ECONOMIC DEVELOPMENT & TRANSPORT COMMITTEE

EDT(2) 14-05 (p4)

Date: 2 November 2005
Time: 9.00 am to 12.30 pm
Venue: National Assembly for Wales, Cardiff Bay
Title: Royal Society Submission to the Welsh Assembly Economic Development and Transport Committee's Policy Review on Science Policy

THE ROYAL SOCIETY

Royal Society Submission to the Welsh Assembly Economic Development and Transport Committee's Policy Review on Science Policy

Summary of main points

1 The Royal Society believes that the Welsh universities are crucial to the future development of the economy and culture of Wales. The importance of the universities to the economy goes much wider than the subjects with obvious immediate applicability, and it is essential to maintain a wide portfolio across the sciences, social sciences, and the arts and humanities.

2 The Society is concerned that in some subjects, especially those that are expensive to maintain such as the science and engineering disciplines, there is insufficient investment to ensure that Welsh universities can remain competitive with England or Scotland: in particular chemistry and biological sciences need to be nurtured.

3 It is important to recognise that the research activity within universities provides more than the generation of applicable new ideas that can be used by business and the public services. It also enhances the learning environment for students, maintains a wide and dynamic knowledge base, and provides access through to the vast majority of new knowledge, which, of course, is being generated elsewhere in the world. It is also an important factor in attracting and retaining investment by multi-national science and engineering based industries, and in transmitting knowledge to the local community.

4 The tables at the end of the paper provide some quantitative information :

- S&T first and postgraduate student numbers (Tables 1&2);
- The mobility of young people starting university courses and on graduation (Table 3);
- Grant, contract and HEFC research income to universities (table 4)
- The units of Assessment in Welsh universities that received a rating of 5*, 5, 4, 3a and 3b in the 2001 Research Assessment Exercise.

5 In the time available, the Royal Society has not been able to analyse in depth the available information on Welsh HEIs' innovation activity, but there are indications that there are areas in which Welsh universities are significantly better that

Scotland and the English regions. This would be worth further study, particularly focussing on the impact of universities on high technology SMEs.

Background

6 The Royal Society is the UK's academy of sciences, with its fellowship drawn from the UK, Ireland and the Commonwealth. It also has some 130 foreign members from elsewhere in the world.

7 The Society promotes excellence in science, technology, engineering and mathematics (STEM), both in the UK and internationally, and encourages public debate on key issues involving STEM and the use of high quality scientific advice in policy making. The Society is committed to delivering the best independent advice, drawing upon the expertise of its Fellows, Foreign Members and the wider scientific community.

8 The Society is undertaking a pilot project to test the methodologies that could be applied to a major work programme looking at the supply and demand for STEM higher education at all levels from foundation degrees and HND/C through to doctoral and post doctoral training. At this stage most of the information that has been collected has been on a UK wide basis, but it is the intention to look more closely at the component parts of the UK to explore whether there are lessons to be learnt, both positive and negative, from more local development. Amongst other things, this will have to await a customised search of the basic HESA database, the specification of which is still being formulated. The Society would be happy to provide an up-date to the Committee when this further information is available.

9 Hence, while the Society has some statistics on Welsh universities and research, at present this is not as comprehensive as it would wish. After considering the published evidence already put before the Committee, the Society believes that it could contribute best to the review in the following aspects of higher education and research across the UK:

A The role of science and engineering in the development of business, the public services and culture.

B The importance of maintaining higher education provision in all major disciplines both in the sciences and humanities.

C The development of higher education – internationalisation of faculty and of the student population.

D The objectives for funding fundamental research at universities;

and then to provide a final section (**E**) considering some issues from the Welsh perspective:

- The basis for comparisons – eg per capita or %GDP;
- First and higher degree students at Welsh universities;
- Regional migration on entry to university and to first employment;
- Research grant/contract income to Welsh universities, and the underpinning research income to Welsh universities from the Funding Council;
- Royal Society University Research Fellows at Welsh universities and Royal Society grant to Welsh universities;
- The standing of Welsh University research in science, engineering and mathematics;
- Comments on the updated background statistics prepared for the Committee – EDT(2) 12-05 (p3).

