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Research Excellence Framework 2014:

Overview report by Main Panel C and Sub-panels 16 to 26

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REF2014

Main Panel C

Introduction

1. The purpose of this report is to provide an overview of the submissions to Main Panel C in REF2014, and the results of our assessments. As well as providing an overview of the data, it reflects on our overall impressions of the submissions, provides feedback on key aspects, particularly impact, which has been assessed for the first time, and enables each sub-panel to reflect on the research strengths and changes since the previous Research Assessment Exercise (RAE2008) evidenced in the submissions which it received for review.
2. The Units of Assessment (UOAs) within Main Panel C received for assessment more than 52,000 research outputs, 2,652 impact case studies and templates, and 612 environment templates. The main panel acknowledges the immense amount of effort involved for units in institutions in preparing their submissions, as well as the tremendously hard work of the sub-panels in assessing the material submitted. It is aware that the introduction of impact as a new aspect of the assessment process brought a new and additional challenge.
3. Comprising 11 UOAs, Main Panel C covered a diverse range of disciplines and research areas. In addition to those disciplines conventionally regarded as core social sciences, it included sub-panels whose reach stretched through design and engineering (for example UOA 16 (Architecture, Planning and Built Environment)), physical sciences (for example UOA 17 (Geography and Archaeology)), humanities (for example UOA 20 (Law)) or biomechanics and medicine (for example UOA 26 (Sport and Exercise Sciences, Leisure and Tourism)). This was reflected in the wide range of theoretical and empirical methodologies that were found in the work submitted to all sub-panels. It encompassed both qualitative and quantitative social science, scientific methodologies used in the biological and physical sciences, along with scholarly approaches associated with the humanities.
4. The iterative process of appointing members and assessors to sub-panels, both before and after submissions had been received, ensured that all work submitted in the 11 UOAs was assessed by relevant experts and in its own terms. The membership of the main and sub-panels is detailed at www.ref.ac.uk/panels/panelmembership/.
5. The overall impression of the main panel and its sub-panels is that the research outputs and descriptions of the research environment submitted for assessment were of higher quality than in previous exercises. The individual elements of the assessment are discussed in more detail below. The overall picture has also been improved by the extremely high quality impact submissions. The main panel noted that, at the level of a panel as a whole, there was broad consistency in the relationship between the sub-profiles for outputs, impact and environment; generally the quality scores for impact and environment were higher than that for outputs, the reasons for which are explored in more detail below. However there were individual submissions where the relationship between the three elements did not follow this general pattern.
6. The main panel noted that 95 per cent (580 out of 612) of individual submissions to the 11 sub-panels were awarded some 4* in their overall profiles, which is an extremely encouraging indication of the resilience and strength in depth of the social sciences, and other disciplines covered by this main panel, within the UK. Furthermore, environment templates provided clear evidence of many research environments that were conducive to producing research of world-leading quality in terms of their vitality and sustainability and which have improved as a result of investment by institutions since RAE2008. The main panel acknowledges that some of the strategies and support in place for producing excellent research outputs will take full effect in the

coming period.

7. There was a great deal of discussion in the sector when the make-up of the main and sub-panels was announced. UOAs that were formed by amalgamating previously separate ones from RAE2008 worked well. Submissions in the sub-panels covered by Main Panel C varied in size and volume. The largest was in UOA 19 (Business and Management Studies), with 101 submissions ranging from the very small with a handful of researchers, to very large with more than 100 full-time equivalent (FTE) staff. Larger sub-panel size, per se, was not found to be a barrier to effective meetings, which have been co-operative, notwithstanding the sheer volume of work involved for certain sub-panels which required a high degree of collegiality and agile working practices to cope with the diversity of submissions. Furthermore, grouping a range of disciplines into a larger main panel has enabled the development of a strong peer group which has allowed sub-panel chairs to calibrate judgements, share best practice and also make comparisons across a very broad range of material. The main panel has found that this has brought strength and confidence to its quality assurance role, ensuring consistency of approach and judgements.

8. The inclusion of both international and user members in the main panel, from the start of the criteria setting phase and throughout the assessment phase, has also enhanced the confidence with which it has fulfilled its advisory and quality assurance roles. These members have played an extremely active role in the work of the main panel, and their advice has been invaluable. Each sub-panel has also had the benefit of its own user members and assessors to support the assessment of impact. They have also had output assessors to support the assessment of research outputs, warranted either by the volume of outputs in a particular area or to provide additional expertise. In contrast to the RAE2008, where additional advisors acted somewhat at 'arms-length', impact and output assessors were full members of the sub-panels for those meetings which they attended.

9. The main panel and its sub-panels received outstanding support from four advisers and four secretaries each seconded from a UK higher education institution (HEI) for the duration of the REF. Their efficiency and advice were crucial in the ability of panels to complete the exercise in a timely and professional manner. The support of the REF team at HEFCE has also been excellent and has been complemented by excellent information technology (IT) systems provided by HEFCE. The IT systems are reported by main and sub-panel members who served in RAE2008 to be vastly improved.

Summary of submissions and overall results

10. Main Panel C received 614 submissions in its 11 UOAs. This represents a 6.7 per cent reduction compared with RAE2008, taking into account merged sub-panels. A total of 14,413 Category A staff was submitted, which represents a reduction of 2.8 per cent compared with RAE2008. At the UOA level, most saw either a reduced number of Category A staff submitted, or a modest increase. The exception was UOA 26 (Sport and Exercise Sciences, Leisure and Tourism), which is clearly a growing discipline.

11. Although the reduction in the number of Category A staff was relatively small, there was a 10.7 per cent reduction in the number of outputs submitted and the average number of outputs per person reduced from 3.64 in RAE2008 to 3.37 in REF2014. This is a result of institutions having taken greater advantage of the opportunity to submit cases for a permitted reduction in the number of outputs to be submitted, based on individual staff circumstances. Table 1 provides a summary of the submission statistics for Units of Assessment within Main Panel C.

Table 1: Summary of submissions

UOA		Number of submissions	Category A staff FTE	% change in Category A FTE	Category A and C staff headcount	Number of outputs	Outputs per Category A and C staff headcount	Impact case studies
	2014	614	14,413	-2.8%	15,490	52,212	3.37	2,040
	2008	604	14,834		16,073	58,494	3.64	-
16	2014	45	1,025	-0.9%	1,113	3,781	3.40	146
	2008	61	1,034		1,156	4,361	3.77	-
17	2014	74	1,686	+3.4%	1,787	6,021	3.37	239
	2008	75	1,630		1,786	6,729	3.77	-
18	2014	28	756	-9.8%	798	2,600	3.26	101
	2008	35	838		881	3,037	3.45	-
19	2014	101	3,320	-5.1%	3,602	12,204	3.39	432
	2008	104	3,497		3,711	13,159	3.55	-
20	2014	67	1,553	-7.1%	1,644	5,525	3.36	225
	2008	67	1,671		1,770	6,264	3.54	-
21	2014	56	1,275	+0.5%	1,321	4,367	3.31	181
	2008	59	1,269		1,335	4,714	3.53	-
22	2014	62	1,302	+4.7%	1,408	4,784	3.40	190
	2008	68	1,243		1,413	5,271	3.73	-
23	2014	29	704	-24.1%	764	2,630	3.44	100
	2008	39	927		1,007	3,729	3.70	-
24	2014	25	562	+6.4%	603	2,015	3.34	80
	2008	29	528		574	2,069	3.60	-
25	2014	76	1,442	-15.0%	1,606	5,526	3.44	218
	2008	82	1,696		1,903	7,146	3.76	-
26	2014	51	790	+58%	844	2,759	3.27	128
	2008	39	500		537	2,015	3.75	-

12. Table 2 describes the average overall quality profile for each UOA, and for the main panel as a whole. The average is calculated by weighting each submission in the UOA (or main panel)

by the number of Category A staff FTE. This method is also used to calculate the FTE-weighted average sub-profiles in the sections on outputs, impact and environment below.

Table 2: Overall quality profiles (FTE weighted averages)

UOA	Name	Average percentage of research activity judged to meet the standard for:				
		4*	3*	2*	1*	U
	Main Panel C	27	42	26	4	1
16	Architecture, Built Environment and Planning	29	40	25	6	0
17	Geography, Environmental Studies and Archaeology	27	42	26	5	0
18	Economics and Econometrics	30	48	19	2	1
19	Business and Management Studies	26	43	26	4	1
20	Law	27	46	23	4	0
21	Politics and International Studies	28	40	26	6	0
22	Social Work and Social Policy	27	42	25	5	1
23	Sociology	27	45	26	2	0
24	Anthropology and Development Studies	27	42	26	4	1
25	Education	30	36	26	7	1
26	Sports and Exercise Sciences, Leisure and Tourism	25	41	27	6	1

Panel working methods

13. The main panel comprised the chairs of the 11 sub-panels, international advisers, user members and a Research Councils UK (RCUK) observer, supported centrally by the REF team and panel secretariat.

14. Main Panel C and its sub-panels carried out the assessment in accordance with the published criteria and working methods. As a consequence of the processes described here, the main panel has full confidence in the robustness of the processes followed and the outcomes of the assessment in all its sub-panels. The main panel fulfilled its responsibilities to ensure adherence to published criteria and working methods and promote consistency in assessment standards through a variety of means including:

- Main panel calibration exercises.
- Receipt and examination of sub-panel arrangements for allocating work for assessment and for arriving at final sub-profiles.
- Scrutiny of emerging assessment outcomes.

- Attendance by main panel members at sub-panel meetings.
 - Provision of advice on issues encountered by sub-panels in the course of assessment.
 - Sample review of outputs by international members of the main panel.
 - An audit of impact case studies and templates by user members of the main panel.
 - Scrutiny of the profiles recommended by the sub-panels.
15. Sub-panels adopted a broadly similar sequence of work during the assessment phase so that main panel activities could be scheduled to provide input and support at the most appropriate stage of the sub-panels' work.
16. The work of both main and sub-panels benefited from the full participation of international and user members whose collective expertise and experience in carrying out, using or commissioning research made an invaluable contribution to the work of the panels.

Main Panel calibration exercises

17. Each aspect of the submission (outputs, impact, environment) was subject to a calibration exercise early in the assessment process, so that the exercise could inform subsequent sub-panel calibration exercises and assessments. In each case the calibration exercise used material submitted to REF2014.
18. The outputs calibration exercise was led by the international members. In addition to these major calibration exercises, the main panel examined the assessment of cases for double-weighting, to ensure consistency among sub-panels, and undertook an examination of the treatment of research in criminology across the three sub-panels where work in this field had been submitted (i.e. 20, 22 and 23).
19. Since impact templates and case studies were being assessed for the first time the Main Panel took particular care to ensure that this aspect of submissions was assessed consistently. There was an initial impact calibration exercise led by the main panel user members. The calibration was complemented subsequently by an audit, carried out on behalf of the main panel by its user and international members in relation to the grade boundaries, to ensure that sub-panels were applying these consistently.
20. There was an additional cross-main panel impact calibration exercise, undertaken by the main panel chairs and a selection of user members from the four main panels. Main Panel C received further assurance from this calibration sample that the guidance in the 'Panel Criteria and Working Methods' had been applied appropriately and that grade boundaries had been drawn consistently.

Consideration of sub-panel allocation and profile formation methods

21. In parallel with the calibration exercises, the main panel received reports from each sub-panel which outlined their method of allocating submitted material for assessment and the process by which the sub-panel would arrive at the recommended sub-profiles. The main panel was satisfied that the arrangements were consistent with the published criteria and working methods and would lead to a fair and robust assessment of the material submitted. There was excellent co-operation between user and academic members and assessors on sub-panels.
22. In addition some international and user main panel members attended sub-panel meetings during the assessment period. The Main Panel Chair attended a minimum of two meetings of each of the 11 sub-panels. Main panel members were thus able to confirm that sub-

panels were undertaking their assessment in a diligent and fair manner and in accordance with the published working methods.

Ongoing advice

23. Throughout the assessment period, main panel meetings provided opportunities for the sub-panel chairs to share best practice and raise issues for consideration by the panel as a whole, thus ensuring consistent treatment of more detailed issues. One example of this was the consistent treatment of outputs which contained material published prior to the assessment period. Sub-panel chairs provided reports on their sub-panels' progress and the measures they had adopted to promote consistent application of assessment criteria.

Scrutiny of emerging outcomes

24. As the assessment period progressed the main panel turned its attention to the emerging assessment outcomes – taking account initially of raw panellist scores and later of emerging panel-agreed scores and sub-profiles. The main panel examined sub-panel FTE-weighted average sub- and overall profiles. Significant differences were explored to confirm that they reflected differences in the quality of material submitted rather than differences in assessment practices or standards. The profiles recommended by the sub-panels were examined in a similar manner.

Sub-panel working methods

Methods of allocation

25. All sub-panels allocated outputs for assessment on the basis of panellists' expertise to ensure the robustness of the assessment process.

26. Impact case studies and templates were assessed by teams comprising at least one academic member and one user member or assessor, with users having a full and equal role in assessing impact.

27. Environment templates were assessed by academic sub-panel members.

Cross-referrals, specialist advice and work spanning UOA boundaries

28. Wherever possible work was assessed within the UOA in which it had been submitted. To facilitate this some additional assessors with relevant expertise were appointed to sub-panels.

29. Where a sub-panel did not have the appropriate academic expertise to review specific material, advice was sought by cross-referral, though the final decision remained with the sub-panel to which the work had been submitted. Where an output was published in a language that a sub-panel was unable to assess, it was referred to a specialist adviser with appropriate expertise. The system of cross-referral, where it was used, generally worked smoothly. Table 3 provides details about the number of cross-referrals within and beyond Main Panel C.

30. A significant volume of material submitted in UOA 19 (Business and Management Studies), fell within the remit of UOA 18 (Economics and Econometrics) and this material was cross-referred for advice.

31. Some sub-panels appointed members in common to assist in assessing work that spanned their remits. This was the case for UOA 18 and UOA 19 and also with respect to criminology, as detailed in sub-panel reports for UOA 20, UOA 22 and UOA 23.

32. Each sub-panel undertook an initial calibration exercise for each section of the submission before embarking on the assessment, and had an ongoing programme of monitoring to ensure scoring remained consistent throughout the assessment period.

Table 3: Cross-referrals

UOA	Name	Cross-referrals out			Cross-referrals in		
		Within Main panel	Outside Main panel	Total out	From Within Main panel	From Outside Main panel	Total in
	Main Panel C	1,912	588	2,500	1,912	421	2333
16	Architecture, Built Environment and Planning	33	102	135	9	13	22
17	Geography, Environmental Studies and Archaeology	55	244	299	71	229	300
18	Economics and Econometrics	0	32	32	1,387	32	1,419
19	Business and Management Studies	1,738	99	1,837	5	2	7
20	Law	11	11	22	75	3	78
21	Politics and International Studies	1	1	2	28	46	74
22	Social Work and Social Policy	69	22	91	42	14	56
23	Sociology	1	9	10	87	48	135
24	Anthropology and Development Studies	0	30	30	37	5	42
25	Education	1	2	3	1	15	16
26	Sports and Exercise Sciences, Leisure and Tourism	3	36	39	170	14	184

Approach to assessing output and developing output sub-profiles

33. Each output was assessed and assigned a rating on the 5-point scale 'unclassified' to 4*, using the agreed criteria.

34. As part of the calibration of outputs, sub-panels came to a view about how to apply the criteria to certain categories of submission consistently. For example, where an output was included more than once in the same submission, the statement explaining the case for this was assessed separately from the quality of the output itself. Similarly, requests for double-weighting were assessed separately from the assessment of the quality of the output. Sub-panels used the

specified criteria to determine whether a request for double weighting could be accepted. Where the submission had not taken the opportunity to explain the case adequately, or had done so without reference to the criteria, the sub-panel had to make a judgement and rejected the request if it could not see a compelling case. Where a request for double weighting was not accepted, the reserve output was assessed (if one had been submitted).

Approach to assessing impact and developing impact sub-profiles

35. In developing the impact sub-profiles, all the sub-panels used the same method of assigning star levels to case studies and impact templates. Each case study and each impact template was graded according to the starred level descriptors. Case studies and impact templates that were judged to be on the borderline between two of the starred levels were assigned a grade of 3.5, 2.5, 1.5 or 0.5.

36. Where this occurred, the case study/template contributed to the impact sub-profile by assigning half of its grade to each of the two starred levels that the borderline grade fell between. For example, if there were four case studies in the submission, each case study contributed 20 per cent to the impact sub-profile (the impact template contributed the remaining 20 per cent). If one of the case studies was graded as 3.5, it contributed 10 per cent at 4* and 10 per cent at 3* to the impact sub-profile.

Approach to assessing environment and developing environment sub-profiles

37. In developing the environment sub-profiles, all the sub-panels used the same method of assigning star levels to the submitted material. The four assessed sections of the environment template, each contributing 25 per cent to the environment quality sub-profile, were graded according to the starred level descriptors. A section of the environment template that was judged to be on the borderline between two of the starred levels was initially assigned a grade of 3.5, 2.5, 1.5 or 0.5.

38. Where this occurred, that section of the environment template contributed to the environment sub-profile by assigning 12.5 per cent to each of the two starred levels that the borderline grade fell between.

39. Each sub-panel scored each section b)-e) of the environment template, taking account of the data presented in REF4a, REF4b and REF4c. In addition the Business and Management and Education sub-panels made reference to information provided by institutions on the number of professional doctorates and the Sports and Exercise Sciences, Leisure and Tourism sub-panel made reference to information provided by institutions on postgraduate research student numbers.

40. Judgements were made, in all cases, solely on the basis of the information submitted by institutions and, in some cases, on the basis of responses to audit queries, and in accordance with the published criteria.

Recommendations

41. Each sub-panel recommended the sub-profiles for outputs, impact and environment and overall quality profiles to the main panel on the basis of its collective judgement.

42. No individual played any role in the assessment of any submission in which they had a major conflict of interest (including those of any institutions that they had been employed by since the start of the REF assessment period).

Research outputs

43. The Output element of the REF was assessed on the same basis as RAE2008, and therefore the results for this element (but not for Impact or Environment) can be directly compared. Both during the calibration exercise, and during the course of reports from sub-panel chairs to the main panel and discussions of the emerging sub-profiles for research outputs, the main panel noted the strengths in research and improvement in overall quality since RAE2008, and noted that strength exists in submissions of various sizes. The proportion of outputs assessed as 4*, world-leading in terms of originality, significance and rigour, has increased from 13.2 per cent to 21.1 per cent.

44. One of the mechanisms by which the main panel assured itself that international standards had been applied to the assessment of outputs, was the attendance of international members at sub-panel meetings which discussed output calibration and scoring, as well as 'dipstick reading' of outputs by the international members in their fields. The international members considered that the assessment process and application of the criteria had been robust and were impressed by the integrity, scrupulousness and transparency of the evaluation process.

45. Table 4 presents the weighted average output sub-profile for each UOA in Main Panel C, together with the weighted average sub-profile for the main panel as a whole.

Table 4: Outputs sub-profiles (FTE weighted averages)

UOA	Name	Average percentage of research activity judged to meet the standard for:				
		4*	3*	2*	1*	U
	Main Panel C	21.1	43.0	29.8	5.5	0.6
16	Architecture, Built Environment and Planning	22.7	40.7	29.8	6.5	0.3
17	Geography, Environmental Studies and Archaeology	22.1	42.1	30.6	4.8	0.4
18	Economics and Econometrics	27.7	48.9	19.8	3.0	0.6
19	Business and Management Studies	20.5	42.8	30.1	5.8	0.8
20	Law	20.1	47.1	28.7	3.7	0.4
21	Politics and International Studies	20.9	40.1	31.5	7.1	0.4
22	Social Work and Social Policy	19.4	44.3	30.2	5.6	0.5
23	Sociology	19.7	47.9	30.4	1.8	0.2
24	Anthropology and Development Studies	19.1	39.3	35.2	5.4	1.0
25	Education	21.7	39.9	29.5	7.8	1.1
26	Sports and Exercise Sciences, Leisure and Tourism	19.5	42.2	31.3	6.1	0.9

46. In reviewing the emerging and final sub-profiles for the 11 UOAs, the main panel considered the data both weighted for size of institution, and unweighted. The unweighted sub-profiles allow consideration of the quality profiles as allocated, as each submission is counted once equally. The weighted average sub-profiles take into account the relative size of submissions in the overall outcome.

47. Table 4 shows that across the 11 UOAs in Main Panel C, there is a high degree of consistency in terms of the weighted sub-profile for outputs, whilst recognising that there is significant variation at the level of individual submissions to UOAs. The exception to this is UOA 18 (Economics and Econometrics), which has a noticeably higher proportion of research outputs assessed at 4*. In exploring the reasons for this, the main panel noted that submissions in UOA 18 did not reflect the full range of research in economics submitted to the REF. The sub-panel (SP) advised that institutions had confined submissions to SP 18 to long established departments or units working in quantitative traditions, whereas the work of other economists was submitted in other UOAs. In this context the main panel also noted the large volume of cross-referrals from SP 19 into SP 18.

48. The main panel recognises that there are different development trajectories across the disciplines within its remit, with some disciplines being long-established and some much more recent. The main panel welcomed the improved quality of research outputs submitted in UOA 26, Sport and Exercise Sciences, Leisure and Tourism, which was an emerging discipline at the time of the last assessment exercise. The growth in numbers of Category A staff, together with the stronger research outputs submitted are evidence that this is a discipline growing in size and strength.

Types of research output submitted

49. Table 5 describes the numbers and proportions of different types of research outputs submitted in each UOA

50. Given the range of disciplines and thematic areas in Main Panel C, it is not surprising that a wide variety of types of output was submitted for assessment. Articles, monographs, book chapters, databases, and physical artefacts were all submitted, in different proportion in different sub-panels. There are examples of each of these types of output being awarded the highest grade.

Table 5: Number and types of research outputs

		MPC	16	17	18	19	20	21	22	23	24	25	26
A	Authored book	4,263	268	467	14	168	904	833	453	381	275	458	42
B	Edited book	422	37	119	0	6	26	60	34	36	80	23	1
C	Chapter in book	3,962	253	420	28	179	1,170	395	430	224	294	536	33
R	Scholarly edition	11	1	5	0	0	0	1	1	0	3	0	0
D	Journal article	42,217	2,908	4,925	2,386	11,660	3,347	3,050	3,695	1,977	1,319	4,285	2,665
E	Conference contribution	228	75	20	2	52	1	1	5	1	1	64	6
U	Working paper	336	4	7	168	103	22	10	6	0	13	3	0
L	Artefact	19	19	0	0	0	0	0	0	0	0	0	0
P	Devices and products	0	0	0	0	0	0	0	0	0	0	0	0
M	Exhibition	24	16	2	0	0	0	0	2	0	4	0	0
I	Performance	1	1	0	0	0	0	0	0	0	0	0	0
F	Patent/ published patent application	2	2	0	0	0	0	0	0	0	0	0	0
J	Composition	0	0	0	0	0	0	0	0	0	0	0	0
K	Design	116	116	0	0	0	0	0	0	0	0	0	0
N	Research report for external body	505	57	30	1	31	46	15	153	8	10	144	10
O	Confidential report for external body	5	0	0	0	2	1	0	0	0	1	0	1
G	Software	8	1	3	0	1	0	0	0	0	0	3	0
H	Website content	27	8	12	0	0	5	0	0	0	0	1	1
Q	Digital or visual media	3	1	0	0	0	0	0	0	0	2	0	0
S	Research datasets and databases	17	0	2	1	0	0	0	0	3	3	8	0
T	Other	46	14	9	0	2	3	2	5	0	10	1	0

Mode and focus of research

51. Given the diversity of disciplines and topics encompassed by the main panel, it was also not surprising to find that a wide variety of modes of conducting research was reflected in to work submitted. However all outputs, of all types, were assessed holistically against the main panel criteria: originality, significance, rigour. This meant that, for example, methodological rigour, however sophisticated, was insufficient to attract the highest grade if it were not matched by similar standards of originality or significance.

52. Outputs awarded the highest grades are found across the full spectrum of topics and modes of research. They include outputs arising from theoretical, empirical and applied research, and some which were a synthesis of previous research.

53. Excellent examples of theoretical outputs were submitted, some being agenda-changing and achieving the highest grades. However, in some sub-panels, it was noted that the theoretical research submitted tended simply to rework existing debates. Alongside high quality theoretical work, it was evident that empirical work submitted was frequently of a high standard; indeed several sub-panels noted a greater level of methodological sophistication and rigour since 2008. Excellent, rigorous empirical work was found across the full range of qualitative and quantitative methodologies. Given that research funders had previously identified a weakness in quantitative skills in UK social science, it was pleasing to see some results of the investment in this area beginning to bear fruit, with greater use made of secondary analysis of data and of data from longitudinal studies, and such outputs often achieving the highest grades. Against this background, poorly executed empirical work stood out as weak against the criteria.

54. The research outputs submitted for assessment provide evidence of a step change in UK participation in research addressing grand challenges which frequently involve large scale international collaborations. Some sub-panels observed that such significant international collaborations by UK researchers have led to greater numbers of outputs published in a wide range of journals, including those which accept work from a range of disciplines, pointing to the scale and significance of the questions being asked, as well as the quality of the resulting research outputs.

55. A noticeable feature of work submitted to most, if not all, sub-panels was thematic or issue-based research which draws on a common intellectual framework but does not fit obviously into any discipline. This did not normally define itself as interdisciplinary research; indeed it seemed to transcend disciplines rather than to span them. Examples include work on health inequalities, interpersonal violence, or migration and labour markets. Such work – and there were other examples – was submitted to a number of different sub-panels yet was often drawing on the same theories and well-established bodies of literature, not located in any specific discipline or disciplines.

56. This type of research could be theoretical or empirical or both; it might be applied work but not necessarily so; it was characterised by no less rigour than work which was located more centrally within a single discipline, or which defined itself as specifically as interdisciplinary work. Some of this thematic work was recognisably rooted in the social sciences, but the same phenomenon was also observable in other disciplines covered by Main Panel C.

57. The main panel concluded that this is a sign of a vibrant intellectual environment, in which new challenges or issues emerge and generate their own core literatures and data. Researchers from various disciplinary backgrounds access each other's work and in turn contribute to an evolving knowledge base, in ways which transcend disciplinary boundaries. These developments do not undermine the importance of disciplines, but they do denote a confidence and openness to

the work of others which – at least in respect of certain topics – is creating a common intellectual language within the social sciences and beyond. Such developments were also welcomed by the user members of our panel, who noted that users are keen to apply any appropriate and rigorous approach to the question being examined.

Quality assurance of research outputs

58. The main panel wished to assure itself that the assessment of research outputs had been undertaken consistently with its published 'Panel Criteria and Working Methods' and also that approaches had been consistent across its 11 sub-panels. It reviewed certain aspects of submissions across the sub-panels as part of the process of agreeing the output sub-profiles.

Interdisciplinary work

59. Institutions had the opportunity to flag research outputs as interdisciplinary. Although this flag was used relatively sparingly, sub-panels felt that while there was a large amount of work which could be considered inter- or cross-disciplinary, they did have the expertise to assess it. They had the opportunity to use cross-referral where necessary to obtain expert opinion and also had the benefit of cross-panel membership – in UOAs 20, 22 and 23 and UOAs 18 and 19.

60. *Double-weighting:* Sub-panels within Main Panel C received double-weighting requests for a very small proportion of the material submitted: less than 2 per cent of outputs. The majority of requests and acceptances were for authored books. There was a notable variation in the number of requests across the sub-panels. Applications for double-weighting which were successful paid close attention to the criteria and provided clear evidence in support of their claim. The main panel examined carefully the evidence for the way in which each sub-panel had applied the criteria for double-weighting. As a result of this the main panel was satisfied that the resulting scores, even when they tended to be higher than for items which were not double-weighted, were a fair reflection of the work submitted.

Outputs submitted more than once by the same institution in the same UOA:

61. Where items were submitted by more than one institution in the same UOA, measures were taken to ensure that all instances of the output received the same score. Where an item was submitted more than once in the same submission, the sub-panel assessed the individual's contribution to the output in accordance with the 'Panel Criteria and Working Methods'.

Research outputs submitted by early career researchers (ECRs)

62. The main panel received an analysis of the output scores for ECRs, compared to those recorded for all outputs and noted that there was no difference in the quality profile for outputs submitted by ECRs compared to the overall outputs sub-profile.

Outputs submitted outside the remit of a UOA

63. Some research outputs were received for assessment by UOAs which they felt to be outside the boundaries outlined in the 'Panel Criteria and Working Methods'. Access to cross-referral advice was found to be helpful in assessing this work in its own terms and in determining the grade awarded.

Requests for 'Other information'

64. The 'Panel Criteria and Working Methods' (REF01.2012) requested additional information for a number of different circumstances (e.g. double-weighting, outputs with material in common). Where adequate information was provided sub-panels used their judgement to assess this and where this was not possible sought further information via audit.

65. The majority of unclassified grades awarded to research outputs were the result of the audit process. Overall, the number of research outputs assessed as 'unclassified' was very small. Very few of those outputs were assessed as unclassified because they did not meet the quality threshold for 1*.

The increase in proportion of 4* work

66. A notable feature of the assessment of outputs is the increase in the percentage of research outputs awarded 4* (from 13.2 per cent in RAE2008 to 21.1 per cent in REF2014). There are increases across all sub-panels, though of varying magnitude. The main panel has come to the view that this reflects an increase in the amount of world-leading research produced in the UK.

67. In advance of the REF submissions, there was much speculation about how selective institutions would be in the staff and the work submitted. Neither the main panel nor its sub-panels have any means of knowing what might have been submitted but was not. Judgements could only be made on the basis of the work submitted. The main panel is confident that the judgements made about outputs submitted are robust and appropriate, because of the care with which the processes were followed, the quality assurance measures put in place (as described above) and the involvement of international members who attested the appropriateness of the standards being adopted.

