

Science & Innovation Investment Framework

2004 - 2014

Progress against Indicators

July 2006

2006 marks the first year of reporting data on the suite of indicators set out in the Progress Against Indicators Report, July 2005. Hence this report provides baseline data from which progress can be measured in future years.

WORLD CLASS EXCELLENCE

Overall assessment:

The UK continues to perform strongly in terms of research output and quality, second in the world to the US, and demonstrates a good balance of strength in its performance across disciplines. The publication of the consultation on the reform of research assessment and funding on 13 June 2006 will be an important source of information to progress work on the national and international benchmarking of UK universities and public research centres.

Table 1: Progress on World class excellence

*** denotes the indicator is also used for PSA reporting**

	Indicator	Goal	Progress
1.1*	Share of world citations, overall and in each of the broad nine science disciplines	Maintain overall ranking as second to the USA, and current lead against rest of G8 ¹ . Close gap with leading two nations where current UK performance is third or lower	In the G8, the UK is 2 nd to the USA in terms of national share of global citations for 2004, with about 12% of global citations. It is 2 nd to the USA on citation count in 7 of 9 research fields, and 8 out of 10 research fields including the newly added humanities field. The UK is currently 4 th in physical sciences and engineering (to the USA, Germany and Japan), with a slight improvement in citation share from 2003. The recent strong performance of non-G8 countries should be noted. In world rankings, the UK's rankings change slightly. It remains 2 nd to the USA in terms of national share of global citations for 2004, but is 2 nd to the USA on citation count in 6 of 9 research fields, and 7 out of 10 research fields including the newly added humanities field. The reason for the change is while the UK is currently 2 nd to the USA in mathematics in the G8, it is 3 rd in the world to the USA and China.
1.2*	Citations per unit GDP	Maintain UK lead in impact and research productivity	The UK led the G8 in 2004 (0.12), with Canada the nearest competitor.
1.3*	Citations per researcher		The UK was second to Italy in the G8 for 2003 (11.09), but Italy's performance may be due to anomalous data.
1.4	Citations per unit of research spend in higher education		The UK led the G8 in 2004, (29.48), with Russia the nearest competitor.

¹ The report commissioned to produce this data uses a group of 25 countries for international comparisons, which account for more than 95% of the world's relatively highly cited papers over the last 20 years. It includes the full G8, a combination of some larger and OECD countries from different continents with research bases both similar and contrasting in structure to the UK, with a spread of smaller nations with active and rapidly growing research bases with specific strengths. The list includes China and India.

Table 1: Progress on World class excellence			
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	Indicator	Goal	Progress
1.5	Benchmark research strength and impact of top ten UK universities against international peers	UK to retain sufficient world class centres of research excellence to continue to attract internationally mobile R&D investment and highly skilled people, to support delivery of overall goal of higher R&D intensity and innovation impact	One of the main aims of the consultation on the reform of research assessment and funding published on 13 June 2006 is to provide the information necessary for the national and international benchmarking of UK universities. The consultation document is available online at http://www.dfes.gov.uk/consultations Work on benchmarking public research centres will also be considered drawing on this information.
1.6	Benchmark research strength and impact of top ten UK public research centres against international peers within the relevant subject area		
1.7	Benchmark research strength and impact of top ten UK universities against second tier of next twenty institutions	Ensure that leading UK centres are complemented by a broader network of strong institutions, departments and centres, to create a dynamic and competitive market for research funding and people.	See 1.5 and 1.6 above.
1.8	Benchmark research strength and impact of top ten research departments/centres in each broad discipline against second tier of next twenty departments/centres		

FINANCIAL SUSTAINABILITY

Overall assessment:

As most assessments of financial sustainability use retrospective data, the impact of recent policy, e.g. Research Councils to pay 80% Full Economic Cost, will take some time to make an impact on the metrics used. The approaches to monitoring have therefore been adapted to try and include prospective elements too. Overall the position appears to be stable or showing evidence of improvement. The baseline established this year should, with the investments that have been made, show considerable improvement over the coming years.

