevitability, however, about the outcome of this change. Through the investigation of human and organisational aspects and other programmes leading to the implementation of new office equipment and services, INSIS is playing an important role in achieving the Community's goal of implementing a strategy for the 'information age' which successfully blends social and political goals with economic and industrial imperatives.

SOCIAL IMPLICATIONS OF INTRODUCING NEW TECHNOLOGY IN THE BANKING SECTOR(1)

This study, conducted by Professor Kirchner at the request of the Commission, covers all the Member States. Consisting partly of an analysis of statistical data and previous surveys, and partly of reports of the views expressed by experts and representatives from both sides of industry, it analyses the rate of new technology infusion in the banking sector and evaluates the social implications across a variety of fields. It also deals with likely developments over the coming five years.

The principal findings of the report are set out under the following heads:

* The development of technology in banking

Mechanization of banking services spread at a rapid pace from the early 1960s. During the 1970s, an electronic infrastructure was established for which the blanket term "Electronic Funds Transfer" was coined. By 1990, automated teller machines, all-purpose debit cards, electronic banking terminals and automatic clearing systems will be commonplace; in contrast, point-of-sale terminals and home telebanking services, as yet very much in the experimental stage, are unlikely to become widespread before the next five years are out.

The report also considers the social implications of introducing new technology from six different aspects:

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(1) "Social implications of introducing new technology in the banking sector" by Emil J. Kirchner, with Nick Hewlett and Frank Sobirey. The report is available from the Office for Official Publications, Luxembourg.

* Employment

The banking sector experienced robust employment growth throughout the 1970s, and it is only in the past two years that some Member States have begun to report a levelling-off or even a modest dip in bank employment. The survey makes no attempt to predict staffing levels in the banking sector seven years hence; instead it presents six possible scenarios, each incorporating a number of variables. The author evaluates the absolute effect of the various technologies, distinguishing in each case the types of job likely to disappear, the types likely to increase, the likely percentage of job losses, the influence of the factors affecting the rate of new technology infusion (competitiveness, consumer reaction, trade union resistance, attitude of governments), and the factors likely to influence jobs (the extension of banking activities towards the provision of new services, productivity, demand). The author comes to the conclusion that over the period 1982-1990, the level of employment in European banks may vary annually from +3.5% to -7.5%. It also seems probable that women, who account for a substantial percentage of all jobs in banking, but generally occupy the least skilled positions, (which are also those under greatest threat from the new technologies, whereas the jobs created to replace them will demand computer science skills) are therefore likely to be the first to suffer from technological redundancy.

* Qualifications

There is a general Community-wide trend towards the disappearance of lower-level jobs accompanied by an increase in higher echelon posts. This is clearly attributable in part to the new technology, which has taken over most or all of the reptitive routine back-office work, but needs highly-qualified personnel to operate it. This has wrought changes in the traditional ladder of bank promotions, leading banks to

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recruit qualified personnel from the broader external labour market. Customer contact and advice services are expanding. These are trends which seem set to continue over the next five years.

* Security: the report deals with two facets

- The protection of citizens from the unauthorised disclosure of confidential information; a number of countries have already introduced statutory safeguards on data protection

- The prevention of fraud: some of the new methods of payment (automatic banking tellers, debit cards) offer greater security against fraud than conventional cheques. Experts are currently investigating ways of preventing the more sophisticated kind of computer fraud: the illegal transfer of funds using home or shop computerized banking terminals.

* Health

The principal problem here lies in the eyestrain which employees may suffer from using visual display units; although concern has been expressed about other ergonomic factors. Extensive research has been done in this field, and the report cites a number of factors which may give rise to worker fatigue, and offers possible solutions.

There would appear to be increasing cooperation growing up between banks and unions in this field.

* Reorganization of working time

The new technologies provide greater scope for more flexible working systems; the future seems likely to bring longer bank opening hours

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and a greater use of part-time working, despite fierce union opposition. The situation could change after 1990, however, as point-of-sale, and even home, banking terminals, come into greater use.

* Consumer reaction

Both users and consumer organizations have generally welcomed the spread of new banking technologies. The attitude of consumers will probably become a factor of major significance as the face of the 'high street bank' undergoes a radical transformation. The report concludes here that social, rather than technological, factors are likely to slow down the rate of progress of armchair banking services.

