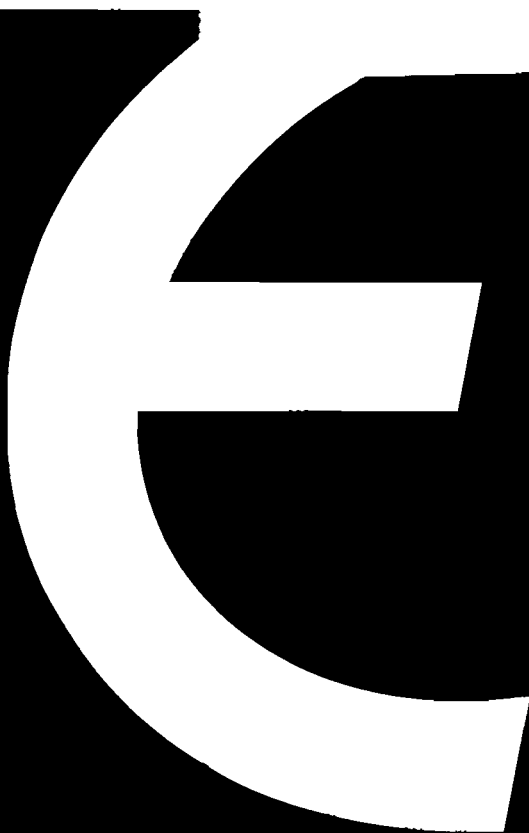


FAST: where does Europe's future lie?



European File

Intense international competition for mastery of new technologies suggests that scientific advance increasingly holds the key to economic progress. Scientific advance also has a critical influence on society, transforming its means of production and organization, its institutions, even its values. These changes are not pre-destined. Scientific and technological progress does not impose a single shape of things to come. It opens the way to a number of possible futures. The revolution in computer technology, now unfolding before our eyes, could be leading to a kind of 'automated dictatorship'. But it could also be the forerunner of an ideal society where micro-electronics would serve the fulfilment of the individual. The search for new avenues of scientific and technological advance must be matched by careful consideration of the means and ends such changes imply. One of the fundamental objectives of research and development policy must be to seek out the widest possible range of options and ways forward.

The need for Community involvement in shaping this policy has been realized for a long time. During the recession Europe's standing in the world economy has slipped seriously. The industries on which Europe's prosperity was founded are in decline. For the first time ever, the European Community imported more cars than it exported in 1982. More serious still is the Community's backwardness in the development of new information technologies. No single European country has a sufficiently large research effort or market to face up to the challenge of technological advance. Hopes of renewed economic expansion depend on joint action and joint examination of objectives and methods.

For this reason the Community launched in 1978 an experimental programme in Forecasting and Assessment in Science and Technology (FAST). Its objective was to identify long-term priorities for joint research and development and to examine the possible effects on society and the economy.

The FAST experiment has laid the foundation for a programme of 'future' research, based on work in the Member States and outside the Community. It has proved the usefulness of a comparatively informal and flexible research tool. With a small budget of 5.6 million ECU,¹ including 1.2 million contributed by associate bodies, a 10-strong team has organized and coordinated a mass of multi-disciplinary research, both technical and socio-economic, covering 36 subjects and involving 54 research centres in Community countries. This basic network has been expanded through close cooperation with a number of Community, national and international groups. The conclusions reached by FAST, presented in December 1982, are therefore based on a great diversity and multiplicity of analyses.

The fundamental issue which underlies the work of FAST is the contribution of new technologies to economic recovery and the creation of jobs. Formerly, the link between scientific and technological progress and socio-economic develop-

¹ One ECU (European currency unit) equals about £0.59, Ir. £0.73 or US \$0.87 (at exchange rates current on 8 March 1984).

ment was considered self-evident. But in developed industrial societies the connection is no longer obvious. Indeed, it is becoming clear that the recession and serious and lasting unemployment problems have been sparked in large part by technological change. Since the end of the 'golden sixties' most forms of economic activity have been transformed by technological innovations, designed to boost productivity. The search for new methods of production has supplanted the search for new products and the satisfaction of new needs. This phenomenon has been described in the FAST report as a 'hijacking of the innovation process'. Its effect has been to take the bounce out of the economic performance of the Community. On the European market — of crucial importance since Community countries carry out more than half their trade with one another — its effect has been to encourage increasingly bitter competition between Community firms. Often this struggle has been fought with technologies imported from the United States or Japan, to the detriment of Community industry and the great advantage of these two countries.

