

EVALUATION OF THE RESEARCH CAPACITY DEVELOPMENT FUND

Final Report

to

Higher Education Funding Council for Wales (HEFCW)

September 2006



Arad Consulting Ltd

Enterprise House

126-7 Bute St

Cardiff Bay CF10 5LE

Tel: 02920 440552

Email: post@aradconsulting.com

Web: www.aradconsulting.com

CONTENTS

SECTION 1: INTRODUCTION TO THE EVALUATION	1
1.1 Introduction	1
1.2 Background to the establishment of the RCDF	1
1.3 Aims and objectives of the evaluation	2
1.4 Methodology	3
SECTION 2: THEMATIC ANALYSIS OF EVALUATION FINDINGS	4
2.1 Sustainability	4
2.2 Research excellence.....	11
2.3 Value for money and efficiency	16
2.4 Management and administration of RCDF programme.....	21
2.5 Common Characteristics.....	22
SECTION 3: EVALUATION CONCLUSIONS AND RECOMMENDATIONS	24
3.1 Introduction and background to the evaluation	24
3.2 General lessons and recommendations.....	26
APPENDIX A - Summary of funded projects.....	29
APPENDIX B - Breakdown of questionnaire respondents.....	32

SECTION 1: INTRODUCTION TO THE EVALUATION

1.1 Introduction

This report details the findings of the evaluation of the Research Capacity Development Fund (RCDF) undertaken by Arad Consulting on behalf of the Higher Education Funding Council for Wales (the Council). The RCDF was a major initiative of the Council's research funding stream, established with the objective of building research capacity in areas of strategic importance to the economy, culture and society of Wales. This evaluation took place between May and August 2006 and will feed into the review of research policy to be carried out by the Council during Autumn 2006.

This evaluation report begins by briefly setting the background to the establishment of the RCDF, the fund's strategic objectives and how it fits in with the Council's broad portfolio of research funding. The aims and objectives of the evaluation process are outlined, along with the methodology employed. The evidence collected is summarised in Section 2, with conclusions and recommendations presented in Section 3.

1.2 Background to the establishment of the RCDF

The Higher Education Funding Council for Wales undertook a review of its research policy in February 2000. During consultations which formed part of this review, institutions voiced broad support for new initiative funding to strengthen research infrastructure and to inject dynamism into the research portfolios of institutions. The Council took the decision to establish the Fund to operate for three years, 2002/03 to 2004/05.

A call for proposals was issued in November 2001, setting out the main features of the RCDF, the criteria for assessment and its operating framework. Applicants were asked to explain the strategic importance of the research and to name partner institutions with whom they would collaborate during the programme of activity.

Twelve applications for funding were received with a total cost of approximately £16 million. 10 projects were funded at 8 institutions with a total value of £8.4 million.

Table 1: Research Capacity Development Fund projects

Lead institution	Project	Total funds
University of Wales, Newport	Centre for Interaction Design	£599,896
University of Wales, Aberystwyth	Wales in a Regional Europe (WIRE)	£500,131
University of Wales, Aberystwyth	Centre for Health and International Relations (CHAIR)	£499,341
University of Wales, Bangor	Centre for Advanced Software Technology (CAST)	£755,000
University of Wales, Bangor	Centre for Molecular Cancer Research	£646,995
Cardiff University	Cardiff Institute for Society, Health and Ethics (CISHE)	£1,504,500
University of Wales College of Medicine*	Biostatistics and Bioinformatics Unit	£1,499,089
University of Glamorgan	Centre for Border Studies	£601,000
North East Wales Institute	Social Inclusion Research Unit (SIRU)	£250,000
University of Wales, Swansea	Multidisciplinary Nanotechnology Centre (MNC)	£1,538,013
	Total	£8,393,965

* NOTE: The University of Wales College of Medicine merged with Cardiff University in August 2004. Further details on the activities and focus of each project are in Appendix A.

1.3 Aims and objectives of the evaluation

The aims and objectives of the evaluation were set out as being to:

- Assess the extent to which the RCDF has been successful in
 - achieving its principal objective of building research capacity in areas of strategic importance to the economy, culture and society of Wales
 - achieving the subsidiary objective of promoting the resilience, diversity, dynamism and sustainability of the research base in Wales
- Assess whether the funded projects are likely to be sustained in the longer term
- Assess whether the Council's investment in the initiative has provided value for money
- Assess whether the most successful projects share any common characteristics which might be taken as predictors of success in the event of any similar future initiatives
- Identify any general lessons for HEFCW in the planning and management of initiatives

1.4 Methodology

The first phase of the evaluation involved reviewing HEFCW documentation relating to the establishment of the fund and various monitoring reports illustrating the progress and outputs of the funded projects. This research was used to design a questionnaire that was used to collect evidence during the evaluation. Two versions of the questionnaire were circulated: one aimed at project managers and the other targeted at other project staff and researchers. The survey yielded a total of 36 responses (see Appendix B), including responses from all 10 project managers. In addition, the evaluation team visited each of the funded projects to carry out interviews with project representatives, including all 10 project managers. These interviews were conducted during June and July and provided a further insight into the experiences of those engaged in research programmes funded by the RCDF.

Both the survey and interviews were carried out at relatively short notice and we are grateful to those who took the time to contribute evidence to the evaluation.

In light of the evaluation aims and objectives, as detailed in 1.3 above, the team sought to collect and analyse evidence according to a series of specific themes:

- Sustainability
- Research excellence
- Value for money and efficiency
- Management and administration of RCDF programme
- Success in meeting RCDF objectives

Each of these themes is explored in the following sections, drawing on the quantitative data obtained through questionnaires and the more qualitative evidence presented during the interviews with project representatives.

We recognise that there are inherent dangers in relying too heavily on self-reporting and feedback from project managers and research staff. This can undermine the validity and reliability of data collected. We have sought to counteract this by drawing on the Council's internal monitoring reports and other associated documentation in order to verify and triangulate data. Furthermore we have sought to gain the views of individuals at a senior strategic planning level within institutions to provide another perspective on the effectiveness of the programme in relation to broader institutional strategies.

SECTION 2: THEMATIC ANALYSIS OF EVALUATION FINDINGS

2.1 Sustainability

Promoting a sustainable research base was a key aim of the Research Capacity Development Fund. The fund was envisaged as a means of facilitating the establishment of robust research centres with the capacity to lever in funding from various external sources. Further indicators of sustainability are the creation of permanent research positions within the research centres and the extent to which collaborative links have been developed with other institutions. This is also tied to the issue of embeddedness and, during the course of this evaluation, Arad sought evidence indicating that the funded projects had become rooted within the broader research strategies of individual institutions. Evidence related to these issues is summarised in this section.

As indicated above, one of the key areas in assessing whether the RCDF programme supported sustainable outcomes is the degree to which the funded projects forged strong inter-institutional partnerships that are likely to continue beyond the funding period. Responses from the survey indicate that, in the majority of cases, strong sustainable partnerships have been formed. Moreover, none of the survey respondents felt that the partnerships formed would have occurred if activities directly related to the RCDF projects had not taken place (Table 1).