A. The role of science and engineering to the development of business, the public services and culture

10 The UK and its component countries have a long history of excellence in fundamental research, and have benefited greatly from this in many ways. Active engagement in fundamental research both forms and nurtures an invaluable skill base and generates knowledge that may have uses far from the original context. So fundamental research is not something that can be left to others while concentrating on apparently profitable applications. At the leading edge, only those who contribute to the pool of new knowledge have early access to the latest developments elsewhere and have the ability to discern their significance. To be globally competitive in the long term, it is necessary (though not sufficient) to maintain a serious commitment to fundamental research. The reasons for supporting fundamental research are considered in more detail in Section D below.

11 Developed countries depend on the skills of their workforce for their competitive success. This is emphatically the case for success in science. It is vital that everyone is exposed to science at school, whatever their future career paths, and that sufficient of the best young people then take their studies in science through to undergraduate and postgraduate levels.

12 In an advanced knowledge economy, it is essential for the population to feel included in the debates on future developments. This requires a broad understanding of the technological underpinning of the economy and of environmental and health issues, which means both that there needs to be a higher general level of scientific literacy and greater dialogue on relevant scientific related issues. In addition to providing formal degree courses, all universities reach out into the community, including visits to and from local schools, providing extra mural courses, open days, and speakers to schools, clubs etc. Some of these activities are organised jointly through local branches of learned societies, such as the Royal Society of Chemistry, the Institute of Physics, and the engineering institutes.

B. The importance of maintaining higher education provision in all major disciplines both in the sciences and humanities.

13 The structure of individual universities is not immutable, and the Society is not necessarily opposed to the closure or merger of science departments provided the welfare of existing students is safeguarded and the change can be justified in terms of improving the overall science provision locally, regionally and nationally. However it is concerned that some recent examples of closures did not apparently fulfil these conditions. Certainly, the claim that this is merely a demand side problem is far too simplistic at the local level, although there is clearly a wider issue of whether sufficient young people are being attracted to university physical science, mathematics and engineering courses.

14 STEM HE provision can be considered at a range of levels - EU wide, UK, country or region. To some students and large firms the location of a particularly attractive university course or research programme even within a country or continent is irrelevant. However, the advent of a mass higher education system, the reduction in individual student support, and the imperative to provide equal opportunity of access to higher education mean that local teaching provision is very important. The formation of regional 'deserts' in some subjects created by closures of university departments increases the risk of discrimination against those who may need to stay near home because of family commitments, cultural or financial pressures. Furthermore, without local university departments in the physical sciences and engineering, the opportunities for increasing university-school links in these subjects will be severely reduced in some areas. Similarly, while larger companies can access information on a world-wide basis, SMEs can be very dependent on their local universities.

15 Ensuring that the education system as a whole will provide the educated and trained individuals to maintain economic and social well-being into the future is clearly the responsibility of Government. Equally, it is the responsibility of individual universities to determine their own future development, taking into account amongst other things*:* the general and financial policies of the Government; and universities' responsibilities for maintaining the highest standards in equal opportunities and for contributing to local, regional and wider economic development. The public sector is the single largest funder of universities and it is essential that the main funding bodies (primarily the Funding Councils and Research Councils) consider very carefully whether there may be perverse incentives or other unintended consequences of their action.

C. The development of higher education – internationalisation of faculty and of the student population.

16 The prime responsibilities of a university are to teach, to maintain and develop the corpus of knowledge relevant to their activities and to transfer this knowledge, not only though teaching, but also other activities targeted for example at business and the public services. These are all interconnected activities and there are obvious dangers in trying to make policies in one area without understanding the interdependence on other areas. The treatment of teaching and research and the application of research in the HE White Paper (DfES 2003) was a good example of this over simplification.

