

TECHNOLOGY
FORESIGHT

***ADVISORY GROUP ON
IMPLEMENTATION***

REPORT

July, 2000

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Executive Summary

Following a proposal brought forward by both the Tánaiste and the Minister for Science, Technology and Commerce, the Government, on 22 February 2000, approved the establishment of an Implementation Group to advise on the arrangements and decisions required to ensure the effective launch of the Research Foundation to be established by Forfás, to administer the Technology Foresight Fund. The Group was required to report to the Tánaiste and the Minister within three months of its establishment. The Tánaiste will submit the report to Government.

The Group met for the first time on the 27 March 2000 and held four meetings. It has structured its advice to the Tánaiste and the Minister around what it considers are the most important issues in the establishment of the proposed Research Foundation.

Key issues

- **Scope and Functions of the Foundation**

The Group agreed that the fundamental objective of the Foundation is to develop and maintain in Ireland an enhanced capability in selected areas of basic research that:

- is of intrinsic excellence acknowledged internationally;
- is of a sufficient scale and critical mass that facilitates, promotes and sustains intellectual interchange and discourse between those engaged in the research and with top-class researchers internationally;
- strengthens the scientific foundations on which to develop high-productivity, high-technology, market-driven, knowledge intensive investments, including start-ups, in Ireland in the industrial and services sectors.

- **Foundation Board and Chief Executive Officer (CEO)**

The Group agreed that it is essential that the Board ensure an appropriate strategy for the Foundation based on an extensive consultation process. The Chairperson of the Board should have the ability to command the respect and credibility of industry and the research community. The Group agreed that the appointment of a Chief Executive Officer of exceptional vision, leadership and achievement is pivotal to the success of the Foundation.

- **Allocation of Technology Foresight Fund**

The Group agreed on the approaches that should be adopted for the allocation of the Technology Foresight Fund including in the case of the first “Call for

Proposals”, broad guidelines regarding contractual arrangements, marketing, additionality, scale of projects and intellectual property rights.

- **Technical Advisory Panels**

The Group agreed the broad composition and the nature of the expertise required for the Technical Advisory Panels to be established by the Foundation in the areas of Information and Communications Technologies (ICT’s) and Biotechnology. Each Panel should be chaired by a chairperson who commands respect and credibility with the research community in Ireland and abroad and with research-based, high technology industry in the areas of Information and Communications Technologies (ICT’s) and Biotechnology. The panels should include representatives of industry, the industrial development agencies and the scientific research community from both Ireland and abroad.

- **Foundation Laboratories**

The Group noted that the Government “agreed that the establishment of research laboratories by the Foundation should be an option if necessary to secure world-class performance in the context of a competitive approach to the allocation of funds”. The Group recognised the need for additional research infrastructure and the fact that this may need to be provided by the Foundation. There was consensus in the Group on the possibility of locating such facilities, reporting directly to the Foundation, on or adjoining existing research campuses where they could enjoy or confer synergies with existing activity. The Group expressed differing and strongly held views on the possibility of establishing such facilities/institute on a green-field site. The Group overall favoured retaining the green-field option. Some members, while recognising that it was unlikely that a decision would have to be made on the issue in the immediate term, were of the view that the Foundation should be able to consider this option without an arbitrary time constraint. However, other members felt that a moratorium of three years should be imposed on this issue and that any decision should be based on a recommendation of the Interdepartmental/Agency Steering Group following an objective and independent evaluation and the recommendations be submitted to Government for decision. The Group agreed that any decision on the establishment of Foundation laboratories be based on a rigorous needs assessment. Detailed consideration would have to be given to determining what precise circumstances would need to prevail and what detailed criteria would be applied in the case of the Foundation setting up its own laboratories. Such a decision should be the subject of objective argument and informed judgement following an extensive consultation process.

- **Steering Committee**

The Department of Enterprise, Trade and Employment, which is the Department responsible, through Forfás, for funding the Foundation, should be assisted by a high-level Steering Committee representative of the relevant Government Departments and Agencies. This should ensure an appropriate consultation process in relation to the operation of the Foundation and enhance synergy and policy consistency between Foundation activities and other research funding organisations.

- **Foundation Linkages with other Research Funding Bodies in Ireland**

The Group agreed that it is essential that structured arrangements be put in place for the effective co-ordination of the activities of the Foundation with that of other research funding bodies in Ireland.

- **Foundation activities – Building research capacity on the island of Ireland**

The Group agreed that the establishment of the Foundation provides an opportunity to foster research capacity on the island of Ireland. The Foundation, therefore, should be encouraged to work with research teams and institutions in Northern Ireland and facilitate their involvement in its activities.

- **Foundation Activities – International Collaboration**

The Group considered the scope and nature of the research being funded under EU programmes and that which will be funded by the Foundation. It noted that there are distinct differences in the nature of the research being funded by each in terms of their respective objectives. It agreed that the Foundation should take account of the funding programmes of the EU and other international bodies in its work.

- **Evaluation/Assessment of the Foundation**

The Group agreed that it is essential clear criteria be established against which the activities of the Foundation be evaluated. These would have regard to best international practice in the evaluation of funding arrangements for basic research. It agreed that the activities of the Foundation should be subject to periodic review by an objective, externally conducted process.

- **Annual Report**

The Group agreed that Annual Report(s) should be prepared by the Chief Executive Officer for approval by the Board. These Reports would inter alia describe the research being supported by the Foundation and how it relates to the

objectives for which it is established.

- **Baseline Study**

The Group agreed that the Foundation should conduct a baseline study of the level and status of basic research being conducted in Ireland in the areas of Information and Communications Technologies (ICT's) and Biotechnology as a benchmark against which the activities of the Foundation could be assessed over time. In undertaking the baseline study the Foundation would consult with other bodies engaged in funding and undertaking such research.

- **Conclusion**

The Group agreed on the series of advices outlined in the Report to be submitted to the Tánaiste and the Minister for Science, Technology and Commerce. These summarise the key arrangements and decisions which the Group recommend are required to ensure the effective launch of the Foundation.

