Cracks in Europe's Framework?

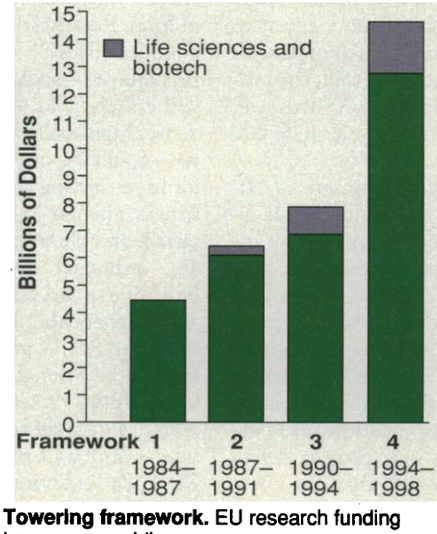
As the European Union begins shaping the next 5 years of its research, all sides are calling for a more focused, streamlined program. But does the European behemoth have the flexibility to change?

BRUSSELS—Last month, government ministers from the 15 member states of the European Union (EU) gathered in the Italian capital to celebrate the 40th birthday of the Treaty of Rome, the agreement that founded what was then called the European Economic Community. Like many 40-year-olds, the union is passing this milestone in the throes of a midlife crisis: While neighboring countries, particularly in eastern Europe, clamor to be allowed into this exclusive club, its longtime members differ greatly in their attitudes toward the union. Stalwarts such as France and Germany are working tirelessly on an economic treadmill, hoping their economies will be fit enough to join a single European currency in 1999, while Britain's Conservative government treats the EU as a threatening foreign power and is ever vigilant in protecting the country from encroaching federalism.

Research has not escaped these strains. This week, the European Commission, the EU's executive body, will formally submit its plans for the next 5-year, multibillion-dollar dollop of research funding, known as Framework 5, for approval by member states and the European Parliament. Although the current framework sum amounts to only 4% of the total spending on research by EU governments, it plays an important role as a catalyst, forging international collaborations among thousands of researchers across the continent. However, in recent years, the rolling Framework programs have been the focus of a chorus of complaints that have become hard for the commission to ignore. Scientists charge that the program's system of reviewing and awarding grants is hostile and impenetrable, while governments see Framework as mushrooming out of control and lacking clearly defined goals. "There's need for root and branch reform," says science policy analyst Luke Georghiou of Britain's University of Manchester.

Government officials and researchers across the continent are anxiously awaiting the commission's formal proposals for Framework 5, which are due to be announced this week. The commission's plans have been in preparation for about 9 months, with working papers published last July, November, and February. In the process, commission officials have consulted about 50 different bodies representing government, scientists, and industry, including its own advisory panels representing academic and industrial researchers.

In spite of this extensive collaboration, some of those who have been involved in the consultation process doubt that the final plans will seriously tackle Framework's problems. They fear that it will be the same old collection of programs simply bundled together under new headings, with the stifling bureaucracy still in place. "In the commission's plans published [in February], anything in Framework 4 could find a place somewhere in Framework 5," says Lord Selbourne, head of the science and technology committee of Britain's House of Lords, which recently reviewed the Framework program. "I'm very depressed at the latest proposals for Framework 5. It's very disillusioning."



Towering framework. EU research funding has grown rapidly.

Once the proposals are made public, the commission, science ministers from member states, and the European Parliament will debate them, and late this year they should agree on a budget and final program. In the past, this has sometimes been a tough process: Each of the 15 states has its own research agenda, and they must agree unanimously on the final structure and budget. Those countries bent on reform will have to take a tough line in the forthcoming negotiations. "There's going to be a need for a stronger push at the government level if some of the reforms are to get through," says Georghiou.

The international research agency

The commission's science mandarins faced a tough task in putting together the Framework program, for research funded by the EU must operate under some unique constraints. First, to avoid stepping on the toes of national research programs, all research projects must be international collaborations. And the research should aim to benefit European industry, which means that most EU funding goes to applied research. Some basic science is supported, however, in areas where industry demands it, such as biotechnology.

