

have given it in the recent past. Yet such protection may remain necessary if fragile economies are to prosper without the "demand-pull" that the welfare state has previously provided.

Take, for example, the question of government support for technological research (particularly in universities). In the 1980s, this became a major field of expansion, as all Nordic governments introduced national technology programmes designed to ensure the build-up of expertise in areas (such as biotechnology, microelectronics and materials science) considered essential to the future health of their industries.

The results of these programmes were mixed. In some cases, the quality of output has been high. In others, often due to a lack of adequate assessment of original grant proposals, it has been disappointing. And even where the research results have been impressive, they may (for reasons of conservatism or indifference) not have been picked up by the industry which they were meant to benefit.

Unsurprisingly, there has now been a backlash against the idea of researcher-led technology programmes. Industrialists are being put in the driving seat, with firm instructions to ensure that these programmes achieve an appropriate "output" in the form of products that can compete in the international marketplace. A well-intended goal, perhaps. But although industrial research managers may be better at identifying

their short-term research needs, there is no guarantee that they (or their directors) will be any better than academic scientists in foreseeing long-term technological opportunities.

Enthusiasm for Europe is also tinged with apprehension. But faint hearts are not likely to win the day. Each country now needs a bold strategy for its research community. One goal must be to find ways to build on pre-existing strengths, for example on the long tradition of medical research in Sweden (the basis of its strong pharmaceutical industry) or the more recent development of oil research in Norway (which has provided an across-the-board boost to the country's research efforts).

A second need is for each country to tap the traditional inventiveness of its populations to carve out niches in the global economy. For some, this will mean finding radical new approaches to products that can be generated from natural resources (such as fish in Norway, or paper and pulp in Finland). For others, it could mean taking adventurous steps in new directions (as the furniture design and mobile telecommunications indus-



tries have done with such success).

The Nordic populations have a long tradition of thriving under harsh conditions. This in itself may provide their scientific communities with the skills required to prosper in an increasingly competitive environment. If they can keep their politeness and good-humour intact in the process, the rest of us will be the richer as well. □

## Collaboration: yes, but in which direction?

WILL entry into Europe mean the end of efforts to increase inter-Nordic cooperation in research? In the short term, most people agree that the impact will, indeed, be negative. Looking longer ahead — or perhaps just being more optimistic — the argument is that, once membership of the European Communities (EC) is established, regional cooperation will become as important as ever.

Close cooperation between the Nordic countries has long been a goal of politicians. Science has benefited in a number of ways. In particular, funds from the Nordic Council of Ministers have been used to establish various joint research institutes, perhaps the best known being the Nordic Institute for Theoretical Atomic Physics (NORDITA).

Today, with all eyes on Brussels and the terms of membership of the EC, pressure for closer Nordic collaboration has taken a back seat. "There is no real policy discussion going on about the future of Nordic cooperation," says one Swedish official. "It is just not on the agenda at present; all attention is focused towards Europe."

One body feeling the squeeze is the Nordic Industrial Fund. This was set up in 1973 by the governments of Denmark, Finland, Iceland, Norway and Sweden to boost technological and industrial development, primarily by identifying and financing Nordic research and development projects.

In the mid-1980s, NIF launched a number of major technology programmes on topics such as biotechnology, materials technology and information technology, in each case put together along the lines of similar programmes being run by the European Commission from Brussels.

Per Gjelsvik, the director of NIF, admits that the fund will now have to change course. "We have reached the conclusion that we will no longer be able to support the same research as the EC," he says. "So we will support research which will provide direct benefit to the Nordic countries, for example, in meeting the needs of their paper or fishing industries."

Gjelsvik is sure that, once Norway, Finland and Sweden become firmly em-

bedded in the EC, there will be renewed calls for regional cooperation. "Everyone is now talking about Brussels. I am saying, let's wait for a few years; when they see the importance of Nordic cooperation, they will turn back again."

In contrast to applied research, collaboration in basic science is continuing to grow, primarily because this is considered to be a cultural activity. In particular, the Council of Nordic Ministers has recently established a Nordic Academy for Advanced Study (NORDAS) to support postgraduate training and the operation of scientific networks.

"There are many small universities in the Nordic countries which have difficulty in setting up strong research groups and providing postgraduate training," says Leif Westgaard, executive director of the academy who works from the offices of the Norwegian Council for Science and the Humanities (NAVF) in Oslo. "Our idea is to pool these resources together to provide joint doctoral training; this year, for example, there will be about 40 courses, in subjects ranging from classical archaeology to planetary physics." □