Table 2 : Progress on Financial sustainability * denotes the indicator is also used for PSA reporting			
	Indicator	Goal	Progress
2.1*	The funding councils assess a range of indicators of sustainability annually relating to income/expenditure, people and buildings ² .	Ensure a financially sustainable level of activity by early in 2010 decade, avoiding over-reliance on non-research incomes and under-investment in research infrastructure	The first report from the funding councils shows the majority of universities on an improving trajectory with reasonable plans <ul style="list-style-type: none"> • The adjusted operating deficit in 2003/4 was 7% of income reduced from 8% in 2001/2 • 8% of institutions receiving 0.7% of research funds gave some cause for concern in 2005/6, none of which were research intensive institutions. The report is being published by the Research Base Funders Forum and Funding Councils.
2.2	Share of full economic costs paid by Research Councils for projects conducted in universities	Research Councils to provide close to full economic cost of university projects	From September 05, the Research Councils have been paying 80% of full economic costs on all successful grant applications. The Research Councils carried out an initial review of implementation in May 2006 – which said it was too early to see the effects of increased funding implementation. As part of the regular reporting cycle OSI and Research Councils will monitor progress.
2.3*	Research costs versus revenues (public and private) across public sector research establishments	Ensure a financially sustainable level of activity across by early in 2010 decade, avoiding over-reliance on non-research incomes and under-investment in research infrastructure	Completed first annual monitoring exercise of PSRE sustainability, which will provide a benchmark to assess progress in future years and also help to provide PSREs and their parent departments with information to assess the investments they need to make to maintain sustainability.

² This is considered alongside universities ‘sustainability frameworks’ describing how universities intend to progress towards sustainability to arrive at an overall assessment.

RESPONSIVENESS

Overall assessment:

There are positive trends in knowledge transfer in the university sector, with continued growth in the number of patent applications and income from contract research, and an increase in licence income (indicators 3.2-3.4). Income from spin-off companies has increased, though the number of spin-off companies has decreased due to the effects of legislation (indicator 3.6). The indicators for Public Sector Research Establishments (PSREs) are more mixed. The PSRE data should, however, be treated with caution given it is only the second year's survey and it is therefore not possible to establish whether there are any patterns. Also these changes are largely due to the actions of a relatively small number of PSREs, which have a disproportionately large impact.

Table 3 : Progress on Responsiveness

* denotes the indicator is also used for PSA reporting

	Indicator	Goal	Progress
3.1	Research Councils' engagement with business and public service R&D users in design, co-funding and delivery of R&D programmes	Research Councils' programmes more strongly influenced by and delivered in partnership with end users of research	Each Research Council has developed metrics to measure their engagement with business and public service R&D users as part of the new Performance Management System. The Research Councils are to publish data on their metrics later this year.
3.2*	The quantity of patent applications and grants from higher education institutions and public sector research establishments, relative to total research activity	Overall improvement in performance against these metrics, towards world-leading benchmarks	Latest data (covering 2003-04) indicates a 86% increase in number of patent applications and 146% increase in number of patents granted annually as compared to 1999-00. Comparisons with the US indicate that UK HEIs produce roughly equivalent numbers of patents per £1m of research. On PSREs the second annual survey indicates a fall of 8% in the number of patent applications and a fall of 48% in the number of applications granted from 2003-04 to 2004-05.
3.3*	The quantity and value of HEI and PSRE intellectual property licences, relative to total research activity		Latest data (covering 2003-04) indicates a 288% increase in number of licenses and options granted and 64% increase in gross income from IP since 1999-00. Comparisons with the US indicate that UK HEIs produce roughly equivalent numbers of licensing agreements per £1m of research, but significantly lower income from intellectual property licensing agreements. On PSREs the second annual survey indicates a fall of 53% in the number of licenses executed but a rise of 32% in the income from licensing from 2003-04 to 2004-05.
3.4*	HEI and PSRE income from business for contract research, relative to total research activity	Overall improvement in performance against these metrics,	Latest data (covering 2003-04) indicates a 18% increase in income from contract research as compared to 1999-00. Comparisons with the US indicate that UK HEIs receive significantly lower income from business for contract research. On PSREs the second annual survey indicates a rise of 47% in income from business from 2003-04 to 2004-05.

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	Indicator	Goal	Progress
3.5	Research publications jointly authored between science base and industry, relative to total research activity	towards world-leading benchmarks	This indicator is currently not being collected. Further research has indicated that collecting this data would involve significant costs and would not be a reliable indicator of research base-business interactions as economically significant collaborative research is likely to be covered by non-disclosure agreements. As an alternative OSI are considering using information on the number of joint ventures as a more useful indicator of university business interactions.
3.6*	Quantity and economic value of spin-outs companies from HEIs and PSREs, relative to total research activity	Overall improvement in performance against these metrics, towards world-leading benchmarks	Whilst the numbers of new spin offs has declined in 2003/04 (down from 197 to 167) this can still be attributed to the impact of schedule 22 of the 2003 Finance Act. However there seems to be more flexibility in HEIs approaches to marketing the fruits of their research. There has been an increase in the numbers of employees (up from 12,800 to 15,200) while aggregate turnover has increased from £358 million to £448 million. Early tentative comparisons with the US indicate that UK HEIs produce a far higher number of spin outs per £1m of research. On PSREs the second annual survey indicates a fall of 4% in the number of spin outs from 2003-04 to 2004-05.
3.7	Level of business confidence in university knowledge transfer activities	Continued improvement	OSI have examined the possibility of building a knowledge base of business confidence metrics through meetings with business representatives and stakeholders, but have serious concerns over how meaningful or robust indicators would be. OSI are looking at alternative indicators and data collection methods.

