Chapter 12

MACROECONOMIC AND STRUCTURAL POLICY IN THE KNOWLEDGE-BASED ECONOMY: NATIONAL POLICY CHALLENGES

by

Luc Soete
Director, MERIT, University of Maastricht

Introduction

A number of recent OECD reports have emphasized the fundamental transformation many economies are currently going through and which is closely associated with the use of knowledge. As the OECD (1996b) report on Technology, Productivity and Job Creation states:

"Today, knowledge in all its forms plays a crucial role in economic processes. Intangible investment is growing much more rapidly than physical investment. Individuals with more knowledge get better paid jobs, firms with more knowledge are winners on markets and nations endowed with more knowledge are more productive." (p. 12)

The growing consensus on the importance of knowledge for industrial competitiveness is closely related to the rapid technological change in the cluster of new information and communication technologies (ICTs) and the resulting dramatic decline in the price of information processing; the technological "digital convergence" between communication and computer technology; and, last but not least, the rapid growth in international electronic networking.

A number of authors (David and Foray, 1995; Abramowitz and David, 1996; Foray and Lundvall, 1996) have described the impact of ICT on the process of knowledge accumulation as a process of "codification" of knowledge, reducing costs of knowledge acquisition and diffusion. Elsewhere I have argued that as a consequence of this increased potential for international codification and transferability, the new information and communication technologies can to some extent be considered as the first truly "global" technology (Soete, 1996). The ability of ICTs to codify information and knowledge over both distance and time brings about more global access. Knowledge, including economic knowledge, is become available world-wide. While the local competencies to access or use such knowledge will vary widely, the access potential is there. In other words, ICTs bring to the forefront the potential for catching-up, based on the economic transparency of advantages, while at the same time stressing the crucial "tacit" and other competence elements in the capacity to access international codified knowledge.

In this paper, I describe some of the main microeconomic, "structural" policy challenges associated with this process, particularly as it appears to have affected European economies. There is at
least an impression that policy makers in Europe appear to be somewhat bewildered by the rapidity of both the new policy challenges they are increasingly confronted with and the diminishing room for manoeuvre for traditional macroeconomic and budgetary policy making. Obviously, the list below is non-exhaustive.

**The particular importance of skills and knowledge accumulation**

It is crucial to realise that ICTs are in essence technologies that are complementary with investment in human resources and skills. In this way, they differ from previous major technological transformations. Most previous major new technology clusters were complementary with physical capital accumulation. Thus, “railroadification”, for example, induced a major boom in investment in the essential material and capital-equipment inputs, leading to a strong upsurge in overall economic growth. Similarly, the mass consumption of motor cars, which “induced” demand for better roads, easily accessible motorways, and readily available petrol and car maintenance services, led to an upsurge of growth based both on the growth of final consumption and the many intermediate demands for materials and capital equipment.

Unlike previous technology clusters, the new ICTs appear not to have such major linkages to intermediate demand for physical, material goods and capital equipment. It is difficult to see how the increased demand for computers, mobile phones, optical fibres or Internet connections, would lead to a major growth impulse following the “induced” demand for plastics in computers and optical fibres or iron oxide in semiconductors. Despite the heavy capital investments required for some of these products (e.g. semiconductors), the material, physical capital accumulation is no longer the essential “complementary asset” of these sets of new technologies. Rather, since the knowledge on how to use information typically depends on one’s skill level and “tacit” knowledge, the new complementary asset to the growth and use of new ICTs is investment in human, immaterial capital.

I would consequently argue that the transformation of the emerging information society into a true “knowledge society” calls in the first instance for a major effort by both the public and private sectors in the essential “complementary assets”: training, education and lifelong learning. Unfortunately, in Europe in particular, a number of disincentives appear increasingly to operate with respect to traditional education and human resource investment:

◊ First, there is the simple feature of the greying of Europe’s working population. As the OECD has emphasized many times, a gap is emerging between the rate of renewal of the working population – some 2 per cent per annum – and the rate of knowledge acquisition in society at large – some 7 per cent per annum. Without additional training and learning during working life, in ten years’ time 80 per cent of new knowledge acquisition will be concentrated in only 20 per cent of Europe’s labour force. As a recent European Green Paper put it: “The workforce is ageing and the technology is getting younger.” Acquiring knowledge and skills is therefore no longer limited to school-aged children, but involves all groups in society: youngsters, middle-aged and older people, people with jobs as well as the unemployed.

◊ Second, knowledge acquisition increasingly is no longer a simple incremental accumulation process. In many information handling and processing areas such as, for example, software engineering, the rate of obsolescence of knowledge is high. Knowledge acquired only ten years’ ago but not maintained has often lost much of its value. This explains why the
unemployment of people with qualifications — but with outdated skills — has become a European characteristic of the 1990s.

◊ Third, the increasing trend towards “external” labour-market flexibility, with greater mobility and transparency in labour markets, has undoubtedly made firms wary of investing in human resources if those investments are likely to benefit, in the first instance, other competing firms. The incentive to invest in general-purpose knowledge and human resources has declined in many of Europe’s largest firms. Typically companies with a high labour turnover tend to invest little in human resources.

