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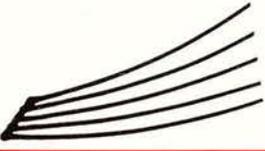
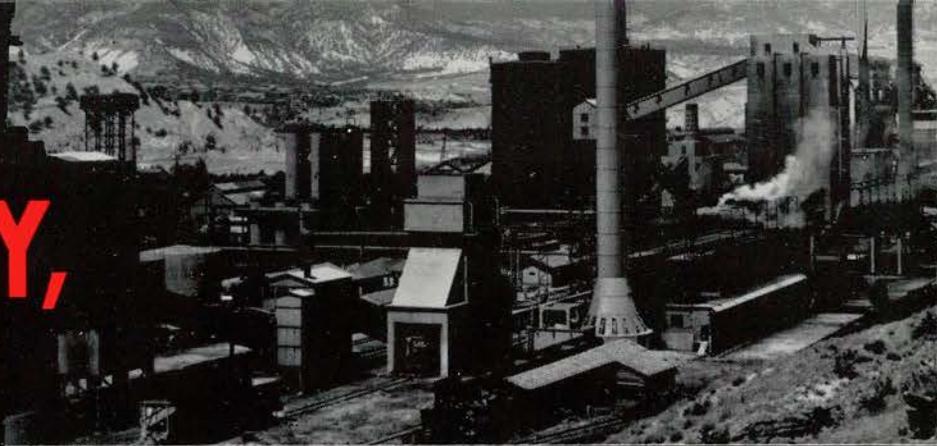
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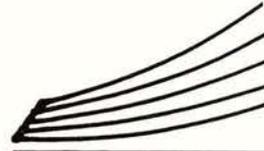
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*Cover:*

*Deregulation in Turkey has made the starting-up of a small business much simpler: instead of twelve authorisations, only one is required – and it is automatic at the end of a month. This is just one example of the movement towards deregulation throughout the OECD area.*

*Ara Guler/Sipapresse*

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# Controlling Government

## A New

Scott H. Jacobs

Silvia Thompson, OECD



***Regulations are the sinews of modern government, the legal instruments that connect abstract government policies with the day-to-day activities of commerce and private life. Governments in the OECD area have constructed massive and complex regulatory systems through which they attempt to serve and balance the economic and social values of their citizens. Alarm over the rapid growth, incoherence, and cost of these systems has stimulated innovative public-sector initiatives in many OECD countries that, against considerable odds, are aimed at fundamentally improving the ways in which governments regulate.<sup>1</sup>***

**N**ational systems of regulation and the public institutions that authorise, develop, enforce and adjudicate the law are much more than mere instruments for implementing government decisions. Regulatory processes and requirements have become key determinants of the scope and form of government authority in industrialised democracies. Regulatory decisions are levers for the distribution of power and resources between state and citizens.

It is not surprising, therefore, that many regulatory reforms underway in OECD countries stem from fundamental views

about appropriate relationships between governments and citizens, or, as the Norwegian Ministry of Consumer Affairs and Government Administration has put it, 'between public regulations and individual freedom'.<sup>2</sup> In many countries – not least Japan, Canada, and the United States – there is a sense that centralised control and decision-making are reaching their limits in view of the democratic values of these societies. To counterbalance the growth in centralised, impenetrable regulatory systems, governments are adopting reforms to eliminate unnecessary or excessive rules, increase public partici-

pation in the processes that produce regulation, devolve regulatory authority to local administrations closer to the people affected, and increase the transparency and accountability of regulatory decision-making. It is also the reason that the Public Management Committee of the OECD is undertaking a substantial study of regulatory reform and management issues.

Regulation affects economic growth in many ways beyond, for example, setting the limits of competition.<sup>3</sup> The direct costs

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# Regulation : Self-Discipline

of compliance consume a substantial amount of resources. A recent study estimated that Federal regulations in the United States impose annual costs (including transfers) of over \$500 billion, or about 9% of GDP and 26% of on-budget government spending.<sup>4</sup> This study, like another recent US analysis, found that social regulation (in health, safety, environmental and consumer protection, among others) is as or more costly than traditional economic regulation.<sup>5</sup> Such regulatory costs have many of the same macro-economic effects on employment, prices and growth as direct taxes.

Regulations can also create substantial indirect costs such as, for example, disincentives to innovation, reduced consumer choice and non-tariff trade barriers. These adverse effects are subtle, widespread,

and often unintended. Thus, for example, inconsistent regulations influence trade patterns in telecommunications equipment. Cumbersome restrictions discourage private-sector activity in agricultural research and development. Tight health regulations in Australia and Japan block virtually all apple imports.<sup>6</sup>

And so governments – fearful of falling behind in an opening, ever more competitive world economy – are implementing a variety of regulatory reforms as part of the measures they have taken to cope with, and foster, structural adjustment. These reforms include better analysis of regulatory impacts, stricter application of cost-benefit analysis, the use of market incentives as an alternative to traditional regulation, straightforward deregulation, and the elimination and simplification of

burdensome rules. The Single Market Programme of the European Communities itself can be seen as regulatory restraint in the common economic interests of its members. ▶

1. A publication on this subject is in preparation.

2. **Directory of Regulatory Review and Reform Organisations in OECD Countries**, OECD Publications, Paris, 1989.

3. See pp. 9–12.

4. T. Hopkins, *Cost of Regulation*, US Regulatory Information Service Centre, Rochester Institute of Technology, Rochester, N.Y., 1991.

5. R. Hahn and J. Hird, 'The Costs and Benefits of Regulation: Review and Synthesis', *Yale Journal of Regulation*, Vol. 8, No. 1, 1991.

6. See Amy Plantin and Dimitri Ypsilanti, 'Trends in Trade in Telecom', Carliene Brenner, 'Biotechnology in the Developing World: Lessons from Maize', **The OECD Observer**, No. 171, August/September 1991, and Kevin Parris, 'Reforming the Apple Market', **The OECD Observer**, No. 172, October/November 1991.

*Regulation can have hidden costs in almost every kind of economic activity: transport, agriculture, housing...*





The simplification and reduction of regulation have benefited various sectors in various countries – here energy in Norway.

There is another central motivation behind these reforms. Governments in OECD countries are faced with growing pressure on public and private finance and are thus searching for innovative solutions that yield results at lower cost. Regulatory reform is part of this larger movement in public management towards a new pragmatism that emphasises results over actions, outputs over inputs, policy consequences over policy instruments. In a sense, the 'rule of law' is being strengthened by more attention to the 'effect of law'.

It was during the 1980s, and particularly since 1985, that no fewer than 18 of the OECD countries launched or expanded broad programmes of regulatory management and reform. These programmes vary considerably in objectives and design, but they have distinctive features that mark them as genuinely new management capacities that enable governments to improve their control over regulation.

First, the new programmes cut across traditional programme boundaries and treat the regulatory system as an integrated body of policies and institutions with common and interlocking problems. In Canada, for example, the new Regulatory Affairs Directorate in the Treasury Board Secretariat is concerned with, among other things, relationships between principal legislation, regulations and compliance policies.

Second, they are independent of regulators and generally linked, instead, to high-level policy bodies, often in the centres of governments. Such bodies include the Cabinet Office of the Prime Minister in Sweden, the Federal Chancellery in Austria, and the Executive Office of the President in the United States. They

include 'horizontal' management ministries, such as the Ministry of Finance in Finland and the Ministry of Justice in the Netherlands. And they also include independent commissions, as in Germany, where a high-level body headed by a state secretary has specific advisory and investigative responsibilities to reduce and simplify regulation.

Third, they are changing internal processes of regulatory development, for example, by introducing cost-benefit principles, as well as revising specific regulations.

Regulatory reform has, of course, been underway in specific areas of government policy for years. Economic deregulation, for example, began in OECD countries in the mid-1970s and has been expanding since.<sup>7</sup> The extraordinarily high costs of environmental regulation marked it early for reform, and innovative regulatory and non-regulatory techniques are probably the most advanced in this field.<sup>8</sup>

The newer programmes take regulatory reform an important step further by creating regulatory-control bodies as more-or-less permanent parts of the central management structures of governments – a development that can be compared to the adoption by governments earlier in this century of modern fiscal budgeting agencies to control and manage national expenditures.

## What Success?

Regulatory managers are newcomers to the thick and heavily protected forests of regulation. Although they are aided by connections to high-level policy bodies, such as cabinet offices, they remain weak

in relation to the established interests and legal/institutional powers of ministries, regulatory agencies and interest groups.

But in spite of the formidable resistance to change, these programmes have accomplished a good deal in improving the accountability, responsiveness, and cost-effectiveness of regulation. Except for a few dramatic cases of deregulation, however, the effect on quality of life has been hidden in thousands of small improvements – improved analysis and understanding of consequences, simpler and shorter rules, enhanced coherence between programmes.

### **Simplification and Reduction of Rules**

Many countries report that regulations have been reduced or simplified in sectors targeted for reform, such as energy in Norway, construction and business law in Japan, customs in the United Kingdom, tax laws in Portugal, food preparation and safety in Denmark, and workplace safety in Italy, to cite only a few. These kinds of reforms are popular and they are proceeding apace, even accelerating. Fewer and simpler rules have reduced costs to businesses and consumers throughout the OECD area, have increased public compliance, and have reduced administrative costs to governments.

### **Unified and Comprehensive Codification and Monitoring**

Several OECD countries have succeeded in consolidating and publishing all rules and laws in force and establishing new monitoring systems to track existing and new regulations. In 1986, for example, Sweden mandated computerised registration for all national regulations, and used the registry to cull out hundreds of unnecessary rules. And Turkey recently completed a codification programme that eliminated 1,600 laws, and consolidated 12,000 others into a mere 700.

These actions have had immediate

7. **Regulatory Reform, Privatisation and Competition Policy in OECD Countries**, OECD Publications, Paris, 1992.

8. **Environmental Policy: How to Apply Economic Instruments**, OECD Publications, Paris, 1991, and **Economic Instruments for Environmental Protection**, OECD Publications, Paris, 1989. See also Jean-Philippe Barde, 'The Path to Sustainable Development', **The OECD Observer**, No. 164, June/July 1990.



BHP Transport

practical benefits, such as improved public comprehension and compliance. Unified codifying procedures have engendered a new sense of discipline by making apparent the scale of the regulatory system, which in some countries became a potent political symbol of over-bureaucratization and red tape. Such procedures have proven to be useful management tools, since 'gatekeepers' can monitor rules entering the registry.

#### **Reductions of Trade Barriers**

The internationalisation of regulatory systems through mutual recognition, harmonisation and elimination of conflicting regulations is an old story that loses none

*Regulations can have unintended effects. Australia's health regulations, for example, block apple imports.*

of its significance in the retelling. Regulatory barriers to the movement of goods and services have been reduced not only through the EC and GATT processes but also through bilateral negotiations, such as those on food regulations between Australia and New Zealand.

Many OECD countries have established or strengthened procedures to review regulation in order to identify potential inconsistencies with international obligations before new regulations are adopted. Such pro-

cedures could help protect from erosion the slow and difficult gains of recent years.

#### **More Reliance on Market Incentives**

Several countries report that their regulatory systems are relying more on market forces to carry out regulatory goals effectively at lower cost. Japan, for example, has strengthened the responsibility of private enterprises for product quality and safety. In Canada, there is more use of market-based economic instruments in preference to traditional regulation. In the United States, information disclosures to consumers are strengthening their ability to choose from among competing products.

#### **Improved Analysis and Understanding of Regulatory Effects**

Regulatory analysis has improved in many OECD countries, although there continues to be much dissatisfaction with the quality of analysis. In New Zealand, cost-benefit analysis is increasingly used at ministerial levels. And its application by independent reviewers in the United States has reduced the costs of regulation by billions of dollars, without any reduction in the benefits. Risk-assessment techniques are attracting more attention, although progress is slow in applying these complex analytical tools to politically charged decisions on health, safety and the environment.

## **Improving Policy Coherence**

A central benefit, not yet fully realised, is likely to be a long-overdue improvement in policy coherence. Among the outstanding characteristics of modern government is its legal and institutional fragmentation along narrowly defined interests and programmes. The pursuit of many separate goals without accounting for their costs and interactive effects has eroded the ability of governments to implement broadly coherent policies.

Regulatory systems are particularly vulnerable to incoherence of this kind because their impacts generally fall directly on businesses and consumers and they therefore escape traditional systems of management and control such as fiscal budgets, which help to order, co-ordinate

and rank those government activities funded by taxes. Regulations are long-lasting, and their effects accumulate over time with results that are often unforeseen and undesirable.

The new regulatory managers are well-situated to identify and tackle interactive and systemic regulatory issues that transcend single regulations and regulatory authorities. They are able to monitor the performance of the system as a whole in carrying out principal policy directions established politically through democratic processes. Two examples make the advantages clear.

In Turkey, a license to open a small business formerly required the approval of a dozen government agencies, which produced uncertainties and long delays. To encourage investment in small enterprises, the General Director of Publication and Codification of Laws in the Under-Secretariat of the Prime Minister co-ordinated the development of a single form to be filed with the municipality alone. Under the new system, if no government agency objects in one month, the license is automatically granted.

And in the United States, the President's Council on Competitiveness co-ordinated the efforts of several Federal agencies to produce a framework for national biotechnology regulation that attempted to assure public safety and maintain the competitive position of the United States in world markets. The Council established broad regulatory principles for all agencies concerned to keep requirements flexible and at a minimum.

## Obstacles to Reform

There are nonetheless substantial obstacles to reform – hardly surprising, given the economic, institutional and political interests embedded in the existing systems.

Opposition by established interest-groups who gain economic advantage through regulation is perhaps the single largest impediment. Even where political support is strong for the overall programme of regulatory reform, such support often vanishes when specific rules or laws are targeted. And ministries and bureaucracies are usually reluctant to fight estab-

lished interests without support from above.

In some countries, too, there is an enormous amount of silent resistance to reform because of traditional and fundamental relationships between governments and citizens. Japan speaks for several countries when it reports 'a tendency of people and enterprises to depend on the government'. Rules are often equated with rights and social equity, and change, particularly toward reliance on market forces, is seen to weaken established entitlements.

Furthermore, the narrow perspectives of programme officials and politicians often make it difficult to weld individual programme perspectives into broader, more coherent views. Another problem of perspective is a tendency of legal systems to solve all problems through new laws and rules, thus adding to the regulatory burden rather than seeking new kinds of incentives and government roles.

The public is often unrealistic about regulation. Governments must simultaneously face demands for less regulation from people who want fewer government controls over their lives, and for more regulation from those who want more government protection from the actions of others. Such demands, particularly for health and safety regulations, are often not based on a balanced assessment of the risks, the effectiveness of government action, or the costs of such action.

Moreover, the sheer technical nature of much regulation makes it difficult for regulatory managers to understand its impact and analytical basis. And where a reformer can't point to obvious potential benefits, it can be difficult to establish a claim on the budgetary sources required to carry it through. So financing reform initiatives, such as hiring analysts or collecting better data, is a serious problem.



The economic and political policy environment today – concerns about competition and economic growth, budget deficits, pressures from the public for more effective government – seems likely to support further the regulatory management and reform initiatives already underway.

Pushed to become more effective, they will expand the scope of their activities

and scrutinise more regulatory areas. They will strengthen their independence from rule-making bodies to escape the conceptual habits and challenge the self-interests of regulators in protecting their authorities and powers. Having learned that long-lasting reform of the regulatory system cannot be done from the outside, they will expand efforts already underway to get involved more deeply and earlier in decision-making processes.

One new development deserves special note. In several OECD countries, such as Canada and Sweden, fiscal budget processes are being expanded to include reviews of the effects and costs of regulations. This unified approach – looking at the total costs and benefits of government activities, both on-budget administrative costs and off-budget regulatory costs – is a positive step that will pull regulatory management deeper into traditional public management and control mechanisms. ■



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# The Sectoral Impact of Deregulation

Eric Lacey

**G**overnment control over certain sectors of the economy used to be taken for granted. But, beginning in the 1970s, the failure of regulatory regimes to achieve their objectives, coupled with the poor performance of some regulated or publicly owned sectors, brought growing pressure for change.

Regulations were often designed to achieve objectives unrelated to economic efficiency, such as ensuring the continued supply of uneconomic services by allowing them to be subsidised by profitable activities. But that approach distorts price mechanisms; and as a result a number of regulated sectors over-supply services at excessive costs, and at standards far above what consumers are willing to pay for. Before the deregulation of North Atlantic air fares, for example, scheduled air lines which operated with only half their seats filled, charged more than twice the fare proposed by charter airlines, which flew at almost 100% seat capacity.

Even where regulation is effective in achieving its immediate goals (for example, protecting the industry from potentially ruinous competition), the cost in terms of welfare losses may be unacceptably high. Many comparisons between regulated and unregulated activities have demonstrated that regulation leads to higher costs and prices. Regulation is also blamed for a large part of the decline in productivity in the United States in the 1960s and '70s and for the relatively poor economic performance of New Zealand over the past 20 years.

## The Current State of Reform

The pattern and speed of regulatory reform in OECD countries have been uneven.<sup>3</sup> While many different sectors have been involved, the five most affected are

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UK Embassy, Paris

***The usual justification for government economic<sup>1</sup> regulation is that in some sectors market forces are absent, or are too weak, to ensure efficient performance. But regulation and public ownership themselves have often constituted barriers to competition and failed to protect the consumer – who has, by contrast, generally benefited from regulatory reform and privatisation, particularly in transport and telecommunications.<sup>2</sup>***

energy, transport, posts and telecommunications, banking and financial services, and broadcasting. Some countries started the process by deregulating road haulage industries in the 1950s and '60s, although the United States is generally credited with setting the ball rolling in

earnest in the mid-1970s when it extensively reformed the regulatory regimes governing airlines, trucking, railways and banking. But it was not until the 1980s that the regulatory revolution became widespread and a number of OECD countries started privatising state-owned corporations.<sup>4</sup> Nonetheless, despite some degree of privatisation, public ownership continues to dominate the postal, telecommunications and railway sectors in OECD countries and is often a central feature in the electricity and gas industries and in airlines.

State radio and television monopolies, too, have been eliminated in many countries, as part of a shift to a more broadly based system embodying a mix of public and private services. Private radio and television stations now compete with public ones, and competition is intensifying in television services as a result of current developments in cable and satellite transmission.