The new technologies will only help to haul us out of recession if their development is balanced between the creation of new methods of production and the creation of new goods or needs. They will become a means for stimulating economic growth only if the needs of society and individuals exert a direct influence, from the earliest stages, on technological research. With this in mind, the FAST team explored three areas where Community involvement could prove crucial: the 'information society', the 'bio-society' and the transformation of work and employment.

Towards an 'information society'

At the heart of the technological upheavals of our times, we find, inevitably, the vast information and communications industry. In its broadest definition, it employs more than one-third of the Community workforce and is expanding rapidly. But the Community faces a double challenge in this field, one external, the other internal.

- The external challenge: the Community is in danger of being outclassed for years to come by the United States and Japan. They have already taken a substantial lead in many fields of high technology. With a very few exceptions, Japanese and American firms control the whole market in new information technologies. For Europe, this is not simply a question of exclusion from one sector. Information technologies have penetrated every aspect of economic and industrial life. It is a question of losing control over the fundamental building blocks of European industry. The external challenge is therefore a threat to the independence of the Community. It raises two vital questions:
 - What are the key technologies which Europe should master? This question has already, in a sense, been answered by the launch of the Esprit programme in February 1984. Its ambitious target is to bring about a techno-

logical breakthrough which will close the competition gap with the Americans and Japanese in 10 years. Five priority areas for research and development have been identified. The FAST team was closely connected with this first step by the Community. It has also recommended further programmes in key areas such as telecommunications (especially satellites), data-processing, domestic electronic equipment and measuring and control equipment.

- How can these technologies be mastered? There are three essential pre-conditions: increased cooperation, leading to genuine joint strategies, between industry and the authorities; the improvement of scientific qualifications, through better links between universities and industry; the promotion of increased European cooperation and technology transfer, notably through greater movement of research and engineering personnel.
- The internal challenge: the FAST team points out that Europe's future faces a 'social' and internal challenge as much as an external one. The new information technologies threaten the unity of our society. Two possible pictures of the future can be traced, depending on the way the new technologies are handled. At one extreme, we can envisage a restricted and increasingly powerful elite profiting from technological advance to the disadvantage of others who would be subject to 'electronic surveillance' or gradually pushed aside because of their 'computer illiteracy'. At the other extreme, one can imagine a Utopian participatory democracy in which all citizens would share in decision-making through a generalized communications system. Reality is unlikely to resemble either of these extremes but the possibilities exist. The way our society develops will depend on the extent to which individuals and social needs influence technological development from the outset. How can this be achieved?
- We must be taught how to live with the new information technologies through experiments in how to apply them to our daily lives: shopping, transport, leisure, communications, work in the home, education and vocational training. The means are already available: teletext, computerized transfer of cash or sending of letters. The public authorities must take steps to provide the necessary communications infrastructure and promote research and development, especially into ways of improving communications between man and machine.
 - In order to generate new jobs, the interaction between social and technological change must be managed in such a way as to create new demand through identifying new or unsatisfied needs in areas such as housing, leisure, transport and health.
 - Finally, our ability to take full advantage of the new technologies will depend on great efforts of training and education. To fill the jobs of the future — and not only those for computer specialists — we need a workforce with entirely new qualifications. Beyond this, we must remember that the

impact of the new technologies will be felt outside the workplace. Everyone must be given the ability to take part in the 'information society' of the future.

Towards a 'bio-society'

Fundamental technological and social changes are also in prospect from another source — bio-technology. Although innovations in this area are still relatively limited, there is no doubt that new applications of the living sciences will shortly redraw the economic map in areas such as chemicals and food processing. In the longer term there are enormous implications for health, energy and the environment. We are entering a 'bio-society', with potentially huge social and ethical repercussions. The manipulation of biological forces is a risky business. Sooner or later it must have implications for subjects as delicate as life, birth, growth, death and human behaviour.

