

Irish Mathematical Society
Submission to the
Science, Technology and Innovation Council

The sophisticated technological society that we aspire to relies on an up-to-the-minute knowledge of new scientific, technological and economic developments around the world. As new developments arise at an increasingly rapid rate, not only must these areas of our economy have a highly educated work force but the numeracy requirements and mathematical skills of graduates working in these areas are generally seen to be playing an ever more important role.

Research in these areas relies heavily on mathematical techniques and the pervasive role of scientific computing has meant that mathematical analysis, modelling and interpretation of data is now an everyday requirement. It is interesting to note that, despite recent layoffs in their hardware division in Galway, DEC have actually been recruiting software people including some mathematicians. To continue attracting companies like AST, DELL and INTEL to Ireland we must provide a technologically advanced work force.

Not only are research mathematical scientists needed to keep abreast of current scientific developments, but foresight by active researchers today, can pave the way, and introduce the changes into the teaching of mathematics, which will allow us to produce the numerate graduates we need tomorrow.

- **A strong research community in the mathematical sciences is essential to keep our science and technology abreast of new developments and to continue supplying graduates with up-to-date qualifications.**

In the past, the mathematical sciences have been seen as an essentially "non-experimental" subject with little or no equipment needs. This is no longer appropriate. As with most other scientific disciplines, high-level computing equipment is now an essential requirement.

- **Funding patterns should reflect the "new" equipment**

SCIENCE, TECHNOLOGY AND INNOVATION

Pauline Mellon

In the spring of 1994 the government established the Science, Technology and Innovation Advisory Council (hereafter referred to as the Council) to undertake a review of science and technology in Ireland. The remit of the Council is to:

- determine whether the current policies, objectives, structures and components of the science and technology system are the right ones for achieving economic development through research, technology and innovation;
- determine what mechanisms should be employed to achieve the desired S & T goals in the light of the above;
- provide a report on the findings, with recommendations about changes to improve the effectiveness and efficiency of the national S & T system in contributing to national economic development. This report will be in the form of a draft White Paper on Science, Technology and Innovation for the Minister and Government to consider.

Interested parties were invited to make submissions to the Council for consideration. At the Easter meeting of the Irish Mathematical Society (hereafter called the Society) it was decided that a brief submission should be made by the subcommittee on behalf of the society. A submission was duly sent. In a follow-up action, the Council held a seminar "Learning from International Experience" in Dublin Castle on 19th September 1994, where international perspectives on science and technology were presented. As secretary of the Society, I was invited to attend this seminar. The submission made by the Society to the Council and a summary of the seminar follows.



needs of research in the mathematical sciences.

A steady supply of Ph.D's is necessary to ensure tomorrow's mathematical community. To date, many of our researchers have completed their graduate work in the UK or in the USA. The current under-supply of graduate fellowships in the UK and the hesitations being raised in the USA about funding so many "foreign" Ph.D's spell imminent danger that these routes may become less available. It is therefore critical to put in place a program of support for Ph.D and post-doctoral students.

- **A program of support at the Ph.D and post-doctoral level is required.**

The research environment in our third-level institutions has deteriorated. Increased student numbers and general under funding means that academics have ever expanding teaching and administrative burdens. Satisfactory computing equipment is often not available and our libraries are being denuded by persistent cuts. As such, the time and facilities to do research is constantly being eroded.

- **It is important to acknowledge the difficulties facing research in the present economic climate and to face these challenges in any new framework for science and technology support.**

To implement the above recommendations it is imperative that

- **the mathematical sciences community is represented at every level of the new science council**
- **a separate mathematical sciences budget is installed**
- **a single person on the new science council be given responsibility for the mathematical sciences.**



"Learning from International Experience".

Dublin Castle 19th September 1994.

The seminar was introduced by Mr D. P. Tierney, Chairman of the Science Technology and Innovation Advisory Council. He described the Council's task as the most fundamental and wide ranging review of science and technology ever to be undertaken by the government and reported that the Council had received submissions from 150 interested parties. He called upon the "players in the field of science and technology" first to come to some agreement among themselves as to the important aspects of desired policy before there could be hope of convincing Government, policy makers and the public as to the value of our efforts.