Table 2

Sustainability	Percentage of respondents (numbers of respondents below)				
	Strongly Disagree		Strongly Agree		
	1	2	3	4	5
The project created new partnerships between institutions that will continue after the end of this project	3% (1)	0% (0)	14% (5)	19% (7)	64% (23)
The partnerships formed during this project would have occurred anyway	39% (14)	53% (19)	8% (3)	0% (0)	0% (0)
The project has developed a funding plan that will ensure future long term sustainability *	0% (0)	11% (1)	11% (1)	33% (3)	44% (4)
The project has developed systems that link into the overall institutional research strategy #	3% (1)	11% (4)	11% (4)	19% (7)	50% (18)
RCDF has enabled us to retain staff and researchers over a longer period of time than would have otherwise been possible*	0% (0)	0% (0)	0% (0)	22% (2)	78% (7)
Potential future project(s) of this nature will not be able to take place without another round of funding identical to the RCDF	0% (0)	11% (4)	14% (5)	25% (9)	50% (18)

Based on 36 responses except

* based on Project Leaders' / Managers' responses only, and

based on 34 responses (2 non-respondents)

NOTE: Responses 1 & 2 and 4 & 5 have been grouped for analysis; this approach has been taken throughout the report.

Survey responses indicate that the partnerships formed were particularly successful in developing greater levels of trust between institutions as well as delivering the expected results by working towards a shared vision. Almost 80% of respondents believed that the projects had been highly or very highly successful in this regard. Opinions relating to the degree to which the partnerships formed were successful in developing good project management structures and planning research activity were also mainly positive, albeit slightly more varied (see table 3). In addition, despite initial teething problems, 70% of respondents felt that the projects had been highly or very highly successful in planning their research activity and in delivering expected results.

Table 3

Collaborative partnership criteria	Percentage of respondents (numbers of respondents below)					
	Low Success	Very High Success				No response
	1	2	3	4	5	
Planning research activity	0% (0)	0% (0)	19% (7)	22% (8)	42% (15)	17% (6)
Communication between partners	0% (0)	0% (0)	11% (4)	36% (13)	36% (13)	17% (6)
Project management structures	0% (0)	8% (3)	8% (3)	39% (14)	28% (10)	17% (6)
Working towards a shared vision	0% (0)	3% (1)	3% (1)	42% (15)	36% (13)	17% (6)
Trust between partners	0% (0)	0% (0)	3% (1)	33% (12)	47% (17)	17% (6)
Delivering expected results	0% (0)	3% (1)	11% (4)	28% (10)	42% (15)	17% (6)

Based on 36 respondents

Source: Evaluation survey

Based on evidence submitted both in questionnaires and during interviews, it appears that the RCDF has enabled institutions to forge new collaborative links and to further consolidate existing partnerships. There were numerous examples of new collaborative projects between institutions in Wales (e.g. between Swansea and Cardiff in the area of nanomedicine) and the formation of a cross-institutional project steering group in the Borders Studies project at Glamorgan as well as with HEIs outside Wales. One project manager noted that:

The links we have with other institutions are now less dependent on individual personal contacts. Our partnerships are more formal and are based on the research centre we have established. I am confident that these links will continue even in the event of personnel changes within the department.

The partnerships formed have also increased opportunities to pursue reconfiguration and collaboration funds and other sources of UK and European funding further demonstrating the degree to which such project and partnerships can be seen to be sustainable. The cross-institutional partnerships developed have also created opportunities for visiting professors to be appointed, albeit for relatively short periods of time. Examples have also been presented to the evaluation team of research staff being appointed for longer term contracts and the creation of new chairs and professorships. These not only demonstrate the degree to which research capacity has been increased but also the ability of individual departments and institutions to plan for the longer term.

Case Study - Centre for Advanced Software Technology (CAST), UW Bangor

The project has developed a range of successful partnerships with several departments within the institution, other Welsh HEIs and local businesses through close links with the CAST Technium. The aim of the project has been to create a world-class computing research infrastructure at the University of Bangor, focusing on informatics and communication and network engineering. The project has also sought to expand the high speed scientific computing capabilities within the institution. RCDF funding of £755,000 has provided the impetus for linking these activities to the overall institutional strategy and has enabled the growth of the departmental and institutional research base and profile nationally and internationally.

The department's proximity and close cooperation with the CAST Technium has provided a focus for inward investment and international visibility and the creation of high quality jobs. There has also been some cooperation with UW Aberystwyth in Physics relating to the Reconfiguration Fund. Cooperation has also been developed between UW Bangor, UW Aberystwyth, UW Swansea and Cardiff University through the Viznet Wales network. The RCDF has thus provided a catalyst for collaboration, development of hardware and personal contact developments.

Other partnerships developed have included EVCO and the National Physics Laboratory. There has also been the development of complementary partnerships and activities with other departments such as chemistry and environmental sciences and psychology which have been kick started by the RCDF funding. This has resulted in the development of joint proposals for funding as well as courses such as the MSc in Visualisation.

Although a strong majority of project leaders considered that their project had developed a sustainable base, a few voiced concerns linked to the robustness and embeddedness of the research base. For example, one professor and project leader explained that the departure of senior staff has had a detrimental effect on the project's outcomes, future prospects and sustainability. Others also referred to problems caused by difficulties in recruiting and retaining staff. In one isolated instance, research staff have been poached by an institution

with more established research profiles. This was clearly very frustrating for those affected and serves to highlight one of the problems associated with developing research capacity, particularly at institutions with currently lower levels of research activity.

The evaluation also sought to gain an insight into the degree to which projects had succeeded in becoming embedded within institutions' research strategies. Again a majority of respondents responded positively, with 69% expressing the opinion that their project developed systems that link well into the overall research strategy of their institution. The most apparent example of this is the nanotechnology centre in Swansea which, according to the Pro Vice-Chancellor, has had a very significant impact on the university since its development and is now a prominent feature of the university's overall research strategy. Another project manager noted that the research centre funded through the RCDF is used as a model for multi-disciplinary research and collaboration across the institution as a whole.

A discussion with a Pro Vice-Chancellor with responsibility for research explained that the success of the RCDF project at his institution had stimulated interest and generated increased support at the senior strategic level. For example the development towards an integrated school of Engineering at Swansea was influenced by the award of RCDF funding. This resulted in the school being realigned in order to incorporate a nanotechnology centre and the centre becoming an integrated part of the institution's overall research strategy. Others also felt that their projects were consistent with overall institutional strategies:

This institution has recently placed a much greater emphasis on inter-disciplinary work, on seeking external research funding and encouraging younger researchers. The Centre's work reflects each of these institutional objectives.

- Project Manager

Most contributors explained that funded projects have enhanced the research profile of their individual institutions, particularly those with relatively low levels of research activity. It appears that experiences through the RCDF have served to heighten people's awareness of the opportunities of drawing in funding for research from alternative sources, raising institutional profiles among businesses and research councils. The publication of papers and attendance at conferences has also contributed to this process.

