Forfás

The 4th Framework Programme in Ireland

An Evaluation of the Operation and Impacts in Ireland of the EU's Fourth Framework Programme for Research and Development

THE NATIONAL POLICY AND ADVISORY BOARD FOR ENTERPRISE, TRADE, SCIENCE, TECHNOLOGY AND INNOVATION

FUNCTIONS OF FORFÁS

Is é Forfás an bord náisiúnta um polasaí agus comhairle le haghaidh fiontraíochta, trádála, eolaíochta, teicneolaíochta agus nuála. Is é an comhlacht é a bhfuil comhactaí dlíthiúla an stáit maidir le cur-chun-cinn tionscail agus forbairt teicneolaíochta dílsithe ann. Is é an comhlacht é freisin trína dciomnaítear cumhachtaí ar Fhiontraíocht Éireann le tionscail dúchais a chur chus cinn agus ar ghníomhaireacht Forbartha Tionscail na hÉireann (GFT Éireann) le hinfheistíocht isteach sa tir a chur chun tosaight.
Is iad feighmeanna Fhorfáis:

- comhairle a chur ar an Aire ó thaobh cúrsaí a bhaineann le forbairt tionscail sa Stát
- comhairle maidir le forbairt agus comhordú polasaithe a chur ar fáil d'Fhiontraíocht Éireann, d'GFT Éireann agus d'aon fhoras eile dá leithéid (a bunaíodh go reachtúil) a d'fhéadfadh an tAire a ainmniú trí ordú
- forbairt na tionsclaíochta, na teicneolaíochta, na margaíochta agus acmhainní daonna a spreagadh sa Stát
- bunú agus forbairt gnóthas tionsclaíoch ón iasacht a spreagadh sa Stát, agus
- Fiontraíocht Éireann agus GFT Éireann a chomhairliú agus a chomhordú ó thaobh a gcuid feidhmeanna.

Forfás is the national policy and advisory board for enterprise, trade, science, technology and innovation. It is the body in which the State's legal powers for industrial promotion and technology development have been vested. It is also the body through which powers are delegated to Enterprise Ireland for the promotion of indigenous industry and to IDA Ireland for the promotion of inward investment. The broad functions of Forfás are to:

- advise the Minister on matters relating to the development of industry in the State
- to advise on the development and co-ordination of policy for Enterprise Ireland, IDA Ireland and such other bodies (established by or under statute) as the Minister may by order designate
- encourage the development of industry, technology, marketing and human resources in the State
- encourage the establishment and development in the State of industrial undertakings from outside the State, and
- advise and co-ordinate Enterprise Ireland and IDA Ireland in relation to their functions.

BOARD MEMBERS

The 4th Framework Programme in Ireland

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EXECUTIVE SUMMARY

The experience of the European Union's (EU) Fourth Framework Programme (FP4) in Ireland has to be regarded as a success for the following reasons:

- Ireland captured 191 MECU of EU funding, 30% of which went to industry
- The number of Irish participations doubled from FP3 to FP4
- The number of organisations involved increased by over 250%
- The number of projects per member of the Irish Research and Technological Development (RTD) community was higher than in all countries other than Greece
- The number of projects divided by the Irish contribution to the EU budget was also higher than in all countries other than Greece

Some of these achievements fell below the extremely ambitious targets set at the outset of the programme. Specifically, Ireland had hoped to capture 240 MECU of EU funding for RTD. It was also hoped that industry would capture 40% of this total. With hindsight, however, it is apparent that these targets were over ambitious for FP4 as a whole. Certainly the proportion of funding captured by Irish industry met initial targets in the more industry-oriented programmes, but FP4 also contained many 'academically-oriented' programmes which lowered industry participation levels across FP4 as a whole in both Ireland and the EU overall.

One of the most important consequences of FP4 was that it allowed Ireland to expand its research base as a precursor to its current attempt to become a knowledge-based economy. Over the period of FP4, public investment in the R&D base was comparatively low and insufficient to fuel the type of expansion required. FP4 funding was additional to Government expenditure on R&D and in scale approximated to three quarters of all State funding of R&D in the business sector and almost half of State contributions to tertiary level institutions. There is little doubt therefore that FP4 played a vital part in maintaining and expanding the Irish research base.

Its impact on the academic research base was particularly marked. The Irish tertiary sector has been extraordinarily dependent on FP4 and earlier Framework Programmes for research funding. In a very real sense, the current strength and even the very existence of the university research community in Ireland can partly be attributed to its involvement in successive Framework Programmes.

For Irish industry, involvement in FP4 was also rewarding. Over 450 firms took part, 90% of them of Irish origin. Framework provided these firms with the additional funds needed to access complementary expertise, enhance internal knowledge bases and increase overall exploitation potential, with two-thirds claiming that the benefits of involvement outweighed the costs and less than 10% stating that costs outweighed benefits.

As in most collaborative RTD programmes around the world, direct commercial exploitation of project outputs was not the norm, though 60% of participants either had plans for commercialisation or had already received some commercial returns. A small number had had spectacular success as a result of participation in Framework Programmes, but overall FP4 allowed Irish industry to raise technological capabilities on a broad front, with improved competitiveness a long-term rather than a short-term consequence.

As far as most participants were concerned, FP4 was also well implemented, with much praise for the help received from the Irish National Delegates and from Commission staff. Naturally there were some dissenting voices, with many finding application procedures slow, difficult and resource intensive, but overall levels of satisfaction with other procedures over the course of project and programme life-cycles were high.

The system in place to promote FP4 to potential participants also appeared to be successful, with FP4 attracting many 'new hands' and establishing many new research linkages. Even 'old hands' continued to establish new links and partnerships while maintaining old links with a select number of trusted collaborators. In Ireland, contrary to the views of some pundits, there was no evidence that the process of networking had started to ossify into a closed 'club' of Framework participants.

There was scope for improvement, however, in terms of raising awareness more broadly in future. In particular, more could possibly be done by bodies such as Enterprise Ireland (EI) to ensure that its regular client base is made aware, where relevant, of the potential of Framework activities.

The overall structures in place in Ireland for overseeing the implementation of Framework and for formulating Irish policy stances was also satisfactory. There is a split in FP4 responsibilities between Forfás on the one hand - primarily advice on policy development to the Office of Science and Technology (OST) of the Department of Enterprise, Trade and Employment (DETE) - and EI on the other - primarily concerned with operational matters via its promotion and facilitation of the bulk of the Specific Programmes. This reflects a broader institutional separation of responsibilities and was entirely appropriate in an Irish context.

The role played by Forfás in terms of informing the development of Framework-related policy positions was generally acknowledged and appreciated in policy-making circles, as was the effort put into ensuring that all National Delegates promulgated this position in different quarters within the Commission. This acted to maximise the influence a small country such as Ireland had on the development of policy in Brussels.

The systems in place to track Irish involvement in FP4 as a whole were sufficient to allow Forfás to fulfil its advisory remit vis-à-vis policy formulation, though there was considerable scope for improvement. Project databases and mailing lists would benefit from more regular updating and maintenance, and a more efficient system needs to be put in place to ensure that the centralised records on Framework participation as a whole are as comprehensive as possible.

Ideally this should involve the improved transmission of higher quality information from the Commission direct to Forfás rather than via Programme Management Committees and National Delegates, but if this does not occur other mechanisms need to be implemented which ensure that the National Delegates adequately service the information needs of Forfás. These would include regular review and updating of participation across the Framework Programme as a whole, to be carried out by Forfás in co-operation with the relevant National Delegates.

The major recommendations are as follows:

- The current division of responsibilities between Forfás and Enterprise Ireland works and the case for maintaining the status quo is strong
- The Advisory Groups set up to feed into the development of an Irish policy stance for FP5 had much to commend them. Similar mechanisms should be put in place as early as possible to inform Irish stances on the remainder of FP5 and the new stances which will have to be developed for FP6
- The Commission should be encouraged to provide information on participation on a regular and systematic basis not only to National Delegates but also direct to Forfás and similar bodies in other Member States
- In future, greater efforts will be needed to ensure that the mailing lists and databases of the National Delegates are adequately maintained and updated
- The newer National Delegates would benefit from more frequent and regular contact with the other National Delegates/Programme Contact Points
- There should be more widespread recognition within Enterprise Ireland that programmes such as Framework are crucial to its overall mission if Ireland is to become a knowledge-based society
- Enterprise Ireland should be encouraged to make sure that its business advisers are well appraised of the benefits of participation in Framework activities and able to suggest this as a course of action, where relevant, during the client diagnostic process
- There is scope for improvement in the user-friendliness of the sources of advice available to potential participants when they are constructing partnerships, and for new delivery mechanisms to be explored, including the use of intermediaries such as Industrial Liaison Officers to disseminate information about Framework to academics and industrialists as part of their routine activities
- More could be done to publicise Framework-related achievements via the publication of successful project outcomes
- Schemes designed to help potential participants write proposals or develop new research ideas should be expanded and promoted
- There may be a need for national schemes to help overcome barriers to commercial exploitation in new markets such as those related to sustainable growth and the environment, where Irish industry has yet to take full advantage of a relatively strong national research base
- More funding opportunities at a national level should be made available to academics in order to lessen the dependence of the academic sector on Framework funding.

1 INTRODUCTION

This report was prepared in response to an invitation to tender issued by Forfás on behalf of the Office of Science and Technology (OST) of the Department of Enterprise, Trade and Employment. The tender asked for an evaluation of the operation and impacts in Ireland of the EU's Fourth Framework Programme (FP4) for Research and Technological Development. The Terms of Reference are attached as **Appendix 1**. The study commenced in May 1999 and the final report was delivered in December 1999.

1.1 Study Aims and Objectives

The aims of the evaluation were to:

- Understand better the relevance of Framework activities to the enhancement of technological capability and industrial development in Ireland
- Suggest ways in which Irish organisations can best be supported in seeking and exploiting their involvement in RTD Framework Programme projects
- Inform the Irish policy stance in future RTD Framework Programme discussions and suggest ways of improving Ireland's input into the structure and operation of the Framework Programmes
- Maximise synergy with national research support initiatives
- Develop more efficient and effective ways of identifying, monitoring, analysing, understanding and even measuring the economic impacts and benefits of publicly-supported collaboration

1.2 Evaluation Issues

The basic evaluation issues to be covered during the study can be summarised as follows:

Nature, Composition and Appropriateness

- An analysis of the pattern of participation by Irish organisations, together with commentary on the fit with Irish S&T capabilities and industrial development needs

Efficiency of Implementation

- An assessment of the structures in place within Ireland to facilitate Irish participation in the Framework Programmes
- The articulation of an Irish perspective on the European Commission's implementation of the Programmes

Effectiveness and Impact

- An analysis of the benefits and costs of participation, for both organisations and Ireland as a whole

Strategy

- Recommendations to improve the overall benefits accruing to Ireland from participation in Framework Programmes

1.3 Approach and Tasks

The study was divided into five main work modules, all of which were designed to throw light on the evaluation issues described above:

Module 1 Framework in Context

- Background information was collected via interviews and desk-top research on the structure and organisation of the FP4 in general and on the scientific, technological, economic and policy contexts in which it has been implemented in Ireland

Module 2 Composition Analysis

- This module analysed data on variables such as project type, project costs, organisational type and participation in different Specific Programmes to provide an overview of Irish participation in FP4. Data were accessed primarily from national sources (Forfás) and supplemented where necessary with data drawn from EU and other sources

Module 3 Administrative Review

- This module involved the collection and review of programme documentation, procedural descriptions and promotional material relevant to Irish participation in the Fourth Framework Programme. It also involved 22 interviews with relevant policymakers and administrators in Ireland. These focused on a critique of current practices and explored suggestions for improvement in the light of the new imperatives of the Fifth Framework Programme (FP5)

Module 4 Questionnaire Analysis

- A questionnaire was designed and dispatched in order to build up a quantitative picture of Irish participants' experience of FP4. It covered basic data on project structure; the nature of the work undertaken; the goals and motives underpinning participation; outputs, impacts and goal attainment; satisfaction with administrative procedures; and future policy

- A copy of the questionnaire is provided in **Appendix 2**

- In the first instance, the questionnaire was sent to a sample of 500 project participations taken from the FP4 database provided by Forfás (approximately one third of all Irish participations in FP4). The sample was constructed to reflect Irish participation in terms of number of participations per Specific Programme, project type, organisational type and role in project (e.g. co-ordinator/non co-ordinator). Investigations following a low response revealed a need to update addresses in the database to take account of personnel movements, organisational name changes, inaccurate data entries, etc. After an extensive telephone-based updating exercise (there was a query on about 25% of the data entries), the addresses of 400 participants from the original sample were confirmed and the questionnaire was redistributed. One hundred completed questionnaires were returned, a 25% response rate

Module 5 Case Studies

- Fifty-three face-to-face and telephone interviews were conducted with Irish participants not included in the questionnaire survey in order to build up a more detailed qualitative picture of their involvement in FP4 and associated impacts. A checklist of questions was used to elicit participants' views on motives for involvement, project progress, goal attainment, overall impact and future strategies. Six interviews were also held with non-participating R&D performers in the fields of information technology, biotechnology and agriculture and food in order to understand why they had not become involved in FP4

- The sample of participants interviewed reflected the pattern of Irish participation in Specific Programme areas which map on to the new structure of the Fifth Framework Programme (FP5), since this is the context in which future policy will be developed. The interviewees were drawn from:

  Activity Area 1 of FP5

  - Creating a User Friendly Information Society
    17 interviews from ACTS (5), ESPRIT (7) and TELEMATICS (5)
  - Promoting Competitive and Sustainable Growth
    14 interviews from SMT (4), IMT (7 - including 5 CRAFT projects), ENERGY (2) and TRANSPORT (1)
  - Improving the Quality of Life and the Management of Living Resources
    11 interviews from BIOTECH (4), BIOMED (1) and FAIR (6)
  - Preserving the Ecosystem
    4 interviews from ENVIRONMENT (2) and MAST (2)

  Activity Areas 2, 3 and 4 of FP5

  - Confirming the International Role of Community Research, Innovation and Participation of SMEs, Improving Human Potential
    7 interviews from TMR (5), DISSEMINATION (1) and INCO (1)

1.4 Study Team

The project was led Ken Guy, the founding director of Technopolis, and managed by Jane Tebbutt, a senior consultant with the company. Data analysis was led by James Stroyan, another senior consultant, and all interviews were conducted by Tebbutt and Guy.

1.5 Report Structure

The remaining **Sections** of the report echo the work modules. **Section 2** provides a brief description of FP4 and a summary of the Irish scientific, technological, economic and policy context. **Section 3** analyses data on the composition of FP4 in Ireland. **Section 4** reviews the management and administration of FP4 in Ireland and **Section 5** summarises the results of the questionnaire survey and the participant case studies. Finally, **Section 6** returns to the evaluation objectives specified in the terms of reference for the study (see **Appendix 1**) and comments on these in the light of the main evaluation findings. **Section 6** also contains a number of recommendations for further action.

The **Executive Summary** at the front of the report contains the main findings and recommendations.

2 FRAMEWORK IN CONTEXT

This **Section** sets the scene for an evaluation of the operation and impact in Ireland of FP4 via the provision of brief background information on FP4 itself; on the economic standing of Ireland; on the position and status of R&D in the country; on support mechanisms for innovation in Ireland; and on current policy issues which are relevant to an appreciation of the appropriateness of FP4 in an Irish setting.

2.1 The Fourth Framework Programme (1994-98)

The EU's Fourth Framework Programme for Research and Technological Development comprised a suite of collaborative, pre-competitive R&D programmes spanning a broad array of scientific and technological disciples and a multitude of industrial and other application areas. It ran from 1994-98 and had an overall budget of 13.2 BECU.

The FP4 subsumed and built on the aims of its predecessor, the Third Framework Programme (FP3). This was broadly designed to meet six major objectives:

- Improve industrial competitiveness
- Attain large market objectives via norms and standards
- Encourage transnational industrial initiatives
- Introduce a European dimension into the training of RTD staff
- Increase economic and social cohesion while ensuring the scientific and technical excellence of research projects
- Ensure initiatives take environmental protection and the quality of life into account

FP4 then added a number of new strategic goals, namely:

- Create high-level infrastructures in information technology, communications, transport and energy
- Strive for greater competitiveness in industrial technologies and their compatibility with quality of life, environmental protection and safety, and smart, clean production technologies
- Co-ordinate Member States' R&D policies with Community research policy

FP4 was structured into four Activity Areas. The first and largest was sub-divided into 15 Specific Programmes covering research, technological development and demonstration, plus one funding line for the activities of the EU's Joint Research Centre (JRC). The other three 'horizontal' Action Areas covered international co-operation, the dissemination of research results and the training of researchers. The Specific Programmes are listed below, together with budget figures, and short summaries of programme activities are provided in **Appendix 3**.

Activity Area I:
Research, Technological Development and Demonstration Programmes

Information and Communication Technologies:

- Telematics Applications Programme (TELEMATICS - 913 MECU)

- Advanced Communications Technologies and Services (ACTS - 671 MECU)
- Information Technologies (ESPRIT - 2,073 MECU)

Industrial and Materials Technologies:

- Industrial and Materials Technologies (IMT [BRITE-EURAM] - 1,737 MECU)
- Standards Measurement and Testing (SMT - 195 MECU)

Environment:

- Environment and Climate (ENVIRONMENT - 601 MECU)
- Marine Sciences and Technologies (MAST - 243 MECU)

Life Sciences and Technologies:

- Biotechnology (BIOTECH - 596 MECU)
- Biomedicine and Health (BIOMED - 374 MECU)
- Agriculture and Fisheries (FAIR - 690 MECU)

Energy:

- Non-nuclear Energy (ENERGY [JOULE-THERMIE] - 1,055 MECU)
- Nuclear Fission Safety (FISSION - 171 MECU)
- Controlled Thermonuclear Fusion (FUSION - 846 MECU)

Transport:

- Transport (TRANSPORT - 263 MECU)

Targeted Socio-Economic Research:

- Targeted Socio-Economic Research (TSER - 112 MECU)

Activity Area II: Co-operation with Third Countries and International Organisations

- Co-operation with Third Countries and International Organisations (INCO - 575 MECU)

Activity Area III: Dissemination and Optimisation of Results

- Dissemination and Optimisation of Results (DISSEMINATION [INNOVATION] - 352 MECU)

Activity Area IV: Stimulation of The Training and Mobility of Researchers

- Stimulation of the Training and Mobility of Researchers (TMR - 792 MECU)

2.2 The Irish Context

2.2.1 General Economic Background

The relevance of initiatives such as FP4 to Ireland has to be considered in the context of scientific, technological and economic developments more generally. In terms of the latter, the economic standing of Ireland has improved dramatically over the last decade or so. Until 1999 Ireland was designated as an Objective 1 region within the EU. This qualified it for funding to promote the development and structural adjustment of regions with a Gross Domestic Product (GDP) of less than 75% of the EU average. The period of the FP4 (1994-98), however, coincided with a phase of strong economic growth, with low

inflation, falling unemployment and a continued rise in GDP, as shown in **Exhibit 2.1. Exhibit 2.2** further shows that the percentage growth increase in GDP between 1997 and 1998 was the highest in the EU, albeit from a comparatively lower base than in many other countries. Nevertheless, by 1999 the Irish GDP had risen to 92% of the EU average and Ireland as a whole no longer qualified for Objective 1 status. From 1999 - 2006, only parts of the midlands and west of Ireland will qualify for Objective 1 funding, with the rest of the country classified as 'Objective 1 in Transition'.