Once again Europe faces a double challenge. Firstly, it must achieve the scientific and technological mastery needed to compete with other parts of the world. Secondly, it must lay down guidelines for the creation of a 'bio-system' which answers its own needs. The FAST programme identified four priority objectives:

- The building of the foundations for a technology which is still mainly at the laboratory stage. The Community's expertise in this field is of the first rank and equal to that of Japan and the United States. But the potential is not equally spread between the Member States. Advances in this area demand mastery of a multitude of the most up-to-date methods. Such mastery is not available to any one European country alone. To hold onto its position and retain control over the development of its activities in this field, the Community must collaborate intensively. It must set up consortiums of experts, strengthen multi-disciplinary research teams, improve the training of research staff and set up data-banks for bio-technological material.

- The integrated management of renewable natural resources. The advance of bio-technology will have many consequences for land use. New types of crops or trees could be developed which might be more resistant to disease, need less water or grow more quickly. Yields might also be increased by new methods of plant-feeding. The use of fertilizers could be reduced, and agricultural surpluses and new forms of protein or industrial products used for animal feed (in which the Community is deficient). Finally, animal reproduction methods could be improved. Better control over the natural environment opens up the possibility, in the medium term, of a radically new solution to the problems of the common agriculture policy. But other possibilities could emerge in the longer term for new land uses such as the production of biomass for conversion into energy and raw materials for the chemicals industry. This could considerably reduce the Community's dependence on imported hydro-carbons. Such developments will, however, lead to difficult decisions on different potential land uses.

- The impact of biotechnology on relations between the Community and the Third World. By allowing improved use of waste and increased production of proteins, biotechnology could make the Community less dependent on imports from developing countries. The commercial consequences for such countries could be serious. On the other hand, bio-technology could help to solve many of the problems of the Third World in areas such as health, food, energy and the environment. The Community can assist by directing its expertise towards the solution of these problems and by promoting transfers of technology.
- Finally, biotechnology will be of growing importance for health and medical research, often in conjunction with new information and instrumentation technologies. Countless new methods are already helping to answer individual and collective needs for improved prevention, detection, diagnosis and treatment of illness. They have been introduced in all medical disciplines but will be of especial importance in psycho-geriatrics, given the ageing of the Community's population. If the technological challenges can be overcome, the potential economic rewards are substantial. The Community faces the problems of how to maintain its strong position in a fiercely competitive field which is also highly costly and complex. Difficulties can also be expected to arise over the ethical justification of medical intervention in genetics, embryology, human behaviour and mental illness.

The transformation of work and employment

Unemployment is one of the most serious problems facing the Community. The rise in the numbers out of work has been felt most acutely in certain regions or by groups such as women, immigrants, and old or under-qualified people. It is becoming increasingly obvious that it is a long-term phenomenon which could affect nearly 15 million people by 1985. The ideal of full employment, formerly one of the fundamental objectives of society, now looks out of reach. The credibility of the Community's economic system could be called into question. In the 1960s unemployment averaged 2% and about 200 000 jobs a year were created in the present Community. To achieve the 2% unemployment by 1995, the Community would have to meet the impossible target of creating one million jobs a year.

The causes of this serious crisis are the increase in the population, the slackening of economic growth and the technological revolution in manufacturing industry. But the new technologies are not responsible only for reducing the number of jobs. They are, to a much greater extent, the source of a social revolution which is destined to change the very nature of employment and work itself.

- First of all, technological change leads to displacement of jobs. It has been estimated that at least half the Community's workforce will change jobs in the next 15 years. These displacements both destroy and create jobs. The final balance sheet is extremely difficult to establish but, taking information technol-

ogy alone, the FAST report envisages a net gain of 4 to 5 million jobs if Community countries act together to identify new or unfulfilled needs. More generally, the employment crisis can be solved by major efforts of innovation, both in traditional industries such as cars, chemicals and construction, as well as in new industries such as alternative energy sources, the environment and maintaining advanced technological equipment. A key role exists here for small and medium-sized businesses and the services sector where a whole new range of opportunities will be created by technological and social change. This redeployment of the European economy must be both outward-looking (without necessarily threatening jobs elsewhere) and inward-looking (aiming to reduce regional disparities and create a genuinely open Community market).