## The Benefits

Public or private, companies operate more efficiently when exposed to competition, and so, to the extent that effective deregulation enhances competition, it produces gains in efficiency. The deregulation of air transport in the United States

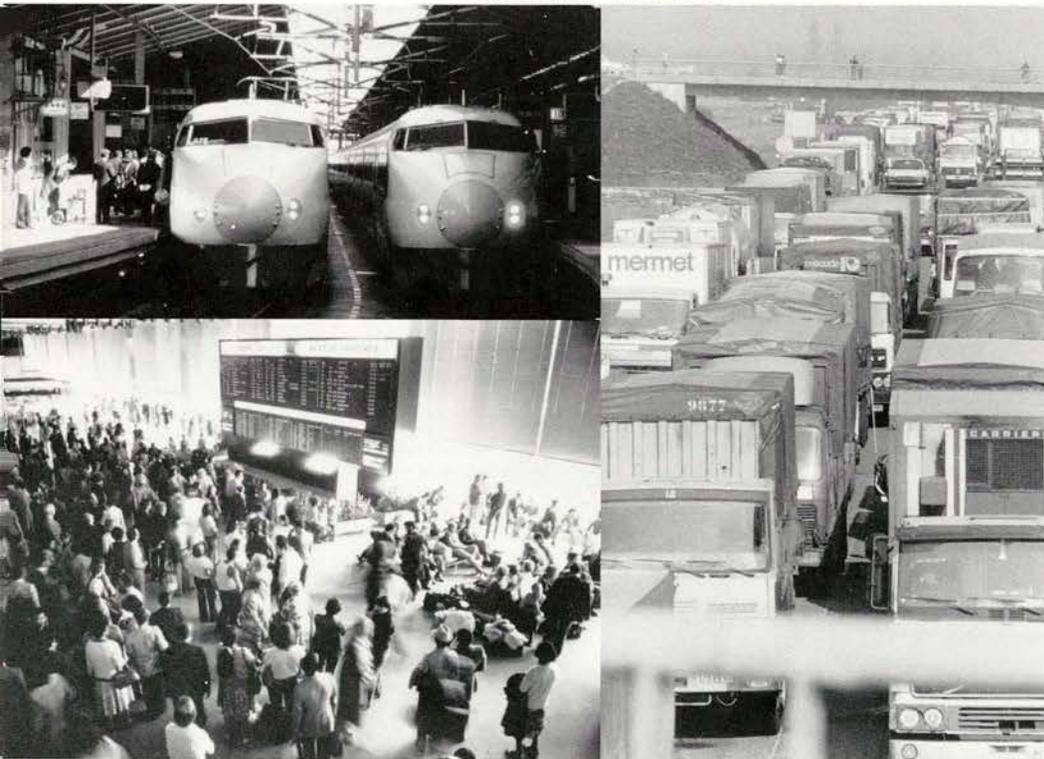
1. 'Economic' regulation is government control of competitive decisions or outcomes in specific industries. This means essentially control of prices, profits, output (or standard of service), entry and exit. The control of quality, such as professional, health and safety standards is therefore not covered. Regulatory reform in this article refers to the reform of economic regulations, which is frequently coupled with an increase in quality regulation.

2. **Regulatory Reform, Privatisation and Competition Policy**, OECD Publications, Paris, 1992.

3. See pp. 3–8.

4. State ownership can be viewed as an extreme form of government regulation, and many of the arguments used to justify it are identical with those put forward for regulation. Privatisation can therefore be considered a form of deregulation, even though the change in ownership itself may not affect competition.

Gordon/REA  
Rudman/REA  
Brucelle/Sigma



In railways, road haulage and air transport alike, deregulation has produced dramatic gains in efficiency.

was prompted partly by the results of a study that showed far more price competition in deregulated intrastate airline services in Texas and California than in other, comparable regulated intrastate markets. Airline deregulation in the United States has generally resulted in lower prices on longer routes and the development of the more efficient 'hub and spoke' route network. Taking account of the increased frequency of services and the drop in fares, the effects on consumers seem overwhelmingly beneficial – indeed, they were estimated in one study at a saving of \$5.7 billion annually.<sup>5</sup>

In New Zealand, the deregulation of air transport led to an 18% increase in traffic on regular services in the first year. In Europe, the liberalisation of routes between the United Kingdom and the Netherlands resulted in both lower prices and increased traffic. Deregulation also reduced the cost of air travel in Canada, although the industry has become more concentrated, with the two main airlines taking over smaller ones.

Road-transport deregulation in the United Kingdom has generally widened choice and reduced prices.<sup>6</sup> There was a sharp drop of up to 40% in long-distance coach fares after deregulation, putting pressure on British Rail to reduce its prices and improve its service, although coach prices have since risen again. In road haulage, deregulation has brought an influx of new operators into the business, creating jobs and improving the quality of service; a comparison between the regulated German trucking industry and the deregulated British industry showed that there was less spare capacity in the United Kingdom and that British operators charged lower prices and earned higher profits. This has been confirmed in other countries, too: in the United States, for example, a recent study estimated that average annual trucking costs were reduced by \$3.8 billion between 1981 and 1986.<sup>7</sup>

Japan's pioneering decision to privatise its state railway system has also paid off for both users and operators. The privatised

companies are carrying appreciably more passengers than Japanese National Railways used to, and whereas the state concern had been in the red for years, the privatised firms are now making a profit and have substantially reduced their long-term debts.

Deregulation of telecommunications has brought lower prices and a wider range of services in the United States, the United Kingdom and Japan. New entrants, especially in the United States, have raised the number of companies providing long-distance services from one in 1970 to over 400 in 1984. In the United Kingdom, the prices of telecommunications equipment have fallen, with 8,500 items of subscriber terminal equipment certified for general use by the end of 1988. Over 200 operators were providing more than 800 value-added services at that point, ranging from videotex services and conference calls to electronic mail and retrieval systems.<sup>8</sup> In Japan, the deregulation and privatisation of 1985 were followed by the entry of many new firms into the industry.

Two of the most widely voiced fears about deregulation – that jobs would be lost and safety standards would decline – have not been borne out. As far as employment is concerned, deregulation led to increased employment in the US airline industry, although there was pressure for a reduction in wages with the arrival of low-cost competitors not bound by long-term labour agreements. And in France, employment in the road-transport industry rose by 20,000 between 1984 and 1987, and other countries report large numbers of new entrants into the sector. Also in road transport, the pressure to improve efficiency resulted in lower real wages for drivers; in the United States, their wages were above average industrial rates of pay before deregulation but have since come down to about the average.

The safety record, too, is unambiguously encouraging. All the countries that introduced economic deregulation in either air or road transport at least maintained, if not tightened, their safety regulations. As a result, accident rates did not increase anywhere and in some cases actually declined, following a downward trend that was already under way before liberalisation. In the United States, for example, fol-



Market access v. monopoly supplier? The privatised British Gas has been criticised for anti-competitive practices.

COL, London

lowing airline deregulation in 1978, most research shows that accident rates have decreased. In road transport, the rate of fatal accidents involving heavy trucks fell by one-third in the United States in the 1980s, and in the United Kingdom accident rates for both trucks and buses continued to decline after deregulation.

## What Drawbacks?

But liberalisation has not been solely beneficial. In financial services, for example, although deregulation has given consumers a vastly increased choice of suppliers and services, anti-competitive practices have sometimes emerged. It is still difficult to penetrate national markets, especially for new entrants. Questions of market access in this sector have been one of the more difficult issues in the Uruguay Round.

The privatisation of telecommunications and gas in the United Kingdom, moreover, does not appear to have benefited the consumer as much as it has the companies concerned. The monopoly suppliers, British Telecom (BT) and British Gas, substantially improved their profitability after privatisation, but both have been censured for anti-competitive practices. In telephone services, the government decided in 1988 to open up the market further by allowing Mercury, BT's only permitted competitor, to start providing public callbox services as well. British Gas was investigated by the UK's Monopolies and Mergers Commission, which concluded that its pricing policy towards industrial users was against the public interest and

recommended that the company should in future publish a price schedule and end discriminatory pricing.

It is significant that some of the most successful privatisations in the United Kingdom were of companies operating in competitive sectors, such as Cable & Wireless, Amersham International, Jaguar and the National Freight Consortium, lending credence to the assertion that state-owned companies are hindered by regulatory constraints. On the other hand, some publicly owned enterprises have appeared congenitally incapable of competing successfully and of making a profit when exposed to market forces. The UK's National Freight Corporation was only able to remain in the highly competitive road-haulage business by absorbing regular losses. The same was true of Sealink Ferries for as long as it was in the public sector. On the other hand, privately owned P&O Ferries was also unable to make a profit in the cross-Channel market for some years, until it restructured its activities in the face of a hostile takeover threat.

## Managing the Transition to Competition

As part of the process of removing direct regulation, some monitoring of the industry is necessary to ensure that an anti-competitive market structure or behaviour does not emerge in the wake of reform. Effective competition laws can counteract such tendencies if the industry is a competitive or potentially competitive one. In the airline industry, for instance, competition policy should be invoked to prevent mergers and acquisitions that restrict competition in particular markets and to outlaw commercial arrangements between airlines that restrict entry, limit capacity or set minimum fares. The same is true of behaviour designed to restrict access to scarce airport or runway facilities or to computerised reservation systems.

In sectors that seem to embody some features of a natural monopoly (that is, where economies of scale and scope are so large that a single firm is sufficient to satisfy market demand), it is important to ensure that predatory behaviour by the incumbent monopoly after deregulation does not inhibit entry by potential competitors –

Benoit Decout/REA



Private radio and TV stations now compete with public ones.

and that the profits from the segments of the industry that are still regulated are not used to subsidise activities in the deregulated segments. Indeed, monitoring by means of competition law may not be sufficient to create competitive markets, so that some form of price or profit regulation may still be required. The type of regulation should be carefully selected so as to encourage and not inhibit competition and efficiency.

In the United Kingdom the price-capping formula 'RPI minus x' (in the partially deregulated gas, airports and telecommunications industries) is considered to be a more pro-competitive form of price control. Under this system the firm is allowed to increase its prices by an amount equal to the retail price index minus a certain percentage (it was fixed at 3% for British Telecom for the first five years following privatisation and has now been increased to 4.5%). The idea is that the firm which reduces its costs by more than the amount given in the formula is rewarded by earning higher profits, and if its costs

5. See S. Morrison and C. Winston, *The Economic Effects of Airline Deregulation*, Brookings Institution, Washington DC, 1986, pp. 8–9.

6. See Eric Lacey, 'Regulation or Competition in Road Transport?', *The OECD Observer*, No. 167, December 1990/January 1991.

7. F.J. Veier and G.B. Stone, *Review of the Evans-Delaney Debate*, report prepared for the US Department of Transportation, Washington DC, 1988.

8. See Amy Plantin and Dimitri Ypsilanti, 'Trends in Trade in Telecom', *The OECD Observer*, No. 171, August/September 1991.

COI, London



The experience of cross-Channel ferries suggests that competitive pressure can prove more important than the form of ownership.

are reduced by less than that amount it suffers reduced profitability. The drawback is in the difficulty of determining the appropriate figure for  $x$  which ensures efficient performance.

In those sectors where, for whatever reason, competition is not possible, one way of enhancing cost-effectiveness is to 'contract out' or franchise particular services by competitive tender – creating competition for the market rather than competition in the market. Contracting out public services such as hospital cleaning and refuse collection has brought considerable savings in costs in some countries; in many cases, the public-sector suppliers have won the contracts by being more efficient than private firms, proving that it is the competitive environment, not the ownership of the enterprise, that makes the difference in performance. But contracting out is only appropriate when the service is sufficiently similar to an existing private-sector activity for tendering to attract a reasonable number of bids. The activity also has to be defined with sufficient precision and clarity for performance to be monitored effectively.

9. See Tim Kelly, 'What Price the Airwaves?', *The OECD Observer*, No. 173, December 1991/January 1992.

Even in industries traditionally viewed as naturally monopolistic there are segments of the market which are competitive or can be made more so. In telecommunications, for example, the proliferation of value-added services and the manufacture of equipment are areas where market forces should be encouraged, even when local monopolies of basic telephone services are inevitable. Advancing technology is rapidly changing the structure and cost parameters of many industries, particularly telecommunications, where alternative systems of delivery – not only by satellite and cable networks but also by microwave and cellular radio – have begun to erode the natural monopoly of the traditional carriers.<sup>9</sup>

□ □

The experience of the past decade allows four basic tenets to be laid down for regulatory reform. First, wherever possible, restructuring should precede deregulation or privatisation. It can be desirable even where local or regional natural monopolies survive by ensuring that the performance of the resulting firms in the industry can be compared. Second, some activities of public or private monopolies may be

made subject to competition, even if others are naturally monopolistic. Competitive and monopolistic activities should be separated to ensure that cross-subsidisation from the monopolised sector does not distort competition – in effect, that no firm in the competitive sector is sheltered from the consequences of its own inefficiency.

Third, competition laws should be applied fully to the competitive activities, particularly for mergers. Although efficiency-enhancing mergers may well arise following deregulation or privatisation, they will require scrutiny to ensure that they are not anti-competitive. Finally, governments should be alert to the danger that incumbent advantage may be used to restrain competition. In some deregulated industries, previously regulated enterprises have continued to dominate by using predatory pricing and other forms of anti-competitive behaviour such as restricting access to important facilities. In such cases, further pro-competitive regulatory reform may be necessary, as may appropriate provisions in competition laws to deal effectively with the conduct of dominant firms. ■



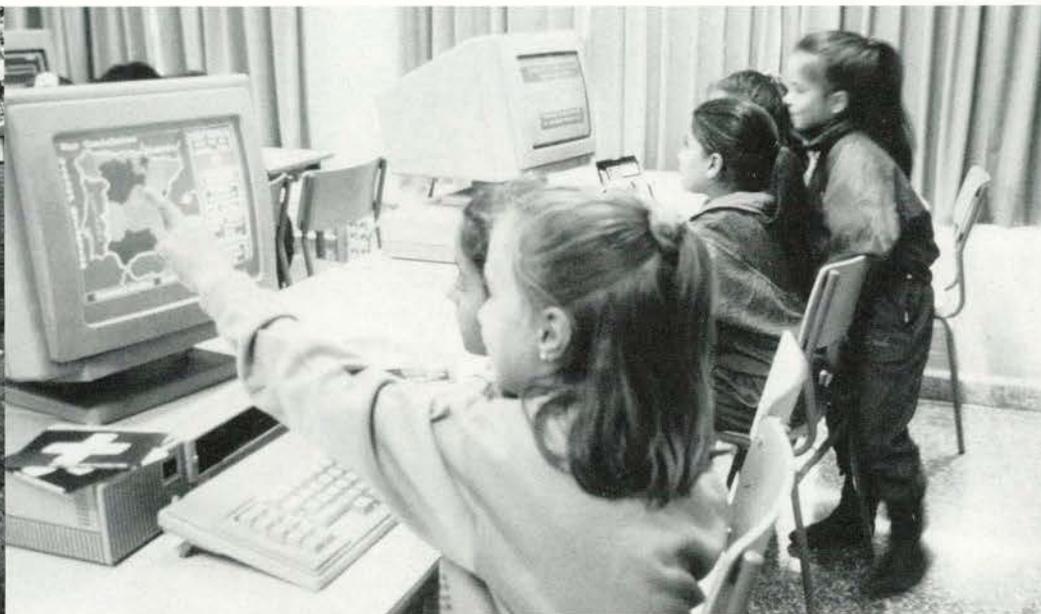
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# 'Athena in Castille' Educational Computing in Spanish Schools



Ministerio de Educación y Ciencia



Ministerio de Educación y Ciencia

**Henri Dieuzeide**

*In the rural, wine-growing village of Navas de Oro, in the Segovia province of Spain, 20 five-year-old pupils are settling down with obvious delight to an Olivetti M280 computer for half an hour's practice in recognising shapes and counting objects. At Hernando Cortes College in a Madrid suburb, 15 pupils handicapped by cerebral palsy are working with intense concentration on keyboards specially adapted for them. Only a few kilometres away, in the San Pascuale Centre, 28 nine-year old pupils in a computer room, attentively watched over by their teacher, are combining some of the basic chemical elements on screen.*

*In Spain as in other OECD countries, the computerisation of society is now reaching into education. Not, in this case, as scattered initiatives but as part of the 'Atenea' project for introducing computers in schools. After a ten-day mission to Spain,<sup>1</sup> a team of experts appointed by the OECD has evaluated the project; and an international seminar in Madrid, arranged jointly by the Spanish authorities and the OECD, took stock of its first phase, which lasted from 1985 to 1990.*

**T**he 'Atenea' project was introduced in 1985 by the Spanish Ministry of Education and Science for the 28 provinces under its responsibility. The project involved volunteer schools in testing the educational applications of computers with one very specific aim in view, to measure how far computing regarded as an educational tool – and so not only as a new subject within the ordinary curriculum – could improve education and learning at primary and secondary levels,

thereby influencing the renovation of study programmes across the board. Key elements in the project are a total of over 1,000 schools equipped, by the end of 1990, with over 8,000 high-quality micro-computers, some sixty general or subject-oriented software packages and, over five years, 11,000 trained teachers. Further

*Henri Dieuzeide, an Inspector General in the French Ministry of Education, Youth and Sport, served as Chairman of the OECD Group of Experts which evaluated the Atenea project.*

central elements were the reform of the education system and a new Education Act in October 1990.

Certain conditions can now be identified as 'constant' prerequisites for successful educational innovation in any country, and

<sup>1</sup> *The Spanish Atenea Project 1985–1990: Evaluators' Report*, OECD/Spanish Ministry of Education and Science, Madrid, 1991, available free of charge in Spanish, English or French from the Centre for Educational Research and Innovation (CERI) at the OECD Directorate for Education, Employment, Labour and Social Affairs.



In the Atenea project computers were treated as an educational tool.

their fulfilment in this instance augured well for the Atenea project. These conditions are firm, consistent backing from the authorities, together with a climate of mutual confidence between those conducting the experiment (pupils, teachers, schools) and the decision-makers (the New Information and Communication Technology Programme – PNTIC), the provision of adequate material resources (\$66 million over five years) to make a perceptibly innovative impact, priority for the training of actual and potential users among teachers, and follow-up and appraisal throughout the project's duration.