BUSINESS INVESTMENT AND ENGAGEMENT

Overall assessment:

To comprehensively assess the overall contribution of business investment and engagement to the 10-year Science and Innovation Framework, there is a need for a broad range of indicators on Business R&D and innovation outcomes. The Government recognises that there is a need for current reporting requirements to include more information on the outputs of innovation. OSI will review the scope and scale of coverage of innovation in the Progress Against Indicators Report (as part of the work in PSA target setting for Spending Review 07), to increase the emphasis on outputs of innovation. The DTI Occasional Paper 6 "Innovation in the UK: Indicators and Insights" provides a detailed analysis of the latest UK Innovation Survey results, from which potential indicators could be drawn from.

Table 4 : Progress on Business investment and engagement

* denotes the indicator is also used for PSA reporting

	Indicator	Goal	Progress																																			
4.1*	Business investment in R&D as a share of GDP	Goal set for Gross Expenditure on R&D implies an increase in Business investment from 1¼ per cent towards 1.7 per cent over the decade	The latest figure for Business Enterprise Research and Development Expenditure (BERD) is 1.15% (2004). While this figure is disappointing, the trend in the real value of BERD has been positive for several years.																																			
4.2	Business R&D intensity by sector	Narrow the gap in performance between the UK and leading international competitors in each sector, reflecting the size distribution of companies in the UK	<p>The table below shows the ratio of R&D to value added by sector for 2002 (This updates Table 3 in DTI's "R&D Intensive Businesses in the UK", Economics Paper No 11)</p> <table border="1"> <thead> <tr> <th></th> <th>France</th> <th>Germany</th> <th>UK</th> <th>USA</th> </tr> </thead> <tbody> <tr> <td>TOTAL MANUFACTURING</td> <td>7.4</td> <td>7.7</td> <td>6.9</td> <td>7.8</td> </tr> <tr> <td> High tech</td> <td>28.3</td> <td>22.6</td> <td>26.7</td> <td>29.5</td> </tr> <tr> <td> medium high tech</td> <td>10.9</td> <td>11.1</td> <td>10.3</td> <td>9.8</td> </tr> <tr> <td> medium - low tech</td> <td>2.5</td> <td>1.8</td> <td>1.6</td> <td>1.7</td> </tr> <tr> <td> low tech</td> <td>1.1</td> <td>0.8</td> <td>0.7</td> <td>1.6</td> </tr> <tr> <td>TOTAL SERVICES</td> <td>0.2</td> <td>0.2</td> <td>0.4</td> <td>*</td> </tr> </tbody> </table> <p>* Not calculated because US services sector data is not comparable with that of other OECD countries</p>		France	Germany	UK	USA	TOTAL MANUFACTURING	7.4	7.7	6.9	7.8	High tech	28.3	22.6	26.7	29.5	medium high tech	10.9	11.1	10.3	9.8	medium - low tech	2.5	1.8	1.6	1.7	low tech	1.1	0.8	0.7	1.6	TOTAL SERVICES	0.2	0.2	0.4	*
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	Indicator	Goal	Progress
4.3*	Investment in innovation-directed activities, including R&D, as a percentage of business turnover	Continued increase in investment in innovation directed activities ³	The latest UK Innovation Survey data for 2005 show that investment in innovation directed activities is around a fifth to a quarter of turnover for an innovation active enterprise. A range has been given, rather than a single figure, due to sensitivity of the data.
4.4*	Proportion of businesses that collaborate with HEIs and PSREs	Increase to reach leading position in Europe ⁴	The latest UK innovation Survey data for 2005 show that 12% of businesses collaborate on innovation and of these, 33% collaborate directly with HEIs and 31% with PSREs. DTI Occasional Paper 6 "Innovation in the UK: Indicators and Insights" provides detailed analysis of university-business collaboration. International data is not yet available as part of the wider Community Innovation Survey, but should be available before the end of 2006.
4.5*	Patents granted per capita	Narrow the gap in performance between the UK and leading international competitors in each sector	An assessment of patenting performance was given in the DTI's Annual UK Productivity and Competitiveness Indicators Report (March 2006). Using patents awarded by the US Patent and Trademark Office, the UK and France have a similar patenting performance (around 60 per million of population), but Germany and the US are much further ahead (with around 130 and 300 per million of population respectively). In spite of this relatively weak patenting performance, the UK performs much more strongly in terms of the protection of non-technological intellectual property, and UK firms use alternative methods of protection to patenting. OSI are investigating using a broader indicator that captures these effects.