◊ Fourth, the fiscal consolidation set in motion as part of the EMU convergence criteria has led many European countries to reduce their public spending on education. This reduction comes precisely at a time when, as argued above, such investments are being recognised as essential “complementary assets” for future growth and competitiveness in the emerging “global information society”.

**Liberalisation: beyond telecommunications**

The industrial transformation associated with the so-called “convergence” between the audio-visual, broadcasting and telecommunication sectors is characteristic of the current digital technological convergence between information and communication technologies. An essential role for governments as safeguarders of competitive forces is linked to creating the optimal conditions in which new investment, markets and services can flourish.

The digital convergence between technologies for broadcasting visual images (television) and for the transportation of data and voice messages (telephony) raises some fundamental regulatory problems. Typically, the creation, distribution and commercialisation of “information” involves many market failures, leading amongst others to market dominance and attempts at vertical integration between incumbents and new entrants across and in each of the various market segments: content creation (including publishing), service provision, distribution network and hardware equipment producers. Regulating such a complex and moving field is a difficult undertaking. The current telecommunication liberalisation process is, from this perspective, only the start of a far more fundamental liberalisation and deregulation process involving telecommunications, broadcasting and publishing. There are strong doubts as to whether the European Community regulatory approach and available regulatory instruments are broad, capable and flexible enough to respond to the current and future technological challenges of internetwork competition.

Already today, there is a clear trend towards increased horizontal concentration among the various market segments mentioned above encompassing the entire territory of the EU. To tackle these, as well as many other potential issues of market-power abuse associated with the current broad convergence between audio-visual sectors and telecommunications, there is, it seems to me, a need for the transfer of regulatory power to the Community level. Dealing with 15 national regulators, getting them to agree, dealing with dispute settlements, etc., is no longer appropriate.

**Public information services: a new engine for European growth?**

To simply limit the role of the public sector to an “economic” enabling role is, in my view, to grossly underestimate the role and importance of public agencies and services as information providers
and information processors in a multitude of economic, social and policy areas. The wide variety of public information services provides a number of opportunities for information-led growth, whereby such services might become the “killer applications” for new, demand-led growth, allowing the public sector to take the lead as content provider and opening up new market opportunities for private partnerships in the development, distribution and maintenance of new information systems.

At the same time, the public sector can help to guarantee comprehensive and reliable information which has a high level of accessibility, user friendliness and affordability. Public services could, in other words, be viewed as one of the most promising engines of new demand growth in Europe for the following reasons:

◊ First, by the simple fact alluded to above, that public administration, whether at a national or local level, is first and foremost an information service, often involving many private and public information features. This raises important questions about privacy, access and democratic control.

◊ Second, because the physical and human-capital investments in such activities are often substantial, they provide interesting opportunities for improved connectivity, standards setting, etc. Public administration might, in other words, take the lead in the Information Society given the high risks involved in investing in new, interactive information systems, and opening up new market opportunities for private partnerships in the development, execution and maintenance of new information systems. Pilot projects could bring to the forefront the many organisational bottlenecks, and enable diversity at the local administration level. Such pilot projects, in the courtyard of government so to say, are likely to reveal more immediate solutions and insights into some of the practical organisational and local problems associated with the use of ICTs. Again, this does not necessarily imply that these services must be provided by public authorities. Rather, the initiative should come from the authorities and involve, wherever possible, new emerging partnerships between public administrations and private firms.

◊ Third, many public services such as social services, immigration, police, libraries and many other local services, are bound by the geographical limits of the country, region or town in which they are situated. Clearly, European, cross border interconnectivity of such services is one of the greatest bottlenecks to intra-European mobility of workers and citizens. At the same time, it is one of the most promising areas for European public procurement and new policy initiatives.

The provision of such “public” services could be viewed, in other words, as a possible engine for new, local, information-led, employment-intensive demand growth creating, on the one hand, the minimum efficient scale for some of the new, upgraded, affordable information and communication infrastructures while, on the other hand, paving the way for the emergence of more market-driven “private” services. Such an ICT-driven process of local employment creation corresponds in many ways to the “electronic” version of the personal-services-led “emplois de proximité” process in operation in many EU countries. However, in contrast to such personal-services-subsidised employment creation, the proposed “electronic” version suggested here is likely to provide more significant learning and reskilling opportunities.
Assisting organisational change

The full potential of the new ICTs cannot be realised if firms concentrate on technological factors only. Despite considerable investment in ICT hardware, many European companies have been unable to significantly improve their competitive position because of skill shortages and inadequate work organisation. Efficiency and the ability to innovate cannot be improved through isolated modifications to work organisation. To be successful, elements of a flexible work organisation such as staff versatility, training, flexible hours, new pay systems, more team work and flatter hierarchies, must be embedded in the broader structures of the firm. Any changes, including the introduction of new ICTs, are only sensible if they are consistent with the overall situation and conditions of a firm.