68. Both on the basis of the rigorous assessment processes followed by its sub-panels and the assurance of the international members, Main Panel C was satisfied that international quality standards had been applied.

69. The main panel believes that the outcomes reflect the volume of work of the highest quality being produced. Such work at 4* level is being produced by units of varying sizes and many different institutional locations. Although it is certainly the case that many units with high proportions of 4* work have been established in their fields for many years, there are also some examples of 'new entrants' doing very well. Those units scoring the highest proportions of 4* are by no means always predictable on the basis of previous RAE outcomes.

Impact

70. With the introduction of the assessment of impact as a new element for REF2014, the main panel appreciates that there was a great deal of anxiety and effort involved for institutions in preparing their submissions. Main Panel C had prepared the guidance in the 'Panel Criteria and Working Methods' with a view to encouraging the widest possible range of non-academic impacts to be submitted for assessment.

71. Main and sub-panels were highly impressed by the range of types of impact, as well as the extent of the beneficiaries. Case studies submitted to the sub-panels demonstrated that research is making a difference outside academia to wide range of organisations, groups and individuals. It is, for example influencing professional practice in areas as diverse as building design, the pedagogy of primary school teachers, and the training of elite athletes. It is influencing a wide range of public policies nationally and internationally in sustainable development, regulatory reform, poverty alleviation, child protection and many more areas. It is doing so by changing the climate of public opinion as well as directly influencing policy makers. In some excellent examples the status quo has been successfully challenged and thereby the position of hitherto excluded or disadvantaged groups has been improved.

72. Although this was the first time such an assessment methodology had been used, sub-panels generally found that case studies provided a good basis for making judgements about the

non-academic impact of excellent research, in terms of its reach and significance. User members on main and sub-panels were integral to the assessment process, and to the calibration of judgements on the submitted material cross sub-panels.

73. The scores for impact were generally higher than those achieved for the research outputs. The main panel noted that this was a pattern consistent across all its sub-panels, and found it encouraging. In interpreting the relationship between output and impact scores, the main panel noted that the requirement for submitting case studies was broadly a one in 10 ratio (one case study for every 10 members of staff submitted). This meant that institutions were able to submit their very best examples of non-academic impact.

74. During both the calibration exercises and consideration of emerging and final impact sub-profiles, Main Panel C and its sub-panels were impressed by the strength and variety of impact drawing on excellent research, evidenced by case studies submitted by a range of sizes of unit.

75. The case studies provide strong evidence of the contribution of social sciences, broadly defined, to social and economic welfare in the UK and internationally, to public discourse, and to policy making. A range of research modes, including individual, collaborative, and international, generated high quality impact. Outstanding quality was found across the range of impact types and beneficiaries, including examples of challenging the status quo or proposals from public bodies and influencing the terms of debate and public opinion, as reflected in the attached sub-panel reports.

76. The 11 sub-panels within Main Panel C received a total of 2,040 impact case studies and 612 impact templates for assessment. Table 6 provides a summary.

Table 6: Summary of impact material submitted

Unit of Assessment	Number of case studies	Number of templates
Architecture, Built Environment and Planning	146	44
Geography, Environmental Studies and Archaeology	239	74
Economics and Econometrics	101	28
Business and Management Studies	432	101
Law	225	67
Politics and International Studies	181	56
Social Work and Social Policy	190	62
Sociology	100	29
Anthropology and Development Studies	80	25
Education	218	76
Sport and Exercise Sciences, Leisure and Tourism	128	50
Main Panel C total	2040	612

77. Table 7 presents the weighted average impact sub-profile for each UOA in Main Panel C, together with the weighted average sub-profile for the main panel as a whole. The majority of the impacts submitted were assessed as either outstanding or very considerable in terms of their reach and significance.

Table 7: Impact sub-profiles (FTE weighted averages)

UOA	Name	Average percentage of research activity judged to meet the standard for:				
		4*	3*	2*	1*	U
	Main Panel C	39.1	40.3	16.4	3.6	0.6
16	Architecture, Built Environment and Planning	38.4	42.0	15.3	3.6	0.7
17	Geography, Environmental Studies and Archaeology	34.3	42.2	19.3	3.9	0.3
18	Economics and Econometrics	36.3	44.7	14.1	3.4	1.5
19	Business and Management Studies	37.7	42.5	17.0	2.2	0.6
20	Law	38.3	41.1	17.7	2.4	0.5
21	Politics and International Studies	40.0	44.2	13.1	2.7	0.0
22	Social Work and Social Policy	43.8	36.0	14.9	4.1	1.2
23	Sociology	43.2	39.4	13.6	3.3	0.5
24	Anthropology and Development Studies	40.8	43.2	11.3	3.8	0.9
25	Education	42.9	33.6	16.7	6.0	0.8
26	Sports Related Studies	39.2	32.4	21.8	6.3	0.3

Assessment of impact

78. As well as the preparation of material for submission within institutions, the assessment process for sub- and main panels has been a learning process. Both the integration and contribution of the user members of the main panel, and of the user members and assessors on sub-panels has been extremely successful.

79. Both the main and sub-panels undertook calibration exercises on both impact case studies and templates.

80. The main panel user members also attended sub-panel meetings, which further facilitated the sharing of best practice and discussion of common issues and queries. Academic and user members worked very well together, finding that there was a genuine commonality of view and this was a definite strength of the process.

81. As the sub-panels assessed submissions, the main panel kept under review the average impact sub-profiles being awarded in each UOA. As well as considering the FTE-weighted averages the main panel also considered the pattern of scores that each sub-panel was assigning

to case studies and impact templates, without weighting the submissions by FTE, assuring itself that variations reflected the quality of the submitted material.

Feedback on issues common across sub-panels

82. The main panel wishes to provide some general feedback to institutions on issues which were common across its sub-panels and which may be useful in preparing case studies and templates for the next REF exercise or its successor, if impact is assessed in the same way.

83. It is acknowledged that institutions were preparing material in this format for the first time, and the main panel anticipates that units will be better prepared for the next exercise, in terms of presentation of the material, responding to the criteria as set out in the 'Panel Criteria and Working Methods', and in evidencing and providing corroboration for the impacts claimed. On this occasion not all submissions provided the required basic information, such as dates of employment for researchers who conducted underpinning research. This necessitated a degree of audit activity which should not have been required.

Impact template

84. The impact template was designed to provide an opportunity for institutions to reflect on their approach to supporting researchers to have impact and on how they can support their researchers to achieve impact in the future. Sub-panels found the template to be useful to understand the strategy and approach adopted by submitting units. They provided complementary evidence, alongside the case studies, which were, by their nature, retrospective and selective. On the whole, however, the impact templates scored lower than the impact case studies. Sub-panels observed that many institutions had not clearly articulated their strategy for and approach to, supporting the achievement of impact. Some institutions used the last section, 'Relationship to case studies' simply to describe the submitted case studies, whereas a discussion of how the case studies exemplified their approach or had informed the development of the unit's approach to impact was requested by the panel guidance.

85. Several sub-panels observed that the impact template might usefully become part of the environment statement for the next REF, as this would encourage integrated strategies for research and its translation beyond academia.

Case studies

86. Despite this being the first time such an assessment had been adopted, a wide range of impressive case studies was submitted. Sub-panels assessed as outstanding, in the reach and significance of their impact, case studies from across a range of submissions of differing size. Although there had been some concerns expressed in advance of the exercise, it did not appear that smaller submissions were disadvantaged; indeed some sub-panels observed that, for some smaller submissions, having to identify only two case studies may have helped them to score well.

87. The best case studies were clear about the impact being claimed from the outset. They were self-contained and made the links between research and claimed impact explicit and provided persuasive evidence of the reach and significance of the impact claimed.

88. Some cases were very well explained, but in others the submitting unit had failed to articulate clearly either the nature of the impact or the relationship between the research and the impact claimed; whether this was because the link itself was tenuous, or because it was poorly explained, was often not easy to determine. Such examples could not be awarded the highest grades. However good drafting alone was not enough: well written material without substance did not score highly against the criteria of reach and significance.

89. It was evident that case studies were easiest to present where a single piece of research, undertaken by one individual or an easily identifiable group, could be linked to a specific claimed impact. Where there was a portfolio of research underpinning the claimed impact, or where the research was collaborative across institutions, the presentation of the case study required careful articulation. However it was quite possible to construct strong case studies in these more complex circumstances and the highest grades were achieved by some examples of this type of case.

90. The 'Panel Criteria and Working Methods' encouraged submissions of impact relating to the prevention of undesirable outcomes, acknowledging that research in the social sciences may hold authorities to account and result in a proposed change not taking place. The sub-panels welcomed the submission of such case studies and it is noteworthy that they were able to evidence impact and achieve the highest quality scores.

91. Sometimes non-academic impact had been planned or anticipated when the research was being undertaken, but often the opportunity to achieve non-academic benefits emerged during the research process, and sometimes it was totally serendipitous. A wide variety of quantitative and qualitative evidence was provided in support of impact claims and sub-panels awarded the highest quality scores to both. The sub-panels acknowledge that some impacts may be more difficult to evidence, because they occur in less accessible geographical regions of the world and that this may have influenced decisions about the selection of case studies.

92. The distinction between dissemination and impact was important for this element of the REF. Although social science can seek to, and succeed in, changing the climate of ideas the REF criteria made it clear that claims for impacts of this type – as well as others – must be supported by evidence of such change. Despite this some case studies tended to focus on dissemination of research findings, often to a variety of audiences, but with little or no discussion of how the audiences were affected. Since dissemination alone does not represent impact in the context of the REF, such case studies did not score highly.

93. There were three aspects of the way in which some case studies were presented, relative to the specified criteria, which made the assessors' task more difficult than it need have been. These relate to: evidence for the quality of the underpinning research; evidence for the impact claimed; specification of what impacts had occurred within the eligible assessment period.

94. The case study template required that the underpinning research was specified, and evidence provided that this was of at least 2* standard, It was not expected that assessors would need to read the research and generally they did not do so. However, where submissions did not attempt to provide evidence that the quality of the underpinning research met the threshold, sub-panels retained the right to read the underpinning research and did so in some cases.

95. Case studies were assessed on the basis of the information presented in the case study template, including the evidence for the impact claimed. The information provided for corroboration was requested or accessed only to verify the claims made, and not to provide further evidence or information. Some of the sources provided for corroboration did not in fact do so as they contained no mention of the submitting institution's research or provided no obvious linkage. In some instances institutions seemed to have experienced a particular difficulty in obtaining corroborating statements from bodies and individuals based outside the UK; the challenge of doing so is acknowledged, perhaps particularly when units are assembling information post hoc.

96. In some cases there was a problem in relation to the eligible assessment period for claiming impact. Some case studies presented impacts which had started before the REF2014 assessment period, without providing any evidence for that which had taken place during the

eligible assessment period. Such case studies left it to the assessor to identify the eligible impact, which was a risk to the submitting institution as the information could be misinterpreted.

Research environment

97. Across UK institutions as a whole, the environment for conducting research of the highest international quality has improved since RAE2008, on the basis of the evidence submitted. The very best research environments were entirely or almost entirely world-leading in terms of vitality and sustainability. At the other end of the spectrum, some research environments were found to be much less strong. This was sometimes because an institution was investing in a discipline which was making its first submission to REF2014. This was acknowledged to be a difficult position, as even significant investments may take time to deliver a strong environment for research.

98. The assessment of environment was undertaken by assigning equal weight to the four elements: Research Strategy; People; Income, Infrastructure and Facilities; and Collaboration and Contribution to the Discipline or Research Base. This structured assessment process ensured that all aspects of the research environment were given due consideration. Examples of evidence in the strongest research environments included:

- A research strategy appropriate to the size and scale of the unit's ambitions.
- Support for and development of staff and postgraduate research students (PGRs) at all levels.
- Income and facilities which support the research strategy and objectives.
- Evidence of the nature of contributions, engagement with the wider community and academic leadership in the discipline.

99. Approaches to promoting equality of opportunity were found to be variable across submissions. In the strongest submissions, there was evidence that policy and practice to promote equality of opportunity was embedded in institutions and units, whereas in some cases, this was less developed. Use of the 'Concordat to support the career development of researchers' as a framework for staff development was also evidenced in strong submissions.

100. Table 8 presents the weighted average environment sub-profile for each UOA in Main Panel C, together with the weighted average sub-profile for the main panel as a whole. As these data are weighted by size of submission, they indicate that 39.9 per cent of research active staff submitted to the REF, working in disciplines falling in the remit of Main Panel C, are working in world-leading research environments.

Table 8: Environment sub-profiles (FTE weighted averages)

UOA	Name	Average percentage of research activity judged to meet the standard for:				
		4*	3*	2*	1*	U
	Main Panel C	39.9	39.2	17.7	3.0	0.2
16	Architecture, Built Environment and Planning	43.2	36.8	15.7	4.3	0.0
17	Geography, Environmental Studies and Archaeology	40.9	38.2	17.2	3.4	0.3
18	Economics and Econometrics	33.4	48.6	17.6	0.4	0.0
19	Business and Management Studies	36.8	39.7	21.0	2.4	0.1
20	Law	43.6	43.1	11.7	1.6	0.0
21	Politics and International Studies	41.3	38.6	16.5	3.2	0.4

22	Social Work and Social Policy	36.9	39.3	20.5	2.6	0.7
23	Sociology	35.1	44.9	18.5	1.4	0.1
24	Anthropology and Development Studies	44.6	47.0	8.4	0.0	0.0
25	Education	48.4	25.0	18.1	7.8	0.7
26	Sport and Exercise Studies, Leisure and Tourism	34.2	40.7	21.7	3.4	0.0

101. The main panel considered the emerging FTE-weighted average environment sub-profiles in each UOA. It also considered the pattern of scores that each sub-panel was assigning to the environment submissions, without weighting them by FTE.

102. As noted in the Panel Working Methods section above, assessment of environment was divided equally amongst the four assessed sections of the environment template. Scoring using a half point scale (0, 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4) in each of the four sections meant that the majority of submissions received a distributed quality sub-profile for environment.

Environment templates

103. Sub-panels found persuasive evidence of high quality research environments in many cases. In general, submissions which scored highly provided better evidence of the claims made than those which did not. Some submissions did not supply sufficient information under each of the four assessed headings to enable them to achieve the higher quality assessments.

Strategy

104. Submissions which scored well reflected on changes and achievements since RAE2008, discussing any obstacles encountered during the assessment period. They also demonstrated how institutional support was applied in the submitting unit, rather than simply describing institutional strategy. Many of the strongest submissions demonstrated a clear connection between strategic leadership at the institutional level and its positive impact on the success of the submitting unit. Institutional 'boilerplate' text did not convince panels of a strong strategy for future research.

105. Submissions which scored less well in the Strategy section often contained lists of research activities or research groupings, with very little discussion of either changes since RAE2008 or future aims and objectives and, in particular how these were to be achieved.

106. Some sub-panels observed a shift towards grouping submissions around research themes and away from local departmental or research groupings. This may reflect the tendency of major research funders towards large-scale funding designed to address major research questions.

People

107. Sub-panels noted innovative and supportive staff development programmes across a range of disciplines and sizes of submission. A key indicator of vitality and particularly of sustainability is the support for, and development of, early career researchers. 19.2 per cent of staff submitted for assessment in Main Panel C were flagged as ECRs in the REF1a.

108. The overall proportion of submitted staff on fractional contracts was higher than in RAE2008, for the most part indicating that the staff submitted in REF2014 had experienced a greater diversity of personal circumstances such as caring, parental and other duties, but were being supported to continue researching. This development is welcomed.

109. However, the sub-panels regretted that some submissions included staff on fractional appointments, often fixed-term over the REF census date, whose contribution to the vitality and sustainability of the submitting unit was not evidenced.

110. PGRs are recognised as a crucial part of the vitality and intellectual life of research units. The contribution of UK Research Councils and other funding bodies to research training over a long period was evidenced in many cases. Whilst it is too early to see the influence of the RCUK Doctoral Training Centres in PhD award numbers, their influence was nevertheless noted in the development of strong PhD training programmes. Strong submissions provided clear evidence of financial and intellectual support for continuing development of PGRs, as well as linking the research of PGRs into research groups and clusters and into the research strategy of the submitting unit. A strong postgraduate community makes a key contribution to the vitality and sustainability of a submitting unit.

Infrastructure, income and facilities

111. Sub-panels found evidence of infrastructure which supports the development of excellent research in social sciences and allied disciplines across a range of sizes of submission. Infrastructure supportive of a discipline and the research objectives of submitting units was not limited to physical space and equipment, but included other non-physical facilities such as digital resources, datasets, archives, computing capacity.

112. Submissions provided strong evidence of success in drawing on a wide range of peer-reviewed and internationally competitive funding sources, with total research expenditure over the period of £2.2 billion. Sub-panels welcomed the positive effects of large-scale funding from national and international research councils. There was evidence that this has enabled ambitious and large-scale collaborations, nationally and internationally which enable researchers to contribute to addressing the biggest societal challenges.

Collaboration and contribution to the discipline

113. Sub-panels welcomed evidence that a large number of staff across all career stages contribute to their discipline nationally and internationally. In assessing collaboration and contribution to the discipline, sub-panels noted that simple lists of esteem indicators were not, in themselves, impressive. They were keen to understand the nature of the contribution made by the activities. Sub-panels understand the pressures on individual researchers within their unit to publish, to apply for grants, to supervise graduate students and welcomed the opportunity to recognise contributions to the wider discipline.

114. There was evidence that scholars are collaborating more extensively, with a greater diversity of approach and the adoption of new methodologies to address major research questions.

Quantitative data

115. Each sub-panel received a standard set of quantitative data for each submission in its UOA. The data included information about staff headcount and FTE, about the number of ECRs included in a submission, the number and pattern of doctoral degrees awarded and the value and pattern of research income awarded.

116. The sub-panels found that these data could not be used in any sort of mechanistic fashion, since they are based on Higher Education Statistics Agency (HESA) data and, therefore, relate to all the staff in a given unit, rather than relating only to those staff submitted. Nevertheless, the sub-panels considered the data alongside the narrative environment templates, to scrutinise and verify claims made and found the data to be a useful indicator as such.

117. The data are summarised in Table 9 and point to significant contributions to the vitality and sustainability of the disciplines within the remit of Main Panel C.

Table 9 Summary data about the volume of research income and doctoral degrees awarded at UOA level

	Number of early career researchers (REF1a)	Total income¹ (£000s)	Income per Category A staff FTE (£000s)	Total doctoral degree awards	Doctoral awards per Category A staff FTE
UOA 16: Architecture, Built Environment and Planning	210	230,860	225	1,410	1.38
UOA 17: Geography, Environmental Studies and Archaeology	365	395,214	234	2,499	1.48
UOA 18: Economics and Econometrics	209	129,637	171	1,087	1.44
UOA 19: Business and Management Studies	731	353,291	106	4,805	1.45
UOA 20: Law	311	77,458	50	1,586	1.02
UOA 21: Politics and International Studies	318	144,180	113	2,198	1.72
UOA 22: Social Work and Social Policy	240	253,446	195	1,546	1.19
UOA 23: Sociology	137	163,482	232	1,201	1.71
UOA 24: Anthropology and Development Studies	114	133,801	238	1,129	2.01
UOA 25: Education	224	303,665	211	3,625	2.51
UOA 26: Sport and Exercise Sciences, Leisure and Tourism	222	83,206	105	921	1.17
Main Panel C	3,081	2,268,239	157	22,006	1.53

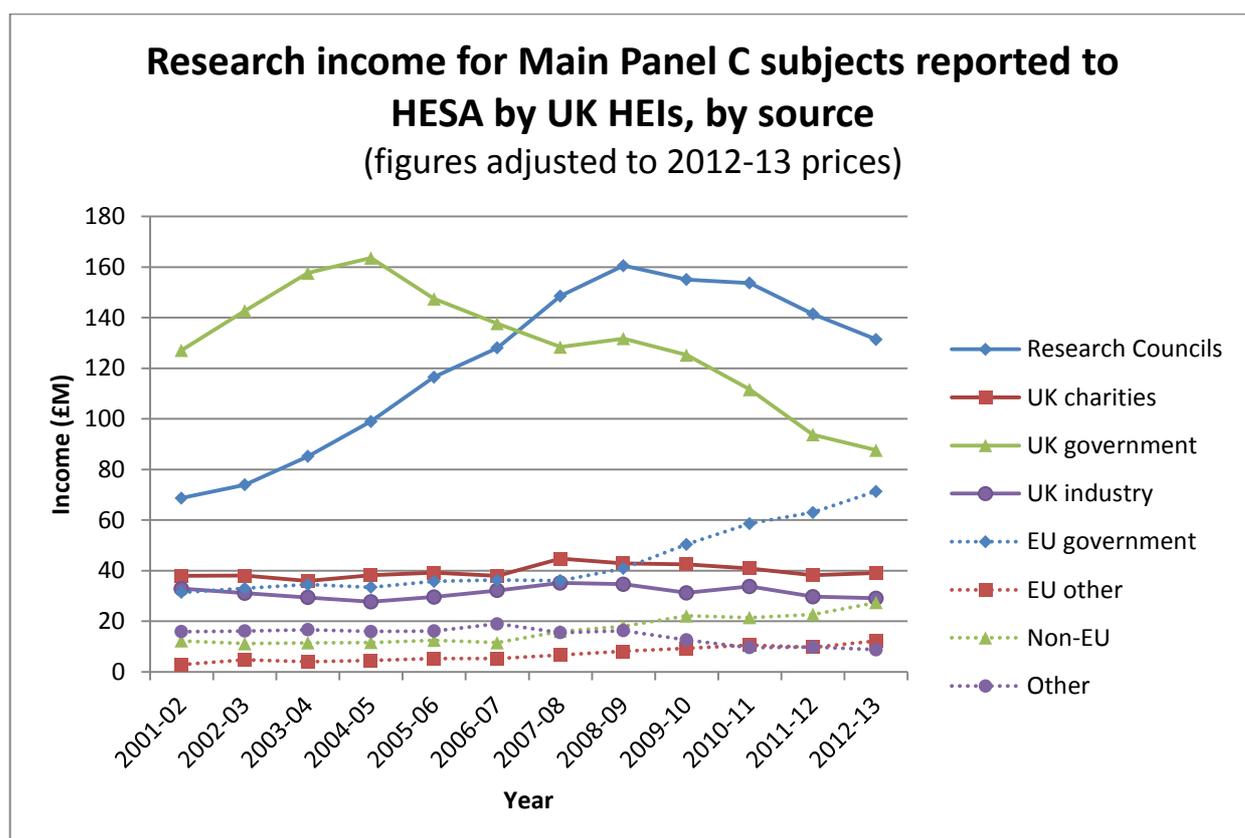
Note: The 'deflators' used to adjust to base year 2012-13 are based on HM Treasury's gross domestic product deflator.

118. Figure 1 describes the research income data per funding source over the REF assessment period.

119. The rise in European Union (EU) funding is welcome and mirrors a similar rise in other main panels. Similarly the flattening out, and then the reduction, of Research Council funding is similar to other disciplines. However the significant reduction in funding from UK government sources has affected the disciplines represented in this main panel more than elsewhere, and presumably reflects the reduction in the research budgets of many government departments and local agencies in recent years. The fact that research performance, and non-academic impact, is impressive despite this is commendable but may simply be a reflection of the time lag between the funding of research and its outcomes. It must therefore be a concern that the future ability of the social sciences, and allied disciplines, to continue to perform at this very high level will be undermined in the future by the reduction in funding which is already evident.

¹ The income figures have been adjusted to reflect 2012-13 prices.

Figure 1: Income by source



Note: The 'deflators' used to adjust to base year 2012-13 are based on HM Treasury's gross domestic product deflator.

Sub-panel 16: Architecture, Built Environment and Planning

Quality Profiles

Profile Type	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	22.7	40.7	29.8	6.5	0.3
Impact	38.4	42.0	15.3	3.6	0.7
Environment	43.2	36.8	15.7	4.3	0.0
Overall	29	40	25	6	0

Summary of submissions

1. UOA 16 (Architecture, Built Environment and Planning) brought together the fields covered by sub-panels H30 and H31 in RAE2008. REF2014 received 45 submissions for the UOA, including a headcount of 1,113 and an FTE of 1,025. This is 43 staff and 10 FTE fewer than were submitted to H30 and H31 in 2008. HESA data, however, suggest growth in numbers of those working in the field overall, while it is clear that some units have grown more than might be explained by the merger of the two RAE sub-panels. Thus there also appears to have been increased selectivity of staff submitted to the exercise, and this has resulted in a reduction in volume of staff submitted to the UOA in relation to the overall sector population. The UOA continues to renew itself with 18.9 per cent of staff submitted (210) classified as early career researchers, and 1,410 doctoral degrees awarded during the period.

Outputs

2. UOA 16 is especially diverse in its composition, research methodologies and forms of research output, with a range spanning from the physical and natural sciences and engineering, through social sciences and policy, to humanities and practice based arts. Although the majority of outputs submitted were peer reviewed journal papers, there was a significant volume of work in the form of authored and edited books, and design outputs. Smaller numbers of conference papers, reports for external bodies and other types of admissible output were also submitted. Excellence was found in outputs of virtually all types, while publication through any given output type was no guarantee of excellence. Particular areas of strength were evident in historical research and in the field of real estate, however, world-leading research at the highest level was found in virtually all sub-disciplines.

Breakdown of different outputs types submitted to UOA 16

Authored and edited books	Chapters in books	Designs and artefacts	Journal papers	Conference Papers	Reports	Other
8.1%	6.7%	3.6%	76.9%	2.0%	1.5%	0.4%

3. It was evident that institutions had exercised considerable diligence in staff selection and in the review of outputs for submission. A total of 3,781 outputs were submitted and assessed, an average of 3.4 per headcount, compared to 3.8 in RAE2008. This reduction in average is accounted for by a number of factors including use of double-weighted outputs and a greater number of claims made by institutions for reductions on account of individual staff circumstances. The sub-panel noted that ECRs achieved a 3 per cent greater proportion of 4* outputs than the sub-panel average, suggesting that the field is attracting world-leading new entrants. The increase

in selectivity, coupled to increasing standards in the field, has resulted in a marked improvement in the quality profile for outputs in the UOA compared to 2008.

4. There has been a notable increase in the volume of interdisciplinary research addressed at global challenges such as sustainability, carbon reduction and resilience to climate change. Much of this research involved collaboration across disciplinary boundaries and the development of mixed methodologies, often as a consequence of significant investment in large interdisciplinary collaborative research projects by research sponsors.

Process

5. All outputs were allocated to a minimum of two panel members or assessors according to disciplinary expertise. In the majority of cases one assessor would be allocated all the outputs submitted by a particular individual with different second assessors allocated according to expertise. Thus most individuals' work was assessed by up to five different assessors. In most cases the scores of the two assessors were in close alignment; in the few situations where agreement could not be reached, a third assessor was called upon.

6. Where institutions had requested cross-referral to another sub-panel or where the sub-panel felt that it lacked the relevant expertise, outputs were cross-referred for advice. The final score for each output taking account of cross-referral advice was decided in discussion between the two sub-panel assessors.

7. During the early stages of assessment calibration exercises at main panel and sub-panel level were used to achieve consistency. Later in the process checks were made on the emerging profiles for disciplinary sub-areas to ensure that the sub-panel was confident that any differences reflected a genuine variation in quality and were not a result of the process adopted.

Impact

8. UOA 16 received and assessed 45 impact templates and 146 impact case studies. Case studies spanned a full range of the disciplinary coverage in the domain. Although there were a larger number in areas such as building science and engineering where objective evidence of the direct impact of excellent research in the submitting unit was perhaps most readily adduced, studies with outstanding impact were found across all disciplinary areas.

9. Evidence for impact of outstanding reach and significance was found in virtually all sub-disciplines. Especially strong cases showed long running user collaborations lasting in some cases over decades. These collaborations provided a pathway for users to help shape the direction of research in the unit, as well as for researchers to transfer the results of research to application in user organisations. Particular strength in research in support of policy and practice was noted.

10. The sub-panel noted that the assessment of impact in REF2014 brought substantial evidence of research in the UOA's remit bringing significant benefit to the UK's business services and practice in this domain, as well as to communities through the effects of impacts on policy. It concluded that the strength of the UK research base makes a significant contribution to the UK's dominant world lead in practice in the fields of planning, architectural design, building science, construction engineering and management.

11. There was significant variation in the quality with which evidence was given by different submitting institutions. The impact templates also varied in their quality. The best demonstrated a strategic approach on the part of the submitting unit to achieving impact from their research, with policies and support relevant to the context of the unit and to its disciplinary composition. At their

best, impact case studies established a direct chain between excellent research conducted within the submitting unit, and significant impact on defined beneficiaries, with the support of credible evidence for both the reach and significance of the claimed impact. In other cases this chain was less well evidenced. This was especially so where claims of impact were very far reaching, but where submitting units found it hard to establish either that the claimed benefit had accrued, or that it was their research specifically that had been directly responsible for the benefits found.

12. It was notable that it was harder for a case study to evidence the chain between the underpinning research and the impact claimed when a portfolio approach, bundling together a number of different impacts within a single case study, was adopted. The sub-panel saw both multiple research projects being bundled with a weak chain of evidence for impact, and single research projects for which multiple impacts were claimed, but not well evidenced.

13. User members noted in particular a need to ensure adequate dissemination of the results of research to firms and businesses who would benefit from these. It was noted that the professional bodies had an important role to play in translation of research to practice, and dissemination of results and innovations amongst their memberships.

Process

14. Impact templates were assessed against the stated criteria by all non-conflicted members and assessors on the sub-panel, prior to discussion in plenary and agreement of scores. Following a calibration exercise involving all sub-panel members and assessors, impact case studies were allocated to groups organised according to research subject specialism and the stated impact type. A user member or impact assessor with the appropriate expertise led each group. Case studies were scored initially by individuals and were then discussed by groups to arrive at a proposed score.