17 A key feature of higher education teaching is the high level of scholarship[1] required, and the necessary staff time for this activity is insufficiently taken account of in central funding, exacerbating the shortfall on the funding of teaching. The issue is complicated by the relationship of scholarship with other activities that enhance it, such as: active research; and professional development, including close interaction with innovative employers of relevant graduates, attendance at international meetings, and collaboration with professional colleagues in the public services and business sectors.

18 There has been much debate on the interdependence of teaching and research. However, too often this has been at an individual teacher level, with attempts to explore if there is a correlation between excellence in teaching and in research on the basis of individual members of faculty. Rather, as the Society explained in its response to the White Paper (RS 2003), while all teachers should undertake scholarship, the linkage between teaching and research should be made at the departmental level, and be in terms of its value in contributing to a stimulating learning environment, not least through the attraction and retention of faculty, and the exposure of students to the frontiers of knowledge.

19 It is essential to ensure that sufficient high quality staff are retained within universities. The Society has a range of programmes designed to help some of the highest quality scientists and engineers at key transitional stages, but it has major concerns that academic careers are no longer sufficiently attractive to secure the future faculty of the university system. While the Government's response to the Roberts recommendations (HMT 2002) has gone some way to improving the situation at post-doctoral levels, more needs to be done to improve the attractiveness of permanent academic teaching posts.

20 Across the UK the number of foreign national that have teaching and research appointments has increased significantly over the past two decades. In 2002/03, 16.5% of full time teaching and research staff were non-UK nationals. The percentage is even higher (36%) for full time research-only staff. Universities are recruiting from the available pool of talent across the world.

D. Fundamental research

21 Fundamental research is largely supported by public funds because of an inability of the market economy to support this activity sufficiently, the research having such long payback times that an individual firm is unlikely to get a sufficient return to justify its investment. However, since most research is done in other countries – this is true even of the US - it is important to consider why individual states invest in fundamental research.

[1] There are many definitions of scholarship. For the purpose of this submission it is defined as "a deep understanding and ongoing engagement with the concepts, ideas, methodology and analysis being taught".

22 Six overlapping reasons for funding fundamental research can be identified:

i. to maintain and develop knowledge, skills, and long-term research infrastructure, for unforeseen eventualities and also a capacity to keep in touch with and understand developments occurring elsewhere in the world;

ii. to solve problems – eg to underpin solutions to societal problems such as those in the health, social, economic, environmental areas;

iii. to fuel economic activity, new and better/cheaper products and new and better/more efficient services;

iv. to train PhDs and post doctoral researchers and to provide within universities an exciting and challenging learning environment for first degree and masters students;

v. to retain existing expertise, and to attract inward migration of skilled people;

vi. to retain business investment and to attract "foreign" companies/capital.

Implicit in many of these are the key roles that fundamental research plays in maintaining culture and a community's standing within the world.

23 From these it can be seen that there are significant localised benefits from fundamental research activity including:

- maintaining expertise across a wide range of disciplines, with people able to pick up and run with new ideas wherever they are generated – includes being available to provide advice to regional and national governments;
- providing the entry ticket to the international research community, sometimes through formal collaborations, but at other times just through attendance at conferences and informal contacts;
- maintaining an interface between universities and the business and wider community;
- educational benefits.

It is important to have a range of public funding streams at various levels and with different objectives. These should include those that provide local managers with funds to develop their institutional human and capital infrastructure strategic, through to funds distributed on a project level. The main purpose of the proposed European Research Council is to increase the number of European research stars and narrow the gap with the US, through a highly intense competition at the highest level. The Society also believes that it is important that the main project grant funding should be on a UK wide competitive basis.

24 There is a wide range of research activity at varying costs. The country needs research stars who make a major international impact, and this work can be expensive and demands selective funding. But not all research needs to be expensive in terms of local facilities. For example: it may be conducted at regional, national or international scientific facilities; undertaken via broadband links to major computing or database centres; or through collaboration with another university or research institute. The key requirement is staff time, and this has to be resourced from the HE Funding Councils' QR research block grants (a unique UK arrangement) or cross-subsidised from elsewhere.