Section 1 – Introduction

- 1.1** The strong performance of the Irish economy provides an opportunity to undertake the investments that will help to sustain strong growth and development in future years. Among such investments are those concerned with Research, Technological Development and Innovation (RTDI) which, if effective, can make a major contribution to providing the knowledge and skills to maintain and strengthen the development potential of the economy.
- 1.2** In this context, the Irish Council for Science, Technology and Innovation (ICSTI), based in Forfás, in 1998, carried out, at the request of the Minister for Science, Technology and Commerce, a series of analyses which sought to identify the emerging technologies that would be the key to national economic development in future years and to present a plan of action to address the opportunities and challenges associated with these technologies. These analyses have been encompassed under the title of the Technology Foresight initiative. In carrying out the Technology Foresight analyses, ICSTI consulted widely with scientists, industrialists, Government officials and others. A high degree of consensus emerged from this consultation process on the public policy actions needed to be undertaken in Ireland now in order to achieve the investment required in research and technologies to underpin future economic growth and living standards.
- 1.3** The recommendations in the Technology Foresight Report published by ICSTI in April 1999 contained a specific recommendation that the Minister for Enterprise, Trade and Employment should establish a Fund to invest in research in key areas of technology that can best assist in upgrading the future competitiveness of the traded goods and services sector in Ireland. The Report recognised that achieving such an outcome would require a qualitative shift in the approach to industrial policy in Ireland. This should be accompanied by a significant increase in the level of resources allocated to investment in Research and Development personnel of world class excellence and in Research, Technological Development and Innovation (RTDI) activities which would achieve the excellence and critical mass required to give Ireland an international reputation in selected technological niches.
- 1.4** Against this background and in the context of the widespread acceptance of the importance of such investment, a sum of £1.95 billion has been earmarked by the Government for Research, Technological Development and Innovation (RTDI) activities in the National Development Plan 2000-2006. £560 million from this amount is being allocated to the Technology Foresight Fund. A transformation of the research landscape is, accordingly, underway with the support of these increased resource allocations to RTDI. These developments provide a new agenda for the RTDI component of industrial policy which will

guide the activities of Forfás and the Industrial Development Agencies. These activities will complement the implementation of the existing Programme for Research in Third-Level Institutions (PRTLII), which is administered on behalf of the Department of Education and Science by the Higher Education Authority (HEA), and the activities of the Department of Agriculture and Food and Teagasc in supporting research in the food area, the Health Research Board (HRB) and the Marine Institute in supporting research in their particular areas of responsibility.

1.5 Taking the issues briefly discussed in the preceding paragraphs into account, the Government on 22 February 2000, made the following decisions:

- a) Approved the establishment of a Technology Foresight Fund of up to £560m (€111m) over the seven-year period of the National Development Plan 2000-2006;
- b) Approved, the establishment of a National Strategic Research Foundation as a sub Board of Forfás under the existing Industrial Development Acts as the mechanism for the management, allocation, disbursement and evaluation of expenditure from the Technology Foresight Fund;
- c) Approved the establishment of an Implementation Group to advise on the arrangements and decisions required to ensure the launch of the National Strategic Research Foundation;
- d) Agreed the overall composition of the Group and that it would report to the Tánaiste and to the Minister for Science, Technology and Commerce within 3 months of its establishment and that the report would be brought to Government for approval;
- e) Agreed that the establishment of research laboratories by the National Strategic Research Foundation should be an option, if necessary, to secure world-class performance in the context of a competitive approach to the allocation of funds.

1.6 The Implementation Group referred to in the preceding paragraph held its first meeting on 27 March 2000. At that meeting it adopted the following Terms of Reference which are derived from the proposal submitted by the Tánaiste and Minister and as agreed by the Government:

- a) To advise Forfás on the recruitment of key people to manage the Foundation, in particular the recruitment of the Chief Executive Officer;
- b) To advise Forfás on the arrangements for the disbursement of the Fund to support the R&D activities and facilities required to meet the objectives for the establishment of the Foundation; and

- c) To consider the appropriate relationship which should exist between the Foundation and the existing bodies for research (e.g. HRB, Teagasc, HEA, etc.)
- 1.7** The membership of the Implementation Group is set out at Appendix A.
- 1.8** Presentations were made to the Group by the Health Research Board (HRB) in relation to the Report by its Technology Foresight Advisory Committee and by the CIRCA Group on behalf of Conference of Heads of Irish Universities (CHIU) relating to its report on “Technology Foresight and the University Sector.”
- 1.9** The Group agreed to structure its advice to the Tánaiste and the Minister around a number of key issues, which would be of strategic importance to the setting up of the proposed Research Foundation. The details of the Group’s advice on these matters are outlined in the following sections of the report.

Section 2 – Scope and Functions of the Foundation

2.1 The Group noted the Government’s decision to establish a National Strategic Research Foundation as part of a major new initiative in further developing a world-class basic research capability in Ireland. It further noted with approval that the Government decision to establish the Foundation, under the Industrial Development funding of the National Development Plan, was based on the belief that support of basic research in the two broad areas chosen, (Information and Communications Technologies (ICT’s) and Biotechnology) is an important long-term instrument of industrial policy. The Group also noted that the corollary of that decision is that strong links should be established between the Foundation, the basic research projects funded and the industrial sector.

2.2 Objectives of the Foundation

The Group agreed that the fundamental objective of the Foundation is to develop and maintain in Ireland an enhanced capability in basic research that

- Is of an intrinsic excellence acknowledged internationally;
- Is of a sufficient scale and critical mass that facilitates and sustains intellectual interchange and discourse between those engaged in the research and with top-class researchers internationally in the selected key areas of ICT’s and Biotechnology and
- Strengthens the scientific foundations on which to develop high-productivity, high-technology market-driven, knowledge intensive investments, including start-ups, in Ireland in the industrial and services sectors.