15. Scoring patterns by different groups were monitored and discussed in plenary, and cross-checks made to assure consistency in assessment. Recommended scores were agreed in plenary. The process was time consuming, but rigorous and equitable and we are confident gave a fair assessment of the reach and significance of the impact achieved during the period by research in the UOA.

Research environment

16. The environment statements and metric data submitted give strong evidence of the vitality and sustainability of research across the UOA as well as within individual submitting units. Many units had developed comprehensive research strategy and support processes and structures since 2008 and there was evidence of the effect of these on submissions. Strategies made specific reference to mechanisms designed to encourage innovation and sustainability for example through support for early career staff as well as by encouraging equalities and diversity.

17. The sub-panel found evidence of strong international collaboration and of UK units playing leadership roles in international research, both within the EU and further afield. Rapid urbanisation in Asia and the Global South appeared to be a major driver for international collaboration, with emerging collaborations driven by international firms in the technology sector. There was evidence of collaborations forming around emerging areas of intellectual and cultural interest or pressing societal or environmental challenges. Three main trends were notable.

18. First, there has been a year on year reduction in research funding from all sources for research in this field. This is surprising in view of the fact that the science budget has been ring-fenced, the urgent and pressing nature of the challenges facing the built environment, the centrality of the built environment to societal and planetary challenges of sustainability, climate

change and human wellbeing, as well as in view of the UK's world-leading position with respect to research and export of business services in this domain to a rapidly urbanising world context.

Total research income, by year, in real terms

Year	2008-9	2009-10	2010-11	2011-12	2012-13
Total research income	£45,648,797	£45,013,105	£44,946,176	£43,531,957	£43,204,806

19. Second, there has been a significant change in the concentration of research funding amongst institutions with both winners and losers of funding. The unit with the largest research income at the end of the period was only fifth largest at the start. A number of units had gained significant institutional and governmental support and investment, and this was reflected in notable improvement in the research environment over the period. Concentration and scale of unit in some cases also helped create a world-leading research environment, however size alone was no guarantee of sustainability.

20. The sub-panel noted that increasing concentration and the move by research sponsors towards larger grants appeared to increase volatility in income, and so might create vulnerability in the sector in future. It was also noted that medium-sized units were amongst the most productive of world-leading outputs, while some small units had taken the opportunity to specialise and innovate. Diversity in the national portfolio of unit type and scale was seen as a key strength.

21. Third, there has been significant investment in early career researchers in a number of institutions. Early career researchers were found to perform well in terms research output quality, so recruitment has been at high quality. There has also been an increase in PGR completions over the period, which given that the number of staff submitted to the exercise is less than in RAE2008, suggests a continuing improvement in researchers entering the field. This gives strong grounds for optimism regarding the vitality and sustainability of the field overall as well as of the specific submitting units concerned.

Research doctoral degrees awarded, by year

Year	2008-9	2009-10	2010-11	2011-12	2012-13
Doctoral degrees awarded	247	238	284	318	322

22. Almost all environment statements made specific mention of equalities and diversity with many showing evidence for the development of strategic responses to this agenda. A number of submissions were working towards or had achieved Athena SWAN, or were taking part in a pilot for the Equality Challenge Unit race and gender charter marks.

Process

23. All environment templates and metric data were read and assessed according to the criteria and working methods statement by all non-conflicted sub-panel members and assessors. Individual scores were compiled and each submission discussed in plenary prior to agreeing the recommended environment profile for the submission. Grade boundaries for environment were subject to a calibration exercise at main panel level.

Sub-panel 17: Geography, Environmental Studies and Archaeology

Overall outcome

Profile Type	%4*	%3*	%2*	%1*	%Unclassified
Output	22.1	42.1	30.6	4.8	0.4
Impact	34.3	42.2	19.3	3.9	0.3
Environment	40.9	38.2	17.2	3.4	0.3
Overall	27	42	26	5	0

Summary of submissions

1. The REF2014 assessment by Sub-panel 17 confirmed the leading position of UK research in Geography, Environmental Studies and Archaeology; a status reflected in world-leading (4*) qualities in outputs, impact and research environment. In RAE2008, Geography and Environmental Studies formed sub-panel H-32 and Archaeology, H-33; Table 1 shows two sets of aggregated data (double-counting the combined submissions) to facilitate comparison of REF2014 outcomes with RAE2008.

Table 1. Overall grade profiles for two subject groups assessed by Sub-panel 17, REF2014

Subject group Grades:	4*	3*	2*	1*	U
Archaeology and combined Submissions	26	39	30	5	0
Geography, Environmental Studies and combined Submissions	27	42	26	5	0

2. The table shows significant increases in the proportion of 4* in both groups compared with 2008, and over 95 per cent of the submissions show some evidence of 4* in their individual profiles.

3. The 74 submissions in UOA 17 were diverse, and included 22 Archaeology and 37 Geography submissions, plus 7 'combined submissions'; and 8 submissions in Environmental Studies, most of which focused on ecological aspects of the biological sciences. The 74 submissions returned 1,787 staff overall (1,686 FTE), including 365 early career researchers; their staff produced 6,021 outputs, supervised to completion 2,499 PhD students, and managed £381.4 million in research grants between 2008 and 2013. Relative to the submissions to RAE2008 sub-panels 32 and 33, there was a net loss of one unit and a gain of 56 FTE staff, but a reduction of outputs by 10.5 per cent, reflecting a general decrease in the average number of outputs per Category A staff member in REF2014.

4. Table 2 summarises variations amongst these submission types, based on averaged submission values. The average size of an Archaeology unit was just under 18 FTE, and the majority (12 of 22) were under 15, with only two larger than 34. The average size of Geography units was 29 FTE, slightly larger than in the 2008 RAE. Although some smaller units submitted in 2008 have disappeared, they have been replaced by others. The smallest Archaeology and Geography units in 2014 were both 4.2 FTE; the smallest combined submission and Environmental Studies units were slightly larger than this. There were proportionally slightly more ECR staff in Geography units than in Archaeology (21 per cent compared to 17 per cent), but combined submission units and Environmental Studies are perhaps more sustainable, with 26 per cent and 39 per cent respectively. Production of PhD theses reverses this pattern, however, with Archaeology staff supervising over two each, Geographers supervising 1.32 each, and staff in the other submission types responsible for fewer than one PhD completion each in the REF period. There were also differences in average total and per capita research income for the four types of

submission, the former obviously correlating with the average sizes of submitting units, and the latter reflecting the composition of different types of unit in terms of both subject matter and staff age profiles.

Table 2: Some characteristics of different types of submission to Sub-panel 17

Table 2 Subject	FTE staff	Max unit size (FTE)	Mean unit size (FTE)	Mean no. of ECRs	Mean no. of PhDs (/FTE)	Ave. research income (£k)	Ave. research income/FTE
Archaeology	393.5	60.9	17.9	3.2	37.51 (2.03)	4,378	191,100
Combined Submission	121.4	30.8	17.3	4.4	15.44 (0.83)	3,801	209,655
Environmental Studies	98.4	21.3	12.3	4.8	10.06 (0.77)	1,005	72,313
Geography	1072.3	62.9	29.0	6.1	40.15 (1.32)	6,773	200,665

Sub-panel membership

5. Several changes occurred in the membership of Sub-panel 17 during the REF cycle. Very sadly, Professor Bernard Smith died in 2012 after a stroke, having played a full and committed role in the early criteria-setting stage. One panel member and one user member had to resign during the course of the exercise. Additional expertise was sought following consultation in 2012, and four sub-panel members were appointed who enhanced coverage of Egyptology, geomorphology, and economic, social and development geographies, and who contributed wholly to the sub-panel's work.

6. The Statements of Submission Intentions received from HEIs in 2013 indicated that the sub-panel expertise needed to be increased to cover climate science, political and urban geographies, and ecology and environmental studies; and, again after consultation, appointments were made of five output assessors who contributed invaluable to the assessment of these areas. These data also indicated that impact case studies were likely in three broad areas: heritage, museums, archives and public engagement; social and economic policy and planning; and environmental policy and its application. To cover these broad fields, eight impact assessors were appointed; their contributions to the assessment processes for impact elements were of immense value to the sub-panel.

7. The sub-panel was indebted to its secretariat, including Katherine Branch in the criteria-setting phase of the REF and Jo Lakey and Michael Wykes in the assessment phase, for the efficient and cheerful management of the arduous task of keeping a complex process on track.

Assessment processes

8. Emphasis on harmonisation of assessment practice in REF2014 required a strong commitment to calibration. The sub-panel met in January 2014 before the formal cycle of sub-panel meetings began to undertake a calibration exercise for output assessment. The sub-panel met in the assessment phase for 16 days, to add to four days in the criteria-setting period, and intensive three-day meetings were essential in the period when calibration exercises dominated the sub-panel's business. The price of increased sub-panel size and greater complexity of assessment was a heavy increase in workload relative to RAE2008. Thus the economies of scale expected to result from combining Archaeology with Geography and Environmental Studies arguably did not arise and, in the light of this, reflection is needed on appropriate sub-panel composition (unitary, separate or some other arrangement) for any future exercise.

9. More broadly, however, the different academic constituencies on the sub-panel for REF2014 worked very well together, respecting different disciplinary cultures while nonetheless ensuring an overall coherence in the assessment process. As this was the first time that impact had been included, there were particular advantages for REF2014 in having a sub-panel with a broader disciplinary and practitioner base to establish a credible benchmark for future iterations of impact assessment, whatever the sub-panel structure involved in such iterations.

10. Calibration exercises were an important element of several meetings, and were conducted in groups with mixed membership. In assessing environment and impact templates and case studies, each submission was assigned to a pair acting as rapporteur and discussant, who presented a case for grading to a mixed group. For the environment template, the pair was of two appropriate panel members, while for impact templates and case studies, it was a relevant impact assessor and a panel member. Three groups assessing impact case studies were each led by three impact assessors with particular expertise – in the three broad areas noted above.

11. These procedures served to build trust, confidence and consistency across the sub-panel. In assessing outputs, every output was assigned to two readers. All archaeological outputs were independently assessed by two sub-panel-members. For other outputs, the allocations were to the most appropriate two panel members, and a process of moderation was adopted, with second readers being called upon to discuss grading in 15 per cent-20 per cent of the outputs. Where multiple submissions of outputs occurred, they were assigned to the same reader. Cross-referrals were made where additional expertise was required; the largest numbers were to Earth Systems and Environmental Sciences (SP 7) and Biological Sciences (SP 5), the latter being a significant change since 2008 and reflecting a change in the nature of the submissions characterised as Environmental Studies.

12. In the assessment of impact, sub-panel members and impact assessors collaborated extremely well, and constructive dialogue was maintained throughout. Much was learned in the process, notably by the sub-panel members from the impact assessors, and in practice it was rarely hard to reach agreement on grades, or consensus on the wider merits/demerits of impact claims. The impact assessors formally reported their confidence in the working methods of the sub-panel, and their satisfaction with the impartiality and fairness shown throughout the assessment of impact.

Outputs

Overview

13. Table 3 shows the output grade profiles achieved by the two sets of submissions also used in Table 1. Both have produced outputs of which more than a fifth were assessed as world-leading (4*), and a further 40 per cent as internationally excellent (3*).

Table 3. Overall output grade profiles for the two subject groups used in Table 1

Subject group Grades:	4*	3*	2*	1*	U
Archaeology and combined Submissions	20.4	38.5	35.1	5.8	0.3
Geography, Environmental Studies and combined Submissions	21.9	43.1	29.7	4.8	0.5

14. Submitted output types are summarised in Table 4. Of the 6,021 outputs, over 80 per cent were journal articles, with the majority of the rest being authored and edited books and chapters. Outputs submitted by Archaeology units were distinctive for having more books and fewer articles, reflecting the major reports of fieldwork typical of the discipline. In Geography and Environmental Studies, the proportions of outputs in books (authored, edited and chapters) were all lower than in

RAE2008. Over half of all authored books were submitted by archaeologists, and the number submitted by geographers declined relative to 2008. This justifies concerns expressed after RAE 2008 about the impact of research assessment on the continuing health of monograph publication in the discipline.

15. The opportunity provided in REF2014 for works of scale and scope to be double-weighted could have encouraged submission of more books, although double weighting was only requested for 23 per cent of the authored books submitted. Sub-panel 17 was distinctive in Main Panel C for the large number of books submitted, double-weighting requests made, and the high percentage accepted. In 2008, authored books submitted to sub-panel H-32 generally performed better than journal articles (they accounted for 15.1 per cent of 4* grades, although only 4.7 per cent of the outputs). In 2014, authored books (7.8 per cent of the total) accounted for 14.4 per cent of the total number of 4* grades, with a significantly higher proportion of double-weighted authored books being awarded the highest grade.

Table 4: The proportions of different output types submitted to Sub-panel 17

Type of output	Number	Percentage Overall	Archaeology Percentage
Journal articles	4,925	81.8%	54.2%
Chapters in books	420	7.0%	21.1%
Authored books	467	7.8%	14.5%
Edited books	119	2.0%	7.9%
Other types of output	90	1.5%	2.3%

16. A further summary in Table 5 is from an analysis of the journals in which articles were published, providing some context for the discussion of outputs below. Although the UOA covers a wide range of subjects, it remains surprising that the 4,925 articles were published in 1,025 different journals, of which 565 were used only once. This is a sign of healthy interdisciplinarity rather than a dilution of disciplinary identities, although the range of journals is still perhaps rather extreme. However, grades awarded to outputs took no account of the journal in which the output was published.

17. The most significant changes in the list in Table 5 relative to 2008 are the strong increase in Nature papers relative to Science, and the first appearances of PNAS and PLOS One. In a list of the top 20 Archaeology journals, the following also appear (in bold when also used in Geography and Environmental Studies): **Quaternary International**, World Archaeology, American Journal of Physical Anthropology, **Philosophical Transactions of the Royal Society B Biological Sciences**, Journal of Human Evolution, Cambridge Archaeological Journal, **Proceedings of the Royal Society B: Biological Sciences**, Oxford Journal of Archaeology and **Quaternary Research**

Table 5. The 20 most commonly used journals

Quaternary Science Reviews	157	ANTIQUITY: A QUARTERLY REVIEW OF ARCHAEOLOGY	55
Environment and Planning A	128	Geology	52
Transactions, Institute of British Geographers	121	PLoS ONE	50
Nature (incl. Geoscience and Climate Change)	94	Progress in Human Geography	46
JOURNAL OF ARCHAEOLOGICAL SCIENCE	87	Antipode	45
Geoforum	83	Science	45
PNAS	78	Urban Studies	45
Environment and Planning D: Society	67	Geophysical Research Letters	44

and Space			
Earth Surface Processes and Landforms	63	Annals, Association of American Geographers	41
Geomorphology	56	Journal of Quaternary Science	40

Note: Columns 2 and 4 give the numbers of papers returned, counting them only once if they were submitted to UOA 17 by different co-authors. Titles in bold were used by staff from all three areas covered by the UOA; those in small capitals were used only by Archaeologists.

I. Archaeology

18. Archaeology units achieved a higher number of world-leading outputs in REF2014 than in RAE2008, and these covered the major themes and periods of archaeology, as well as reflecting its global reach and impact on other disciplines. In the 22 Archaeology submissions, 318 outputs were graded at 4* (23 per cent). These included 39 double-weighted outputs (over half of this output category). The sub-panel found evidence of 4* outputs in all Archaeology submissions (single and combined).

19. The pattern of outputs in Archaeology (see Table 4) reflected the focus of the discipline on major fieldwork projects, historical narratives of regional and global scale, and analytical and theoretical engagement across the humanities, social sciences and sciences. The emphasis on books and chapters in books as outputs (44 per cent) reflected the scale and scope of the interdisciplinary ethos that underpinned the discipline. The ambition of archaeology as a discipline was well shown by its commitment to long-term projects, published in detail and within an interpretive framework that is theoretically dynamic and which achieves a high level of conceptual sophistication.

20. The sub-panel read more than 1,400 archaeology outputs from 29 units. The overriding impression was of a vibrant, innovative research discipline in which the key descriptors for the REF2014 were the **integration** of theory, methods and analysis and **collaboration** across both intra- and interdisciplinary communities. The strength of world-leading and internationally-excellent research confirmed Archaeology as an historical discipline with global relevance. There was very strong evidence that Archaeology achieved its potential as the historical bridge across the humanities, social sciences and biological, earth and physical sciences.

21. The strengths in **archaeological science** noted in RAE2008 have continued, and innovation is readily apparent. The revolution in direct analytical investigation was noted, with impressive results in isotope and ancient DNA studies and their integration in innovative multi-proxy approaches which take as their goal the investigation of people, resources and landscapes. There was abundant evidence that science-based theory and method were now as important in the social interpretation of the past as social theory is across the humanities. A particular strength noted was an engagement of materials and scientific artefact studies with social questions in historical archaeology.

22. Continuing this theme of integration, scientific dating continued to be a disciplinary strength. The sub-panel was impressed by both the range of uses for science-based advances in dating and the precision and accuracy which have come from the widespread adoption of Bayesian modelling. Since 2008, there have been major advances in refining chronologies to answer questions posed over the time-span of a human generation. Computer modelling continued to mature as an important area of archaeological research with notable achievements in 'visualisation' linked to field projects. The sub-panel also observed the world-leading status of the 'soft' sciences in archaeology, which included archaeobotany and archaeozoology as components within the vibrant field of bio-archaeology.

23. The REF2014 outputs emphasised the importance of **primary field data** to the discipline. Innovations noted previously in non-invasive field survey have matured, with a marked impact both on the accuracy of detail currently obtained from field-survey and on its scale. It has also prompted an exceptional increase in European Research Council (ERC) funding, much of it for new fieldwork. As a result, the scale of archaeological endeavour and fieldwork has grown significantly. As noted above, the high scores achieved by double-weighted items, many of which reported on team-based field-projects, as well as the authored monographs and the many edited volumes, captured the central importance that such research plays in the discipline.

24. The sub-panel found evidence for 4* outputs across the range of periods that archaeologists research. The UK's traditional strength in **Palaeolithic archaeology** and its contribution to interdisciplinary investigations in human evolution has been enhanced. Other world-leading areas included research on agricultural societies of later prehistory, where major advances have been made in understanding their social and ritual histories. Innovation in **Mediterranean research** was also evident in how this region is now integrated into wider, and more complex social networks. This strength continues into **Roman archaeology**, where a return to historical narratives about the empire, conducted at a wide variety of scales and regions, has reaped rewards. The sub-panel assessed several major monographs dealing with the **ancient civilisations of the Near East and Egypt**, where research has clearly led to closer and more profitable integration between material and textual evidence. A similar integration is evident in many of the outputs from the **Medieval period**, where UK archaeologists have embraced the explanatory power of material culture studies and applied it to large, complex datasets with great effect.

25. For a community of fewer than 400 staff, the geographical range of archaeological inquiry was compelling, with, as in RAE2008, research of world-leading quality tackling every continent except Antarctica. The sub-panel noted the growth of research in Africa and the Americas, as well as new foci of interest emerging in India and China. UK Archaeology, on the evidence submitted, continued to set international agendas across the continents, as well as in Europe, while the standards of research within the UK were acting as a benchmark for the subject globally. This leading position is based on the quality and scale of data recovery, as well as on the intellectual agendas explored.

26. Theory, the panel noted, has become less abstract and more focused on meeting the interpretive challenges of the explosion in large, high quality datasets. One example of this trend, representing a new avenue of research in the REF period, has been the field of conflict and post-conflict archaeology. Since RAE2008, archaeologists across the ancient world have witnessed the greatest and most rapid destruction ever of heritage assets, an urgent challenge that has been met by innovative research played out within a well-theorised approach to post-conflict heritage. Archaeology has also embraced the impact agenda by extending its research interests in the field of practitioner and community research. A trend which the sub-panel welcomed was the growth in interest in the 'archaeology of the modern', which promises much for a future REF exercise.

II. Geography and Environmental Studies

27. World-leading and internationally-excellent outputs in Geography were produced across the range of submitting units, in substantial numbers in certain units and with significant pockets of excellence elsewhere, with unmistakable evidence of a substantial overall rise in the quality of these outputs since RAE2008. The sub-panel found UK geographers setting intellectual agendas across the natural and social sciences, while also engaging the humanities and the life, health, computing and engineering sciences. There may be a genuinely **post-disciplinary** space emerging here, with UK Geography reaching into other scholarly domains, often invited by new

disciplinary partners, and with other disciplines now publishing in Geography journals and contributing to its conferences.

28. While human and physical geography outputs tend to differ markedly in epistemology and methodology, there has arguably been some meta-level convergence in their shared concern for human-environment relations, with new intersections arising around climate, water, flooding, pollution, flora and fauna. The outputs showed UK human geography confronting 'grand challenges', producing research which addressed the most pressing issues of environmental/climate change, water and food security, global conflict and conflict resolution, human rights and social justice, and health and well-being. Developing conceptual frameworks and innovating methodologically, this research was asking difficult questions and providing convincing answers, across global, national, regional and local scales. In parallel, UK physical geography and environmental studies have been prominent in revealing the complex dynamics of the global environmental system, adopting, where appropriate, the collaborative strategies of 'big science'. Outputs here also witnessed a broadening of spatial focus, linked to new understanding of relationships such as those between vegetation change and carbon fluxes, in northern latitudes (wetlands) and the tropics (forests), making good use of satellite remote sensing by exploiting its spatial and temporal resolutions very effectively.

29. While world-leading outputs still featured in Geography journals, there were also outputs in other disciplinary and cross-disciplinary fora (see Table 5). Human geography authors now rarely feel the need to proclaim their 'geographical' disciplinary identity, but rather excel in simply **demonstrating** what a 'geographical' perspective brings to the domains in question. In physical geography and environmental studies, the addressing of 'big science' questions has also led to collaborative work, multiple authorships, multiple submissions and publication in particular journals. There was thus a significant increase in the number of papers published in Nature in REF2014 relative to RAE2008 (94 compared to 38), in the first appearance of PNAS and PLOS in the top 20 journals, and in the position of Quaternary Science Reviews at the top of the list in Table 5.

30. The increase in output quality since RAE2008 reflects deliberate attempts to submit material expected to be graded better than 2*, which although 'internationally recognised', is deemed to be 'incremental'. This selectivity risks undermining the foundational role of such work, much scholarly/scientific inquiry being dependent on essentially incremental work. However, outputs to REF2014 generally displayed a more critical approach to the collection and interpretation of data, and to its inestimable worth in contributing to large datasets and modelling exercises focused on complex issues concerning environmental change, variability and ecosystem management. The more incremental work of ongoing scholarship and science has itself therefore been strengthened.

31. As noted in the Summary, units submitted as Environmental Studies in REF2014 differed from those in RAE2008, and their characteristics are reviewed with those of physical geography in section II.b below. However, 'environmental studies' may also be construed as the application of social sciences in environmental fields, as addressed in the following section on human geography.

II.a Human Geography

32. The sub-panel recognised a wide-ranging '**environmentalisation**' across UK human geography, entailing an infusion of research on 'nature-culture' assemblages, the 'more-than-human' and multiple 'ecologies', paralleled by a centring of long-term environmental (especially climate) issues and associated/emerging insecurities. Simultaneously, political economy was

being conjoined with political ecology, in parallel with serious attention to how 'vital geographies' and 'bio-political geographies' articulate, notably in novel studies of biosciences, biotechnology, biosecurity and bioethics across a diversity of sites and sectors worldwide. Some of this work was conceptually sophisticated, some methodologically pioneering, and some offered reinvigoration of older subfields (for instance, environmental-ecological economics and environmental politics/policy critique).

33. Another development was a pervasive move that foregrounded politics, policies and **justice**, in their many manifestations across different spaces and scales. Researchers were tackling environmental, climate, territorial and social justice, investigating socio-spatial inequalities (measuring areal deprivation and its underlying causes), governmental anticipations and actions (both exacerbating and alleviating inequalities), social movements and civil society, cross-border solidarities and cosmopolitanisms, and grassroots, community and neighbourhood experiences of injustice.

34. These broad-brush environmental and justice engagements blurred sub-disciplinary divisions of human geography, which are increasingly porous and mutually influencing. The sub-panel's impression is that UK human geographers were less circumscribed within sub-disciplinary fields. Insofar as they remained ready to deploy terminologies such as 'economic geography', 'cultural geography' and the like to reference substantive domains of the analytical world, it was rare for such deployment to imply a defence of specific silos of academic labour. For example, agricultural, rural, industrial and transport geographies – all traditional UK strengths – were less starkly demarcated components in a broader mix of disciplinary endeavour. More generally, the impression was that, rather than sub-disciplinary identities, it was the substantive themes, including the 'grand challenges' mentioned above, that were often shaping the research undertaken.

35. Nonetheless, some observations can be made along loosely sub-disciplinary lines. **Economic geography** was generating extremely strong work: the 'new economic geography' has gained remarkable traction, with contributions by geographers and economists in journals associated with both disciplines. There were also strengths in political-economic, cultural-economic and 'heterodox' economic geography. There were echoes of critiques of neoliberalism, but new work tackled financialisation and service economies, often with a convincing governance thread. Research on urban and regional economic geography displayed less innovation over the period, although work on resilience, clusters and learning was strengthened. The strongest **political geography** outputs offered new accounts of territory, boundaries and borders in novel, exciting and varied ways. Also notable were outputs exploring feminist and postcolonial geopolitics, while there was good work on geographies of governance, sometimes framed by the ongoing 'scale' debate. **Cultural geography** and **social geography** continued to be at the forefront of the UK's contribution, addressing issues, problems, oppressions and subversions integral to everyday social life with conceptual sophistication and methodological rigour. Notions of affect and emotion – of atmospheres and ambiances – were now familiar, but so too were diagnoses of power and resistance, violence and hospitality, paternalism and autonomy, alienation and participation, and fixity and mobility.

36. **Population geography** was well-integrated into other domains of human-geographical inquiry, and indeed, was probably **more** central to the discipline, given world-leading work on the biopolitics of life, death, sex, migration and refugees. Progress was also made in the sub-discipline more narrowly defined, with new knowledge and growing sophistication in probing datasets, refining geospatial referencing and calibrating spatial models. **Health geography** had strengthened, especially in more analytical domains that link to health sciences, but also in

qualitative and critical health geography – spanning global biopolitics to the vitality of the body. **Development geography** – often critiquing mainstream constructs of ‘development’ and providing alternative conceptualisations, informed by but not limited to post-colonial theory – was producing exemplary studies which blended theoretical insight with the historical depth afforded by archival inquiries or sensitive ethnographies. A specific strength was research that considered environmental (notably climate) change over varying time-scales, examining the implications of climate change for matters of ‘development’, livelihood and sheer survival across the Global South.

37. Insightful findings were produced by **urban geography** scholars researching UK towns and cities, where the best work consistently placed UK studies in wider international contexts. Excellent global urban studies outputs took seriously global relations and comparisons in many different registers. A concern might be the lack of attention to theorising ‘the urban’ from the Global South and the role of ‘Southern theory’ in challenging Northern orthodoxies. In **historical geography**, high quality outputs were being written about a breadth of phenomena, periods and places, showing that this sub-discipline broadened its foci considerably without sacrificing depth and rigour. Outstanding historical work was being undertaken throughout human geography, including a thorough attention to ‘temporalities’. World-leading work was particularly evident where historical sensibility and sustained archival inquiry addressed ‘grand challenges’, such as human responses to climate change, alongside themes of globalisation, imperialism, colonialism, exploration, science and medicine (including interfaces with science studies and histories of ideas).

38. Theoretical innovation has long been a feature of UK human geography, and the breadth of post-structural advances noted in RAE2008 continued to shape many outputs submitted to REF2014. The result was a distinctive but diverse ‘relational human geography’ arguably generative of a ‘spatial turn’ now percolating well beyond the discipline’s borders. In particular, the sub-panel noted an upsurge in theorising the ‘more-than-human’ (sometimes the ‘post-human’), informing the widespread ‘environmentalisation’ noted earlier. Such work provided high quality geographical inflections on phenomenological, non-representational and practice-based theories, and there were emergent attempts to connect this work with biopower and technologies of the self, ‘states/spaces of exception’ and ‘sovereignty’, and the psychodynamics of the unconscious. In the best work, conceptual insights were mobilised alongside detailed empirical scholarship; theory for its own sake was relatively rare, with conceptually-informed substantive engagement being commonplace. World-leading outputs in REF2014 drew from the enrichment and critique provided by feminist theory. Indeed, a ‘mainstreaming’ of feminist theory in UK human geography has yielded exceptional results, but has also led to some dilution of a distinctive corpus of ‘feminist geography’ per se. Whether this development implies some loss could be the basis for further critical reflection.

39. Deficiencies revealed by RAE2008 in the quantitative expertise of UK human geography have been remedied, and the sub-panel was impressed by the improved power of quantitative methods in many REF2014 outputs. While some mundane numerical work was still found, and there is room for more ‘meta-analysis’ of datasets, the sub-panel witnessed both wider use of quantitative methods and considerably enhanced sophistication in techniques of data mining and linkage, areal classification and delimitation, Geographic information systems (GIS) and automated cartography, and spatial model calibration. ‘Spatial econometrics’ was more prominent, often allied to research on urban and regional policy; environmental-ecological economics provided a renewed basis for analysis and evaluation; ‘agent-based modelling’ was being applied to a variety of human-geographical problems; and broader moves (organisational

and computational) were enabling UK human geography to tackle “big data”, longitudinal studies and multi-level modelling scenarios that also engage physical geographers.

40. There was also a maturation of qualitative work, with, for instance, more concerted effort to contextualise interviews conducted against other (e.g. documentary) data sources or to deepen the interrogation of individual narratives. In-depth, sustained ethnographies were evident, although there were a few instances where ethnographic empirics became over-burdened by theoretical ambition. Creative and experimental methodologies allowed a multi-sensory immersion in surrounding environments, chiming across to a range of participatory projects where artworks, installations, websites, events and exhibitions comprised active ‘co-productions’ of geographical knowledge. Methodologically self-conscious historical geography was relatively limited, notwithstanding the rigorous use of traditional archival methods. Some inquiries in both historical geography and the history of geography, however, had become more evidently ‘experimental’ in their engagement with unofficial, fragmentary, even ‘artefactual’ archives.