³ In the previous report, this included the goal of "Narrow the gap in performance between the UK and leading international competitors in each sector, reflecting the size distribution of companies in the UK." The Community Innovation Survey gathers this data on a different basis across different European countries, so the data is not strictly comparable. Hence the goal has been modified accordingly.

⁴ In the previous report this included the goal of "and close gap with the US". However, appropriate comparisons with the US are problematic, and there is little supporting evidence that a gap exists with the US. Hence the goal has been revised accordingly.

Table 4 : Progress on Business investment and engagement			
* denotes the indicator is also used for PSA reporting			
	Indicator	Goal	Progress
4.6*	Business innovation performance, as measured by a basket of indicators ⁵	Narrow the gap in performance between the UK and leading international competitors in each sector	<p>The latest UK innovation Survey data for 2005 shows that:</p> <ul style="list-style-type: none"> • 25% of businesses are product (goods and services) innovators, 59% of which have introduced new products to market; • 16% of businesses are process innovators, 30% of which have introduced new processes to their industry; • 57% of businesses are innovation active; • 7% of employees are educated at degree level in Science and Engineering subjects, this increases to 9% amongst innovation active firms. • DTI Occasional Paper 6 "Innovation in the UK: Indicators and Insights" gives more detail on breakdowns by sector. <p>The numbers in the first three bullet points differ slightly to those in the relevant section of the Annual report, as the numbers in the Annual report have been adjusted for comparability to the 2001 survey - the number of sectors covered was substantially increased in the 2005 survey. The numbers above, however, will be used as baseline data for comparisons with future surveys. As with indicator 4.4, international data is not yet available as part of the wider Community Innovation Survey, but should be available before the end of 2006.</p>

⁵ The basket, as set out in the PSA technical note, comprises indicators which are from the Community Innovation Survey, including indicators 4.3, 4.4 and the following: share of firms which had introduced a new product, service or process improvement; share of firms which are 'innovation active'; employment of qualified scientists and engineers in business.

SUPPLY OF SCIENTISTS, ENGINEERS, and TECHNOLOGISTS

Overall assessment:

The overall position of the UK in terms of its stock of STEM skills is a strong one. The UK compares favourably with other OECD countries in the supply of STEM skills and there are signs that the UK's relative position has recently improved further. There is a steady increase in the stocks of these skills and a relatively constant flow of them into the working-age population.

Table 5 : Progress on Supply of scientists, engineers and technologists * denotes the indicator is also used for PSA reporting			
	Indicator	Goal	Progress
5.1	Science GCSEs	Work with schools and others to continually improve the number of pupils getting at least level 6 at the end of Key Stage 3 (11-14 year olds) Continually improve the number of pupils achieving A*-B and A*-C in two GCSEs	Key results are (expressed as a percentage of all 15 year olds in schools): 50% of pupils achieved A*-C in 2005, up from 48% in 2004; and 52% achieved in mathematics, up from 50% in 2004. DfES drawing up implementation plans.
N E W	UK position in international comparisons of school science	Work with schools to further improve UK world class position in international comparisons of school science	DfES drawing up implementation plans.
5.2	Recruitment into science teacher training	To eliminate as far as possible the undershooting of the national Initial Teacher Training targets by 2007/08	2005/06 recruitment was 91% of the places available. This figure has risen from 88% in 2004/05. Teacher recruitment in the STEM subjects has risen for the sixth year in succession. There were over 7,500 recruits in these subjects in 2005/06, 70 per cent more than in 1999/2000. That does not include the rising numbers of graduate career-changers following employment-based training routes.
N E W	Recruitment, retraining and retention of specialist teachers	Step up so that targets by 2014 should be: 25% of science teachers have a physics specialism; 31% of science teachers have a chemistry specialism; 95% of maths lessons to be delivered by a maths specialist.	Research carried out by the NFER finds that in 2004/5 19% of physics teachers had a physics specialism (ie a degree of specialist initial teacher training qualification in physics). The corresponding figure for chemistry was 25%. National Statistics produced in 2002 through the Secondary Schools Curriculum and Staffing Survey showed that 92% of physics teachers and 93% of chemistry teachers held post-A Level qualifications in those subjects.