Exhibit 2.1: Inflation Rate, Unemployment Rate and GDP in Ireland

	1994/95	1995/96	1996/97	1997/98	1998/99
Inflation Rate	2.5%	1.6%	1.5%	2.4%	2.1%*
Average Unemployment Rate	12.1%	11.5%	9.8%	7.7%	6.7%**
GDP per Capita (ECU)	13,673	14,962	16,986	19,315	N/A

Source: Central Statistics Office * June 1998 - June 1999 ** 6 months average

Exhibit 2.2: GDP Increases in the EU, 1998-99

Member State	Percentage increase in GDP (1998 to 1999)
Ireland	9.8
Greece	6.7
Portugal	6.5
Spain	5.9
Netherlands	4.9
Finland	4.8
Denmark	4.8
Italy	4.0
UK	4.0
Sweden	3.9
Austria	3.7
Belgium	3.7
France	3.5
Germany	3.5
Luxembourg	N/A

Source: Extrapolated from Main Science & Technology Indicators 1999, OECD

This improvement in economic standing should not disguise structural weaknesses which still remain, however. **Exhibit 2.3** compares a series of economic indicators across the EU. It shows clearly that Ireland is still a low labour cost economy with a relatively large emphasis on agriculture compared to more modern, post-industrial, service-sector dominated knowledge economies. Moreover, given that unemployment is currently low (down to 6.7% in 1999) and its labour pool is the second smallest in the EU after Luxembourg, any attempts to restructure and modernise its economy will require a strong focus on reskilling and will be hampered by acute skills shortages. **Irish attempts, therefore, to move towards the creation of a modern 'knowledge society' will depend crucially on the ability of its existing 'knowledge base' to prosper and play a part in the production of a new generation of 'knowledge workers'**.

2.2.2 R&D in Ireland

The 'knowledge base' Ireland will require in a modernised economy will have to have a substantial scientific and technological component. In turn this is a function of its R&D capacity and performance.

Exhibit 2.3: Comparative Economic Indicators across the EU

Member State	Unemployment rate (%) 1998	Labour force (mill.) 1997	Agriculture as % of labour-force 1997	Industry as % of labour-force 1997	Services as % of labour force 1997	Hourly labour cost (ECU) 1996
Belgium	9.5	3.8	2.7	27.5	69.8	25.1
Denmark	5.1	2.7	3.8	26.2	70.0	23.3
Germany	9.4	35.3	2.9	34.7	62.4	28.6
Greece	11.6	3.9	19.8	22.5	57.7	8.9
Spain	18.8	N/A.	8.3	29.9	61.8	14.8
France	11.7	22.2	4.6	26.6	68.8	22.3
Ireland	**7.8**	**1.4**	**10.9**	**28.6**	**60.6**	**13.9**
Italy	12.2	20.0	6.5	31.7	61.8	18.3
Luxembourg	2.8	0.2	2.4	23.3	74.3	20.0
Netherlands	4.0	7.2	3.7	22.9	73.4	22.3
Austria	4.7	3.6	6.9	29.6	63.5	24.8
Portugal	5.1	4.5	13.3	31.0	55.7	5.7
Finland	11.4	2.1	7.8	27.4	64.8	20.3
Sweden	8.3	3.9	3.2	25.6	71.2	19.5
UK	6.3	26.6	1.9	26.9	71.2	13.4
EU Average	**10.0**	**9.8***	**5.0**	**29.4**	**65.6**	**20.3**

Source: Eurostat 1999 * 14 Member States only

Research and development in Ireland is performed in industry, in universities and other tertiary level technological institutes and in government labs and other institutions. Irish business currently invests around 720 MECU in R&D (the figure in 1997 was 644 MECU), most of which is performed within the business sector. In comparison, the total Irish Government R&D budget in 1998 amounted to 268 MECU, an increase of 15.5% over the previous year. This budget was sourced from the Exchequer (124.4 MECU); CSF funds (71.8 MECU; EU contracts (28.4 MECU); contracts with business (20.5 MECU) and other earned income (22.8 MECU). It was then used to fund R&D in the business sector (38.3 MECU); tertiary level institutions (129.1 MECU); Programmes in Advanced Technology (PATS - 22.6 MECU); and Government labs and institutions (77.9 MECU).

In comparative terms, however, these expenditure levels are low. **Exhibit 2.4** shows that Ireland is currently lagging the EU average spend on R&D in terms of Business Expenditure on R&D (BERD), Gross Expenditure on R&D (GERD), and Government Intramural Expenditure on R&D (GOVERD)[1]. In terms of BERD and GERD, Ireland invests less in R&D than most EU countries but more than other LFRs (Greece, Portugal and Spain), and more on BERD than Italy and Austria too, though investment from foreign-owned firms accounts for two thirds of BERD[2]. Government expenditure on R&D as a percentage of GDP, however, is lower than everywhere else in the EU apart from Belgium.

1 The data in the **Exhibit** are for the following years: Austria (93), Belgium (95), Denmark (98), Finland (98), France (97), Germany (97; BERD % 98), Greece (93; GOVERD 95)), Ireland (97), Italy (98), Netherlands (96; BERD % 97), Portugal (97), Spain (98), Sweden (97; BERD % 98) and the UK (97). The EU averages are given for 1997.

2 'R&D and Innovation by Industry in Ireland', Forfás, 1997.

Exhibit 2.4: Comparative BERD, GERD and GOVERD figures across the EU

Member State	BERD as a % of GDP	GERD as a % of GDP	GOVERD as a % of GDP
Austria	0.83	1.55	0.13
Belgium	1.07	1.58	0.06
Denmark	1.30	2.06	0.32
Finland	1.98	2.92	0.38
France	1.37	2.23	0.44
Germany	1.58	2.31	0.34
Greece	0.13	0.48	0.13
Ireland	**1.11**	**1.50**	**0.11**
Italy	0.59	1.11	0.23
Luxembourg	N/A.	N/A.	N/A.
Netherlands	1.15	2.09	0.37
Portugal	0.15	0.65	0.16
Spain	0.43	0.88	0.15
Sweden	2.85	3.85	0.14
UK	1.22	1.87	0.26
EU Average	**1.15**	**1.83**	**0.28**

Source: Main Science & Technology Indicators 1999, OECD

The proportion of R&D personnel in the workforce is also lower than the EU average, while surpassing comparable proportions in the other LFRs (Greece, Portugal, Spain) and even those for Austria, Italy and France (see **Exhibit 2.5**[3]). The proportion of business R&D staff in the overall R&D workforce is around the EU average, though the Irish figure is lower than all other Member States apart from the other LFRs. The good news, however, is that the compound growth rate for all R&D personnel in Ireland is much higher than the EU average, surpassed only by Greece, which is coming from a much lower base.

The overall picture, therefore, is of an expanding R&D base despite fairly limited investment in R&D generally, particularly by the Irish Government, and it is against this background that Irish involvement in FP4 must be set. Irish institutions received about 36 MECU per annum from FP4, and although this is small in comparison with overall industrial spend on R&D, it is similar to the amount of all government funding of R&D in the business sector and about one quarter of government contributions to tertiary level institutions. **In terms of publicly-funded efforts to expand the national S&T base and ready the country for a transition to a knowledge-based economy, the contribution of FP4 was substantial.**

3 The data in the **Exhibit** are for the following years: Austria (93), Belgium (95), Denmark (97/98), Finland (97/98), France (96/97), Germany (96), Greece (93), Ireland (97), Italy (96), Netherlands (96), Portugal (97), Spain (97/98), Sweden (97) and the UK (93). The EU averages are for 1996.

Exhibit 2.5: R&D Personnel across the EU			
Member State	**Total R&D Personnel per 1000 workers**	**% Compound Growth Rate (all R&D personnel)**	**Business R&D Personnel (% of R&D personnel)**
Austria	6.6	1.5	61.8
Belgium	8.9	2.0	59.8
Denmark	11.0	2.0	56.4
Finland	16.1	10.8	54.1
France	5.3	0.8	50.7
Germany	11.4	-1.2	61.0
Greece	3.5	14.7	19.8
Ireland	**7.8**	**11.0**	**67.9**
Italy	6.1	0.4	42.8
Luxembourg	N/A.	N/A.	N/A.
Netherlands	10.7	1.9	48.8
Portugal	3.6	8.3	11.2
Spain	5.3	3.3	36.3
Sweden	15.4	2.3	67.0
UK	9.5	2.3	60.7
EU Average	**9.4**	**0.9**	**52.9**

Source: Main Science & Technology Indicators 1999, OECD

2.2.3 Support Mechanisms for Innovation

Key public sector R&D players (either funders or providers, or both) include the Higher Education Authority (HEA) and its parent Government Department of Education and Science (DES), Enterprise Ireland (EI), Teagasc (agriculture and food), IDA Ireland, the Marine Institute, the Health Research Board, the National Microelectronics Research Centre and the Environmental Protection Agency. **Exhibit 2.6** provides details of R&D budgets. HEA, DES, EI and Teagasc administer about two thirds of the available funds. The bulk of the money available from the HEA goes directly to universities as block grants while DES has recently commenced funding research in the third level colleges on a programmatic basis. The majority of the Teagasc research budget is consumed internally (there are approximately 100 research staff). Much of the funding from Enterprise Ireland, however, is available on a competitive basis to a wide cross section of the research community (both academic and industrial). Some of these initiatives constitute important alternative or complementary sources of funds to FP4.

2.2.4 Policy Issues

The impact of any publicly-funded initiative has to be assessed in terms of contemporary policy issues and priorities. For many, an impact is only meaningful if it relates to hot topics on the policy agenda and can be seen to be part of a solution to a policy problem. In Ireland, recent economic success and the implications for the country's Objective 1 status have focused the mind on economic restructuring and the role of science and technology in the development of a knowledge-based society. Consequently, recognition of the important role of R&D for the future of the Irish economy has increased dramatically in recent years. During 1998 the Government established an inter-departmental committee on science and technology to make recommendations on S&T expenditure to the Cabinet Committee on Science and Technology. It also established the Irish Council for Science Technology and Innovation (ICSTI) to advise it on the strategic direction of S&T policy and conducted a Technology Foresight exercise to explore future options.

Exhibit 2.6: Leading Irish Public Sector R&D Players

Organisation	R&D Budget (1997) MECU	% of Total Public Sector R&D Budget (1997)	R&D Budget (1999) MECU	% of Total Public Sector R&D Budget (1999)
Enterprise Ireland	35.2	23.4%	63.7	28.5%
Higher Education Authority	38.6	25.7%	46.8	20.9%
Department of Education & Science	2.1	1.4%	23.0	10.3%
Teagasc	22.7	15.1%	22.0	9.8%
Marine Institute	7.9	5.3%	11.7	5.2%
IDA Ireland	7.0	4.7%	7.7	3.4%
Shannon Development	6.5	4.3%	6.5	2.9%
Health Research Board	4.7	3.1%	6.3	2.8%
National Microelectronics Research Centre	3.4	2.3%	3.3	1.5%
Údarás na Gaeltachta	2.3	1.5%	2.4	1.1%
Environmental Protection Agency	1.7	1.1%	2.2	1.0%

Sources: State Investment in Science and Technology 1997, Forfás
State Expenditure on Science and Technology 199, Forfás

Note: Budget funds are combined Irish Exchequer and EU funds

Within this milieu, four issues of critical importance stand out, all of which FP4 had the potential to influence:

- Academic-Industry Linkages
- Exposure to International RTD
- Skills Shortages
- Embedding Multi-National Companies (MNCs)

Academic-Industry Linkages

In constructing a knowledge-based society, it will be imperative to ensure that adequate links and flows exist between the two main repositories of scientific and technological expertise in the country - the academic sector and industry. The evaluation of FP4 thus looked carefully at the impact of the programme on knowledge linkages.

Exposure to International RTD

It will also be important to ensure that indigenous expertise is adequately aware of and linked to leading-edge developments elsewhere in the world. The extent to which FP4 introduced Irish participants to mainstream scientific and technological developments abroad was therefore a keen evaluation focus.

Skills Shortages

Ireland has shifted in recent years from a country which had an 'unemployment crisis' to one which is now experiencing a 'skills crisis'. **The future economic health of the country will depend crucially on the ability of the existing 'knowledge infrastructure' to resolve this crisis.** Whether or not FP4 strengthened the Irish 'knowledge base' to any considerable degree was thus another critical evaluation issue.

Embedding Multi-National Companies (MNCs)

Most R&D performed in Ireland is funded and conducted by foreign MNCs. **Ensuring that they remain in Ireland and that new ones are attracted into the country is thus an important strand in Ireland's attempt to become a 'knowledge-based society'**. Initiatives such as FP4 can contribute to these ends directly - via the participation of Irish-based MNCs in R&D projects; and indirectly - via the creation of an indigenous 'knowledge pool' which both attracts new MNCs into the country and helps retain existing companies. The implications of FP4 for 'embedding' were thus considered carefully.

3 COMPOSITION ANALYSIS

The following analyses of Irish participation in FP4 are primarily based on data supplied to Technopolis Ltd by Forfás, complemented on occasion by other data sets. Some cleaning of the Forfás data was undertaken in order to remove a limited number of double-entries in the data set and to correct for a few other data entry errors. Unless otherwise stated, all figures are derived from this cleaned database. After an initial overview of participation, more detailed breakdowns are provided by type of organisation, role of participant, Specific Programmes, regional participation and links between partners.

3.1 Overall Participation

A total of 467 Irish organisations were involved with approximately 5000 overseas partner organisations[4] in 1,187 FP4 projects. The number of Irish participations in these FP4 projects was 1,489, with an average of 1.25 Irish participations in each project in which there was Irish representation. Industry participations accounted for 32% of the total number. In comparison, there were 752 Irish participations in the Third Framework Programme (FP3), with industry participation accounting for 28% of the total.

Even though the number of Framework projects in which Irish participants were involved rose in FP4, Ireland's share of overall participation fell slightly, as it did for all countries other than Sweden, Finland, Austria, Belgium and Luxembourg. This is shown in **Exhibit 3.1**, which uses CORDIS data cleaned by OST, Paris, to compare each Member State's share of overall participation in FP3 and FP4.

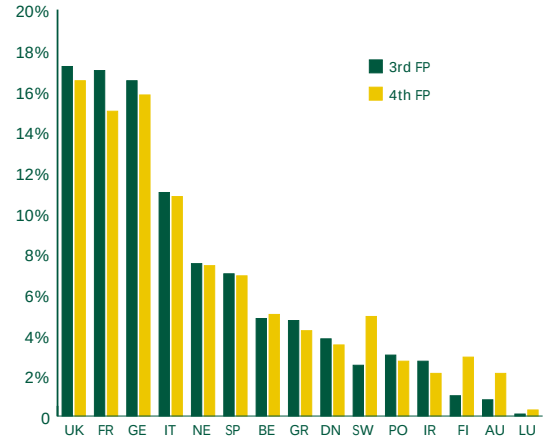
The total EU funding associated with Irish participation was just over 191 MECU, with industry receiving 30% of this figure across the programme as a whole and a higher proportion in the industrially-oriented sub-programmes. The comparable figure for FP3 was 98 MECU. The amount individual organisations contributed themselves to each project was not recorded in the Forfás data set. Given the ratio of academic participation (typically 100% funded) to industry participation (typically 50%) funded, the overall RTD effort probably amounted to some 250 MECU.

The Forfás data set does not include success rates for FP4 project applications. However, the Industry Research and Development Group estimates the success rate as 1 in 5, with 30-40% success rates for SME projects and R&D personnel mobility projects.

Irish targets for FP4 were set by the responsible Minister at 240 MECU worth of contracts, with at least 40% of this figure expected to go to industry. **Despite the fact that these very ambitious targets were not reached, the increases recorded in Exhibit 3.2 over successive Framework Programmes, including an almost 100% increase in participations from FP3 to FP4 and an increase of over 250% in the number of organisations, all represent considerable achievements.**

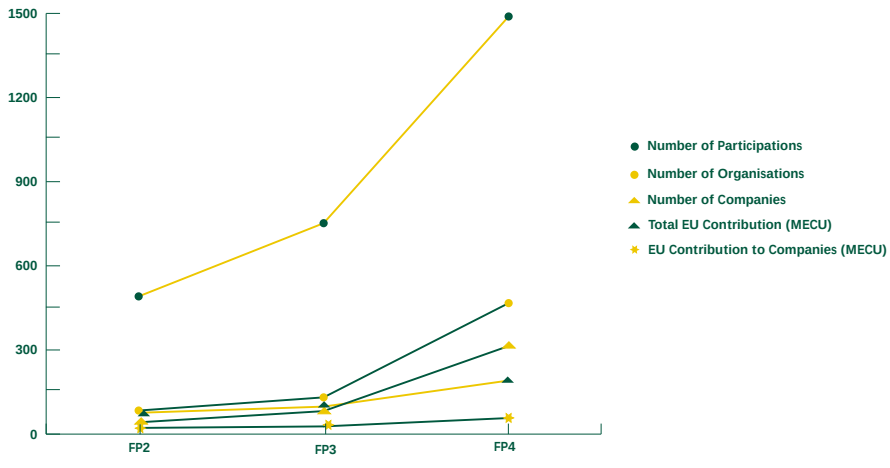
4 Given typographical errors in data entries and a lack of standardisation in data entry procedures for the Forfás data set, it was impossible to provide an accurate figure for the number of partner organisations. The figure of 5000 is extrapolated from a cleansing operation carried out for partner organisations in Austria, Belgium/Luxembourg and Great Britain - a quarter of all known participations. Forfás provided an independent estimate of 7,400 overseas partners, though this figure is likely to include multiple counting of partner organisations.