The OECD team of evaluators did identify a few less favourable aspects. The promoters of the project, running PNTIC in the Ministry of Education and Science, had underestimated the amount of time, and of material and human resources, that it would take to produce the volume of high-quality educational software which alone would justify using computers in the classroom; they had further underestimated the complexity of the market for such software.

The team also came up against the usual problems of how to assess what real impact computers may be making on learning. They found favourable effects on pupil attitudes, attentiveness, lasting interest, growing confidence in the school, a feeling of responsibility towards the hardware. Yet the signs of cognitive development and consolidation of skills learned were rather few, and not very conclusive. No doubt the motivation generates some delayed effects, and it will take time to identify any changes in learning strategies or the kinds of knowledge that may have been built up.

More generally, the Atenea project found it difficult to get useful information fed back from the schools themselves to the decision-makers of the PNTIC: a database ('EXPER') had been established at the Madrid headquarters of the project to

collect information about computer applications in classrooms, but teachers were not sending in much material and were seldom consulting it.

### Innovative Features

Apart from deliberately restricting computers to a teaching aid role – 'the project is centred on the pupil, not on the machine' – the Atenea project also presented some innovative features which were much discussed at the Seminar: sound planning and organisation aimed at reducing implementation problems at school level, while heading off any tendency for the project to veer away from its goals (towards, for example, the teaching of computer programming).

Another innovative feature is that the project depends wholly on the voluntary commitment of its teachers. Every participating school has to present a hardware-use plan setting out the pedagogical aims. Every participating teacher signs the project document, which has to be forwarded to the Ministry before any steps can be taken to implement it.

Atenea has succeeded, moreover, in maintaining a balance that has been uncommon among OECD countries in how it has used the resources required to make it function effectively: over the five-year period, less than half the budget has been spent on computer equipment and maintenance, the remainder being spent on training and on producing educational software (Table).

The most innovative feature of Atenea has been to build up a firm network of monitor trainers who are responsible for instructing its users, for liaising with PNTIC and for technical and pedagogical directions within the schools. Every one of these 130 key individuals, recruited among educational technologists and innovators,

has received 500 hours of training at PNTIC headquarters and has a group of up to 20 schools under his or her control. It is the monitor's task to give every teacher some 60 hours' training, together with assistance on implementing software in the classroom.

### New Information Technologies in Education?

Although the Madrid seminar noted that the Atenea project had advanced satisfactorily towards the pedagogical goals laid down, establishing new teaching environments, giving a fresh perspective to the various subject programmes and developing new teaching materials and strategies, it also suggested a number of questions for the Spanish authorities about the way ahead. How could they best move on from the first, experimental phase to a phase of generalisation? A thousand schools, 130 monitors, 60 software packages, 11,000 teachers constitute a mass which can be managed by a centralised network. But that mass represents only 12% of the schools under the Ministry's authority. Will it be enough simply to increase available resources within the present centralised pattern? Where will they find the hundreds of monitors a national network would require?

Table <b>ATENEA: RESOURCE ALLOCATION, 1986</b> \$ million	
Equipment, maintenance	30
User training	23
Educational software, publications	13
<b>Total</b>	<b>66</b>
Source: Atenea project	

Yet another consideration is raised by the principle of voluntarism. This creams off the willing volunteers, but how far will it be compatible with extending the project to every school in a province? Will they be able to breach the 'wall of indifference' on the part of the majority of teachers, an obstacle in most OECD countries to the generalisation of educational innovations?

Non-participating teachers are coming under all kinds of pressure from parents, local authorities, industry and the pupils



Attentiveness, lasting interest, growing confidence – but in spite of these favourable effects on pupils, it is too early to say whether there have been lasting improvements in the way children learn.

themselves, these latter visibly aggrieved by the volunteer principle – why should the computer room be out of bounds to a class solely because its teacher has refused to take part in the project?

The participating teachers themselves can have mixed, sometimes questionable, motives. For some it will be genuine curiosity, an urge to do the job better. Others again are dedicated technologists, computer enthusiasts, always ready to play around with the system. Still others may have an eye to career prospects, a higher profile, promotion or a better appointment. Good will may not be bottomless; an ambitious teacher may want to move on, leaving his current project behind; the computer hobbyist may discover some new enthusiasm.

All of these considerations raise once again the question of incentives, moral as well as financial or administrative, to encourage the majority of teachers (not all of whose anxieties are necessarily unwarranted) to master the new technologies without having to worry that they may be penalised if unsuccessful. On this, a 'risk premium' was suggested for the innovative teacher along the same lines as in other professions, on the understanding

2. *Introduction of Computers in Schools: the Norwegian Experience – Examiners' Report*, Paris, 1988, available free of charge from CERI.

that such a premium would be awarded for some specified period so as not to create a permanent bonus for the perpetual innovator, since professional risk declines as innovation becomes generalised.

### Towards Open School Programmes?

In any industrial country, technological innovations can be generalised, and the Atenea project affords an opportunity to see how the transition can be effected. Norway, which in 1988 underwent an OECD evaluation similar to this one for Spain, is a case in point.<sup>2</sup> The Spanish experience was interesting also for another reason. The 1990 Education Act (LOGSE) devolved management to the provinces and provided for the gradual introduction of an open school programme (*curriculum abierto*). More flexibility on hours and content will make the new technologies easier to build in. Conversely, practices which the Atenea project has introduced into schools (its new pedagogical teams, formulation of annual plans and targets) will be easy to extend throughout the management of the new programme.

But can the Atenea project structure itself survive as a central engine for innovation? New arrangements have been made:

monitors have been included in province training centres, province co-ordinators will take charge of liaison with PNTIC. The project will have to redefine its own role in co-ordinating (better information exchange through increased use of telecommunications), control (especially for training activities related to the new programmes) and assessment (simple tools, the same in all schools, to appraise the technologies' effects more reliably). The project probably will remain responsible for hardware/software standards and criteria, for negotiating rights to foreign software and for distributing any Spanish software that may be useful in other countries.

□ □

The Atenea project was also conceived at the outset as an instrument with which to 'unblock' the education system. As it grows, its nature is liable to change. It will have to evolve and be invented afresh so that it keeps abreast of developing technology and matches Spain's new pedagogical requirements. This may be hard to bring off, since it involves two distinct processes moving in different directions and at different speeds.

The issues that Atenea addresses are much like those facing other industrialised countries engaged in modernising and in reconciling the young with school through technology. The OECD experts' work in Spain stressed the importance of exchanging information among member countries, with a view not to identifying some single global strategy but to draw up an inventory, useful to them all, of well-thought-out procedures and practices for application in the field. Here the Atenea project will certainly have made its mark. ■



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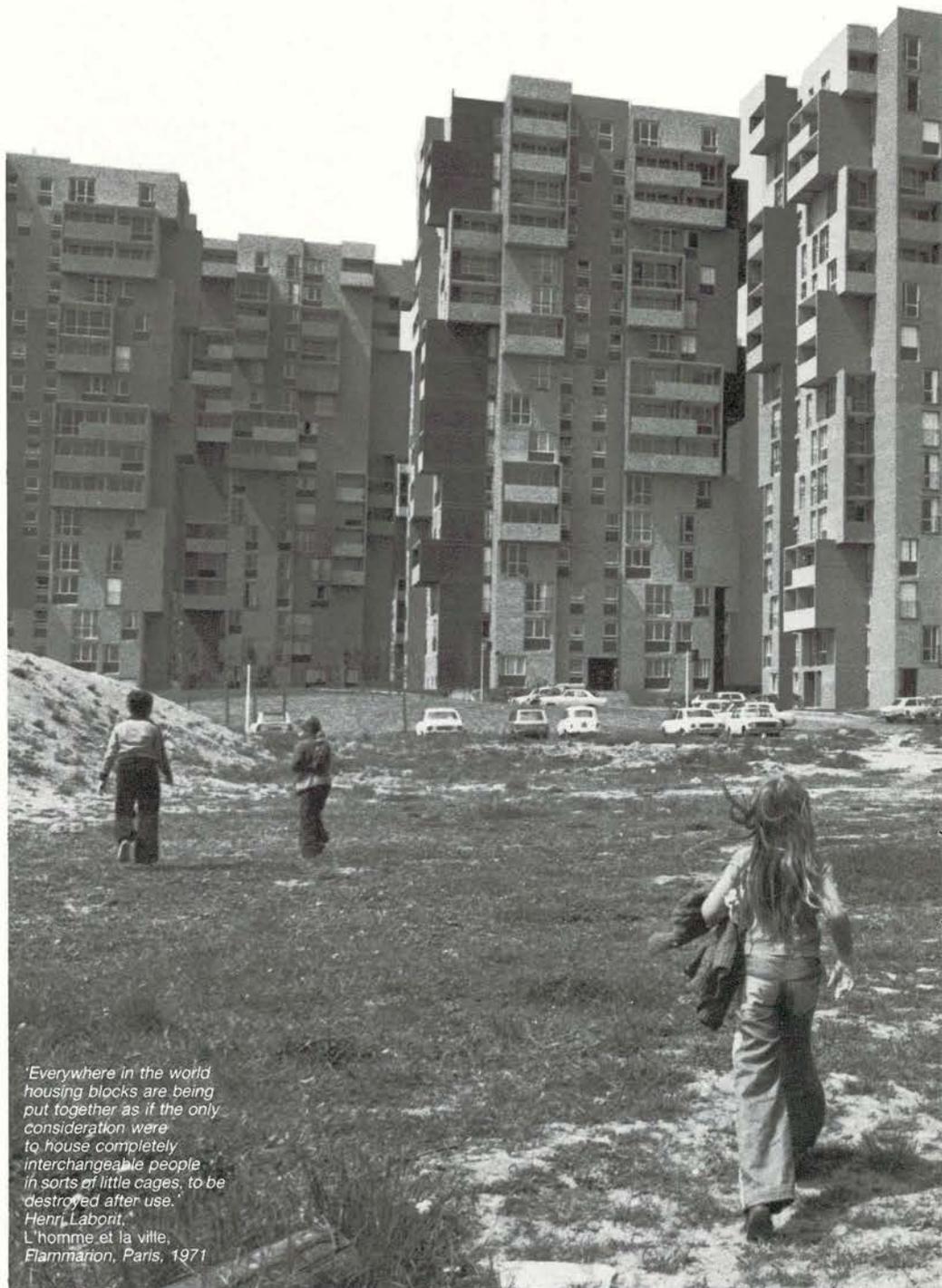
# The Case for the Urban Environment

**Ariel Alexandre**

*Without a comprehensive urban policy, social, economic and physical deterioration of the kind already suffered by some conurbations will continue, with all the attendant dangers.*

**C**ities are centres of activity and places for exchange. But they also attract disadvantaged groups – ethnic minorities, jobless youngsters, old people – who seek refuge there or cannot move away. The consequent problems and conflicts have to be dealt with through measures based in economic and social policy. But an urban policy, to be effective, should give a spatial dimension to sectoral policies, co-ordinating them and instilling considerations of solidarity and equity. Admittedly, such a policy will be hard to define and harder still to apply, because it calls for an all-encompassing

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*'Everywhere in the world housing blocks are being put together as if the only consideration were to house completely interchangeable people in sorts of little cages, to be destroyed after use.'*  
Henri Laborit,  
L'homme et la ville,  
Flammarion, Paris, 1971

approach and for close co-operation among all the parties involved. But it is a challenge that will have to be met by a large number of countries, including those in the East and South of the world. For if cities go on expanding, they will end up suffocating themselves; they are not viable in the long term.

Policies to upgrade the urban environment cannot offer a panacea for all the ills from which cities suffer. Raising the quality of life in towns is only one attribute of a policy for the city that has to include a strong socio-economic component: segregation and pockets of unemployment have to be alleviated, cultural and leisure services that match local requirements have to be provided, delinquency staved off, local enterprise encouraged, run-down cities and neighbourhoods helped.

Nonetheless, the improvement of the urban environment and its buildings has become a priority for the 1990s, and there is a growing awareness that a specifically urban strategy is required.<sup>1</sup> There are four reasons.

First, living conditions in cities are steadily worsening. Disamenities – air and water pollution, rubbish, noise, traffic jams, ugliness, dirt, the absence of green spaces, crumbling buildings and infrastructure – are growing. And the problem is by no means confined to northern industrial towns: it is equally serious on the Mediterranean rim,<sup>2</sup> in tourist resorts and rapidly growing conurbations – not to mention the suburbs built quickly and cheaply in the 1950s and '60s.

Second, demand for a high-quality local environment is becoming ever more vociferous and so is taking on a political dimension – witness the success of the 'green' parties in national, regional and local elections in a number of countries and the inclusion of ecological concerns in the manifestoes of other political parties.

Third, many economic activities today, particularly in the service sector, want to set up in business in attractive, unspoiled,

1. *Environmental Policies for Cities in the 1990s*, OECD Publications, Paris, 1990. See also Ariel Alexandre and Eric Oberkamp, 'Funding Urban Infrastructure', *The OECD Observer*, No. 172, October/November 1991.

2. See Sergio Arzeni, 'Tourism in Mediterranean Cities', *The OECD Observer*, No. 164, June/July 1990.

Silvia Thompson, OECD



'The horses of the barbarians are parked in the forum.' Bertrand de Jouvenel, speaking at the OECD in 1971

unpolluted areas. For younger, lively, well-qualified people the choice of where to move is governed by the quality of their environment, which is therefore of increasing importance to the economic vitality of any town.

Lastly, in the developed countries, three-quarters of the population are city-dwellers. And so failure to improve the urban environment is the equivalent of failing to improve the environment at all.

It may be self-evident to declare that most environmental problems centre on the large cities or can be attributed to them. Yet that statement means that the strategy adopted must be specifically urban and spatial; problems cannot be dealt with piecemeal, sector by sector. Moreover, the concentration of pollution and other disamenities within a small space (cities take up only a tiny proportion of total land area of most countries, often no more than 2 or 3%) has not merely additive but synergetic effects: city-dwellers find themselves exposed, at one and the same time and in one and the same place,

to too much insecurity, too much pollution, too much noise, too much stress.

Yet local co-ordination of the anti-pollution measures of different sectors is very weak. And environmental considerations are hardly ever taken into account in non-environmental programmes. As a result, urban environment policies are narrow in scope and poorly endowed with resources.

Some towns – or rather, some local authorities, backed up by local people and businesses – have nevertheless done wonders in rehabilitating run-down neighbourhoods and raising the standard of urban transport.

## Rehabilitating Run-down Neighbourhoods

Rehabilitation most often concerns old inner cities. But it is now increasingly being attempted in more recently built, disadvantaged suburbs and former industrial zones that have been left to decay.

The experience gained to date shows that, if economic activity is really to be

given a new lease of life, a city must not only improve its buildings and infrastructure but also reduce the degree of pollution (rubbish, water pollution, smoke). London, Manchester, Vancouver and Istanbul offer examples of success. New uses have been found for dilapidated buildings and sites, water pollution has been reduced and waterfronts improved. Interestingly, riverside and seaside settings seem to have a distinct advantage here: water is both an environmental and aesthetic asset and a source of leisure pursuits.

The recipe for success in urban rehabilitation programmes includes long-term planning and careful implementation of the plans adopted; diversified funding sources; public/private-sector partnerships; local initiatives with strong public support; the purchase and 'set-aside' of sufficiently large expanses of land. To attract some establishments, moreover, recourse to taxes or tax incentives is often necessary.

There now exists a substantial body of experience in rehabilitating abandoned industrial zones. And the turn will come of the suburbs built in the 1950s and '60s, even of some tourist resorts, though for the time being the focus – especially around the Mediterranean rim – tends to be on improving buildings rather than on reducing pollution and disamenities.

### Improving City Transport

Road traffic – commercial and private – raises huge environmental problems in cities, bringing air pollution, congestion, noise and danger. Local authorities often seem paralysed by the sheer scale of these problems.

Yet some cities – London, Osaka, Munich and Zurich, for instance – have set an example, by restricting motor traffic, upgrading public transport and cutting down nuisance. Now Stockholm is considering making drivers pay to enter the city – as Singapore has been doing for the past fifteen years. The aim is to reduce the number of cars with a single passenger, thus reducing pollution and traffic jams, and to spend the revenue on improving public transport.

Many cities are still hesitant about taxing private car drivers, even though they over-consume limited, valuable urban space. There is also an enormous amount of reluctance to charge city tolls, as there was at the beginning of the 1960s, when parking charges were first introduced. Charging would nevertheless be the most effective and fairest way of reducing traffic noise and pollution and upgrading public transport. It seems likely that, with the passage of time, more and more cities will resort to charges, increasing local taxes on petrol and making drivers pay a toll at city gateways (as, indeed, many countries did in past centuries).

Another step would be for each metropolitan zone to set up a single authority whose powers would cover both privately owned traffic and public transport. Only an authority of that kind would be able to make the necessary trade-offs, 'internalising' more equitably the environmental costs of private motoring and improving the quality of the environment and the public transport system.

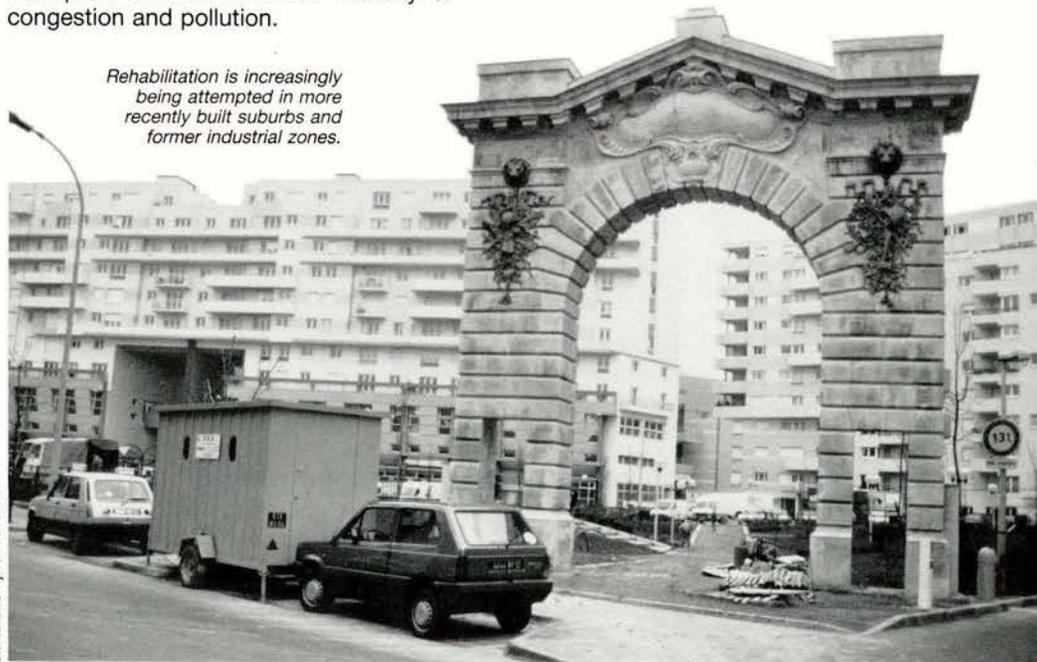
Broadly speaking, it is increasingly realised that demand for transport will have to be contained, restricted or even reduced. There is a physical limit to the growth of motor traffic, set by the limits to the space available and the intensity of congestion and pollution.