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	Indicator	Goal	Progress
5.3	SET participation at A-level and other level three equivalents	To increase the number of young people choosing to study these subjects. From 2006/7, to achieve year on year increases in the number of young people taking these subjects so that the target entries by 2014 are: Mathematics – 56,000 Chemistry 37,000; Physics – 35,000;	Entries into A-level Biological Sciences were up by 1,427 students to 45, 662 in 2005. Chemistry entries were up by 1,034 to 33,164 for 2005. Entries for physics were down by 506 to 24,094. In 2005 50,000 16-18 year olds attempted at least one VCE A (or DA) level in 2005. As a percentage of those young people who studied VCE or a Double Award in 2005, the cohort that studies science and engineering is 3.7%, an increase on 2004. For ICT the percentage decreased to 33.2%. DfES are in the process of drawing up implementation plans.
5.4	Post-16 learner success	To improve success rates in SET	In 2005, 240,000 16-18 year olds attempted at least one GCE A level; the percentage achieving A – E at A Level were: Biology 95.1% Chemistry 96.6% Physics 95.3%. Other science 96.0%.
5.5	Qualifications of the post 16 workforce	To achieve a fully professionally qualified FE and training workforce in post-16 SET teaching	Under Success for All, post-16 science teachers are eligible for a newly developed national coaching programme, specifically designed to train teachers to coach their peers in strategies for teaching science more effectively. In the first year of operation 269 science teachers have enrolled. Staff Individualised Record (SIR) data for 04/05 shows that 80% of the full time workforce and 60% of the part time workforce currently meet the 2006 90:60 interim qualification target.
5.6	Post 16 inspection results	To improve the number of institutions graded outstanding or good on the quality of SET teaching and learning	From 2005, there is less intense inspection of good provision, evidenced by internal quality assurance and achievement data. Individual areas of learning may not be inspected or graded at every provider, so data for the whole sector will not be available to support this indicator, though subject specific thematic reports will be produced by the Inspectorates. Ofsted are planning to do a thematic report on Science & Mathematics for post-16 this year.
5.7	Recruitment and retention of SET teachers in the post 16 sector	To reduce shortages	Research undertaken in 2005; results were published in November 2005 at http://www.dfes.gov.uk/rsgateway/DB/RRP/u014388/index.shtml . One element of the study focussed specifically on maths and science teachers and there is limited evidence of excessive vacancies compared to other subject areas.
5.8	Graduates in SET subjects	To increase the numbers qualifying	Between 2003/04 and 2004/05, UK undergraduate qualifications obtained in Physics and Chemistry rose by 5 per cent and 1 per cent, respectively. Biological Sciences increased by 8 per cent but stabilised (0 per cent growth) when not including

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			Sports Science and Psychology. Engineering and Technology qualifications fell slightly (by 1 per cent), Mathematical and Computer Sciences both decreased by 4 per cent.
5.9*	PhDs per head of population	To maintain international rank and remain above the average for the G8 countries over ten years	Latest data shows that the UK is ranked 2 nd within the G8, behind Germany (0.24 awards per 1000 population).
5.10	Quality of researchers	To increase the UK ranking of citation share in nine research fields to top three in G8 in 7-9 super units of assessment by 2006	See indicators 1.1 and 1.3 for 'World Class Excellence' section.
5.11	Proportion of minority ethnic and women participants in higher education	To increase at various levels, including among researchers, lecturers, professors and senior professors	<p>Female representation in HE for 2004/05: Subjects allied to medicine – 82.7% Veterinary science – 72.3% Biological sciences – 64.1% Agriculture & related subjects – 59.5% Medicine & dentistry – 57.6% Physical sciences – 41% Mathematical sciences – 38.2% Architecture, building & planning Architecture – 31.1% Computer science – 24% Engineering & technology – 15.4%</p> <p>UK domiciled HE students by ethnicity 2004/05 for SET*: White - 76.94% Black or Black British - Caribbean - 1.19% Black or Black British - African -3.41% Other Black background - 0.38% Asian or Asian British - Indian - 4.00% Asian or Asian British - Pakistani - 2.19% Asian or Asian British - Bangladeshi - 0.60% Chinese - 1.03% Other Asian background - 1.61% Other (including mixed) - 2.32% Unknown - 6.32%</p> <p>*SET covers: Medicine & dentistry; Subjects allied to medicine, Biological sciences, Veterinary science, Agriculture & related subjects, Physical sciences, Mathematical sciences, Computer science, Engineering & technology</p> <p>The data suggests that the total stock of SET graduates in the workforce is still disproportionately male. In 2004 64% of total SET graduates were male. Those SET subjects where women form the majority are predominantly in areas such as nursing or Psychology. Of 429,785 female SET HE students, over 48% were studying either Nursing or Psychology.</p>