- The employment problem goes further, however. A transformation is taking place in the nature of work itself, both in its substance (the relationship between man and machine) and its value to society. This shift in the role of work — in a business, in the life of an individual, for society as a whole — stems from the combined pressure of technological, economic and socio-cultural factors, including new values and aspirations. It affects working time (reduction in total hours worked, part-time working, temporary work or flexible hours) but also influences the nature of paid employment (the black economy, moonlighting) and the place of work (tele-employment and work at home). Slowly the old rigid conception of work as a single job for eight hours a day in one place is being broken down. It will be replaced by a more flexible model of employment, which will transform the old notion of 'full employment' to fit the new social, economic and technological conditions of the years ahead.



Apart from outlining the major strategic objectives for the Community, the FAST experiment also identified a series of long-term priority aims for Community research and development. Its recommendations covered both technological and social objectives. They involve ways of organizing research activities, ways of improving the scientific and socio-economic environment and specific projects which deserve joint Community efforts. The recommendations range from the need to gather basic facts, to support experiments, set up new activities or bolster existing ones.

Some of the work of the FAST research network has already led to specific uses, including a chemicals project in France, a biomass study project in Scotland and a project in Denmark to study the social impact of information technologies. At Community level, the FAST team was involved in the drawing up of the first framework programme for scientific and technical research¹ and the Esprit and European bio-technology programmes.²

¹ See *European File*, No 8/83: 'Towards a European research and science strategy.'

² See *European File*, No 8/84: 'From Esprit to the "bio-society", the European Community and new technologies.'

The results of the first FAST experiment caused considerable interest in both Community and scientific and economic circles. The Community therefore decided in June 1983 to launch a four-year FAST II programme which will cost 10.5 million ECU, including 2 million from associate bodies. Organization of the programme is in the hands of a team of 12, including six scientists, using research contracts, a cooperation and information network and — a new departure — 10 researchers seconded from Member States for between 12 and 24 months. FAST II will centre on four major research themes, identified by FAST I:

- Relations between technology, work and employment;
- The development of integrated systems for renewable natural resources;
- The emergence of new industrial systems in the communications (audio-visual, cable networks, telecommunications) and food processing sectors;
- Transformation of service activities and technological change.

All these issues form part of the central problem to be tackled by the FAST programme: the role of science and technology in the search for renewed economic development ■

Central problem and research themes for FAST II

Theme One

Relations between technology, work and employment

Goes to the heart of the objectives of manufacturing industry and personal aspirations

Theme Two

The development of integrated systems for renewable resources

A necessary path and potential lever to a 'new growth' in Europe, in partnership with non-renewable resources



The unifying central problem of FAST II:

the role of science and technology in the search for renewed economic development

Theme Three

Strategic industrial systems:

- communications,
- food-processing

Two basic industries, already going through profound and rapid change. New industrial activities are being created. Corresponding Community policies are needed

Theme Four

Transformation of service activities and technological change

Services hold the key to the transformation of society and the economy. Europe's future is at stake here

The contents of this publication do not necessarily reflect the official views of the institutions of the Community. Reproduction authorized.

Commission of the European Communities

Information offices (countries fully or partially English speaking*)

Ireland 39 Molesworth Street, Dublin 2 — Tel. 71 22 44

United Kingdom 8 Storey's Gate, London SW1P 3AT — Tel. 222 81 22
— 4 Cathedral Road, Cardiff CF1 9SG — Tel. 371631
— 7 Alva Street, Edinburgh EH2 4PH — Tel. 225 2058
— Windsor House, 9/15 Bedford Street,
Belfast BT2 7EG — Tel. 40708

Australia Capitol Centre, Franklin Street, PO Box 609,
Manuka 2603, Canberra ACT - Tel. (062) 95 50 00

Canada Inn of the Provinces-Office Tower, Suite 1110, 350 Sparks Street,
Ottawa Ont. K1R 7S8 — Tel. (613) 238 64 64

USA 2100 M Street, NW, Suite 707,
Washington DC 20037 - USA — Tel. (202) 862-9500
— 245 East 47th Street, 1 Dag Hammarskjöld Plaza,
New York, NY 10017 - USA — Tel. (212) 371-3804

* Offices also exist in other countries including all Member States.