Indeed, it is of interest that whereas energy consumption as a proportion of national income has fallen steadily over the past twenty years ('energy intensity' per unit of GDP is down 25% on 1970), transport 'consumption' over the same period has risen constantly: the volume of traffic per unit of GDP is up by 10%. Each dollar produced now involves no less than a 500-metre drive in a car or a lorry. It really is time to make road transport more efficient.

### The Keys to Success

The common element in the success of the most dynamic cities in enhancing their environment is that they have taken action themselves without waiting on other decision-making levels, introducing radical measures that were unpopular at the outset (levies on pollution, restrictions on drivers) to improve the quality of life and at the same time reduce pollution and nuisance. They have taken a broad approach, stressing the co-ordination of programmes and their enforcement. Above all, in framing urban policies they have systematically taken aboard environmental considerations

*Rehabilitation is increasingly being attempted in more recently built suburbs and former industrial zones.*



*Sylvia Thompson/OECD*

Pascal Nieto



Leimdorfer/REA

Only a single authority, responsible for both private and public transport, would allow a balance to be developed between them.

and set up private/public-sector partnerships.<sup>3</sup>

First and foremost, everything possible must be done to internalise the environmental costs of urban activities – to make polluters pay and to offer incentives not to pollute. Pollution taxes and levies would help here – but such charges are still far too rare and, even where they do exist, they are too low to offer any real incentive.

The reduction of urban congestion and pollution will require a rise in the price not only of driving cars but also of using electricity, local services, and other conveniences. To persuade city-dwellers to use public transport, ride bicycles and to walk, car use will have to be taxed much more heavily than car ownership.

In addition, environmental considerations should be basic to town planning and management. Any large-scale project, public or private, should be subject to evaluation of its impact on the environment. In the same way, those responsible for policies and programmes which also, though less directly, affect the environment (industry, road-building, public housing, and so on) should systematically take

3. See also Christian Huillet and Pieter van Dijk, 'Partnerships for Rural Development', *The OECD Observer*, No. 162, February/March 1990.

into account the possible effects on the environment from the planning stage onwards.

There are many ways to this end. For instance, environmental specialists could be regularly placed at the disposal of services which do not themselves have the necessary expertise. Or official urban-planning institutions could be set up to co-ordinate all local activities concerned with enhancing the environment.

No urban-planning policy can succeed unless local people are actively involved and public- and private-sector projects closely and continuously co-ordinated. Partnerships are an essential key to success in revitalising a city. Partnerships, moreover, unlike economic incentives, are often already in place. A city will often turn to the private sector to carry out its plans, whereas it is still hard, in many cases, to justify recourse to economic incentives.

□ □

There is a wide variety of efforts currently under way to upgrade the urban environment. Yet planners still rarely look at the problem and the city as a whole. Policies are still small-scale, piecemeal, and never all-embracing. They should be much more

ambitious and far-reaching than they have been. Central government, in particular, ought to encourage local initiatives by offering incentives and aid, and by running an enlightened information policy through which municipalities can discover experience that has proved pertinent elsewhere.

In short, if a city is to prosper it must care for its environment – and reducing the impact of cities on the global environment, moreover, is going to be a central component of the environmental policy of every country. Indeed, it is now generally accepted that threats to the environment concern the whole planet – global warming is one example. Patently, cities have to set themselves to solving problems for which they are in large measure responsible. ■



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# Science and Technology *sans frontières?*

Gabriel Drilhon

*How should national systems of science, technology and innovation respond to the radical changes – political, economic, scientific and technological – now affecting all parts of the globe? That question lay at the heart of the discussions by the ministers responsible for science and technology policy in OECD countries during their recent meeting at the Organisation's headquarters.*

International scientific and technological relations have considerably increased over the past ten years – hence the term 'technoglobalism' now occasionally heard. Such relations take a wide range of forms: co-operation between scientists and between basic research laboratories; technical co-operation agreements between firms; technology transfer within multinational companies; the development of international networks involving enterprises, government research establishments and university laboratories within the framework of programmes totally or partially government-funded; transactions on intellectual property rights and new technology-related types of intellectual property; trade in high technology products; foreign direct investment in science and technology activities.

As a result, science and technology have recently become important points of international negotiation in fora where formerly they had not figured, as in the GATT. At the same time, traditional technology-related negotiations such as those dealing with intellectual property rights,

standards, and health and safety regulations have developed further.

This expansion of science and technology in international relations and negotiations takes place in a context of further geopolitical concentration: the continuing movement of Europe towards a unified market by 1993 and to economic and monetary union; developments in North America through increased co-operation between the United States and Canada and, more recently, Mexico; increasing links among the countries of the Pacific region, and around Japan in particular. And events since 1989 in central and eastern Europe obviously represent another major development (box, p. 21).

The first consequence of these changes is the necessity of increased international scientific and technological co-operation. It falls primarily to scientists and research institutions to develop such co-operation. The interest of governments is related partly to their concern in ensuring the most

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efficient use of public money in science and technology, and partly to the scale of some research topics which inherently require extensive geographical co-operation. In a broader perspective, governments also consider co-operation as a means of reducing scientific and technological disparities between countries and as an element in international political, economic and cultural relations. 'Big science' is a good example of all these aspects of international co-operation.

## **Co-operation in Big Science**

The term 'big science' has so far been used to refer to research requiring extraordinarily expensive equipment and facilities, such as particle accelerators for research in physics, neutron sources, fusion devices and large optical and radiotelescopes, deep ocean drilling or polar vessels, large-scale ultraviolet lasers and space-based telescopes. Two factors explain why the size and range of big-science projects,

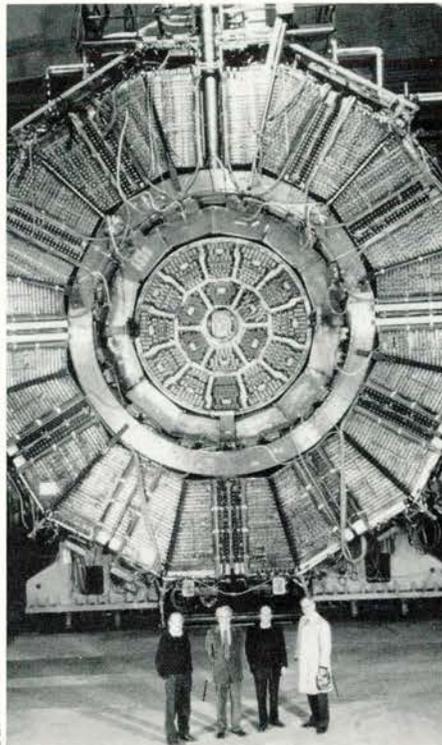
and hence their cost, have grown considerably over the past 50 years: the development and accumulation of scientific knowledge, and the expansion of technological capabilities. Cost-sharing among countries, if only to prevent duplication, is a major impetus behind co-operation.

The profusion of projects reflects the fact that, besides the traditional disciplines of big science, such as astronomy and high-energy physics, a growing number of research fields – ranging from new materials to life sciences – are becoming big sciences in their requirements for expensive equipment, facilities or teams of experts from several disciplines. Some facilities, such as neutron sources or satellites, are now required in a wide spectrum of disciplines. One development is that major facilities, once built, are often used by a very large and geographically diverse community of researchers.

Another development is that countries outside the OECD area are, or plan to be, involved in research which is dependent on large-scale equipment and facilities. The former Soviet Union, China, Korea and Brazil, for example, are likely to be interested in co-operating with OECD countries.

The benefits of engaging in research which calls for large-scale facilities and equipment are well-known and widely accepted: the achievement of unique scientific findings, unobtainable by other means; an in-

*Another example of international co-operation: a high-energy particle accelerator, which is used to explore the structure of matter at different levels – crystal, atomic, nuclear, elementary.*



CERN Photo

dustrial fabric which is potentially better integrated for participating enterprises; prestige status for the country chosen as the site for such facilities.

Initiatives to launch big-science projects often come from narrow segments of the scientific community. Exchanges of views and information between the governments of the countries concerned on such initiatives may be required at a relatively early stage. And the escalating costs of these projects mean that, even for the wealthiest of nations, they can be implemented only through international co-operation and the optimum cost/benefit ratio must be obtained for all participating countries. Furthermore, the human and financial resources involved in sharing international big equipment and facilities (not forgetting the implications for related national R&D activities) can be so high that for many countries, the decision to participate involves real problems of resource allocation and choice of priorities.<sup>1</sup>

Over and above the research requirement for extraordinarily expensive equipment and facilities, an important, and comparatively new, development is leading to the demand for a different type of big-science co-operation – large-scale pro-

1. **Choosing Priorities in Science and Technology**, OECD Publications, Paris, 1991; see also Gabriel Drilhon, 'Choosing Priorities in Science and Technology', *The OECD Observer*, No. 170, June/July 1991.

Besides macro-economic stabilisation – a necessary, though not sufficient, condition, for achieving sustainable improvements in economic performance – the central and eastern European countries are also faced with micro-economic and structural problems linked with their competitiveness. Having been sheltered from international competition for decades they have a good deal of growth to make up, and the technological standard of their industries must therefore be raised. The capacity to generate and assimilate scientific advances and technological innovations must become an integral part of the process of economic reform.

The central problems for science and technology policy are how to create new structures and to prevent the disintegration of the science base and of science institutions in a period where demand for scientific output is in severe decline. The state no longer intends to – nor can it – subsidise research institutes,

### EAST-WEST: DESIGNING CO-OPERATION

and industry is not yet able to take on this task. So safeguarding the science and research base and improving the education and training of scientists and engineers is of key importance for long-term economic growth and competitiveness. Simply put, how can the potential large-scale emigration of essential human resources be countered? On the whole, the standard of scientific education is high and even though the quality of research varies among different disciplines, in some fields there is an impressive standard of basic research which may lead to the development of advanced technologies – the problem here lies in the capacity to develop applications.

Catching up enough ground to become competitive on international markets involves

a complex of policy problems which cannot be resolved merely through internal reform – they also require favourable international conditions and measures on the part of OECD countries. Outside financial assistance, though necessary, will not suffice. Rather, what appears to be necessary is co-operation in many specific fields, in, for instance: assistance in establishing communication networks and access to scientific publications; support for collaborative activities (including travel); help in establishing assessment mechanisms for R&D or peer-review procedures. Furthermore, given the importance that these countries become familiar with western practices and expertise, thought should be given as to how western firms could best be involved in co-operation. Consideration should also be given to the possibility of strengthening existing modes of bilateral co-operation within the framework of multilateral co-operation.



Institut Pasteur

*The production of vaccines against pandemic diseases often requires a considerable amount of international co-operation.*

grammes that are geographically dispersed. These often call for multidisciplinary collaboration; and they are less centred on expensive equipment and more on the co-ordinated planning and conduct of research, and on data handling internationally – if not on a global scale.

In general, these programmes point to issues of increasing political importance, on which there is a clear and often urgent call for more knowledge and understanding. Examples include research on the dynamics and evolution of the climate, the investigation of biological diversity, the human genome, and pandemic diseases. Co-operation in these areas could produce substantial savings in limited human and financial resources.

Usually, the financing of very large programmes is not rigidly proportioned; rather,

it is agreed to on the basis of inter-agency or inter-governmental arrangements, which reflects the important role the scientific community plays in designing such programmes. This type of co-operation benefits from an international distribution of research effort through the effective co-ordination of planning and implementation within and across countries. Agreements are required on management arrangements covering the respective roles in, and contributions to, the programmes. Experience in integrating them into national planning schemes, and the management issues they raise, is still at a relatively early stage. New principles, procedures and mechanisms may yet be required.

In particular, large-scale programmes often involve the production of vast amounts of data, which then have to be

processed, disseminated, stored, utilised and interpreted if these programmes are actually to reach their objectives. Further progress has to be made on the planning, organisation and management of such tasks. The time-scale and quantity of data involved require that research funding be considered many years into the future.

The international mobility of scientists is a vital element in generating, planning and implementing major facility projects as well as large-scale programmes. Governments have an important role to play in creating an environment, not least the financial and administrative conditions, that can facilitate such mobility.

## National and International Interdependence

Apart from the necessity of more, and better, co-operation, the internationalisation of science and technology has a further consequence: international issues can no longer be regarded as an appendix to national policies. How much meaning can the term 'national policies' retain, now that any policies with direct or indirect impact on national 'systems of innovation' must

National research systems must now adjust to the internationalisation trend but also to several other new developments: the stronger, more visible and more rapid contribution expected from science in a wide spectrum of concerns, such as economic prosperity, health, the environment, and so on; the increased tension caused by the broadening missions assigned to research institutions, the limitation of the resources available and the increasing cost of scientific research. These developments raise a number of issues concerning the respective roles, relations and organisation of all institutions within the research system.

One such issue is the availability of the human resources required to maintain and renew the research base. The expanding demand for higher education will generate a substantial increase in the recruitment necessary in this sector within the next 10 to 20 years. Demand for scientists and engineers from industry and the government sector is also generally expected to increase substantially. Furthermore, in addition to training for research careers, some countries

## RESEARCH SYSTEMS

consider that training through research should more broadly become an integral part of higher education.

For these reasons, the qualitative as well as quantitative development of post-graduate education and post-doctoral training are receiving increasing policy attention. In a number of countries, this includes efforts to promote the international mobility of post-graduate students and young scientists, as, for instance, with the recent Programme on Human Capital and Mobility adopted by the European Communities.

Aspects of human resources are, of course, not limited to the research base but also extend to engineering and management. Engineers require periodic retraining to keep in touch with new developments, and managers have to be familiar with research strategies and to be convinced of the importance of holding the 'technological edge'. But the development of appropriate human resources for the research base also depends more broadly

on the general education system. The quality of mathematics and science education in secondary education is an important factor in both the supply and quality of future graduate and post-graduate students in science and technology. It strongly influences their ability to pursue such studies as well as the image of science and technology in youth and society.

The kinds of adjustment required of research systems have led to increased policy interest in the development of research networks, both national and international. Their main common feature is the emphasis on the co-ordination and collaboration between groups in existing institutions (rather than the creation of new institutions), with a view to ensuring the more effective and flexible functioning of research systems. Research networks are often designed to reach a critical mass of human, equipment and financial resources in some areas, to bring together complementary skills and abilities (especially in multidisciplinary research) and to facilitate the circulation and diffusion of scientific information and data, to, for instance, potential users.

take full stock of the international context by which they are influenced, and which they themselves influence?

Innovation is intrinsically an interactive process. Technology and technical progress result from the efficient operation of a complex system involving elements from the private and public sectors. Some of them – research centres, universities, the education system, and so on – (box, p. 22) belong to the non-market sectors of society. Others, such as private enterprises, are at the very heart of the market system. The enterprise is the main agent in this system but its intrinsic economic and technological efficiency is also a function of the institutional (and thus non-economic) characteristics of the wider, national system of innovation within which it operates.

The creative capacity of such a system depends on the number and quality of its composite elements as well as on the nature and quality of their relationships with one another: client and/or supplier enterprises, markets, public authorities, financial and banking institutions, education and training institutions (technical and university), industrial and university research centres, infrastructures, and so on. This is why national systems of innovation are, now increasingly considered as a set of interconnected networks. The vitality of the composite element that plays a central role in maintaining and/or developing any of these networks governs the vitality of the innovation system as a whole.

It is from this perspective in particular that efforts should be made to strengthen the ability of small and medium-sized enterprises (SMEs) to gain access to technology and to use and to absorb it effectively. Because of their limited resources, these enterprises frequently lack the internal research capabilities to monitor and integrate technological advance in their products and production processes. Consequently, more than other firms, they depend a good deal upon efficient networks based upon partnerships (with large firms, suppliers, distributors, and so on), on expertise (consultancy services, government laboratories, contract research organisations, higher education institutions and the like) and on the support of national, regional and local authorities. Furthermore, measures to im-

prove the innovation capacity of SMEs should take into account their difficulty in gaining access to the market.

The interactive nature of the innovation process also has important implications for understanding the international dimension of technological progress. Technology cannot be approached as a traditional economic good to be tracked by conventional statistics and tabulated in trade balances. Innovation is a complex process that runs simultaneously through research and development and the production and marketing of goods and services with high value-added components. It is the result of a dynamic process of comparative advantage, where the range of public and private institutions generates a distinctive pattern of national economic performance.

Such a pattern may be based on significant differences in national innovation systems (how, for example, the financial system handles short- and long-term transactions) and the resulting *de facto* differences in national policies on technology generation, acquisition, diffusion and exploitation. These asymmetries are increasingly recognised as a potentially critical factor in the varying ability of national economies to exploit new technologies in the international market place.

Governments are increasingly aware of the global nature of technology development and exploitation, and, in particular, the impact that their national policies can have in the creation and/or maintenance of comparative advantage. In particular, national support policies for the development of new technologies are a subject of increasing international concern because they are viewed by some countries as altering the terms of international competition, even though the measures themselves are primarily domestic in orientation, and, in the case of the member states of the European Communities, they are already subject to Community regulations.