25 The selectivity of the 1990s led to some helpful rationalisations in the system, but there are important limits to the optimal degree of concentration of research in UK universities. The recent demise of some departments rated 4 in the 2001 RAE has meant the loss of good units with high reputations for their undergraduate courses where the demand had kept up well. Furthermore, some members of faculty in these departments had international standing and had received significant Research Council grants. The departments themselves were amongst those that had been chosen as a base by the Society's University Research Fellows. Many 4 rated departments are relatively small and have established important and innovative niche research programmes. Some of the EPSRC international reviews of UK research disciplines have

highlighted the important role of small departments. The Welsh funding Council, rightly in the Society's view, has developed a less selective funding formula than that used by HEFCE.

26 A widely quoted table of firms indicating the percentage importance of local, national and overseas universities according to the firm's largest market, shows that local universities were particularly important to small businesses, but that local universities were also important to those with national or even international customers – (this interpretation of this table assumes that firms size varies roughly with the location of largest market from local to international):

Importance of location of university with size of firm

Firm's largest market	Location of University		
	Local	National	Overseas
Local	88	12	0
Regional	47	53	0
National	37	47	16
International	26	48	26
All	36	46	18

Source: Community Innovation Survey (UK), DTI/ONS 2001

E Some comments on the available statistics including:

i The basis for comparisons – eg per capita or %GDP;

27 While for the whole of the UK, it is helpful to use GDP as a scaling or normalising factor to compare the performance of regions or countries of differing size, when considering the distribution of public funds within the UK, this is not so appropriate, especially if one of the overall aims of economic policy is to increase per capita GDP

28 For publicly funded R&D it is probably best to use population as the scaling factor. Since Wales has 4.93% of the UK's population and contributes 3.9% of the UK GDP, using population as a scaling factor produces a lower comparison than using GDP.

ii *First and higher degree students at Welsh universities*

29 A comparison of the undergraduate and postgraduate students in major discipline areas is shown in tables 1 and 2. This shows those subjects where Welsh universities educate more or less than the share of UK population.

iii *Regional migration on entry to university and to first employment*

30 A study by Universities UK (UUK) on the migration of students entering university and then on their first destination employer is shown in table 3, for each of the English Regions, Scotland , Wales and Northern Ireland. This shows that Welsh school children are more likely to move elsewhere in the UK, particularly to neighbouring English regions than their Scottish and Northern Ireland counterparts. Similarly, graduates from Welsh HEIs are much more like graduates from HEIs in the English Regions than are the Scottish and Northern Ireland graduates in terms of the location of their first job. From the data it is not possible to track the Welsh schoolchildren through to the first destination.

***iv Research grant/contract income to Welsh universities and the underpinning research income to Welsh universities from the Funding Council*;**

31 Table 4 shows the research grant and contract income in 2003/04 to universities in England Scotland and Wales, disaggregated into Research Councils, UK charities, UK Government, UK industry, from elsewhere in the EU and other overseas and also the relevant Funding Councils over the period 1994-95 to 2002-03. When using population as the scaling factor to compare the three countries, it is clear that Scottish universities are receiving significantly more research grants/contracts than England, and in many cases English universities are receiving more than Welsh universities. The

Charities income for Wales is particularly small because of the predominance of medical charities. The second part of the table shows that over the past 9 years Scotland has invested significantly more in research infrastructure than either England or Wales, although recently Wales has been closing the gap.

v. URFs at and RS grant to Welsh universities in science engineering and mathematics.