2.3 Functions of the Foundation

The Group noted and approved the functions of the Foundation to promote and encourage basic research of world-class status in key areas of scientific endeavour including the niche areas of Information and Communications Technologies (ICT’s) and Biotechnology. It will manage, allocate, and monitor expenditure on a major new Programme of Basic Research in these areas, which meet the fundamental objectives of the Foundation. It agreed that the potential strategic relevance of research programmes for industrial development purposes will be an important consideration. It noted that the Programme will concentrate, in the first instance, on the fields of Information and Communications Technologies (ICT’s) and Biotechnology. It agreed that an important objective of the Foundation should be to build on the existing basic research capability in Ireland in the third-level sector, in the research institutions and in industry. In doing so, the Foundation should pro-actively and selectively promote the attraction of world-class research teams and individuals to Ireland from around the world. It agreed that the Foundation should fund programmes of research which meet the

tests of world-class excellence determined by competitive international peer review, flexibility of operations and excellence of management arrangements and clear lines of accountability.

2.4 The Sustainability of Basic Research in Ireland

The Group endorsed the significant change in policy approach which underlines the decision of the Government to allocate the substantial resources as those envisaged in supporting basic research in ICT's and Biotechnology through the Technology Foresight Fund. The Group stressed the importance of giving some thought to the issue of the long-term continuation of the approach now being put in place. In this context revenue raising measures, including the question of generating income through the exploitation of Intellectual Property Rights, should be pursued by the Foundation. In the absence of a long term commitment to research funding, the objectives for which the Foundation is being established, as summarised at paragraph 2.2 above, will not be attained.

The Group accepted that:

- Basic research represents a “public good” for which significant State funding is economically justifiable and necessary;
- There is increasing interest by industry in basic research and its funding;
- Structures should be put in place to help the Foundation in the recycling of the proceeds of the exploitation of Intellectual Property Rights (IPR).

These provide a framework through which some aspects of the “sustainability” of the measures now being put in place by the Government can be addressed. The Group agreed that the business models for all organisations are undergoing radical transformation. The Foundation, therefore, should also have the capacity to be responsive to similar change. Arising from these considerations, the Group considered that it was most unlikely that investment in the Foresight programme would produce sufficient direct financial return to the Foundation to allow it to continue a high level of research funding without additional support from the Exchequer and other sources. Nevertheless, the Foundation should make every effort to secure a financial return from its investment in research to make a significant contribution to its future funding activities.

Section 3 –Foundation Board and Chief Executive Officer (CEO)

3.1 Foundation Board

The Group noted the Government had decided that the Foundation will be responsible to and supported by a Board, which will include leading industrialists from high technology companies and internationally respected researchers and research managers from Industry, Third Level Colleges and the Public Sector (including the HEA). It noted that the composition and functions of the Board will be determined by the Tánaiste and the Minister for Science, Technology and Commerce in accordance with modern, good corporate governance practice. It agreed that it is essential that the Board ensure an appropriate strategy for the Foundation based on an extensive consultation process, that funds be allocated in a way which is consistent with this strategy, that the Board ensure that arrangements are put in place to evaluate the progress of the Foundation relative to its objectives and that transparency and clear accountability govern its operations in line with the principles of good corporate governance. While the Group saw some merit in the proposal made to Government by the Tánaiste and Minister that the Chairperson of the Board be an industrialist, it considered that the fundamental determinant should be his/her qualities as a Chairperson and the ability to command the respect and credibility of industry and the research community.

The functions of the Board should, inter alia, include:

- Advising and assisting the CEO and senior management in the delivery of the Foundation's objectives;
- The approval of strategies to achieve world class capacity in research in the selected areas;
- The approval of an Action Plan for the Foundation;
- The approval of annual and multi-annual budgets for the Foundation;
- The approval of the accounts of the Foundation;
- The approval of the appointment of a Chief Executive Officer (CEO);
- Ensuring the outputs and impacts of the research funded by the Foundation are monitored and evaluated.

3.2 Chief Executive Officer (CEO) - Characteristics required

The Group agreed that the appointment of a Chief Executive Officer of exceptional vision, leadership and achievement is pivotal to the success of the Foundation as an organisation of high standing with research bodies and research-based industry in Ireland and abroad. The Group agreed that the person sought should carry major credibility with the international research community including those in industry. He/she should be a person of outstanding leadership qualities and intellectual

ability. The CEO should also be a person of demonstrable vision, enterprise and energy and should have an outstanding record of achievement. It recommends that the Chief Executive Officer of the Foundation should, ex-officio, be a member of the Board of the Foundation.

3.3 Recruitment

The Group noted that Forfás had undertaken preliminary work in preparation for the recruitment process, including having meetings with key organisations in the UK, Europe and the US for this purpose. The Group agreed that the services of specialised recruitment advisors would be required to assist in identifying long and short lists of candidates for the post of Chief Executive Officer of the Foundation and noted that key recruitment bodies have been identified for this purpose. Given that the objective is to have the process of selection well advanced by the end of 2000, the Group agreed that it was essential that a profile specification for the post and the recruitment process should be initiated immediately.

3.4 Functions of the CEO

The Group agreed that the key functions of the CEO of the Foundation should be to:

- Develop an Action Plan for the Foundation in accordance with the policy guidelines set out by the Department of Enterprise, Trade and Employment and Forfás;
- Have responsibility for developing the organisational structures for the Foundation;
- Devise strategies to deliver world-class research in the areas selected by the Foundation;
- Consult extensively with Government Departments and other research funding bodies in Ireland, including the Health Research Board, the Department of Agriculture, Food and Rural Development, the Department of the Marine and Natural Resources and the Higher Education Authority, Enterprise Ireland and IDA Ireland (all of which have specific statutory research responsibilities), in carrying out his/her functions to ensure that funding proposals are complementary and additional to existing activities;
- Propose and recommend to the Board of the Foundation annual and multi-annual financial allocations to activities which will lead to the achievement of the Foundation objectives;
- Monitor the implementation of funded proposals;
- Promote and exploit the commercialisation of the results of Foundation funded research;
- Ensure that proper monitoring and evaluation systems are in place to identify the outputs and impacts of the investment in research;
- Put in place appropriate financial control procedures to ensure that public monies are properly disbursed and accounted for;
- Undertake ongoing liaison with policy-makers in the relevant Government Departments in order to facilitate the prioritisation of future funding for research;

- Raise Ireland's international ranking in basic research in the areas funded by the Foundation by increasing the proportion of international research in these areas carried out in Ireland.