Until 1984, the EU carried out many separate research programs, but it was then decided to group them all under an umbrella program dubbed Framework, with its budget and goals first set at 4-year (later changed to 5-year) intervals, with some overlaps. Most EU research funding is distributed as grants to collaborations of academic and industrial researchers. The EU does not have any direct involvement in Europe's large international laboratories, such as the CERN particle physics lab or the European Molecular Biology Laboratory, which were set up directly by the governments involved. Framework funds do, however, support the EU's own Joint Research Centre (JRC), with headquarters at Ispra in Italy, and other facilities in Belgium, the Netherlands, Germany, and Spain. The JRC mostly carries out research and develops standards in the fields of energy, information technology, environment, biosciences, and socioeconomics.

Since 1984, the Framework budgets have mushroomed: The first Framework program, which ran from 1984 to 1987, cost $4.5 billion and supported seven programs of research; Framework 4, running from 1994 to 1998, will spend $14.6 billion on 20 programs, covering information technology, environment, life sciences, and energy. More than 10,000 projects are currently funded.

Although, in all but the smallest EU countries, Framework money only makes a small contribution to the total research funding available, for some labs EU funding has become a lifeline. "We've been winning European funds for many years, and about 30% of our income comes from the EU. If we didn't have that funding, I think the unit would have been in severe difficulty," says Alan Lehmann, molecular biology head at the U.K. Medical Research Council's Cell Mutation Unit in Sussex. "I'd be struggling without the EU. I

Small Countries Make the Most of EU Largesse

For researchers in most of the European Union's (EU's) 15 member states, Framework funding is a welcome addition to the support they get from their governments. But in some of the smaller and less well-off countries, Framework is more than that: It is the difference between scientific life or death. And it is not just the money that is welcome; it is the sense of belonging to a continent-wide club of researchers. "For a small country, anything to help international collaboration is very important," says Susan Hedigan, EU liaison officer at Trinity College Dublin.

Ireland, for example, is one of the smallest EU countries, with a population of only 3.5 million. Government spending on science is chronically low compared to other European countries, and Irish researchers have become increasingly skilled at tapping into the EU's coffers. "A recent poll found that 60% of Irish research groups get EU funds," says John Donavan, secretary of the Irish Research Scientists' Association in Dublin. Jean Law, EU liaison officer at University College Cork, says that $9.8 million of the college's $25 million in external research income comes from the EU. And at Trinity College Dublin, one-third of external research income now comes from Brussels. "EU funds are an extremely important element," says Hedigan.

Even in Belgium, home of the European Commission, the EU's executive arm, domestic spending on research "is less than [that of] any of its neighbors," says immunologist Michel Goldman of the Free University of Brussels. Researchers either have to find industrial funding or go to the EU. "We are becoming more and more dependent on the EU," he says.

For smaller nations in the southern part of Europe, EU money is especially important, but some policies have led to friction. In the spirit of affirmative action, the EU has encouraged researchers in the wealthier countries to seek a southern partner, but geneticist Claudio Sunkel of the Institute for Molecular and Cell Biology in Porto, Portugal, has found that he has been approached by scientists more interested in his location than his science. "We've been asked a number of times to participate in collaborations, but the proposals did not fit into our research," he says. Another problem has been to persuade postdocs to come south to work; instead, postdocs prefer to go to well-established northern labs. But, says Alexander Quintanilha, dean of the biomedical school at the University of Porto, Portugal's efforts to strengthen its science base are beginning to pay off: "Postdocs are beginning to come."

With uncertainty looming over Framework 5, researchers in smaller EU countries are beginning to worry about their reliance on Brussels. "Our dependence is somewhat frightening. It gives a lot of scientists concern if [funding] were now to decrease significantly," says Quintanilha.

Researchers in Greece are in a similar predicament. "We're heavily dependent on the EU. It provides about 50% of our grant income," says George Thireos, director of the Institute of Molecular Biology and Biotechnology in Iráklion on the island of Crete. "If there's a shift away from basic research to industrial research, this is not healthy for us. Greece has a weak industrial base, and it will be left out," says Eleptherios Economou, director of the Foundation for Research and Technology in Iráklion. Says Hedigan: "We are aware of our EU dependency. We don't know what will happen in the long term." –N.W.

have very little core funding," says nutritional scientist Susan Southon of the Institute of Food Research in Norwich, U.K.