32 The distribution of Royal Society University Research Fellowship (URFs), Dorothy Hogkin Fellowships (DHF) and small research grants (SRG) is as follows in terms of numbers of awards:

	URF		DHF		SRG	
	Number	%	Number	%	Number	%
England	254	86	43	79.6	166	82.5
Scotland	35	11.9	10	18.5	25	12.4
Wales	5	1.7	1	1.9	6	3.0
Northern Ireland	1	0.3	0	0	4	2.0
Total	295		54		201	

vi The Standing of Welsh University Research

33 The standing of particular areas of university research cannot be ascertained merely from the value of external research grants and contracts even within disciplines, because of the wide range of costs of research. Some information can be obtained from an analysis of the most recent UK wide Research Assessment Exercise (RAE), although this was designed to compare within Units of Assessment (UOAs), and some care has to be exercised over detailed comparisons across these UOAs. Table 5 shows those Units of Assessment across Welsh Universities that received ratings of 5*, 5, 4, 3a and 3b. After the table, these ratings are defined. The table also shows the number of research active-staff in the particular unit of assessment, rounded to the nearest whole number. Note that these staff have teaching and other responsibilities.

34 Ratings 5* and 5 indicate that at least half of the submitted research was at a level of international excellence, and a 4 rating that nearly the whole department equates to UK national excellence and some evidence of international quality. From this it can be seen that Welsh Universities have a good spread in the medical, biological and physical sciences and in engineering. However, some are spread rather too thinly – for example in chemistry (already highlighted to the Committee in the RSC submission) there are no 5 or 5* departments and one of the two 4 rated departments has subsequently closed (Swansea). The position of biological sciences also needs further consideration, and these and some other subjects need to be carefully nurtured.

vii Comments on the updated background statistical document EDT(7) 12 – 05 (p3)

35 In the light of discussions on scaling factors at (i) above, the Welsh % share of UK totals should be compared with its 4.93% of the UK population.

36 Committee members will already have noticed the comparatively high level of HE spin-out activity generated by Welsh universities and the high level of collaborative research and consultancy contracts. If it has not already done so the

Committee may wish to ask its adviser to investigate the IP Wales study of Intellectual Property in UK HEIs with emphasis on Wales.

37 The relatively low level of research grants and contracts has already been commented above, and may indicate that steps need to be taken to ensure that the universities can continue to transfer commercially valuable knowledge in the face of increasing global competition.

38 Similarly, the funding of research and post graduate students goes well beyond the two Councils mentioned in the report (ESRC and NERC). In total those and the other Councils (Biotechnology and Biosciences, Engineering and Physical Science, Medical and the Particle Physics and Astronomy Research Councils) funded just under £29million of research in Welsh Universities in 2003/04 (see table 4). Furthermore the Central Laboratory for the Research Councils and the other Councils will have provided access to UK and International facilities for Welsh researchers, including access to X-ray and neutron sources for determining molecular structures.

39 Finally, although they are beyond the scope of this Royal Society paper, important background comparative information on intellectual property and general innovation involving the universities can be found in the following papers:

- IP Wales: study of the intellectual property in UK HEIs, with an emphasis on Wales;
- The annual higher education – business and community interaction surveys published by the HE Funding Councils.

40 Although the Society has not been able to analyse these papers in depth, they do shown some interesting differences between Welsh HEIs and those in Scotland and the English Regions, for example: on patent filing and assigning, and on spin-out and staff and graduate start-ups. This would warrant further study, especially the impact on SMEs.

KDJR/ 27.10.05

Table 1 First Degree students – by location of institution 2002/03

	England	Wales	Scotland	Northern Ireland	UK
	Total	Total	Total	Total	Total
Total - full & part time first degree	**883,055**	**59,040**	**120,060**	**30,625**	**1,092,775**
Subject area					
Medicine & dentistry	25,640	1,295	5,120	1,110	33,160
Subjects allied to medicine	71,100	4,975	12,850	3655	92,575
Biological sciences	73,690	6,930	12,045	2,140	94,805
Veterinary science	2,355	0	715	0	3,065
Physical sciences	38,745	3,185	5,615	1,000	48,555
Mathematical sciences	16,270	790	2,140	375	19,575
Computer science	70,580	2,730	6,150	2,920	82,380
Engineering & technology	63,885	4,080	9,835	2,205	80,005