In addition, it is expected that the CEO should be a person of such stature that he/she will have the capacity to

- Support the Tánaiste and Minister for Enterprise, Trade and Employment and the Minister for Science, Technology and Commerce in making proposals to Government to promote investment in world-class research relevant to Irish economic needs;
- Act as adviser to the Government, Taoiseach, Tánaiste and Minister for Enterprise, Trade and Employment and the Minister for Science, Technology and Commerce on the development and implementation of science policies in Ireland.

Section 4 – Allocation of Technology Foresight Fund: Some Key Issues

4.1 The Group agreed strongly that a first “Call for Proposals” for activities to be funded from the Technology Foresight Fund should be initiated as soon as possible. The Group was briefed on the preparations being made by Forfás for such a first call for proposals and on the approach envisaged pending inputs from the Advisory Group on Implementation and inputs from relevant sources including the conclusions of a number of workshops conducted by Forfás on issues such as Intellectual Property Rights and the Peer Review Process. The Group addressed the following main issues:

4.2 Contractual Arrangements

There was general agreement that, for the First Call for Proposals, contractual arrangements would be drawn up between the Foundation/Forfás and the host organisations (universities, research institutions, institutes of technology, industry with research facilities). The Group recommended that a template for a model contract be prepared by Forfás. It was noted that there is considerable merit in ensuring that specific legal entities i.e. third level and other research institutions, should be party to contracts rather than individual researchers. The researchers involved will require to be contracted directly to the host organisation where the research is done. Issues such as extent of teaching duties (see paragraph 4.5 below), sharing of facilities/equipment, intellectual property and other personnel matters shall be dealt with on a case by case basis between the institution in which the research is carried out (the host organisation) and the researcher(s) and agreed with the Foundation by the host organisations. The Foundation will reserve the right to terminate the contract and recover funds if, for example, the researcher or host organisation should fail to comply with any of the conditions in the contract.

4.3 Marketing

There was general agreement that a strong marketing effort to promote the objectives of the Foundation would be appropriate. It was agreed that special efforts would be needed to encourage researchers who may not be currently resident in Ireland to apply. It was noted that a number of Universities are already in discussions with researchers from around the world with the aim of attracting top class research capability to Ireland with the support of the Foundation and there was agreement that this approach should be strongly encouraged.

4.4 Overheads to be claimed by organisations

It was agreed that it would be essential to have a balanced pragmatic approach to funding overheads and this could be achieved by benchmarking against best practice procedures adopted by bodies engaged in funding basic research in Ireland and in other countries. It was agreed that the question of access to Foundation funded equipment and vice versa should be specifically addressed in contracts.

Given the complexity of issues associated with funding overheads and the wide divergence of practices used by research funding agencies both at home and abroad, it was agreed that Forfás would convene a meeting of experts from the funding agencies and CHIU to get their advice on this issue. This Group would examine the policy issues in relation to overheads in advance of the Foundation signing the first tranche of contracts.

4.5 Additionality

It was agreed that ensuring that the research activity supported represents a substantive addition to what is in place already in Ireland is a key strategic issue for the Foundation. The Government agreed to the establishment of the Foundation on the premise that the Foundation would achieve a very significant increase in the level, quality and scale of basic research capability in the areas of ICT and Biotechnology in Ireland. The Group noted that this will result in a substantial increase in the number of full time research personnel engaged by the various research bodies in Ireland. The Group also recognised the importance of maintaining close links between the research work undertaken in third level institutions and the education (particularly teaching role) of these institutions. The Group emphasised that good research facilities attract and retain good academic staff in third level institutions with a consequential upgrading of both the research and teaching capability of the third level system. This in turn improves the quality of student intake and output to the benefit of industry and society at large. The Group recognised that some academic teaching and service responsibilities (e.g. as with health research) may be required and saw merit in researchers sharing the benefits of their experience with the wider academic community. They agreed that researchers funded by the Foundation could have limited teaching responsibilities and that the level of these responsibilities will be agreed between the researchers, the relevant institutions and the Foundation.

4.6 Fellowships

The Group agreed that the funding of Fellowships, while an important strategic issue for the Foundation, is not a priority in the First Call. It was agreed that the overall concept should be kept active but “parked for the moment” as it was considered more appropriate to concentrate on funding teams during the First Call.

4.7 Scale of Projects

The Group agreed that, in publicising the First Call, a signal should be sent to potential Principal Investigators (PI's) that proposals of "up to £1m per annum" would be entertained. This would give a significant indication of the scale of projects which could be considered.

4.8 Baseline Study

The Group agreed that a baseline study to establish the present level, quality and capability in basic research in ICT's and Biotechnology in Ireland should be carried out as a matter of urgency. The study, to be commissioned by the Foundation, should be undertaken by an international body of standing in the area of research evaluation and should address the level, scale and quality of basic research being undertaken in Ireland in the year 2000 in these two areas. This will facilitate the Foundation in establishing how this capability compares with best international practice in these areas and help to provide parameters against which the progress of the Foundation can be evaluated over the coming years. The study should be carried out by the Foundation in consultation with Department of Agriculture, Food and Rural Development, the Office of Science and Technology, the Department of Health and Children, the Department of Education and Science, the Department of Marine and Natural Resources, HEA, HRB, Teagasc, Enterprise Ireland, IDA and other organisations as appropriate. It would link, as appropriate, with any benchmarking and evaluation studies being carried out by these organisations.