For many, the requirement that collaborations involve at least two EU member countries in order to receive funding is one of the program's strengths. "There is no national money for European collaborations, so the program is unique and becoming more and more important," says neurobiologist Geneviève Rougon of the CNRS Institute for Developmental Biology in Marseille, France. George Brownlee, a molecular biologist at the University of Oxford in the U.K., who has held EU grants, says: "There was a lot of artificiality about the collaboration at first, but we soon saw the value of it."


BRIAN MOODY

Disillusioned. Britain's Lord Selbourne.

This enforced collaboration often makes successes out of unlikely partnerships. Anna Ruffilli, an immunologist at the International Institute of Genetics and Biophysics in Naples, Italy, who works on an important plant pollen allergen in southern Europe, is now, with EU funds, collaborating with a lab in northern Italy and another in Germany. "The allergen has proved to be a very good model system, so our northern partners can exploit it to study basic aspects of the immune response and we can use their expertise to study potential new therapies more quickly," she says. And Rougon decided to take a risk in inviting one of her competitor labs to join her in seeking EU funding. They agreed and were successful in winning funds. "It's turned into a very fruitful collaboration," she says.

For many years, the focus on applied research excluded many researchers from EU funding. But, for biologists at least, with the beginning of Framework 3 in 1990, the share of funds devoted to life sciences jumped from 5% to 12.6%. The aim was to give a boost to Europe's fledgling biotechnology industry and open up opportunities for basic researchers. One notable success was the EU's backing of a consortium of labs to sequence the first entire chromosome—from the yeast *Saccharomyces cerevisiae*—which led to a project to sequence its entire genome, completed last year. "Some of the large biotechnology projects have had a big impact," says Georghiou, one of a panel that reviewed the EU's biotechnology program this year.

Bureaucratic maze

In spite of the EU's increasingly important role for a large number of scientists, for many, Brussels remains a byword for bureaucracy. For example, the gap between submitting an application and receiving funds can stretch to 18 months. "All the difficult aspects in assessing a project are managed relatively quickly," says Georghiou. "The delays are genuinely bureaucratic." EU administration, he says, is based on an antiquated version of the French civil service, where individuals have little responsibility themselves and must always refer decisions upward.

The jargon and labyrinthine procedures used by Brussels officials often confuse newcomers. "Brussels issues contracts for research, so applicants must submit their proposals with milestones and deliverables, which are often alien to them," says Alf Game of Britain's Biotechnology and Biological Sciences Research Council, who acts as a contact point for British researchers seeking biotechnology funding from Brussels. "The very first time I applied, I felt lost. It was horrendous. It is no use trying to go it alone," says Southon. "The EU's biotechnology work plan alone runs to 50 pages. There's a lot of ambiguity in determining what research is eligible, so it is hard to advise people, and the result is too many bids," says Game.

To guide researchers through the bureaucratic maze, most of the large EU countries have a specialist office in Brussels. Training courses and consultancies specializing in obtaining EU funding have also sprung up. Among U.K. universities, the amount of EU funds won varies enormously, depending not on their research strengths but on their ability to exploit the workings of the commission. "Researchers at the bench have learned to word their proposals depending on what they want to hear in Brussels," says Harry Beckers, chair of the advisory council on science and technology policy to the Dutch government.

The commission's system for reviewing proposals also wins few friends. Reviewers are asked to travel to Brussels to conduct their assessments. "We were kept in rooms reading manuscripts for hours. It's a very aggressive process of keeping things secret and essentially contributes to a lower quality of evaluations," says one reviewer. "The time required is also likely to put off some of the best reviewers," he adds.

And even when the grant money is safely in the bank, many researchers have found that the problems continue. EU funds come with little money for overhead, and researchers may need extra money to carry out the work. "Universities can find EU contracts expensive," says neurobiologist Julian Burke of the University of Sussex. Collaborations must also nominate a coordinator for the project—keeping disparate groups focused on the goal and acting as a link with administrators in Brussels—a tall order for collaborations that can involve dozens of labs. "It can be very demanding," says Rougon.

Researchers' discontent over the running of Framework has recently been backed up by a report ordered by the commission itself. The review panel, headed by former EU research commissioner Viscount Davignon, found the Framework program "unfocused" and "underachieving" (*Science*, 7 March, p. 1414). The review called for changes in the way research topics are chosen to achieve a more focused program, the introduction of majority voting in ministerial meetings to reduce the influence of national interests, an overhaul of management, and stronger external monitoring of the commission.