	England	Wales	Scotland	Northern Ireland	UK
	%	%	%	%	%
Total	**80.81**	**5.40**	**10.99**	**2.80**	**100**
Subject area					
Medicine & dentistry	**77.32**	**3.91**	**15.44**	**3.35**	**100**
Subjects allied to medicine	**76.80**	**5.37**	**13.88**	**3.95**	**100**
Biological sciences	**77.73**	**7.31**	**12.71**	**2.26**	**100**
Veterinary science	**76.84**	**0.00**	**23.33**	**0.00**	**100**
Physical sciences	**79.80**	**6.56**	**11.56**	**2.06**	**100**
Mathematical sciences	**83.12**	**4.04**	**10.93**	**1.92**	**100**
Computer science	**85.68**	**3.31**	**7.47**	**3.54**	**100**
Engineering & technology	**79.85**	**5.10**	**12.29**	**2.76**	**100**
% of the Total UK population	**83.67**	**4.93**	**8.53**	**2.87**	

Source HESA publications

Table 2 Postgraduate Students by location of institution 2002/03

	England Total	Wales Total	Scotland Total	Northern Ireland Total	United Kingdom Total
Total full and part time postgraduates	**416,745**	**23,475**	**45,665**	**11,625**	**497,500**
Qualification aimed for					
Research for a higher degree	89,940	4,780	11,445	2,450	108,610
Taught course for a higher degree	199,965	13,150	18,205	4,730	236,050
Other postgraduate	126,845	5,540	16,020	4,440	152,845
Research for a higher degree					
Medicine & dentistry	7,345	210	900	220	8,680
Subjects allied to medicine	4,550	380	885	375	6,185
Biological sciences	10,110	635	1,750	255	12,755
Veterinary science	290	0	180	0	465
Physical sciences	10,015	520	1,340	260	12,130
Mathematical sciences	2,140	65	240	5	2,455
Computer science	3,535	200	500	90	4,315
Engineering & technology	11,885	625	1,460	345	14,320
Taught course for a higher degree					
Medicine & dentistry	3,580	490	375	30	4,475
Subjects allied to medicine	14,360	810	1,760	635	17,560
Biological sciences	9,460	675	685	180	10,990
Veterinary science	55	0	0	0	60
Physical sciences	4,565	470	405	135	5,580
Mathematical sciences	1,610	15	350	0	1,985
Computer science	15,355	700	1,475	650	18,180
Engineering & technology	16,585	545	1,480	280	18,890
Other postgraduate					
Education	56,125	2,845	7,430	1,385	67,790

Percentage of UK total for full and part time P/G students	Total	Wales Total	Scotland Total	N. Ireland Total	United Kingdom Total
Total full and part time postgraduates	84	4.72	9.19	2.34	100
Qualification aimed for					
Research for a higher degree	82.81	4.40	10.54	2.26	100
Taught course for a higher degree	84.71	5.57	7.71	2.00	100
Other postgraduate	82.99	3.62	10.48	2.90	100
Research for a higher degree					
Medicine & dentistry	84.62	2.42	10.37	2.53	100
Subjects allied to medicine	73.57	6.14	14.31	6.06	100
Biological sciences	79.26	4.98	13.72	2.00	100
Veterinary science	62.37	0	38.71	0	100
Physical sciences	82.56	4.29	11.05	2.14	100
Mathematical sciences	87.17	2.65	9.78	0.20	100
Computer science	81.92	4.63	11.59	2.09	100
Engineering & technology	83.00	4.36	10.20	2.41	100
Taught course for a higher degree					
Medicine & dentistry	80.00	10.95	8.38	0.67	100
Subjects allied to medicine	81.78	4.61	10.02	3.62	100
Biological sciences	86.08	6.14	6.23	1.64	100
Veterinary science	91.67	0	0	0	100
Physical sciences	81.81	8.42	7.26	2.42	100
Mathematical sciences	81.11	0.76	17.63	0	100
Computer science	84.46	3.85	8.11	3.58	100
Engineering & technology	87.80	2.89	7.83	1.48	100
Other postgraduate					
Education	82.79	4.20	10.96	2.04	100
% of the UK population	83.67	4.93	8.53	2.87	