II.b Physical Geography and Environmental Studies

41. This review also refers to sub-disciplinary areas, although again the research it covers increasingly transcends these. It is also difficult to justify separating studies of contemporary processes and past environmental changes, since these are mutually constituted, but this is a convenient distinction as the former are more closely integrated with applicable research that leads to impact.

42. **Environmental processes.** Geomorphology, or ‘earth surface processes’, has continued to be an area of particular research strength in UK Geography, and the presence of the journals *Earth Surface Processes and Landforms*, *Geomorphology and Geology* in Table 5 attests to this. Its traditional morphological focus was being revitalised in REF2014 outputs through the use of digital elevation models, where in combination with process models and rigorous appraisal of errors, representation of land form in three and four dimensions provided the basis for understanding the evolution of topography.

43. What has long been a core area, **fluvial geomorphology** or **fluvial processes**, might now be better defined as **water science**, and recognised as a sub-discipline spanning hydrology, water chemistry, aquatic ecology, and river channels, hillslopes and drainage basins, and with a strong focus on applicable aspects of environmental management. Nevertheless, world-leading work on flow dynamics and sediment transport, and their upscaling to fluvial sedimentology and morphology, continued to be published in REF2014, often using innovative combinations of experimental work in the field and laboratory, coupled with numerical modelling (sometimes involving flora and fauna).

44. A particular development in RAE2008 that has broadened and deepened was a trend that has integrated hydrochemistry, environmental biogeochemistry and hydro-ecology and reflects the importance of two-way interaction between physical and ecological processes, and the subsequent influences on climate feedbacks, especially regarding fluxes and sequestration of carbon. This has given water science a global research agenda that has not only related to the understanding of recent and future climate change, but also provided insights into the increasing use of the water environment in global food production, waste disposal and water pollution and recreation.

45. Some outstanding work was evident in catchment-scale studies aimed at maximising ecological function and service provision in lotic systems, linking instream, hyporrheic and riparian habitats, with applied dimensions of this work generating biological and chemical tools for assessing the quality of water in relation to the requirement of the Water Framework Directive to

link reach and catchment scales. Hillslope process studies also increasingly bridged between the physical and the biological, and both in field experiments and in innovative numerical modelling examined the dynamic process links between runoff, vegetation, sediment flux and surface change, scaling up to landscapes experiencing climate and human land cover change pressures.

46. Other fields that were particularly strong numerically and in output quality included **aeolian process studies** and **glaciology**. A substantial body of work on **aeolian processes** showed evidence of a growing application of sophisticated field and laboratory techniques for monitoring and measuring processes and surface change at very short timescales, and up-scaling them to the landform scale. There was also work that monitored large-scale sediment fluxes, including a growing focus on dust and its contribution to atmospheric processes. Field-based studies were combined with a range of often innovative modelling approaches, from computational fluid dynamics to cellular automata.

47. High quality research was also evident in response to globally-important process-driven questions in **glaciology**, a sub-field that has grown considerably and is so strong now in the UK that it has matured to being a sub-discipline. 'Hot topics' amongst world-leading outputs in glaciology included the biogeochemistry of ice masses, and their influences on climatic feedbacks through efflux of carbon and methane; and the relationships between ice losses (both glacier thinning and calving at sea-water termini) and climatic warming, particularly with regard to sea level change and its prediction. Competition internationally in these fields is intense, and there has been a significant increase in short, high-impact papers. Quantifying (using remote sensing), understanding, and modelling processes of ice loss is a sophisticated area of research, and many papers displayed a high level of rigour and wide significance. A particular development was the application of experimental and numerical approaches tested initially on alpine glaciers to the larger-scale systems of Greenland and Antarctica, with a view to evaluating ice-climate relationships with global consequences. Although much work focused on quantifying recent changes in the cryosphere, and may have taken a large share of research funding in glaciology, a strong inquiry-driven quest remained for improving understanding of glaciers, ice sheets and their sedimentary and glacial geomorphological signatures.

48. Compared to RAE2008, there was a considerable expansion in outputs related to the development and application of state-of-the art computer climate models for studying contemporary and future climate change issues. In addition, strong statistical analysis of these models and observations was evident. Many of these studies were at the forefront of climate change research and contributed to international reviews such as the Intergovernmental Panel on Climate Change.

49. It was also encouraging to note that two areas identified as having declined in the review of RAE2008 have recovered; these are **coastal and marine processes** and **soil science studies**. Hydrodynamic modelling of **estuarine and coastal processes** appeared to be catching up with fluvial process studies, also with strong links to management (for example, in the simulation of the effects of managed retreat). There was also evidence of a growing body of work focussing on hard-rock coasts, including erosion rates and the vulnerability of such coasts to climate change and sea level rise impacts. In **soil science**, evidence of recovery since RAE2008 was seen in investigations of topics that span soil microbiology, carbon cycling, nitrogen leaching, and soil contamination and remediation. These again had a strong applied focus, and also perhaps experienced a resurgence because they contribute to inter-disciplinary approaches to big questions about the carbon cycle and the climate.

50. **Biogeography and Ecosystem Science**. In the returns to SP 17, research in these fields in Geography units was significantly strengthened by submissions from units that may be classed

as Environmental Studies. These submissions perhaps reflected the developing focus of SP 5 (Biological Sciences), and the displacement of whole-organism and ecosystem studies. This research theme covered a very wide range of studies varying in scope, scale and method; it included significant work on northern latitudes (especially wetlands) and the tropics (forests).

51. In **behavioural ecology**, there was a commendable richness in the range of taxa being exploited, from insects through to large mammals in terrestrial and aquatic environments. Some excellent outputs showed substantial innovation across all scales of enquiry, particularly in research design. **Phylogenetics** and **phylogeography** have seen the development of many studies involving plant and animal genetics. These included descriptive studies that play an important role in data provision, as well as inspiring innovative studies that tackled exciting biogeographical questions and harnessed genetics in addressing hypotheses concerning the spatial and behavioural characteristics of organisms, as well as their better identification. Finally, studies in **macro-ecology** reflected the growth in national to global scale datasets, and the way these were being critically evaluated is gratifying. Data included plants, insects, birds, and marine and terrestrial macro-fauna. This research related to issues of global environmental (including climate) change, and included such components as invasive species, range occupancy patterns and species energetics. Publications also often made excellent use of remote sensing and GIS to study macro-ecological patterns.

52. The assessment of eco-system services (including land uses, water services, ecological assets and amenity assets), was a strategically-important growth area. Indeed, the application of integrated methodologies for these assessments, especially at high spatial resolution, was providing an important bridge linking applied physical geography with environmental human geography and environmental studies. A more precise spatial component of the identification of potential and valuation of multi-functional ecosystem services was an important scientific and policy-relevant contribution that will continue to offer opportunities for research impact into the future.

53. **Quaternary science and environmental change.** These multi-disciplinary fields, concerned with the Quaternary past, recent change in the anthropocene, and the potential for future environmental change resulted in a substantial body of outputs. Some world-leading research was of a fundamental kind, defining the nature of proxy variables, and establishing chronological techniques. For example, there was a growth in the development and use of new biological and biogeochemical proxies for hind-casting environmental variables. This was a positive and noteworthy outcome of research over the REF period. Key outcomes have been improvements in the resolution and spatial scale of applicability, datasets that were assembled up to sub-continental and even global scales, and improved understanding and quantification of uncertainties.

54. There was agenda-setting research into the development and application of a range of dating methods (^{14}C , optically stimulated luminescence, ^{210}Pb , palaeomagnetism, tephrochronology), and this continued to be a key strength, enabling quantification of rates, magnitudes and frequencies of surface processes, landscape development and climatic and environmental changes. Such work also contributed notably to geoarchaeology and palaeoclimatology. However, applications of cosmogenic nuclides are relatively and surprisingly rare, and may have been submitted mainly to SP 7.

55. There continued to be a very strong body of research focusing on empirical and model-based reconstructions of terrestrial and marine environments of the past. Such research often had a strong international component, and increasingly resulted in data synthesis that has widened the impact of the work to a much larger community. There was also ongoing strength in detailed

site-specific analysis for key Quaternary terrestrial type-sites. Studies of the palaeoclimates of pre-Quaternary periods have also substantially increased.

56. Some case studies of environmental, landform and landscape change in specific regions resulted in high quality research and international collaboration, notably in cold regions and warm, dry regions. Quaternary research in the former continued to be a major strength of UK physical geography and environmental science, and displayed increasing rigour, with research in palaeoglaciology extending across wide geographic areas beyond the UK. In warm and dry regions, Quaternary research was also strong in UK Geography units, and used an increasingly sophisticated array of proxy records, especially in lake basins, but also in other environmental contexts, including dune fields. Research crossing into geo-archaeology was also evident, with 'big questions' being addressed through detailed multi-proxy site-specific studies, and through integrating evidence from multiple sites.

57. As noted above, there has been a resurgence in the number of outputs concerned with coastal processes and geomorphology, and this can only be welcomed in an island nation. Many of these studies were linked to interpretation of past sea level changes or to predicting the impacts of future climate changes. Geomorphological and environmental studies communities are now making significant contributions to debates in these areas.

58. Methodological developments. The global scope of physical geography research is often dependent on 'big data', and well-established methodologies for generating these – notably, remote sensing. The science of this methodology has continued a trajectory of maturity, with papers increasingly published in journals germane to fields of application (e.g. glaciology, ecology, land cover) rather than in specialist remote sensing journals. Nevertheless, innovation was evident in the combination of data from different sensors and platforms to enable mapping of particular surface attributes, and in the use of unmanned aerial vehicles in a range of different applications.

59. There was evidence of the continued generation of high quality palaeoecological and neoecological data and training sets, especially to support transfer function development related to climate and ecological change. There were examples of sophisticated statistical and modelling applications (e.g. mixed and predictive modelling) which added a demonstrable elegance and reach to data archives in both the palaeo- and neo-ecological arenas. Indeed, numerical modelling is now fully embedded in physical geography research of all kinds, often in conjunction with laboratory (e.g. flume) and field methods, and used experimentally, innovatively, and often in cutting-edge ways.

60. Beyond the issues related to data and their analysis, other technical developments were seen in the increasing applications of advanced geochemical, geophysical and biological techniques to answer a wide range of environmental and geomorphological questions. This is an important trend, and the methods were giving new insights into issues of environmental change and environmental management across a broad range of geological timescales and contexts. They included tephra studies, palaeoceanography, marine and terrestrial carbonate systems, and forensic science. These techniques also made substantial contributions to understanding contamination and remediation of soils, peatlands, surface waters and the urban atmosphere, particularly with regard to toxic metal species, and issues such as antibiotic resistance and radionuclide transfers to organisms.

Impact

Overview

61. The submissions showed that UK Geography, Archaeology and Environmental Studies were all able to provide, for HEIs, funders, government and other stakeholders, significant portfolios of high quality cases that displayed research making a real, substantial and evidenced difference to the economic, social and cultural well-being of communities, the health of environments, and the effectiveness of institutions in many different places. As Table 6 shows, over 70 per cent of these impacts were classed as having very considerable (3*) or outstanding (4*) reach and significance. The sub-panel was impressed by the range and diversity of the impacts, the number of impact case studies judged to have had high quality impacts, the range of units of different sizes and overall research strengths producing these impacts, and the diversity of forms of impact outcomes that could achieve the highest grades (and not only those with the most tangible of outcomes). These grades aggregate those for Impact Templates and Impact Case Studies (ICSs).

Table 6. Overall Impact grade profiles for the two subject groups used in Table 1

Subject group Grades:	4*	3*	2*	1*	U
Archaeology and combined Submissions	30.5	42.4	23.1	3.9	0.1
Geography, Environmental Studies and combined Submissions	33.8	41.2	20.7	4.0	0.4

Impact templates

62. The impact templates frequently provided convincing accounts of units' approaches, strategies and plans, often displaying enthusiasm for embedding impact throughout their research culture, governance and practices. The sub-panel found many outstanding examples of clear and realistic strategies for achieving future impacts, and a range of approaches for managing staff time, developing relationships with stakeholders and potential beneficiaries, and providing support for achieving impacts. The best impact templates explained the overall ethos for the unit's impacts, articulated a clear strategy for connecting impact domains, pathways and beneficiaries, and specified mechanisms of effective impact governance (impact officers, impact committees, reporting channels, funding streams and secondments); while also offering proposals about how future impact activities might be monitored, and of how feedback might loop between monitoring and impact governance.

63. However, the newness of impact assessment in REF2014 inevitably meant that some units were further along the path of developing impact activity than others, and some units produced impact templates that were weaker than their ICSs, suggesting that the formalisation of impact has lagged behind the grounded achievement of 'real world' impacts. Sometimes, the underpinning structures for delivering impact were less successful if they did not recognise specific disciplinary contexts or distinctive unit approaches, and failed to take into account the potential needs and contributions of beneficiaries in shaping research and its impact.

Impact case studies

64. The sub-panel witnessed a great variety of ICSs, ranging from applications of quantitative archaeological or environmental science, to events entailing qualitative encounters (exhibitions, films, story-telling, 'public' fieldwork, citizen science etc.). High- and low-quality impact was identified across this spectrum, with no simple correspondence between type of ICS and grade awarded. The best ICSs offered well-argued cases for integrated relationships between research, users, publication and impacts, presented a clear pathway from the underpinning research to the impact, and showed ample evidence of 'reach' and 'significance'. Within the three broad thematic

groups noted above (heritage, museums, archives and public engagement; social and economic policy and planning; and environmental policy and its application), ICSs had many generic properties.

65. There were, for example, many different types of intended beneficiary and again, no simple association between types and grades awarded. There were ICSs directed at public policy, from global through national, regional and local government scales, with research influencing policy mandates, guidelines and initiatives by major bodies, panels and commissions, and with impact pathways that sometimes led to 'tools' (technologies, software, methods) and even to practical and tangible changes 'on the ground'. There were ICSs directed at non-governmental organisations (NGOs) and voluntary/third sector organisations, with research influencing the pronouncements, practices and effectiveness of such organisations. There were ICSs directed at industry, occasionally through enterprises spun-off from HEIs, with research applications translated into successful products and services. There were ICSs directed at local communities and grassroots collectives, striving to improve livelihoods, health and well-being through the implementation of research findings, with researchers acting as advocates or looking to empower people in their own search for change. There were ICSs directed at 'the public', seeking to communicate research findings or scientific knowledge to particular constituencies through fieldwork, events, exhibitions, websites or other forms of outreach.

66. The relationship of researchers to beneficiaries was also diverse. In some ICSs the relationship was distant, with researchers depending upon intermediaries (public bodies, spin-off companies, etc.) to create and secure impact pathways. Such distance did not prevent the receipt of high grades. In other ICSs the relationship was closer, sometimes involving active co-production of the research with non-academic collaborators, the latter on occasion then doubling as beneficiaries of the research. The sub-panel was impressed by ICSs where the researchers had worked from the outset with input from those who might stand to benefit from the research. The best ICSs presented a convincing account of both impact domains (e.g. entrepreneurship, advocacy) and intended beneficiaries (e.g. industry, communities), with a strong narrative of impact pathways, leading from research undertaken, through applications, consultancy, briefings and outreach, to ensuring that beneficiaries truly benefitted. The best ICSs offered convincing evidence not only of impact per se, but also of the precise pathways from research through the contacts, influence and activity delivering the impact.

67. Some weaker ICSs sought to claim several different impacts in a single case study, and were then unable to provide underpinning research and impact evidence of uniform quality. Some were guilty of over-claiming impacts, whereas more successful submissions were realistic about the impact that they could legitimately claim. Some impact pathways were short and direct, while others involved a longer time period between research and claimed impacts, with many intermediate 'actors' involved (including other academics). Both kinds of pathway could earn high grades, but the latter were harder to evidence convincingly to show that the original research had a decisive influence all the way along the impact pathway. Some ICSs were unfortunately let down by being poorly articulated, failing to meet the requirements of the template, failing to match claims with evidence, and even offering supporting evidence that was difficult to access.

68. The ICSs needed to be carefully written to fit the template structure, which may have seemed to imply a rather linear model of research impact at odds with the recognition that not all impacts fit an implied 'research → publication → impact' model. One concern is that a template for reporting case studies may encourage an instrumental approach to research impact, leading to a prescriptive model of how units should be constituted, behave and respond to deliver high quality impact. This could inhibit imaginative, creative endeavours where outstanding impact

occurs spontaneously. There is a balance to be struck between formalising impact governance, and leaving room for creativity and simply being nimble in revealing impact if and when it emerges.

69. Some ICSs (and also impact templates) were fundamentally organised around dissemination activities (exhibitions, open days, public talks) and, as such, strained at the bounds of what has been understood as impact in REF2014. Some lower grades were awarded for this reason. Instances of impact activity with a disseminative flavour – in the public communication of science; in academically-led exhibitions and websites; in the enlisting of the public into fieldwork and site excursions – were nonetheless graded highly where the impacts of the dissemination were clear and evidenced (with detail, perhaps quantified, of the scale, scope and reach, and subsequent effects of the activity in question).

Assessment of ICSs

70. Deciding if ICSs met the threshold conditions sometimes proved difficult if the exact dates and institutional location of the research, or the extent of impacts continuing into the REF assessment period, were unclear (in the latter case if impact pathways extended over many years, and less obviously continued after 1 January 2008). Evaluating the strength of evidence for claimed impacts was taxing, as was judging the evidence of whether impact pathways properly linked underpinning research to claimed impacts. The quality of evidence presented in both respects was variable, and in some cases the sub-panel had to award lower grades. How to measure the evidence was also the subject of debate. Quantitative measures (numbers of people or localities impacted, percentage improvement in performance or savings, etc.) were helpful as evidence, but evidence did not always have to be quantitative to be convincing. Qualitative evidence (minutes of meetings, attributions in white papers, press coverage, testimonials, etc.) was legitimate where it matched the research and impacts involved. Independence of evidence from the researcher(s) was ideal, but could be difficult to realise in cases of genuine co-production, where collaborators were potential beneficiaries who might have also provided testimonies.

71. 'Reach' and 'significance' proved useful criteria for judging ICSs, if interpreted flexibly in relation to the character and scale of the impacts being assessed. Case studies claiming impacts on relatively small numbers of people could achieve high grades, as well as those claiming to reach large numbers. In fact, ICSs claiming influence over global agendas were sometimes difficult to validate. While 'reach' was not equated with geographical provenance, concerns still arose about what kind of 'reach' ought to be regarded as more 'significant'. There could (and should) be no single answer: both varieties of ICS here could score highly or lowly, depending on the quality of the evidence presented for the original research, for the pathways to impact and for the impact itself.

72. A related issue concerned the variable 'geography' of evidence for impact. It was undoubtedly hard to acquire clear-cut, verifiable evidence from particular people and places, notably (but not exclusively) in the Global South where official record-keeping, evaluation and attribution of research influence (in policy statements, etc.) may all be relatively limited. It was therefore harder to assess some 'overseas' ICSs, and evidence had to be judged against what was likely to be feasible in particular cases. A larger issue, however, is that the sub-panel considers it vital that submitting units continue to see 'overseas' research as a viable source of credible impact case studies, and it is essential that future REF exercises are not constructed in ways that risk precluding ICSs based in the Global South, or indeed anywhere where securing the required evidence may prove challenging.

I. Archaeology ICSs

73. Some of the strongest Archaeology ICSs were in areas where research directly impacted on professional archaeology, museums, policy and heritage management, but others included research areas in agriculture, food, wildlife conservation and conflict resolution. A significant proportion of archaeology impact case studies involved different forms of public engagement and dissemination based on the results of archaeological research.

74. II. Geography and Environmental Studies ICSs.

75. ICSs with outstanding reach and significance were representative of the three broad areas identified in the Summary, although many contained aspects of more than one (for example, environmental governance). About 10 per cent were in areas of public engagement and understanding, including heritage, finance, science and technology, and political institutions. The rest were split evenly between environmental and socio-economic themes. The former included several focused on European environmental regulation, and others on hazard assessment and management, climate change adaptation, forest management, etc.; the latter included governance, politics and territory, health, social and income inequalities, transport, regional and economic policies, and ecosystem service accounting.

Research environment

Overview

76. Units submitting to Sub-panel 17 displayed diverse research environments, configured variously in terms of size, organisational structures, internal arrangements (in terms of groups, themes, clusters, etc.) and levels of infrastructural development and support. Some environment templates (ETs) were presented in a 'top down' fashion, driven by HEI structures and procedures; others were more 'bottom up' and with scant reference to their HEIs; both could earn high grades, however. There was no necessary link between size (number of Category A staff submitted) and grades awarded for an ET. Disparities did emerge between environment and output profiles for some units, but in such cases the sub-panel assured itself that no misjudgements had been made in the gradings of either element. Table 7 shows that 75 per cent of the research environments were deemed to be conducive to internationally excellent (3*) and outstanding (4*) research.

Table 7. Overall Environment grade profiles for the two subject groups used in Table 1

Subject group Grades:	4*	3*	2*	1*	U
Archaeology and combined submissions	42.4	35.0	18.1	4.1	0.3
Geography, Environmental Studies and combined submissions	37.6	40.2	18.4	3.5	0.3

77. In some cases excellence was enabled through a 'big science' approach, with sizeable clusters of cognate researchers supported by state-of-the-art facilities, while in other cases it resided in the efforts of scholars primarily needing the availability of time for dedicated activity. In many units, such models co-existed well, although managing their sometimes competing demands for delivering excellent research could be a challenge (as addressed in some of the best ETs). Table 8 summarises some indicators of research environments in the two subject groups adopted in this report.

Table 8. Summary statistics on research indicators for the two subject groups in Table 1 (here based on summing and averaging across all submissions in each set)

	No. of Sub-missions	No. of PhD completions	No. of PhD completions per FTE	Total grant income, £m	Total grant income, £m, Research Councils etc.	Total grant income, £m, EU	Total grant income, £m, Industry	Total grant income, £m, charity
Archaeology and combined Submissions	29	933	1.8	122.9	35.7	25.0	25.4	12.4
Geography, Environmental Studies and combined Submissions	52	1674	1.3	285.2	125.4	42.0	24.6	17.8

78. Staffing policies were better articulated than in RAE2008, and the evidence presented for their implementation more convincing. There were good instances of support for equality in a number of ETs, with evidence of proactive recruitment strategies, international hiring, and of units seeking to improve gender and ethnicity ratios, and demonstrating the local relevance and application of core equality and disability principles. There were extensive examples of best practice, of a few units that were leading or central to their host HEI's initiatives, and of attaining external recognition by awards such as HR Excellence in Research and Investors in People. In particular, the sub-panel was impressed by strategies now in place to address equality and diversity issues throughout the research environment. One indication is that 101 ECRs were returned in the Archaeology group of units (circa 20 per cent of the REF2014 headcount), and 295 in the Geography group (23 per cent).

79. A conspicuous strength of research in the Sub-panel 17 disciplines is their commitment to researching 'overseas', and it is recognised that the major time, logistical and language commitments required for generating high quality research outside the UK, particularly in the Global South, sit uneasily with standard expectations about the time-frames of academic production. Such research cannot always fit neatly into the time-scales of PhDs and research grants. The sustainability of such research will depend upon having an overall research 'environment', in which units, HEIs and funding bodies continue to fund 'overseas' fieldwork and release the necessary research leave periods.

I. Archaeology

80. The sub-panel found abundant evidence of strategic support by HEIs for their Archaeology units. This had led to widespread investment in staff and infrastructure. These strategic initiatives were sector wide and resulted in a rich research dividend. The evidence for infrastructure included new buildings, laboratory refurbishment, additional library provision to meet the needs of open access, and investment in computing to enhance both fieldwork and the analysis of primary data.

81. Archaeology saw very significant growth in competitive research funding between RAE2008 and REF2014. The Archaeology group in Table 8 achieved research funding of £122.9 million, an increase of 42 per cent over RAE2008. Particular achievements noted in the research funding in this group include an increase in RCUK funding from RAE2008 by at least 25 per cent;

significant growth in funding from the EU, industry and UK charities (see Table 8); an increase since RAE2008 in EU research income notably because of widespread success with ERC funding schemes; increase in industry funding by circa 60 per cent in the same period reflecting Archaeology's engagement through research with the commercial sector; but a decrease in research income from UK charities which the sub-panel interpreted as evidence of strategic decisions by archaeologists to switch emphasis away from grants with no indirect costs or Full Economic Costing, thereby benefitting their HEIs.

82. In REF2014 continuing success with the Arts and Humanities Research Council (AHRC), the Natural Environment Research Council (NERC) and the British Academy was augmented by ERC funding. This new success was shared across many units and included grants to both early career and established researchers (five starting and 18 advanced grants awarded in the REF period). The levels of research funding obtained by the predominantly medium-sized and small Archaeology units were impressive.

83. Postgraduate research in Archaeology was particularly impressive. In spite of a national decline in the availability of RCUK studentships, Archaeology continued to attract, train and support large numbers of PhD students, with completions increasing from 767 in RAE2008 (26 submissions and 7 years) to 933 in REF2014 (29 submissions over 6 years; Table 8). These students experienced enhanced support and supervision, and the sub-panel found repeated evidence of the central position of postgraduate students in the research environments of Archaeology units, and welcomed this investment in training and nurturing the next generation of researchers and academics. Archaeology PhD completions increased from 1.5 per staff FTE in RAE2008 to 1.8 in REF2014.

84. The status of UK Archaeology as the leader of an historical discipline with world relevance was supported by evidence provided by the submitted units of individual and unit esteem, and of major contributions to national and international research agendas, frequently involving leadership. UK archaeologists sat on advisory bodies of major research and heritage organisations, and participated widely in panels which awarded research funding. They served as editors, and on the editorial boards, of internationally renowned journals. They were called to give advice on issues relating to all aspects of heritage and to shape policy at local, national and international levels. The scale and diversity of knowledge-networks created by UK archaeologists was impressive, and these networks were testament to the continued vitality and significance of the discipline of Archaeology and its importance to UK Research in the humanities, social sciences and sciences.

II. Geography and Environmental Studies

85. UK Geography is in excellent health, and there is evidence that sub-disciplinary/thematic research areas and submitting units are, in the main, sustainable over at least the medium term (the next 10-15 years). Nonetheless, there is no room for complacency, and it is essential to ensure the continuing support of RCUK for the breadth and diversity of Geography's research endeavour, in terms of investing in people, infrastructure and facilities, as well as ongoing efforts to secure financial support and wider recognition for research excellence and high quality impact. Table 8 shows the strength of external research income generation in the Geography group of 52 units with 1,292 FTE staff, where it is notable that almost half of the £285.2 million total is derived from the UK research councils, and 15 per cent from the EU. In RAE2008, the 1,120 Category A staff in 49 units earned £196.6 million in total, and the research council proportion of this was a third. This is a 25 per cent increase in total income per capita in REF2014, and an even greater increase in research council support. The REF2014 data also show a systematic increase in research funding through the REF period, notwithstanding the effects of recession.

86. Convincing strategies and mechanisms were reported by most Geography and Environmental Studies units. A distinct strength of UK Geography lies in its PhD students, and the sub-panel was impressed by the evidence provided from many submitting units of sizeable PhD communities central to overall unit research cultures. Several units were evidently very active in encouraging their PhD students to publish journal papers and present at international conferences. However, there are some concerns about conversion of the discipline's PhD cohort into ECR positions. There was strong evidence of growing success in securing PhD funding from a variety of sources (the Economic and Social Research Council (ESRC) and NERC but increasingly AHRC too, as well as the Engineering and Physical Sciences Research Council (EPSRC), the Biotechnology and Biological Sciences Research Council (BBSRC) and the Department for International Development (DFID)), and it is notable how many units have been leading in the running of (cross-disciplinary) ESRC/AHRC/NERC doctoral training, postgraduate consortia and collaborative award initiatives. There was also evidence of units mounting successful Masters-level training programmes, an important platform for securing '1+3' PhD studentships and providing valuable advanced research-based learning more generally.

87. There could have been stronger and more differentiated statements about support for both ECRs and postdoctoral researchers, and especially about ensuring equality of career development routes for contract researchers. Some units mentioned the deployment, sometimes on fractional contracts, of retired/emeritus staff, with innovative ideas about their role in mentoring and succession planning. This suggests an aspect of equality and diversity – to do with scholars at the latter end of their careers – which would repay more attention in future.

88. Evidence of national and international collaborations is widespread throughout UK Geography, and was amply demonstrated in the ETs, in the co-authorship of outputs and the documentation of impacts. There can be no questioning the internationality of UK Geography, nor the readiness of researchers to collaborate with a diversity of academic colleagues in many different institutional locations and, echoing earlier claims, other disciplines. However, UK Geography may not be equally global in its substantive research interests and related collaborations. A UK, North American and European focus for both research and collaboration is unsurprising, but there is perhaps not as much research in/on Latin America, notably Latin American cities, as might have been anticipated. There may also be a relative imbalance towards Sub-Saharan Africa compared to the rest of the African continent. There are signs that China is emerging as both a research location and a source of collaboration, particularly in physical geography; there may be cause for reflection on reasons for the relatively limited evidence of published outputs based on this research and collaboration.