An address by the then Minister for Commerce and Technology, Mr Seamus Brennan, followed. Minister Brennan reiterated the view that there is no consensus as to how spending on science, research, technical development and innovation can best contribute to national development in its broadest sense. He admitted, however, that not enough money was being spent on science and technology. The issue, as he stated it, "is not whether we can afford to increase such spending but, rather, whether we can afford not to do so". He also said that it should not be a choice between basic or applied research, as he recognized that both are essential and interlinked. The Minister also announced the setting up of a Single Research Support Fund to include

- the funding for basic research and strategic research;
- support for Ph.D's and M.Sc's and
- the third level / industry cooperative research.

This fund is intended to be administered in full consultation with third level and industry interests.

The minister also expressed his high hopes for Irish participation in the EU Fourth Framework Programme.

The international contribution began with Dr Joseph Clarke, Senior Science Advisor, United States Department of Commerce,



and Chairman of the OECD Innovation Committee.

Dr Clarke began by suggesting that low-unemployment is correlated to higher R & D investment (as a percentage of GDP). Dr Clarke outlined the aims and priorities of the OECD and its Working Group on Innovation and Technology Policy. He claimed that the global economy is increasingly knowledge-based and that the information and communication technologies, in particular, are having a pervasive impact on this economy. He also claimed that specialized skills are being increasingly demanded by new jobs. **His conclusion was that government S & T policies can help in the creation and use of new technologies, as a base for high-productivity, high-wage employment.**

The second speaker from abroad was Dr Harry Beckers, Group Research Coordinator for Royal Dutch/Shell and former chairman of EU Industry Research and Development Advisory Committee.

Dr Beckers spent some time outlining the different natures of industrial and academic research. While industrial research grew out of its academic forefathers, its priorities and therefore its needs are different and this has become increasingly apparent over the last few decades. He claimed that it is therefore not appropriate to evaluate industrial research from an academic viewpoint. He outlined levels of R & D that are appropriate for various industrial sectors and warned that companies should stay close to the average R & D expenditure for their industrial sector. **He agreed that the presence of a good scientific infrastructure and the availability of trained and educated employees within a stable environment is of the greatest importance to the multinationals in seeking attractive locations.**

Perhaps the most relevant international speaker from the Irish perspective was Professor Paolo Fasella, as his comments and observations were mostly about the Irish situation. He referred to the comparative shortage of scientists in Ireland, which is especially worrying as the average age of the Irish scientist is one of the highest in Europe. **He made a direct call on the Irish government to improve their funding for science and tech-**



nology, saying that it is not adequate or appropriate to rely so heavily on European funding but that this should be strongly supplemented by funds from the Irish government.

He said that a "neutral" education is necessary to allow long term research benefits and that for a policy to be effective in the long term it must support a wide range of basic research activities.

Professor Paolo Fasella is the Director General of the Science and Technology Directorate of the European Commission.

The final speaker of the session was Mr David Wilkinson, Head of Science and Engineering Base Group of the UK Office of Science and Technology.

Mr Wilkinson informed us of the science policy of the UK government and described the divisions of research funding. The recent White Paper "Realising Our Potential: A Strategy for Science, Engineering and Technology" produced in the UK in May 1993 had as an important tenet the fact that the UK "government accepts its role as the main funder of basic research. It wishes to sustain within the United Kingdom expertise across the core disciplines of biology, chemistry, mathematics and physics and to provide the climate where centres of international excellence can develop and flourish".

The presentations were followed by an open forum. It was clear from the questions asked and views offered that many people present agreed with Professor Fasella's viewpoint that the Irish government was sadly lacking in its support for research, and particularly basic research. The open forum was cut short due to an overrun in the time allotted for the presentations. This was rather unfortunate, as there were surely many people present who had strong and relevant points to contribute.

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