Exhibit 3.1: Participations by Member States



Source: Gusmão, R., (1999), 'Developing and Using Indicators of Multilateral S&T Co-operation: the Example of European Research Programmes', OST, Paris

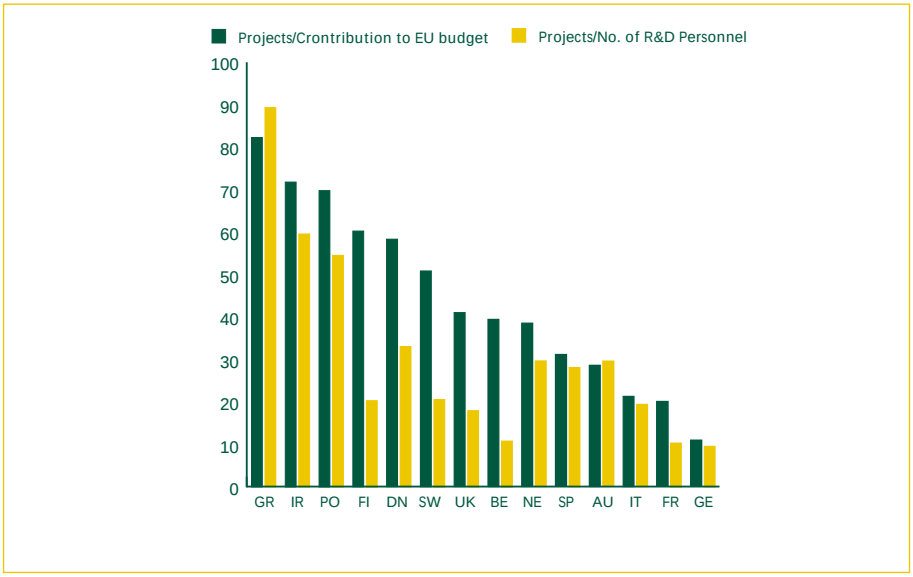
Exhibit 3.2: Performance over Time in Successive Framework Programmes



Source: FP2, FP3 - Forfás; FP4 - Cleaned Forfás data base. NB For FP2 and FP3, the number of contracts awarded is used as a surrogate for the number of participations.

The scale of these achievement can best be seen via an analysis of the 'Framework Project Intensity', as measured by the number of FP4 projects per capita of the R&D community in the country, or the ratio of the number of FP4 projects to the national contribution to the EU budget. **Exhibit 3.3** is taken from a study of Finnish participation in FP4 and shows both these (normalised) measures for the Member States. **It reveals that Irish participation levels were very high given the size of the Irish research base and the national contribution to the EU budget.**

Exhibit 3.3: Framework Project Intensity in Member States



Source: Luukkonen, T. and Niskanen, P., (1998), 'Learning Through Collaboration: Finnish Participation in EU Framework Programmes', VTT, Finland

3.2 Participation Breakdown

3.2.1 Type of Organisation

Irish participation by main category of organisation is shown in **Exhibit 3.4**. The HEI sector accounted for most participations, with 669 across the 23 institutes. Collectively, these HEIs accounted for 45% of all Irish involvement in FP4. Private industry accounted for 32% of all participations, State Research Institutes (RIs), Commercial Semi-State organisations (CSS) and 'Other' organisations accounting for the remaining 23%. Foreign-owned companies in Ireland accounted for only 4% of all participations.

EU funding for Irish participation by main category of organisation is shown in **Exhibit 3.5**. It shows that HEIs were the foremost recipients of EU research funding. The 23 HEIs received an average of just over 4 MECU each, collectively accounting for 96 MECU, half of all Irish funding. Average funding per project obtained by State RIs was just over 1.2 MECU, whilst private industry and other categories of participant typically secured between 100 and 300 KECU per project.

Exhibit 3.4: Irish Participation by Organisation Type

Type	Number of Organisations	Number of Participations	Percentage of Participations	Participations per Organisation
Higher Education	23	669	45%	29.0
State Research Institute	15	139	9%	9.3
Commercial Semi-State	20	49	3%	2.5
Industry - Irish Owned	269	416	28%	1.5
Industry - Foreign Owned	45	55	4%	1.2
Other	95	161	11%	1.7
Total	**467**	**1489**	**100%**	**3.2**

Exhibit 3.5: Irish Funding by Organisation Type

Type	Number of Organisations	Total Funding (KECU)	Percentage of Funding	Average Funding per Organisation (KECU)
Higher Education	23	95,738	50%	4,163
State Research Institute	15	18,788	10%	1,253
Commercial Semi-State	20	5,560	3%	278
Industry - Irish Owned	269	50,019	26%	186
Industry - Foreign Owned	45	7,565	4%	168
Other	95	13,608	7%	143
Total	**467**	**191,278**	**100%**	**410**

3.2.2 Role of Participant

Exhibit 3.6 shows the breakdown of Irish participation and funding by project role. It indicates that most Irish participants acted as partners or sub-partners (86% collectively), with 13% acting as project co-ordinators.

Exhibit 3.6: Participation and Funding by Role in Project

Role	Number of Participations	Share of Participations	Total Funding (KECU)	Share of Funding
Partner	1,201	81%	138,800	73%
Co-ordinator	200	13%	43,412	23%
Sub-partner	71	5%	5,756	3%
Research performer	17	1%	3,310	2%
Total	**1,489**	**100%**	**191,278**	**100%**

3.2.3 Specific Programmes

Irish participation in FP4 is broken down by Specific Programme in **Exhibit 3.7.** This shows that Irish participation was heavily focused on Information & Communication Technologies (TELEMATICS/ESPRIT/ACTS), Industrial and Manufacturing Technologies (IMT), Training and Mobility of Researchers (TMR) and Agriculture and Fisheries (FAIR), all of which collectively accounted for nearly three quarters of Irish participation.

Exhibit 3.7: Irish Participation by Programme

Programme	Number of Projects	Share of Irish Projects	Number of Participations	Share of Irish Participations
IMT	166	14.16%	223	15.08%
TELEMATICS	160	13.65%	229	15.48%
TMR	158	13.48%	162	10.95%
ESPRIT	148	12.63%	193	13.05%
FAIR	135	11.52%	163	11.02%
ACTS	65	5.55%	100	6.76%
DISSEMINATION	51	4.35%	59	3.99%
BIOTECH	47	4.01%	55	3.72%
INCO	45	3.84%	47	3.18%
ENVIRONMENT	43	3.67%	48	3.25%
SMT	38	3.24%	56	3.79%
MAST	36	3.07%	43	2.91%
ENERGY	29	2.47%	34	2.30%
TRANSPORT	20	1.71%	20	1.35%
BIOMED	12	1.02%	19	1.28%
TSER	10	0.85%	19	1.28%
FISSION.	6	0.51%	6	0.41%
FUSION	3	0.26%	3	0.20%
Total	**1,172**	**100.00%**	**1479**	**100.00%**

The absolute number of Irish projects and participations is only part of the story, however. In terms of funds received by Irish organisations within each programme, the same six programmes occupied the top six slots and accounted for almost 138 MECU or three quarters of all EU funding for Irish participation. **In Exhibit 3.8**, however, Specific Programmes are ranked in terms of the overall share of programme budget secured by Irish participants. **Given that Ireland's population represents less than 1% of the total population of the 15 Member States, Irish participants captured relatively high**

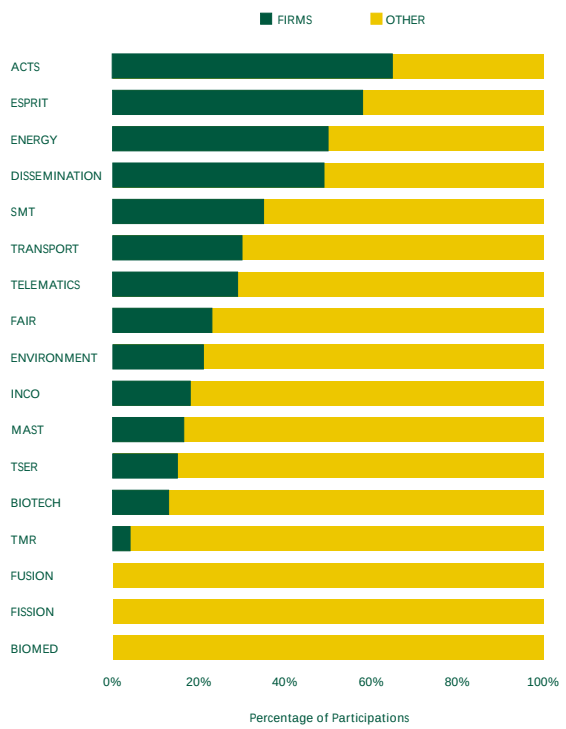
proportions of Specific Programme budgets in 13 out of 18 cases. In particular, the Irish showing was strongest in the areas of advanced communication technologies (ACTS), agriculture and fisheries (FAIR), targeted socio-economic research (TSER), standards, measurement and testing (SMT), telematics applications (TELEMATICS) and marine science and technology (MAST). Collectively, Irish partners captured 1.86% of all EU project spend under FP4.

Exhibit 3.9 shows the ratio of industry to 'other' participations by Specific Programme. It reveals that industry participations constituted the majority of participations in only three programmes - IMT, ACTS, and ESPRIT - and that the proportion of industry participations was less than 20% in half of the 18 Specific Programmes.

Exhibit 3.8: Irish Funding by Programme

Programme	Irish Funding (KECU)	Programme Funding	Irish Funding as a % of Programme Funding
ACTS	20,067	584,310	3.43%
FAIR	17,943	557,189	3.22%
TSER	2,487	88,775	2.80%
SMT	4,155	152,143	2.73%
TELEMATICS	19,655	742,386	2.65%
MAST	5,457	210,268	2.60%
TMR	16,143	702,336	2.30%
DISSEMINATION	5,856	270,439	2.17%
BIOTECH	10,121	505,600	2.00%
IMT	29,975	1,518,686	1.97%
ESPRIT	33,957	1,761,141	1.93%
BIOMED	4,706	304,440	1.55%
ENVIRONMENT	5,933	487,632	1.22%
TRANSPORT	1,838	218,080	0.84%
ENERGY	6,943	883,650	0.79%
INCO	3,628	482,000	0.75%
FISSION	784	138,000	0.57%
FUSION	1,630	659,020	0.25%
Total	**191,278**	**10,266,095**	**1.86%**

Exhibit 3.9: Proportions of Industry and Other Participations by Programme



3.2.4 Regional Participation

Exhibit 3.10 shows the breakdown of Irish participation and funding by County. Not surprisingly, Dublin dominates the picture, with over half of the participations and the revenues (57% and 55% respectively) accruing to Dublin-based organisations. Organisations from Cork, Galway and Limerick (all locations with major universities) further accounted for another third of all participations and funding, leaving organisations located elsewhere in the country with only 10% or so.

Exhibit 3.10: Participations and Funding by County

County	Number of Participations	Share of Participations	Total Funding	Share of Funding
Dublin	849	57%	105,393	55%
Cork	223	15%	34,727	18%
Galway	132	9%	18,859	10%
Limerick	87	6%	11,335	6%
Kildare	37	2%	3,398	2%
Sligo	24	2%	4,565	2%
Donegal	20	1%	2,488	1%
Clare	20	1%	1,862	1%
Waterford	15	1%	1,992	1%
Wicklow	15	1%	1,354	1%
Carlow	12	1%	1,041	1%
Meath	12	1%	754	0%
Remaining 14 Counties	43	3%	3510	2%
Total	**1,489**	**100%**	**191,278**	**100%**

3.2.5 Collaborative Links

Although Irish organisations participated in 1,187 projects, the majority of these contained just one Irish partner. Only 200 or so contained more than a single Irish participant, with a total of 476 Irish-Irish collaborations in all. In comparison, participation in FP4 involved a vast number of collaborations with organisations from other Member States and beyond. Of the 1,187 projects in which Irish organisations participated, data on foreign partners was available for 950 of them. Within these, the total number of non-Irish participations was just over 7,100 and the total number of collaborations between Irish and non-Irish organisations was just under 10,000. Non-Irish partners from 64 countries were identified. **Exhibit 3.11** shows Member State participations in projects containing Irish partners, while **Exhibit 3.12** shows comparable figures for non-EU participations.

Most links were with organisations in Great Britain, Germany, France and Italy, i.e. the larger economic units in the EU. This is not surprising given the distribution profile shown earlier in **Exhibit 3.1**, which ranked each Member State's share of overall participation in FP4. The similar rankings in the two **Exhibits** demonstrate that Irish partners did not have any obvious 'preferred partner countries' despite the high proportion of links with organisations in the UK, Germany etc. Similarly, **Exhibit 3.13**, based on CORDIS/OST(Paris) data, indicates that no Member States overtly considered Ireland as a 'preferred partner country'.

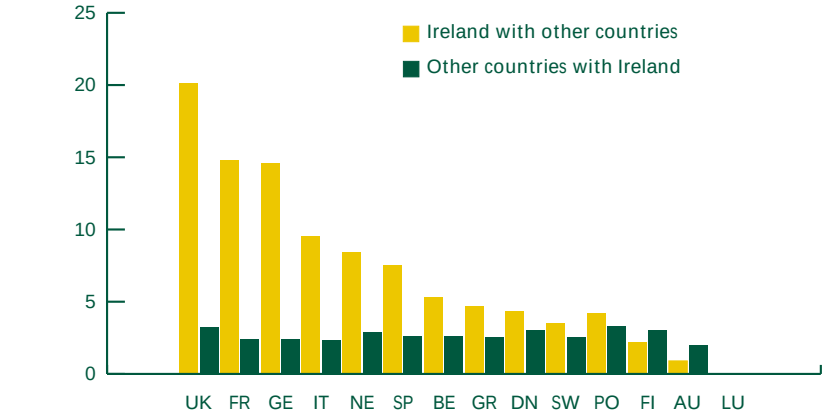
Exhibit 3.11: Member State Participations in Projects with Irish Partners

Country	Number of Participations	Share of Participations
Great Britain	1,501	23%
Germany	874	13%
France	841	13%
Italy	600	9%
Netherlands	506	8%
Spain	445	7%
Sweden	352	5%
Belgium/Luxembourg	330	5%
Greece	283	4%
Finland	250	4%
Portugal	250	4%
Denmark	227	3%
Austria	145	2%
Luxembourg	2	1%
Total	**6,606**	**100%**

Exhibit 3.12: Non-EU Participations in Projects with Irish Partners

Country	Number of Participations	Share of Participations
Central and Eastern Europe	101	19%
New Independent States of the Old USSR	37	7%
Other European Continent	343	63%
ROW	61	11%
Total	**542**	**100%**

Exhibit 3.13: Links with Participants in Other Member Countries



Source: Gusmão, R., (1999), 'Developing and Using Indicators of Multilateral S&T Co-operation: the Example of European Research Programmes', OST, Paris

The total number of participations by non-Irish partners in projects containing Irish partners is broken down by Specific Programme in **Exhibit 3.14**. Although most collaborations occurred in the TELEMATICS, IMT, FAIR and ESPRIT programmes, the links per Irish participant were highest in programmes such as TRANSPORT and TSER in which Irish participation levels were comparatively low.

Exhibit 3.14: Irish and Non-Irish Participations by Programme

Programme	Number of Projects[5]	Number of Irish Participations	Number of Non-Irish Participations	Ratio
TRANSPORT	9	11	108	9.8
TSER	29	29	237	8.2
TELEMATICS	144	218	1593	7.3
ACTS	43	74	533	7.2
BIOTECH	44	56	386	6.9
MAST	22	26	178	6.8
SMT	41	55	351	6.4
FISSION	5	6	38	6.3
INCO	40	42	257	6.1
ENVIRONMENT	38	41	220	5.4
TMR	53	55	289	5.3
FAIR	131	157	820	5.2
IMT	157	202	1000	5.0
ESPRIT	127	164	795	4.8
ENERGY	33	34	157	4.6
BIOMED	1	1	4	4.0
DISSEMINATION	33	48	182	3.8
Total	**950**	**1,219**	**7,148**	**5.9**

5 The number of projects relates to those projects for which Irish and Non-Irish Participation data were available

4 Administrative Review

In this **Section** we look at the structure and organisation of the promotion, facilitation and administration of FP4 in Ireland. After a short review of the structures in place and the roles and responsibilities of the actors involved, we assess activities at the level of the whole Framework Programme and at the level of the individual Specific Programmes. We conclude with a short commentary on the overall division of responsibilities.

4.1 The Promotion, Facilitation and Administration of FP4 in Ireland

The management and administration of RTD programmes generally require structures and procedures to be put in place which are capable of dealing with all parts of the programme life-cycle, from the formulation of objectives through awareness raising, initial implementation, calls for proposals, interfacing with prospective participants, project selection, contract negotiation, the setting up of Management Information Systems (MIS), project monitoring, interfacing with participants, project assessment, sharing and dissemination of project results, programme evaluation, the formulation of future strategies, interfacing with policymakers etc.

For many RTD programmes, e.g. national initiatives, fairly simple structures and procedures usually suffice, with one ministry or government department typically appointing a programme manager responsible for all aspects of management and administration. For international, multi-programme initiatives such as FP4, however, the situation is much more complex.

In the first instance, there has to be a division of responsibilities and tasks between the European Commission and the Member States. In the European Commission, structures and procedures exist to cover all aspects of the programme life-cycle. There is no need, therefore, for all these to be duplicated at the Member State level. In particular, it is important for the project selection process to be centralised, and for overall programme management (at Framework and Specific Programme levels) to reside in Brussels and Luxembourg (albeit guided by Programme Management Committees composed of representatives from the Member States). The efficient implementation of many other programme life-cycle tasks, however, is improved via the existence of complementary 'mirror' structures in the Member States. Awareness raising and the provision of advice to potential participants, for example, are both improved when national bodies can exploit existing advisory structures and channels of communication.