Sub-panel 18: Economics and Econometrics

Quality profiles

Profile type	4* (%)	3* (%)	2* (%)	1* (%)	UC (%)
Overall	30	48	19	2	1
Outputs	27.7	48.9	19.8	3	0.6
Impact	36.3	44.7	14.1	3.4	1.5
Environment	33.4	48.6	17.6	0.4	0

Summary of Submissions

1. 28 submissions were made in the UOA, seven fewer than in RAE2008. 756 FTE (Category A) staff were included: a reduction of 9.8 per cent from 2008. 2,600 outputs were submitted, 14.4 per cent fewer than in 2008. 3.26 outputs were returned per person, down from 3.45 in 2008. Seven submissions returned more than 110 outputs, 12 between 70 and 110, and nine fewer than 70. As for impact case studies, 101 were submitted for assessment; two submissions included six or more, nine included four or five, and 17 submitted two or three.
2. It is noteworthy that all institutions submitted in UOA 18 have some outputs assessed as world-leading, and all have some environment and impact scores of at least internationally excellent quality. As far as the overall quality sub-profile is concerned, the relatively high average scores for Economics and Econometrics reflect both selection effects (discussed below) and the exceptional performance of the highest-scoring institutions. The latter is especially true of world-leading quality: out of 28 institutions submitted in UOA 18, nine have over 20 per cent world-leading grades, with an average of 49 per cent, while the remaining 19 institutions have on average 13 per cent world-leading grades. The profile of internationally excellent and world-leading quality scores combined is less concentrated: 12 institutions have over 80 per cent of scores at this level, while 21 have over 60 per cent. Putting this differently, using a weighted-average grade, the average institution in the top quartile had 53 per cent world-leading grades and 40 per cent internationally excellent grades. By contrast, the average institution in the bottom had 8 per cent world-leading grades and 44 per cent internationally excellent grades.
3. As in most if not all UOAs in Main Panel C, the ranking of UOA 18 sub-profiles shows a tendency, on average, for Environment scores to be somewhat above Impact scores, and for both to be above Output scores, in institutions with the highest overall quality grades; the reverse tendency is exhibited by those institutions with the lowest grades. However, all three sub-profiles are closely bunched together to a greater extent than in other sub-panels in Main Panel C.

Outputs

4. With 2,600 outputs submitted directly in UOA 18, all sub-fields of the discipline were well represented. Fortunately, the wide expertise of sub-panel members made it possible to grade almost all these outputs directly, with only a few very specialised outputs in Mathematics and Psychology being cross-referred to other sub-panels. Consistency of grading across sub-panel members was assured by assigning a significant number of outputs to more than one reader, by extensive cross-checks throughout the process, and by a detailed econometric analysis of all individual grades by Sub-panel 18 members towards the end of the process. The latter showed no statistically significant difference in output profiles between sub-panel members when controlling for a number of characteristics of submitted outputs.
5. The largest category of outputs submitted was journal articles (2,386), with only SP 17 and SP 26 receiving a larger proportion in Main Panel C. Significant numbers of working papers

were also received (168) as well as some book chapters (28) and authored books (14). Only two claims for double-weighting were received, both in respect of authored books. The sub-panel found instances of world-leading or internationally excellent quality in all forms of output submitted, though the proportion was higher in the case of journal articles, reflecting the rigorous process of peer review which is now the norm in economics journals.

6. The sub-panel judged that there was strength in all areas of the discipline, including microeconomic and econometric theory, as well as in macroeconomics and more applied fields such as labour, industrial organisation and international economics. Newer fields such as experimental economics and political economy were also well represented. A small number of outputs were submitted in economic history, and an even smaller number in 'heterodox' economics. Nevertheless, reflecting worldwide trends in the discipline, many outputs, including many of those ranked world-leading, dealt with topics outside the traditional boundaries of economics. Typically these did not involve multidisciplinary per se, but rather the application of quantitative economic tools, both theoretical and empirical, to questions more usually studied by other social sciences. Of course, many more outputs dealt with both theoretical and empirical topics recognisably within the traditional confines of economics.

7. The sub-panel was impressed by the consistently high level of rigour which was exhibited by the vast majority of papers submitted. However, technical rigour alone was not sufficient to guarantee a high grade. Only outputs that exhibited appropriate levels of originality and significance in addition to using rigorous methods were graded as internationally excellent or world-leading. This was in line with the published criteria, and also reflects worldwide trends in economic research, where rigour is now viewed as a necessary but not sufficient condition for excellence. The sub-panel was also impressed by the high standard of empirical work submitted in many fields. Most empirical papers paid careful attention to identification strategies, or to establishing that the evidence reflected the mechanisms being studied, rather than confounding factors.

8. Compared to RAE2008, the proportion of Economics and Econometrics outputs awarded high grades rose slightly. The proportion of world-leading grades in UOA 18 rose by 1.2 percentage points from 26.5 per cent to 27.7 per cent, while the proportion of world-leading and internationally excellent grades combined rose by 2.8 percentage points from 73.7 per cent to 76.5 per cent. At the same time, the absolute number of outputs awarded high grades fell somewhat. The main explanation for the simultaneous fall in absolute numbers and rise in the proportion of high-scoring outputs appears to be the extreme selectivity of submissions in UOA 18. REF2014 continues the trend already clear in RAE2008: no post-1992 universities were submitted, while the preponderance of Russell Group universities has increased. The seven universities submitted to Economics and Econometrics in RAE2008 but not in REF2014 had the seven lowest average scores in RAE2008. All seven submitted economists in UOA 19 (Business and Management Studies) in REF2014.

9. As in RAE2008, a considerable number of outputs that were submitted in UOA 19 (Business and Management Studies) by economics groups in business schools were cross-referred to Sub-panel 18. In total, outputs cross-referred from Sub-panel 19 constituted just over a third of all outputs graded by Sub-panel 18 (1,361 out of 4,014). While many of the cross-referred units were relatively small, the list included 15 institutions where 30 or more outputs were cross-referred to Sub-panel 18, indicating that significant economics groups exist in a number of business schools.

10. A number of the groups cross-referred from Sub-panel 19 had output sub-profiles comparable to the best units submitted directly in UOA 18. For example, the output sub-profiles of

the three strongest departments submitted directly in UOA 18 and those of the three strongest cross-referred groups were very similar. However, on average, outputs submitted directly in UOA 18 were assessed to be of a higher quality than those cross-referred from Sub-panel 19: a smaller proportion of cross-referred outputs were assessed to be at the world-leading 4* quality level, although the vast majority were assessed as being of an internationally-recognised quality at 2* or above. Considerable attention was paid to establishing that this pattern did not reflect any bias in grading, and that the same standards were applied to both groups of outputs. Suggestive evidence of lack of bias comes from the 103 outputs that were submitted by different co-authors in UOA 18 both directly and via cross-referrals from Sub-panel 19. For the minority of these outputs that were initially graded differently, the differences in grade were equally split between higher and lower grades. (As in all cases where initial grades differed, these differences were eliminated when the grades were concurred). More formal confirmation of the lack of bias came from the detailed econometric analysis of all individual grades by Sub-panel 18 members already referred to: this showed no statistically significant difference between the output profiles for outputs submitted directly in UOA 18 and those cross-referred from other sub-panels, when controlling for a number of characteristics of submitted outputs.

11. Sub-panel 18 was the only one in Main Panel C which made use of citation data. These were provided on a comparable basis from a leading commercial dataset. As they referred to a specific date at the end of the assessment period, considerable care was required to ensure that they were applied appropriately to outputs which were published at different times over the six-year period. Though the citation data were useful in confirming a number of marginal judgements, there were very few cases where the presence or absence of citations, or their number, affected the grade awarded to the output.

12. Sub-panel 18 was also unusual in Main Panel C in that a number of institutions submitted co-authored papers more than once: in total, 18 papers of this kind were submitted twice, 13 by a single institution. The 'Panel Criteria and Working Methods' (para. 48) allowed this for 'substantial pieces of co-authored work', requesting a statement 'to **demonstrate** [bold added] that each co-author or co-producer's contribution has been substantial.' In a number of cases, either no accompanying statement was included, or it took a generic form which did not make a distinctive case for submitting the output twice. Having taken advice from Main Panel C, the sub-panel gave very careful consideration to whether, notwithstanding the inadequate accompanying statements, a case could be made for accepting that the outputs were substantial and that both authors had made substantial contributions. On the basis of the content of the outputs, the sub-panel took the view that this was true for some of them, but not for all. In a significant number of cases an 'Unclassified' grade was entered for one of the authors of the submitted outputs.

Impact

13. Assessing the quality of impact case studies and templates was enormously assisted by the expertise and experience of the very senior and high-profile impact assessors who joined the sub-panel for this stage of the evaluation process. Notwithstanding the fact that this was the first time that institutions were required to show the impact of their research, the quality of the case studies submitted was impressive. Perhaps it is not surprising that it proved relatively easy to see potential links between economic research and economic impact. Both sub-panel members and impact assessors were impressed by the careful ways in which the channels of impact were documented. Successful routes to impact included some examples of long-standing institutional commitment to public engagement and dissemination of research findings to potential users, but also examples of serendipitous impact where academic work not explicitly targeted at policy debates was shown to have an unanticipated but significant impact on users. A large proportion of

the impact case-studies submitted related to effects on UK government policy, both macroeconomic and microeconomic, but a sizeable minority related to impact on policy by international institutions.

14. As made clear in the guidelines, the quality of the underlying research was only a threshold requirement, and, once it was agreed to be of internationally recognised quality, it played no role in the evaluation of the impact case study. (A very small number of case studies were deemed to be 'Unclassified', in all cases because the sub-panel did not accept that the underpinning economic research was of internationally recognised quality.) Nonetheless, it was striking that many of the highest-ranked case studies were underpinned by research that was itself of world-leading or internationally excellent quality.

Research environment

15. Environment has been part of the research assessment process for some time, so it was to be expected that best-practice approaches have disseminated throughout submissions in the UOA. The sub-panel was nonetheless impressed with the procedures that most submitted units had in place for fostering research, supporting graduate students and early career researchers, and encouraging diversity. Especially at the highest-scoring institutions, but broadly speaking in almost all cases, there were many examples of international linkages and wider contributions to the discipline, testifying to the high degree to which UK academic economics is integrated into the worldwide profession.

16. The overall proportion of submitted staff on fractional contracts was higher than in RAE2008, for the most part reflecting a welcome improvement in the flexibility of employment contracts and a greater diversity of personal circumstances. However, the sub-panel noted that a number of units submitted staff on fractional appointments, whose primary affiliation was with institutions overseas. Moreover, in some cases these staff were employed at the submitting unit on short-term contracts beginning shortly before the REF census date and/or ending shortly afterwards. Many of the outputs of these staff were graded as internationally excellent or world-leading. For the majority of units, these outputs did not constitute a large proportion of the total submission, and so did not appear to pose a challenge for sustainability. Nevertheless, the sub-panel was not persuaded that the contribution of these staff to the unit's research environment was of the same order of magnitude as their contribution to the quality of outputs.

Sub-panel 19: Business and management studies

Quality profiles

Profile type	4* (%)	3* (%)	2* (%)	1* (%)	UC (%)
Overall	26	43	26	4	1
Output	20.5	42.8	30.1	5.8	0.8
Impact	37.7	42.5	17.0	2.2	0.6
Environment	36.8	39.7	21.0	2.4	0.1

Summary

1. Though it bears the same name as in RAE2008, the remit of the UOA was broadened to include research in Accounting and Finance (AcFin), which was a separate UOA in RAE2008. As in RAE2008, research outputs that fell within the remit of the Economics and Econometrics UOA were cross-referred for assessment to Sub-panel 18, via a common panel member. The Economics and Econometrics sub-panel recommended grades to the Business and Management Studies sub-panel. Table 1 summarises the main differences between the submissions to the sub-panel compared and those submitted to the two sub-panels in RAE2008.

Table 1 Comparison of submissions to REF2014 compared with RAE2008

	REF2014	RAE2008	
	Business and Management Studies	Business and Management Studies	Accounting and Finance
Submissions	101	90	14
FTE staff	3,320	3,338	160
Outputs	12,204	Approx. 12600	Approx. 600
Impact cases	432	n/a	n/a

2. Amongst the 101 submissions were some from institutions that did not make a submission in the Business and Management Studies UOA in RAE2008. A comparable number that did submit to RAE2008 did not submit to REF2014. The 3,320 FTE staff submitted amounted to 3,602 on a headcount basis, of whom 731 were designated as ECRs.

3. Table 2 compares the average overall profile, weighted by size of submission, which resulted from the assessment process during REF2014, with comparable statistics from RAE2008. Note that the RAE2008 sub-profiles for each submission were rounded to 5 per cent, whereas the granularity was 1 per cent in REF2014. Table 2 shows that research performance has improved significantly since 2008 and that almost 70 per cent of work was assessed as 3* or 4*. This is clear evidence of the increasingly high quality of UK research in business and management studies.

Table 2 Overall quality profiles, REF2014 compared with RAE2008

		4*	3*	2*	1*	u/c
REF2014	BMS (UOA 19)	26%	43%	26%	4%	1%

RAE2008	BMS (I36)	17%	36%	33%	13%	1%
	AcFin (I35)	7%	37%	39%	15%	1%

4. In RAE2008 and REF2014, institutions were able to decide how selective they would be in including staff whose research outputs would be submitted for assessment. Therefore the quality profiles relate only to those staff included.

5. The sub-panel was delighted to see that submissions included a significant proportion of ECRs, but was concerned that some of these were appointed rather late in the assessment period, which may have had a disproportionate effect upon the profile of some institutions. Similarly the panel was concerned about the inclusion of some visiting staff on part-time contracts; particularly those with substantive appointments in other countries, who were appointed late in the assessment period, with contracts that concluded shortly after the end of the assessment period.

Sub-panel working methods

Membership and expertise

6. The full membership of the sub-panel consisted of 23 academic staff and one user representative, all nominated by relevant bodies. Of the 23 academic members, 13 had served on either the Business and Management Studies or Accounting and Finance sub-panels in RAE2008, offering continuity in terms of standards and methods of working.

7. The sub-panel was supported by a further eight impact assessors, who worked with sub-panel members to assess research impact. There were also three further academics who acted as output assessors, taking a share in the assessment of research outputs.

8. The main areas of competence covered by the members of the sub-panel included: Accounting, Corporate Social Responsibility, Critical Management Studies, Econometrics, Economics, Employment Relations, Entrepreneurship, Finance, Information Systems, Innovation, International Business, Leadership, Management, Development Education and Learning, Management Science, Marketing, Operational Research, Operations Management, Organisational Psychology, Organisation Studies, Project Management, Public Management and Administration, Service Operations, Small Business, Strategic Management and Technology Management.

9. The sub-panel recognised that outputs could not always be characterised as falling neatly into these sub-fields and aimed to ensure that their distribution and assessment were sensitive to other categorisations such as theme, sector or function. The sub-panel was pleased to see work of an interdisciplinary nature not only across these sub-disciplinary fields but also across the social sciences more generally, and into science and medicine.

Roles and responsibilities

10. The sub-panel Chair (Professor Pidd) and Deputy Chair (Professor Broadbent) worked closely together, ably assisted by the sub-panel secretary and adviser. Each full member of the sub-panel had four main roles:

- a. **The assessment of outputs within their competence.** Professor Blackaby also acted as a conduit to the Economics and Econometrics sub-panel.
- b. **Main coordinator for a set of submissions.** This role involved taking the lead in assessing the quality of the research environment and ensuring that all work in their submissions was assessed in the time available.

- c. **Deputy coordinator for a set of submissions.** This role involved working with the main coordinator to agree recommendations to the sub-panel.
- d. **Assessing the quality of research impact.** working closely with the impact assessors to agree recommended grades for impact cases and impact templates.

11. As noted earlier, three additional output assessors were added to the sub-panel who read and recommended grades for the outputs assigned to them. The eight user assessors participated in the assessment of all impact templates and impact cases, playing a full and equal role with the academic members of the sub-panel. In allocating these roles, due account was taken of major conflicts of interest as specified in the Panel Criteria and Working Methods for REF2014. Members with major conflicts of interest left the room during any discussions of relevant institutions. All quality profiles were agreed unanimously after considerable debate by the sub-panel members who were present.

Assessment of submitted work

12. The sub-panel worked in close cooperation with Main Panel C and adopted an iterative approach to assessing all three elements: outputs, impact and the research environment. This assessment proceeded as follows for each element.

13. The sub-panel worked through a sub-set of submissions in plenary session as a calibration exercise to establish common standards. The sub-panel then operated in sub-groups, based on expertise in the case of outputs, to produce recommended grades for the whole sub-panel to consider. These recommended grades were then discussed in plenary, though members with a major conflict of interest left the room during any discussions of a relevant institution.

14. The REF IT systems enabled the sub-panel to monitor the quality sub-profiles as they developed and the developing sub-profiles were also discussed at meetings of the main panel, which allowed calibration of standards across its sub-panels. There was no requirement that sub-panels produce identical or similar average profiles, but sub-panel chairs were required to justify the emerging profiles to provide assurance that similar standards were being applied.

15. A sample of work was read and assessed by an appropriate international member of Main Panel C, without her seeing the grades recommended by the relevant sub-panel members. When she was able to compare her grades with those awarded by the sub-panel members she declared herself confident in the standards being applied.

Comments on the work submitted for assessment

16. The final sections of this sub-panel overview report provide reflections on the main sub-fields of work submitted. This section reflects on the three elements for the sub-panel as a whole.

Outputs

17. Journal articles comprised over 95 per cent of the outputs (11,660) submitted for assessment. Other types of research output included 168 authored books, 179 book chapters and 103 working papers. As in the previous research assessment exercises, journal articles were published in a very wide range of outlets, this time numbering in excess of 1,000. All outputs were read in sufficient detail to enable a grade to be defined. If the same article was submitted more than once by authors included in different submissions, the sub-panel ensured that all instances received the same grade. The sub-panel received just eight requests for outputs to be double-weighted and was able to agree to all but one, for which the reserve output was assessed. Items accepted as double-weighted were awarded grades that ranged from 2* to 4*.

18. More than 1,300 of the research outputs submitted to the sub-panel were economics and were cross-referred to the Economics and Econometrics sub-panel. Professor David Blackaby, a full member of the sub-panel, was also a full member of the Economics and Econometrics sub-panel and acted as a conduit for research outputs cross-referred between the two sub-panels. A small proportion of research outputs was cross-referred to other sub-panels, mainly within Main Panel C. Members of the Business and Management Studies sub-panel who received advice and recommended scores for cross-referred items used their own professional judgement to assign a final grade.

19. Table 3 compares the weighted average output profile for the 101 submissions made in the UOA, with the comparable profiles for RAE2008. The improvement in the weighted average profile is considerable and is an indicator of the improved quality of research outputs submitted to REF2014, compared with those submitted to RAE2008. Outputs were assessed against the three criteria of originality, significance and rigour and it was pleasing to see improvement in all three dimensions. This improvement includes an increased emphasis on internationalisation, with more work involving collaborative work with international partners. In some submissions, the reduction in staff numbers since 2008 may have played a part in this relative improvement.

Table 3: Weighted average output profiles for REF2014 and RAE2008

		4*	3*	2*	1*	u/c
REF2014	BMS (UOA 19)	20.5%	42.8%	30.1%	5.8%	0.8%
RAE2008	BMS (I36)	13.8%	36.2%	35.4%	13.5%	1.0%
	AcFin (I35)	5.9%	36.4%	41.0%	15.7%	1.0%

20. As stated in paragraph 38, page 64 of the 'Panel Criteria and Working Methods', the sub-panel did not use journal lists to assess the quality of outputs. A post-assessment review of a sample of about 1,000 outputs showed that a range of grades was given to outputs in the same journal whatever the overall ranking of that journal.

Impact

21. Research impact was a new element in REF2014, so a comparison with the previous research assessment exercises is impossible. Sub-panel members worked closely with the impact assessors to agree grades for the impact templates and the impact case studies. Each template and case study was read by a core group that consisted of the primary and deputy coordinators for the relevant submission, together with an impact assessor. In some instances the group was enlarged in order to compare and contrast cases and ensure appropriate relative grades. Where particular expertise was needed, two impact assessors were part of some of these impact assessment groups. All scores were discussed and finally agreed in plenary.

22. The sub-panel welcomed the inclusion of research impact in the REF, since it would help encourage research that continues to be relevant to policy and practice. The impact assessors were a great boon to the sub-panel, offering well-informed views that were sensitive to the aims of the REF and the opportunities available to researchers in business and management studies, whilst also being aware of the time and other constraints faced by UK academics. It is pleasing that a large majority of submissions showed elements of outstanding impact and clear relevance to policy or practice or both.

23. The weighted average impact sub-profile for the sub panel was as follows:

Profile type	4* (%)	3* (%)	2* (%)	1* (%)	UC (%)
Impact	37.7	42.5	17.0	2.2	0.6

24. At least some of the work submitted by about 80 per cent of the units was assessed as demonstrating outstanding impact, with 4* scores ranging from over 80 per cent to less than 10 per cent. A very small proportion of impact cases were given an unclassified grade because the underpinning research cited in the submission was not judged to reach an internationally recognised standard of excellence. Half or more of the impact work described in almost 30 per cent of submissions was rated as outstanding, which is a real credit to those institutions and to the field of business and management studies.

25. The impact cases covered a very wide range of impact types, including impacts within organisations, on national policy, on international agreements and on the public. The high scoring impact cases typically provided clear evidence of the reach and significance of the impact, the underpinning research which was cited clearly met the threshold requirement of international excellence and there was a strong narrative that described how the research led to the impact.

26. In general, the impact templates were rated lower than the impact cases and it seemed that some institutions were uncertain what to say in this section of their submission. A particular problem was that some submissions merely used the final section of the template (Relationship to case studies) to summarise each impact case study rather than to relate them to the historic or current strategy of the unit.

Research environment

27. It should be noted that the assessment criteria of REF2014 required the sub-panel to assess environment statements in a different manner from that used in RAE2008. In RAE2008, the sub-panel members read the environment statements and took a holistic view to develop a profile. In REF2014, sub-panels were required to separately score four elements of the statement and these were combined arithmetically to give an environment profile. Table 4 compares the weighted average sub-profile for research environment with the sub-profiles in RAE2008 and demonstrates the improvement that has occurred over the period. This improvement was particularly evident in well-considered and appropriate research strategies and clear evidence of support for staff to develop and maintain their research potential.

Table 4 Weighted average environment profiles for REF2014 and RAE2008

		4*	3*	2*	1*	u/c
REF2014	BMS (UOA 19)	36.8%	39.7%	21.0%	2.4%	0.1%
RAE2008	BMS (I36)	23.3%	37.0%	28.0%	10.2%	1.6%
	AcFin (I35)	7.2%	41.3%	34.5%	14.5%	2.5%

28. The criteria used to assess the environment submissions focused on the degree to which the submission demonstrated clear evidence of vitality and sustainability that was conducive to producing research of world-leading, internationally excellent, internationally recognised or nationally recognised quality. Environment submissions were assessed independently of research outputs and research impact.

29. REF sub-panels were provided with HESA data for each submission, which showed the number of doctoral degrees awarded in each year of the REF assessment period and external research income, categorised by type, also for each year of the REF assessment period. Standard analyses were provided by the REF team including median values for each sub-panel and also statistics based on headcount and FTEs included. Because institutions could decide how many staff to submit, interpreting these statistics on a proper per capita basis was difficult and probably not meaningful. However, the gross values and their patterns over the years of the REF period were useful in giving some idea of the underlying scale of activity in each submission.
30. The report of the Business and Management Studies sub-panel after RAE2008 commented that total research income had risen considerably since the previous RAE in 2001. Total HESA-reported research income for the institutions submitted to REF2014 amounted to over £340 million. The figure reported for sub-panel I36 in RAE2008 was approximately £360 million. RAE2008 covered a period one year longer than REF2014, which suggests that the average total annual research income has risen slightly in REF2014 when compared to RAE2008, in cash terms.
31. The HESA data show that the total doctoral degrees awarded over the REF period was 4,804, which compares with a figure of 3,450 for the longer period of RAE2008 for sub-panel I36. This suggests that PhD enrolment and graduation numbers have risen since 2008, though the sub-panel was concerned that some submissions included far too many PhD enrolments for the number of staff included in the submission for the support for those PGRs to be excellent. Such concerns typically led to a lower score for that section of the environment template.
32. The number of ECRs included in the submissions amounted to about 20 per cent of staff included on a headcount basis. This suggests that there has been significant recruitment of ECRs across the units that submitted their work to the sub-panel, which implies that the sector is taking succession planning seriously. It will be a challenge for the business and management studies community to ensure that these new recruits are properly mentored and supported as they develop as independent researchers, whilst coping with significant teaching loads in most institutions.
33. The strongest environment statements paid clear attention to all sections of the environment template. Their strategies were clearly articulated, were ambitious and appeared feasible in the light of conditions in the UK. The people section of the template had a clear relationship with the research strategy, demonstrated that staff development was a priority and provided a clear rationale for the doctoral work of the unit. The section on Income, infrastructure and facilities clearly described the support given to researchers and the success of the unit in gaining external funding and its link to excellent research. The final section, Collaboration and contributions to the discipline or research base, demonstrated that the unit was not isolated and attending purely to its own internal needs but was a major player in the wider development of the discipline and was taken seriously by researchers elsewhere.
34. However, a significant proportion of environment statements were weak enough to suggest that excellent performance by individuals has been achieved against the odds in some institutions. The environment statements given very high scores describe units that evidence vitality and have sustainable plans in which staff have access to support and resources that enable and sustain very high quality research and in which staff development, from ECRs onwards, is taken very seriously. Others, sadly, suggest research environments with limited or unconvincing evidence of vitality, in which very few staff receive support to develop their research potential.

35. The sub-panel was delighted to be able to award 100 per cent 4* to several environment submissions. It should be noted that this does not mean that they describe perfect research environments, but they do provide clear evidence of environments conducive to world-leading research.

The state of Business and Management Studies research as seen by the sub-panel

36. The improved performance seen for outputs and the research environment seems to be based on higher quality research and better deployment of resources, though a reduction in numbers submitted, when compared to REF 2008, may also have played a part in some submissions. Researchers in UK business and management studies can certainly be proud of their work, much of which is as good as anywhere in the world. The high scores for impact also reflect well on the community and will help end concerns expressed by some, that research within UK business schools takes little or no heed to real-world issues. The case studies demonstrate the multiple ways in which business and management research has made an impact across the economy, policy, environment and society.

37. The remainder of this overview provides summaries of the work assessed from each of the main sub-fields covered by the sub-panel.

Accounting and finance

38. The overall volume and quality of work in the accounting and finance area has continued to increase since RAE2008, with a growth in outputs submitted of approximately a quarter and a further adjustment of balance from accounting in favour of finance. Outputs of world-leading quality were found across a full range of submitting units of varying sizes and degrees of specialisation in the field and indeed across a broad range of publication outlets. Outstanding impact was also similarly spread.

39. Work of high quality was spread across a very broad range of topics. In the area of finance, the volume of such work was particularly considerable in market microstructure, banking, risk management and asset pricing. In accounting there was evidence of high quality across the board with substantial scholarship being demonstrated, for example but not exclusively, in the areas of sustainability, governance, management accounting, market-based accounting, interdisciplinary and critical perspectives, and accounting history.

40. Noticeable changes occurred in the composition of the topics of outputs submitted compared with RAE2008. The number of outputs submitted in the behavioural finance area increased notably, and there was a reduction in the proportion of submitted outputs focused on derivatives pricing methodologies and mathematical finance. Little work in the area of public services accounting was submitted, despite the significant representation of the public services in the economy. There remains a small but significant stream of work in accounting education. However, there must also be concern about the relatively low numbers of outputs in the more technical areas of accounting, financial accounting, auditing and taxation. Outputs of world-leading and international quality could be found in all these fields, but whether sufficient attention is being paid to these issues is questionable. Very little submitted work focused on substantive investigations of the financial crisis, its causes and implications, and there was no discernible change in the nature or type of research undertaken since the crisis, nor the basic underpinning of accounting and finance functionalities in economic systems.

41. The body of work employed a range of methodologies including archival, empirical, case study and theoretical approaches, although quantitative empirical work particularly in finance was

most prevalent. The sub-panel was pleased to see research involving approaches and ideas from other disciplines including psychology, sociology, history, and statistics and operations research, employed to help tackle problems in accounting and finance. The sub-panel noted a small number of pure theory papers in finance containing highly sophisticated economic models but necessitating highly limiting assumptions and without recourse to data analysis. The sub-panel formed a view that in most cases the best work involved a combination of rigorous theory with empirics, case studies or simulations.

42. In finance, research employed data from all major asset classes, and there was a discernible increase in the use of information from the credit default swap markets. An increasing concentration of research using a small number of large datasets based on US markets, alongside a general improvement in the rigour of econometric techniques employed, was observed. In addition, a significant minority of work judged world-leading used international datasets, allowing for comparisons across financial markets, and a number of papers of that standard employed exclusively UK data. In accounting, research addressed international issues in relation to accounting standards, drew international comparisons in relation to organisational issues and provided national and internationally relevant analyses at relevant levels of resolution. The sub-panel considers it important that the best research continues to address issues of wider relevance to the UK and European contexts.

43. Journal articles continued to constitute the main form of output submission, although world-leading and internationally excellent work was also found in other forms including books. The sub-panel observed a substantial increase in the proportion of finance work published in prominent US journals, although papers of world-leading standard were found in numerous UK and other non-US edited journals. In accounting, the range of approaches to research is represented in journals of international reputation based in Europe, Australasia and the USA.

44. The diversity of UK research, sometimes answering different types of questions and, where necessary, drawing on UK and international data, remains a strength of the UK academy which is valued internationally and should continue to be nurtured and respected.

Employment relations and human resource management

45. This subject area continued to comprise a significant part of the submissions to the sub-panel, with virtually every submitting unit of any size having some representation in the area. Boundaries between this area and cognate ones are necessarily inexact, but approximately 1,000 outputs from the area were assessed.

46. Given this number of outputs, one of the three additional output assessors worked in this area. In addition to the mechanisms for ensuring consistency described earlier, the output assessor and the member of the sub-panel jointly assessed a sample of outputs to calibrate their grading, and they also consulted each other on individual cases so as to ensure an appropriate profile where outputs were shared between them. Similar benchmarking was also conducted with sub-panel members from two closely related subject areas.