Source HESA publications

Table 3A. Relationship between region of domicile and region of study, 2001/02

Region of domicile	Total home domiciled HE students (thousands)	Percentage of all	Percentage studying within region of domicile	Percentage studying within region of domicile or contiguous regions
East	125.6	7.7%	59%	76%
East Midlands	99.3	6.1%	43%	80%
London	231.8	14.2%	66%	84%
North East	66.5	4.1%	63%	91%
North West	178.1	10.9%	68%	90%
Northern Ireland	62.5	3.8%	78%	78%
Scotland	212.6	13.0%	89%	96%
South East	209.4	12.8%	59%	87%
South West	115.0	7.0%	55%	79%
Wales	84.1	5.1%	65%	87%
West Midlands	130.0	7.9%	61%	82%
Yorkshire and the Humber	120.4	7.4%	50%	87%
All	1,635.0	100.0%	64%	86%

Includes **all** UK-domiciled Higher education students (in both higher and further education institutions and study both full-time and part-time)

Source: Patterns of higher education institutions in the UK: Fourth Report (Universities UK September 2004) - data from Regional Trends 37, ONS

Table 3B Regional mobility of students engaged in full-time employment after graduation

	Region of employment	
	In same region	In same or contiguous region
Region of study		
East	45%	88%
East Midlands	37%	80%
London	68%	91%
North East	50%	70%
North West	61%	83%
Northern Ireland	95%	n/a
Scotland	84%	87%
South East	51%	95%
South West	48%	74%
Wales	55%	78%
West Midlands	50%	71%
Yorkshire and the Humber	45%	71%

First destination of graduates from full-time study

Source: Patterns of higher education institutions in the UK: Fourth Report (Universities UK September 2004) - data from customised HESA dataset

Table 4. Grant and HE Funding Council funding of research at Universities

Grant / Contract Funding 2003/04

	Population mid 2002 ,000	%of UK population	OST Research Councils £k	UK Charities £k	UK Gov, NHS etc £k	UK industry £k	EU £k	Other overseas £k	Other £k	Total £k
England	49,561	83.67	692,203	576,172	403,368	204,471	172,345	124,371	38,963	2,211,493
Scotland	5,055	8.53	104,335	92,382	72,667	31,031	31,644	15,194	7,123	355,136
Wales	2,918	4.93	28,840	16,608	24,545	9,488	9,108	2,047	6,237	96,873
N Ireland	1,697	2.87	7,786	6,194	21,465	2,728	8,230	1,071	3,615	51,089
Per 1,000 population										
England			13.97	11.63	8.14	4.13	3.48	2.51	0.79	44.62
Scotland			20.64	18.28	14.38	6.14	6.26	3.01	1.41	70.25
Wales			9.88	5.69	8.41	3.25	3.12	0.70	2.14	33.20
N Ireland			4.59	3.65	12.65	1.61	4.85	0.63	2.13	30.11

Funding Council Funding

	Population mid 2002 ,000	1994-95 £k	1995-96 £k	1996-97 £k	1997-98 £k	1998-1999 £k	1999-2000 £k	2000-01 £k	2001-02 £k	2002-03 £k
England	49,856	807000	809300	819400	827000	882,000	928,000	1,029,000	1,206,000	1,335,000
Scotland	5,057	128200	128000	128500	130200	128,200	140,600	150,300	158,100	169,100
Wales	2,938	50700	49500	49900	48000	49,200	60,600	65,400	75,100	82,800
N Ireland	1,697	31100	30900	29700	27500	25,700	27,900	31,300	34,300	39,500
Per 1,000 population										
England		16.1866	16.2328	16.4353	16.5878	17.6909	18.6136	20.6394	24.1897	26.7771
Scotland		25.3510	25.3114	25.4103	25.7465	25.3510	27.8030	29.7212	31.2636	33.4388
Wales		17.2566	16.8482	16.9843	16.3376	16.7461	20.6263	22.2600	25.5616	28.1824
N Ireland		18.3265	18.2086	17.5015	16.2051	15.1444	16.4408	18.4443	20.2121	23.2764