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			A recent report for the Royal Society outlined that the most notably under-represented ethnic groups in SET occupations are the Bangladeshi population (1.6%) and the Black Caribbean population (2.3%). This was based on figures for those employed in SET for the period 2002/03
5.12	Recruitment and retention trends in HE institutions	To monitor with particular regard to shortages reported by the UCEA	The 2005 UCEA survey reports that institutions believe that the picture regarding recruitment and retention has largely remained the same over the last year. The group where shortages were experienced most commonly was amongst manual workers. The subject areas where academic recruitment shortages were reported are the same as in previous surveys: law, business & management, economics, accounting, computing/IT and health. Plans for the next survey are currently being discussed

PUBLIC ENGAGEMENT

Overall assessment:

Data from the 2005 MORI poll suggests the public have a positive view of science and scientists in general. But it also suggests that levels of trust in government and industry scientists and scientific advice is somewhat lower. **It should be noted that it is difficult to separate out public confidence in government science from public trust in government more generally** (MORI research suggests that levels of trust in government and journalists have remained around 20% in post war years).

Work progressing within government to strengthen the management of science and scientific advice indicates that government performance in this area continues to improve.

Table 6 : Progress on Public engagement			
No indicators are currently used for PSA reporting			
	Indicator	Goal	Progress
6.1	Independently measured trends in public attitudes towards key science and technology issues	Evidence of high and sustained levels of positive attitudes to science, engineering and technology	Data from 2005 Mori survey ⁶ show: 86% of adults think science makes a good contribution to society; 82% of adults think that science will make our lives easier; 70% of adults trust scientists to tell the truth.
6.2	Independently measured trends in public confidence in science and technology policy	Evidence of improvement in the level of public confidence in scientific advice from government	Data from 2005 Mori reports show: The public have retained a positive overall image of science (86%), but a negative perception of past government handling of a number of controversial issues (MMR and BSE in particular) has eroded trust in government advice and also in scientists. Levels of trust in government scientists to provide accurate information about scientific facts (14%) and industry scientists (13%) are considerably lower than those working for charities and universities (scoring 41% and 43% respectively). Although seven in ten people feel the media sensationalise their science coverage, a significant proportion (25%) still value newspapers and TV (42%) as sources of information, support or advice about science. Only 11% valued government to provide the same.

⁶ The survey will be repeated in 2008.

Table 6 : Progress on Public engagement			
No indicators are currently used for PSA reporting			
	Indicator	Goal	Progress
6.3	Acknowledgement and responsiveness to public concerns by policy-makers and scientists	Evidence of improvement	<p>Departmental performance on the use of science and scientific advice:</p> <p>S&I Assessments 4 Departments have completed their Science and Innovation Strategies, which will be used to inform Spending Review 07 (SR07) proposals by Departments; 5 Departments are very close to completing; and 2 Departments are unlikely to complete theirs in time for input to SR07. 3 Agencies (HSE/FSA/ Environment Agency) and 2 of the Devolved Administrations have also produced Science and Innovation Strategies.</p> <p>Appointment of Departmental Chief Scientific Advisers (CSAs) 10 Departments, 3 Agencies (FSA, HSE, Environment Agency) and 2 of the Devolved Administrations have appointed CSAs. 1 department (DCMS) is in the process of recruiting their CSA.</p> <p>The value of S&I strategies has become widely recognised, to the extent that some Agencies and Devolved Administrations have voluntarily undertaken their own. We have also seen Departments collaborating to benefit from the experience of "early adopters". In particular, Defra's CSA team has been very happy to inform the work of several other Departments. As the wider debate has matured about better integration of all evidential streams, Defra has led the way in creating a second-generation "Evidence and Innovation Strategy" which is now being looked at closely by OGDs, like DTI, to help further embed evidence-based policy-making.</p> <p>Science Reviews OSI conducts a rolling programme of authoritative and independent reviews of Government Departments. The reviews evaluate the quality, management and use of science in policy development and informing the work of the Departments. Departments currently under review are the Health and Safety Executive (HSE), the Office of the Deputy Prime Minister now the Department of Communities and Local Government (DCLG) and the Department of the Environment Food and Rural Affairs (DEFRA).</p> <p>Skills The Government CSA (GCSA) has now been established as the cross-government Head of Profession for Science and Engineering. As part of this, GCSA is responsible for the Professional Skills for Government (PSG) agenda for government scientists and engineers.</p> <p>Sir Brian Bender has also been appointed as Head of Policy Delivery across the Civil Service. As part of this, he is responsible for the PSG agenda for government policy experts.</p>