□ □

The issues arising from the international implications of the differences in national systems are also linked to traditional trade, competition and investment policies. They are therefore currently under debate in those bodies dealing with the

Cosaldieri/Elf Aquitaine



Exploratory drilling in Antarctica.

operation of the international trading system. But the emphasis now placed on the capacity of firms to develop new processes and products based on new technologies is increasingly bringing science and technology policy-makers into the debate both nationally and collectively. ■

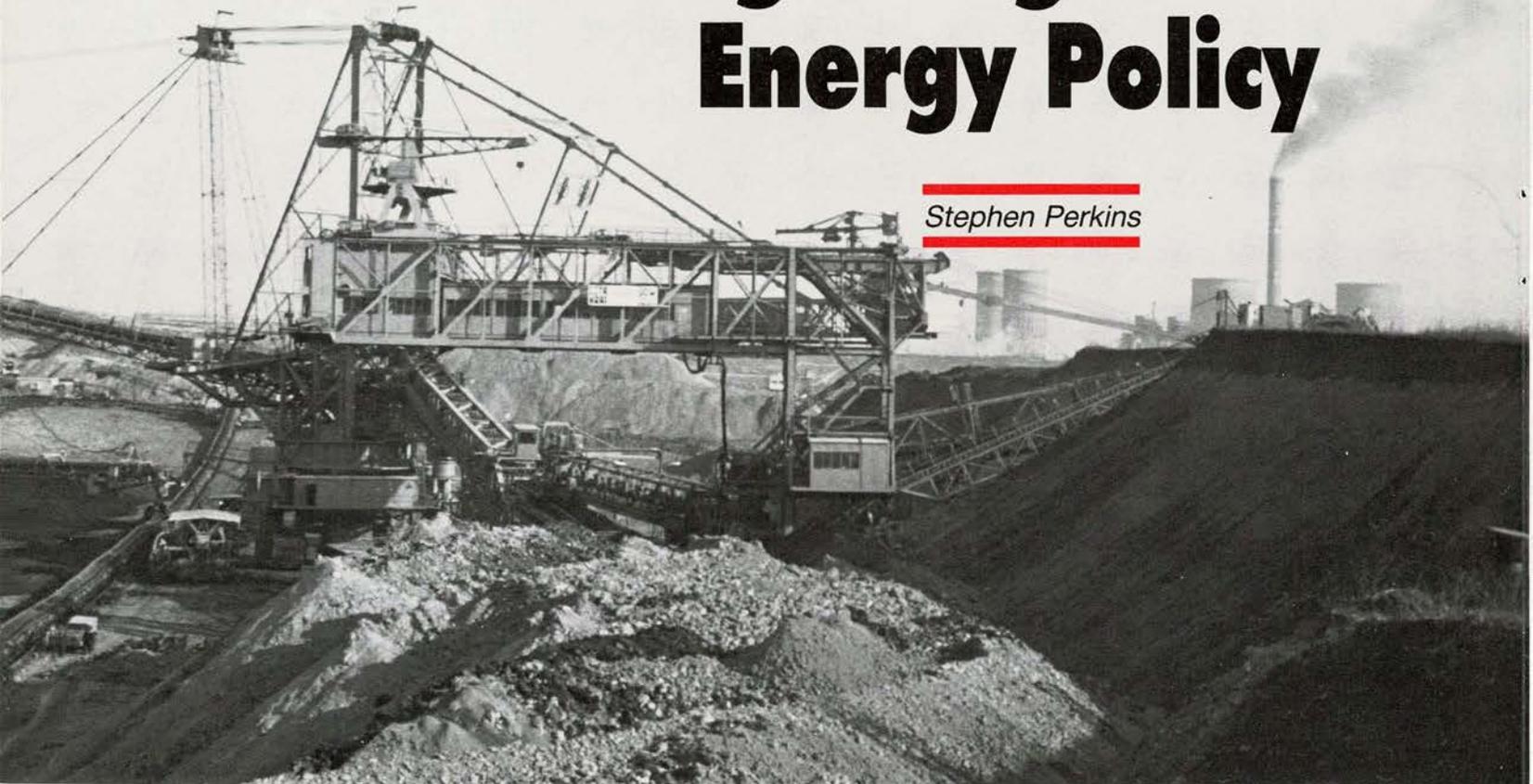


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# Reforming Hungarian Energy Policy

Stephen Perkins



*Liberalisation of prices, privatisation, opening-up to world markets – the reform of Hungary's energy sector reflects the trends of general economic reform.<sup>1</sup>*

**H**ungary's energy-sector industries are changing fast. Last year saw the reorganisation of one of the biggest industrial groups in central and eastern Europe, the former Hungarian Oil and Gas Trust. It also witnessed the privatisation of a coal mine (the first in eastern Europe), and the reconstitution of the national electricity board (MVMT) as an assembly of individual corporations. Economic conditions are also changing rapidly, and the liberalisation of most energy prices is to be completed by mid-1992.

Domestic energy production in Hungary – oil, gas, nuclear power, very low calorific coal and lignite – represented 52% of primary energy requirements in 1990 and is declining. Hungary thus depends on imports for approximately half of its supplies (Figure 1) – a sharp rise since 1973 when that figure was only 38% (Table). In addition, Hungarian production of nuclear power is dependent on foreign enrichment and processing facilities, currently in the former USSR, although uranium ore sufficient for

domestic requirements is mined within the country. Primary energy consumption, which had been increasing, fell sharply in 1989 and 1990, with a further decline in 1991, the result of the acceleration in economic transition and associated losses of markets in former CMEA countries and the consequent fall in economic output. In the long term energy consumption will probably increase again – so in all likelihood import dependence will grow.

Inefficient production and use of energy, generally low added value in economic output and a high share of energy-intensive industries mean that energy intensity (energy consumption per unit of GDP) is substantially higher in Hungary than in OECD countries (Figure 2). Market forces are likely to increase energy-efficiency in the future, particularly in the industrial sector. Such improvements could be encouraged through government measures, such as advisory and training services – although

there are currently no such initiatives. The economic restructuring and accelerated replacement of outdated production technologies that are required if companies want to compete successfully on world markets will contribute to a more efficient allocation of all production factors, including energy.

On the basis of energy consumption per capita, Hungarian energy intensity is similar to the average in European OECD countries. But industry accounts for a larger part of demand in Hungary than in European OECD countries. A decline in industrial demand is expected to be offset in the future by growth in residential and service-sector demand and particularly by growth in demand for oil from the transport sector. As well as increasing freight and commercial traffic, success in economic reform is likely to result in an increase in personal mobility as incomes rise. Electricity demand, too, is expected to grow, both in

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1. *Energy Policies – Hungary: 1991 Survey*, IEA/OECD Publications, Paris, 1992 (to be published also in Hungarian).

the industrial and household sectors, and probably more swiftly than forecast by the government, particularly beyond 2000.

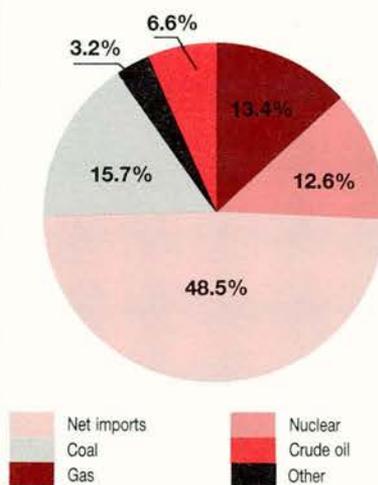
Hungary is landlocked, with a small internal market. It borders Austria, the Czech and Slovak Federal Republic (CSFR), the former USSR, Romania and what was Yugoslavia. Hungary's principal supplier of hydrocarbons and electricity, mainly because of former alliances, is the ex-Soviet Union. That combination – of large imports from a single supplier and Hungary's landlocked situation – creates special difficulties. The only sea-link of substantial capacity for fuel imports is the Adria pipeline, which runs through the former Yugoslavia and on to the CSFR from the Adriatic terminal at Krk Island. Virtually unused before 1990, the pipeline was operated at around 70% capacity between mid-1990 and mid-1991 to compensate for a sharp drop in the supply of oil from the former USSR, but it was closed in September 1991 as a result of the war in Yugoslavia.

In view of economic and political uncertainties in the former USSR and Yugoslavia, a considerable amount of uncertainty attends imported energy supplies, both on the operation of the Adria pipeline and the future availability of gas, oil and electricity from what was the USSR.

Much attention is being given to developing infrastructural links with or through OECD member countries. The government is examining the possibility of connecting the Hungarian electricity grid with the system of the Union for the Co-ordination of Production and Transmission of Electricity (UCPTE, an organisation of west European electricity companies). It is also pursuing, as a matter of priority, investment in a trunk gas pipeline linkage from Győr in western Hungary to Austria or the CSFR to provide some flexibility in imports. Providing access through such links to supplies of electricity, natural gas and oil will inevitably take time and require a large amount of investment, and the economics of such projects are as yet highly uncertain. In the interim, domestic coal production is of strategic value and developing hydrocarbon storage facilities will be important in improving supply security.

The Hungarian government began working on a new energy policy in 1989. Although this has been an extremely difficult

Figure 1  
**ENERGY IMPORTS  
AND INDIGENOUS PRIMARY  
ENERGY SUPPLY BY FUEL, 1990**



Source: Hungarian State Energy and Energy Safety Authority (AEEF) and OECD

task, the main policy objectives, as stated in government policy papers, are clear:

- eliminating one-sided energy import dependence and realising opportunities to diversify imports
- improving energy efficiency, partly through encouraging conservation, and partly through influencing the restructuring of industrial production

- establishing market conditions in energy supply, and developing liberalised prices that reflect international values
- giving priority to low capital-cost solutions and economic means of supply, and to the creation of a flexible energy system that is responsive to demand
- protecting the environment from damage by energy-related projects
- involving the public in decisions connected with the development of energy systems that have an impact on society as a whole
- developing new organisational and control systems appropriate to a market economy and curtailing monopoly powers
- limiting state intervention to the minimum deemed justifiable.

## Restructuring the Energy Sector

In keeping with the government's goal of breaking up highly concentrated economic structures, there are plans for the restructuring of all the major energy enterprises. The national electricity board has been reconstituted, with separate production and distribution companies operating as affiliates to a central 'concern' which owns the affiliates together with the electricity grid and controls the dispatch of power stations. The concern will buy from the generating companies and sell to the distributors, and a new internal pricing system is being developed to regulate the fi-

Table  
**TOTAL PRIMARY ENERGY SUPPLY, 1973–90**  
Mtoe

	1973	1975	1980	1985	1989	1990
Indigenous production	14.6	14.3	15.1	16.9	16.7	14.6
Coal	8.0	7.3	6.9	6.3	5.3	4.5
Crude oil	2.0	2.0	2.0	2.0	1.9	1.9
Natural gas	4.0	4.3	5.1	5.8	4.7	3.8
Nuclear	n.a.	n.a.	n.a.	1.7	3.6	3.6
Other (including NGLs <sup>1</sup> )	0.6	0.6	1.1	1.2	1.1	0.9
Imports	9.6	11.7	15.4	15.3	16.2	15.5
Exports	0.7	0.6	1.3	1.8	2.2	1.7
Stocks	0.0	-0.4	-0.4	-0.4	-0.3	-0.1
Total	23.5	24.9	28.7	30.1	30.4	28.3

n.a. = not available  
1. Natural gas liquids.  
Source: AEEF

Locally produced coal, despite its extremely low quality, continues to be of strategic importance for the generation of electricity.



Serge Attali/REA

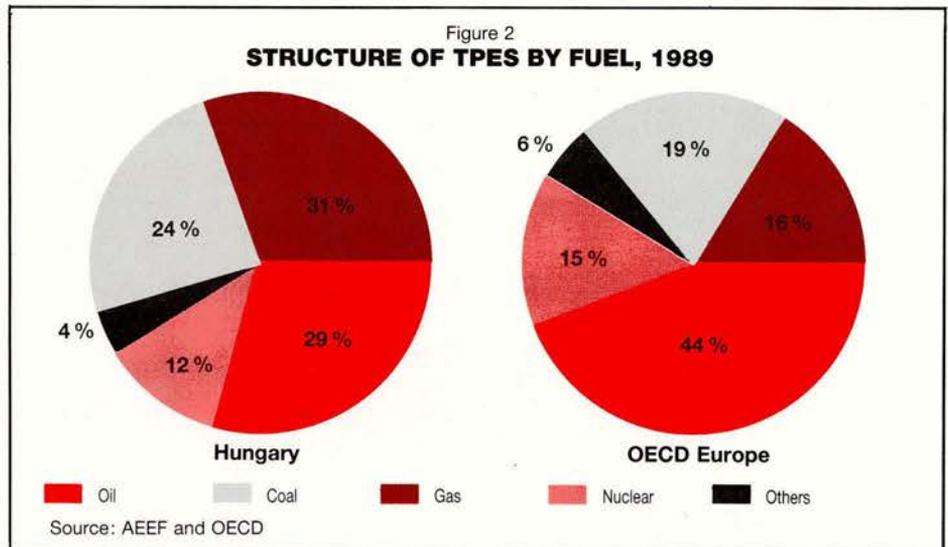
financial flows within the industry. It is to be hoped that this will ensure that prices reflect economic costs and avoid cross-subsidisation. A regulatory body will also be required to oversee operation of the industry.

Although much Hungarian generating capacity is based on the combustion of poor-quality coal, MVMT operates a major nuclear power station at Paks on the Danube which has good safety characteristics and a performance record as good as the best stations in western Europe.<sup>2</sup> Much of the original Soviet design and many imported components were replaced by local products produced to higher standards. MVMT has been able to finance a rolling plan of investment, upgrading power stations and distribution infrastructure. It currently plans to install a number of gas turbines to generate combined heat

and power at existing district heating stations to enhance its generating capacity, and has identified substantial potential for investment in load-management measures to offset growth in electricity consumption.

The restructuring of the Hungarian Oil and Gas Trust in 1991 meant that 12 of the Trust's 22 affiliates, including the six regional gas distributors, were separated into independent companies. The remaining oil and gas production and transport units, together with oil refineries and product trading divisions, were established as a vertically integrated joint-stock company and renamed the Hungarian Oil and Gas Company (MOL). MOL operates one of the most sophisticated refineries in eastern Europe at Százhalombatta. It has a high utilisation rate (94%), and recent investments continue to upgrade its capacity to produce lighter products – unleaded petroleum in particular – to meet the changing demands of the Hungarian market.

Foreign oil companies are active in Hungary, particularly in distribution. Yet duties on imported products have prevented much penetration of the market by foreign refiners. New legislation on participation and investment in the oil industry, ensuring competitive access for new participants in refining, transportation, storage and marketing, is required and some further restructuring of MOL may be necessary if competition, which would promote the



Hungary's landlocked position forces it to import the bulk of its oil through pipelines.

Hungarian Embassy, Paris



economic efficiency of the industry, is to be encouraged.

Reorganisation of the coal mines is being accompanied by bankruptcy procedures for some mining companies, all but one of which continue to be state-owned. Deep-mining conditions in Hungary are difficult. All coals have low calorific value and high sulphur content. Local damage to the environment from coal production and combustion has been severe. Production is expensive, and supply and quality are deteriorating. On the other hand, coal is an important national energy resource and is an important source of local employment. The situation of the industry has been distorted by poor technical decisions in the past and a regime of low fixed prices. It is clear that a substantial contraction of the domestic industry is inevitable, and it is essential that this contraction be managed in an orderly – and economically optimal – fashion, preserving such parts of the industry as are economic and taking into account the social costs.

### What Role for the State?

No single model can be prescribed for the role that the state should adopt in the energy sector, and even in IEA member countries the nature and extent of government involvement varies widely. During the transitional period in particular, a pragmatic approach is to be expected.

Some government intervention to manage the transition in the mining industry

2. See Jacques de la Ferté, 'A New Role for Nuclear Energy?', *The OECD Observer*, No. 170, June/July 1991.

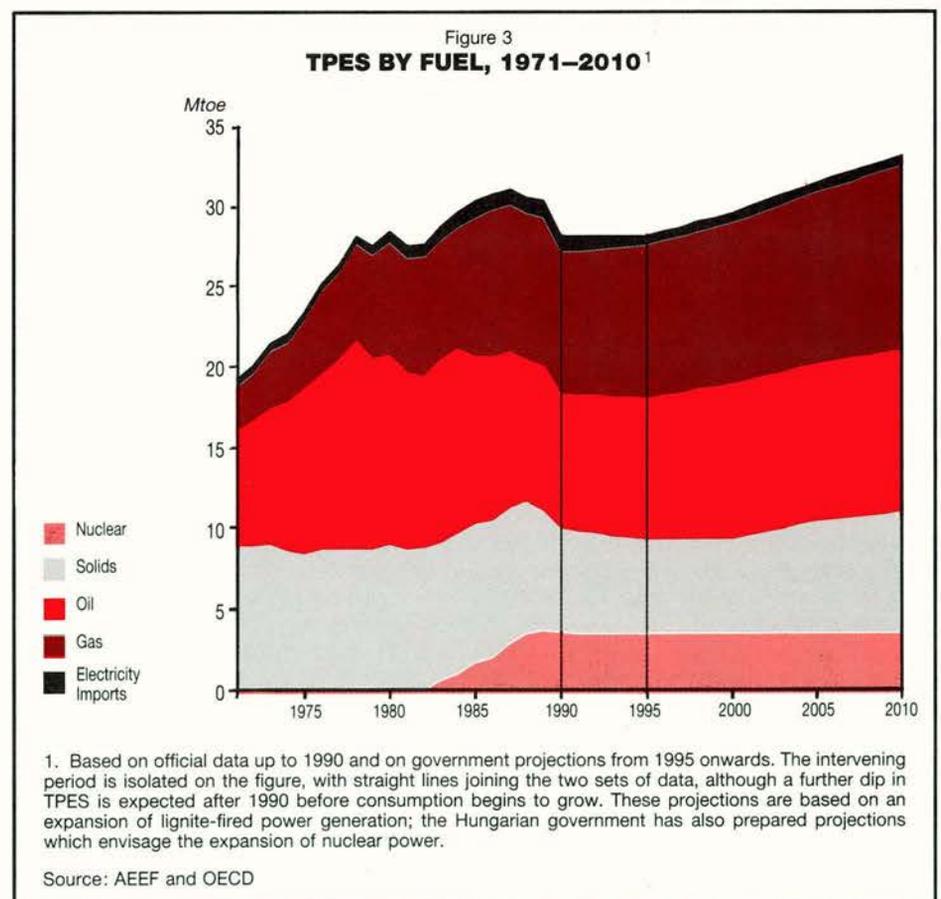
appears inevitable. One possibility would be to determine medium-term contracts between MVM and the coal industry, with contracted volumes declining until the industry reaches a viable size. Coal companies are faced with a monopsonistic

purchaser of power-station coal, so that market forces will not lead to an optimal solution. There are at least three possible solutions: transferring the mines into the electricity supply industry, in which case decisions about them are theoretically optimal, but in practice are made by an industry with a primary focus elsewhere; managing the purchasing monopoly through price and quantity agreements; or moving control of coal-fired power stations to the regional mining companies so that competition can be exercised in the supply of electricity to the high voltage grid.