In Britain, the House of Lords carried out an inquiry and came to similar conclusions. Like the Davignon panel, the Lords' report highlighted failings such as a success rate for applications of below 10% in some areas of research that is creating a growing band of disgruntled researchers. "The level of oversubscription in some programs is ludicrous," says Game. There is also growing concern that the commission cannot close programs down after their goals have been achieved. The unanimous voting system used by ministers in agreeing on framework programs helps nations with a vested interest in a particular program keep it running. Some EU member governments are now claiming that the proliferation of programs under Framework is blurring the boundaries between what the EU supports and what member states themselves fund, challenging the EU rules for research. Several countries, including the U.K. and Germany, have called for a more focused program concentrating on topics with a clear European dimension.

STRUCTURE OF FRAMEWORK 5

Thematic Programs:

1. The Living World and Ecosystem
   - Health and food
   - Control of viral and infectious diseases
   - The "cell factory"
   - Management and quality of water
   - Environment and health
   - New rural and coastal areas
2. Information Society
   - Services for the general public
   - Electronic trade and new methods of work
   - Multimedia content
   - Essential technologies and infrastructures
3. Competitive and Sustainable Growth
   - Products, processes, organization
   - Sustainable mobility and intermodality
   - New perspectives in aeronautics
   - Marine technologies
   - Advanced energy systems and services
   - The city of tomorrow

Horizontal Programs:
(These are intended to help in the implementation of all of the above thematic programs.)

1. Confirming the international role of European research
2. Innovation and participation of small and medium-sized enterprises
3. Improving human potential

Seeking counsel

None of these complaints came as news to EU science officials. They heard them voiced repeatedly during the preparation of plans for Framework 5, when they carried out an extensive consultation exercise that included the commission's own two advisory panels: the European Science and Technology Assembly (ESTA), a body consisting of 75 prominent researchers who meet twice a year, and the Industrial Research and Development Advisory Committee (IRDAC), made up of industrialists involved in R&D. The commission also consulted more than 50 other scientific and technical organizations, including the European Science Foundation (ESF), as well as the governments of member states and their national research councils. "In this way, we avoid projects that are only conceived by the administration itself," says ESTA member François Gros, former director of the Pasteur Institute in Paris and a former EU science adviser.

Judging by the working papers already published, the industrial research community seems to be satisfied. IRDAC called for a less cumbersome decision-making process and the concentration of funds on fewer topics, all with importance for European industry. "Much of the advice given by IRDAC has ended up in the [working papers]," reports physicist Yves Farge of the French company Pechiney, who ended his tenure as IRDAC chair in February. "In a first approach, we have been listened to," he says.

Advisers from the academic community are less satisfied, however. They are particularly upset that their calls for more spending on basic science seem to have been ignored. "The general architecture is still very much modeled on industrial demand," says Jean Pierre Bourguignon, director of the Institut des Hautes Études Scientifiques near Paris and president of the European Mathematical Society. Although promoting basic science is not the commission's primary function, "it must have regard to the overall health of the science base within the union," argues Tony Mayer, ESF's head of strategy. "We still dream of having physicists on the [program] committees," says Gero Thomas, secretary-general of the European Physical Society.

The European Commission is performing quite a juggling act as it tries to reconcile the conflicting demands of researchers, industrialists, and member governments in Framework 5. But the commission's own hopes for a more focused program may be thwarted by member states bargaining to keep their favored programs going when their vote is needed for final approval. Although in the published working papers Framework 5 has just three main themes, critics argue that the new structure simply rearranges that of Framework 4 under new headings. "This is not a fault of individuals but of a structure which inhibits the formulation of real strategy and makes effective implementation difficult," says the Davignon report.

Several member governments have already written to the commission requesting changes to the final structure, and U.K. Science Minister Ian Taylor also called for a statement by the commission on how it will change Framework's management. "It is time for a great leap forward," says the Davignon report, but it is hard to see how a committee of 15 recalcitrant states can make that leap. Says Georghiou: "I'm sure some of the reforms will get through, but it's difficult to see the final outcome at this stage."

–Nigel Williams and Alexander Hellemans

Alexander Hellemans is a science writer in Paris.