Table 5: Units of Assessment Results in the 2001 Research Assessment Exercise

5*		5*		
Allied to Medicine (19)		Celtic studies (7)	Celtic studies (16)	
Civil Eng (14)	Civil Eng (20)	Education (22)		
Politics & International Studies (15)		English (37)		
Psychology (27)	Psychology (38)	Theology (9)		
Town & Country Planning (33)				

5		5		
Agriculture (23)		Archaeology (18)		
Built Environment (19)		Art and Design (7)		
Clinical Lab Studies (38)		Celtic Studies (5)	Celtic studies (8	Celtic Studies (12)
Computer Science (12)	Computer Science (20)	Communications, Media studies (16)		
Earth Science (27)		Drama (14)		
Electrical & Electronic Eng (22)		European Studies (29)		
Mammalian Biology (28)		English (6)		
Pharmacy (26)		German & Scan (8)		
Physics (12)	Physics (23)	History (27)		
Pure Maths (12)	Pure Maths (17)	Iberian Lang (7)		
Accounting & Finance (9)		Music (8)	Music (8)	
Business Man (85)		Sports related (11)		
Law (34)		Theology (15)		
Social Work (10)				
Sociology (33)				

Figures in parenthesis are research active staff in unit rounded to nearest whole number.

4

Applied maths (6)
Biological Sciences (29)
Clinical Dentistry (38)
Chemistry (12) Chemistry (35)
Community based Clinical (53)
Computer Science (33) Computer Science (14)
Ecological & Environment Bio (32)
Environment Science (34)
Electrical & Electronic Eng (16) Electrical and Electronic (11)
Geography (24) Geography (35)
Hospital based clinical (97)
Mechanical & Aeronaut Eng (31) Mechanical & Aero (18)
Nursing (14)
Physics (15)
Psychology (15)
Economics (16)

3a

Agriculture (29)
Biological Sciences (36) Biological Sciences (27)
Chemistry (two institutions combined) (11+12)
Mech, Aerol & Manufacturing Eng (2)
Pure Maths (7)
Business Management (17)
Social Policy & Admin (24) Social Policy & Admin (15)
Politics (15) Social Policy & Admin (20)

3b

Allied to medicine (9)
Food sciences (5)
Nursing (21) Nursing (26)
Pure Maths (3)
Built Environment (23)
Business Management (28) Business Management (14)

4

Archaeology (17)
Art and Design (35)
Classics (9)
English (12) English (17 English (15) English (16)
French (2) French (2)
German & Scandinavian Lang (2)
History (13) History (20) History (21) History (6)
Italian (4)
Law (22)
Theology (9)

3a

American Studies (7)
Anthropology (9) Anthropology (5)
Archaeology (8)
Art & Design (6)
Classics (5)
Education (10) Education (24) Education (12)
French (3)
History (8)
German & Scand (3)
Iberian Lang (2)
Law (13)
Library rel (16)
Middle Eastern Studies (1)
Philosophy (7) Philosophy (2)
Sports related (9)

3b

Archaeology (3)
Art& Design (9)
Celtic Studies (3)
French (1)
Linguistics (7)
Sports related (10)

Definitions of the RAE Ratings 5* to 3b

5* (five star)
Quality that equates to attainable levels of international excellence in more than half of the research activity submitted and attainable levels of national excellence in the remainder.

5
Quality that equates to attainable levels of international excellence in up to half of the research activity submitted and to attainable levels of national excellence in virtually all of the remainder.

4
Quality that equates to attainable levels of national excellence in virtually all of the research activity submitted, showing some evidence of international excellence.

3a
Quality that equates to attainable levels of national excellence in over two-thirds of the research activity submitted, possibly showing evidence of international excellence.

3b
Quality that equates to attainable levels of national excellence in more than half of the research activity submitted.