Secondly, in both the Commission and Member States, different structures have to exist to cope with the operational aspects of individual Specific Programmes on the one hand; and with Framework-level activities such as the evolution of policy stances for the next Framework Programme on the other. In the Commission, each Specific Programme has its own operational management and administration structure located (primarily) in Brussels, while aspects such as policy development for the next generation Framework Programme are handled outside these structures. In the Member States, too, the operational aspects of individual Specific Programmes are often dealt with separately from aspects such as the development of a national position vis-à-vis new Framework Programmes.

Thirdly, as well as 'mirror' structures in each of the Member States, there also has to be an 'interface' structure which allows each of the Member States to interact at various stages of the programme life-cycle with Commission structures at both Specific Programme and Framework Programme levels.

In Ireland, all this complexity means that a large number of State bodies were involved in the promotion, facilitation and administration of FP4. Foremost amongst these were Enterprise Ireland (EI - formerly Forbairt) and Forfás. **In simple terms, EI was primarily responsible for the operational aspects of FP4 in Ireland and for handling the interface with the Commission at the Specific Programme level, while Forfás was responsible for Framework level activities and for advising the Office of Science and Technology (OST) of the Department of Enterprise, Trade and Employment (DETE) on the development of an Irish position on new Framework Programmes**. Most of the other bodies involved were concerned with operational aspects at the Specific Programme level.

4.1.1 Framework Programme Level Activities

As noted above, Forfás is the body responsible for most Framework level activities. **The main role of Forfás generally is to act as the policy advisory and co-ordination board for industrial development and science and technology in Ireland**. Formally, it is the body in which the State's legal powers for industrial promotion and technology development have been vested. It is also the body through which powers are delegated to Enterprise Ireland for the promotion of indigenous industry and to IDA Ireland for the promotion of inward investment. The broad functions of Forfás are to:

- Advise the Minister on matters relating to the development of industry in the State
- Advise on the development and co-ordination of policy for Enterprise Ireland, IDA Ireland such other bodies as the Minister may designate
- Encourage the development of industry, technology, marketing and human resources in the State
- Promote science and technology for economic and social development
- Encourage the establishment and development in the State of industrial undertakings from outside the State
- Advise and co-ordinate Enterprise Ireland and IDA Ireland in relation to their functions

Concerning FP4, Forfás acted as a focal point in relation to EU research and technology policy developments, including monitoring Irish involvement in the Framework Programme on behalf of the OST, part of the DETE. Specifically, it was responsible for:

- The preparation of promotional material for use in Ireland on the Framework Programme as a whole
- Management of the information system set up to track Irish participation across FP4, with data collected from the Irish organisations responsible for the operational management of the Specific Programmes in Ireland and subsequently distributed to select organisations across Ireland
- The co-ordination of other intelligence-related activities concerning the functioning of the Framework Programme as a whole

- The provision of policy advice concerning Framework activities to OST and the Minister
- The provision of advice to Enterprise Ireland concerning its Framework-related functions

Forfás did not have specific responsibility for stimulating the dissemination of FP4 outputs and results. It did, however, publicise some of the achievements of Irish participants in FP4 as part of its remit to raise awareness about the existence of Framework and potential participation in both FP4 and FP5.

One other body active in this sphere which deserves mention is the Irish Innovation Relay Centre located in Dublin and housed within Enterprise Ireland. This is one of a network of 52 advisory centres located throughout the EU. Created as part of the Innovation programme of FP4, the Centre's task is to promote the transfer of research results and technologies into local and regional environments, including results obtained during the course of all FP4 projects. The IRC is also responsible for supplying advice and information to organisations wishing to participate in EU funded research and technological development programmes, including assistance identifying prospective research partners and help submitting proposals to the EU.

4.1.2 Specific Programme Level Activities

All Specific Programmes within FP4 had Programme Management Committees (PMCs) comprised of National Delegates from the Member States. As in other Member States, Ireland provided two National Delegates for each of the 18 Specific Programmes in FP4. In turn, these National Delegates were responsible for the 'mirror' programme management and administration functions for each of the Specific Programmes within Ireland. In effect, they were the national programme managers responsible for the operational aspects of FP4's implementation in Ireland. One of the two Delegates for each programme generally adopted this mantle, with the other acting in an advisory or deputy capacity.

The National Delegates responsible for programme management functions were expected to:

- Attend Programme Management Committee meetings, represent the interests of the Irish State and of Irish participants and report Specific Programme developments (e.g. numbers of successful Irish applications) to Forfás
- Stimulate interest in FP4 by promoting the programmes nationally and respond to requests for information and advice from participants prior to the submission of proposals
- Advise applicants during the contract negotiation phase and subsequently during the course of project lifetimes

Representatives from Enterprise Ireland sat on ten PMCs, giving EI primary responsibility for the majority of the Specific Programmes. Moreover, the ten programmes which EI oversaw or 'managed' accounted for approximately three quarters of the overall FP4 budget. In comparison, Forfás representatives sat on three PMCs and representatives from the Department of Transport, Energy and Communications sat on four. Two representatives from the Radiological Protection Institute sat on the 'Nuclear Fission

Safety' and 'Controlled Thermonuclear Fusion' Programme Management Committees, and representatives from a further 15 Government Departments (e.g. the OST of the Department of Enterprise, Trade and Employment, the Department of Health, and the Department of Agriculture, Fisheries, Food and Forestry) and other organisations (e.g. University College Cork, the Economic and Social Research Institute, and the National Dairy Products Research Centre) sat on a total of 12 PMCs. Despite the high proportion of Irish academic participants in FP4, the Higher Education Authority (HEA) had only one National Delegate on the PMC of the 'Stimulation of the Training and Mobility of Researchers' Specific Programme.

The dominant role of EI is not surprising given its overall remit in Irish industry and innovation support systems. This is to bring together the key marketing, technology, enterprise development, business training and science and innovation initiatives through which the Government supports the growth of Irish industry. Enterprise Ireland clients are in general Irish companies from the manufacturing and internationally traded services sectors employing 10 or more staff. The general services offered by EI are delivered through a network of 12 offices in Ireland (plus a further 28 throughout the world) and are structured and co-ordinated to deliver solutions to a wide range of client needs.

The areas managed by EI covered 8 out of the 15 RTD and Demonstration programmes included in Activity Area I of the FP4. These spanned most of the 'mainstream' industry areas such as information and communication technologies, biotechnology, manufacturing technology and most energy-related activities. Two out of the three 'horizontal' action lines corresponding to Activity Areas III and IV were also managed by EI.

In comparison, the RTD and Demonstration Programmes overseen by other Irish State bodies were those for which the bodies concerned generally had either overall responsibility or greater access to relevant expertise, e.g. transport and agriculture.

4.2 Assessment of Framework Programme Level Activities

Framework level activities were primarily the responsibility of Forfás and the IRC, with Forfás leading on the development of the 'big picture' in order to promote the FP4 as a whole and offer over-arching policy-related advice. In contrast, the IRC offered specific 'micro-level' advice and information on partnering, proposal writing, etc. to potential participants irrespective of which programme areas interested them. Enterprise Ireland also contributed a great deal to promotional activities at a Framework level given its management of 10 of the Specific Programmes.

The ability of Forfás to develop an overview of FP4 depended critically on the flow of information from the National Delegates. These provided data on the number of Irish applicants to individual programmes and the number of projects ultimately selected for entry into the contract negotiation stage - data made available to the National Delegates during PMC meetings in the Commission. These data were then made available to Forfás in electronic form and compiled into a data base on Irish participation in FP4 as a whole, together with supplementary information on aspects such as type of organisation, NACE code, etc. Most National Delegates also kept databases for their own Specific Programme areas.

While this system worked well for the most part, it was not without its deficiencies:

- Some National Delegates were better than others at keeping records and transferring comprehensive data to Forfás in a timely fashion
- Data entry by the National Delegates was not 100% accurate. For two programmes in particular, double entries inflated the number of Irish participants
- The Commission did not provide data (or at least did not provide them in a digestible form) on actual participation, i.e. the number of selected participants who made it through the contract negotiation stage and started projects. This also inflated Irish participation levels
- There was little or no regular updating of entries in the database to take account of withdrawals, name changes, etc., again primarily due to the fact that data of this nature were not provided by the Commission
- Although the database tracked the type of organisations receiving funding, it did not indicate organisational size on a consistent basis. This made it impossible to track, for example, the proportion of SMEs participating in FP4

These are all areas where there is considerable scope for improvement, not least in terms of the original supply of information on participation from the Commission. The system in place for FP4 depended on the aggregation by Forfás of non-standardised information (each Specific Programme handled and presented information to its PMC in a different way) collected via non-standardised routes (some National Delegates were better receivers and transmitters than others). An attractive alternative would be for the Commission to insist on standardised data collection and presentation formats across Thematic and Horizontal Programmes (which replaced Specific Programmes in the FP5) and for all data to be communicated not only to the PMCs but also to a centralised point in Brussels (e.g. the evaluation unit in DGXII), where data on Framework participation as a whole could then be aggregated and transmitted directly to national bodies responsible for maintaining an overview of national participation in Framework, i.e. Forfás in the case of Ireland.

Despite the flaws discussed above (which are not atypical of those found elsewhere in the EU), the FP4 information systems in place were sufficient to provide an adequate overview of Irish participation. During the course of the programme, Forfás prepared a limited number of promotional items for widespread circulation which were clear and informative. A small number of policy and position papers were also prepared which recipients generally found to be succinct, to the point and helpful, particularly those aimed at developing the Irish policy stance towards the Fifth Framework Programme (FP5). In this instance Forfás was responsible for co-ordinating and synthesising inputs from the National Delegates and from the Programme Advisory Panels established by the Office of Science and Technology for the FP4. Comprised of representatives from industry, the higher education sector and State organisations, these Panels were briefed by Forfás prior to the preparation of written submissions outlining national priorities across the FP4 areas. Forfás then consolidated these views into a set of priorities which came eventually to represent the Irish policy stance on FP5.

Once Forfás had helped develop policy stances, it also helped to ensure that the National Delegates "sang the same song" by relaying the main messages in a consistent and coherent fashion in individual PMCs. This, it was felt, would help maximise the impact a small country such as Ireland could have on the direction of future Framework activities.

Forfás, the IRC and Enterprise Ireland organised and took part in a series of events promoting FP4 and, subsequently, FP5. Launch events were held in Dublin, for example, for both FP4 and FP5. Invitees to the launch for FP4 were based on FP3 participants, coupled with email invitations to other members of the research community. Advertisements also appeared in journals such as Technology Ireland (circulation 15,000). Many of the participants interviewed during the course of the evaluation of FP4 had attended these events. Indeed, one commented that the event to launch FP5 had attracted "virtually all the researchers in Ireland". Some decried the paucity of similar events at a regional level, but most were complimentary about the events they had attended.

In addition to participation in promotional events for FP4, the IRC also promoted Framework during the course of summer visit programmes to firms and published articles on FP4 in its weekly newsletter, distributed to a 'core list' of 300-350 organisations (mostly SMEs with 20-30 staff). Its main Framework-related activities, however, were conducted as a response to requests for information or assistance by firms. Typically these involved requests for information on research opportunities within EU programmes, advice on potential European partners for FP4 projects, and assistance with proposal writing. In many instances, too, the IRC was able to respond directly to these requests - suggesting partners, appraising people of the benefits and costs of participation and advising on future courses of action. Likely candidates were also referred on to the relevant National Delegates in particular Specific Programme areas.

As part of its normal provision of business and technology services delivered via its three Dublin-based and 11 regional offices, Enterprise Ireland also had many opportunities to promote participation in Framework activities, where relevant, to its regular client base. EI's fundamental approach is to understand the needs of its clients and respond to them in an holistic manner. This 'client diagnostic' approach involves a careful analysis of clients' needs and the formulation of appropriate courses of action to meet agreed targets. On occasion this can involve EI business advisers (i.e. mainstream EI staff as opposed to those primarily concerned with particular FP4-related tasks) suggesting Framework as one option, then signposting potential participants to other relevant quarters (e.g. National Delegates or IRC) whenever necessary. **In practice, whereas Framework "certainly wasn't rammed down people's throats", there is some doubt as to "the frequency it was even put on the plate"**. This may have been entirely appropriate - participation in Framework is certainly not the answer to many of the problems confronted by SMEs - but it could also have been due in part to an imperfect appreciation of the nature and benefits of FP4 participation on the part of EI business advisers. **Some National Delegates within EI noted that their activities were regarded by many within the organisation as marginal to EI's mission. If so, this is something which could and perhaps should be rectified within EI**.

4.3 Assessment of Specific Programme Level Activities

The main focus of attention here is the role played by the National Delegates. Correspondingly, **the first point to note is the genuine appreciation felt by most participants for the help and assistance they received from the Delegates**. This was expressed in both the questionnaire returns and the interviews with participants (see Section 5). Participants were particularly appreciative of the advice they received prior to submitting proposals, but many continued to benefit from their contact with the National Delegates over the whole project life-cycle. Even experienced hands used to dealing directly with Commission officials continued to benefit from their interaction with the Delegates, and few had plans to interact solely with the Commission in their future Framework dealings. Some academics expected to have more contacts with Brussels either directly or through their own Industrial Liaison Officers, but most still anticipated being able to exploit the new FP5 National Delegates and/or Programme Contact Points whenever necessary. **For both old and new participants, the National Delegates constituted a key resource**.

As well as offering advice and assistance to existing and potential participants, many of the National Delegates played an active part in promoting their Specific Programmes via organising and participating in conferences and seminars and writing articles for publication in a range of outlets. They also represented Irish interests - of both the State and individual participants - in PMC meetings.

The performance of individual National Delegates in terms of their advisory, promotional and representative roles varied. To some extent this was a function of personality and experience, but largely appeared to be a function of the time and resources their parent organisations allowed them to devote to the tasks. Some Delegates were able to allocate sufficient time and resources to their FP4 responsibilities, but for many the resources available to them were slight. The fact that the help and assistance offered by the National Delegates was appreciated by so many participants is thus all the more remarkable.

Many of the National Delegates complained that resources were slim because FP4 was peripheral to the main interests of their parent organisations. This could be said of all the organisations involved, however, and it explains neither the disparity in resources made available to the Delegates located in different organisations nor the relative success or productivity of some National Delegates compared with others.

One factor was perhaps influential in determining relative performance, however. **The concentration of programme management activities in EI and the cumulative experience of involvement in previous Framework Programmes meant that a collective pool of expertise existed within the organisation which the EI National Delegates were able to tap**. Even though some of the EI National Delegates complained that both they and Framework were marginal to the mainstream interests of the majority of their colleagues in EI, they still benefited from regular daily contact with the other National Delegates within EI. In contrast, the National Delegates from other organisations were typically cut off from regular contact with other people interested in FP4. There was some sporadic contact between National Delegates, but generally they were less able to tap into the collective expertise available to the EI National Delegates.

6 In some countries the National Delegates and the Programme Contact Points for FP5 are different, though this is not the case in Ireland.

For some of the newer National Delegates (for both FP4 and FP5), lack of contact with other National Delegates seriously impeded their progress up learning curves. In future this could be rectified by more helpful initiation procedures, briefing sessions and regular meetings with other National Delegates/Programme Contact Points.

For the National Delegates to function effectively they need to be in tune both with developments in the Commission and with the needs of their target audiences. The former requires regular attendance at Commission meetings, and some National Delegates had better track records than others in this respect. In the Third and Fourth Framework Programmes there was a tendency to choose "high profile names" rather than "professional meeting people" as National Delegates, though the latter were often dispatched to Brussels as alternatives. This led, in some instances, to complaints from some participants that their Delegates appeared a little out of touch with developments in Brussels. For the FP5, there was a deliberate attempt to rectify this via the appointment of personnel more likely to be proactive and operational due to their position and role within their parent organisations, and hence more likely to attend Commission meetings on a regular basis.

National Delegates have to keep in touch with the needs of prospective and actual participants in order to reflect these in the development of future policies. They also need to relay information on Framework-related developments to the same audience in order to stimulate interest in Framework and encourage the submission of proposals.
It is imperative, therefore, that the National Delegates maintain adequate mailing lists and databases on target audiences. It was apparent, however, that more could be done in some quarters to maintain and expand these lists and databases. In one instance, mailing lists were not handed over to a new Delegate. In another case, little had been done to expand the mailing list even though the switch from FP4 to FP5 meant that a whole new sector of the research community fell under the remit of one Delegate. In future, greater efforts will be needed to ensure that mailing lists and databases are adequately maintained and updated.

In FP4, the Advisory Panels established for each Specific Programme proved an effective means of gathering 'user perspectives' as input to the formulation of policy positions. They also constituted a useful means of filtering information on Commission developments back to influential members of the R&D community. Certainly many of the National Delegates valued their existence, even though attendance at Panel meetings did tend to tail off in some instances over programme lifetimes. The continued use of such mechanisms has much to commend it.

4.4 Division of Responsibilities

One issue which emerged during the course of the evaluation concerned the appropriateness and efficacy of the division of responsibilities between the various actors involved in the promotion, facilitation and administration of FP4 in Ireland. In particular, a number of 'policy and administration' interviewees commented on the roles played by Forfás (mainly concerned with Framework level activities and policy advice) and EI (primarily concerned with operational issues at the Specific Programme level). General opinion amongst these was that both had performed adequately, though some felt that the 'institutional distance' between them, both spatial and functional, left something to be desired. This group tended to argue that one body (EI) should handle both policy and operational aspects of Framework.

This view neglects two important aspects, however. In the first instance, the split between policy and operational aspects for FP4 mirrors the overall split in responsibilities between Forfás and EI overall, making it entirely appropriate for FP4 to be handled in this way also. Allocating responsibility for FP4-related policy to EI would only start to make sense if the responsibilities of Forfás as a whole were to be subsumed by EI. Secondly, even though EI's operational outreach is large, it does not cover all the territory spanned by the Framework Programmes. National Delegates need to be recruited from a broad base of organisations and institutions if all promotion and support functions are to be fulfilled, and many of these bodies - most of whom were content with the role and performance of Forfás - would resist EI assuming responsibility for Framework level activities as a whole. **The case for maintaining the current division of responsibilities is therefore strong.**

5 Questionnaire and Case Study Analyses

This **Section** summarises the findings of the questionnaire survey (see **Appendix 2**) and the case studies conducted as part of the evaluation. As before, the material is presented in terms of the four broad evaluation issues addressed throughout this document.