4.9 Intellectual Property Rights (IPR)/exploitation

It was agreed that it should be a priority for the Foundation to establish a clear policy on IPR, given that Principal Investigators (PI's), who wish to bid for funding, will need to be informed of the overall IPR position. The Group agreed that this policy should provide for an appropriate share of the benefits, including financial, which accrue from research funded by the Foundation to be assigned to the Foundation for use in the further development of the activities of the Foundation. The Foundation should pay particular attention to putting in place arrangements for commercial exploitation of activities funded by the Foundation where activities with such potential arise. This should be done in consultation with bodies such as Enterprise Ireland which have experience in developing such an approach and in order to ensure that commercial exploitation takes place in Ireland to the greatest extent possible consistent with the objective of full commercial exploitation.

A particular objective would be, in so far as it is realistic and possible, to have the benefits of exploiting the research here in Ireland and the Foundation and the relevant state agencies should work together to maximize that objective.

4.10 Foundation activities – Building research capacity on the island of Ireland

The Group agreed that the establishment of the Foundation provides an opportunity to develop research capacity on the island as a whole. The Foundation therefore should be encouraged to work with research teams and institutions in Northern Ireland and facilitate their involvement in its activities. The Trade and Business Development Body could provide the mechanism for building on the strengths of relationships that already exist with Northern Ireland, notably in the health research area.

Section 5 – Composition/Role of the Technical Advisory Panels

- 5.1** The Group noted the Government decision that the Foundation will be supported by advisory panels to advise on policy and strategy in relation to promoting and funding basic research in the areas of ICT's and Biotechnology. The panels will advise the Foundation on a range of issues as set out below and will not be responsible for decisions in relation to the funding or selection of individual projects. The panels should advise on:
- An appropriate consultation process (national/international) which will facilitate the selection of areas for funding in the areas of Information & Communications Technologies (ICT's) and Biotechnology;
 - The required calibre and characteristics of Research Team Leaders;
 - The broad principles for the allocation of funds between the different areas of research activity;
 - The scope and shape of “Calls for Proposals”;
 - The required strategies to build up selected areas of research excellence and to attract and maintain world-class researchers in Ireland;
 - The identification and selection of experts who will serve on international peer review evaluation committees.
- 5.2** Each of the two Advisory Panels should have 12 members including:
- A chairperson with a high international reputation in research and industry;
 - Members of the scientific research community in Universities and other research institutes who are of international standing;
 - Industry representatives who are senior executives of companies which have a strategic commitment to R&D;
 - Representatives from the industrial development Agencies (e.g. IDA/Enterprise Ireland) and
 - Other leading international figures (industrialists or people from research institutions) who can provide an international perspective on how the objectives can best be attained and who can act as “ambassadors” for the activities of the Foundation.

Section 6 – Foundation Laboratories

6.1 Government Decision.

The Group noted that the Government “agreed that the establishment of research laboratories by the Foundation should be an option if necessary to secure world-class performance in the context of a competitive approach to the allocation of funds”. In accordance with the Memorandum submitted to Government this option would only be exercised following a detailed “needs assessment” and close consultation with existing bodies engaged in basic research in Ireland.

6.2 Provision of Additional Facilities

The Group recognised the need for the provision of additional infrastructure, such as bio-resource centres, additional laboratory facilities and new high-end ICT research capability. The Group also recognised that cost or scale considerations could indicate that additional facilities should be provided on a national basis and be available to all researchers in Ireland. There was consensus on the possible need for such facilities to help secure the objectives of the Foundation.

6.3 Location

On the issue of location the options ranged from locating laboratories/facilities adjoining or on existing research campuses and integrating them with existing research facilities or on an independent green-field site separate from existing research or academic facilities. There was consensus in the Group on the possibility of locating such facilities, reporting directly to the Foundation, on or adjoining existing research campuses where they could enjoy or confer synergies with existing activity. The Group expressed differing and strongly held views on the possibility of establishing such facilities/institute on a green-field site. The Group overall favoured retaining the green-field option. Some members of the Group, while recognising that it was unlikely that a decision would have to be made on the issue in the immediate term, were of the view that the Foundation should be able to consider this option without an arbitrary time constraint. However, other members felt that a moratorium of three years (see paragraph 6.6) should be imposed on this issue and that any decision should be based on a recommendation of the Interdepartmental Steering Group in conjunction with the Foundation and the recommendations be submitted to Government for decision. These members argued that the needs assessment should be commissioned by the Steering Group and should be conducted to the highest international standards by top level international scientists supplemented by members of the Irish research community.

Some Group members believed that well resourced universities, modelled on the best in the US research system, represent the best place to carry out and sustain a

world-class basic research effort in Ireland. They stated that world class basic research capability already exists within the Irish University system despite the fact that the sector had, until recently, been underfunded. In order to develop and fulfil the potential for achieving basic research excellence, they considered that substantial investment is required to alleviate present infrastructure deficiencies and to attract back to the existing research system in Ireland both world-class Irish researchers who now work abroad together with other world class researchers who wish to work in a new research environment. They argued that:

- While the primary product of Technology Foresight will undoubtedly be knowledge to underpin industrial development into the future, equally important for economic development is the education and training of people skilled in the generation of new knowledge and its application, and growing our third level infrastructure would be the best option available to achieve these complementary goals;
- The US model of research funding, suitably adapted, would be very relevant to Irish circumstances, especially given the significant base of US companies and the objective of the Foundation to deepen their involvement in Ireland by creating the environment in which they could be encouraged to locate research.

6.3.1 Independent Green-field Site

A number of Group members expressed strong reservations against the concept of stand-alone green-field Foundation research facilities in an Irish context stating that:

- They would require considerable financial investment – both capital and current - thereby reducing the funding available for the key objective of supporting research teams;
- There was a high risk of accumulating rigidities and inflexibilities in terms of personnel and activities. Major problems would arise when stand-alone institutions no longer fulfilled their missions or when a change in mission would be required;
- It would create “enclave” activities with poorly integrated links to the educational system – in particular the reduced opportunities for ensuring inputs from research into teaching and the training of postgraduates which would reduce the potential contribution by Foresight to the creation of a world class scientific and technological cadre in the selected priority areas;
- Some key researchers in the areas of interest to Foresight might leave universities and other research establishments;

- It would result in slower start-up times for projects than would be the case within existing institutions;
- There could be risks of poor co-ordination with recent investments in research in universities and other third level institutions in particular the Programme of Research for Third Level Institutions (PRTL). More than £120m will be spent through the third level sector on research in Biotechnology and ICT's under the PRTL over the next 4 years;
- There would be difficulty in attracting researchers from abroad to a start-up operation. World leading researchers may not leave career track appointments in leading world level universities to come on a five year contract to a new research institute with no track record but would be more likely to be attracted to career or contract positions in established universities and institutes
- It would be an inefficient way to spend the monies allocated to the programme. The Foundation could end up being pre-occupied with its own bricks and mortar rather than encouraging world-class research and the laboratories themselves would not be good value for money.