However, some concerns were also raised. One project representative drew attention to the difficulties faced by those engaged in multi-disciplinary research. It was argued that some research activities can be marginalised due to departmental or school-based structures within institutions, largely because the focus of the research lies between two or more 'traditional' subject areas. Therefore, while activities may be sustainable and of proven value, they may not enjoy as much departmental support as they might. This is clearly a matter for individual

institutions to address and ensure that their internal administrative structures are able to support multi-disciplinary research.

Arguably the key measure of sustainability in relation to RCDF projects is the degree to which the research supported is able to attract further funding from other sources. Some projects have already proven very successful in securing research grants from a range of funding agencies. Detailed figures are included in table 4 below and demonstrate that across all projects the initial £8.4 million RCDF money invested levered in £21.7 million during the course of the funding period. This amounted to over two and a half times the amount invested across the 10 projects. However there was considerable variation in terms of the income generated and leverage gained by funded projects. Significantly, £19.4 million of external funding was secured by just four projects, the BBU, MNC, CISHE and CMCR, based at institutions with established institutional research profiles. The greatest leverage factor was achieved by BBU, which drew in £7.8 million over the three years of the unit's existence following investment of £1.5 million.

Half of the funded projects brought in less external funding than was allocated to them over the course of the three years. It is important to note that this doesn't necessarily reflect the quality of the research outputs. However, the figures do indicate that the projects with the greatest scope for attracting external research funding are those at institutions which have a sizeable and well-established research base, particularly where the subject is applied sciences, biosciences and technology.

Projects have secured £11.8 million in Research Council funding, which is excellent news as the HE sector in Wales seeks to boost the proportion of such grants it receives. Government and public sector funding accounted for the next highest amount of external funding, £5.3 million, indicating that research has taken place which is of direct relevance to policy development in areas of economic, social and cultural importance.

Table 4 – Research Income

Income source	Project										TOTAL
	WIRE, Aberystwyth	CISHE, Cardiff	CHAIR, Aberystwyth	CMCR, Bangor	SIRU, NEWI	MNC, Swansea	BBU, Cardiff	CAST, Bangor	Interaction Design, Newport	Border Studies, Glam	
Research Councils	£60,930	£618,746	£120,000	£435,013	£0	£3,800,000	£6,394,000	£393,000	£0	£45,000	£11,866,689
Other government / Public Sector	£30,170	£2,717,890	£0	£155,000	£213,000	£450,000	£906,000	£108,000	£140,000	£570,000	£5,290,060
Industry / Private sector	£0	£36,849	£89,000	£1,393,496	£0	£400,000	£0	£40,000	£20,000	£0	£1,979,345
Departmental / institutional budget	£3,000	£0	£0	£199,620	£5,000	£850,000	£0	£45,000	£25,000	£315,000	£1,442,620
Other e.g. EU	£2,515	£51,490	£0	£87,409	£0	£400,000	£500,000	£0	£0	£80,000	£1,121,414
Total	£96,615	£3,424,975	£209,000	£2,270,538	£218,000	£5,900,000	£7,800,000	£586,000	£185,000	£1,010,000	£21,700,128
RCDF funding	£500,131	£1,504,500	£499,341	£646,995	£250,000	£1,538,013	£1,499,089	£755,000	£599,896	£601,000	£8,393,965
Leverage factor	0.2	2.3	0.4	3.5	0.9	3.8	5.2	0.8	0.3	1.7	2.6

Survey responses from project managers or co-ordinators reveal that seven of the institutions received additional or alternative funding from their institutions (see table 4). This is encouraging and suggests that the projects have impacted positively upon institutional research strategies. However, it also raises the question of whether or not individual institutions could have funded the research capacity development in the first instance.

This point is taken up in more detail under the theme of value for money; however, it is worth noting here that views expressed during interviews suggest that, even in situations where internal funding sources may have been available to develop further research capacity, the capacity increase that would have been created would not have been as large and the timescales required to develop it would have been longer.

The ability to lever in additional funds clearly has a direct impact on staff retention and the potential to deliver high quality research in a sustained manner. Questionnaire responses indicate that all project managers believe that RCDF funding had enabled them to retain research staff for a longer period of time than would have otherwise been possible. A clear majority of managers (77%) also said that their projects have developed a funding plan that will ensure future long term sustainability.

Table 5: Numbers of staff supported by RCDF projects

Staff directly funded by RCDF #	Number of staff with long term funding guaranteed	Total numbers of staff funded both directly and indirectly *
54	66	138

HEFCW figures do not include postgraduate students visiting fellows/lecturers or professors.

* This number includes staff funded following other research grants secured. It also includes professors, senior researchers, researchers and support staff – where possible postgraduate student figures have been removed.

Source: Evaluation survey

The number of staff recorded by HEFCW as being directly funded by the programme is 54. This includes professors and research staff based at the institutions themselves, but does not include postgraduate students, visiting fellows/lecturers or professors. The total number of staff supported from all the activities generated by the projects, including research financed through additional funding, is 138. This is encouraging as it indicates that the programme has - directly and indirectly - supported almost two and a half times the number of staff that were supported in the first instance. However, the figure of 138 includes all professors and research staff (including visiting staff) as well as other support staff. Furthermore despite efforts to omit figures relating to postgraduate research staff, it has not been possible to do so

in all cases, particularly where survey figures relating to staff have been presented in an aggregated format. Despite these minor anomalies the figure offers a reasonable indication of the degree to which projects funded under the RCDF have provided further employment and research opportunities, additional to those initially funded.

One issue of concern is that, of the 138 staff supported, only approximately half of them (66) have as yet been guaranteed long term funding. However, it is also worth noting that this figure is higher than the number of staff initially directly supported by the programme. Moreover, decisions relating to the long term funding position of staff associated with some projects (e.g. the BBU project in Cardiff) will not be made until 2007. As such we can expect the number of long term funded staff to increase over the next twelve months.

2.2 Research excellence

The Welsh Assembly Government's *Reaching Higher* strategy emphasised the need to invest in high quality research and to "build on areas of excellence, taking full account of the development potential in all institutions"¹. The RCDF is a programme which has been shown to fully complement these objectives. Its principal aim of supporting research in areas of strategic importance to the economy, culture and society of Wales meant that a very diverse range of projects were funded, ranging from cutting edge technological research to research in social sciences.

As such, evaluating the impact of the programme in terms of the quality of the research funded is not straightforward. As can be seen from Table 6, below, the approach adopted during this evaluation has been to consider a series of general outputs including supplementary research income, publications, commercialisation, staff development and the impact that the funding has had on the profile of institutions through the development of centres of excellence.

