

Technology, Employment and Structural Change

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Growth and employment depend crucially in the long run on the capacity of economies to generate and make the most effective use of scientific and technological knowledge – this was one of the main themes in the OECD Jobs Study. The gains in efficiency from the introduction, diffusion and continuous improvement of new production processes are one of the major factors behind the secular rise in real wages in OECD economies. And throughout history the emergence of new activities has been a major factor in the creation of new employment.

But over the past two decades, which have been characterised by high and persistent unemployment in many OECD countries and growing wage inequality in some, the 'destructive' part of the 'creative destruction' involved in the process of structural change has often been the most visible. Many people associate technical change, combined with increasing international competition, with widespread loss of jobs and the growing unemployment of workers with superseded skills. Moreover, technology, and in particular information and communication technology, is held responsible for increasing disparities in incomes and for job insecurity.

There is thus a gap between the confidence of economists, businessmen and policy-makers in the continuing historical record of growth and employment associated with new technologies and the view of large parts of the general public, who are more sceptical about the opportunities for growth and demand that new technologies offer and who may be more directly affected by the employment displacement and job insecurity associated with their introduction. These adjustment

problems raise major policy challenges for OECD countries and underline the importance of further assessment of the links between technology and jobs.

Four issues dominate the current debate and give rise to many questions. First and foremost, there is growing concern about the nature of the jobs being created and destroyed after the introduction of new technologies and the accompanying distribution of benefits and costs across the workforce. The decline in demand for unskilled labour has been so dramatic that unemployment and/or falling relative wages have affected a very large part of the lower-skilled elements of the labour force. How does the introduction of new technologies interact with the historical trend in the distribution of skills in society? What kinds of skill become redundant, and what kinds are in demand? How can education and training systems respond to the demand for new skills?

Second, there are questions about the actual productivity gains associated with the introduction of new technologies. Has the relationship between technical change, productivity growth, wages and employment shifted over the past two decades, and what has been the role of the service sector in this process? Do high-productivity sectors create more jobs than low-productivity ones? To what extent can technical change be characterised as labour-saving, and has this differentially affected job creation among sectors? What are the international implications? Are some countries benefiting from technical change more than others in terms of job creation, and what are the major factors, such as domestic and foreign demand, that

affect these employment gains? The first article in this issue of The OECD Observer addresses some of these questions.

Third, there are questions regarding the new demands arising from the use of new technologies, particularly in sectors where markets might fail or be wrongly regulated. Are existing regulations preventing competition in product markets and the emergence of new goods and services, or is it rather the case that firms are deterred from experimenting with potential areas of new demand because of risks which are too high? For example, it is commonly agreed that telecommunications regulation must adapt to the changing circumstances of technical advance and increasing competition. Regulatory reform and removal of many restrictions to market entry are essential for the development of appropriate information infrastructures and associated applications and services, which are widely regarded as important sources of future demand and employment. These issues of regulation and growth are important world-wide and are illustrated in this issue of The OECD Observer by a case study of Mexico, the newest member country of the OECD.

Fourth, there are questions about the required organisational changes within firms: in the organisation of work (flexibility, 'multi-skilling', job security, and so on); in the organisation of production ('lean' production, 'downsizing', flexible specialisation); and in the learning capacity of firms (knowledge acquisition, the role of complementary assets) and the like. There is also the question about the actual and potential creation of employment in small and medium-sized businesses, and particularly the role of technology in this process and the relative role of high-technology businesses.

These developments have important implications for technology and innovation policy and for broad policies affecting business and industry. The most pertinent direction for policy centres on the development of human capital. Although there are, overall, no single lines of change in education and training policies related to technology and business requirements, we are witnessing a period of widespread experimentation aimed at shifting education and learning closer to work requirements. This period of experimentation involves attempts to provide students with a broader range of competences so as to underpin continuous life-long learning, and to couple this with more applied 'just-in-time' learning, expanded opportunities for work-based learning, and education and training to encourage entrepreneurship.

Much of technology policy nonetheless still focuses on the generation of industrial technology in large manufacturing firms. There may be considerable scope for improving long-term economic performance by shifting the policy balance towards broad diffusion of information and knowledge, not least to smaller firms, to complement policies aimed at technology generation. Initiatives in this area have been taken in some countries, but more efforts could still be undertaken. A further 'rebalancing' of technology policy is required to make its objectives more coherent with other policies, including those which affect employment and human capital. The second article discusses some of these

interlinkages between financial and innovation systems and the pressures to make them mutually more efficient.

The desire to strengthen the links between technology policy and other areas of government policy are apparent in the re-examination of competitiveness and related policies which are underway in most large OECD countries (including Canada, Germany, the United Kingdom and the United States) as well as in some smaller OECD countries. Long-run economic and employment performance can be improved if there is a deeper involvement in technology development and diffusion of all the actors concerned: on the one hand the science and technology sector and on the other hand the innovation system as a whole (business firms of all sizes and sectors, research centres, universities, the financial sector and technology users). This process will be supported if there are strengthened market mechanisms and enhanced competition in product markets and if countries re-examine the incentives and institutions which influence corporate behaviour and public provision of goods and services.

More generally, policy should focus on decreasing the costs and increasing the benefits from change associated with the introduction of new technologies and related industrial re-organisation. This includes lowering the costs of transition and dealing with market failures as well as reducing the costs associated with the long learning phases involved. Three areas of policy are important: first, technology and business-oriented training and skill formation for excluded people and groups affected by changing skill requirements; second, modification or elimination of regulations which slow the adoption of new technology and organisational forms (for example, in labour regulations and public procurement); and third, enhancing the business infrastructure (such as increasing the diffusion of information on best practices, where many countries have recently taken initiatives, and improving accounting for human capital).

These policy questions are being raised within an increasingly globalised economic environment. The OECD has an important role to play in this process by spreading an understanding of the function of technology in economic growth, and devising broad policy guidance to maximise the benefits and minimise the costs of technological change. Two current activities serve to illustrate the OECD's work in this area. First, the meeting of the Committee for Scientific and Technological Policy at Ministerial level in September 1995 will in part focus on the links between the science system and human resources. Second, the work of the Organisation on technology and employment in conjunction with the G7 should help reinforce the beneficial impacts of technological change.