Others expressed the view that the option of creating a new independent institute or laboratory on a green-field site, like the successful institutes operating in Germany, Israel, the UK and the US, had significant merit and would offer the following advantages:

- It would provide a flagship for the new basic research ambition for Ireland giving the required visibility, scale and critical mass. This would support efforts to get high-class research based industries to stay in or to move to Ireland;
- A single location could be selected for the research laboratories for both the Biotech and the IT activities permitting new and timely synergies that should emerge;
- It would ensure that focus on generating a special research ethos is created from the start with the capacity for a versatile and responsive approach;
- The researchers would have the flexibility to work in a manner that is free from involvement in other activities that inevitably arise on a third level campus (e.g. committee activities) and concentrate on their core research objectives;
- The boundaries between different national funding agencies would be clearly delineated. This would avoid situations where the different policies for the different agencies give rise to a compromise rather than the decision which is best for the Foundation's research agenda;

- It would be more visible than the addition of a building, or the taking over of an existing space in a university. This visibility would facilitate the development of good linkages between Foundation activities and those in industry which is a key objective of the Government decision to establish the Foundation;
- The provision of facilities of a scale and cost beyond the capability of any one existing research entity would be facilitated. The facilities of an independent Foundation laboratory could be made available to all research bodies (thus avoiding the creation of “enclave” activities) operating in Ireland and would facilitate joint research projects between these bodies and the Foundation;
- A neutral site would avoid the inevitable complexities and recriminations that would arise when individual universities were chosen for national facilities and would ensure that the easy option of spreading Foundation laboratories around 'all' of the campuses is avoided; (It was noted however by some members that this distribution issue had not arisen in the case of the PRTL where outcomes are solely determined by the competitive process.)
- Foundation laboratories would facilitate interaction with staff and students across the entire University system rather than with those of a particular University where the facilities might otherwise be located. This would be to the benefit of the overall education mission of the Universities;
- Good co-ordinating arrangements between the Foundation and the HEA and other research bodies can be put in place and progress had already been made in this regard (see paragraph 8.2)

6.4 Governance

The governance options would be significantly influenced by the location chosen by the Foundation. There was consensus that the Foundation would need to have a strong role in the governance of Foundation-funded laboratories. If these were located on the campus of an existing research facility, the Foundation would need to ensure that the facilities were available to the wider national research community rather than just the host institution. Similarly, if the facility were located in a green-field site, the governance structure would need to accommodate national usage, not just Foundation funded activity. The ultimate governance structure would require to be determined in the context of the arrangements for the support of research laboratories decided upon. The possibility of facilities being owned or governed by a consortium of stakeholders, such as existing Universities, should not be ruled out.

6.5 Impact on Competition

Competition, with outcomes determined by rigorous international assessment,, was seen by all members of the Group as a necessary condition for ensuring quality outcomes. Some members argued that the establishment of Laboratories by the Foundation would damage the competitive process because tension would arise within the Foundation between funding research in its own laboratories and in other institutions. The Foundation would be under strong pressure to favour funding programmes in it's own laboratories and over time this would damage the quality of research and the economic outcomes.

These members were also concerned that if new stand alone laboratories were established at an early stage in the Foresight programme that they would, as a result of their difficulties in attracting top level personnel internationally cause unproductive competition with the Universities for the best quality research scientists from the existing University structure. This would have consequential adverse effects on research and teaching capabilities and quality of degrees conferred by the Universities and with no net benefit to the national research effort.

Others argued that separate laboratories would stimulate competition. They suggested that there is no reason why the “risk of losing key researchers” from Universities to Foundation laboratories should happen since the Universities are prepared to compete on equal terms for research funding from the Foundation. They also noted that decisions on the funding of projects by the Foundation would be decided by a process of competition and international peer review. This approach would accordingly confer no particular advantage to a proposal received from any Foundation Laboratories which might be established following a needs analysis.

6.6 Timescale for Decision

Given the background of such a change to our research environment and the consistent underfunding of basic research in Irish universities for many years, some members felt that there should in effect be a moratorium of at least three years from the Foundation's establishment before any decision is taken on the setting up of stand-alone Foundation Laboratories. They argued that during this time funding could be spent on building world-class basic research capability on our existing base. This could include the establishment of quasi-freestanding institutes in association with one or more universities (ideally on a university campus such as the NMRC model) to ensure synergy between research and high level education and training. They felt that during this time, a determined effort would continue to be made by the universities and other institutions to increase

operational efficiency and flexibility so as to enable the establishment of realistic and workable inter-institutional collaborative mechanisms to deliver on the world-class basic research objectives of the Foundation. Following this moratorium, a needs assessment, which should be professionally conducted to the highest international standards, should be carried out. This would include an actual evaluation of the performance of the existing institutions in winning and delivering on Foundation funded projects. The basic criteria to be applied should essentially be evidence of non-performance by the university/existing institute sector in areas of basic research considered critical by the Foundation and compelling evidence that this non-performance could be rectified by setting up an independent research laboratory. These Group members stated that this needs assessment should be a major undertaking given the important implications for the future of research in Ireland as well as the Foundation. Accordingly they felt that it should be commissioned by the proposed inter Departmental/Agency Steering Group and that the recommendations be submitted to Government for decision. In the opinion of these members the needs assessment should be set in the context of

- (a) an agreed statement of the specific research objectives of the Foundation;
- (b) the research objectives to be sought in the selected priority areas;
- (c) identification of the shortfalls and constraints in the capability of the existing research system to achieve these objectives;
- (d) an evaluation of the financial implications and potential effectiveness of the alternative strategies and approaches for addressing those specific constraints and shortcomings.