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	Indicator	Goal	Progress																																										
6.4	Trends in media coverage of science and technology issues	Evidence of broad and balanced coverage, with wide public engagement and confidence	<p>Media monitoring work from Cardiff University's School of Journalism, Media and Cultural Studies was commissioned to establish the breadth, balance and trends in media coverage of science and technology issues.</p> <p>Cardiff will report on a quarterly basis throughout 2006. The first report (covering January and February 2006) has now been completed. The report concluded a wide range of S&T issues were covered in the media, and that Government policy issues are as likely to serve as hooks for news stories as scientific research facilities.</p> <p>The top issues focussed on for this period, broken down by media type are:</p> <table border="1"> <thead> <tr> <th colspan="2">All Media</th> <th colspan="2">Radio Broadcast</th> <th colspan="2">Newspaper</th> </tr> <tr> <th>Topic/Subject</th> <th>Percent</th> <th>Topic/Subject</th> <th>Percent</th> <th>Topic/Subject</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Bird Flu</td> <td>11%</td> <td>Energy</td> <td>21%</td> <td>Bird Flu</td> <td>10%</td> </tr> <tr> <td>Animals</td> <td>9%</td> <td>Bird Flu</td> <td>17%</td> <td>Animals</td> <td>9%</td> </tr> <tr> <td>Energy</td> <td>8%</td> <td>Animals</td> <td>11%</td> <td>Interconnectivity</td> <td>8%</td> </tr> </tbody> </table> <p>Television Broadcasts</p> <table border="1"> <thead> <tr> <th>Topic/Subject</th> <th>Percent</th> <th>Percentage of Air time</th> </tr> </thead> <tbody> <tr> <td>Bird Flu</td> <td>35%</td> <td>30%</td> </tr> <tr> <td>Energy</td> <td>21%</td> <td>21%</td> </tr> <tr> <td>Climate Change</td> <td>9%</td> <td>18%</td> </tr> </tbody> </table> <p>Animals featured highly on the subject list because of the whale in the Thames and the debate on animal testing. The arrival of Bird Flu in Europe made this the most frequent topic for February.</p> <p>Although climate change accounted for fewer TV stories than energy it had a similar amount of air time. This suggests that climate change was being debated, and other issues were being reported.</p>	All Media		Radio Broadcast		Newspaper		Topic/Subject	Percent	Topic/Subject	Percent	Topic/Subject	Percent	Bird Flu	11%	Energy	21%	Bird Flu	10%	Animals	9%	Bird Flu	17%	Animals	9%	Energy	8%	Animals	11%	Interconnectivity	8%	Topic/Subject	Percent	Percentage of Air time	Bird Flu	35%	30%	Energy	21%	21%	Climate Change	9%	18%
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DATA SOURCES

Table 1: World class excellence * denotes the indicator is also used for PSA reporting		
	Indicator	Data source
1.1*	Share of world citations, overall and in each of the broad nine science disciplines	Public Service Agreement Target Metrics for the UK Research Base, December 2005, http://www.ost.gov.uk/research/funding/psa_metrics_report.pdf Indicators 3.01, 3.02, 3.03
1.2*	Citations per unit GDP	Public Service Agreement Target Metrics for the UK Research Base, December 2005 Indicator 4.04
1.3*	Citations per researcher	Public Service Agreement Target Metrics for the UK Research Base, December 2005 Indicator 5.03
1.4	Citations per unit of research spend in higher education	Public Service Agreement Target Metrics for the UK Research Base, December 2005 Indicator 4.07

Table 2 : Financial sustainability * denotes the indicator is also used for PSA reporting		
	Indicator	Data source
2.1*	The funding councils assess a range of indicators of sustainability annually relating to income/expenditure, people and buildings. This is considered alongside universities 'sustainability frameworks' describing how universities intend to progress towards sustainability to arrive at an overall assessment	This indicator has been amended following the work of the funding councils, on behalf of the Research Base Funders Forum, to assess institutional sustainability. The assessment uses forward plans and 'trigger metrics' derived from Higher Education Statistics Agency data and additional information from Higher Education Institutions. The output of this assessment is a report on the state of the sector: <i>Monitoring financial sustainability in UK HEIs</i> published at http://www.dti.gov.uk/science/science-funding/Funders_Forum/index.html . The indicator chosen reflects the overall financial health of institutions recognising that viable research enterprises must also be sustainable in their other activities.
2.3*	Research costs versus revenues (public and private) across public sector research establishments.	Benchmark indicators were developed for PSREs by an external consultant.