5.1 Evaluation Issues

5.1.1 Nature, Composition and Appropriateness

Both the questionnaire and the interview modules asked participants to comment on the nature of the projects in which they were involved and the character of their involvement. This allowed an aggregate picture of the composition of Irish participation in FP4 to be built up. In turn this allowed the appropriateness of Irish involvement in FP4 to be tested via inspection of:

- The relevance of participation to the goals of the organisations involved; to world-wide S&T agendas; and to overall programme goals
- The mix of projects compared with programme compositions elsewhere in the EU
- The goals of participants compared to those of participants in similar programmes elsewhere in the EU
- The fit with local circumstances

Relevance

Irish participants in projects certainly considered them to be strategically important and highly relevant to their own organisations, to programme goals and to world scientific and technological agendas (see Exhibit 5.1).

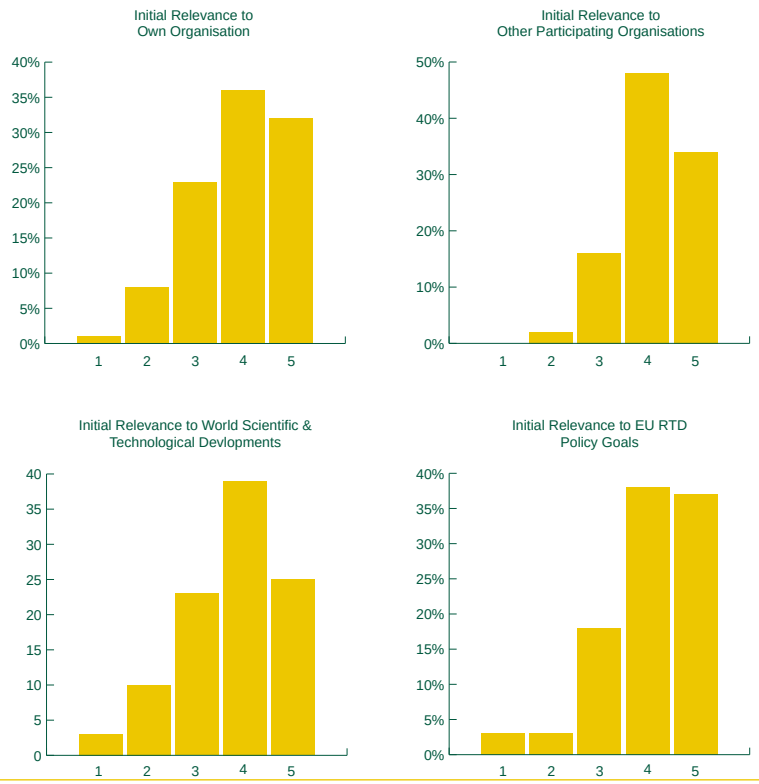
Nature of Projects

The mix of projects undertaken by Irish participants in terms of the nature of work conducted within them was entirely in line with similar mixes in other countries and in other collaborative R&D programmes. In Ireland, as elsewhere, there was a primary focus on applied R&D combined with a healthy sprinkling of other projects at both the basic and demand ends of the spectrum (see **Exhibit 5.2**). **It was always to be expected, therefore, that the majority of project outputs would not lead directly or speedily to marketable projects and commercial returns.**

Project Goals

The goals of participants were generally focused on strengthening scientific and technological capability via networking activities and access to additional funds in order eventually to exploit the knowledge gained for the good of both their own organisations and the community at large (see **Exhibit 5.3**). **These goals were entirely in line with the rationale which underpins most collaborative R&D programmes, including FP4.**

Exhibit 5.1: Relevance of Projects



5.2: Primary Focus by Type of Activity

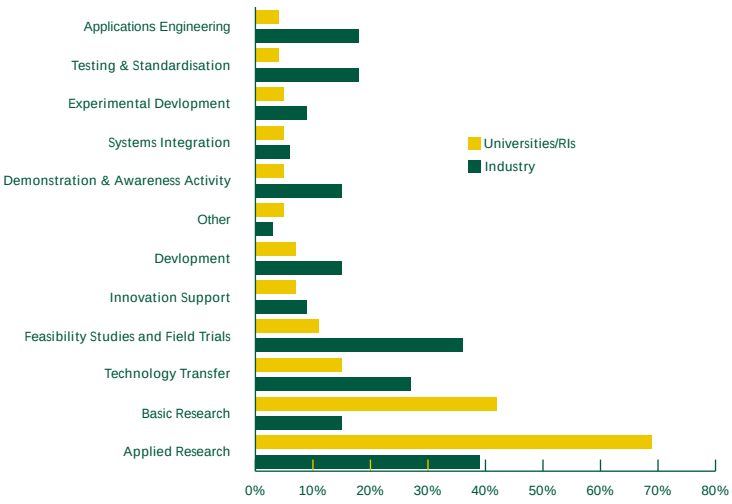


Exhibit 5.3: Top Ten Motives and Goals of Participants

Motives/Goals	Type*	Overall Ranking	University/RI Ranking	Industrial Ranking
Enhancement of existing knowledge base	K	1	1	1
Access to complementary sources of expertise	N	2	3	2
Maintenance of expertise in a research area	K	3	2	20
Access to additional funds	S	4	4	5
Development, evaluation or improvement of tools and techniques	K	5	7	4
Formation of new European research partnerships and networks	N	6	6	11
Exploration of new, alternative technology paths	K	7	10	6
Deeper understanding in core technology area	K	8	5	17
Enhanced reputation and image	N	9	9	12
Acceleration of RTD	K	10	13	8
Production of publications, PhDs etc.	K	18	8	37
Development or improvement of new processes	E	12	16	3
Development or improvement of new products	E	19	24	7
Reduction of in-house contribution to project	S	23	25	9
Financial risk-reduction	S	27	31	10

* K - Knowledge-oriented Goals E - Exploitation-oriented Goals
N - Network-oriented Goals S - Strategic Management Goals

Fit with Local Circumstances

Knowledge and networking goals were important for all participants, but an important driver for many - especially academics - was the availability of funding and the lack of comparable funding via national schemes, plus the fact that collaboration with foreign partners was the only way many could access the complementary expertise they desired. Few became involved solely for the money, however, and projects were generally only undertaken if they were in line with the broader goals and strategies of participant organisations.

There were some examples of academic institutions following FP4 agendas rather than their own, but these were the exceptions rather than the rule and **there was little evidence that FP4 was distorting the country's scientific and technological base by orienting it towards topics and issues out of alignment with the true interests of the R&D community or the country more generally.**

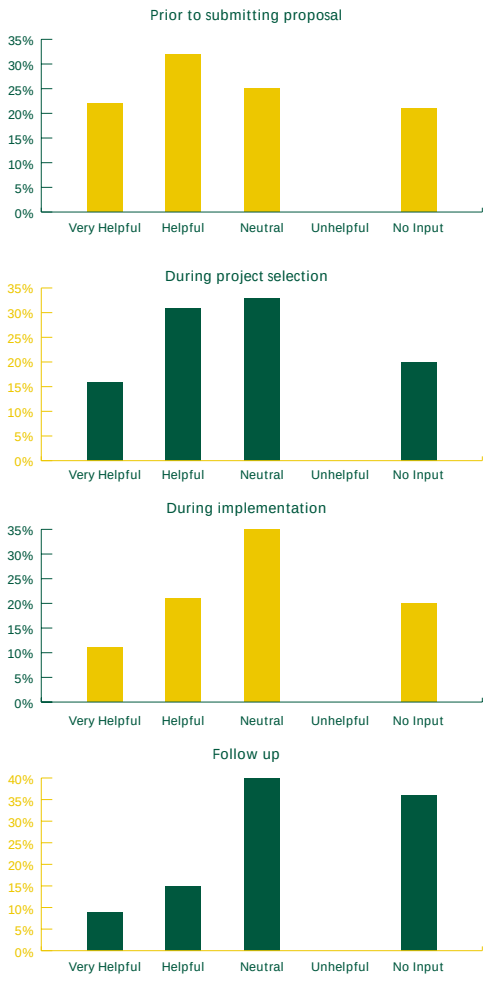
5.1.2 Efficiency of Implementation

The questionnaire survey provided an opportunity to assess overall levels of satisfaction with the implementation of FP4 in Ireland. The case studies, on the other hand, allowed participants to elaborate on particular aspects of implementation at all stages of project and programme life-cycles and to comment on some of the factors which affected project progress.

Overall Satisfaction

The help and assistance offered by the National Delegates to FP4 participants was widely appreciated, particularly the support provided prior to the submission of formal proposals (see Exhibit 5.4).

Exhibit 5.4: Input from National Delegates



As well as being complimentary about the help and assistance they received from National Delegates in the early stages of the cycle, **participants also praised the assistance provided by Commission officials at all stages in the project life-cycle.**

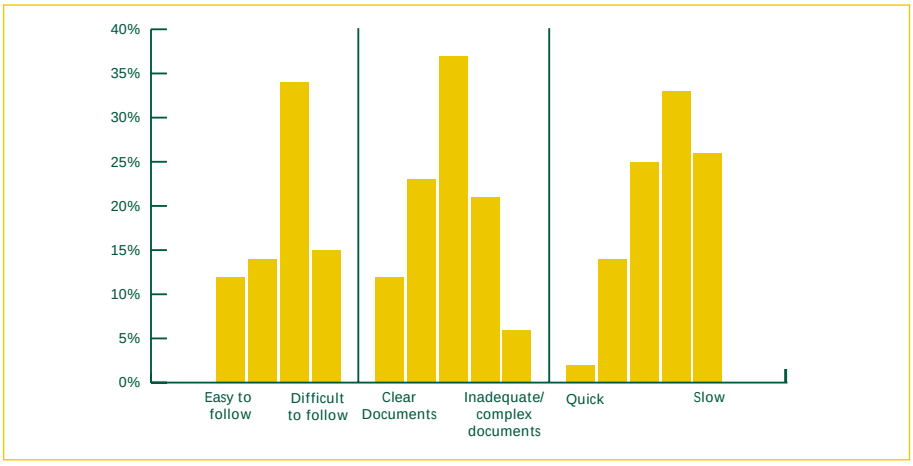
Life-Cycle Stages

Despite the efforts of all concerned and a laudable degree of success, there is still a strong likelihood that many potential participants in Framework activities are unaware of the benefits of involvement, particularly SMEs. New approaches are needed, including proactive attempts to identify and target prospective applicants.

Participants tended to construct partnerships without recourse to sources of advice. When they did avail themselves of services such as those offered by the Innovation Relay Centre or CORDIS, they were not always satisfied. **More user-friendly services are necessary if potential participants are to make use of them**.

Although Irish participants were generally well disposed towards National Delegates and Commission officials, **most found European Commission application procedures for FP4 both slow and difficult to follow (see Exhibit 5.5)**. Time alone will tell whether the greater standardisation across programmes in FP5 and the more overt use of digital modes of communication will constitute an improvement.

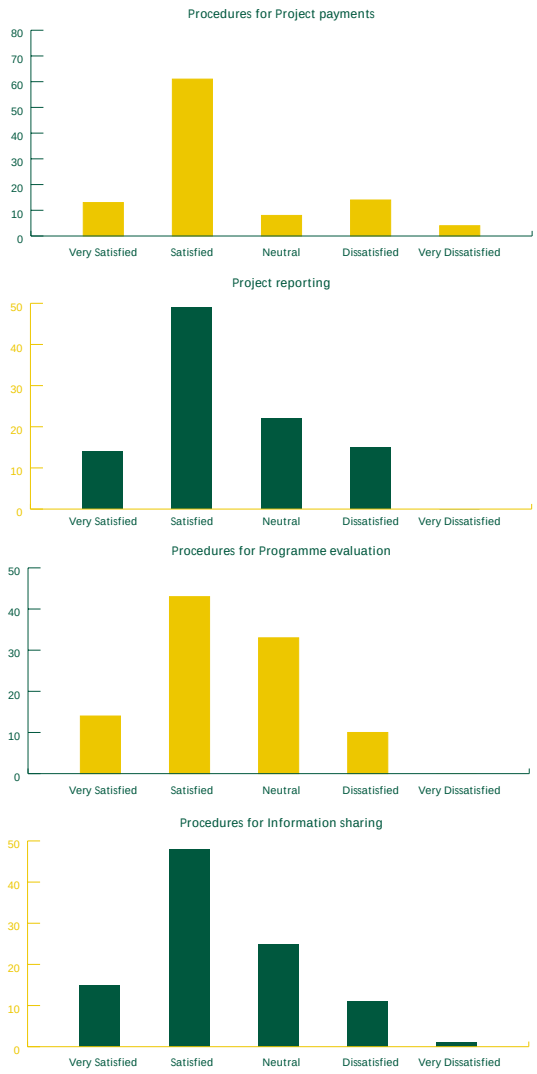
Exhibit 5.5: European Commission Application Procedures



In contrast to the general antipathy concerning application procedures, **Irish participants were broadly satisfied with the administrative arrangements relating to payments, project reporting, programme evaluation and the sharing and dissemination of information (see Exhibit 5.6)**. There were also no complaints about unacceptably high rejection rates for proposals and few quibbles about budget cuts prior to acceptance, though these did occur. There were some complaints, however, that project start delays had adversely affected projects, and a small minority said that delays in payment had affected them very severely. SMEs were most affected because of the impact of even small delays on overall cash flow.

Some participants decried the fact that there was little feedback concerning unsuccessful applications. Although burdensome for Commission officials, more extensive debriefing would be welcomed by many in the research community.

Exhibit 5.6: European Commission Administrative Arrangements



Although most participants were satisfied with project reporting arrangements, a sizeable minority was more critical. Many in this group could not understand why reporting arrangements were so heavy, particularly for project leaders (some of whom said they would not act in this capacity again), and **suggested that 100% funding for the administrative component of projects would help sweeten the pill.**

Academics are accustomed to publishing and sharing project results, but few industrial participants went to any great lengths to ensure the widespread dissemination of results, even though few feared that others would be able to exploit these results in advance of themselves. This reticence to share, however, did not stop most from complaining about the difficulties they had experienced trying to access the results of other participants.

Project Progress

A range of factors affected project progress. Good project management skills had an important positive effect, as did early identification, clarification and resolution of IPR issues. Major negative factors included the burden of leadership, too many partners, lack of openness concerning the objectives of all partners, lack of commitment on the part of partners, personnel loss and technical complexity.

5.1.3 Effectiveness and Impact

Projects are effective if they achieve their goals and satisfy participants. In turn, if the same projects are in line with programme goals, which they were for FP4 in Ireland, then programmes can also be deemed effective.

Both the questionnaire survey and the case studies allowed participant satisfaction and goal attainment, and hence effectiveness, to be investigated. They also facilitated an exploration of the impacts of projects both on organisations themselves and more broadly. Finally, they further allowed statements to be made about the additionality associated with FP4 in Ireland.

Participant Satisfaction

Participant satisfaction with project outcomes is a crucial test of programme effectiveness, and **there is little doubt that the vast majority of Irish participants in FP4 were satisfied with their involvement in the programme**. In addition to considering their projects to be highly relevant to both their own and Commission goals, they also considered that their projects were of a high calibre, i.e. adequately resourced, well executed projects producing timely outputs of high quality and utility.

The majority of participants were also convinced that the benefits of involvement outweighed the costs generally associated with collaborative R&D (see Exhibit 5.7).

Goal Attainment

The most crucial test of programme effectiveness is whether or not participants achieved their project goals. **In FP4, achievements were generally greatest in terms of enhancing the knowledge base of participants and least in terms of exploitation-oriented goals (see Exhibit 5.8)**. It should be remembered, however, that **most participants ranked exploitation goals as less important than knowledge-related goals, and that most participants - academic and industrial - achieved or surpassed their most important goals (even exploitation goals) and under-achieved only in terms of what they considered to be relatively minor goals**.

Exhibit 5.7: Costs and Benefits of Participation

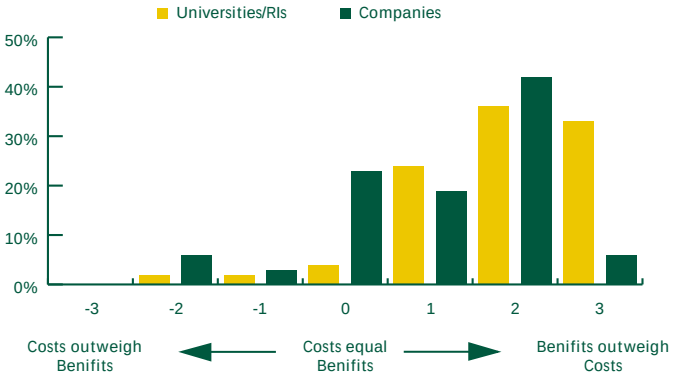
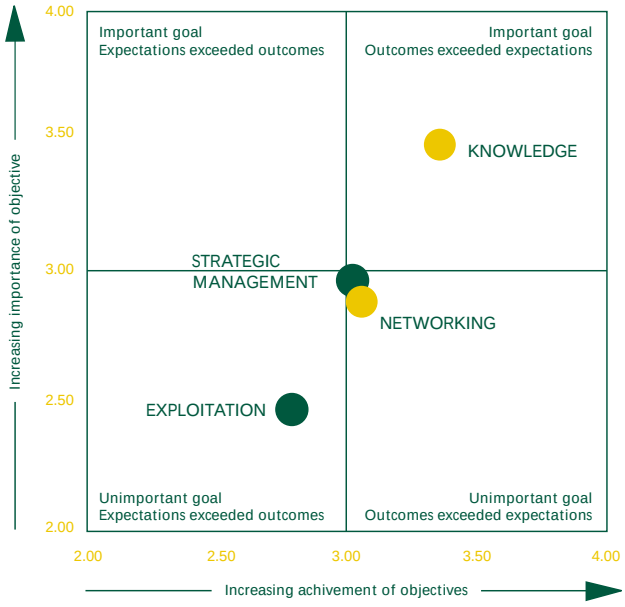


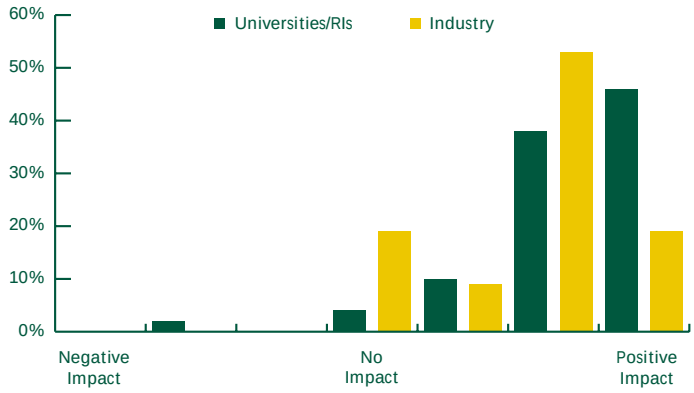
Exhibit 5.8: Importance and Achievement of Goals - All Participants



Impact on Own Organisation

For most participants, industry included, the most significant impact on their own organisation was the impact on scientific and technological standing (see Exhibit 5.9).