¹ *Reaching Higher*, Welsh Assembly Government (2002) p.12

Table 6: RCDF Project Outcomes

Research Excellence Outcomes	Percentage of respondents (numbers of respondents below)		
	Yes	No	No response
Have you published any papers emerging from the research outcomes of this project?	81% (29)	19% (7)	0% (0)
Have you presented your research findings at any conferences?	78% (28)	22% (8)	0% (0)
Has the research resulted in the production of any new products?	36% (13)	53% (19)	11% (4)
Has the research produced any patents or other commercial outcomes?	8% (3)	86% (31)	6% (2)
Has the research drawn any outside investment?*	100%* (10)	0% (0)	0% (0)
Has the research created any knock-on benefits for the local economy?	36% (13)	50% (18)	14% (5)
Has the project benefited the training of researchers?	89% (32)	6% (2)	3% (1)
Has the project raised the profile of the research base within your department/institution?	92% (33)	8% (3)	0% (0)
Have you secured any consultancy work as a direct consequence of the outcomes achieved from this project?	36% (13)	64% (23)	0% (0)

Source: Evaluation survey

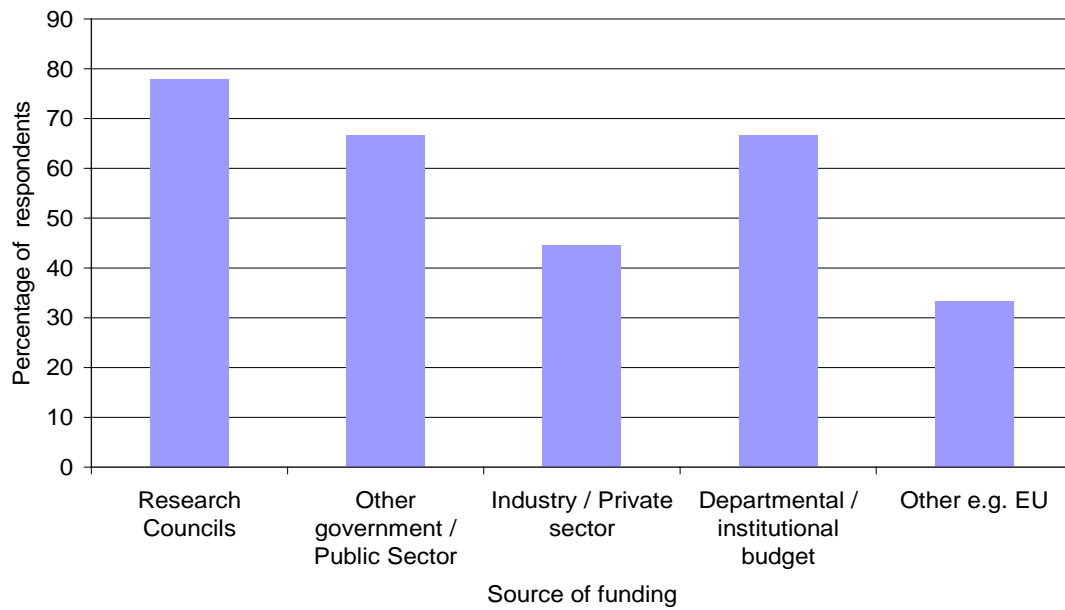
Based on 36 respondents except * based upon responses from 10 project managers

2.2.1 Income secured

As indicated in Section 2.1, above, the additional income that projects have secured is a measure of their sustainability. It also offers an indication of the quality of the research. All project managers responded that they had succeeded in attracting funding and / or investment from outside the institution (see table 7 below) with seven of the funded projects having secured research council funding, including major grants from the ESRC, EPSRC and MRC.

Six of the projects also secured funding from government / public sector agencies while four projects have obtained private sector or industry funding for research (see table 7 below). This is encouraging as it clearly indicates that the programme has succeeded in supporting quality research that is widely valued across the business and governmental sectors.

Table 7. Alternative sources of funding secured during the project



Source: Evaluation survey

The survey findings reveal that the vast majority of respondents (over 89%) reported that the funding had helped develop capacity by training researchers. A number of researchers referred to the benefits they had gained from exposure to state-of-the-art facilities and technology under the supervision of academics who are leading experts in their field.

I have gained research training as part of my employment on the project and as a result am studying for a PhD. Equally importantly, I have gained invaluable experience through attending conferences and seminars and learning from others undertaking related research.

- Project researcher

2.2.2 Publications

Over three quarters of respondents (81%) noted that they had published papers based on their research through RCDF-funded projects. Lists of publications presented to the evaluation team illustrated that many project managers and researchers had been very prolific in terms of the written outputs produced. In view of their multi-disciplinary nature, some projects had published research across several disciplines, building expertise in niche research areas and developing UK-wide and international links.

The evaluation team were keen to establish the number of publications that had been produced by team members within RCDF funded projects. Projects recorded a combined total of 713 publications, including 446 peer reviewed publications (see table 8 below).

Table 8 - Publications produced

	Books / chapters in books	Peer reviewed publications	Other publications / articles	Total
WIRE, Aberystwyth	14	20	67	101
CISHE, Cardiff	23	87	15	125
CHAIR, Aberystwyth	9	11	8	28
CMCR, Bangor	2	28	0	30
SIRU, NEWI	13	31	12	56
MNC Swansea	1	91	43	135
BBU, Cardiff	2	129	0	131
CAST, Bangor	0	11	13	24
Interaction Design, Newport	5	8	4	17
Border Studies, Glamorgan	26	30	10	66
TOTAL	95	446	172	713

2.2.3 Commercial Outcomes

The RCDF has funded a number of projects which relate to sectors identified by the Welsh Assembly Government as being strategically important, including nanotechnology, health and bio-sciences. Prioritising investment in research in such areas must be maintained over the long term if the HE sector in Wales is to increase its competitiveness and international profile. The results achieved by RCDF projects are evidence that Wales has, in some areas, research and researchers of the highest quality.

Case Study - Multidisciplinary Nanotechnology Centre (MNC), Swansea University

The MNC at Swansea has developed an international reputation for scientific excellence in many new fields that stretch traditional engineering concepts. This has only been made possible by radical thinking that combines engineering with science, mathematics and medicine. Therefore, the Multidisciplinary Nanotechnology Centre (MNC) has an active strategy to develop projects that bridge traditional disciplines to provide a step change in technology. RCDF funding of just over £1.5 million has been a key factor in the continued development and success of the Centre

The RCDF funding allowed the Centre to attract high quality researchers which further highlighted the department's and institution's commitment to developing an excellent research profile. The Centre recruited a further 8 members of staff and this allowed it to reach critical mass. It also provided the Centre with a degree of

impetus to attract other sources of funding and further funds was attracted from the Royal Society, SCRIF, Portfolio awards and RCE Fellowships.

In addition the funding has contributed to the training of personnel which is another key aspect of the development of sustainable and dynamic research bases and for inter-departmental cooperation. They have also developed a Masters programme in nanotechnology which will attract 15 students next year and there is also the potential for an undergraduate course in the future. The Centre also hopes to develop its potential for spin out companies and attracting inward investment.

The Centre was officially opened by Sir David King, Chief Scientific Adviser to HM Government and Head of the Office of Science and Technology.