Brigitte FAVAREL

EUROPEAN FOUNDATION FOR THE IMPROVEMENT OF LIVING AND WORKING CONDITIONS

Technological developments in banking and insurance: Consequences for customers and employees

by

Eberhard Köhler
Project Director
European Foundation

4 national studies (Federal Republic of Germany, France, Italy, United Kingdom) and summary report

During the second four-year cycle of the European Foundation (1981-84) investigations were carried out (and in some cases are still continuing) in various branches of industry:

1) banking and insurance (1981)
2) supermarkets (1982)
3) public administration (1983)
4) engineering/manufacturing technology (1984)

The first area of study, dealt with here, has now been completed and the report published. The summary report and the individual national studies can be obtained directly from the European Foundation (Loughlinstown House, Shankill, Co. Dublin, Ireland, Tel.: 01-82.68.88).

Institutes taking part

Federal Republic of Germany: Institut für Arbeitswissenschaft, Technische Universität Berlin

France: Groupe d'études sociales, techniques et économiques. Paris.

Italy: Istituto di Studi sulle Relazioni Industriali e di Lavoro, Rome.

United Kingdom: Manchester Business School, Work Organisation Research Centre, Manchester.

Research method

The four national studies are principally based on an evaluation of secondary literature, illustrated by selected case studies and in-depth interviews with users, those directly affected and representatives from both sides of industry. Banking and insurance were treated throughout as a separate area.

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Principal findings: banking

A large number of common themes were identifiable in the four national studies. One finding was that modern technology has been introduced on a wide scale throughout the major financial institutions. The research method tended to focus on the impact in high-on volume credit institutions, with the result that the report largely ignores the experiences and lessons provided by special banks.

New technology is making itself felt on both sides of the counter. Terminals and printers are increasingly being used for simple counter-clerking activities such as opening, closing and keeping accounts, general clerical procedures, etc.

A change has also been brought about in the kinds of first-line banking activities carried out by cashiers and customer advisers.

The introduction of computers and terminals in particular is freeing customer advisers from such time-consuming tasks as routine searches, records and bookkeeping, leaving them more time to devote to customers and improving the quality of advice and bank services.

Generally-speaking, computers are tending to crop up in all departments, with the greatest concentration in fields calling for extensive manual work to be done.

It is still as yet too early to draw any final conclusions on the question of qualifications. The traditional commercial syllabus will need to be extended in future to cover electronic data processing, an area in which training courses still lag far behind. The basic trend in training is towards increased specialization; in many cases this will call for narrower, more concentrated knowledge, while in others, a wider range of duties will demand a broader knowledge base.

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The impact on customers has been quite considerable in all four countries, with effects making themselves felt in contacts with counter staff as well as outside the banks. Computerization of the bank's internal systems will reduce customer processing time; a faster throughput of information to bank staff will also lead to a qualitative improvement in customer advice. Cashless transactions (cheques and credit cards) are becoming increasingly common in all countries. It seems likely that self-service will play an increasingly important role in future, as automatic cash dispensing and cash deposit points, point-of-sale terminals and viewdata become more widespread. These relatively new forms of financial services can be expected to expand even further as customers become more used to electronic data processing techniques, and credit institutions increasingly press for greater rationalization of services.

The effect on the size of the workforce has so far been fairly neutral. While the number of employees have remained static or increased slightly, the effects of rationalization over the last 20 years have mainly made themeselves felt in a much wider range and greater volume of services. However, further expansion, eg. by extending the network of branches, does not yet seem to enter the plans for the future.

Principal findings: insurance

Developments in the insurance sector have by and large mirrored those in banking. Individual activities have suffered as a result, while others have been enhanced. One example of the former is the work of risk consultant.

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Before the introduction of microcomputing technology, the risk manager's job involved a high level of responsibility, checking out and evaluating the risks involved in taking over policies from agencies. Now, the task has largely been automated, based on the simple keying-in of certain data. In contrast, job extension has occurred in cases where data storage, previously carried out by a number of special operators, is now done by a single clerk who simultaneously inputs and corrects the data.

Computers have made particular inroads in the personnel-intensive and time-consuming tasks of loss adjustment and claim handling. In the latter case, the very time-consuming task of consulting the filing department has been dispensed with entirely, making the filing department obsolete in many cases.

Changes in working methods have occurred not only within insurance companies themselves, but also to an equal extend among agencies and brokers. Using remote terminals connected to the main computer agencies can now process customer enquiries more promptly than ever before and even amend the policies themselves. EDP techniques now also enable head offices to supervise agencies more closely than in the past. The job of insurance broker (at least in certain lines of insurance) on view data in their own homes and compare the conditions and premiums offered by the various insurance companies. This puts them in a stronger position to evaluate the representative's advice or selling propositions.