Table 3 : Responsiveness * denotes the indicator is also used for PSA reporting		
	Indicator	Data source
3.1	Research Councils' engagement with business and public service R&D users in design, co-funding and delivery of R&D programmes	First annual report of Research Councils' Performance Management System, Forthcoming, 2006
3.2*	The quantity of patent applications and grants from higher education institutions and public sector research establishments, relative to total research activity	For 3.2-3.4 and 3.6: <ul style="list-style-type: none"> Higher Education-Business and Community Interaction Survey (HE-BCI), available annually

Table 3 : Responsiveness		
* denotes the indicator is also used for PSA reporting		
	Indicator	Data source
3.3*	The quantity and value of HEI and PSRE intellectual property licences, relative to total research activity	For 3.2-3.4 and 3.6 cont <ul style="list-style-type: none"> Public Sector Research Establishments survey, available annually US Association of University Technology Managers survey
3.4*	HEI and PSRE income from business for contract research, relative to total research activity	
3.6*	Quantity and economic value of spin-outs companies from HEIs and PSREs, relative to total research activity	

Table 4 : Business investment and engagement		
* denotes the indicator is also used for PSA reporting		
	Indicator	Data source
4.1*	Business investment in R&D as a share of GDP	ONS (available on an annual basis) http://www.statistics.gov.uk
4.2	Business R&D intensity by sector	ONS “MA 14 – Business Monitor” publication, OECD STAN database
4.3*	Investment in innovation-directed activities, including R&D, as a percentage of business turnover	Community Innovation Survey (CIS) (every four years, next, CIS 4 to be published in 2006, covering 2003-04) http://www.cordis.lu/innovation-smes/src/cis.htm The survey covers EEA countries only. UK data was published in early 2006, but data for other EEA countries are not yet available.
4.4*	Proportion of businesses that collaborate with HEIs and PSREs	
4.5*	Patents granted per capita	DTI’s Annual UK Productivity and Competitiveness Indicators Report (March 2006); Figure 2.4, http://www.dti.gov.uk/files/file28173.pdf
4.6*	Business innovation performance, as measured by basket of indicators	As for 4.3 - 4.4

Table 5 : Supply of scientists, engineers and technologists		
* denotes the indicator is also used for PSA reporting		
	Indicator	Data source
5.1	Science GCSEs	DfES annual Statistical First Release (SFR). 2004 GCSE statistics published in June 2005 at http://www.dfes.gov.uk/rsgateway/DB/SFR/s000585/index.shtml
5.2	Recruitment into science teacher training	The Training and Development Agency for Schools (TDA) annual survey of recruitment to initial teacher training. Next one to take place in October 2006, reporting by November 2006.
5.3	SET participation at A-level and other level three equivalents	DfES/Assessment and Qualifications Alliance (AQA)/UCAS
5.4	Post-16 learner success	Combination of the Office for Standards in Education (OfSTED /LEA and official exam board data.
5.5	Qualifications of the post 16 workforce	Learning and Skills Council Staff Individualised Record (SIR). The LSC SIR Data for 2005/06 will be available in February 2007.
5.7	Recruitment and retention of SET teachers in the post 16	DfES commissioned research by York Consulting assisted by MORI.

Table 5 : Supply of scientists, engineers and technologists		
* denotes the indicator is also used for PSA reporting		
	Indicator	Data source
	sector	
5.8	Graduates in SET subjects	Higher Education Statistics Agency (HESA) individualised student record January 2006. Comparisons cover HE qualifications obtained by UK domiciles at UK HE institutions. Figures for all undergraduate qualifications are included but exclude the Open University. Subject of study is defined using the Joint Academic Coding system (JACS), which is based upon the proportion of time spent on each subject.
5.9*	PhDs per head of population	Public Service Agreement Target Metrics for the UK Research Base, December 2005, http://www.ost.gov.uk/research/funding/psa_metrics_report.pdf Indicator 2.02
5.10	Quality of researchers	See data sources for indicators 1.1 and 1.3 for 'World Class Excellence' section.
5.11	Proportion of minority ethnic and women participants in higher education	HESA data for 2004/05. Royal Society, "SET and the UK's ethnic minority population," April 2005. http://www.royalsoc.ac.uk/page.asp?id=3140
5.12	Recruitment and retention trends in HE institutions	University and Colleges Employer Association (UCEA) annual reports, latest published http://www.ucea.ac.uk/report_recruitment_retention_staff_he2003.html

Table 6 : Public engagement		
No indicators are currently used for PSA reporting		
	Indicator	Data source
6.1	Independently measured trends in public attitudes towards key science and technology issues	MORI survey 2005.
6.2	Independently measured trends in public confidence in science and technology policy	MORI survey 2005
6.3	Acknowledgement and responsiveness to public concerns by policy-makers and scientists	Departmental science reviews/ Science & Innovation Assessments/ Co-ordination of Research and Analysis Group (CRAG) assessments.
6.4	Trends in media coverage of science and technology issues	Cardiff University report, first quarter 2006.