Research developed through other projects (notably the Social Inclusion Research Unit at NEWI and the Centre for Molecular Cancer Research in UW, Bangor) is also closely related to current policy priorities in the fields of health and education. This includes direct contributions in terms of informing policy development. Other projects have impacted upon the local knowledge economy in terms of new partnerships with industry. The Centre for Advanced Software Technology in Bangor forms part of the Technium Wales network and has a dedicated R&D team that works on collaborative projects with industry. The MNC in Swansea also engages in direct knowledge transfer to industrial clients through the Centre for Complex Fluids Processing. This Centre has been designated as a Centre of Excellence in Technology and Industrial Collaboration (CETIC). Its purpose is to help companies to benefit from the best industrially relevant expertise and facilities from universities within Wales.

Some project managers also commented that they were exploring the potential future spin outs with local and national businesses. Despite this, it is somewhat surprising that only a third of respondents claimed their research had positive knock-on effects on the local economy and this perhaps reflects the lack of coherent linkages between the HE sector and the business sector. The RCDF programme also supported a number of projects, such as those focused on social science research, which do not necessarily lend themselves to knowledge commercialisation. It is not particularly surprising, therefore, to note that only a minority of projects (36%) reported that their research had led to the development of new products. In the same vein, only 8% of respondents noted that their project had resulted in commercial outcomes, including patents.

2.2.4 Other benefits

A substantial proportion of the programme's funding went towards further developing research infrastructure. Capital funding was included within the funding allocated to the two projects in Aberystwyth, which has contributed towards the costs of completing a new building on the campus.

"We have developed a range of valuable contacts and we have embarked on a programme of research work that is truly innovative. Furthermore the funding has contributed to the development of a building of international standard that is now the home of this very important project. The combination of the research work, the contacts and the building bodes well for the future".

- Project Manager

There are also links between the RCDF and the development of additional teaching and learning within institutions. The Bioinformatics & Biostatistics Unit in Cardiff developed an MSc course relating to its research. The course has recently completed its first year with 9 students in total. External examiners praised the quality of the course and the Unit has received over 70 enquiries for the 2005-06 course. Other courses related to the funded projects have also been initiated or are in development in other institutions across Wales.

This is also the case at the North West Cancer Research Fund Institute (NWCRF) in Bangor, which has developed an associated teaching programme. The increased research profile of NWCRF has also led to better links with numerous NHS trusts. It has made a significant contribution to the growth of the institutional research base and profile, largely as a result of the range of papers published and presentations delivered at conferences.

Funding has allowed us to engage with a range of institutions and policy bodies who were previously unaware of our specialisms and capacities. We have achieved a strong research profile in just 3 years.

- Project Manager

2.3 Value for money and efficiency

The degree to which the RCDF programme has generated good value for money relates to a number of the themes that have been addressed during the course of this evaluation, including resilience, increasing research excellence and raising the profile of the Welsh research base. The programme has also sought to ensure that the projects themselves provide added value through their focus on partnerships and sustainability. The development of additional masters and undergraduate courses as well as training courses for research staff can also be regarded as providing added value to the initial investment.

The evaluation also sought to determine the additional impact or additionality of the RCDF by obtaining views on whether the same or similar research capacity would have been developed in the absence of the fund. Also, could comparable outcomes / impacts have been achieved had the projects been funded through other sources, including resources available at individual institutional level?

Views expressed by project managers and staff suggest strongly that the RCDF programme funded and supported the development of new research capacity that would not otherwise have been established; or at least would not have been established to the same scale nor within the same timeframe. All project managers surveyed disagreed (90% strongly) with the suggestion that their project would have been undertaken anyway even if they had not successfully secured RCDF money. In addition, 90% of managers disagreed with suggestions that the same value for money could have been achieved under other programmes (see table 9 below).

Table 9: Value for money

	Percentage of responses (number of respondents below)				
	Disagree 1	2	3	4	Agree 5
This project would have been undertaken anyway even if we had not successfully secured RCDF money	90%	11%	0%	0%	0%
	(8)	(1)	(0)	(0)	(0)
The same value for money could have been achieved under other programmes	67%	22%	11%	0%	0%
	(6)	(2)	(1)	(0)	(0)

Based on 9 respondents
Source: Evaluation survey

In terms of additionality, the vast majority (92%) of survey respondents agreed that the RCDF funding had generated collaborations that would otherwise have not been possible. However, there were concerns that displacement had occurred amongst some respondents. Some 12% of those surveyed felt that focus on collaboration within the funding criteria detracted attention away from other important aspects of the project research. It should be noted however, that over 70% of staff disagreed with this assertion (see table 10 below).

Table 10: Collaboration and displacement

Outcome	Percentage of responses (number of respondents below)					
	Disagree 1	2	3	4	Agree 5	No response
The funding enabled us to develop collaborations that would not otherwise have been possible	0% (0)	0% (0)	6% (2)	28% (10)	64% (23)	3% (1)
The focus on collaboration within the funding criteria detracted attention away from other important aspects of the project research.	42% (15)	31% (11)	14% (5)	6% (2)	6% (2)	3% (1)

Source: Evaluation survey

Most other external funding streams for R&D are very much project-driven and seek to provide solutions to specific problems or research goals. Developing capacity was considered by many of those consulted to be a very different process which requires a certain degree of risk taking and longer term planning. It was considered by the large majority of respondents that the RCDF has allowed individual institutions to undertake this process and create high quality research facilities and capabilities.

This leads on to the question of whether the funding of research capacity should fall upon the external funding bodies or should lie within the institutions themselves. As mentioned above, investing in the development of new research capacity is not without its risks and many institutions are less willing to invest in research areas where there is no clear track record of previous research success or expertise. It was often stated that the RCDF acted as a ‘catalyst’ for researchers and groups of researchers to carry forward their ideas:

“In our case, the concept of the project existed prior to the RCDF. We had been in discussions with partners at other institutions and were aware of what could be achieved – the funding we received under this programme enabled us to realise this by establishing a dedicated research centre.”

- Project manager

Evidence from both research-focused institutions and those which have traditionally concentrated on teaching and learning indicated that such dedicated research centres would not have been supported by institutional funding. The RCDF has enabled schools and departments within institutions to establish a critical mass of research activity in new areas, providing a platform to enable projects to draw in substantial sums of additional funding. As such, the investment has undoubtedly demonstrated value for money.

The length of the funding period was however highlighted as an issue by a large proportion of individuals interviewed. A number of projects had experienced delays in staff appointments and other project management problems which held them back during the first 12-18 months. Others explained that the first year of the funding period was taken up by planning and co-ordinating activities. As such, some projects were not in a position to generate new research income until relatively late in the funding period, which placed pressure on project managers in terms of sustainability, achieving outcomes and meeting project timescales.

While some institutions stated that they would have achieved more with greater levels of funding, the majority were satisfied with the levels that they had received. However the balance of opinion was that 3 years provided insufficient time for planning and preparatory activities. A number of senior research staff explained that, as a result of the pressures to get projects fully operational in a relatively short space of time, they had been heavily involved in administrative matters during the first half the funding period, which represents an inefficient use of senior researchers' time.