47. The quality profile was close to that for Business and Management as a whole. Several institutions had centres of excellence in the field, and it was pleasing to note that a number of impact cases came from the field. High quality outputs were found in a very wide range of journals, including the major British and European journals, and also in books and book chapters.

48. In terms of substantive topics, the interest in international and comparative issues noted in 2008 developed further. As well as the established topic of cross-national comparison, there was growing attention to the dynamics of the global economy, human resource management

(including global talent management) in multinational companies, and the linkages between global, national, and local systems of regulation. It was also pleasing to see substantial attention to the experience of work, through lenses including gender and diversity, emotional labour, and labour process analysis. There was also attention to emerging topics including the range of 'new actors' in employment relations, migration and its effects on employment, and workplace bullying. This burgeoning of the field points to its vitality, but also indicates challenges of integration and overall conceptual understanding.

49. Research methods in general tended to become more sophisticated, with evidence of longitudinal designs in survey research and comparative study in case study research. Some very strong ethnographies were also noted. There remained some limitations in weaker outputs, for example cross-sectional surveys of a relatively superficial kind and case studies lacking in depth and rigour.

Organisational psychology and the behavioural aspects of Human resource management

50. There were many world-leading and internationally excellent outputs in this subject area. Overall, the submitted work was stronger than in RAE2008. The best work often used multiple methods and/or multiple studies (especially multiple experiments) to tackle phenomena of real significance in business and management. Sometimes great ingenuity was shown in combining quite different sources of data, with choices driven by theory. Rigour and (where relevant) measurement precision were frequently evident in the submitted work. In the world-leading outputs, this technical sophistication was deployed to address pressing theoretical and/or practical issues. Review articles (including meta-analyses) were more numerous than in RAE2008, and some of those that offered creative syntheses and/or innovative suggestions for future research were judged to be world-leading. Qualitative as well as quantitative research was well-represented in the world-leading outputs.

51. There was a slight tendency for outputs to take the organisational and economic context, and ideas from allied disciplines, into account more than in RAE2008. Further movement in these directions would be welcome. Nearly all the submitted work made a significant contribution to the field. Within this, the outputs judged as internationally recognised or nationally recognised, were limited in their scope, most notably in their integration of theory and data and/or the volume or sophistication of the data collected.

Organisation studies

52. Around 500 core outputs were submitted in this field, and many more overlapped with other areas such as management accounting, marketing and strategy as well as HRM, public sector management and elements of psychology (e.g. psychoanalytical perspective, notably those informed by Lacan). A majority of these outputs were assessed to be of world-leading or internationally excellent quality. Scholars in other areas, such as marketing, accounting and strategy, often draw theoretical and methodological inspiration from research in Organisation Studies, and so the vibrancy and sustainability of this field is important for their future development. Contributions from the broad field of Organisation Studies were in evidence in providing underpinning support to Impact cases across a wide range of studies.

53. The strong performance in Organisation Studies reflects its long established and theoretically sophisticated development in the UK. This legacy is evident in the large number of highly regarded European journals (e.g. Organisation Studies, Organisation and Human Relations but also British Journal of Management and the, Journal of Management Studies) that are truly international in orientation. Journals based elsewhere (e.g. the Academy of Management Journal,

Academy of Management Review, Organisation Science and Journal of Management Inquiry) have become rather more receptive to a wider range of submissions and have increasingly been publishing UK scholarship and appointing UK academics on their editorial boards and to their editorships. These developments have been helpful in increasing the exposure of UK-based scholarship in Organisation Studies to a wider, international audience.

54. The submitted outputs ranged across highly diverse topics such as change, culture, leadership, identity, work, ethics, innovation, education and methodology. Well-represented approaches to these topics included narrative analysis, discourse analysis, labour process analysis and institutional theory. There was preponderance of more qualitative work but with a slight increase in quantitative outputs submitted. The rise in the number of outputs influenced by institutional theory was particularly noticeable. An expansion of work in critical management studies during the assessment period is also evident in the 2014 submissions.

55. The field of Organisation Studies continues to benefit from the recruitment of early career researchers from Europe, Australasia and increasingly from North America. This augurs well for the future development of the field, as long as the distinctively European approach to Organisation Studies scholarship – which draws upon a broad range of social theories and deploys a wide variety of methods – is enhanced rather than displaced, or weakened, in the process. The submission of Organisation Studies books, very many of world-leading quality, was welcome, as the monograph provides an important counterbalance to what can be addressed within the confined space of a journal article. Aside from the books, there was evidence of a general narrowing of outputs, with some submissions seeming to decide which outputs to submit by reference to a limited number of places of publication, rather than their substantive or innovative contribution. Unfortunately, the rigour of journal articles submitted was not always matched by an equivalent originality or significance. A surprising number of outputs dealt with comparatively trivial or esoteric topics in a rather formulaic way so that their contribution was sometimes difficult to discern. Future research might usefully pay more attention to the organisational dimensions of more weighty, pressing issues of political economy, climate change, inequality and security by deploying theoretical resources congruent with their incisive examination.

Strategic management

56. Strategic Management is an inherently multi-functional and multi-disciplinary topic which draws on a wide range of theoretical underpinnings. Outputs in the area of Strategic Management can therefore be found in a wide range of journals many of which are focused on general management issues.

57. In general we found there to be fewer outputs specifically in this domain than in the previous RAE2008 exercise, and, as with RAE2008, outputs in the strategy area tended to be concentrated in a more limited set of units. The quality of the outputs was judged to cover the full spectrum from world-leading to nationally recognised and, in a small number of examples, unclassified. In a few cases, outputs were brief summaries of a research project or a concept described in a practitioner based journal and, in these cases, it was particularly difficult to assess fully the quality and rigour of the research undertaken.

58. While there were a number of theoretical outputs, the majority of submissions were empirical. A wide variety of topics were in evidence and it was noted that significant levels of outputs were found in areas such as environmental forecasting, business model development and dynamic capabilities. It was noted that some world-leading outputs were generated by those holding fractional appointments with substantive appointments in other countries, which suggests

that the quality of full-time strategy research in UK institutions may not be as strong as the output grading may suggest.

59. It was noted that there were relatively few impact cases submitted in the strategy area. This could be due to research in strategy having impact at the specific organisational level, rather than at the policy level, making it more diffuse and difficult to evidence within the case study format. It was also noted that while the majority of outputs submitted were journal papers, as in RAE2008 there was evidence of world-leading strategy research submitted as research-based books.

Marketing

60. Just over 1,100 marketing outputs were submitted to the sub-panel, which represents a reduction of approximately 10 per cent on the number of papers submitted to the RAE in 2008. There is clear evidence of Universities submitting fewer but higher quality papers, resulting in 70 per cent of these outputs being recognised as either world-leading or internationally excellent in terms of originality, significance and rigour. While there have been more publications in what are often regarded as the world's top journals, marketing outputs assessed as world-leading were published in over 35 different marketing and non-marketing journals. Three journals, namely the European Journal of Marketing, the Journal of Marketing Management, and Industrial Marketing Management, account for almost 40 per cent of the total submissions.

61. This positive picture of the state of the discipline within the UK's universities is offset by three other observations. The first is the total number of staff submitted with marketing outputs was surprisingly small, given the scale of teaching in marketing in the UK. The RAE report in 2008 stated that 'many schools lack enough research active staff working in the marketing area and the training of postgraduates, and particularly of research students, by the non-research active is a ticking time bomb for the future of the marketing discipline in the UK' and we are concerned that given the small submissions by some institutions with both a large marketing faculty and a large PhD programme this situation has not improved.

62. The second observation is the strategy adopted by many of the universities to make use of external faculty from other countries, in effect buying their research output while keeping them on fractional, short-term contracts that coincided with the REF submission date.

63. Finally, there was a scarcity of marketing impact case studies and fewer publications than expected that bridge theory and practice, which represents a serious problem for a practice-based discipline like marketing.

64. On a more positive note, the number of early career researchers submitted revealed a clear trend of supporting and developing young researchers in marketing. A second positive observation is that the marketing submissions were based upon a wide range of theoretical, experimental, positivist and interpretivist approaches, indicative of the vigorous heterogeneity of perspectives to be found in the discipline. This heterogeneity was also reflected through the developing use of innovative research design and creative mixed methods. A third positive note is the strong national and international collaborations that were implied by the composition of authorship teams on many publications.

Management development and management education

65. The area of management development and management education contained rather fewer submissions to the REF than one might have expected. Outputs covered a range of areas from aspects related to doctoral studies to training and development activity. Outputs submitted to the panel were disseminated through a variety of publications, but predominantly in peer-reviewed

journals. There was a surprising variability in quality in terms of originality, significance and rigour. Many of the weaker outputs failed to make a contribution to theory or practice.

66. Outputs also continued to lack appropriate theoretical grounding and in some cases failed to build on well-established previous research in the field. This lack of connection makes it difficult to take the field forward. Methodologically, the field concentrates predominantly on the case method, relying on the richness of description to carry the ideas to the reader, but from which it is arguably more difficult to validate and theorise.

67. As was the case in RAE2008, a proportion of the outputs were based on data collected through samples of managers registered on taught programmes within institutions, as opposed to direct studies or evidence from private and public organisations. This practice raises questions in relation to research design and the generalisability of the findings.

68. As in RAE2008, outputs submitted to the sub-panel in the areas of management development and management education were not uniformly spread across institutions submitting to REF2014; the predominance coming from institutions that have a strong professional focus to their work.

Leadership, knowledge and management learning

69. REF2014 shows evidence of an increase in outputs to these areas of management and business research. Within this there was evidence of an increase in interdisciplinary work, particularly with science fields such as medicine and evidence of work based approaches such as technology transfer, knowledge transfer and university-industry links.

70. The theme of knowledge and learning pervades a whole range of sub disciplines, sectors, themes and functions. Papers were received that focused on many aspects of learning, including issues for trainers and learners. Outputs submitted to the sub-panel in this area were usually journal articles, many of which are now seen to be within the mainstream of management and business research.

71. Leadership as a field appears to have sustained an interest amongst academics since RAE2008 with a high number of submissions focusing on the topic. These covered all aspects, from empirical studies of leadership within different sectors, e.g. the health service, higher education and cultural industries, to critical examinations of the nature of leadership in a range of different contexts. Outputs in the area of leadership were also mainly disseminated through journals, both British and North American.

72. Within both fields there is a considerable dispersion of researchers across institutions with contributions coming from academics right across the sector. The majority of outputs submitted were substantially grounded in the literature and built their contributions on empirical findings. Methods used were broad, including both quantitative and qualitative and on occasions quantitative and qualitative within the same paper.

73. A number of the interdisciplinary papers had important findings for policy improvement.

Management science and project management

74. A substantial number of papers were submitted in the general area of Management Science/Operational Research (MS/OR) from a wide range of institutions, showing that it remains an important area of activity in business and management studies. The institutions included a small number of large centres that demonstrated clear excellence and critical mass in the field. Many other institutions provided evidence of small pockets of activity in the field which was often

of high quality. Finally, there were also outputs judged to be of world-leading standard from individuals in institutions without a clear MS/OR group.

75. The subjects covered under MS/OR were widely dispersed, with no concentration on any particular technique or on any particular domain. Many of the outputs submitted represent work at the interface with other disciplines including statistics, informatics and engineering. Outputs judged to be world-leading included applied research in many areas including health, energy planning and transport policy. These not only showed how MS/OR methods could be used in that domain but also moved the subject on by contributing to the development of methodology and its application. Some of the lower-rated outputs were noted to be case studies in which a standard technique was applied to a specific problem with little or no contribution to either the development of the technique or its wider application.

76. While much of the MS/OR work was published in traditional MS/OR journals, there were outputs in a range of journals beyond these, with some outputs appearing in journals associated with, for example, organisation behaviour, strategy, HRM. Publication occurred in journals within the UK, Europe, US and the rest of the world. There were a significant number of outputs in specialist journals, particularly in the area of health. As might be expected, a large number of outputs were published in the main European titles, the European Journal of Operational Research and the Journal of the Operational Research Society.

77. The work submitted in project management was of mixed quality. Some was considered to be of world-leading standard, but there was a significant amount judged to be below international standard. Research in project management was spread amongst many universities with very few clusters of excellence (beyond one or two people), or evidence of a critical mass of researchers. Nevertheless there was some evidence of groundbreaking research that is likely to influence the development of the field, particularly with respect to its impact on practice.

78. Many outputs were in specialist Project Management journals, but also some were in other outlets: general management and strategy journals, engineering journals, production management journals, management science journals, and so on. Indeed the definition of a project is being extended to address organisational change and other 'softer' projects.

Operations, innovation and technology management

79. The Operations, Innovation and Technology Management fields were well represented in REF2014. Around 1,000 outputs were submitted, covering a wide range of areas and from a wide range of institutions. This was particularly the case for Operations Management. For Innovation and Technology Management, there appeared to be a greater concentration of work in a smaller number of institutions, perhaps reflecting the inclusion of Operations Management as opposed to Innovation or Technology Management in the core MBA curriculum.

80. In terms of methods, the Operations, Innovation and Technology Management communities are inclusive. A wide range of research methods are adopted, ranging from qualitative (case studies and action research) through to quantitative (surveys and modelling). There is a clear trend towards more theoretically grounded papers, especially in some of the 'top journals', although there are still relatively few studies that draw on theoretical insights from sister disciplines. This is particularly noticeable for the more policy orientated Innovation and Technology Management papers, as well as papers published in US journals.

81. Thematically, there is a continued trend towards papers that explore beyond the boundaries of a single firm. There is continued emphasis on supply chains and networks, along with growing interest in international manufacturing and more complex organisational configurations. There are

relatively few papers exploring technology and the way that data are changing the nature of manufacturing business models, although some evidence that this theme is starting to gain momentum. The diversity of sectors and geographic locations studies appears to have increased, with many more studies looking at non-traditional operations, for example, military and disaster relief logistics.

82. As mentioned elsewhere in this report, impact cases were a new feature of REF2014. Operations, Innovation and Technology Management research featured heavily in many impact cases, with some outstanding examples of links between research and practice.

Information systems

83. In RAE2008 most of the Information Systems (IS) outputs submitted to the Business and Management Studies sub-panel were cross-referred to UAE I137 (Library and Information Management). The RAE2008 Business and Management sub-panel reported that the discipline of IS was increasing in strength numerically with a growing number of researchers, many of whom were in small groups. In REF2014 this growth has continued, although still with concentrations of strengths in a relatively small number of institutions. Overall, the IS subject area performed well with around three quarters assessed as being of quality that is world-leading, or recognised internationally, in terms of originality, significance and rigour.

84. There was a wide range of output submissions in terms of the research approach adopted but probably the majority were qualitative and adopted the case study approach in various forms. Of these the best papers were rigorous in terms of the description of the research approach and methodology, sample interview sizes, detailed thematic analysis and insightful discussions with appropriate conclusions. The weaker papers lacked authentic research designs, and/or significant empirical data. The quantitative papers were generally undertaken well with the better ones having discussions of relevant context and appropriate conclusions. A number of philosophical papers were submitted which had cross-overs with various other discipline areas. The best of these were well argued, provided significant detail, and made appropriate linkages with the discipline practice. There were relatively few outputs based on action research, grounded theory or experimental methods. Overall, rigour, in terms of methodology was high, with a good grasp of both qualitative and quantitative methods displayed by the community.

85. In terms of areas covered there was a relatively wide range including; IS strategy, outsourcing, offshoring, IS development, sociotechnical studies, IS in health, telehealth, decision support systems, business intelligence, enterprise resource planning implementation, e-government, knowledge management, IS for crisis management, IS for project management, social media, virtual worlds, e-business, and mobile working. The focus of the research was strongly empirical and the connections with the needs and issues of industry, government and society were notable. This contrasts strongly with a comment from the previous subject report that stated that there was 'a shortage of research in practical environments which is considered detrimental to the health of the discipline'. Thus, it seems the discipline is in good shape and has become much more relevant to practice, although surprisingly there were relatively few impact case studies submitted in the IS area.

Public sector

86. Public sector management remains a strong and healthy area of research within business and management, with a significant majority of outputs assessed as being of internationally excellent quality or world-leading. Almost all the outputs submitted were journal articles. In REF2014 fewer books and book chapters were submitted than in RAE2008, and no commissioned reports were submitted this time. Almost all the books submitted were research

monographs and the sub-panel judged them to be of internationally excellent quality or above. Some book chapters were assessed at an internationally excellent quality but most chapters were judged to be of internationally recognised quality.

87. The type of research varied widely from more theoretical papers to empirical studies. Qualitative research remains the dominant form in the field but there were many impressive examples of quantitative research, particularly dealing with performance management issues. The field does have considerable scope to become more internationally comparative, as the research was predominantly UK focussed, though there were some notable exceptions.

Small business and entrepreneurship

88. The outputs and contributions submitted to REF2014 in the field of small business and entrepreneurship indicate improvements in both quality and volume over previous assessments. This suggests that small business and entrepreneurship is a vibrant and healthy field of academic study. In REF2014 there were over 800 related outputs submitted to the sub-panel, although establishing a precise number is difficult because of its interdisciplinary nature with links across many other subject fields, and even beyond conventional business and management domains. This reflects the boom in entrepreneurship in terms of the number of clusters of staff and research students more widely in higher education, further underlying the significance and vibrancy of the field.

89. The topics examined in this field were diverse, offering both continuity with previous studies and insights into new areas, adding to the accumulation of knowledge and contributing to theory. These spanned analyses of people, that is the characteristics of entrepreneurs and their staff (e.g. demographics, gender, ethnicity, age); organisational studies (e.g. start-ups, family businesses, corporate entrepreneurship, SMEs); effects on the economy and society (small business performance, internationalisation); interactions with their wider environments (e.g. public policy interventions; finance, regulation); and raising awareness of business-ownership and entrepreneurship through research-based, entrepreneurship education.

90. Although showing a growing diversity in the methodologies used, the majority of outputs continue to be empirical, using positivist approaches. The outputs showed an increase in the use of large-scale data sources, utilising advanced quantitative techniques, but on occasion these were felt to be rather unimaginative with little to show for the sophistication in technique in terms of contribution to theory and/or practice. However, there was also a growing body of outputs that were more reflective, taking a critical approach to the phenomenon of entrepreneurship and associated concepts. Weaker outputs tended to be studies with insufficient contextualisation or theoretical contribution. Submissions that utilised longitudinal or ethnographic data were rare and although an ongoing challenge, may justify attention in the future. The outputs submitted to the panel used a variety of routes for dissemination, including refereed conference proceedings, specialist book series, and subject field and general management peer-reviewed journals. As with other subject areas reviewed by the panel, the overwhelming majority of outputs were disseminated through North American and European journals, with only a few books or research monographs presented for evaluation. Almost a fifth of outputs in the field were assessed as world-leading and a half as internationally excellent.

91. The sub-panel detected several groups of researchers within the submitted units with a growing international profile. The significance of the field in terms of research quality, relevance and endurance is further demonstrated in the number of impact case studies. Many impact cases used underpinning research in this field and these showed particularly strong reach and

significance in relation to impacts on public policy, support agencies and professional development.

Responsibility and sustainability

92. It was encouraging to see that a healthy number of outputs in the business and management submissions addressed the themes of responsibility and sustainability, drawing on a wide array of core business and management disciplines including accounting, ethics, finance, general management, marketing, strategy and supply chain management. Likewise, many submissions said that exploring responsibility and sustainability topics is a formal part of their research strategy. These two observations bode well for the continued development of this area of research. While the majority of papers focused on for-profit (most usually listed) companies, some papers focused on broader domains including not-for-profit organisations, small and medium-sized firms as well as the public sector (an area that is currently under-explored, especially given the size and function of that sector). Some papers were inter-disciplinary in nature and where this was evident, interconnections between business and management to work in geography, law and political/governance studies seemed to be most productive.

93. This sub-field is also growing in empirical and theoretical depth. In the former, it was pleasing to see in-depth investigations of particular settings where responsibility is contested. Some (but not all) of these investigations were supported by external funding which appears to have made more substantive research engagement possible. Likewise, engaging with theoretical debates found within philosophy, ethics and governance proved fruitful for developing this field.

94. There were weaker aspects in the sub-field. Some replication studies focused on relatively small changes to responsibility contexts and tested for effects, often using relatively small or very standard datasets. In addition, the sub-field has a rather episodic feel rather than being focused around programs of investigation, which may limit more in-depth observations being made. Likewise, failure to fully engage with the complexity of the problem sets being addressed (be they global climate change, biodiversity or human rights challenges) risks a disconnection between substantive topics and some of the research undertaken. The sub-panel noted that there are parallel literatures developing in different parts of business and management studies (perhaps most clearly between social/environmental accounting and ethics) and looks forward to greater synergy as these sub-communities engage even more closely. Finally, there were some hints that the ongoing global financial crisis might cause re-consideration of questions of responsibility and sustainability but in large part, this crucial part of the context in which this field operates is presently under-explored.

International business

95. The overwhelming majority of papers submitted in international business were largely empirical rather than theoretical, and the majority of those were quantitative, based on the analysis of datasets. The outputs rated as world-leading covered the full gamut of approaches and included those with a qualitative focus, and as well those making a wholly theoretical contribution. The qualitative outputs tended to be at the international management end of the discipline.

96. Of the quantitative papers, the majority covered three areas; firm location, international technology transfer and firm performance in an international setting. The quality in all three areas varied a good deal, with a pleasing proportion of work judged to be world-leading, but also a significant proportion that was viewed less favourably by the sub-panel. It was also pleasing to see from the outputs that the quality of quantitative work has improved through the period, with ECRs and more junior scholars making significant contributions to research in this sub-field.

97. Finally, it was pleasing to see a large number of impact cases from the international business area. Most of the impact was centred around policy influence and advice, with several outstanding impacts locally, nationally and internationally.

Economics and econometrics

98. The main review of economics and econometrics can be found in the subject review provided by Sub-panel 18. It appears that, for a variety of historical and perhaps strategic reasons, the numbers of economics departments submitting in the Business and Management UOA has increased, whilst the numbers submitting in the Economics and Econometrics UOA has declined. The number of units submitting directly to UOA 18 has fallen over time, 52 in 1996, 41 in 2001, 35 in 2008 (three of which were new universities) and 28 in 2014 (none of which were new universities). Of the 101 institutions that submitted their research in UOA 19, 92 institutions had some of their outputs cross-referred to UOA 18. This represented just over a tenth of the outputs received by SP 19 and just over a third (1,360 out of 4,014) of outputs graded by SP 18. Whilst many of the units cross-referred were relatively small, the list included 15 institutions where 30 or more outputs were cross-referred to SP 18, indicating that significant economics groups exist in a number of business schools.

99. Outputs submitted directly in UOA 18 were on average assessed to be of a higher quality than those cross-referred from SP 19. However, a number of groups cross-referred had output profiles comparable to the best units directly submitted in UOA 18. For example the output sub-profiles of the three strongest departments submitted directly in UOA 18 and the three strongest output sub-profiles of cross-referred departments were very similar. A detailed econometric analysis of all individual grades by SP 18 sub-panel members showed no statistical difference in output profiles when controlling for a number of characteristics of submitted outputs. A smaller proportion of outputs were assessed to be at the world-leading 4* quality level, although the vast majority were assessed as being of an internationally-recognised quality at 2* or above. Whilst relatively little work was submitted directly in UOA 18 in regional economics and economic history, more research in these areas was seen in outputs cross-referred to SP 18. Overall it was clear in a number of cases that strong economics units had chosen to submit their outputs directly in UOA 19 rather than UOA 18.

Sub-panel 20: Law

Quality Profiles

Profile Type	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	20.1	47.1	28.7	3.7	0.4
Impact	38.3	41.1	17.7	2.4	0.5
Environment	43.6	43.1	11.7	1.6	0.0
Overall	27	46	23	4	0

Summary of submissions

1. The sub-panel received 67 submissions, the same number as in 2008, but including 10 HEIs submitting to Law for the first time. 1,553 FTE Category A staff (including 311 ECRs) were included: a reduction of 7 per cent from 2008. 5,525 outputs were submitted (11.8 per cent fewer than in 2008). 11 submissions returned more than 35 FTE Category A staff, 30 returned between 15 and 34.99 FTE and 26 submitted fewer than 15 FTE. 3.36 outputs were returned per person, compared to 3.54 in 2008. This is a result of the opportunity taken by institutions to submit cases for a permitted reduction in the number of outputs to be submitted, based on individual staff circumstances. 225 impact case studies were submitted for assessment.
2. All assessments were agreed by the sub-panel in plenary after consideration of the assigned lead readers' judgements and comments. Review mechanisms were put in place to ensure consistency of approach throughout the assessment phase.

Outputs

3. The sub-panel received outputs judged to be of world-leading quality from over 85 per cent of submissions and the overwhelming majority of work submitted was of at least internationally recognised quality providing valuable knowledge to the field, confirming that excellent research and scholarship are being conducted in very many law schools across the United Kingdom. Legal scholarship continues to develop understanding of the nature and effects of law and laws, not only within the academic world but also as a distinctive contribution to the knowledge base of the legal profession, the judiciary, government, law reform, campaigning, and civil society organisations.
4. The sub-panel firmly shares the view of its predecessors that peer review remains the most reliable method of assessing research quality in law. We found instances of world-leading or internationally excellent quality regardless of the form of the output. Outputs included (but were not limited to) authored books, databases, chapters, edited collections of essays, journal articles, case commentaries, working papers and research reports. The largest categories received were journal articles (3,347), chapters in books (1,170) and authored books (904). The sub-panel was disappointed to see a small number of outputs with content that was duplicated in outputs published before the REF period or in other outputs in the same submission, and judged the originality of such outputs accordingly. We also noted that where new editions or revised works were submitted, the opportunity was not always taken to explain what material was new to the REF period.
5. The sub-panel received 166 claims for double weighting, which were almost exclusively made in respect of monographs. The sub-panel noted that different HEIs appeared to have

adopted significantly different policies in relation to whether such claims would be made. We noted that supporting statements often failed to articulate clearly the ways in which the output was of sufficiently extended scale and scope as required by the panel guidance.

6. There was a large volume of outputs covering several core areas of law, including public international law, criminal law, criminal justice and criminology, legal theory (broadly defined and covering a wide range of approaches), public law and human rights, commercial law and EU law. From its assessment of the sub-fields included in submissions, the sub-panel considers that law and religion, intellectual property and IT law, transitional justice, gender, sexuality and the law, and law and finance all appear to be developing fields of interest. Tort law showed a revival of scholarly interest. By contrast, the volume of outputs submitted in property law and more traditional types of mercantile law was surprisingly low given their importance in undergraduate and postgraduate law courses. Competition law, family law, labour law, environmental law, law and the humanities (including legal history) and medical law are well-established fields of study. Outputs in comparative law tended to focus more on common law than civil law systems. The sub-panel was pleased to receive submissions relating to legal education but the methodological rigour and significance exhibited by some of these outputs was uneven. There were numerous examples of research contributing to understanding of the fundamental issues affecting society or responding to major topical concerns, and this has led to some merging of sub-fields or blurring of subject boundaries, such as commercial law and public international/EU law, the growing significance of regulation as a broad field of interest and the use of human rights law and theory as a basic frame of understanding. We found numerous examples of world-leading quality across the range of outputs submitted.

7. A considerable number and range of criminology and criminal justice outputs were assessed by the law sub-panel. Criminology outputs reflected the range of scores and included a substantial number of outputs assessed as world-leading. Outputs provided strong evidence of a growing, vibrant and dynamic sub-discipline. In many strong submissions, world-leading and internationally excellent criminology outputs were evident both among ECRs and academics at different stages of their careers. Criminology was also evident as a research strength in some weaker submissions where criminology outputs were associated with pockets of excellence.

8. The sub-panel regards it as an indicator of the strength of the discipline that world-leading work was demonstrated across the wide variety of methodologies employed in legal research and scholarship including doctrinal, theoretical, contextual, historical, socio-legal, critical and empirical approaches. Bodies of knowledge and thought were drawn upon from across the social sciences and the humanities. While there is a notable trend towards more broadly 'contextual' approaches to the discussion of legal issues and the field of legal studies as a whole is increasingly influenced by socio-legal research methods and techniques, there were nonetheless many impressive examples of legal scholarship in the more traditional and classical modes. The influence of the humanities was also marked and a considerable proportion of high quality outputs drew upon the insights and perspectives of disciplines such as history, philosophy, and literary and cultural studies. There were also strong examples of multi- and interdisciplinary work, including at the interface between law and economics, politics, and social policy, and in some fields disciplinary boundaries appear to be increasingly porous. Criminology outputs also manifested a considerable degree of interdisciplinarity by means of engagement with diverse other social science disciplines. The sub-panel considered itself as having sufficient expertise to reach a robust judgement in relation to nearly all outputs: it cross-referred 22 outputs to other sub-panels (including outside Main Panel C) where it considered that it lacked the appropriate expertise.

9. The sub-panel views this trend towards methodological diversity and interdisciplinarity as evidence of the growing sophistication of legal scholarship as a body of knowledge and understanding with wide-ranging insights, impacts and implications for the social world. We were particularly impressed by those monographs derived from doctoral theses which were innovative and exciting and displayed strong significance and rigour. However, fragmentation and increasingly narrow specialisation sometimes produced outputs which suffered from failing to situate their analyses within the wider legal or contextual frame of reference. Training in legal and social science research methods appears to be an established part of several doctoral research programmes (though there appears to be limited exposure to quantitative methods) and the use of empirical methods is becoming more common, although still confined to a relatively small number of fields. There were a few encouraging examples of sophisticated and innovative empirical methods being employed although these tended to involve multi-disciplinary teams. Outside the sub-field of criminology, relatively little quantitative social research was submitted, and some outputs presented data in an unsophisticated way. A small but growing part of the field is making significant contributions to the quantitative study of legal institutions and processes, which is a growing area internationally.