The introduction of terminals has both advantages and disadvantages for clerks in administrative departments. Advantages include the rapid availability of up-to-date and comprehensive information,

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the disappearance of tiresome, routine tasks, the concentration of work in the hands of a single clerk, shorter application processing times and a lower error rate through feasibility checks and stricter demarcation of processing stemps. Among the drawbacks are the relative lack of availability of data processing equipment, system response times that are too long, poor work-station conditions and inflexible procedures.

As regards qualifications, the position seems to be paralleling developments in banking. Computers are taking over simple counter clerking duties and certain specialized tasks (eg. filing), accompanied by a growing need for highly-qualified qualified personnel in other areas. There is a certain amount of deskilling in clerical duties; procedures have become standardized, the software generates decision paths and there is less scope for independent initiatives in insurance business. On the other hand, insurance companies are making greater efforts to provide in-house continuation training and refresher courses in order to cushion their employees from some of the possible adverse effects.

By and large, most of these consequences go unnoticed by the customer; unlike banking, the introduction of new technology in insurance is less visible. The main changes are to the company's internal organization, which the customer does not see. The customer does benefit in particular from faster processing and claim handling, etc. but there are not expected to be any deep-rooted, qualitative changes in the insurance product offered to the customer.

As in banking, rationalization has not so far led to a reduction in the workforce, but has rather produced a quantitative increase in the spread of services offered to the customer.

EUROPEAN FOUNDATION FOR THE IMPROVEMENT OF LIVING AND WORKING CONDITIONS

The extent of the introduction of electronic technology in office work: First phase of the project

by

Eberhard Köhler
Project Director
European Foundation

4 national studies (Federal Republic of Germany, France, Italy, United Kingdom) and summary report.

Institutes taking part

The first phase of the project includes studies from four EC countries, together with a summary report. These studies have been carried out by the following institutes as part of the 1981 work programme:

GITP : Stichting GITP/Organisatie en Informatica, Nijmegen, Netherlands

HUSAT : Human Sciences and Advanced Technology Research Group, Loughborough University, United Kingdom

IAO : Fraunhofer-Institut für Arbeitswirtschaft und Organisation, Stuttgart, Bundesrepublik Deutschland

RSO : Istituto di Ricera intervento sui sistemi organizzativi, Milan, Italy

Principal findings

It has proved extremely difficult to obtain reliable, quantitative measurements of the extent to which electronic office technology has been introduced. The classifications for statistics kept by public institutions have not kept pace with the extremely rapid developments in office automation technology. Manufacturers for their part differ widely in their willingness to provide information. The results of individual market surveys and forecasts (some conducted by leading institutions in the field) have been vehemently contested by manufacturers, depending on their market strategies. This is particularly true with regard to the number of EDP and word-processing systems installed and the market shares which they represent. Postal authority

figures, on the other hand, are generally reliable, but only offer information on the total number of systems installed, without enabling any conclusions to be drawn as to the market share of particular manufacturers.

One clear fact does emerge, however: the introduction of electronic technology in offices has progressed much more slowly than forecast in all the predictions of the last 10 to 15 years.

Analysis of the case studies reveals a number of problem areas affecting users and operators directly, ranging from ergonomic problems in the narrow sense to problems of man/machine interfacing and the most suitable training and support for system operation.

Fears about job losses were also present in some instances.

The case studies also show that the introduction of office automation techniques produces changes in work content. The burden of repetitive tasks is lightened; they can be done in less time or even dispensed with altogether. Almost all the changes in work content reported in the individual case studies represent an extension of the work and are perceived as such by the users.

The studies did not reveal whether organizational changes were a direct consequence of the introduction of new technology. In some cases the organization of work remained unchanged, while elsewhere the work was reorganized in various different ways. However, what changes there were appeared to be principally micro-organizational and no clear trend towards centralization or decentralization could be discerned.

The introduction of "the electronic office" often resulted in productivity gains, but the case studies offered no conclusive answers on cost/benefit ratios.

The situation also varies as regards possible changes in the number of jobs. In many cases, there was no information available on this subject, but the findings seem to suggest that among users affected the trend is towards a reduction in the over all the work force. However, this must be read subject to the widespread hypothesis which says that in a competition-orientated economy, the number of jobs lost due to firms leaving the economy would be even greater if the new rationalization technologies were not introduced. On the other hand, many trade unions argue against this, saying that firms should not introduce everything which it is technologically possible to introduce, or at least that they should do so with greater discrimination.

The four national studies (each available in the original and in English translation) and the summary report (in all official Community languages) can be obtained directly from the European Foundation, Loughlinstown House, Shankill, Co. Dublin, Ireland, tel.: 01-82.68.88.

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