In November 1991, the Dorog coal mine became the first industry in the energy sector to be privatised. Service companies in energy enterprises are likely to be other early candidates.

Government policy on privatisation allows for four categories of enterprise:

Figure 3  
TPES BY FUEL, 1971–2010<sup>1</sup>





Serge Aital/REA

The power station at Paks has good safety characteristics.

- some entities will remain entirely in state ownership
- most government-owned enterprises are to be privatised without limitation
- in a small number of cases, where enterprises are judged to be of some strategic importance, a minimum 51% share is to be retained exclusively for Hungarian nationals; examples include vehicle manufacturing and the national airline, Malev
- for industries of central strategic importance – including the electricity supply industry, oil production, trading and refining, and natural gas production, import and transmission, though not regional gas distribution or coal mining – a minimum 51% share will be reserved for central government ownership.

Local government, moreover, is expected to play an increasingly important role in the ownership of energy-sector industries. Ownership of district heating companies is to be transferred to municipal governments. The Budapest gas distribution company is owned by the city government, and municipalities are likely to re-assume some role in the ownership of other regional gas distribution companies. Local

authorities may also play a role in the ownership of electricity distribution systems. The authority, structure and responsibilities of local government in general are undergoing systematic transformation, and though much progress has been made in defining the responsibilities of municipal and regional government authorities, legislation to provide further clarification is urgently required.

One of the main principles of Hungarian energy policy is the development of liberalised prices that reflect international values. The government has therefore made very large increases in energy prices since 1989, particularly for household consumers, for whom prices of coal, district heating and electricity (in Budapest) were less than one-third of estimated economic costs in 1989. It removed formal control over petroleum product prices – except for liquid petroleum gas (LPG) – in January last year. And it has, in addition, made a commitment to the World Bank to remove controls on other energy prices, in two stages. By 1992 coal, firewood and LPG prices should have been liberalised. The government has agreed to eliminate all house-

hold energy subsidies from the state budget by mid-1992, to transfer authority for setting district heating prices to local governments and to implement agreed new tariff structures for electricity and natural gas.

Where central government is to continue administering energy prices – for electricity and natural gas – they are to reflect costs fully. The same ought to be true for district heating prices, which are administered by local government.

□ □

Thus, questions of tax aside and assuming that liberalised prices for energy carriers will be set by suppliers to cover their costs – and if local governments do not subsidise district heating prices, all energy prices should mirror economic costs by mid-1992. This will require further large increases in prices, especially to households for electricity, district heating and gas, before that date. It also implies the elimination of subsidies for gas supplied to the fertiliser industry.

These actions provide the basis for economically efficient energy markets, yield prices that give correct incentives for energy conservation – which in turn will have beneficial environmental effects – and reduce demand on government resources. It follows that any financial assistance judged necessary to compensate specific groups of consumers for price rises should be provided in the form of direct income support, not through price management of any kind. ■



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# Private Pay for Public Work?

**Pressure for improved performance in the public sector is changing the systems governments use to pay their employees. Across a range of OECD countries, traditional salary systems based on hierarchy and length of service are being replaced or supplemented by schemes that link the pay of public-sector managers to their performance.<sup>1</sup>**

*Maria Maguire and Robert Wood*

**T**he adoption of performance-related pay (PRP) schemes in the public sector reflects the private-sector culture of incentives and individual accountability championed by the rationalist economic policies of the 1980s, thus attracting considerable political support. Yet not many of them have been in operation long enough for proper assessments of their impact. And those that have been running longer have not produced enough data to allow a judgement on whether their costs are justified, either by gains in performance or by savings.

But, despite mixed success, it seems likely that the principle of linking pay to performance will remain an important issue for the foreseeable future, in part since, as surveys in Australia and the United States<sup>2</sup> have found, managers continue to support the principle of PRP even when they are unhappy with existing schemes.

## Rhetoric v. Reality

The logic of PRP is based on the simple and compelling argument that individuals who believe their pay to be directly related to their performance will work harder and achieve more than others. But rhetoric and reality are separated by practical problems affecting implementation.

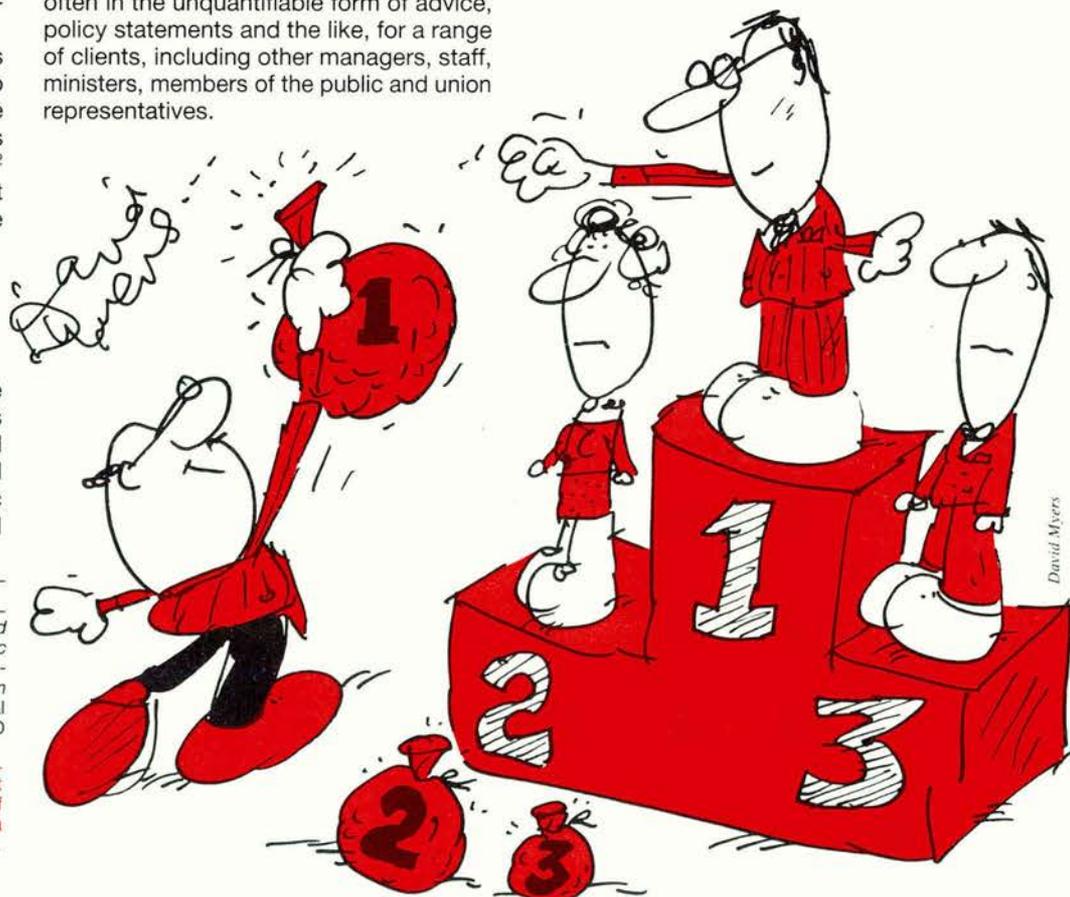
1. A publication on this subject is in preparation.

2. Robert Wood, *Performance Pay and Related Compensation Practices in Australian State Public Sector Organisations*; Patricia W. Ingraham, *A Summary of the Experience with Pay for Performance in the United States*, Public Management Occasional Papers, both available free of charge from the OECD Public Management Service.

Maria Maguire works in the OECD Public Management Service. Robert Wood is Head of the Department of Management, University of Western Australia, and a consultant to the OECD Public Management Service.

Foremost among these is the difficulty of defining good performance and measuring the marginal product of an individual manager. The value created by an individual manager's efforts is often inseparable from that created by others, or which is attributable to external factors, such as changes in budgets, political decisions or industrial relations. And the nature of managerial work in the public sector adds to the measurement problem. Much of the manager's time is spent on service activities, often in the unquantifiable form of advice, policy statements and the like, for a range of clients, including other managers, staff, ministers, members of the public and union representatives.

In the absence of a market for these and similar services, performance measurement for most such jobs must depend on subjective appraisals by hierarchical superiors, against criteria that may not be clearly linked to organisational performance. Survey evidence from a number of schemes shows that the resulting ambiguities often undermine the incentive value of PRP by reducing the perceived links between performance and pay. ▶



Additional difficulties arise in decisions on allocating pay. Unlike many private-sector PRP schemes, public-sector ones rarely take the form of pure incentive systems in which individual rewards are determined solely by individual performance against agreed standards. Limited budgets and, in some cases, quotas on the number of recipients for performance awards mean that public-sector managers are often forced to compete with their peers for merit increments<sup>3</sup> and bonuses, based on an annual rating of performance.

The question of how PRP schemes fit with the strategies and cultures of different public-sector agencies is an important one. The acceptance of the principle of performance-based pay may in itself be an indicator of a shift toward a performance culture. Yet it remains to be seen what other aspects of organisational behaviour will be affected by PRP. For example, most schemes appear to emphasise individual accountability over team performance, and measures of organisational output are rarely used to determine individual pay.

## Approaches to Performance-Related Pay

Variations in the design of PRP schemes in OECD countries reflect a trade-off between the standardisation of centrally imposed schemes and less standardised, decentralised ones. Longer-established schemes in Canada, the United Kingdom and the United States have adopted more standardised approaches across the whole of central government, whereas more recently implemented ones in countries such as Australia, New Zealand and Sweden allow departments and agencies more latitude. No data are yet available on the relative effectiveness of the two approaches, although revisions to some of the longer-

3. Merit increments are performance-related payments which are added to and become a permanent part of the basic salary of the recipient. The most common form of merit scheme is a pay range for a given position or grade with a defined minimum and maximum, which are adjusted periodically to take account of inflation, but no intermediate incremental steps. Progression through the pay range is linked to performance rather than seniority, with the best performers progressing most rapidly through the range.

established schemes have shown a more decentralised approach – which suggests that there are advantages in flexibility.

The most common approach to appraising the performance of a manager in the public sector is an annual cycle that starts with the establishment of job objectives, is followed by reviews of performance, and culminates in the rating of performance against objectives by a more senior manager. This rating then becomes a factor in

the decision on allocating PRP. The final approval of PRP awards is usually the prerogative of the head of department, who must operate within defined constraints, such as quotas and budgets. In some schemes, nonetheless, such as those in Denmark and the Netherlands, for example, no formal appraisal is required, and departmental heads are free to determine how to allocate PRP awards, as well as their distribution.

### PERFORMANCE-RELATED PAY SCHEMES IN OECD COUNTRIES

#### **Australia**

Performance bonuses for Senior Executive Service in the commonwealth public service (to be implemented this year). Some statutory authorities and government business enterprises, as well as one state government (Victoria) have PRP schemes.

#### **Canada**

PRP for senior staff first introduced in 1964. Current PRP plan for the Management Category includes merit salary range and performance bonuses. Similar pay plans cover senior staff in other occupational groups in central government agencies. Performance bonuses for Deputy Ministers (heads of departments). Some crown corporations and provincial governments have PRP schemes for managers.

#### **Denmark**

Two PRP schemes introduced in 1989, one for all public servants, the other for senior managers. Both schemes include merit increments, temporary salary increases and lump-sum bonuses.

#### **Finland**

Experimental PRP schemes in selected agencies in central and local government.

#### **France**

System of performance bonuses for civil servants in operation since 1946.

#### **Germany**

Performance bonus scheme introduced in the Post Office in 1989.

#### **Ireland**

Merit pay range for Assistant Secretaries in central administration introduced in 1990. Schemes have also been introduced for managers in some non-commercial state bodies and for chief executives of all commercial state bodies.

#### **Italy**

Experimental productivity bonus schemes in some parts of the central administration.

#### **Japan**

Performance-related allowance (lump-sum bonus) for national public employees, excluding the most senior levels, since the 1950s.

#### **Netherlands**

PRP schemes (merit increments, temporary salary increases, lump-sum bonuses and token rewards for special achievements) introduced for all central government employees in 1989.

#### **New Zealand**

PRP introduced for staff at virtually all levels in most central government departments since 1988.

#### **Spain**

Productivity bonuses introduced for all civil servants after reform of the public-service pay system in 1984.

#### **Sweden**

Flexible pay system, including performance-related element, introduced for senior public servants in departments and agencies of central administration in 1985. Public servants at all levels may be covered by bonus systems under local collective agreements.

#### **United Kingdom**

PRP schemes introduced for staff at virtually all levels of the civil service since 1987. Scheme covering senior civil servants consists of merit range and lump-sum bonuses. Schemes also operate in government business enterprises, local government agencies and the National Health Service.

#### **United States**

PRP schemes for Senior Executive Service (lump-sum bonuses) and middle management levels (merit increments and lump-sum bonuses) introduced following the 1978 Civil Service Reform Act. A 1990 pay reform provides for extension of PRP to most grades. PRP schemes operate in many state and city administrations.

Performance awards commonly consist either of lump-sum bonuses that have to be re-earned each year or of a combination of bonuses and merit increments added to basic pay (box). The wider use of bonus schemes reflects the flexibility they offer in adjusting pay when an individual's performance falls and in varying the number of awards and the PRP budget from year to year. Their adoption also reflects a reaction to problems that affect merit schemes in times of high inflation. As a result of inflation, annual general salary increases in the second half of the 1980s either equalled or exceeded the merit increments paid to the vast majority of managers.

The size of merit increments and bonuses varies widely in the OECD area. Merit increments vary from 3 to 20% of basic salary; and for bonuses upper limits of 20% of basic salary, or more, are not uncommon for senior managers. And because bonuses are usually calculated as a percentage of basic salary, their value is higher for senior managers than for their more junior colleagues. In some countries (Canada and the United States are two examples) the percentage of basic salary paid as bonuses is higher for managers in more senior positions. Since bonuses and merit increments are taxable at the marginal rate, they are of course worth considerably less as take-home pay than before-tax.

The extent of discretion allowed in decisions on pay allocation varies from country to country as a function of three major constraints:

- the specification of awards and their links with annual performance ratings
- the size and flexibility of the budget allocated for PRP
- quotas or imposed distributions in the allocation of awards.

Several PRP schemes include guidelines or requirements for the size of awards payable for each performance rating, supplemented in some schemes by limits on the number of staff who may receive different grades of award. Such quotas ensure that, within the available budget, there is some variety in the awards paid to different managers, yet they are often the focus of criticism on the grounds that they create arbitrary distinctions between staff,

thus weakening the perceived relationship between performance and pay. They also limit the discretion available to departments and agencies in operating PRP systems. But highly standardised relationships between performance ratings and pay awards may also run into problems: if staff know that their performance ratings will directly determine their pay, it may generate intense pressure on supervisors to lower standards and give higher performance ratings.

The highly competitive nature of PRP awards is partially due to the relatively small budgets allocated to them. In the schemes currently operational in the OECD area, these range from 0.3 to 11% of the payroll for eligible staff, but in most cases they are below 5%. Some allow centrally allocated budgets to be supplemented with funds from salary savings and the budgets of other departments. And most schemes allow the payment of awards to less than 50% of the eligible staff and payment of the maximum awards to only a small minority. Because of this under-funding, relative to the size of the maximum awards payable, a majority of staff feel they obtain little benefit.

### Problems and Benefits

Inflation of performance ratings, with distributions highly skewed towards the top of the rating scale, is a common problem, reflecting a difficulty inherent in basing PRP on subjective performance appraisals. Managers, as appraisers, appear unable or unwilling to differentiate between one another's performance except in the broadest terms. Yet it does not follow that there is no discrimination in the allocation of PRP awards. Supplementary information, including the knowledge that a manager tends to rate his staff leniently, may be used by hierarchic superiors to allocate awards between staff who receive similar ratings. But the move away from a direct link between appraisal ratings and awards tends to undermine the perceived relationship between performance and pay, leading to a belief that the allocation of pay is arbitrary or biased.

Where quotas or forced distributions of performance ratings have been introduced,

they too have weakened the perceived link between pay and performance. Schemes with neither quotas nor a defined structure of awards potentially allow a much larger proportion of staff to share in the performance awards, but individual awards often become so small as to have no real incentive value.

The most commonly reported benefit of PRP is that it leads to a sharper definition of the job goals of individual managers and strengthens their link to departmental goals, as well as focusing attention on the development of performance indicators for individual jobs. A few schemes, moreover, report reductions in the turnover of high-performing staff. By contrast, the available data suggest that PRP adds to both the wage bill and administrative costs of compensation. So more rigorous cost-benefit analysis is clearly required.

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There is a range of difficulties that must be dealt with if PRP is to be more effective in the public sector. Redesigning the schemes may help achieve some of the solutions. Yet the development of appropriate performance criteria, the measurement of individual outputs and the assessment of individual contributions to organisational performance remain central problems. Governments may also have to commit more funds so that more managers can be paid larger performance-based bonuses each year – their salaries are already 20–50% lower than those of their counterparts in the private sector. It is arguable that not until a significant number of them feel they have a chance of competing successfully, in fair conditions, for substantial awards, will performance-related pay schemes have the effects that are hoped for. ■



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# Technological Change in Korean Electronics

**E**lectronics is seen as the proof of a vision that has South Korea as the precursor of a succession of newly industrialising economies (NIEs) changing the face of the world industrial structure, soon to be followed by the countries of central and eastern Europe. On the surface, this impression appears to be correct. Korean companies have moved to the leading edge of the industry in a relatively short period of time and are dominant suppliers of a range of products.