Most respondents also argued that they would have preferred to have received the same levels of funding over 5 years to allow a more gradual inception period. The evaluation highlighted that, in the absence of a robust administrative underpinning to support the development of research capacity within individual institutions, academic and scientific expertise can be diverted away from core research activities. This, and the absence of a quality planning structure, can inevitably lead to negative impacts upon efficiency and value for money.

Biostatistics and Bioinformatics Unit (BBU), Cardiff University

The BBU project has provided excellent value for money in terms of increasing research excellence, raising the profile of the Welsh research base and attracting a large amount of additional funding. UW College of Medicine (now part of Cardiff University) received £1.5 million under the RCDF programme to develop the BBU. The project focuses on complex statistical analysis and the development of sophisticated informatic systems to access and integrate biological data. This state of the art facility will help scientists throughout Wales understand the causes of diseases such as Alzheimer's disease, schizophrenia, Attention Deficit Hyperactivity Disorder (ADHD), cancer, Huntington's disease and depression.

RCDF funding has allowed the Unit to respond to advances in biology and create a sustainable research group. The Unit has succeeded in accessing a further £7.8 million in grants and engaged in the development of new computer programmes. The unit has developed the skills of staff involved and created additional high tech employment opportunities. There are also other potential benefits that are still being pursued, including spin offs and chemical trials.

80% of the papers and research produced so far have been peer reviewed and have contributed to increasing Wales' already strong bio-science reputation and the research base. They have developed fellowships, MSc courses and Business Informatics at PHD level, all of which are contributing to developing the research skills within the group in a sustainable way, which augurs well for the future of the Unit.

2.4 Management and administration of RCDF programme

In all cases individuals consulted were generally very pleased with the way in which the programme was managed and administered by HEFCW. All managers surveyed agreed (over three quarters strongly) that the project had been well managed whilst most of those who responded agreed that the application, appraisal and decision making process associated with the RCDF was rapid and efficient. The degree of flexibility built into the programme was appreciated and the level of bureaucracy associated with monitoring processes was generally considered to be acceptable.

Table 11: Management Issues

	Percentage of respondents					
	Disagree 1	2	3	4	Agree 5	No response
The application, appraisal and decision making process associated with the RCDF was rapid and efficient	0% (0)	0% (0)	22% (2)	11% (1)	33% (3)	33% (3)
The target setting process ensured a realistic but challenging focus on the projects	0% (0)	0% (0)	11% (1)	33% (3)	56% (5)	0% (0)
Project monitoring processes have been very bureaucratic	44% (4)	44% (4)	11% (1)	0% (0)	0% (0)	0% (0)
It is has been difficult to manage other partners	33% (3)	33% (3)	0% (0)	22% (2)	11% (1)	0% (0)
The project has been managed well by HEFCW	0% (0)	0% (0)	0% (0)	22% (2)	78% (7)	0% (0)

Based on 9 respondents

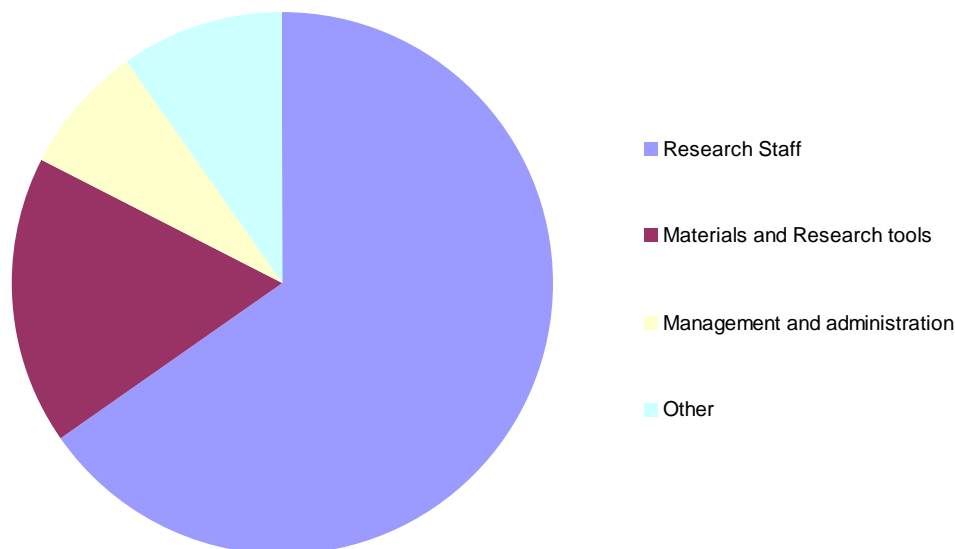
Source: Evaluation survey

The vast majority of managers (89%) agreed that the target setting process ensured a 'realistic but challenging focus on the projects'. As can be seen from the table above, some managers noted that they had had some difficulties in managing other partners within their projects. Further responses at the interviews stage suggested that these difficulties were related to communications and project deliverables but the overwhelming view was that institutional cooperation had generally worked well.

Managers' survey responses revealed that, on average, around two thirds (64%) of total budget was spent on research staff in the RCDF projects. Materials and research tools on average accounted for 18% of budgets, whilst management accounted for 9%. Other categories of expenditure incurred by projects were 'teaching staff buy out' (23% of budget in Aberystwyth, WIRE), refurbishment (26% in Swansea and 3.5% in Cardiff), travel &

communications (15% Aberystwyth, CHAIR) and PhD Studentships (7% in Bangor, Molecular Cancer Research).

Figure 1: Proportion of project budgets allocated



Source: Evaluation survey

One minor point was raised which revealed a different interpretation of the RCDF's objectives and main focus. One project manager felt that the fund had not invested sufficiently in developing new research capacity at institutions with a low base of research activity, having understood this to be the primary aim of the fund. If the Council is to channel resources towards such development in the future it may wish to consider earmarking specific funds for this aim.

2.5 Common Characteristics

The aim of the funding programme to encourage diversity means that while the RCDF projects have little in common scientifically they do share common characteristics. One of the key common characteristics across virtually all of the projects is the multidisciplinary element of the project teams involved. Most of the projects have drawn expertise from various departments which have enabled projects to widen their research focus and enhance their expertise. This is consistent with much innovative research at a European level which is taking place at the interface between disciplines and exploring new areas of research.² This

² "High levels of [research] performance can be achieved by the networking of specialist centres throughout the countries of the EU... in particular multidisciplinary research involving universities and companies." from the EC Communication 'Towards a European Research Area' (Com 2000-6)

process has also encouraged the development of centres of expertise that can play an important role in attracting external funding to institutions and raise their profile with the governmental and business sectors and internationally.