Other members expressed the view that the Foundation should be in a position to exercise all options from the outset through which the objectives of the Foundation should be achieved and should be able to pursue its objectives without being bound by an arbitrary time constraint. While recognising that it was unlikely that a decision would have to be made on the issue in the immediate term, they argued that Government had not set such a time constraint. The option, therefore, as provided by Government should be able to be exercised by the Foundation when it was appropriate, taking the various issues identified into account. They expressed concern that setting down arbitrary time limits at the outset would create a period of uncertainty and therefore should be avoided. They advocated that a dynamic open view on issues should prevail within the Foundation so that decisions are made on the basis of the contribution that could best be made to meeting the objectives of the Foundation. They felt that there was no rational basis for delaying the implementation of whatever decision was appropriate given the late stage at which Ireland was growing its basic research capacity. These members stated that the Foundation itself should carry out the required needs assessment in relation to the establishment of laboratories. If this responsibility was removed from the Foundation it would seriously compromise its status and credibility and undermine its ability to recruit a CEO of the high calibre and characteristics as set out in Section 3 of the Report.

6.7 Conclusions

The Group recognised the need for additional research infrastructure and the fact that this may need to be provided by the Foundation. There was consensus in the Group on the possibility of locating such facilities, reporting directly to the Foundation, on or adjoining existing research campuses where they could enjoy or confer synergies with existing activity. The Group expressed differing and strongly held views on the possibility of establishing such facilities/institute on a green-field site. The Group overall favoured retaining the green-field option. Some members, while recognising that it was unlikely that a decision would have to be made on the issue in the immediate term, were of the view that the Foundation should be able to consider this option without an arbitrary time constraint. However, others felt that a moratorium of three years should be imposed on this issue and that any decision should be based on a recommendation of the Interdepartmental/Agency Steering Group following an independent and objective evaluation and the recommendations be submitted to Government for decision.

The Group concluded that:

- The ultimate success of the Foundation in meeting its objectives will depend on the excellence, scale and reputation of the scientific endeavours funded and supported by the Foundation in its contribution to Ireland's industrial development strategy over time;
- Achieving the required fundamental upgrading of basic research facilities to the standards of excellence acknowledged internationally would involve building, in the first instance, on existing capabilities in Ireland in this area i.e. in the Third level Sector and other Research Institutes;
- Detailed consideration would have to be given to determining what precise circumstances would need to prevail and what detailed criteria would be applied in the case of the Foundation setting up its own laboratories. Such a decision should be the subject of objective argument and informed judgement following an extensive consultation process;
- The importance of making the right decision on this matter was paramount and there should be no a priori commitment to the location, governance or establishment of such facilities or conversely;
- Any decisions in this area would have to take into consideration not only the short-term immediate objectives of the Foundation but also the wider impact of any decision on the objective of enhancing research and human capital in Ireland.

Section 7 – Steering Committee

- 7.1** The Group agreed that the Department of Enterprise, Trade & Employment, which is the Department responsible for funding the Foundation through Forfás, should be assisted by a high level Steering Committee in order to ensure an appropriate consultation process in relation to the operation of the Foundation and enhance synergy and policy consistency between Foundation activities and other research funding organisations. The Department of Enterprise, Trade and Employment will chair the Committee which would include Forfás, Enterprise Ireland, IDA, the Department of Education & Science/HEA, the Department of Finance, the Department of Health and Children/HRB, the Department of Agriculture, Food and Rural Development/Teagasc, the Department of Marine and Natural Resources/Marine Institute, the Department of Public Enterprise and the Department of the Environment and Local Government/Environmental Protection Agency.
- 7.2** The Steering Committee should therefore be an integral and coherent part of the consultative process in relation to the policy and funding of the Foundation. In addition it was agreed that the Steering Group should also be primarily responsible for commissioning periodic arms length evaluations of Foundation funded and other national research activity.
- 7.3** Some Group members expressed the view that the Steering Committee should be the body to commission the needs assessment required in relation to the establishment of independent Foundation laboratories (Section 6)

Section 8 - Linkages with other Research Funding Bodies

8.1 Interaction with other funding Agencies

It was noted that a degree of overlap and duplication (and possibly substitution) in funding basic research projects could take place if appropriate consultation and communications arrangements are not in place between different State agencies involved in supporting basic and other research in Ireland. The Group strongly recommended that appropriate arrangements be put in place to facilitate information sharing between such agencies. The Group also agreed that the interaction between the different funding agencies should extend beyond purely the exchange of information to include liaison on policy issues. Co-ordination should therefore take place in the context of the different missions of each organisation.

8.2 Outcome of ongoing discussions

The Group noted that good consultation arrangements had already been initiated by Forfás with other funding agencies. Arising out of discussions that had taken place and which will continue, Forfás will continue to consult with the other research funding agencies before the issue of the First Call for Proposals so that any co-ordination issues that might arise can be discussed and incorporated in the documentation. The issue of substantial capital funding by the Foundation in buildings in third level institutions needs to be addressed. This is an issue which will require very careful consideration and co-operation particularly between Forfás and the HEA in order to avoid serious problems occurring down stream. Further consideration will also be given by Forfás and research agencies to the setting up of a small working group with membership drawn from all the relevant agencies, with perhaps an independent chair and secretary, which would work out protocols/arrangements for co-operation, observer status and exchanges of information between the agencies in respect of the funding of research. While some structures, processes and procedures may of interest to all the agencies, it is likely that there will be a strong bilateral element to some of the arrangements (particularly in respect of the exchanges of information) given the fact that the agencies have different missions, needs and requirements.