A major re-evaluation of this picture seems to be necessary. For this success is to some extent illusory, and it will be some time before Korean electronics companies are able to take a leading role in the development of the industry and to control their own destinies.

The appearances of success are not hard to find. By any measure, the Korean electronics industry has made enormous strides during the past twenty years, becoming the world's third-largest producer of consumer electronics products, as well as of components and parts. Korean companies started exporting microwave ovens in 1980; only seven years later they had become the largest producers. Full-scale

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Martin Bloom

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***It has become fashionable to refer to South Korea as 'the new Japan' and to see South Korean companies in a wide range of industries moving to the forefront of international competition. How far is this true? <sup>1</sup>***

exports of video cassette recorders (VCRs) started only in 1985; within a few years Korean producers had 20% of the world market.

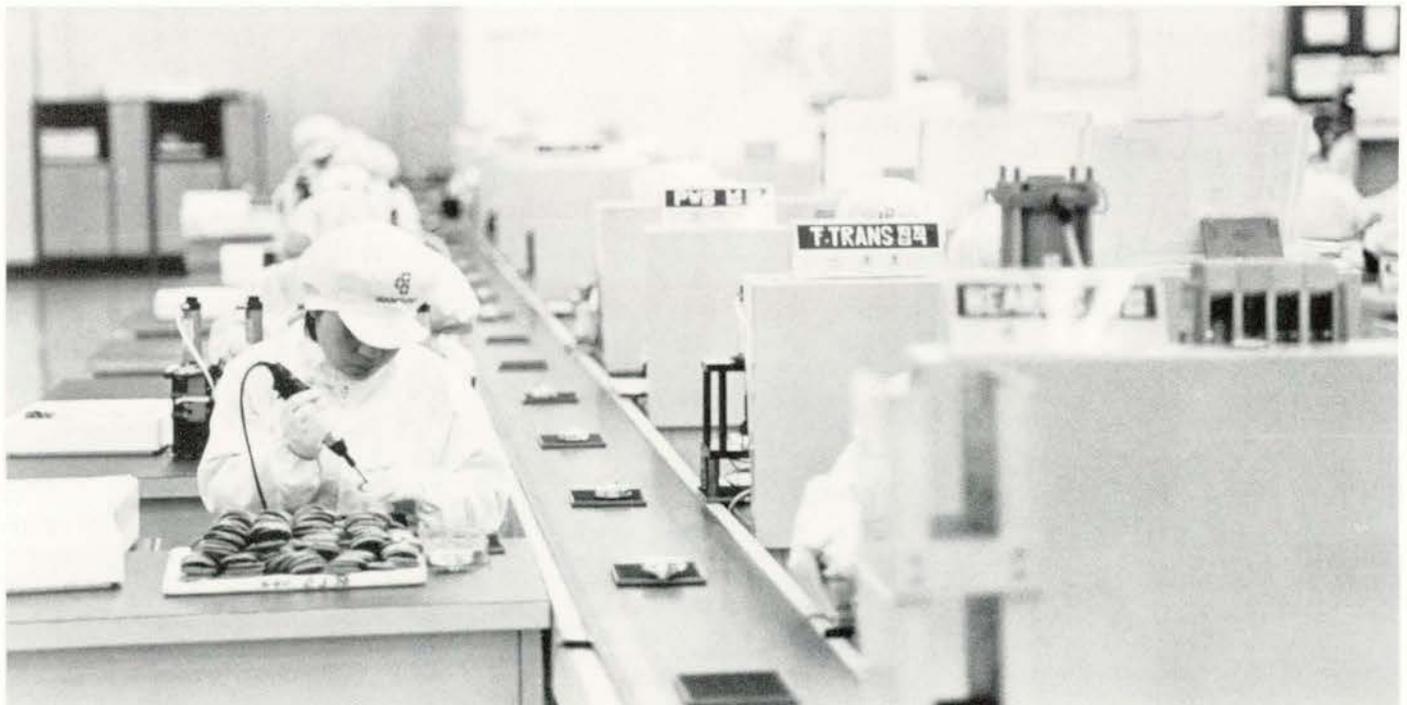
Korean companies have likewise grown to world stature. The two largest companies in the industry – Samsung and Goldstar – are highly internationalised and

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have recently started to establish overseas assembly operations and joint ventures, as well as overseas research facilities, and to acquire overseas companies. The changes have been dramatic. In 1977, the Samsung Group was the 197th largest industrial company outside the United States in the ranking in *Fortune* magazine; ten years later it was 20th. It is now the 14th largest industrial company in the world.

## The Beginnings of the System

These dramatic changes disguise a complex situation. The success of the Korean electronics industry is largely a by-product of the role it came to play in the international expansion of the Japanese industry during the past two decades and the counter-strategies of US companies in their own competition with the Japanese. Korean electronics producers are thus dependent on foreign components and original equipment manufacture (OEM) or other sub-contracting deals to a degree that ties them into a system over which hitherto they have had little control. They are inter-



Philippot/Sygma

nationalised – but in ways that deny them many of the major benefits.

The origins of this system go back to the early 1960s, when the government introduced an industrial strategy which gave priority to export industries financed by large-scale foreign borrowing. Foreign machinery, raw materials and components were essential here. It was a system that became self-sustaining. The most successful exporters had priority access to loans at subsidised interest rates and received the government permits necessary to undertake a range of commercial activities, including permission to license foreign technology. In the late 1960s, these measures were linked to control over market entry into some export sectors, leading to an inevitable concentration of economic power into a few business groups or 'chaebol'.

Samsung and Lucky-Goldstar group companies were major beneficiaries of these developments, initially through the preferential position that government policy gave to general trading companies and through success in other sectors (Samsung in sugar and textiles in particular, and the Lucky-Goldstar group in chemicals). That provided them with the resources to enter and dominate the electronics industry at a later stage. Their strategies in this sector were based on acquiring foreign machinery and equipment, importing the basic components and other raw materials for assembly by productive, low-cost Korean labour, especially female, and selling overseas on an OEM basis in as large a quantity as the market would bear. The Japanese or American customers to whom these goods were sold were often the same ones who had provided the components, and had organised the purchase of the machinery and equipment, training the work force of the Korean companies in its use. (Even now, over 60% of the industry's workers are female; most appear to work between the ages of 18 and 24 in order to earn a dowry.)

This was an extremely effective strategy for companies faced with a limited technology base in an industry in which technology – and thereby products – are con-



*In seven years Korea has become the world's largest producer of micro-wave ovens.*

tinually changing, and for companies with negligible brand recognition overseas and with no international marketing presence.

Nevertheless, success did not come immediately. Foreign companies had a dominant position in the Korean electronics industry throughout the late 1960s and the first half of the '70s, especially with the entry of Japanese companies in the early '70s. By 1976, over half of all employment in Korea's electronics industry was in foreign-owned or joint-venture companies, a considerable increase over the position in 1972.

Since then, the importance of foreign companies in the Korean electronics industry has progressively declined as the Korean government made efforts to promote the local industry and enable some to take control of their joint ventures with foreign firms. The share of foreign companies in Korean electronics exports fell from almost 76% in 1969 to around 55% in 1972 and to below 40% in 1980. Between 1976 and 1985, the balance shifted markedly towards domestic firms; the numbers employed in wholly owned foreign subsidiaries was reduced by a third while employment in the industry as a whole grew by almost 50%. Foreign companies are still dominant for production of electronic components and parts, though largely through joint ventures; in this strategically important sector, they control almost 60% of total production.

Samsung, Goldstar and the other major Korean companies have progressively tried to overcome their weaknesses – in component technology and product design

and development skills, and in overseas marketing and distribution. They have been effective in acquiring and absorbing foreign production technology, especially for assembly operations, together with the managerial skills necessary to operate foreign production equipment.

From the early 1970s, joint ventures provided the main source of foreign technology for Samsung and Goldstar. Licensing increased in importance as their own research activities developed and as Japanese companies left these joint ventures for various reasons. Their research activities speeded up the further absorption of technology, while those Japanese companies that withdrew from joint ventures, such as NEC, retained technical links with their former partners and continued to license their technology to them.

## Strengths and Weaknesses

From this base of production technology came a deeper involvement with product development and with the production of components. Through various routes, Samsung and Goldstar in particular have developed their production skills, acquiring and operating the latest equipment. The efficiency of their operations was initially low but has improved tremendously. They prefer high-volume production of standardised items, and are less inclined to adapt machinery to more specialised lines. This may be a reflection of their lack of sophistication in production engineering and of the skills necessary to design automated production sys-

1. Martin Bloom, **Technological Change in the Korean Electronics Industry**, Development Centre/OECD Publications, Paris, forthcoming 1992.



Charlie Cole/Picture Group/REA

Over 60% of the workforce in Korean electronics is female.

tems, but must also be the outcome of their OEM strategy. Another area of weakness is in precision engineering, where Samsung and Goldstar have nevertheless mastered the production processes required for certain major components for some of the materials technologies that are becoming important for electronics components.

One sector which shows how much progress Samsung and Goldstar have made in improving their production skills is semiconductor manufacture, where yields are the key to competitiveness. Korean companies undoubtedly found production of 'Dynamic Random Access Memory' semiconductors (DRAMs) an attractive market because these products require high-volume production with much lower design input than custom integrated circuits. Yet even here, only Samsung has succeeded independently, with Goldstar dependent on an OEM deal with Hitachi.

And there have been other successes. In the 1970s, Samsung developed its first microwave oven by 'reverse engineering', dismantling the products of competitors to discover how they were assembled. The early prototypes were not promising; they had a tendency to melt. The product

was continually improved until a working model was developed.

The ability to develop and commercialise innovative new products is still some years away. Korean companies still have enormous hurdles to overcome in managing the product development chain. To succeed, they will have to develop new product ideas and produce them competitively; they will also have to be able to create and promote a new market, with the tremendous resources that that will entail. Even Sony failed to sustain a position in the VCR market with its Betamax standard.

Korean electronics companies have been expanding their international marketing networks in recent years, but still sell well over half of their exports under the brand name of their customers, whether foreign manufacturer or retailer. This would matter less if they were not still dependent on foreign components for over 60% of their requirements, and mostly from Japan, and another quarter from foreign-owned subsidiaries or joint ventures in Korea. Imported components tend to have a high value-added, and therefore represent a high proportion of ex-factory costs for

most electronics products. This gives Korean companies smaller margins, and thereby less flexibility where there are adverse changes in the exchange rate or an above-average rise in wage rates, making their products more vulnerable to foreign competition.

Given time, Korean companies should be able to overcome their weaknesses. Unfortunately, the future may not be that kind to them. They are heavily dependent on the changes that are taking place in the international economic environment, with increased trade regulation in the products in which they have specialised.

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It is clear that a Korean-type strategy of acting as subcontractors for Japanese and Western companies is a vulnerable one: it is heavily dependent on international political and economic relationships. Companies elsewhere may prefer a different course. Those in central and eastern European countries start from a much stronger technological base, and through restrictions on the transfer of technology have been forced to learn how to copy Western products – though not the latest generation and not always to the same standard as the originals. The European market might provide the same role for them as the United States market did for Korea, and some companies might even wish to look to the Koreans for production technology. The main difficulties may arise not through problems of access to technology or to markets, but to an inability to find stable political structures that can guide industry in its re-adjustments. Faith in the free market may not be enough – a more positive selection of development strategy may be required. ■



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# Taxing Profits in a Global Economy

*John Nørregaard and Jeffrey Owens*

***Can different corporate tax regimes co-exist in a world where the globalisation of business activities has increased and where most non-tax barriers to international flows of capital, services and technology have been removed?<sup>1</sup>***

Corporate tax systems have been criticised in recent years on a number of grounds: that they can have adverse effects on domestic investment and saving; that they may distort the international allocation of capital; that they are complex; that they lack neutrality.

Yet capital markets in OECD countries are becoming increasingly integrated, as controls on international investment are removed and foreign-exchange regulations loosened. The proportion of international activities accounted for by large multinational enterprises (MNEs) has increased. As a consequence, international capital flows may have become more sensitive to variations between national tax regimes.

These differences may now be one of the few remaining barriers to improving the international allocation of capital. And with the commitment of the European Communities (whose member states now comprise half of the OECD countries) to establish a single market by 1993, the removal of potential obstacles, not least fiscal, has increased in importance.

But taxation is only one – and in many cases not the most important – determinant of decisions on investment and finance. Others include the short- and

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medium-term economic outlook in different markets and countries, the cost of capital in relation to that of other inputs, the profitability of investments, the availability of finance and government grants, and the quality of public infrastructure.

The relative importance of these determinants varies between countries and over the business cycle. Nevertheless, the taxation of profits can and often does have a substantial impact on marginal investments<sup>2</sup> and their financing, as well as on deci-

1. *Taxing Profits in a Global Economy: Domestic and International Issues*, OECD Publications, Paris, 1992.

2. 'Marginal' investments are expected to earn a rate of return on the initial outlay just sufficient to persuade investors that the project is worthwhile.

*The tax climate may be as important a factor – though a less obvious one – in attracting investment as the quality of public infrastructure.*



sions on location both inside a country and across frontiers. Other taxes, such as those on payroll and social-security contributions, may also affect costs and thus the location of investment, particularly in the short to medium term.

### MEASURING EFFECTIVE TAX RATES ON DOMESTIC INVESTMENT

The tax rates shown in the corporate tax legislation – the 'statutory rates' – are not a good guide to the tax burden on corporate profits. A better approach is to look at the effective tax rates on domestic marginal investments, those which take into account not only the statutory corporate tax rate, but also other aspects of the tax system – such as capital allowances and stock relief – which determine the amount of tax paid and thus the profitability of investment. Effective tax rates may also require a consideration of personal taxes, and the manner (if any) in which the corporate and personal tax systems are integrated. Inflation will also alter effective tax rates in various ways, depending on how the tax system calculates taxable profits in the presence of inflation.

Taxes on corporate income generally raise the pre-tax rate of return required in order to yield the same (post-tax) return as in the absence of taxes. So the company has to earn a higher rate of return in order to be able to match the return which could be achieved by buying a government bond. Taxes on personal income from the corporate sector mean that investors receive less than the gross amount paid to them. The difference between the rate of return earned by companies before corporate tax and an individual's receipts after tax is a measure of the total distortion (the total tax 'wedge') caused by taxes.

Apart from the question of whether a project which is profitable in the absence of tax is still profitable when tax is applied, there is the equally important issue of whether tax distorts the form of the investment. If tax is relatively generous to particular types of finance and assets, resources may be diverted towards them rather than the sorts of investments which would take place if the tax system were neutral. Comparisons of the required pre-tax rate of return or the tax wedge on similar investments financed in different ways (or in investments in different assets financed in the same way) give an indication of the extent to which the tax system achieves this 'allocative' efficiency.

OECD governments have a number of common national concerns about corporation tax. In spite of the very different degrees to which they rely on corporate tax as a revenue source (Figure), governments have to ensure that these revenues are efficiently and equitably collected. They have to weigh up the various advantages and disadvantages of tax neutrality towards decisions on location and investment and interventionist policies to influence investment patterns. There has recently been a shift from interventionism to neutrality, in part reflecting a growing scepticism about the ability of governments to 'pick winners' and an increased awareness that the cost of incentives in terms of revenue forgone may exceed the extra investment generated by these subsidies. Nevertheless, governments continue to subsidise particular activities and sectors.<sup>3</sup>

The international policy issues which arise are more difficult to formulate since they involve not only the design of domestic tax systems but also their interaction. Each government has to address two broad sets of issues. The first is to ensure that each country gets its fair share of the tax base associated with international transactions. And the second is to maintain a favourable tax climate to attract inward investment and to avoid encouraging an undue outflow of domestic capital.

For many years it has been realised that countries cannot successfully address these issues unilaterally and that mechanisms for co-ordination are required. And over the last seventy years or so, indeed, international allocation rules have been developed, first in the League of Nations, then in the OECD and the United Nations. These organisations have established 'international rules of the game' to help countries arrange their tax relationships with other countries. These rules cover, for example, the allocation of taxing rights between the country where the revenue is generated and that where the parent company is based. Principles have been agreed to govern transfer prices for tax purposes when goods, services, technology and loans are exchanged between affiliates of a multinational enterprise.

The globalisation of economies may mean that a review of international tax arrangements is required. International

considerations, indeed, will grow more and more important in determining national tax policies, especially for small, open economies. Policy-makers have somehow to reconcile these new constraints with their desire to adapt their tax systems to social, economic and institutional conditions in their own countries, and yet simultaneously enable all countries to reap the potential gains in efficiency from liberalisation.

### The Main Elements of Reform

So increased attention has to be paid to the international implications of any proposed modifications to national tax systems. This, in turn, may mean that the criteria traditionally used to evaluate tax reforms have to be reconsidered. Policies which may have been appropriate in economies where exchange controls and other limitations on international transactions were prevalent may neither be feasible nor desirable once these non-tax barriers are removed.

There are therefore four main issues that are occupying the governments of OECD countries.

#### *The Elimination of Economic Double Taxation*

There is no consensus on the desirability of integrating taxes on personal and corporate incomes or on what would be the best method to this end. Most, but by no means all, public-finance experts accept that economic double taxation<sup>4</sup> can distort the financing and investing decisions of enterprises. But they find it difficult to agree on the quantitative significance of these distortions. Moreover, the introduction of methods of relieving such double taxation may be costly in revenue terms and, at least in the short term, can complicate international fiscal arrangements.

3. See Robert Ford, 'The Cost of Subsidising Industry', and Rauf Gönenç, 'From Subsidies to Structural Adjustment', *The OECD Observer*, No. 166, October/November 1990.

4. 'Economic double taxation' occurs where distributed profits are taxed first as corporate income and then as the income of the shareholder.

