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1986c

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Office of Technology Assessment

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Massachusetts Institute of Technology
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Dr. Vary T. Coates - Office of Technology Assessment (OTA),
US Congress

Coates began by asserting that office automation (OA) is not just a marginal or incremental improvement in equipment, but rather a fundamental transformation in the technology which supports basic economic activity. Among other things OA is expected to change:

- the organization of the flow and pace of work.
- the skills required for office work (thus the training and education that is needed)
- the way in which office jobs and occupation are defined and tasks and responsibilities distributed among them (i.e. job classification and compensation)
- the internal structure of the office
- the distribution of jobs among occupational categories and levels
- the level of employment

She said that OA is a deceptively simple term for, first, technologies that range from main frame computers and national or transnational communication networks, to personal computers and off-the-shelf software packages, and secondly, the reorganization of work to make use of these technologies. It is a technological change of the order of that brought about by the telephone and telegraph or the internal combustion engine, in terms of the breadth and scale of long range effects on work and workers.

She said that while there are strong supporters of both the negative and positive aspects of OA, most organizations find that it greatly increases productivity although the transition is often long and very troublesome. In addition most office workers who use automated equipment have enthusiasm mixed with some fear and doubt about the related problems. She believed that most of these problems can be solved by cooperation between workers and managers.

Coates then went on to discuss the last two categories of change listed above - the level of office employment over the next 15 years and the distribution of jobs among office-related occupations. She stated that OTA's recent study concluded that the growth in office employment (which had been strong for many decades) will slow down in the next decade, and may even begin to decline during the 1990s. She then discussed in broad terms the reasoning behind this conclusion.

She stated that the importance of the effects of OA was related to the large proportion of American office workers - 45% of American workers work in offices (8% in management, 16% as professionals and 20% clerical). Also office work cuts across all industries and is a growing component of all of them. The

office worker details are - 30% of employees of manufacturing firms, more than 50% of service industries, 80% of Federal employees and more than 90% of banking and real estate industries. Farms, mines, hospitals, nightclubs and football teams all have offices. Further, she added that office work is very much alike in all industry sectors - ordering, invoicing, making payments, inventory control, bookkeeping, letter writing, etc. In the '60s and early '70s OA was an option primarily for large offices, however, in today's context with PCs and related software, even small businesses are moving towards it.

All industry sectors she said are in the increasingly competitive global economy, striving for greater productivity. As the information handling component of these operations grow more attention is being paid to productivity, although in white collar work this has always been difficult to define and measure. As a result the temptation often is to define productivity in terms of labor cost reduction. Particularly as companies become more conscious of secondary costs of labor such as pensions, health insurance, etc. She stated that automation can be adopted for many reasons (e.g. to make possible new information - intensive services or products) but it is inherently labor-saving. Coates explained in detail that a large part of clerical work today involves such actions as "keyboarding". This she said is most likely to disappear in the next decade as computers takeover these repetitive functions. Data is increasingly being captured at the point of origin by computers, transferred directly by computers, read by computers (optical scan) and in addition possibilities of great break throughs in speech recognition by computers will move to make redundant a sizable portion of clerical work. With improved telecommunication reliability and lower costs the reduction in clerical work will also be enhanced by some companies which use lower paid off-shore workers for data entry type of functions.

Coates mentioned that there has been a good deal of discussion as to whether automation de-skills or enhances office jobs. Infact, the technology can be and is being used both ways. Tasks can be made simple, routine, repetitive and tightly sequenced; and the work can be paced, monitored, and checked by the computer. This she said minimises the training required and makes workers easy to replace. On the other hand however, many tasks can be reintegrated into one job thus providing more variety, feedback and presumably challenge for the worker. In either of these modes however, there can be significant time and labor saving if the organization adopts its structures and procedures to use the technology effectively. She said that with the emphasis on labor cost reduction there appeared to be an emerging trend toward maintaining a minimum workforce and relying on part-time and temporary workers to handle peaks in workload. For the employer this is an efficient way of handling a fluctuating workload and minimising costs related to employee benefit packages. She mentioned that this conversion of employees to part-time/temporary status could become a major public policy problem, mainly because of the related employee

benefits that would otherwise have to be provided by the tax payer.