Section 9 – Integration with European Union Research Programmes

- 9.1** The Group noted the scope and nature of the research being funded under the EU Framework Programmes and those which the Foundation will fund and noted both similarities and distinct differences in the nature of the research being funded by both in terms of their respective objectives.
- 9.2** EU Programmes are carried out in the context of relevance to society and focus on the scientific excellence of the research projects being funded by them. Scientific excellence will also be the key component of Foundation funded activities but a fundamental difference lies in the narrower, more focused scope of the sectors of research to be funded by the Foundation (i.e. Information and Communications Technologies (ICT's) and Biotechnology). A further difference lies in the interest of the Foundation in the commercial exploitation of Intellectual Property arising from Foundation activities. There is also a fundamental difference in that the focus of Foundation activities will be on the relationship between the research supported and the specific long-term development needs of the Irish economy. While there will undoubtedly be a certain overlap of interest between the activities of the Foundation and those of the EU in the research fields, these are not fully congruent.
- 9.3** While the Group noted that the Technology Foresight objectives are being determined by national policy requirements, it also noted that in following such an approach it will be important for the Foundation to establish international linkages with other highly reputable research funding agencies/organisations particularly in Europe (e.g. EMBO, Wellcome Trust, MRC etc.) and in the US (e.g. NSF/NIH).
- 9.4** The Group agreed that the Foundation should monitor EU Developments and liaise closely with the Department of Enterprise, Trade and Employment in the context of Irish negotiations on Framework Programme policy and the discussions on the European Commission Communication on the European Research Area.

Section 10 - Evaluation and Indicators

10.1 The Group agreed that the Chief Executive Officer (CEO) should prepare an annual report for the Board and High Level Steering Committee referred to in Section 7. This Report would describe the research being supported by the Foundation and how it relates to the objectives for which it is established. The Report will be prepared in association with 4/5 international experts, who will assess the status of the research being undertaken and facilitate benchmarking of the indicators, where appropriate. Given the objective of achieving basic research excellence, the Group recognized that it will be difficult to establish a direct linkage between the activities of the Foundation and specific outcomes such as new industries. They agreed, however, that the Report could evaluate the performance of funded activities against key indicators such as:

- International quality and recognition of research e.g. citations and publications;
- Production of researchers, including exchanges with industry;
- The number of companies establishing R&D activities in Ireland because of the availability of R&D excellence in the field;
- Total expenditure by business on R&D in related sectors;
- The quality of industry linkages with funded R&D activities e.g. strategic partnerships, other collaborative arrangements, personnel exchanges, IDA visits;
- Intellectual property generated and extent of commercialisation of research e.g. company spin-offs;
- Other external linkages (e.g. association with other international institutions involved in international collaborative projects);
- The number of postgraduate students involved in research funded by the Foundation;
- The number of postdoctoral researchers;
- The capacity to attract world class researchers to work in Ireland;
- The number of start-up and campus companies linked to research funded by the Foundation.

Appendices

- A** Members of the Technology Foresight Advisory Group on Implementation

- B** Organigram for Foundation

Members of the Technology Foresight Implementation Group

Chair

Paul Haran Secretary General, Department of Enterprise, Trade and
Employment

Other Members

Jennifer Condon Director, National Software Directorate

Jim Flanagan Department of Agriculture, Food and Rural Development

Frank Gannon Executive Director, European Molecular Biology
Organisation (EMBO)

Ronald Long Assistant Secretary, Department of Enterprise, Trade &
Employment

Frank McCabe Vice President, Intel Corporation (retired)

Michael Murphy Chairman, Health Research Board (HRB)

Niall Ó Donnchú Department of Public Enterprise

Eda Sagarra Chairman, Research Council for the Humanities and Social
Sciences

Brian Sweeney Chairman, Siemens Group Ireland

Don Thornhill Chairman, Higher Education Authority (HEA)

John Travers Chief Executive Officer, Forfás

Gerry Wrixon President, National University of Ireland, Cork (*representing
the Conference of the Heads of Irish Universities*)

Secretary

Mattie McCabe Department of Enterprise, Trade and Employment

Structure for Foundation

Foundation Board

CEO

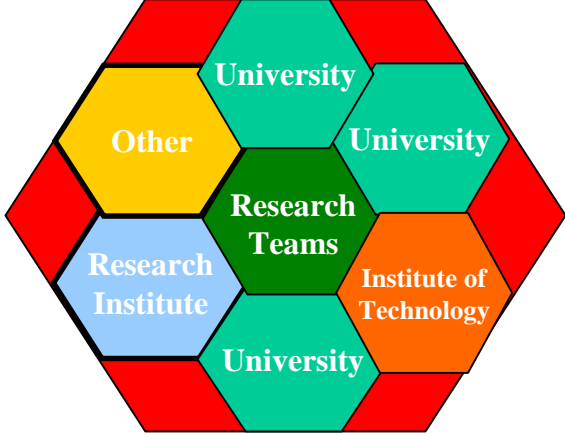
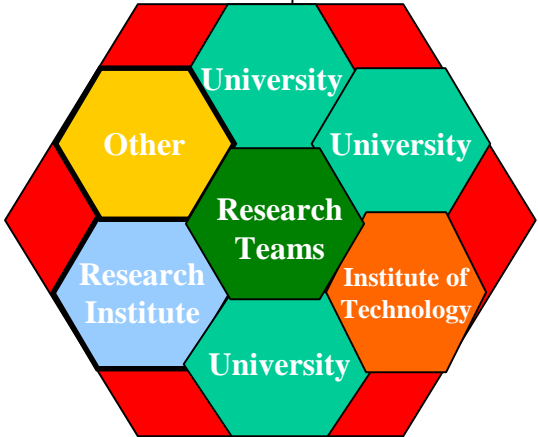
**Interdepartmental / Agency
Steering Committee**

Biotechnology Division Manager

ICT Division Manager

Biotechnology Advisory Panel

ICT Advisory Panel



The Government, in February 2000, agreed that the establishment of research laboratories by the Foundation should be an option if necessary to secure world class performance in the context of a competitive approach to the allocation of funds.