Exhibit 5.9: Impact on Scientific and Technological Standing



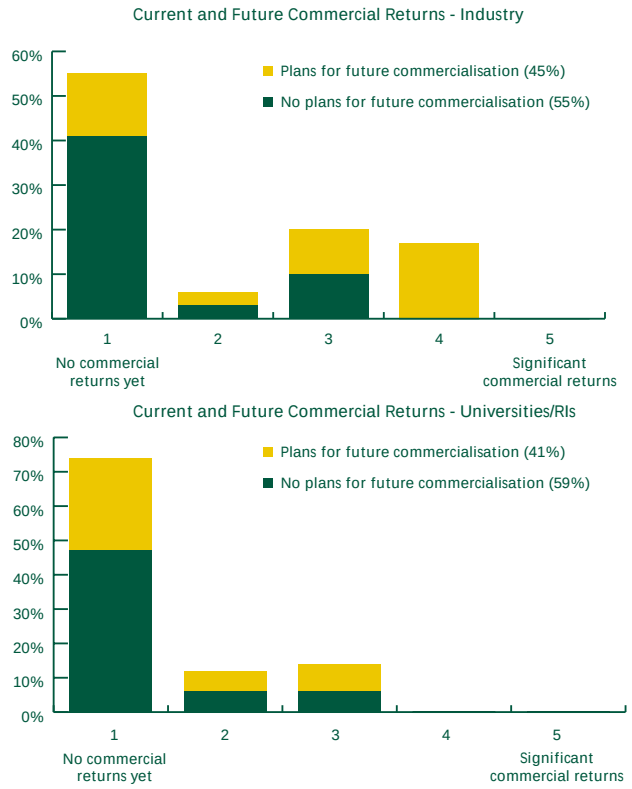
Even though the intangible, capability-building goals associated with collaborative R&D programmes were emphasised even by industry participants, **few ever lost sight of the fact that they were but a means to end, and that new products and processes were the ultimate goal (see Exhibit 5.10)**. Further development was needed in most cases, however, before exploitation could take place.

Exhibit: 5.10 Proportion Ranking Outputs as Important

Type of Output	University/RI	Type of Output	Industry
Publications in refereed journals	83%	New processes	77%
Other publications	81%	New products	71%
PhD theses	64%	New services	63%
New methods or tests	57%	Demonstrators, prototypes or pilots	56%
Other	56%	New methods or tests	56%
Demonstrators, prototypes or pilots	52%	Other	40%
New products	45%	Software or codes	38%
New processes	43%	Norms and standards	25%
Patent applications	30%	Patent applications	19%
Patents granted	27%	Patents granted	19%
Software or codes	26%	Licences sold	19%
New services	23%	Publications in refereed journals	13%
Norms and standards	22%	Other publications	6%
Licences sold	22%	PhD theses	0%
Spin-off companies	20%	Spin-off companies	0%

Few had experienced significant commercial returns by the time of the evaluation, though about half the firms involved had experienced some gains and expected to realise more in the future (see Exhibit 5.11). Conversely, 40% of firms had not and did not expect commercial returns to accrue directly from projects given the type of work they had undertaken, and firms were similarly divided in terms of the impact participation had or hadn't had on the competitiveness of their organisations.

Exhibit 5.11: Current and Future Commercial Returns



It is unreasonable to expect FP4 to have had a significant effect on competitiveness in such a short period of time. Framework Programmes are designed to increase competitiveness via a long-term process which involves sharing know-how across international boundaries, strengthening scientific and technological capabilities via this sharing, and then exploiting this knowledge to improve competitive position and performance. Although it is possible for this sequence of events to occur during the course of individual projects, in most cases the time-span involved is much longer, and for most projects the sequence is also often less direct.

In Ireland there were a number of very successful projects which produced products very quickly and started to reap commercial rewards at an early stage. Across all participants, however, the general picture was of raised competence levels and positive signs that exploitation would occur sometime in the future - exactly in line with realistic expectations of what programmes such as FP4 can achieve.

Few projects had an appreciable impact on net employment levels within industrial organisations, **though this was not the case in academic institutions, where over half the participants said there had been positive impacts on employment levels.**

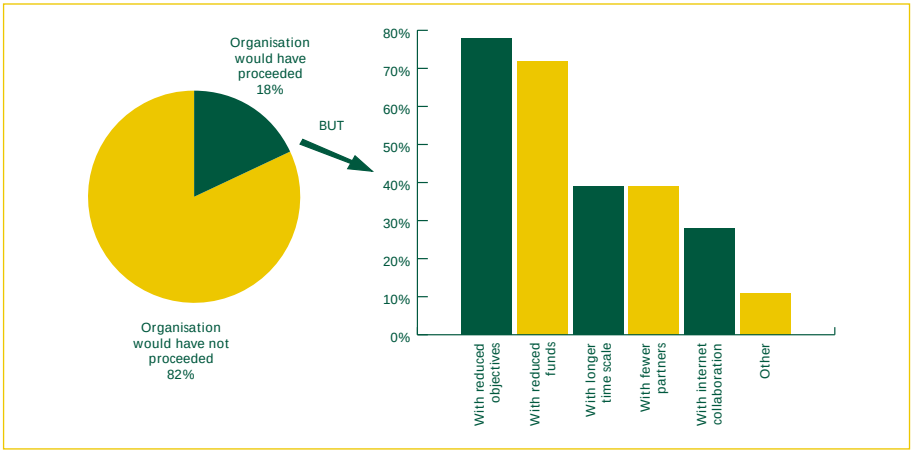
External Impacts

Outside of their own organisations, participants generally felt that their partner organisations had benefited positively from involvement. The scientific community was seen as the primary intermediate user of project results by both academic and industrial participants, though the latter saw manufacturing industry as the prime beneficiary in the long term, though only after the scientific community had further developed and helped exploit project outputs and results.

Additionality

Generally speaking, the projects undertaken by Irish participants were complex, exciting, long-term projects in core technologies which most organisations considered of strategic importance and high relevance to their organisations. Very few of them, however, would have been feasible without the participation of partner organisations abroad or the existence of a mechanism facilitating collaborative R&D. **Indeed, the large majority of participants were adamant that they would not have become involved in projects in the absence of EU funding (see Exhibit 5.12).**

Exhibit: 5.12 Additionality



In particular, the academic research base would not have been able to prosper in the way that it has over the last decade or so without FP4. The Irish tertiary sector has been extraordinarily dependent on FP4 and earlier Framework Programmes for research funding. Half of all FP4 funding went to this sector, with FP4 funding 30-80% of all research in some HEIs. **In a very real sense the past growth, the current strength and even the very existence of the university research community in Ireland can partly be attributed to its involvement in successive Framework Programmes.**

5.1.4 Strategy

During the case studies participants were asked to comment on their future plans concerning the dissemination of project results; the further exploitation of results and outputs; participation in future Framework Programmes; and the use of funding sources other than FP5, especially those funds likely to become available in the aftermath of the Irish Technology Foresight exercise. The questionnaire also gathered relevant information on follow-on activities and on participants' perceptions of the strengths and weaknesses of R&D 'supply' and market 'demand' within Ireland for new products and services.

Dissemination and Exploitation

A number of participants felt that there was scope for the further dissemination and subsequent exploitation of results. Within their own organisations, academic and industrial participants believed there was scope for improving the dissemination of results to their research colleagues. Industrial partners also believed more could be done to inform their colleagues in production, marketing, sales etc. about the FP4 achievements of the research staff.

More widespread dissemination of the results of FP4 would benefit potential FP5 participants eager to establish reference points when writing their own proposals.

One way of improving dissemination within and between projects would be to introduce the concept of 'Shared Cost Project Clusters' utilising some of the advanced dissemination techniques pioneered in dissemination-oriented Concerted Actions in FP4. Allowing participants in these dissemination clusters to benefit from the 100% funding regime of Concerted Actions would also be an incentive to take part.

Future Framework Participation

Most participants expected to continue with follow-on R&D in the context of collaborative programmes such as FP5, though many were planning to tap into other funding sources, including internal sources for further development and commercial exploitation (see Exhibit 5.13).

Many SME participants in FP4 remained interested in the possibility of participating in FP5. **For most there were high entry barriers, however, and continued efforts to lower these will be required if the proportion of SMEs in FP5 is to increase.**

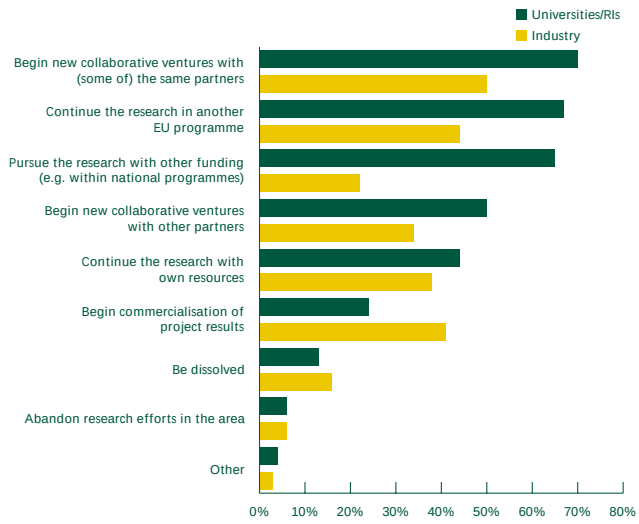
The continued utilisation of public funding sources by the private sector to underwrite R&D should not be seen as evidence of a dependency culture. This is to misunderstand the continuous need of industry to tap into knowledge pools broader than they could ever hope to establish on their own. **On the contrary, programmes such as FP4 should be regarded as extremely relevant and effective instruments which continue to meet the needs of many in the Irish industrial community.**

Alternatives to FP5

Although many participants said they were contemplating the use of national funding sources for follow-on work, few were aware of the recent Technology Foresight exercise, nor of the possibility of more national funding becoming available in areas such as IT and biotechnology.

If such funding does become available, most organisations said they would use it to complement FP5 rather than treat it as a direct substitute, preferring FP5 when suitable partners could not be found in Ireland.

Exhibit 5.13: Future Plans



Supply and Demand

Irish participants were generally appreciative of the strength of the Irish research base across all the areas corresponding to the thematic and horizontal programme areas of FP5. They also felt that the demand for new products and services would be high in these areas. They were less confident of the ability of Irish industry to commercialise the results of R&D conducted in these areas, with the exception of the IT area. **There may thus be a case for national schemes to help overcome barriers to commercial exploitation in these areas.**

6 Conclusions and Recommendations

This short concluding section returns to the original evaluation objectives specified in the terms of reference for the study. It considers each of the objectives contained therein and attempts a response based on the findings of the evaluation exercise. It concludes with a list of recommendations drawn from the body of the report.

6.1 Evaluation Objectives

6.1.1 The Relevance of Framework to Ireland

Objective 1 - Understand better the relevance of Framework activities to the enhancement of technological capability and industrial development in Ireland

The first step in understanding the relevance of FP4 to Ireland is to recognise that it is a support mechanism which has been successfully exploited by the Irish RTD community. At first sight some might dispute this, arguing that FP4 failed to meet its targets. Participation in FP4, for example, fell short of the political targets set at its outset in terms of value of contracts (Target: 240 MECU worth of EU funding; Achieved: 191 MECU of EU funding) and the proportion captured by industry (Target: 40%; Achieved: 30% by value).

These political targets were extremely ambitious, however, for a Framework Programme which contained a mix not only of 'industrially-oriented' programmes but also of 'academically-oriented' programmes which helped lower the proportion of funding captured by industry across FP4 as a whole. In terms solely of 'industry-oriented' programmes, the proportion of funding captured by Irish industry did indeed meet initial targets.

The targets were also extremely ambitious for a programme in which success was a function not simply of the efforts of the relevant National Delegates to promote FP4, but also of the size and calibre of the research community, the quality of the proposals put forward and the extent of competition from centres of excellence across Europe. The relative success of Irish participation in FP4 is perhaps better exemplified by the fact that there were almost 100% more participations in FP4 than FP3 and more than 250% more organisations took part. Moreover, Irish participation levels in FP4 in proportion to the relatively small size of the country's research base and its contribution to the EU budget were bettered only by Greece.

The second step in understanding the relevance of Framework activities in Ireland is to acknowledge that the growth of the Irish research base over the span of successive Framework Programmes, particularly its growth in the tertiary level sector, has been due in large part to the existence of EU funding and the ability of Irish researchers to capture it.

The third step is to acknowledge that Ireland needs to expand its R&D base if it is to become a knowledge-based economy. Over the period of FP4, public investment in the R&D base was comparatively low and insufficient to fuel the type of expansion required. FP4 funding was additional to Government expenditure on R&D and approximated to three quarters of all State funding of R&D in the business sector and almost half of State contributions to tertiary level institutions. There is little doubt therefore that FP4 played a vital part in maintaining and expanding the Irish research base.

In particular, the academic research base would not have been able to prosper in the way that it has over the last decade or so without FP4. The Irish tertiary sector has been extraordinarily dependent on FP4 and earlier Framework Programmes for research funding. Half of all FP4 funding went to this sector, with FP4 funding 30-80% of all research in some HEIs. In a very real sense the past growth, the current strength and even the very existence of the university research community in Ireland can partly be attributed to its involvement in successive Framework Programmes.

For Ireland to become a knowledge-based society, Irish researchers need to stay in touch with advances in knowledge on a broad front. FP4 enabled a large number of researchers to build networks and come into contact with their counterparts in other countries. This allowed researchers to experience other cultures and research methods and to gain familiarity with leading-edge developments in Europe. It also contributed to the internationalisation of indigenous companies. By helping to link indigenous sources of expertise to leading-edge developments in the EU, FP4 has directly contributed to the creation of a knowledge-based economy in Ireland.

By allowing Irish researchers in academic institutions to keep abreast of international developments in the world of science and technology, FP4 acted to broaden the sector's knowledge base. In turn, this should strengthen the sector's didactic capability and increase the likelihood that Ireland will be able to resolve its skills crisis in due course.

In some disciplines - atmospheric chemistry and marine engineering are good examples - the opportunity to participate in FP4 led to tangible gains in Ireland's scientific and technological capabilities, cutting years off learning curves and development times. In others - electronic and software engineering are good examples here - the existence of the Framework Programmes enabled researchers of excellent calibre to remain employed as researchers. At the same time Framework also ensured that a steady stream of well qualified researchers entered into the competitive, and nationally lucrative, world of software development.

Moreover, the knowledge accumulated by Irish participants has been translated directly and indirectly into building national technological capabilities and has speeded the rate of industrial development in the country. This is most obviously demonstrated by the creation of a small number of extremely successful companies, now recognised as star research performers which, in their early days, used Framework funding as seed capital in order to become established and grow. Without the existence of Framework, it is debatable whether they would have survived or even come into existence. One 'policy and administration' interviewee even commented that the Framework Programmes were "worth it for one company alone".

For the most part, however, the Framework Programmes allowed Ireland to raise technological capabilities on a broad front such that many organisations are now better placed to exploit the knowledge they have gained. Improved competitiveness is a long-term rather than a short-term goal.

The direct contribution of FP4 to the strengthening of academic-industry links within Ireland was not overtly significant given that relatively few projects involved Irish academics and industrialists working together. Indirectly, however, it had a considerable positive impact on the scientific and technological capability of the academic sector

in particular, making Irish academic institutions much more attractive partners for Irish industry to work with in future.

FP4 did not involve MNCs to any significant degree. Indeed, the proportion of FP funding going to foreign-owned companies fell from 6% in FP2 and 8% in FP3 to just under 3% in FP4. FP4 did not therefore contribute directly to the embedding process. Indirectly, however, it has helped to increase the knowledge base and credibility of the Irish research community and considerably increased its visibility on a European and world stage. It has also contributed to the creation of a well educated, well qualified and technologically aware workforce capable of acting as a magnet to attract and retain the growing number of multinational firms based in Ireland. Given that the existence of a skilled labour pool is one of the most important criteria used by 'knowledge intensive' MNCs in locational decision-making, the long-term indirect impact of FP4 is likely to be much greater than any short-term direct effects. It is important, therefore, that organisations such as EI recognise that the Framework Programmes are an important element of the 'embedding' process and continue to support and promote participation in them.

6.1.2 Helping Irish Organisations to Exploit Framework

Objective 2 - Suggest ways in which Irish organisations can best be supported in seeking and exploiting their involvement in RTD Framework Programme projects

A wide variety of Irish organisations participated in FP4. Generally speaking, the assistance they received over the course of their involvement, from proposal submission to the completion of projects, was commendable. This assistance came from Commission officials on the one hand and from a matrix of providers in Ireland on the other. Foremost amongst these were the National Delegates, with other assistance coming from Forfás, the IRC, employers' representatives and other parts of Enterprise Ireland.