Another common feature has been the external partnerships created by the projects. The focus upon inter-institutional partnerships has been a key feature of the programme and this has also contributed to the creation of external networks. These partnerships include all-Wales networks, local hospitals and NHS trusts, business, technology centres etc. These partnerships have been vital in enabling the programme to achieve its aim of increasing research capacity in areas of strategic importance and linking to the social and economic development of Wales. Such links can also create a dynamic series of partnerships between public and private sector which in turn can lead to clustering and knowledge flow between different partners.

In general a common characteristic of the most successful RCDF project seems to be that they are supported by a critical mass of research activity in the form of a sizeable and well-established institutional research base. Two of the projects which operated in such environments succeeded in leveraging in additional funding totalling £13.7M.

The effectiveness of leadership and management within projects is also critical to success. Strong project management and the delivery of clear objectives have been evident in projects that have succeeded in establishing sustainable research capacity. Where project outcomes have fallen short of expectations, it has been clear that there have been periods of instability in project leadership or lack of clarity in terms of who is driving the research agenda forward.

SECTION 3: EVALUATION CONCLUSIONS AND RECOMMENDATIONS

3.1 Introduction and background to the evaluation

The principal objective of the Research Capacity Development Fund was to build research capacity in areas of strategic importance to the economy, culture and society of Wales. Its subsidiary objectives were to promote the resilience, diversity, dynamism and sustainability of the Welsh research base.

The Fund provided a total of £8.4 million and supported ten projects at eight institutions. It was established for three years, 2002/03 to 2004/05, although awards were profiled to continue into 2005/06 in order to allow additional time for project start ups.

The projects selected for support were very diverse and spanned a wide range of subject areas. In broad terms, the lead disciplines can be categorised as follows: science/engineering – two projects; medicine – one project; social sciences – five projects; creative arts – one project; cross-disciplinary spanning science and medicine – one project.

The selected projects fulfilled the programme's objective of promoting research of relevance to the economy, culture and society of Wales in a variety of ways:

- As the economy continues to evolve and diversify, there is a need to align research to complement emerging sectors and meet the challenges of knowledge competitiveness, economic growth, better skills levels and the provision of higher quality, sustainable jobs. The focus in the RCDF programme upon areas such as nanotechnology, IT and biosciences is consistent with the Assembly's economic objectives, and aspects of *Reaching Higher* such as knowledge commercialisation and links with the private sector.
- A significant number of the projects were concerned with aspects of health research and social justice, which are also priority areas for the Assembly. Indeed, with the development of the Science Policy for Wales, health research looks set to become even more central in future.
- Two of the projects took Wales itself as part of the subject for the research (Centre for Border Studies, University of Glamorgan and Wales in a Regional Europe, UW Aberystwyth).

Arad's evaluation of the programme focused primarily on considerations of research excellence (as evidenced chiefly by research income and publications) and on the long-term sustainability of the projects. To date, the ten projects in the programme have:

- Secured external research income totalling £21.7 million, of which £11.8 million was from Research Councils
- Produced a total of 713 publications, of which 446 were in peer-reviewed journals.

Inevitably, there was some variation in performance between projects. For example, it was notable that the projects which were most successful at attracting high levels of research income were those at institutions which have a sizeable and well-established research base, particularly where the subject was science and engineering. However, the above figures demonstrate that, taken as a whole, the RCDF programme can be considered to have been generally successful in establishing a body of good quality research.

In order for the programme to be successful in its objective of building research capacity, it is essential that projects should be capable of sustaining themselves once the RCDF funding comes to an end. The levels of external research income attracted indicate that, in most cases, it is reasonable to expect that projects will be capable of generating sufficient funding to enable them to be sustainable after the end of the funding period. This is confirmed by staffing data gathered for the evaluation. These figures indicate that around 54 posts were directly funded by the RCDF awards and that a further 84 (including visiting appointments and postgraduate research students in some cases) were created as a result of additional income generated, resulting in a total of 138 posts. Of these, 66 have guaranteed funding to support their continuation after the end of the RCDF programme, and there is a possibility that this number may increase.

The evaluation also highlighted the important role that partnership played in the programme. Most of the projects were interdisciplinary, in the sense that they involved staff from a number of different departments or, in some cases, different faculties. Interdisciplinarity was strongly encouraged in the programme's call for proposals, but was not an absolute requirement. However, it is clearly a very positive aspect of the programme, since much of the most exciting research takes place at the interface between disciplines. The call for proposals also strongly encouraged inter-institutional partnerships. This was intended to help ensure that projects achieved critical mass, and was also connected with the Assembly's policy, as set out in *Reaching Higher*, of developing networks of excellence between institutions across Wales. In most cases, the inter-institutional partnerships seem to have worked well, although a few staff reported difficulties in establishing or managing such partnerships. A third

dimension to partnership is the collaborative relationships which some projects have established with bodies outside the HE sector.

The establishment of new partnerships of various kinds, with all that implies for the cross-fertilisation of ideas and increased critical mass, is one way in which the RCDF programme has helped enhance the dynamism and diversity of the research base. More fundamentally, it has also done so by supporting the establishment of new research groups in such a diverse range of subject areas.

The project teams were generally very satisfied with the way in which the programme was managed and administered by HEFCW. Whilst some institutions stated that they could have achieved more with greater levels of funding, the majority were satisfied with the levels they had received. However, the balance of opinion was that three years provided insufficient time for planning and preparing activities.

In conclusion, it should be recognised that investing in what can essentially be regarded as largely human and knowledge capital development carries a relatively high degree of risk. Returns to such investments are far from guaranteed, even in cases where the outcome objectives have been largely achieved. On the other hand, successful outcomes can deliver significant returns and therefore demonstrate excellent value for money. The outcomes achieved to date such as published papers, creation and retention of posts, development of new networks and the attraction of additional sources of funding suggest that the projects funded under RCDF have, on the whole, been very successful in terms of scientific excellence and raising the diversity and profile of the Welsh research base.

3.2 General lessons and recommendations

1. HEFCW may wish to tailor future capacity development funds to meet different needs. For example HEFCW may wish to consider one development fund to encourage research capacity from a low base and a separate funding pot to encourage further capacity development in areas of established scientific excellence.
2. The three year lifespan of the funding programme was considered by many of those consulted to be slightly restrictive. Many of the projects experienced a bedding-in period of up to twelve months which restricted the time that was left to actually develop the capacity development objectives. Future funding programmes of this nature may wish to build a contingency timeframe into the administration process to ease similar time pressures placed on some projects.