Another characteristic of computers and telecommunications is that they obviate the constraints of time and distance. While it makes possible a significant increase in off-shore data entry, it also makes home-based work feasible and attractive to employers and employees. However there are some monetary, social, and psychological costs which are often unexamined. Coates asserted that for conventional office workers, a significant increase in home-based work would mean competition for jobs (home-based workers cost the employer less) and also lessened political pressure for children's day care. From a public policy point of view she said that home-based work presents an additional problem of how these workers can be guaranteed worker protection provided by existing laws.

In addition to the effects on clerical work, Coates claimed that managers and professionals were not immune to the effects of OA. She spoke of the tendency of OA to blur the boundaries between these categories, as managers and professionals use word processors to draft their own documents, and secretaries call up data and prepare reports. At the lower level of management reduced clerical staff would automatically reduce the amount of supervision, and the number of lower level managers required will decrease as a result of the computer aiding a greater span of control. The computer's ability to collate information together with the ability of clerks to handle a number of functions thus far performed by a middle manager will result in the overall reduction of middle management too. While the effect of OA on professionals is likely to be less threatening than on managers, there is still a possibility that they could be replaced by paraprofessionals. A few professionals have even been displaced by expert systems.

Finally OA brings changes in the office as a physical and social environment. Coates said that both physical and mental stress is likely to increase when OA is used to speed up the work and make it more demanding. Especially if control over the pace and sequencing shifts from the individual to the computer. She stated that the problems and issues related to OA are serious and deserve the careful consideration of both private organizations and government. However she claimed that these problems should not obscure the promise that OA holds for strengthening our economy and improving the work life of America's office workers.

Speaker's Comments and Responses to Questions

The first question asked by a member of the audience was related to the impact of OA on home-based sole

proprietorships, to which Coates responded saying that she had no statistics but that it had opened up a lot of opportunity for entrepreneurs and clerks. A member of the audience commented that she was a part-time professional and a home-based sole proprietor, as a result of which she had to finance her own health insurance.

Another question was raised about the estimated loss of employment to which Coates said that the OTA did not have this information. In fact they didn't want to do a quantitative labor forecast as they felt that they did not have the capability to do so. On being asked whether she anticipated employment to react negatively to OA, she said that the OTA anticipates a resultant decline in the 1990s. However they were not sure whether employment would grow and then decline or whether it would just decline without showing any further growth. To this a comment was added from the audience that while banking and insurance had shown a large increase in transaction volume, there was not much of an increase in employment. Coates stated that the labor force in this industry seems to be declining already with the advent of OA.

With reference to white collar work the question was asked as to whom it included - did it include doctors, cashiers, etc.? She said that some areas of white collar work like those mentioned did not appear to experience the negative effects of OA.

Referring to Coates' earlier mention of off-shore employment, there was an inquiry as to whether the government couldn't restrict this in any way. She responded saying that the government in actual fact was encouraging this primarily as a service to third world countries.

On the question of the opportunities available to clerical workers as a result of OA, she stated that there was significant scope for clerical staff to become paraprofessionals. The unfortunate result that has been observed she said, is that clerical skills get upgraded and jobs take on more challenge but there is no real increase in their wages. In this context she quoted such occurrences being reported in New York city. She stated that there is also a school of thought that anticipates the creation of a new breed of CEOs with completely different skills - skills in OA.

Regarding the economics of OA and the justification of productivity by economics, Coates said that there are a lot of examples but they cannot actually compare them. Quantifying productivity benefits is difficult and the OTA hasn't seen any cost benefit studies so far. She claimed that there were many reasons for OA and a number of companies do not use OA primarily to reduce the labor force. The primary reasons often quoted for OA are the ability to reach markets, compete effectively, reduce error, improve the quality of work, etc.

Finally, there was some discussion on one of the negative aspects of OA which is the possibility of piece work control and the maintaining of employee records related to sickness patterns etc. Coates claimed that a number of this type of record storing and communication issues have to be resolved.