Process

10. All outputs were assigned to at least two members/assessors and they were assessed independently before opinions and scores were compared. A small number of outputs were cross-referred to another sub-panel or referred to an expert advisor where the sub-panel lacked appropriate language expertise. All proposed scores were presented to the full sub-panel for consideration and then determined in plenary. Because criminology outputs were submitted to a number of sub-panels (notably SP 20, SP 22 and SP 23), procedures were implemented during the assessment period to ensure broad consistency of approach between them. These included the appointment of a joint assessor working across these three sub-panels, a joint calibration exercise and Main Panel C oversight of the assessment profiles as they emerged.

Impact

11. The sub-panel was impressed by the scale and extent of the impact that legal research (inclusively defined) is having in shaping law and public policies locally and globally and the examples provided by the submitted case studies will provide a valuable resource for HEIs seeking to develop and enhance their approach to, and achievement of, impact in the future. Case studies tended to focus on policy-related examples, and although there were several cases focused on judicial impact (i.e. influence on judicial decision-making) there were fewer instances of impact on the provision and practice of legal services than might have been expected. However, there were a number of cases arising from research in criminology or criminal justice which provided evidence of impact on professional practice both within and beyond the UK.

12. Subject matter ranged widely, although with a preponderance of examples concerning criminal law reform, criminal justice policy and practice, and aspects of equality, human rights and civil liberties. Regulation of business, commerce and the environment featured strongly, and there were several examples of impact on law and policy in the areas of family and social welfare, medical and bio-ethical practice, EU and international law, governance and access to justice. There were a very small number of examples of public engagement and influence on legal education beyond the submitting HEI.

13. The impact of research was usually demonstrated by how it had informed the development of policy and new legislation and influenced the work of national, EU and international policy makers, judges and legislators. There were convincing examples of how research had informed

public debate and held proposed changes or practices up to scrutiny, sometimes resulting in preventing a change from taking place. There was less consideration of the importance of research in improving NGO campaigning and input to policy or service provision, and less mention of the impact on end service users.

14. There were examples of outstanding impact in each of the main areas of judicial/policy decision-making and several with international reach both at the international organisation level (e.g. EU) and across several jurisdictions. There were also outstanding examples of localised impact with deep significance. Outstanding impacts were demonstrated across the range.

15. The strongest case studies provided a coherent and convincing narrative with a clear account of what the underpinning research identified as the issue and then how that research was utilised to achieve the specific change or effect being claimed. They effectively pinpointed the nature and scale of the impact, describing not simply the change brought about, but the extent and depth of that change on those affected. They distinguished clearly between the process of disseminating the research and the resulting impact.

16. By contrast, weaker cases failed to set out clearly the thread of evidence linking the research to the claimed impact. The sub-panel was surprised to note that several submissions failed to provide evidence of the quality of the underpinning research as required by the guidance. Weak cases did not supply convincing evidence to support the claims, or made exaggerated claims for the impact of the research, which were often exposed by reference to the corroborating sources, particularly where the issue was the subject of wide public debate and academic commentary and endeavour.

17. The sub-panel considered that the impact templates provided in submissions often displayed a rather unsophisticated approach, perhaps reflecting the novelty of this element of the assessment process and the understandable lack of sufficiently advanced thinking and planning about how a unit is to support and promote impact arising from its research. There were, however, examples of units which demonstrated an approach conducive to achieving impacts of outstanding reach and significance, evincing a clear and thoughtful approach to the meaning of impact and how it can be achieved, realistic but imaginative plans for moving beyond dissemination to impact and appropriate linkage between research planning and expected effect. Such units offered support to staff to develop their impact skills and impact-mindedness, whilst recognising that not all of the research conducted in the unit would or should necessarily lead to impact beyond academia.

18. Strong examples of templates included a clear and specific explanation of the context which enabled understanding of the impact being pursued and the strategies for achieving it and distinguished between approach and strategy. They showed evidence of thinking as to how the unit's focus on impact should best be directed: this might relate to a decision to concentrate on particular types of impact or subject areas, sometimes related to particular research centres, but was equally demonstrated by clear thinking about the pathways to pursue to achieve the impacts sought and evidence of care and innovation in shaping mechanisms to be used. There were convincing examples of proactive networking with end-users and a proactive approach as well as acting in responsive mode. Thus, some templates utilised a 'lifecycle' approach demonstrating the early thinking about potential impact outcomes in planning, building relationships, research actions, dissemination plans etc. There was also evidence of unit and institutional **support** (as well as monitoring) for staff to engage in and improve their approach to impact activities, through mechanisms such as training and the facilitation of interaction with practitioners and policy makers etc. Strategic goals were clearly identified with specific and clear means set out to achieve them; indicators of success and tools for logging impact, collecting contemporary corroborating

statements and monitoring were clearly identified. Strong templates used their case studies to elucidate how the unit's approach and mechanisms could operate in practice. A number of institutions made ambitious commitments to embedding impact as an aspect of their research endeavour and have set themselves challenging goals to be realised in the next REF period.

19. By contrast, some templates were judged to demonstrate confusion over the meaning of impact, with a failure to distinguish this from the actual production of research or its dissemination. Some units displayed a rather perfunctory and unimaginative approach to engaging with end-users, and limited ambition regarding how to strengthen their impact. Some provided a list of examples and individual efforts rather than explaining how they sought, as organisations, to enable or facilitate impact from their research.

Process

20. All impact templates and case studies were assigned to at least one user member/assessor and two academic members of the sub-panel as lead readers, who each read the submission independently before discussing and comparing their views. All assessments were determined by the sub-panel in plenary following discussion led by the user member/assessor. User members and assessors made a highly positive contribution to assessing both the strength of the evidence provided to support the claim and the reach and significance of the impact itself. They provided valuable insights into the process of commissioning and using academic research to inform and shape policy and practice.

Research environment

21. The sub-panel considered that the large majority of submissions demonstrated solid provision for the support and promotion of research with basic infrastructure in terms of both resources and organisation and direction. Several institutions provided evidence of stimulating research environments conducive to delivering world-leading research in terms of vitality and sustainability.

22. A number of units set out structures involving the organisation of research into groups, centres or clusters and provided convincing examples of how these have stimulated and fostered vibrant research cultures. However, in some cases it was not always clear how these were providing meaningful support for research and structures sometimes appeared rather over-elaborate and confusing. The sustainability of such arrangements was not always clear; nor was there always evidence of how they would be reviewed and assessed as the work of the unit moved forward. There were several impressive accounts of thoughtful and effective strategic planning, with convincing evidence of strategies that would ensure sustainability for the unit into the future and avoid dependence upon particular members of staff or particular funding streams or subject areas. Some units at an early stage of development focused on the generation of more research and on promoting research activity in itself rather than on the production of high quality research. The sub-panel saw impressive examples of research environments regardless of the size of the unit, the organisation of its work or its strategic focus and is convinced that there is no one strategic model for a larger or smaller unit which will necessarily deliver research success. We considered that world-leading research can be, and is being, supported and developed through a variety of strategic and organisational approaches which depend upon the context of the individual unit.

23. Staffing policies and support for career development generally supplied evidence of standard provision such as appraisal, mentoring and arrangements for making time for research through workload allocation models and study leave. Strong submissions also provided detailed and convincing information regarding how they provide collegial support and stretch the

intellectual ambitions and achievements of their staff. The sub-panel was disappointed to note that several institutions failed to provide sufficient or convincing evidence of how they promote and deliver equality of opportunity in their arrangements for developing the research careers of their staff.

24. There were 1,586 doctoral awards during the REF period by HEIs submitting to SP 20. Several units set out strong provision for the training and development of research students and explained convincingly how they integrate their students into their research culture. The sub-panel attached more weight to the nature and quality of provision demonstrated than to the number of students recruited, particularly where information on skills training, completion rates and outcomes for postgraduates was limited or lacking.

25. The total amount of external research income received by HEIs submitting to SP 20 during the REF period was £74.8 million. Many submissions demonstrated commendable success in achieving competitively-funded awards and sustainability through a broad diversity of funding sources. Most submissions included increasing research income as a strategic goal but not all were convincing in explaining how this would be achieved, nor how it would be sustained. Criminology and criminal justice often provided the main source of research to generate external income. Units set out details of infrastructural support including both physical space and equipment and access to digital and other resources. Levels of investment in staff and facilities varied widely and the sub-panel recognised that some newer units may be building from a low base and will take time to see the fruits of investment and expansion.

26. The element of the submission concerning collaboration and contribution provided frequent examples of impressive achievements by individuals, groups and centres at both national and international levels, demonstrating convincingly how these have contributed to the discipline and to particular fields of study. The strongest examples showed well-organised provision and support for the development of networks and research exchange and interchange, both within the discipline, and, where appropriate, across the institution and across disciplinary boundaries. The trend, noted above, to a more blended, multi- and interdisciplinary approach in research production in some aspects of law was reflected in the description of a number of multi-departmental and multi-institution networks and groupings providing both critical mass and the pooling of infrastructural resources for the production of programmes of research. Criminology and criminal justice were explicitly identified as a research strength and cluster of research excellence within a significant number of high scoring units.

27. Impressive examples of inter-institutional and international collaborations within law itself also demonstrate the potential of the discipline to engage with major issues and deliver insights which will have significant and far-reaching effects on the development of the law in the next REF period and beyond.

Process

28. All environment templates were assigned to at least three academic members of the sub-panel as lead readers who each read the submission independently before discussing and comparing their views. All assessments were determined by the sub-panel in plenary session.

Sub-panel 21: Politics and International Studies

Quality Profiles

Profile Type	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	20.9	40.1	31.5	7.1	0.4
Impact	40.0	44.2	13.1	2.7	0.0
Environment	41.3	38.6	16.5	3.2	0.4
Overall	28	40	26	6	0

General

1. In total, 56 submissions were made to UOA 21 (Politics and International Studies) in REF2014. Some other work broadly in the field of politics and international studies was submitted to other units of assessment and some of that work was cross-referred to SP 21. The following general comments and feedback concentrate on that work submitted directly to the sub-panel. Overall, the sub-panel read in detail, evaluated and graded 4,367 outputs, 181 impact case studies, 56 impact templates and 56 environment statements.

2. In RAE2001 and RAE2008 68 and 59 units, respectively, were submitted to the equivalent sub-panel. Seven departments which entered in 2008 did not submit to this sub-panel in 2014, and one which made a multiple submission in 2008 made a single submission in 2014, whilst five were submitted for the first time.

3. These submission figures should not, however, distract from the reality of a continually growing field of study. Since 2001 there has been a significant rise in the overall number of researchers submitted to Politics and International Studies. Indeed, Category A equivalents have risen in consecutive assessments, from 1,076 in 2001 to 1,269 in 2008 to 1,275 in 2014. One obvious consequence is a small, if notable, rise in the mean size of units of assessment submitted. In 2014, this was 22.8, as against 21.5 in 2008. Further, in 2008 the smallest submission was just one FTE, the largest 88.85, whereas in 2014 the smallest submission was of three FTE and the largest 98.3. The RAE2008 and REF2014 review periods have also seen the emergence of a small number of very large submitting units and a certain concentration of staff within these large units (with over a quarter of Category A staff in REF2014 coming from the five largest submissions).

Number of Category A FTE	Number of Submissions: RAE2008	Number of Submissions: REF2014
0 – 14.99	20	23
15 – 24.99	20	17
25 – 34.99	15	10
35 – 44.99	0	1
45+	4	5

4. There has been a notable increase in the number of early career researchers returned. Of the Category A staff entered, 24 per cent were declared as ECRs (defined as staff who first entered the academic profession on terms that qualified them for submission to the REF on or after 1 August 2009). In fact, most ECRs submitted to this sub-panel entered the profession well after that date. This is an increase since 2008 when 21 per cent of submitted staff were ECRs. It compares favourably with the Main Panel C average of 19.7 per cent.

5. The sub-panel fully implemented the very demanding assessment procedures set out in relation to outputs, impact and environment in the main panel working methods. For these reasons it has confidence in the robustness of the judgements made about the research quality of the individual units of assessment submitted. All assessments were agreed by the sub-panel in plenary after detailed consideration by those sub-panel members to whom items had been assigned. Review and calibration mechanisms were put in place to ensure consistency of approach through the assessment phase.

Outputs

6. The sub-panel received outputs judged to be world-leading from the vast majority of submissions (52 of 56); the overwhelming majority of work submitted (92.4 per cent) was judged to be of at least internationally recognised quality. This confirms the excellence of the research and scholarship, both theoretical and applied, being conducted in departments of political science and/or international studies in the UK during the review period. Many examples of world-leading research were found in each area identified in the unit of assessment descriptor.

7. All of the 4,367 outputs submitted were read and independently graded by at least two sub-panel members. In each case the final agreed quality level was the result of a careful deliberation between the two (or, exceptionally, more) readers conducted after having first shared their independently-reached judgements. Each reconciled grade was only then reported for agreement to the sub-panel as a whole. UOA sub-profiles for outputs were only revealed to the sub-panel at its final meeting. In each case, they were the simple aggregation of the grades awarded to the individual outputs returned. Overall, then, the sub-panel achieved the most extensive examination of outputs ever recorded in Politics and International Studies in the history of UK research assessment processes (it being the first to have read and independently graded **all** of the research outputs submitted to it).

8. The sub-panel cross-referred only a very small number of outputs that reached beyond the remit of Politics and International Studies to other disciplinary sub-panels or which were published in languages which it lacked the competence to read. All of these cross-referred outputs were also examined in detail by at least one sub-panel member (reflecting on a précis of the piece in the case of items cross-referred because of the language in which they were published). In common with the main panel, the sub-panel thus sought to ensure that advice was taken where appropriate but also that common standards of judgement were applied to all outputs and that it retained the ultimate responsibility for the grade awarded.

9. The sub-panel's judgements were sensitive to the interdisciplinary character of much of the work submitted to it. A significant proportion of such work was judged to be world-leading or internationally excellent. The sub-panel was particularly struck by the quality of work drawing on political science and international studies perspectives, theoretical traditions and methodologies which reached out into other disciplinary fields (such as health and epidemiology, law and social policy). It was also impressed by the quality of much of the inter-disciplinary work returned to it which sought to bring insights to political analysis from outside of the discipline.

10. Reassuringly, and in contrast to its predecessor in the RAE2008 assessment, the sub-panel identified virtually no work submitted to it that fell outside of the intentionally broad and inclusive unit of assessment descriptor.

11. Claims for double-weighting were almost exclusively made in respect of monographs. The sub-panel noted that different HEIs adopted very different policies in relation to whether such claims should be made for ostensibly similar items and there was a considerable variation in the quality of the claims made. Supporting statements often failed to explain clearly the ways in which the submitted output was of sufficiently extended scale and scope to warrant double-weighting, as required by the panel guidance. As a result, and in keeping with the procedures established during the main panel calibration of double-weighting, a high proportion of claims for double-weighting were rejected.

12. Overall, the sub-panel formed a very positive view of the discipline as energetic, ambitious and as consistently producing research of very high quality. The changes made to the grading system since RAE2008 preclude direct comparisons with the outcomes of that assessment exercise. However, the sub-panel's evaluation of the research outputs that it examined suggests a continued, indeed sharp, increase in the quality of the discipline since both the ESRC International Benchmarking Review of 2007 and the RAE of 2008. For example, 20.9 per cent of the outputs examined were graded as world-leading. As these are extremely demanding standards, exactingly and consistently applied, the discipline can have great confidence in the overall quality of the research that it is producing.

13. The sub-panel was pleased to note that research of high quality was being undertaken in units of all sizes and across the full range of sub-fields embraced by the discipline. Though it was not an explicit part of the sub-panel's remit to assess the relative size and strength of sub-disciplines, it did reflect on such questions once the evaluation was complete. It was impressed by the methodological and substantive pluralism evident in the content of research outputs submitted. It was also impressed by what it saw as an almost step-level increase in the rigour with which methodologies, both qualitative and quantitative, were operationalised, described and reflected upon. A pronounced increase in the use of quantitative methodologies was noted in all disciplinary sub-fields, with the vast majority of units of assessment returning work of this kind. Much of this work was very strong, but it was on average certainly no stronger than that using other methodologies.

14. The sub-panel was struck by the relative lack of work on US domestic politics and on South Asia and Latin America. It was also concerned at the seeming decline in the volume of research drawing on primary fieldwork conducted in languages other than English. The public availability of information on the outputs returned means that a debate can take place across the relevant professional communities in Politics and International Studies about the range of work being produced in the various sub-fields. But what is clear, is the exceptional quality of work being conducted in political science and international studies in the areas of: political theory, political philosophy, the history of ideas, international political theory, political behaviour, electoral studies, international and comparative political economy, international relations theory, international history, public administration and governance, sub-national government, security studies, foreign policy analysis, gender and politics, comparative politics, political sociology, formal theory, European integration theory and EU studies. Significant volumes of work at 4* level were found in each of these sub-fields (and in many others besides).

15. In addition, the sub-panel identified work of the highest quality in all publication types. Outputs included (but were not limited to) journal articles, authored books, edited books and chapters in books and research reports for external bodies. The largest categories received were,

predictably, journal articles (3,050), authored books (833), chapters in books (395) and edited books (60). Together these accounted for more than 99 per cent of the outputs submitted. The sub-panel noted a pronounced rise in the proportion of journal articles submitted to it and an equivalent fall in the number of edited collections and book chapters returned. The 3,050 journal articles submitted were published in a total of 743 different journals.

16. Though a small proportion of chapters in books and edited books were judged world-leading in terms of their quality, it was journal articles and, above all, authored books which were most likely to be judged world-leading. The strong performance of authored books in REF2014 in Political Science and International Studies (documented in the table below) clearly reaffirms the need to maintain and defend the crucial role of the research monograph in the discipline.

Output type	Items returned	4* items	% of 4* items
Authored book	833	305	36.6
Journal article	3,050	570	18.7
Chapter in book	395	17	4.3
Edited book	60	5	8.3
Others	29	0	0
Total	4,367	897	20.5

17. The 570 journal articles judged world-leading in terms of their quality were published in over 180 different journals. Of the journals in which five or more returned items were published, there was no single journal for which all returned items were judged world-leading. Thus, whilst exacting peer review undoubtedly contributes significantly to the quality of published work within the discipline, publication in any given journal is neither a guarantee of, nor can be used as, a proxy for research quality. It is for this reason, above all, that the sub-panel firmly shares the view of its predecessor that sub-panel peer review of outputs remains the most reliable method of assessing research quality in political science and international studies.

18. The sub-panel was disappointed to find a small but nonetheless significant number of outputs which duplicated research published either before the REF period or in work returned in the same submission. In such cases it was forced to revise its judgement of the originality of the work accordingly. In a handful of cases, new editions or revised works were submitted without supporting text to explain what material was new to the REF period, leading to a number of audit queries. One item was unclassified since it had already been returned in RAE2008 (with a 2007 digital object identifier and a 2008 publication date).

19. There was a very great deal of work exhibiting rigour, significance **and** originality at the very highest levels. However, despite an almost step-level increase in rigour being identified, it was not the case that international standards of rigour always or automatically produced work judged to attain a similar international standard in terms of originality and significance. Indeed, the sub-panel was concerned that, in an understandable desire to return work seen as methodologically robust (particularly where that work had been exactly peer-reviewed), submitting units sometimes returned work that fell short of international standards of originality and significance.

20. Despite the generally extremely impressive performance of research monographs in the REF (as detailed above), the sub-panel identified a concern about monographs based too closely and narrowly on PhD theses. Although these typically contained excellent research, it was felt that

many remained too close in form, content and even style to the PhD theses on which they were clearly based to show their rigour, originality and, above all, significance. The revision for publication of PhD theses, the sub-panel feels, needs to become a more important focus for support of early career researchers within the discipline.

21. This notwithstanding, the performance of early career researchers was extremely impressive. Very many early career researchers were returned (they accounted for nearly a quarter of the staff submitted). Moreover, and on average, the items returned for them were judged at least as favourably as those of longer-standing staff. A review of the grading of outputs from ECRs compared to all staff submitted revealed no overall difference between outputs graded at 4*, and a slightly higher (5.5 per cent) proportion of outputs graded at 4* and 3* combined. This clearly augurs well for the future of the discipline and confirms the sub-panels very favourable view of the discipline's support in general for ECRs (see below).

Impact

22. It was noted in the RAE2008 subject overview that many staff in the field of Politics and International Studies were also substantially involved in policy making circles and the critical scrutiny of public policy of all types both in the UK and in other countries over the course of the assessment period. They engaged widely in stimulating policy debates, giving advice to governments and other public bodies and in directly researching issues of governance. It is clear that this long-standing experience of working directly with practitioners has contributed to the exceptional capacity of the discipline to generate excellent impact witnessed by the sub-panel in REF2014.

23. The sub-panel received impact case studies or templates judged to be outstanding from the majority of submissions (37 of 56), with the vast majority submitting either an impact case study or template judged to be achieving outstanding or very considerable impacts (50 of 56). Moreover, 73 per cent of the impact case studies submitted was judged to demonstrate impacts being outstanding or very considerable in terms their reach and significance; the equivalent figure for the impact templates was 59 per cent. Paralleling the trend for outputs, examples of outstanding impact were found in each area identified in the UOA descriptor, including political theory and international relations theory. Accordingly, the sub-panel found impact of outstanding reach and significance arising from underpinning research conducted in all sub-fields within the discipline (from both applied and more purely theoretical approaches), and drawing on all methodologies, qualitative and quantitative alike. In many instances, strong impact case studies were underpinned by research of an interdisciplinary character – although, overall, such case studies were neither more nor less likely to be graded highly.

24. Impact templates were assigned to two academic members and one user member. The user members were drawn from government, business, think tanks and the third sector. Impact case studies were assigned to one user member or assessor and one academic member of the sub-panel. In addition, a common second academic member was assigned all of the impact case studies and the template for a given submitting unit. This sub-panel member acted as rapporteur for the unit when the provisional impact profiles were discussed by the sub-panel in plenary session (respecting conflicts of interest).

25. The sub-panel is pleased to report the very high degree of consensus between user members and academic members of the sub-panel in evaluating impact. Though each brought different perspectives to bear on the materials they were asked to judge, it is striking how easy it was to reach amicable agreement on the quality of case studies and templates alike when

evaluated against the published criteria and in the light of the main panel's guidance and calibration mechanisms.

26. The sub-panel was impressed by the scale and extent of the impact that research in political science and international studies is generating, in terms of in shaping public debate and understanding of politics and the formation and critical scrutiny of public policy at all levels (from the very local to the most global). The examples provided by the submitted case studies will provide an invaluable resource for HEIs seeking to develop further and enhance their approach to, and achievement of, impact in the future. Sub-panel members are committed to working with the relevant professional associations to aid that collective task, drawing on their experience in evaluating impact case studies and impact templates in REF2014.

27. Though, given their range and diversity, it is difficult to generalise, case studies tended to focus primarily on policy-related examples, although a large number of case studies were also returned which sought to demonstrate impact in informing the wider public debate and understanding of politics and policy. There was something of a tendency for case studies to draw disproportionately on research on the UK itself – rather more so than for research outputs, for instance. Nonetheless, there were examples of impact case studies judged as world-leading that were based upon research conducted on (and in) all parts of the world. It was notable how many very strong impact case studies drew on primary qualitative research conducted in the field.

28. The sub-panel was impressed by the range and diversity of the case studies submitted to it and the tendency for UOAs to reveal the breadth and range of their impact generation in the case studies they had selected. Case studies of a great variety of different types and with a great diversity of beneficiaries were all judged very favourably.

29. The sub-panel noted the perhaps inevitable tendency for case studies to be drawn from those fields of research where impact claims were perhaps most easily evidenced – though the quality of the evidence provided still varied very considerably.

30. It was also noted that, in a number of cases, and particularly where researchers had changed HEI during the assessment period, units might have benefitted from developing joint (inter-unit) case studies (in situations in which each HEI could make a credible case for having made an investment in the underpinning research leading to the generation of tangible impact). Similarly, it was noted that units were often reluctant to give sufficient recognition to research conducted elsewhere (and/or by other researchers) in the generation of the impact they were claiming. This resulted in a certain amount of over-claiming of research impact and, albeit less frequently, the duplication of claims to the same or very similar impact in case studies submitted by different units. Such unfortunate duplication might have been tempered by a greater willingness on the part of units to collaborate in developing joint inter-institutional case studies. Not a single example of a jointly-submitted case study was received by the sub-panel, despite the encouragement in the submission guidance.

31. The sub-panel noted that 'additive' case studies – in which a large number of separate, and typically loosely-connected, claims to impact were made – were invariably judged less favourably than more clearly focussed case studies. The latter were found better able to substantiate the claims they made evidentially and to show more clearly the pathway from the underpinning research to the impact itself. This notwithstanding, individual researcher-focussed case studies and more group-based case studies were judged similarly favourably – neither was found to be a more appropriate or efficacious strategy for returning impact judged of reach and significance.

32. The sub-panel was, in general, impressed by the degree to which submitting units had developed appropriate mechanisms and procedures for supporting and nurturing the generation

of research impact, particularly amongst early career researchers. It was encouraging also to find many excellent case studies drawing on the underpinning research and associated impact-generation of early career researchers. It was clear to the sub-panel that many of the units which performed particularly well in this element of the assessment had developed, over a long period of time and well before the start of the assessment period, a track record of impact generation and appropriate networks of research dissemination and engagement with potential beneficiaries in government, think tanks, NGOs, the third sector and beyond.

33. The strongest examples of impact templates, of which there were many, typically included a clear and well-illustrated explanation of the specificity of the institutional context (the shape and composition of the unit and its history of user engagement). This helped the sub-panel to understand the types of impact being sought and to gauge the appropriateness of the strategies for achieving such impact. Such templates typically differentiated clearly between the general approach to impact and the specific strategies pursued to encourage, stimulate and further its development, often giving a strong indication of how impact had become embedded within the research culture of the unit. They also showed how strategies linked to specific policies to support impact generation: whether this involved a decision to concentrate on particular types of impact, a particular set of beneficiaries, particular sub-fields within the discipline (perhaps linked to a research centre or cluster), or a more general approach to stimulating impact. The strongest templates also detailed and documented an institutional capacity to act proactively to generate potential audiences for impact alongside a capacity to act in response mode, to unanticipated opportunities as these arose.

34. Also impressive was the extent to which units had made available resources to support the engagement of staff (including early career researchers) in impact-generating activities through a combination of training and facilitated interaction with practitioners, policy makers and other potential beneficiaries. Although wider institutional support was important in many cases, impact policies were typically (though not exclusively) judged most successful where they were unit, discipline- or research-focus specific in character.

35. Strategic goals in strong impact templates were clearly articulated with identifiable means set out to achieve them and appropriate indicators of success and mechanisms for collating and reflecting collectively upon developing experience. Such templates typically used the case studies to elucidate and illustrate how the unit's approach to impact and the strategies it has put in place operated in practice.

36. By contrast, the weakest impact templates often confused impact and the procedures and strategies for promoting it with the actual production and dissemination of research itself. Some provided merely a list of examples at the level of individual researchers (or, less frequently, research teams) with little sense of how the unit sought, more collectively, to enable or facilitate impact generation from their research by, for instance, reflecting on the experience of engaging with potential beneficiaries.

Environment

37. The sub-panel considered that the large majority of submissions displayed good provision for the support and promotion of research. 54 per cent of submissions were found to exhibit at least some element of world-leading quality in their research environment, with 91 per cent of submissions found to contain at least some elements of international excellence in terms of the quality of their research environment. The sub-panel was particularly impressed by procedures to support early career researchers and the extent to which such researchers were fully incorporated within the research culture of almost all units of assessment.

38. Following a calibration process whereby the entire sub-panel assessed a sample of non-conflicted environment templates, each environment template (and its supporting quantitative data) was assessed by at least two sub-panel members (one assigned the role of submitting unit environment rapporteur). All environment submissions were then considered and discussed in detail in a plenary session of the sub-panel, with individuals with conflicts of interest leaving the room as appropriate. The rapporteur for each submission introduced the submission and its data and proposed a quality sub-profile for discussion and agreement. The sub-panel began by discussing and agreeing quality sub-profiles for all the institutions where there were no conflicts of interest, ensuring that all members had the benefit of full group discussions at the outset.

39. Overall, the sub-panel saw a significant improvement in research environments, as judged by an analysis of the environment statements and supporting metrics returned to it.

40. Such improvements were, however, uneven. In particular, the sub-panel noted the frequent disparity between eloquently phrased but vague and general commitments with respect to equality and diversity, on the one hand, and the absence of detailed policies and strategies to address such concerns, on the other. In many environment statements, a tendency simply to list achievements failed to communicate a sense of strategic purpose or vision.

41. Most units of assessment identified appropriate thematic or sub-disciplinary foci for their research and supported these well. However, where thematic priorities had been identified by the HEI centrally (rather than arising organically within the submitting unit), they were typically seen as less effective and mapped less clearly on to research outputs.

42. The sub-panel was extremely impressed by the procedures and policies typically in place to mentor and support early career researchers. In very many units of assessment these were judged to be world-leading or internationally excellent. In the view of the sub-panel this notable improvement in research environments across the discipline has contributed significantly to the excellent performance of early career researchers in REF2014 noted and detailed above.

43. The sub-panel was also impressed by the procedures and policies in place to support doctoral students and to integrate them within research environments. 2,197 doctorates were awarded during the course of the assessment period, a 10 per cent increase since RAE2008 (which had a longer census period). In the view of the sub-panel this notable achievement is a reflection of the strength in general within the discipline of doctoral provision and the wider strategies in place for the mentoring of scholars at all stages in their professional development from the doctorate onwards. In the sub-panel's view, a higher proportion of doctoral students are now receiving internationally-excellent or world-leading training, mentoring and support. This it sees as key to the ongoing vitality and sustainability of the discipline in the UK.

44. External research income generated over the whole assessment period by the total number of submitted units exceeded £139 million in value. Of this more than £42 million derived from income sources 1 (Research Councils or similar sources), whilst £23 million came from UK industry, commerce and public corporations, £20 million from other government bodies in the UK, £28 million from EU sources and £14 million from UK-based charities. Research income per research active staff FTE totalled over £109,000, a figure which compares very favourably with that reported in RAE2008 (of £90,000 in 2008).

