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Technology and Employment in the Electronics Industry *by Luc Soete and Giovanni Dosi*
(Frances Pinter, London, 1983) pp. xiii + 90. £35.00 (pb), ISBN: 0-8618-7378-4

Technology and its effects on employment are central to the economic and social issues of our time. Much of the concern expressed about technological change relates to its effects on both the nature and number of jobs. There is a popular demand for quantitative estimates of the effects of technology on employment, but they are rarely attempted with significant rigour.

This book addresses these issues in a series of analyses of the effects of technology on employment in the United Kingdom 'electronics industry'. The authors chose this industry because it has a combination of qualities with potential to revolutionise the economic system, including a dramatic effect on costs and substantial improvements in technical performance in a wide range of goods and services. They have taken pains to separate electronics industries (based on microelectronics) from electrical (or electro-mechanical) ones, and have made some informative comparisons between them. This is a useful book for readers who appreciate a quantitative approach to the relationships between technology and employment. Two comments are in order on its presentation: explanations of abbreviations that may be well-known to UK readers (such as MLH) would have assisted other readers, and the price seems high for a relatively short paperback with poor quality binding.

The book is divided into three Sections. The first, which contains some less-than-lucid jargon, reviews readily available information and briefly discusses the effects of major technological changes on both the electronics and electrical industries over the post-war period. On the input side of innovation the authors show that UK expenditure on research and development in electronics has increased almost two-fold in real terms since 1975, is far greater than capital expenditure, and compares well with major competitors in electronics and computers. However, the share of government funding of R&D has risen steadily to more than 50 per cent, most of which is defence-related, so that private industry spends less on R&D than these competitors — a problem not unique to the UK. In other parts of the engineering sector there has been no comparable increase in R&D. On the output side of innovation, patent data reveal a serious decline in the comparative UK position over a decade. A brief chapter on the role of UK government policy in relation to the electronics industry makes the point that most government support schemes are aimed at raising awareness of electronics technology. The rate of diffusion of the technology is surprisingly slow, given its major advantages, and the

authors speculate that firms hold poor expectations of demand in the present economic conditions.

The second Section (30 pages) constitutes the significant contribution of this book. An attempt has been made to construct a consistent series of data on output, employment, investment and prices for the post-war electronics industry and its various subsectors. The authors describe their estimates of gross output, capital and labour productivity as 'heroic', stressing that they have had to be based on a number of unrelated sets of data. The details provided of the authors' estimating procedures are very brief and intermediate data are not always presented (e.g. Chapter 7), leaving the reader with little choice but to accept what has come out of the black box. However this is not to deny the impact of the analyses, particularly the graphical presentations of trends in best-practice labour and capital productivity in manufacturing sectors. These figures demonstrate the unique position of the electronic computers subsector in enhancing both labour and capital productivity in similar marked extents over the decade 1970-80, in contrast to increases in labour productivity and decreases in capital productivity for a number of other electronic subsectors. The graphs also contrast the increase in capital productivity of the electronics industry with the decrease for the electrical engineering industry, though both have experienced increases in labour productivity.

The authors conclude, unsurprisingly, that significant job losses will occur as a direct result of the rapid incorporation of electronics into a number of mechanical and consumer goods sectors. However they note that the replacement of 'intelligent' (microelectronic) capital for 'non-intelligent' capital should lead to significant output growth and possibly employment growth. They argue that the unusual combination of growth in both labour and capital productivity in the electronics industry could cause such an improvement in profitability and/or international competitiveness that it would lead to employment growth in manufacturing. The rate of diffusion of electronic capital equipment is seen as limiting; the authors speculate that it is being retarded not only by institutional factors such as inertia and perceptions of demand, but by the very rapid rate of technical change in microelectronics, as firms wait for prices of equipment to fall in the reasonably near future.

The second Section also presents an analysis for areas of comparative advantage in the UK electronic and electrical industries. There are relatively limited advantages in a few areas, including computers, but there are major competitive weaknesses in the consumer sector for both these industries.

The last four chapters of the book focus on employment trends and forecasts. There is a succinct analysis of employment by gender and occupational category in the electronics industry. One striking finding is that female employment in electronics declined in each subsector over the period 1970-81, accounting for 96 per cent of the overall decrease of 41,787 in the industry. Another is that the most skilled occupational categories, from managerial to professional and administrative staff, represent no less than 39 per cent of total employment in the electronics industry and are increasing. The authors have hesitated to link the above two observations and suggest that female employment levels have decreased disproportionately because women are mainly employed in less-skilled occupations. The analysis bears out a

general tendency for technology to reduce the need for less-skilled employees, but shows that in all the sectors of the electronics industry at least, the demand for scientists and tehnologists is increasing.

Finally the authors use a capital vintage simulation model to forecast employment levels in the electronic and electrical industries, assuming rates of output, investment and best-practice productivity growth. Three scenarios are assessed, based largely on observed rates of the above parameters in previous periods. One questions the value of the sparsely detailed exercise and the significance of the figures, even though the assumptions seem reasonable. The authors themselves point out that the model is for a closed economy, and also that the overall economy-wide employment implications of microelectronics cannot be judged on such a basis. To make further progress much more needs to be known about the diffusion process for microelectronics and the authors hint that this will be a subject for their future investigation. The work in this book differs from much in the area of technological change and employment in seeking out data on which to base deductions; this is the type of approach needed if our understanding of the effects of technological change on employment is to make real progress.

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New Information Technology in Education, *by David Hawkridge*
(Croom Helm, London & Canberra, 1983), pp. ix + 238, $20.25

This book should prove to be a useful introductory text in teacher education, since there are as yet so few in this field, but it is nonetheless disappointing. The better parts are on the applications of new technology in all branches of education, and their problems and limitations. The first Part, an attempt to review the whole field of information technology, is irritating and imbalanced, too short to be of value, and doubtless would confuse a real tyro.

Hawkridge, a Professor of Applied Educational Sciences and the Director of the Institute of Educational Technology at the Open University, writes in the Preface of his excitement as he studied information technology and its uses in education, but remarks that 'it is important to think about how education can take advantage of technology, rather than the other way round' (p. vii). This is a refreshing change from the approach of many naive technological enthusiasts.

Part One attempts, in a mere 66 pages, to cover: definitions of 'technology' and 'information technology'; the key ideas of Machlup, Bell, Stonier and others; binary codes, microelectronics and the nature and use of computers and telecommunications; information and communication; the whole range of devices for input, output, processing and storage; and the 'makers and sellers' and 'buyers and users' of information technology.