Given overall levels of satisfaction with the structures and mechanisms in place to provide support and assistance, there is no obvious case for wholesale changes to existing approaches. There are, however, some steps which could be taken to strengthen areas of comparative weakness:

- Investigating more fully whether there is an awareness problem concerning Framework activities within Irish industry
- Raising awareness of the existence of Framework amongst non-participants if such a problem is found to exist
- Providing more in-depth targeted assistance to 'novice' participants
- Ensuring better dissemination of research results

In broad terms, strategies to overcome these weaknesses could include:

- Better use of new and existing intermediaries, e.g. Industrial Liaison Officers within universities, to disseminate information about Framework as part of their routine activities
- Consideration of more specialised services. These could include proposal writing assistance or fuller subsidised consultancy time to help develop research ideas

- Collection and publication of research results. Industrial researchers and decision makers (non researchers with a need to be informed in order to take research funding decisions) are particularly ill-served. Ideas include provision, promotion (and even subsidy) of public platforms to raise awareness of projects and outcomes. These could be complemented by the routine collection of 'case studies' by Forfás, EI or the IRC to showcase Irish achievements (this feeds into the first awareness raising task mentioned above)

6.1.3 Informing Future Policy

Objective 3 - Inform the Irish policy stance in future RTD Framework Programme discussions and suggest ways of improving Ireland's input into the structure and operation of the Framework Programmes

Participation to date in successive Framework Programmes has been a success, with many benefits for the Irish science and technology base and, ultimately, the strength of the Irish economy. This in itself should inform future Irish policy stances of the wisdom of continued support for Framework and the need to stimulate continued and broader involvement, particularly by the private sector.

Framework programmes have helped establish a healthy and viable research community in the tertiary level sector in Ireland, primarily via participation in shared cost research projects and programmes such as Training and Mobility of Researchers. In future, academic participants should also be encouraged to avail themselves of the support for research infrastructures which is now available in FP5.

The dependence of this sector on Framework funding has not been a problem to date but it could pose problems in the future. If there is to be a serious move in the direction of a knowledge-based economy, tertiary level institutions and Ireland as a whole would benefit enormously from a greater plurality of potential research funding sources.

Given the relative size of Irish involvement in Framework Programmes, the importance of Framework as a support mechanism in the Irish National Innovation System should be fully recognised in Irish research policy exercises and debates. Conversely, the results of initiatives such as the recent Technology Foresight exercise should be incorporated into the discussions and decisions leading up to the start of FP6.

The role played by Forfás in terms of informing Framework-related policy positions was generally acknowledged and appreciated in policy-making circles, as was the effort put into ensuring that all National Delegates promulgated this position in different quarters within the Commission. This acted to maximise the influence a small country such as Ireland had on the development of policy in Brussels.

The split in FP4 responsibilities between Forfás on the one hand (primarily concerned with advice on policy development to the OST) and EI on the other (primarily concerned with operational matters via its promotion and facilitation of the bulk of the Specific Programmes) reflected a broader institutional separation of responsibilities and was entirely appropriate in an Irish context.

Turning to improvements in the structure and operation of the Framework Programmes, there are three areas of slight concern as FP5 takes off. During FP4 the National Delegates generally performed well, offering solid support to all applicants and participants.

Performance did vary from one Specific Programme to another, however, and was generally better when organisations were able to devote sufficient resources to the task and deficient when this was not the case.

The counterparts of the National Delegates in FP5 may not be able to maintain overall high standards, however. A few of the new appointments in particular appeared heavily resource constrained, and some effort will probably be needed to persuade their parent organisations of the importance of offering adequate support to FP5 participants and potential participants. Many of the newer Delegates also felt isolated and would benefit from frequent contact with the other Delegates.

The concentration of programme management activities in EI and the existence in EI of an organisational environment which permitted and even encouraged the regular sharing of experiences gave a natural advantage to the National Delegates operating out of EI. Although some networking activities involving all the new Delegates have started, these probably need to be established on a more regular basis. In particular, thought should be given as to how non-EI National Delegates could usefully share their experiences with other Delegates.

The second area where there is scope for improvement concerns the Management Information Systems (MIS) in use both by National Delegates for individual programmes and by Forfás for the Framework Programmes as a whole.

The systems in place to track Irish involvement in FP4 as a whole were sufficient to allow Forfás to fulfil its policy formulation and advice remit, though there was considerable scope for improvement. Project databases and mailing lists would benefit from more regular updating and maintenance, and a more efficient system needs to be put in place to ensure that the centralised records on Framework participation as a whole are as comprehensive as possible.

Ideally this should involve the improved transmission of higher quality information from the Commission direct to Forfás rather than via Programme Management Committees and National Delegates, but if this does not occur other mechanisms need to be implemented which ensure that the National Delegates adequately service the information needs of Forfás. These would include regular review and updating of participation across the Framework Programme as a whole, to be carried out by Forfás in co-operation with the relevant National Delegates.

At the Specific Programme level, the mailing lists kept by National Delegates on potential Framework participants and the data bases kept on actual involvement are key to many of the roles the Delegates are expected to perform. There was scope here for greater uniformity in practice across National Delegates and for greater efforts to be made in the compilation, maintenance and updating of lists and records.

A third area in which action should be considered concerns the mechanisms in place to support the formulation of an Irish policy stance vis-à-vis new Framework Programmes. Many of the National Delegates appreciated the existence of the (now defunct) Advisory Committees established for each programme area and the opportunity they provided both to elicit and disseminate FP4-related information. Again, considerable thought needs to be given as to how these crucial information gleaning and sharing activities can best be performed within the new context of FP5.

Whatever mechanisms are devised, it will be important to consider the inclusion of college-based Industrial Liaison Officers in the advisory networks which are constituted. Increasingly they are becoming important intermediaries between the academic world, industry, Irish government bodies and the European Commission as the academic sector begins to think more strategically about research and survival strategies.

6.1.4 Maximising Synergy with National Initiatives

Objective 4 - Maximise synergy with national research support initiatives

The promotion of Framework is one area which could be improved via interaction with other national research support initiatives. Promotional activities for FP4 varied from the organisation of specific events and the distribution of relevant published material to advocacy - where appropriate - of participation in FP4 during the course of the regular 'client diagnostic' activities of Enterprise Ireland. Most of these promotional routes appeared exemplary, and the fact that many more organisations participated in FP4 than FP3 is testimony in itself to the efficacy of promotional efforts.

That said, however, the few non-participants interviewed during the course of this evaluation were generally unaware of the programme's full potential, and there was also some doubt as to whether mainstream business advisers within EI were sufficiently appraised of the potential benefits of participation in Framework Programmes to consider it as an option for its clients.

Probably the most important way a national support mechanism could bolster Framework participation would be for Enterprise Ireland to ensure that its business advisers are well briefed regarding the pros and cons of involvement in Framework. Collaborative ventures such as FP5 or national S&T support schemes are by no means a panacea for all firms, but they are likely to become increasingly important if Ireland is to transform itself into a knowledge society. Participation in FP5 should at least be considered as a potential option during the client diagnostic phase.

Other national initiatives which would complement Framework activities could:

- Promote awareness of FP5 and the dissemination of FP4 results by providing a platform for Framework representatives at conferences, seminars etc.
- Reduce entry costs, particularly for SMEs, by providing financial assistance to help potential participants write proposals. A scheme of this nature is already in operation and could be expanded and better publicised
- Help cover the administrative costs of participation. In principle there is no block against Member States supplementing Commission funded projects as long as the principles of subsidiarity are respected and, although it is not the norm, the practice can be found throughout the EU. Helping to cover the administrative costs of project leaders in particular would stimulate Irish leadership of projects and the collective ability of Irish participants to influence science and technology developments in Europe
- Encourage researchers to further develop their Framework results in the context of more market-facing projects involving Irish partners only (though there is no legal obstacle to the inclusion of non-Irish participants if they increase commercialisation prospects)

- Encourage researchers in the tertiary level in particular to undertake longer-term work which could provide the platform in years to come for the formulation of project proposals for FP6, FP7 etc.

6.1.5 Monitoring and Evaluation Framework

Objective 5 - Develop more efficient and effective ways of identifying, monitoring, analysing, understanding and even measuring the economic impacts and benefits of publicly-supported collaboration

Building up an understanding of the benefits and impact of Framework Programmes involves the collection of input, output and impact data. The first step, the collection of input data, involves no more than keeping adequate participation records (name of participant, date of proposal, date of acceptance, duration of project, title of project, nature of work, programme area etc.) supplemented by data from secondary sources on the participants, e.g. NACE codes, employment size, turnover of firm etc. This allows Programme Composition Analyses to be performed in which the composition of projects and project types can be checked off against overall programme aims and national policy objectives and expected impacts predicted. Knowing that a participation profile is dominated by basic research projects allows one to predict with some certainty that commercial exploitation aims are unlikely to be realised in the short-term. In Ireland, therefore, improving Management Information Systems on Framework participation is the first and most important step which has to be taken in order to enhance collective understanding of the likely impacts of FP5.

The collection of output and impact data poses more of a problem. At the moment the Commission is currently planning to implement a scheme which will ask all FP5 participants to provide core data on expected outputs and impacts and, subsequently, on actual outputs and impacts. The idea eventually is to build up a quantitative picture of FP 5 impacts. In order not to increase the data load on participants, it is imperative that Member States do not duplicate these data collection exercises. Member States, including Ireland, should focus more on the development of qualitative pictures aimed at highlighting best practices and success stories. At the very least there is scope for small exploratory studies aimed at the formulation and testing of new ways and means of assessing the broader downstream impacts of activities such as the Framework Programmes.

6.2 Recommendations

6.2.1 Structure and Organisation

- **The current division of responsibilities between Forfás and Enterprise Ireland works and the case for maintaining the status quo is strong**

- **The Advisory Groups set up to feed into the development of an Irish policy stance for FP5 had much to commend them. Similar mechanisms should be put in place as early as possible to inform Irish stances on the remainder of FP5 and the new stances which will have to be developed for FP6**

6.2.2 European Commission

- The Commission should be encouraged to provide information on participation on a regular and systematic basis not only to National Delegates but also direct to Forfás and similar bodies in other Member States
- National Delegates should urge the Commission to provide more feedback on unsuccessful proposals to applicants
- National Delegates could also promote the idea that 100% funding for the administrative component of projects would lighten the heavy administrative and reporting load carried by project leaders
- Matched funding requirements are a strong deterrent for SMEs, particularly those new to Framework Programmes. Any mechanisms (EU or national) which lower initial entry barriers would be welcome
- The dissemination of know-how and results between projects could be improved if dissemination activities within clusters of Shared Cost projects could take advantage of the 100% funding regime of Concerted Actions

6.2.3 National Delegates

- In future, greater efforts will be needed to ensure that the mailing lists and databases of the National Delegates are adequately maintained and updated
- The newer National Delegates would benefit from more frequent and regular contact with the other National Delegates/Programme Contact Points

6.2.4 Enterprise Ireland

- There should be a more widespread recognition within Enterprise Ireland that programmes such as Framework are crucial to its overall mission if Ireland is to become a knowledge-based society
- Enterprise Ireland should be encouraged to make sure that its business advisers are well appraised of the benefits of participation in Framework activities and able to suggest this as a course of action, where relevant, during the client diagnostic process

6.2.5 Awareness and Dissemination

- Concerted efforts are needed to identify whether or not an awareness problem exists concerning the potential benefits of involvement in Framework Programmes
- New approaches will also be needed to rectify the problem if it exists, including proactive attempts to identify and target prospective applicants
- There is scope for improvement in the user-friendliness of the sources of advice available to potential participants when they are constructing partnerships, and for new delivery mechanisms to be explored, including the use of intermediaries such as Industrial Liaison Officers to disseminate information about Framework to academics and industrialists as part of their routine activities
- More could be done to publicise Framework-related achievements via the publication of successful project outcomes

6.2.6 New Schemes

- Schemes designed to help potential participants write proposals or develop new research ideas should be expanded and promoted
- There may be a need for national schemes to help overcome barriers to commercial exploitation in new markets such as those related to sustainable growth and the environment, where Irish industry has yet to take full advantage of a relatively strong national research base
- Academic researchers should be encouraged to avail themselves of the support for research infrastructures which is now available under FP5
- More funding opportunities at a national level should be made available to academics in order to lessen the dependence of the academic sector on Framework funding

6.2.7 Monitoring and Evaluation

- Studies should be commissioned into novel, cost-effective ways of tracking and assessing the broad downstream impacts of collaborative RTD programmes such as FP5
- The Commission should be encouraged in its efforts to collect data on expected and actual project outputs and impacts and care should be taken not to duplicate these activities at a national level

Appendix 1 Terms of Reference

1 **Undertake an evaluation of the operation of the Fourth Framework Programme in Ireland in order to determine:**

- The pattern of participation by Irish organisations in terms of type and sector of organisation, nature of participation, technology area and funding received
- The nature of the projects in which they participated
- The nature of benefits derived by Irish participants, including intangible benefits such as the creation of new networks
- The relevance of the projects to Irish industry
- The mechanisms by which enterprises got involved in the Programme, and their reasons for doing so
- The degree to which the Programme complements national initiatives for promoting research, development and innovation
- The efficiency and effectiveness of the Programme's promotion in Ireland, and of the assistance provided to intending applicants
- The efficiency and effectiveness of the Programme's administration by the European Commission, from an Irish perspective
- The appropriateness of the procedures for deciding Ireland's inputs into the design of Framework Programmes

2 **Carry out this evaluation by:**

- Analysing existing data on Irish participation in the Programme
- Interviewing those responsible for the planning, operation and monitoring of the Programme in Ireland (including relevant government departments and agencies and a sample of Advisory Panel members)
- Examining the promotional literature and the procedures in place for assisting potential participants
- Reviewing a stratified random sample of individual projects from all major Framework programmes to establish their benefits to the participant organisations and their relevance to Irish industry in general
- Conducting a short survey of managerial and promotional procedures for Framework Programmes in other Member States
- Reviewing a small sample of unsuccessful applicants, to the extent that this proves possible
- Carrying out any other investigations relevant to the purposes of the evaluation

3 Provide a report of the results obtained, with recommendations on:

1. The relevance of the Programme to the enhancement of technological capability and to industrial development in Ireland
2. The suitability of the procedures for encouraging and monitoring Irish participation
3. The mechanisms for developing Ireland's input into the structure and operation of Framework Programmes
4. Actions to enhance the benefits to Ireland from the Framework Programmes and to maximise the synergy with national research support initiatives
5. Definitions of appropriate output and impact indicators for continuous or periodic monitoring of the benefits derived from Irish participation

Appendix 2 Questionnaire to Participants

Evaluation of the Fourth Framework Programme in Ireland

This questionnaire is part of a study conducted for the Office of Science and Technology and Forfás. Your co-operation in answering the questions is kindly requested. All individual answers and comments will be treated as strictly confidential and non-attributable.

Please use a separate questionnaire for each project in which you were (or are) involved.

In addition, unless otherwise specified, please answer for your organisation's participation in each project, and not for the project as a whole.

NAME OF RESPONDENT _____

FUNCTION IN PROJECT

- Technical Contact Point ☐
- Administrative Contact Point ☐
- Other (please specify) ☐ _____

NAME OF ORGANISATION _____

ADDRESS

Street _____

City _____ County _____

TEL _____

FAX _____

EMAIL _____

ROLE IN PROJECT Co-ordinator/Main Partner ☐ Partner ☐ Associate Partner ☐

EMPLOYMENT IN ORGANISATION

TYPE OF ORGANISATION

- ☐ University
- ☐ Research Institute/Centre
- ☐ SME
- ☐ Large Enterprise
- ☐ Public Authority
- ☐ Other (please specify below)

_____

PROJECT TITLE & ACRONYM _____

CONTRACT NUMBER _____

RTD PROGRAMME NAME _____

Please fax the completed questionnaire to Technopolis Ltd on +44 1273 747299. Alternatively you can mail it to Technopolis Ltd, 3 Pavilion Buildings, Brighton, BN1 1EE, United Kingdom. An addressed envelope is enclosed.

For further information concerning this questionnaire and operational aspects of the evaluation please contact Jane Tebbutt either at the above address, or by telephone on +44 1273 204320, fax +44 1273 747299 or email: jane.tebbutt@technopolis.co.uk. For other enquiries, please contact Bill Hogan, Science & Technology Division, Forfás, by tel +353 1 607 3000 or by email: hogand@forfás.ie

Please return this questionnaire as soon as possible. Thank you.

A. YOUR PROJECT

1. **Please indicate the Start Date and Duration of your project.** Start Date Duration (in months)

2 **Please indicate the Project Type.** Shared Cost ☐ Concerted Action ☐

3. **Please indicate the EU Funding.** For your organisation's participation _____ EURO
   For the project as a whole _____ EURO

4. **Please indicate the Total Funding.** For your organisation's participation _____ EURO
   For the project as a whole _____ EURO

5. **Please indicate the number of organisations participating in your project.**

☐	Universities	☐	Large Enterprises
☐	Research Institutes/Centres	☐	Public Authorities
☐	SMEs	☐	Other (please specify below)

B. YOUR PARTICIPATION IN THE PROJECT

1. **Please indicate the strategic importance of this project to your organisation.**
   Minor importance ☐ ☐ ☐ ☐ ☐ Major importance

2. **Did you participate in the project primarily as a provider or user of project results?**
   Provider ☐ User ☐ Both ☐ Other (please specify) ☐ _____

3. **Was this your first participation in the programme?**
   First participation of your organisation Yes ☐ No ☐
   First participation of your team Yes ☐ No ☐

4. **Was the project co-ordinated or linked with other projects within your own company or organisation?**
   Yes ☐ No ☐

5. **Did your project contain:**
   Partners with whom you have worked before ☐ Number of known teams ☐
   Partners with whom you have not worked before ☐ Number of new teams ☐

6. **What was the primary focus of your participation in the project?**

☐ Basic Research (research to answer serious fundamental questions)
☐ Applied Research (research to answer questions which have a particular application or use in view)
☐ Experimental Development (work building on research and leading up to design specifications)
☐ Development (the work needed to meet the design specifications)
☐ Systems Integration (a form of development which calls for mature components to be integrated)
☐ Applications Engineering (a process characterisation stage prior to full implementation)
☐ Feasibility Studies and Field Trials (typically of proposed new products and processes)
☐ Testing and Standardisation (e.g. the routine testing and analysis of materials, components etc.)
☐ Demonstration and Awareness Activity (involvement in attempts to promote the use of new technology)
☐ Technology Transfer (involvement in the acts of supplying, transmitting and absorbing new technology)
☐ Innovation Support (help of various sorts typically offered by professional 'intermediaries' to SMEs)
☐ Other (please specify) _____

7. Please tick each of the following scales to characterise the nature of your organisation's participation in the project.