3. There is widespread support for continued investment in the development of research capacity in order to plan and develop Wales' knowledge economy. The RCDF was considered to be an excellent and unique programme. There were calls for the focus to remain on funding substantial projects in the future and evidence from this evaluation suggests that projects with greater critical mass have been the more successful.
4. In general the cross-institutional partnerships have worked well and these partnerships could potentially continue under larger funding programmes such as the Reconfiguration and Collaboration Fund. It may, however, be useful in future to consider funding high quality research groups which can offer a dynamic, single institutional approach to developing the Welsh research base.
5. The multidisciplinary aspects of the projects supported have been very successful and should be encouraged further in future funding programmes. This could take place through departmental collaboration within and across institutions in order to widen the drive for research excellence and develop cooperating clusters of expertise. Further financial and administrative incentives could be considered in this instance.
6. Future funding programmes could be more explicitly linked in with Welsh social and economic development strategies. These should particularly relate to the development of knowledge clusters, priority sectors and the commercialisation of knowledge. This process can also be linked to the 'softer' elements that drive a knowledge economy such as promoting new networks, providing research for public services and quality of life. These factors can all relate expanding Wales' research base and encouraging inward investment.
7. The development of new academic and training courses in the field developed under the programme is to be welcomed. These were largely an unexpected but welcome spin-off however this process can form a key aspect of developing and promoting the sustainability and dynamism of the Welsh research base and creating highly skilled jobs. This process should therefore be encouraged as an element of future funding programmes.
8. The external management of the programme has been considered to be very effective and there was particular support for the flexibility in terms of funding and key deliverables which allowed projects to embed and develop despite some timescale slips.

9. The substantial funding awarded to each individual project was not without risk however the resulting scientific excellence and capacity development has, in most cases, provided very good value for money. Any similar future funding programmes should be prepared to take similar risks and provide sufficient large scale funding to further sustainable capacity development and dynamic partnerships and research processes.

10. Overall the programme can be regarded as being very successful having achieved its primary objectives in almost all cases. The funding application reviews and initial risk assessment processes also appear to have been successful and the general management processes adopted have ensured effective monitoring of successful outcomes with minimum bureaucracy. The overwhelming majority of those involved in the projects would welcome another round of funding in line with some of the ideas and recommendations outlined above.

APPENDIX A - Summary of funded projects

Lead institution	Project title and summary description of activities	Total funds
University of Wales, Newport	<p>Centre for Interaction Design</p> <p>The group is looking at the role of wearable technology and how it can be deployed to create market ready products, examining the motivations and commercial possibilities, in areas of the market such as sport and fitness, corporate wear and inclusive design. Driven by the application of technical textiles, micro-technologies and new manufacturing techniques this project aims to develop innovative smart clothing to address end-user needs from technical, aesthetic and cultural view points.</p> <p>Further information is available at: http://artschool.newport.ac.uk/smartclothes/</p>	£599,896
University of Wales, Aberystwyth	<p>Wales in a Regional Europe (WIRE)</p> <p>This project seeks to develop a unique research centre in Wales, with expertise in regional governance within the European Union. It aims to establish a Constitution Unit focusing on the multi-level governmental context in which Wales now exists. In addition to institutional partners in Wales, the centre has been working in close collaboration with partners at the London School of Economics.</p>	£999,472 (total funding for both Aberystwyth projects)
University of Wales, Aberystwyth	<p>Centre for Health and International Relations (CHAIR)</p> <p>This project is working in partnership with UW Bangor to establish new research programmes in health and globalisation, and health and security.</p>	
University of Wales, Bangor	<p>Centre for Advanced Software Technology (CAST)</p> <p>This project aims to create a world-class computing research infrastructure, focusing on informatics and communication and network engineering. It also seeks to expand the high speed scientific computing capability.</p> <p>Further information is available at: http://www.wda.co.uk/index.cfm/cast_technium/technium/en6311</p>	£1,401,996 (total funding for both Bangor projects)
University of Wales, Bangor	<p>Centre for Molecular Cancer Research</p> <p>The North West Cancer Research Fund Institute is a centre of excellence for molecular cancer studies located within the School of Biological Sciences at the University of Wales, Bangor. The centre comprises research groups in various aspects of molecular cancer research, including angiogenesis, signal transduction pathways, colorectal cancer biology, DNA repair, cell structure and chromosomal rearrangements / chromatin dynamics.</p> <p>Further information is available at: http://www.nwcrinstitute.co.uk/</p>	

Cardiff University	<p>Cardiff Institute for Society, Health and Ethics (CISHE)</p> <p>CISHE conducts and co-ordinates multidisciplinary research, with a strong contribution from the social sciences and within the related domains of biomedicine, health services, public health and bioethics. The institute undertakes and facilitates research of international excellence, placing emphasis on tackling health inequalities and ensuring that our research has an impact on policy and practice in Wales and beyond.</p> <p>Further information is available at: http://www.cardiff.ac.uk/socsi/cishe/</p>	£1,504,500
University of Wales College of Medicine*	<p>Biostatistics and Bioinformatics Unit</p> <p>This project focuses on complex statistical analysis and the development of sophisticated informatic systems to access and integrate biological data. This state of the art facility will help scientists throughout Wales understand the causes of diseases such as Alzheimer's disease, schizophrenia, Attention Deficit Hyperactivity Disorder (ADHD), cancer, Huntington's disease and depression.</p> <p>Further information is available at: http://bbu.uwcm.ac.uk/</p>	£1,499,089
University of Glamorgan	<p>Centre for Border Studies</p> <p>This Centre aims to make a significant contribution to the better understanding of the diverse national, political and cultural identities in contemporary Wales, Europe and beyond. The project is engaged in Border Studies in a cultural and historical context as part of its multidisciplinary work that includes political and social sciences.</p> <p>Further information is available at: http://www.centreforborderstudies.co.uk/</p>	£601,000
North East Wales Institute	<p>Social Inclusion Research Unit (SIRU)</p> <p>SIRU focuses on research that seeks to improve the lives of vulnerable and marginalised people. The aim is to help strengthening the delivery of social welfare and community justice services by improving their capacity to understand, analyse and address complex social needs and contribute to improved prevention, interventions, services and policies.</p>	£250,000
University of Wales, Swansea	<p>Multidisciplinary Nanotechnology Centre (MNC)</p> <p>The MNC at Swansea has developed an international reputation in many new fields that stretch traditional engineering concepts to the extreme. This has only been made possible by radical thinking that combines engineering with science, mathematics and medicine. Therefore, the Multidisciplinary Nanotechnology Centre (MNC) has an active strategy to develop projects that bridge traditional disciplines to provide a step change in technology.</p>	£1,538,013

	Further information is available at: http://www.mnc.swansea.ac.uk/research.htm	
	Total	£8,393,965

APPENDIX B - Breakdown of questionnaire respondents

Lead institution	Project title	Number of respondents
University of Wales, Newport	Centre for Interaction Design	1
University of Wales, Aberystwyth	Wales in a Regional Europe	3
University of Wales, Aberystwyth	Health of Nations Unit	1
University of Wales, Bangor	Centre for Advanced Software Technology	5
University of Wales, Bangor	Centre for Molecular Cancer Research	5
Cardiff University	Cardiff Institute for Society, Health and Ethics	3
University of Wales College of Medicine*	Biostatistics and Bioinformatics Unit	10
University of Glamorgan	Centre for Border Studies	2
North East Wales Institute	Social Inclusion Research Unit	4
University of Wales, Swansea	Multidisciplinary Nanotechnology Centre	2
	Total	36

* The University of Wales College of Medicine merged with Cardiff University in August 2004.