### The Reduction of Tax-induced Distortions in Domestic Investment

Even after the recent wave of corporate tax reform, which eliminated many tax incentives, tax systems continue to distort investment patterns. In the manufacturing sector they tend to favour investment in machinery over buildings and particularly over inventories (box, p. 36). And there are wide differences in the effective burden of corporate tax on different sectors of the

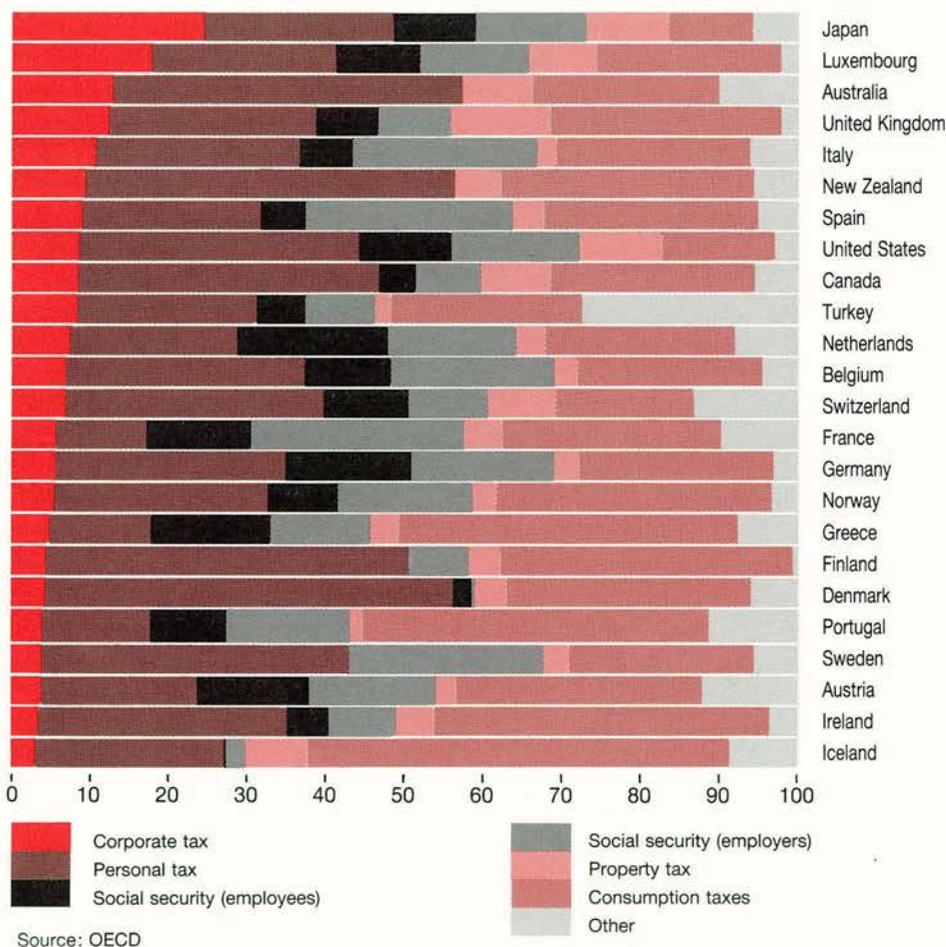
#### EFFECTIVE TAX RATES ON INTERNATIONAL INVESTMENT

A parent company which makes an investment in a foreign country through a subsidiary could raise funds outside the country in which it is resident. Any profit made by the subsidiary could be taxed at four stages. First, in the country where the subsidiary is located under the corporation tax of that country. Second, by the source country when the profits are repatriated to the parent company. Third, the country where the parent is resident may impose a further corporation tax on the foreign-source income of the parent. Fourth, personal taxes may be paid by individual investors on their return.

The relevance of each tier of taxation in determining the post-tax profitability of a new investment depends on how the investment is financed. Numerous arrangements exist. The parent company could provide funds to the subsidiary by injecting new equity into the subsidiary, or by lending to the subsidiary and charging interest on the funds. In each case, the parent itself also has to raise the funds, which it could do by issuing new equity, retaining earnings, or borrowing on its own account. Finance could also be provided by the parent forgoing the receipt of dividends from the subsidiary (that is, the subsidiary could retain its profits rather than repatriate them to the parent), in which case it is assumed that the parent also reduces its own dividend payments.

The tax treatment of the profits made by the subsidiary will be different in each of these cases. The form in which finance is raised by the parent affects the discount rate which must be applied to the return on the project, for the same reasons as when the project takes place entirely in one country. Nonetheless, tax systems tend almost universally to discriminate in favour of domestic investment.

Figure  
CORPORATE TAX AS PERCENT OF TOTAL TAX REVENUES, 1989



economy, reflecting partly the continued use of selective tax incentives and partly the often unintended interactions between different parts of the corporate tax system and economic conditions in different sectors. Incentive provisions may also favour capital-intensive rather than labour-intensive investment projects – and inflation accentuates these distortions.

#### Taxation and Corporate Finance

Tax systems are not neutral as to alternative sources of corporate finance. Finance by debt tends to be favoured over retained earnings and equity (box, left). How far

governments should be concerned about these non-neutralities depends, among other things, upon the view taken on the efficiency of capital markets in allocating funds and on risks attending corporations that place a high reliance on debt financing. Recent experience with the high-debt ratios of corporations and the use of high-risk ('junk') bonds has reinforced the view that tax systems should be neutral on the choice between debt and equity.

#### The Relative Tax Treatment of Domestic and Foreign Investment

Much of the discussion on the tax treat-



Lespinasse/REA

*What kind of fiscal regime will attract foreign investment without damaging domestic enterprises?*

ment of cross-border investment flows in the manufacturing sector centres upon whether tax systems are neutral between the choice of investing at home or abroad, or what economists refer to as capital-import and capital-export neutrality.<sup>5</sup> Yet such neutrality benchmarks cannot capture all of the complexity of these arrangements.

5. 'Capital export neutrality' occurs where the tax system is neutral towards the export of capital since investors face the same marginal effective tax rate on income from similar investments, whether they invest in the domestic economy or abroad. Capital import neutrality prevails when domestic and foreign suppliers of capital to any given market obtain the same after-tax rate of return on similar investments in that market, taking account of the corporate and personal taxes paid in the country of source and of residence.

First, they do not allow for the many-sided nature of international investment decisions. Investors can change their place of residence and the form of their investment (whether, for instance, in a subsidiary or by means of a branch). They have a wide range of choices on how to finance an investment (for example, by subsidiaries in a third country or locally). These decisions cannot be encompassed in a simple conceptual framework.

Second, capital-export neutrality is particularly difficult to achieve where domestic systems in the source and residence countries provide for different tax treatments of differing sectors and activities. Effective tax rates will then vary widely across assets, industries and sources of finance.

Third, even if neutrality were achieved under these circumstances, differences in nominal rates may nevertheless give rise to cross-border arbitrage. Fourth, the analysis is unable to take account of the different possibilities to evade and to avoid tax that are open to domestic and international investors.

Finally, these concepts provide only a starting point for the negotiation of tax treaties, the outcome of which reflects the balance of interest between the parties at a given moment. Nevertheless, they provide a convenient starting point to analyse international tax arrangements and encourage policy-makers to take a more global view of the benefits and costs of existing international tax arrangements and proposed changes.

□ □

The potential tax burden on corporations operating in manufacturing is generally higher on direct investment flows from one country to another than on purely domestic investment, which is to say that capital export neutrality is not achieved. Although this may be explained in part by the methods used to relieve international double taxation, it appears that the operation of withholding taxes on dividends and interest paid to non-resident corporations also tends to result in a less favourable treatment of foreign investment in comparison to domestic direct investment. A general removal or reduction of these taxes could help countries increase capital-export neutrality. ■



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# INDICATORS

AUSTRALIA	1991 1992 1993		
	Gross Domestic Product	-0.6	2.6
Inflation Rate	1.3	3.1	3.9
Unemployment Rate	9.5	10.1	9.7
Current Balance <sup>a</sup>	-3.4	-3.5	-3.6

AUSTRIA	1991 1992 1993		
	Gross Domestic Product	2.8	2.6
Inflation Rate	3.2	3.4	3.2
Unemployment Rate	3.4	3.8	4.0
Current Balance <sup>a</sup>	-0.3	-0.4	-0.5

BELGIUM	1991 1992 1993		
	Gross Domestic Product	1.4	2.0
Inflation Rate	3.4	3.3	3.2
Unemployment Rate	9.4	9.7	9.6
Current Balance <sup>a</sup>	2.2	3.0	3.4

CANADA	1991 1992 1993		
	Gross Domestic Product	-1.1	3.1
Inflation Rate	3.6	2.8	2.2
Unemployment Rate	10.3	10.2	9.8
Current Balance <sup>a</sup>	-3.0	-2.8	-2.8

DENMARK	1991 1992 1993		
	Gross Domestic Product	2.0	2.5
Inflation Rate	2.0	2.4	2.4
Unemployment Rate	10.3	10.2	9.6
Current Balance <sup>a</sup>	1.6	1.8	2.2

FINLAND	1991 1992 1993		
	Gross Domestic Product	-5.2	-0.4
Inflation Rate	4.1	-0.3	1.4
Unemployment Rate	7.7	9.8	9.3
Current Balance <sup>a</sup>	-4.7	-3.3	-2.0

FRANCE	1991 1992 1993		
	Gross Domestic Product	1.4	2.1
Inflation Rate	2.8	3.0	2.7
Unemployment Rate	9.3	10.1	10.2
Current Balance <sup>a</sup>	-0.7	-0.6	-0.5

GERMANY	1991 1992 1993		
	Gross National Product	3.2	1.8
Inflation Rate	4.5	4.5	3.9
Unemployment Rate	4.3	5.0	5.1
Current Balance <sup>a</sup>	-1.3	-0.8	-0.7

GREECE	1991 1992 1993		
	Gross Domestic Product	1.0	1.3
Inflation Rate	18.4	14.7	11.0
Unemployment Rate	8.6	9.6	10.5
Current Balance <sup>a</sup>	-2.4	-2.7	-2.8

ICELAND	1991 1992 1993		
	Gross Domestic Product	0.3	-1.6
Inflation Rate	8.2	7.0	8.0
Unemployment Rate	1.6	2.0	2.0
Current Balance <sup>a</sup>	-4.4	-4.3	-4.8

IRELAND	1991 1992 1993		
	Gross National Product	1.3	2.5
Inflation Rate	3.1	3.0	3.0
Unemployment Rate	15.8	16.5	16.0
Current Balance <sup>a</sup>	3.0	1.8	2.0

ITALY	1991 1992 1993		
	Gross Domestic Product	1.0	2.0
Inflation Rate	7.1	5.8	5.2
Unemployment Rate	10.9	10.8	10.7
Current Balance <sup>a</sup>	-1.4	-1.5	-1.8

Notes: figures in *italics* are OECD projections  
 a. current balance as % of GDP/GNP

Source: Economics and Statistics Department, OECD; for further information, contact **The OECD Observer**

# V INDICATORS

		1991	1992	1993
<b>JAPAN</b>	Gross National Product	4.5	2.4	3.5
	Inflation Rate	2.2	2.1	1.9
	Unemployment Rate	2.2	2.3	2.3
	Current Balance <sup>a</sup>	2.1	2.2	2.1

		1991	1992	1993
<b>LUXEMBOURG</b>	Gross Domestic Product	2.5	2.9	3.3
	Inflation Rate	3.1	3.3	3.0
	Unemployment Rate	1.4	1.4	1.3
	Current Balance <sup>a</sup>	1.9	2.9	..

		1991	1992	1993
<b>NETHERLANDS</b>	Gross Domestic Product	2.2	1.8	2.3
	Inflation Rate	3.1	3.2	3.3
	Unemployment Rate	6.1	6.4	6.3
	Current Balance <sup>a</sup>	3.7	4.3	4.6

		1991	1992	1993
<b>NEW ZEALAND</b>	Gross Domestic Product	-2.9	1.0	2.0
	Inflation Rate	1.3	2.2	2.2
	Unemployment Rate	10.4	11.5	11.6
	Current Balance <sup>a</sup>	-2.7	-1.9	-1.2

		1991	1992	1993
<b>NORWAY</b>	Gross Domestic Product	4.1	2.0	2.9
	Inflation Rate	1.5	3.3	3.4
	Unemployment Rate	5.3	5.1	4.8
	Current Balance <sup>a</sup>	5.0	5.5	5.8

		1991	1992	1993
<b>PORTUGAL</b>	Gross Domestic Product	2.7	2.6	2.7
	Inflation Rate	14.3	13.5	12.5
	Unemployment Rate	3.9	4.5	5.3
	Current Balance <sup>a</sup>	-0.9	-1.9	-2.6

		1991	1992	1993
<b>SPAIN</b>	Gross Domestic Product	2.5	2.9	3.2
	Inflation Rate	6.5	5.8	5.0
	Unemployment Rate	15.9	15.2	14.6
	Current Balance <sup>a</sup>	-3.2	-2.9	-2.9

		1991	1992	1993
<b>SWEDEN</b>	Gross Domestic Product	-1.2	0.2	1.5
	Inflation Rate	6.9	3.1	4.0
	Unemployment Rate	2.7	4.1	4.1
	Current Balance <sup>a</sup>	-1.9	-1.7	-1.3

		1991	1992	1993
<b>SWITZERLAND</b>	Gross Domestic Product	-0.2	1.2	1.8
	Inflation Rate	6.2	4.5	3.5
	Unemployment Rate	1.2	1.6	1.4
	Current Balance <sup>a</sup>	4.6	4.9	5.2

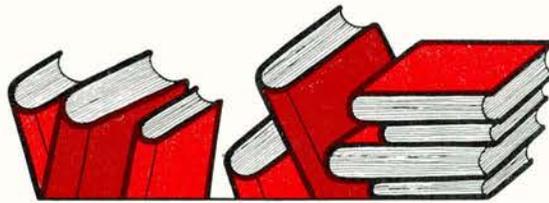
		1991	1992	1993
<b>TURKEY</b>	Gross National Product	2.3	2.8	5.5
	Inflation Rate	58.6	66.0	50.0
	Unemployment Rate	11.5	13.2	13.4
	Current Balance <sup>a</sup>	-0.3	0.2	-0.2

		1991	1992	1993
<b>UNITED KINGDOM</b>	Gross Domestic Product	-1.9	2.2	3.2
	Inflation Rate	6.2	4.2	3.7
	Unemployment Rate	8.7	9.9	9.7
	Current Balance <sup>a</sup>	-1.1	-1.4	-1.6

		1991	1992	1993
<b>UNITED STATES</b>	Gross National Product	-0.7	2.2	3.8
	Inflation Rate	3.6	3.0	2.9
	Unemployment Rate	6.7	6.7	6.1
	Current Balance <sup>a</sup>	-0.1	-0.9	-1.0

Notes: figures in *italics* are OECD projections  
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Source: Economics and Statistics Department, OECD; for further information, contact **The OECD Observer**



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See Donald Hirsch, 'The Schools/Business Partnership', *The OECD Observer*, No. 174, February/March 1992.  
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(March 1992)

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(February 1992)

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See Rémy Prud'homme, 'Information Technology and the Future of the City', *The OECD Observer*, No. 171, August/September 1991.

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### MAIN SCIENCE AND TECHNOLOGY INDICATORS 1991/2

(January 1992) Bilingual

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(February 1992)

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With 57 tables

See Candice Stevens, 'Industrial Internationalisation and Trade Friction', *The OECD Observer*, No. 173, December 1991/January 1992.

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(92 92 01 1) ISBN 92-64-13626-6 280pp.

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See Jean-Eric Aubert, 'What Evolution for Science and Technology Policies?', Robert Brainard, 'Internationalising R&D', and Martin Brown, 'Science, Technology and the Environment', *The OECD Observer*, No. 174, February/March 1992.

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See Philippe Montigny, 'From Technological Advance to Economic Progress', **The OECD Observer**, No. 170, June/July 1991.

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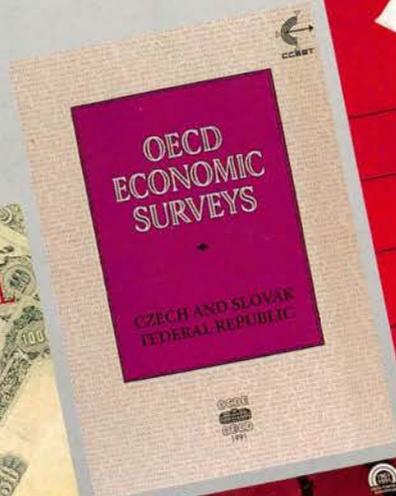
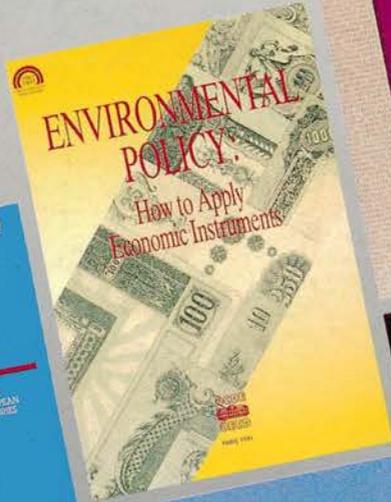
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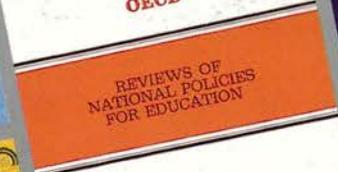
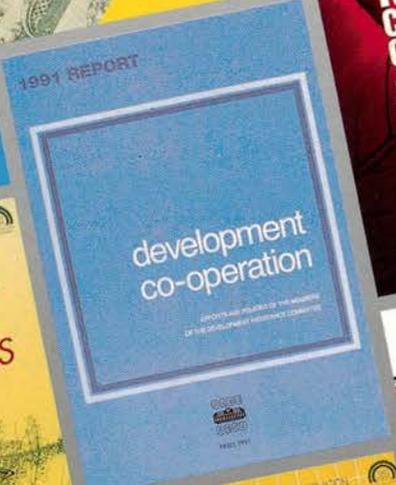
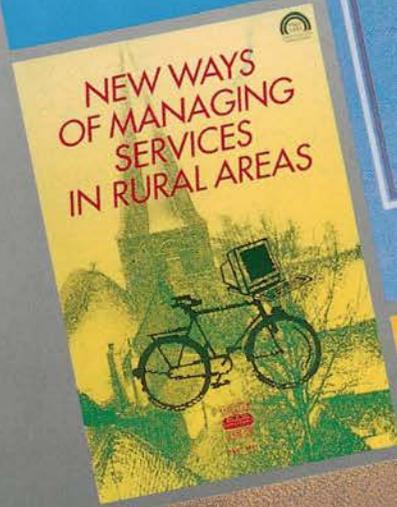
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