With the new ICTs, communication can take place in “real” time and over vast distances. Somewhat paradoxically, however, the importance of person-to-person communication requiring physical proximity has not necessarily declined in the working world. Rather the contrary. New approaches to management stress the importance of inter-personal communication while the decentralisation of responsibilities has increased the need for direct communication.

Virtually all companies are reviewing their range of activities and transferring certain activities to outside suppliers. There are several reasons why firms choose to outsource: some companies form strategic alliances; some concentrate on core activities; and some exploit cost-differences between in-house and external production. Outsourcing is undoubtedly a major growth factor for the new, specialised firms with a highly specialised workforce. Other suppliers, however, have been downgraded to mere suppliers of parts. Competition from low-wage countries will in these cases seriously threaten the viability of such organisations. Small and medium-sized suppliers are under particular pressure, and will only survive if they develop expertise as partners in the production and development of new products and services. Such strategic expertise can be developed through co-operative relationships with other firms thus allowing them to free themselves from “electronic hierarchies” by building up their own networks.

Such organisational and technological innovation by SMEs is highly dependent on support within the region, through for example, training or technology transfer centres. In particular, it is essential that public policy concentrate on helping SMEs in their restructuring efforts.

Reorganising time

One of the most dramatic features of the current ICTs is their enormous potential for the rapid transfer of digital information. This opens up many new opportunities for more flexible production and quicker responses to changes in demand. In some service sectors the speed of response has become the essential ingredient of economic value. In other sectors, interactivity, facilitated by digital communication, has created new trading opportunities. At the same time, human capital has to be developed. Workers need more time for retraining. “Time” is becoming an essential new production factor.

In sectors dealing with the production, transportation and distribution of material goods, new ICTs allow for a reduction in the time/storage dimension between production and consumption. Many of the most distinctive characteristics of the new ICTs are related directly to the potential of the new technology to link-up networks of component and material suppliers, thus allowing for reductions in storage and production time costs. At the same time, certain activities can be outsourced to places far removed from the assembly or final point of production. In transport and logistics, the new technologies facilitate more efficient usage and flexibility in the delivery and transport of goods. In distribution, the
increased flexibility associated with the new technologies allows a closer integration of inventories with demand, thus reducing the firm’s storage and inventory costs.

In contrast to some of the traditional sectors involved in the production and distribution of material goods, many service activities are characterised by the simultaneity of production and consumption. It is this simultaneity feature which has generally limited productivity improvements in such activities. As argued above, ICTs, almost by definition, will allow for the increased tradeability of service activities. By introducing a time/storage dimension, information technology will enable the separation of production from consumption. It is this latter feature which is behind the enormous new potential for the tradeability of communication and entertainment services reflected in the growth of multimedia. The fact that the “consumption” of such services can take place at a different time than the production allows these services to be much more widely distributed.

However, contrary to the traditional “time-saving” nature of the sort of capital embodied in new manufacturing technologies, the postponed consumption of such services will become “time consuming”. In other words, the new demand generated by ICTs does not only allow more immediate communication and quick responses and interactions, it can also require consumers to spend more time.

From this perspective it is essential to re-evaluate the debate on the reduction of working time. The focus should shift away from issues related to the distribution of work and instead concentrate on the increased time required to consume new ICT goods and services, including training and reskilling. Despite the relative material affluence of our societies and the availability of numerous time-saving household equipment, there is still, in most households, a dramatic shortage of time for “non-work” activities.

However, the new ICTs do not only tend to restructure the old, traditional forms of production; they also call into question the accepted conventions of place and time of work. The nature of work and its role are likely to undergo major change. Although the nature and extent of these changes will vary markedly from place to place, the general dimensions are an increase in part-time work, an increase in the unpredictability of working hours, an increase in casual forms of work (temporary or fixed-term contracts, etc.), and a decline in the expectation of a career for life.

On many dimensions the increased use of ICTs both increases the salience of these trends and provides scope for new policies to improve the integration of one’s working life into the rest of one’s life. For instance, the increasingly rapid rate of obsolescence of existing skills is undoubtedly endangering the employability of older workers and might increase their unemployment rate. Those who have interruptions in their careers – usually women – are finding it increasingly difficult to keep abreast of rapidly changing skill requirements and often end up in peripheral jobs. An economy that is increasingly based on high-quality products and services cannot afford to have an increasing proportion of its workforce in peripheral and atypical jobs. If this occurs then human capital is being unnecessarily wasted and social cohesion will be reduced. Lifelong, flexible working can increase the opportunities for learning to preserve employability and facilitate the reconciliation of work and family.
NOTES


2. "It is a process of reduction and conversion that greatly facilitates the transmission, verification, storage and reproduction of knowledge" (David and Foray, 1995).

3. Directives based on Article 90(3) EC. Once the exclusive and special rights which Article 90(3) directives are designed to deal with have been removed, traditional competition policy provisions (Articles 85 and 86) will have to be relied upon.

4. The speed of reaction for a firm like Reuters is said to be within the time slot of 6 seconds.

REFERENCES