Low cost	☐ ☐ ☐ ☐ ☐	High cost
Low risk	☐ ☐ ☐ ☐ ☐	High risk
Technically trivial	☐ ☐ ☐ ☐ ☐	Technically complex
Mundane	☐ ☐ ☐ ☐ ☐	Exciting
Necessary	☐ ☐ ☐ ☐ ☐	A luxury
Short-term	☐ ☐ ☐ ☐ ☐	Long-term
Fundamental	☐ ☐ ☐ ☐ ☐	Applied
Curiosity-driven	☐ ☐ ☐ ☐ ☐	Mission-oriented
RTD-oriented	☐ ☐ ☐ ☐ ☐	Diffusion-oriented
Product-oriented	☐ ☐ ☐ ☐ ☐	Process-oriented
In a core technology area for your org.	☐ ☐ ☐ ☐ ☐	In a peripheral area for your org.
Feasible without collaborators	☐ ☐ ☐ ☐ ☐	Only feasible with collaborators

C. MOTIVES, GOALS, OUTCOMES AND ACHIEVEMENTS

1. For your organisation's participation in this project:

- **How important were the following as motives and goals?**
- **To what extent were expected outputs and outcomes achieved?**

	MOTIVES AND GOALS Not important 1 2 3 4 5 Very important	OUTCOMES AND ACHIEVEMENTS Less than expected 1 2 3 4 5 More than expected
Knowledge-oriented goals and achievements		
Enhancement of existing knowledge base	☐	☐
Maintenance of expertise in a research area	☐	☐
Exploration of new, alternative technology paths	☐	☐
Acceleration of RTD	☐	☐
Deeper understanding in core technology area	☐	☐
Reorientation of RTD portfolio towards longer-term RTD	☐	☐
Development, evaluation or improvement of tools and techniques	☐	☐
Production of publications, PhDs etc.	☐	☐
Enhanced skills of RTD staff	☐	☐
Increased number of research staff	☐	☐
Network-oriented goals and achievements		
Access to complementary sources of expertise	☐	☐
Overcome failure to locate appropriate national partners and expertise	☐	☐
Formation of new European research partnerships and networks	☐	☐
Formation of new, longer-term business alliances	☐	☐
Monitoring of competitors' activity	☐	☐
Better co-operation with universities and research institutes	☐	☐
Better co-operation with firms	☐	☐
Better co-operation with suppliers	☐	☐
Better co-operation with customers	☐	☐
Follow-on entry into other programmes	☐	☐
Follow-on entry into RTD and business collaborations in the private sector	☐	☐
Enhanced reputation and image	☐	☐

Exploitation-oriented goals and achievements

Reorientation of RTD portfolio towards shorter-term RTD	☐	☐
Production of demonstrators, prototypes, pilots etc.	☐	☐
Production of patents and licences	☐	☐
Development or improvement of new products	☐	☐
Development or improvement of new processes	☐	☐
Development or improvement of new services	☐	☐
Development or improvement of European standards	☐	☐
Learning to work in new markets	☐	☐
Improved competitiveness	☐	☐
Increased turnover, market share or productivity	☐	☐
Improved protection of the environment	☐	☐

Strategic Management goals and achievements

Access to additional funds	☐	☐
Reduction of in-house contribution to project	☐	☐
Cost-sharing between partners	☐	☐
Financial risk-reduction	☐	☐
Technological risk-reduction	☐	☐

D. OUTPUTS AND IMPACTS

1. How important are each of the following outputs in assessing the success of your participation in the project?

	Minor importance				Major importance
New services	☐	☐	☐	☐	☐
New products	☐	☐	☐	☐	☐
Demonstrators, prototypes or pilots	☐	☐	☐	☐	☐
New processes	☐	☐	☐	☐	☐
New methods or tests	☐	☐	☐	☐	☐
Norms and standards	☐	☐	☐	☐	☐
Software or codes	☐	☐	☐	☐	☐
Publications in refereed journals	☐	☐	☐	☐	☐
Other publications	☐	☐	☐	☐	☐
PhD theses	☐	☐	☐	☐	☐
Patent applications	☐	☐	☐	☐	☐
Patents granted	☐	☐	☐	☐	☐
Licences sold	☐	☐	☐	☐	☐
Spin-off companies	☐	☐	☐	☐	☐
Other (please specify below)	☐	☐	☐	☐	☐

_____

2. Please indicate whether you expect the outputs or results of your organisation's participation in this project to be demonstrated, evaluated, developed further or used regularly in the following settings.

	Demonstrated	**Evaluated**	**Developed further**	**In regular use**
Own RTD unit	☐	☐	☐	☐
Own production/business unit	☐	☐	☐	☐
Partners in project	☐	☐	☐	☐
Other organisations	☐	☐	☐	☐

3. Who are the subsequent users of the results of your work in this project?

	Intermediate user	End user
Manufacturing industry	☐	☐
Service sector	☐	☐
Scientific community	☐	☐
National/regional administrations	☐	☐
European Commission	☐	☐
International agencies	☐	☐
Other (please specify)	☐	☐

4. Please indicate whether or not the project has already led to significant commercial returns for your organisation.

No returns yet — Significant returns

1 2 3 4 5

☐

5. Does your organisation have any plans for the future commercial exploitation of project results?

Yes ☐ No ☐

6. What impact has participation in this project had on your organisation?

	Negative impact			No impact			Positive impact
Scientific and technological standing	☐	☐	☐	☐	☐	☐	☐
Competitive position	☐	☐	☐	☐	☐	☐	☐
Employment levels	☐	☐	☐	☐	☐	☐	☐

7. Please characterise the expected impacts of your organisation's participation in the project over the next ten years at regional, national and European levels.

	Regional Scale of likely impact Low High 1 2 3 4 5	**National** Scale of likely impact Low High 1 2 3 4 5	**European** Scale of likely impact Low High 1 2 3 4 5
Improved employment situation	☐	☐	☐
Improved quality of life and health	☐	☐	☐
Improved preservation of the environment	☐	☐	☐
Improved economic development and growth	☐	☐	☐
Improved competitiveness	☐	☐	☐
Improved scientific and technological capability	☐	☐	☐
Establishment of critical RTD masses	☐	☐	☐
Development of standards	☐	☐	☐
Implementation of Community goals in general	☐	☐	☐
Other (please specify)	☐	☐	☐

_____

8. Please provide a breakdown of your organisation's staffing of the project.

	Total number of personnel involved in project		Number recruited specifically for this project		Number leaving during/after project	
	Male	Female	Male	Female	Male	Female
Research staff	☐	☐	☐	☐	☐	☐
Technical staf	☐	☐	☐	☐	☐	☐
Management and administration	☐	☐	☐	☐	☐	☐
Other staff	☐	☐	☐	☐	☐	☐
TOTAL	☐	☐	☐	☐	☐	☐

9. What happened/will happen at the end of your project? Your organisation's project team will:

- Be dissolved ☐
- Abandon research efforts in the area ☐
- Continue the research in another EU programme ☐
- Continue the research with own resources ☐
- Pursue the research with other funding (e.g. within national programmes) ☐
- Begin new collaborative ventures with (some of) the same partners ☐
- Begin new collaborative ventures with other partners ☐
- Begin commercialisation of project results ☐
- Other (please specify) _____ ☐

10. What would have been the impact on the project as a whole if your organisation had not received EU funding support?

- ☐ Project would not have been undertaken by any of the partners
- ☐ Your organisation would not have participated in the project
- ☐ Your organisation would have participated, but:
  - ☐ With reduced objectives
  - ☐ With longer time scale
  - ☐ With international collaboration
  - ☐ With reduced funds
  - ☐ With fewer partners
  - ☐ Other (please specify) _____

11. Please provide scores for the project as a whole against each of the following issues.

	1 Low	2	3	4	5 High
The initial relevance of the project to world scientific and technological developments			☐		
The initial relevance of the project to EU RTD policy goals			☐		
The initial relevance of the project to your organisation			☐		
The initial relevance of the project to other participating organisations			☐		
The overall performance of the project research team			☐		
The adequacy of project resources (human, financial, technical)			☐		
The timeliness of project results and outputs			☐		
The quality of project results and outputs			☐		
The utility of project results and outputs			☐		
The impact of the project on world scientific and technological developments			☐		
The extent to which the project succeeded in addressing EU RTD policy goals			☐		
The impact of the project on your organisation			☐		
The impact of the project on other participating organisations			☐		

12. Overall, how do the costs and benefits associated with your organisation's participation in this project balance out? Please tick one of the following boxes.

Costs outweigh benefits — Costs equal benefits — Benefits outweigh costs

-3	-2	-1	0	1	2	3
☐	☐	☐	☐	☐	☐	☐

E. PROCEDURES

1. How would you assess European Commission procedures for making an application for research funding under the Fourth Framework Programme?

Easy to follow	☐☐☐☐☐	Difficult to follow
Clear documentation/information leaflets	☐☐☐☐☐	Inadequate/complex documents
Quick	☐☐☐☐☐	Slow

2. How would you describe the input received from European Commission officials concerning your project?

	Very Helpful	Helpful	Neutral	No input	Unhelpful
Prior to submitting your proposal	☐	☐	☐	☐	☐
During project selection/negotiation	☐	☐	☐	☐	☐
During the life of your project	☐	☐	☐	☐	☐
Feedback/follow-up to your project	☐	☐	☐	☐	☐

3. How would you describe the input received from National Delegates concerning your project?

	Very Helpful	Helpful	Neutral	No input	Unhelpful
Prior to submitting your proposal	☐	☐	☐	☐	☐
During project selection/negotiation	☐	☐	☐	☐	☐
During the life of your project	☐	☐	☐	☐	☐
Feedback/follow-up to your project	☐	☐	☐	☐	☐

4. How satisfied were you with the following administrative arrangements?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Procedures for project payments	☐	☐	☐	☐	☐
Procedures for project reporting	☐	☐	☐	☐	☐
Procedure for programme evaluation	☐	☐	☐	☐	☐
Procedures for sharing information	☐	☐	☐	☐	☐

F. FUTURE POLICY

1. The Activity Areas below correspond to the Fifth Framework Programme. For each one, please use 1-5 scale (1=low, 5=high) to indicate:

- The strength of Irish research capability
- The ability of Irish industry to commercialise technology
- The strength of demand for new and improved products and services

Please answer for as many areas as possible, not just those in which you may be involved.

There are four **Activity Areas**.

AA 1 - RTD and Demonstration Programmes - is divided into four topics which are listed below as follows:	Strength of Irish research capability 1 2 3 4 5	Ability to commercialise results 1 2 3 4 5	Strength of demand for new products/services 1 2 3 4 5
a) Quality of life and management of living resources	☐	☐	☐
b) Energy, environment and sustainable development	☐	☐	☐
c) User friendly information society	☐	☐	☐
d) Competitive and sustainable growth	☐	☐	☐
AA 2 International role of community research	☐	☐	☐
AA 3 Promoting innovation and encouraging SMEs	☐	☐	☐
AA 4 Improving the socio economic research base	☐	☐	☐

THANK YOU FOR TAKING THE TIME AND TROUBLE TO COMPLETE THIS QUESTIONNAIRE

Appendix 3 Specific Programmes within the Fourth Framework Programme

1 Activity Area I: Research, Technological Development and Demonstration Programmes

1.1 Information and Communication Technologies

- *Telematics Applications Programme (TELEMATICS - 913 MECU)* This programme aimed to promote cost effective and user friendly services using information technology, particularly in relation to education, administration, environment, employment, the elderly or disabled, health and transport. There were nine Calls for Proposals resulting in 710 projects.
- *Advanced Communications Technologies and Services (ACTS - 671 MECU)* The remit of this programme was to investigate and provide access to state of the art communications infrastructures. It covered areas such as third generation mobile communications, further development of high speed networks and their integration with Internet protocols, security and standards, and work on interactive multimedia services. There were three Calls for Proposals and an overall budget of 6.1 BECU. Typical projects cost 6 MECU, 43% funded by the EU, with about ten partner organisations across four or five Member States.
- *Information Technologies (ESPRIT - 2,073 MECU)* This programme has been in existence since 1983. Eleven Calls for Proposals resulted in 2,141 projects and funding of 1.9 BECU. Almost half of the contracts granted were for RTD projects (accounting for 74% of the budget). Another 41% were for support measures to promote applications (23% of the budget), and the remainder of the budget went on general preparatory, dissemination and awareness raising projects. Industrial participants received 64% of the funding.

1.2 Industrial and Materials Technologies

- *Industrial and Materials Technologies (IMT [BRITE-EURAM] - 1,737 MECU)* The IMT Programme continued the earlier BRITE-EURAM focus on RTD activities with industrial objectives and was intended to reinforce the competitiveness of European industry. It covered many areas of industrial activity from flexible manufacturing processes through aeronautics, environmentally sustainable construction and maritime engineering. There was also an extremely strong focus on SMEs via the CRAFT programme, which allowed SMEs to contract research performers to undertake relevant R&D tasks.
- *Standards Measurement and Testing (SMT - 195 MECU)* This programme supported pre-normative research for the development of standards. It also supported the development of measurement and analysis methods to implement Community policies, facilitated the recognition of research results and encouraged the adoption of a European metrology infrastructure.

1.3 Environment

- *Environment and Climate (ENVIRONMENT - 601 MECU)* This programme was subdivided into four main work areas covering Natural Environment, Environmental Quality and Global Change (47% of the budget); Environmental Technologies (25%); Space Techniques Applied to Environmental Monitoring and Research (20.5%); and Human Dimensions of Environmental Change (7.5%)
- *Marine Sciences and Technologies (MAST - 243 MECU)* There were four areas within this programme - marine science, strategic marine research, marine technology and concerted actions. A number of projects were cross-programme platforms, e.g. ELOISE (the European Programme on Coastal Ecosystems) consisted of 29 projects split between MAST and Environment and Climate, and ENRICH (the European Network in Research on Global Change) was run jointly with INCO and Environment and Climate.

1.4 Life Sciences and Technologies

- *Biotechnology (BIOTECH - 596 MECU)* Projects within this programme addressed issues such as genetically modified food, food labelling, cloning, bio-genetics and the Biosafety Protocol. Some 514 RTD contracts involving 3568 participants were signed during FP4. The programme had an industrial participation rate of 18.5% (up from 6.2% in FP3) and included a number of interesting actions such as the creation of a Biotechnology and Finance Forum and workshops to help entrepreneurs develop business plans.
- *Biomedicine and Health (BIOMED - 374 MECU)* This programme spanned pharmaceuticals, biomedical engineering, brain research, cancer research, AIDS and infectious diseases, cardiovascular work, occupational and environmental health, rare diseases and human genome research. There were 3 Calls for Proposals and over 700 projects were funded during FP4.
- *Agriculture and Fisheries (FAIR - 690 MECU)* The FAIR programme aimed to strengthen the competitiveness of the agro-industry and encourage work relevant to the Common Agricultural and Fisheries Policies and rural development issues. There were 6 Calls for Proposals and support activities included SME specific measures, TMR grants and dissemination actions.

1.5 Energy

- *Non-nuclear Energy (ENERGY [JOULE-THERMIE] - 1,055 MECU)* JOULE was the part of the programme devoted to R&D; THERMIE was the demonstration element. JOULE had two Calls for Proposals and successfully encouraged the participation of SMEs, attracting 62 proposals involving SMEs in the final Call, 49 of which were selected and funded to the tune of 19 MECU. THERMIE promoted the use of clean and efficient energy technologies in three broad areas (renewable energy, rational use of energy in buildings, industry and transport); the more efficient use of fossil fuels; and the more effective exploration, distribution and transportation of hydrocarbons.
- *Nuclear Fission Safety (FISSION - 171 MECU)* The objective of this programme was to look at nuclear fission safety on a broad front - from the use of radioactive materials in medical applications to the use of nuclear energy to produce electricity. There was only one Call, with 216 multi-partner contracts resulting from the 460 proposals submitted. Projects were grouped into 38 clusters to facilitate the sharing of results amongst researchers.
- *Controlled Thermonuclear Fusion (FUSION – 846 MECU)* The FUSION Programme was aimed in the long term at the production of safe, environmentally sound prototype reactors which would eventually lead to the construction of viable power stations able to meet the needs of potential users.

1.6 Transport

- *Transport (TRANSPORT - 263 MECU)* Projects in this programme were focused on improving the efficiency of different transport modes and speeding up their integration into a European transport system. Accession countries were specifically targeted. There were four Calls for Proposals and 278 projects were funded, 211 of which were shared cost RTD projects. There were also 18 Concerted Actions and some jointly funded projects with TELEMATICS.

1.7 Targeted Socio-Economic Research

- *Targeted Socio-Economic Research (TSER - 112 MECU)* This was a new programme introduced in FP4 which had a broad portfolio of collaborative research projects, thematic networks, studies, conferences and networks. Three Calls resulted in a total of 164 shared cost actions and 98 accompanying measures.

2 Activity Area II: Co-operation with Third Countries and International Organisations

- *Co-operation with Third Countries and International Organisations (INCO – 575 MECU)* This programme provided an interface between European research and that of the rest of the world. For example, it funded RTD projects which brought European partners into contact with researchers from non-EU countries, particularly those from Central and Eastern Europe, the New Independent States and Mediterranean countries. The rationale behind the programme was to improve external relations, to prepare for the enlargement of the EU, to improve the EU's international competitiveness and to improve European influence on world S&T policy developments.

3 Activity Area III: Dissemination and Optimisation of Results

- *Dissemination and Optimisation of Results (DISSEMINATION [INNOVATION] - 352 MECU)* This programme (also known as the INNOVATION programme) promoted the creation of a suitable environment for innovation across Europe and the rapid diffusion of technologies, particularly to SMEs. It supported projects concerned with the financial and venture capital prospects for innovation in Europe, the development of regional innovation systems, intellectual property rights and technology transfer. It was also responsible for the development of CORDIS and the Innovation Relay Centres.

4 Activity Area IV: Stimulation of The Training and Mobility of Researchers

- *Stimulation of the Training and Mobility of Researchers (TMR - 792 MECU)* This programme funded researchers to work in other Member States and promoted the dissemination of research results. It also managed the 'Marie Curie Fellowships' scheme. Funding was prioritised for applications with a strong industrial or cohesion element, particularly those involving Less Favoured Regions (LFRs).

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