45. The sub-panel was impressed by the contribution of so many individual members of the profession to research-related public goods (such as journal editing, organising conferences and giving service to professional associations). It recognised that such commitments are not, perhaps, so easy to sustain in the age of regular research evaluation. It made a conscious effort to acknowledge contribution to such public goods in its judgement of environment.

46. It was similarly impressed by the extent, range and diversity of the networks of international collaboration with which units were engaged, but noted that it was only in a relatively few cases that these were actually led by scholars in the submitting unit. The strongest examples showed well-organised provision and support for the development of networks and research exchange and interchange both within the discipline and, where appropriate, across disciplinary boundaries. The sub-panel noted the greater involvement of submitting units in the REF2014 review period in such collaborative, multi- and inter-disciplinary partnerships and ventures.

47. As noted by the RAE2008 panel, it was pleasing to note the widespread adoption of good mentoring practices, especially in relation to the large numbers of ECRs mentioned earlier. Evidence presented of the training and supervision of postgraduate research students was also a generally highly impressive feature of submissions. Overall the panel was able to form a very positive image of the vitality and sustainability of the discipline in the UK.

48. Overall the sub-panel was strongly persuaded that the discipline in the UK is supremely well-placed to retain and extend its already considerable role in the organisation and shaping of the research agenda internationally in the years ahead.

Sub-panel 22: Social Work and Social Policy

Quality Profiles

Profile Type	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	19.4	44.3	30.2	5.6	0.5
Impact	43.8	36.0	14.9	4.1	1.2
Environment	36.9	39.3	20.5	2.6	0.7
Overall	27	42	25	5	1

Summary of submissions

1. UOA 22 addresses a broad field, covering 'all forms of research in social work, social policy and administration and criminology, including those in governmental, voluntary and community, private for profit and not for profit areas.' The sub-panel received 62 submissions, six fewer than in the 2008RAE. 1,302 FTE (Category A) staff were included: an increase of 4.7 per cent from 2008. Eight submissions returned more than 35 FTE Category A staff, 26 returned between 15 and 34.99 FTE and 28 submitted fewer than 15 FTE. 3.4 outputs per person were returned, a reduction from 3.7 in 2008. 190 impact case studies were submitted for assessment.
2. All assessments were agreed by the sub-panel in plenary after consideration of the assigned lead readers' and co-readers' judgements and comments. Review mechanisms were put in place to ensure consistency of approach throughout the assessment phase.
3. Because criminology outputs were submitted to a number of sub-panels (notably Sub-panel 20, 22 and 23), procedures were implemented during the assessment period to ensure broad consistency of approach between them. These included the appointment of a joint assessor working across these three sub-panels, a joint calibration exercise and Main Panel C (MPC) oversight of the assessment profiles as they emerged.
4. The sub-panel received a total of 4,784 outputs, a fall of 9.2 per cent compared with RAE 2008. We noted a sharp increase in the work in criminology and criminal justice coming to the sub-panel. The review conducted by Main Panel C indicated that some two thirds of the criminology and criminal justice outputs identified in that exercise came to SP 22. We received some work in sociology and 55 items were cross-referred to SP 23. 14 other outputs were cross-referred to a range of other sub-panels within MPC and a further 22 outside MPC. 56 items were cross-referred into the sub-panel, 35 of them from SP 19, seven from other MPC sub-panels and 14 from outside MPC.
5. We also received a substantial quantity of gerontological work and more work than previously from a demographic perspective.
6. The sub-panel included 10 members with expertise in social policy, eight in social work, six in criminology and three in gerontology, some members having expertise in more than one area. We comment on these areas separately where there are specific issues.
7. The sub-panel wishes to draw attention to the expertise, enthusiasm and support of the user members, despite the many calls on their time.

Outputs

In general

8. The sub-panel was impressed by the vitality and robustness of the research in all areas and by the wide range of areas covered in work coming to the sub-panel. This is reflected in the increase from 16 to 27 per cent in the proportion of work overall assessed as world-leading in comparison with RAE2008. It is also shown in the range of achievement between a group of exceptionally strong submissions achieving very high scores across all three areas of outputs, impact and environment, and a larger cluster of mid-ranking submissions, where differences between scores in the three areas made a difference to final outcomes. World-leading and internationally excellent work was found across the full range of outputs including research reports as well as books and articles, as might be expected in a highly applied area. The sub-panel received 453 authored books, 430 book chapters, 3,695 journal articles and 153 research reports.

9. We were struck by the growth in the amount of quantitative work, both in proportion and quality, across all our areas. As noted above, the volume of policy-related criminology and criminal justice work coming to the sub-panel also appears to have increased over the period.

10. The submissions contained a substantial quantity of inter- and particularly multi-disciplinary work with a range of disciplines, including sociology, political science and public administration, psychology, economics, law and history, and this has continued to expand.

11. We found, as had been anticipated in the highly applied areas of social science covered by the UOA, a close linkage between research and research outputs and impact, in many cases underpinned by the relationships established and sustained between institutions and a variety of outside agencies and groups.

12. Cross-national work also continues to expand. This includes a noteworthy strengthening of links within Europe and a great deal of research outside Western countries, particularly in Asia and Africa.

13. The volume of work, both quantitative and qualitative, on black and minority ethnic (BME) issues has also continued to grow and to be included among that achieving the highest assessments.

14. Institutions in the area covered by SP 22 made minimal use of the opportunity to request double-weighting for outputs. 15 requests were made by institutions covering 0.31 per cent of total outputs, against 1.1 per cent for MPC as a whole. There appeared to be a considerable number of other outputs for which requests could realistically have been made. Seven of the double-weighting requests were accepted by the sub-panel.

Social policy

15. Social policy accounted for roughly half the work considered by the sub-panel. Most of the points that apply to outputs in this area have already been made in the 'General' section. In addition to the improvement in quality of quantitative work and the expansion of cross-national work and research on BME issues mentioned above, we noted a substantial expansion of work relating to issues of health and medical care, especially in relation to ageing; employment; inequality and poverty; migration; and the social policy implications of climate change. Particularly noteworthy are the boundary areas between social policy and gerontology, social policy and demography and social policy and criminology/criminal justice.

16. We were interested to note that relatively little work on the social policy aspects of education came to SP 22. The links between psychology and social policy merit further expansion.

Social work

17. This area made up nearly one third of the work considered by the sub-panel. Research in this field demonstrates increasing methodological sophistication. The sub-panel noted an increase in large scale multi-method empirical studies, including longitudinal studies. These are often linked to the collaborations discussed in the section on Environment below. There is evidence of improved conceptualisation of approaches to the long term outcomes of social work interventions. We noted an increased rigour in qualitative research. There was a welcome expansion of high quality quantitative research, often in collaboration with other disciplines such as psychology and economics. Some excellent examples were found of imaginative and insightful work showing innovative approaches to capturing the service user perspective. There was evidence of comparative research across countries, and of research that engaged international partners in exploring common issues.

18. There was an increased exploration of theory and theory development and of its relevance to the research area in question. The sub-panel commended work that went beyond documenting experiences to engage with broader theoretical and conceptual frameworks. There was evidence of renewed attention to psychodynamic perspectives, and, in most cases, of greater conceptual sophistication in such work.

19. The largest group of outputs addresses social work with children, young people and families. There were increases in research on social work as it relates to older people; death and dying; religion and spirituality; and drug and alcohol abuse. Research in mental health included large scale empirical studies undertaken in collaboration with health disciplines. The interface with criminal justice has grown, with the development of new areas of research. These include family justice and the interface between domestic violence and criminal justice. Social work brings expertise on systemic issues to research in a range of fields. Conceptual and empirical pedagogic research and research on professional education has increased in volume and quality.

20. There was less work than expected on social work and inequality(ies). The good quality work on race, migration and ethnicity included precise expositions and attempts to make sense of people's experience within contexts of diversity. We found more research than in the previous exercise on social work and sexualities and social work and disability, the latter typically in collaboration with health disciplines. There was increasing recognition of the diversity of carers and greater sophistication in conceptualising their experience within broader debates. There was less work than expected on ethics and values, with some good quality work noted in the field of dementia.

Criminology

21. The sub-panel considered a significant number of outputs relating to criminology and criminal justice, as noted in the Summary of submissions section, reflecting the substantial growth of criminological research across the sector. We estimate that this work made up nearly a quarter of the outputs coming to SP 22. The outputs were judged in accordance with the full range of possible scores, including a substantial number of outputs assessed to be world-leading or internationally excellent. Some of the work submitted, particularly that which incorporated a comparative or transnational aspect, was judged to be extending the theoretical and conceptual boundaries of the discipline in a highly commendable way. There was strong evidence of building

upon the more traditional psychological and sociological roots of criminology towards a broader range of approaches and an increasing diversity of themes and research methods.

22. There were some theoretical innovations, especially in respect of the new media and in relation to interpretations and constructions of crime. The latter applied especially to work around constructions of 'terrorism', new wars and Islamophobia. There was also evidence of increased confidence in relation to interdisciplinary research alongside strong comparative work. The panel was pleased to observe that close attention to the ethical dimensions of research characterised outputs. In addition to pioneering examples of small-scale qualitative work there was also strong evidence of emerging research involving 'big data'. There were some very interesting and innovative methodological approaches in the work read and overall much evidence of exciting developments in this multi-disciplinary, pluralistic field.

Gerontology

23. Gerontology continues to grow as a distinctive interdisciplinary field. Themes covered included social policy (evaluations of service and policy provision), social work (issues of death and dying; the state of gerontological social work), geography (urban planning), healthcare (especially dementia care), demography (both young and older people), housing and religious studies. A range of social contexts were covered. The interdisciplinary nature of ageing research reflects the funding available for such approaches during the last 20 years. There were excellent examples of international work reflected both in outputs and environments.

24. The quality of outputs across institutions in terms of originality, rigour and significance was high, irrespective of whether it was from well-established or from newly emerging centres, or from individuals in institutions without a centre or group on ageing, with a number of outputs assessed at world-leading standard. Gerontology was also integrated in larger research centres, which received significant funding for ageing research. Across a number of research themes, there was a high degree of originality in both theoretical and empirical work submitted to the UOA. Methodologically, gerontology included quantitative and qualitative studies, mixed methods and comparative cross-national research covering a wide range of countries. There was evidence of methodological innovation through the use of visual and biographical methods and also through the analysis of large and complex data, including administrative data.

Impact

In general

25. The disciplines covered by the sub-panel have a long and continuing tradition of active engagement with research users, and this was demonstrated in the substantial number of world-leading and internationally excellent impact case studies, above the MPC average. The sub-panel noted that, in addition to the impact captured by the case-study approach, the work of the institutions submitting to UOA 22 has a more general and diffuse influence on the climate of ideas. This has contributed to the noteworthy capacity of institutions to form the links with users that enable the activities reported in the case studies to take place.

26. The sub-panel was struck by the broad range of case studies in the diversity of the themes and areas covered, and in the proactivity of submission members in finding ways to establish links with a broad variety of end users. The case studies submitted appeared to carry significance for policy development at local, national and international levels and for governmental and non-governmental organisations. There were some excellent case studies, using innovative knowledge exchange mechanisms (for example, using modern technology and different media forms) and capitalising on diverse networks and relationships. Most case studies submitted were

outstanding or had very considerable or at least considerable impact in terms of reach and significance.

Criminology

27. The increasing diversity of the criminal justice sector, comprising governmental, non-governmental and private sector agencies, was reflected in both impact statements and in case studies. Several impact case studies demonstrated outstanding or very considerable reach and significance and deployed a range of innovative knowledge exchange and engagement strategies. The work submitted revealed a strong interface with social policy in particular, but also with social work and other related work that came to the sub-panel.

Environment

In general

28. We felt that there was evidence of cross-fertilisation between the various disciplines included in UOA 22 within institutions, and that this applied across all our areas. The sub-panel noted strong evidence of a commitment to gender equality and of moves towards greater ethnic diversity in current staffing and in departmental planning. There is a clear variation between institutions in numbers of postgraduate students, and a sharp upward trend in the number of postgraduate degrees awarded, increasing by more than 37 per cent during the assessment period. Research income in the UOA has remained broadly stable, but is again highly skewed to particular institutions.

29. The sub-panel noted as a strength of the research environment across the range of submissions the high degree of involvement outside academe, including engagement with government, local, national and cross-national, NGOs and third sector organisations, relevant businesses and the mass public.

Social policy

30. There was much evidence of stronger international collaboration, especially with European and East Asian countries. This was demonstrated through participation in collaborative research projects, contribution to policy debates and in conferences such as those organised by the EU, the European Network for Social Policy Analysis, Research Committee 19 of the International Sociological Association, and the East Asian Social Policy Network, with strong contributions to international conferences in related disciplines such as the European Consortium for Political Research, the European Sociological Association, and the International Sociological Association.

Social work

31. Social work continues to build its interdisciplinary collaborations, extending its reach beyond sociology, gerontology and law to new areas such as social geography and economics. Such collaborations are increasingly featuring in new intra-university structures including research centres and groupings, with evidence of post-RAE restructuring in a number of submissions. There was evidence of increasing inter-university collaborations nationally and internationally both in relation to research and to postgraduate research students. The building of research capacity in this way is welcomed in a context where the numbers of social work researchers continue to be low relative to other disciplines in this UOA.

32. There was also evidence of the development of partnerships with a diverse range of research users, particularly in relation to impact. The involvement of service users in research has increased, and panel members particularly welcomed evidence of innovative approaches to the involvement of groups such as children and young people and 'hard to reach' groups.

33. The sub-panel noted that international collaborations could be developed further in this field.

Criminology

34. Submissions to UOA 22 expressed a strong and growing commitment to criminology and there was much evidence of investment in early career staff alongside strategic incentivisation for research, and institutional support for those engaged in research. There was also evidence of a growth in PhD students in several units, and evidence of a strengthened postgraduate research culture. In sum, there was much evidence of vibrancy and environmental features that are conducive to producing research of world-leading and internationally excellent quality.

Sub-panel 23: Sociology

Quality profiles

Profile type	4* (%)	3* (%)	2* (%)	1* (%)	UC (%)
Overall	27	45	26	2	0
Outputs	19.7	47.9	30.4	1.8	0.2
Impact	43.2	39.4	13.6	3.3	0.5
Environment	35.1	44.9	18.5	1.4	0.1

Summary of submissions

1. 29 submissions were received in UOA 23 (Sociology). A total of 704 Category A staff were submitted for assessment. The submissions included 2,630 outputs and 100 impact case studies.

Sub-panel working methods

2. Assessment of all elements in the submissions was subject to oversight by Main Panel C. This oversight included calibration, moderation, and audit of assessments, as specified in the 'Panel Criteria and Working Methods' and as reported in the Main Panel Overview.

3. The allocation of research outputs for assessment was expertise-led, with a second reader being the co-ordinator for an individual institution's submission. All outputs were double-read independently by the pairs of sub-panel members and agreed grades were subject to moderation at sub-panel level. The outputs from each institution were assessed by a large number of pairs drawn from across the whole sub-panel.

4. All Environment Templates, Impact Templates, and Impact Case Studies were considered by all sub-panel members. Assessments by assessor pairs were reported and discussed in plenary sessions to arrive at an agreed grade. In plenary discussions, panellists with conflicts of interests withdrew for the discussion of the particular institutions for which they were conflicted. The sub-panel held additional calibration and moderation exercises for each element in the assessment.

5. The area covered by the Sociology UOA is specified in the 'Panel Criteria and Working Methods' as encompassing the empirical and theoretical study of social structures, cultures, and everyday practices of societies. As such, it relates closely to interdisciplinary fields relevant to other sub-panels. Much sociological work is undertaken in Schools and Departments where it is combined with Social Policy or Social Work, in Schools of Business and Management, in Schools of Health and Medicine, in Schools of Education and in other collaborative contexts. Research in Sociology has therefore been submitted in several UOAs in REF2014 and it is noted that a substantial body of sociological research appears as an integral element of the submissions made to UOA 22 (Social Work and Social Policy), as well as to UOAs 2 Public Health, Health Services and Primary Care, 19 Business and Management Studies, 25 Education, 26 Sport and Exercise Sciences, Leisure and Tourism, and 36 Communication, Cultural and Media Studies, Library and Information Management. The work submitted in the Sociology UOA is, therefore, a partial representation of the discipline, encompassing the work of, predominantly, the stand-alone, single discipline departments rather than that done in the combined departments and interdisciplinary

units. A full picture of the state of sociological work could be based only on the vast amount of work submitted to all UOAs and the comments here relate only to the work submitted in this UOA.

6. A significant number of research outputs were cross-referred in to UOA 23 from other sub-panels and from sub-panels in other main panel areas. Sub-panel 23 referred little material out to other sub-panels.

7. Since criminology outputs were submitted in a number of UOAs (notably 20 Law, 22 Social Work and Social Policy and 23 Sociology), procedures were implemented during the assessment period to ensure broad consistency of approach between them. These included the appointment of a joint assessor working across these three sub-panels, a joint calibration exercise and Main Panel C oversight of the assessment profiles as they emerged. Comments specific to the criminological work submitted in this UOA are reported below.

8. The published Guidelines for the REF encouraged institutions to submit the work of all their eligible researchers. It was clear from the Environment templates, however, that institutions had adopted varying criteria in their selection of staff for submission. The number of impact case studies submitted varied according to the number of researchers within a unit and to institutional selectivity.

Although each element was given a different weight in the scoring of the overall profiles, the sub-panel regards the overall profile and the various sub-profiles as being equally significant in reflecting different aspects of research quality. Attention must be paid to the constituent sub-profiles of Outputs, Impact, and Research Environment and to the comments relating to these as well as to the summary overall profile.

Outputs

9. The outputs submitted demonstrated clearly the diversity and vibrancy of sociological research, confirming the judgment of the 2010 ESRC International Benchmarking Review. There was a clear improvement in overall research output quality by comparison with RAE2008. The sub-panel was particularly encouraged by the submission of strong work in theory and in philosophy of social science, areas that had been noted as poorly represented in submissions to RAE2008. It was clear that much high quality theoretical work was being undertaken. This was also apparent in the large amount of theoretically informed empirical work in many specialist areas.

10. There were clear signs of improvement in quantitative skills and in the rigour and innovativeness of qualitative methods. Very high quality methodological work was submitted and empirical papers showed clearly the enhanced skills in these areas that have developed during the REF assessment period. Much of this work was judged to be at the frontier of social science methodological work. Significant work engaged with developments around 'big data' and digital data practices, including the role of expert knowledge, and explored its implications for sociological research. Equally significant was the finding that the rigorous application of scientific procedures and method in outputs is now routine practice. Notable were the large number of outputs reporting mixed methods, both quantitative and qualitative.

11. Substantive areas in which large numbers of high quality outputs were submitted included: race and ethnicity, with especially interesting work on migration and borders: health and biomedicine; and social studies of science. The large number of submissions in social studies of science and technology showed clear evidence of the maturity of this sub-discipline, albeit that this work was characterised by a relative lack of conceptual or methodological innovation. Less strong was some work in media and communications, though some sociological work in this area

was submitted in UOA 36 (Communications, Cultural and Media Studies, Library and Information Management). Across all areas there was a notable engagement with issues of globalisation and cross-national research.

12. The large number of outputs rated at 4* or 3* are clear indicators of the increase in the overall quality of sociological research. However, the sub-panel welcomed the submission of the substantial body of work that was assessed at the 2* level. This work contributes to incremental and cumulative advances in knowledge in the field and such 'normal' science is evidence of the maturity of research in a range of specialisms. It provides the foundations on which important and essential points of reference can be built and critical breakthroughs can be made.

13. The number of criminological outputs submitted in the UOA was less than anticipated but they were all submitted to sociology appropriately. This is in contrast to RAE2008 where a noticeable proportion of the criminological work submitted came from a wider range of disciplinary bases. The sub-panel noted the immense overlap between Criminology (so-labelled) and other areas of sociology such as studies on gender-based violence. This indicated a fruitful synergy between criminological and other sociological work within the units submitted. A large proportion of the criminological outputs in REF2014 were judged to be internationally excellent or world-leading mirroring the profile outputs submitted to the panel as a whole.

14. In RAE2001, a separate Women's Studies sub-subpanel had been established to consider gender-based work in sociology and that cross-referred from other sub-panels, including Literature and History. The volume of referrals in this area had declined by 2008 as gender issues had become more thoroughly embedded in mainstream research. The 2014 sub-panel noted the inclusion of gender issues across all specialisms within the discipline and received no requests for cross-referral of outputs on women and gender. It was clear that a large volume of gender-based research was being undertaken and submitted to the subpanel and that this was strongly embedded in a range of substantive areas of sociology. The subpanel noted the high quality of much of this work.

15. Strength was apparent in outputs of all types, including books, articles, and chapters, with the highest grades being awarded across the full range of research outputs. It was noted, however, that chapters in books with limited research content tended to score at lower levels. Monograph publication is an important feature of sociological research and the sub-panel welcomed the inclusion of books in institutional submissions. The higher grades often earned by monographs, as compared with some articles, reflected the strength of sustained engagement afforded by book-length publication as compared with most journals that require relatively short articles. The articles submitted came from an impressive range of specialist journals of international standing as well as from major general journals. This is a feature of journal publication within sociology and the subpanel judged all articles on their quality not their place of publication.

16. Relatively few requests for double-weighting were received; those that were received came from a small number of institutions. The sub-panel considered the cases made and examined the outputs against these claims in order to assess whether outputs had passed the published threshold of scale and scope to be given double-weighting. The sub-panel felt that the criteria for double-weighting may have led to a cautious strategy being adopted in many institutions and felt that a number of other requests might have been made successfully.

17. The sub-panel welcomed the widespread inclusion of ECRs and noted the very high quality of work submitted by such staff in many units. Especially notable were the ways in which such staff were engaging productively with both qualitative and quantitative methods. It also welcomed

the submission of smaller units where sociological research was to be built up through institutional investment.

Impact

18. The sub-panel was impressed by the extremely high levels of reach and significance in the majority of case studies submitted. The involvement of user representatives in the sub-panel and as impact assessors was a wholly positive feature of the exercise. The user voice was invaluable as a guarantor that impact had been adequately assessed. Sociological work of all kinds demonstrated with evidence its ability to speak to and contribute to policy issues and critical public discourse. Sociology, compared with many other disciplines, is able to avail itself of more, and more varied, opportunities to conduct research with potential impact, and units were therefore more able to select from a greater number of persuasive cases. The large number of highly rated case studies across the UOA indicates the clear commitment of sociologists to ensuring the impact and public benefit of their work. Sociological research has directly informed public policy, changed the terms of public debate over key issues, and has been directly embedded in changes to training and delivery practices in the public, private, and third sectors. This impact has been apparent at the local, regional, national, and international levels.

19. This was the first research assessment to explicitly assess impact and many units presented policy-related work rather than the critical and transformational work that is such an important feature of the discipline. Where such critical and transformational work was submitted, the sub-panel was often impressed by its quality and its ability to score highly. The sub-panel encourages units to submit such work in future exercises.

20. Case studies that were assessed at lower grades were predominantly those in which presentational issues led to a failure to depict the impact of the research with sufficient adequacy. Evidence to justify claims was sometimes missing or incomplete, the nature of the impact was not always clearly stated, and there was not always a clear narrative linking the actual research to its claimed impact.

21. The requirement for a minimum of two case studies meant that very small units were expected to demonstrate impact for a higher proportion of their research work. The sub-panel noted that in some small submissions, one of the two case studies was notably weaker than the other.

22. In submissions where criminological work was especially prominent, impact case studies were judged to have the same range of excellence in their reach and significance as case studies in other areas.

Impact templates were uneven in terms of their quality. In many cases the sub-panel found a strong strategy for establishing pathways to impact and a clear description of the current approach to impact. Less strong across the UOA were the reflections on case studies. The best of the Impact templates drew out conclusions from the success of the case studies and showed how these had contributed to the development of an impact strategy and strategic thinking. The weakest of the Impact templates simply used the final section of the template to restate the case studies in summary form. In these submissions it often appeared that case studies and Impact templates had been drafted independently and with little overall crafting to show that there was a genuine reflection on patterns of engagement

Research environment

23. Environment templates reported on Research Strategy, Staffing and Research Students, Income and Facilities, and Collaboration and Contribution to the Discipline. The sub-panel was

able to attain a good understanding of the varying ways in which units were developing the discipline within their institutions and of the degree of institutional support provided. There were clear signs of institutional investment in Sociology and of innovative strategic responses to the external environment. Submissions showed strong evidence on the academic impact of their research within and beyond the discipline, on their role in editorial and other professional work, and on their very high level of regional, national, and international collaboration.

24. Environment templates were, however, variable in quality and there were variations in the quality of presentation. It was clear that the 'Panel Criteria and Working Methods' guidance had not always been followed, resulting in material appearing in the wrong sub-sections or being omitted altogether. Those supervising the writing of the submissions were not always aware of the ways in which the guidance relating to Main Panel C differed from that relating to other Main Panels. In some cases, there was evidence of centrally drafted 'boiler-plate' text, with no indication that such central facilities were embedded in the unit's practices and procedures.

25. Many units, both large and small, demonstrated a clear strategy for developing their research quality, postgraduate research student numbers, and research income. This reporting, however, was uneven across the UOA, with some units listing achievements rather than documenting the strategy that may have underpinned these achievements, and some omitting reference to staffing strategy and succession planning. It was clear that there had been much restructuring at institutional level across the sector and that some institutions were better able to handle the consequent staff turnover. In some cases, the rapidity of change had made it difficult for a long-term strategy and future plans to be properly demonstrated. Some very small institutions in process of building their research capacity found it difficult to score highly as their templates were necessarily aspirational. The sub-panel was, however, pleased to recognise the potential of these units on the assumption that anticipated institutional support will be forthcoming.

26. The sub-panel noted that some fractional appointees whose outputs were submitted had appointments elsewhere and were not shown to be embedded in the research environment of the unit.

27. There was evidence across the UOA that equality and diversity issues were regarded as extremely important and as a central feature of the planning of the research environment and in relation to staffing strategies, mechanisms of support, and opportunities for career development. The sub-panel noted with concern, however, that a number of units made no mention of equality and diversity issues.

28. Postgraduate research training was well evidenced in many institutions. There was gratifying evidence in a number of cases that the ESRC Doctoral Training Centres (DTCs) had been embedded in institutional practices and procedures. In some cases, however, it was striking that no mention was made of the contribution of a DTC to the research environment. It was noted that a number of institutions were finding it more difficult to recruit postgraduate research students because they were not part of a DTC. The sub-panel was concerned that this would have a cumulative effect over the coming years and hopes that some way will be found of including more institutions within a broad umbrella when the DTCs become Doctoral Training Partnerships in 2017.

Sub-panel 24: Anthropology and Development Studies

Quality profiles

Profile Type	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	19.1	39.3	35.2	5.4	1.0
Impact	40.8	43.2	11.3	3.8	0.9
Environment	44.6	47	8.4	0	0
Overall	27	42	26	4	1

Summary of submissions

1. The submissions to REF2014 in anthropology and development studies provided evidence of the health and vitality of research activity in both fields. The sub-panel was impressed by the extremely high quality of the outputs submitted for assessment and by the evidence presented on the research environments from which those outputs were produced. Evidence on impact, assessed for the first time in this exercise, was especially impressive as is clear from the sub-profile scores across the units. The quality of the impact cases is, of course, an expression of the long history of non-academic engagement in anthropology, and of a commitment to policy-orientated and deep engagement with a wide range of development actors in development studies. Research in UK anthropology and development studies has been demonstrated to produce lasting, meaningful and significant impacts internationally.

2.

3. The sub-panel received 25 submissions from 21 HEIs. Four institutions prepared separate submissions for development studies and anthropology. Three institutions that submitted to UOA 43 (Development Studies) and one that submitted to UOA 42 (Anthropology) in RAE2008, did not submit for this exercise, but two institutions submitted for the first time, both in development studies. A total of 603 staff were returned. In FTE there were 562.1 compared to 527.8 in 2008 (327.9 in anthropology and 199.9 in development studies). The scale of the submissions ranged from 55.8 to 8.6 FTE. Of those which had submitted in 2008, eight submitted fewer staff (six of which were smaller by 25 per cent or more), and 14 submitted more staff (five growing by 50 per cent or more).

4. In some submissions, growth was partly explained by decisions to combine different areas of activity, some of which had been submitted to different units of assessment in 2008. None of the submissions returning significantly smaller numbers provided an explanation in their Environment template. As this suggests, different institutions appear to have made very different strategic decisions about the configuration of staff within their submissions, and this in turn makes it difficult to draw conclusions about the relative health of anthropology and development studies from the figures on staffing alone.

5. New procedures for assessing staff circumstances were followed in REF2014; altogether 202 staff (33 per cent of the total) reported personal circumstances and submitted less than four outputs each. The proportion reporting circumstances varied from 9 per cent to 64 per cent across the submissions. The biggest category was early career researchers, of whom 111 were submitted (18.4 per cent of all staff). The proportion of early career researchers in individual submissions varied from 0 per cent to 57 per cent.

Outputs

6. Most of the submissions returned outputs that were judged by the panel to be world-leading and the majority of outputs submitted were of at least internationally recognised quality, confirming the excellent research being carried out by UK development studies and anthropology departments. World-leading and internationally excellent work was evident across all forms of output, emphasising the importance of expert peer review as the principal mode of quality assessment.

7. For assessment of outputs, the sub-panel was joined by three additional assessors, brought in to strengthen expertise in certain areas of development studies and biological anthropology. The panel assessed a total of 2,014 outputs. Of these the biggest component was made up of journal articles (1,319), followed by authored books (275), edited books (80), and book chapters (294). There was a very small number of visual submissions (Exhibitions, DVDs of films), and a larger number of other assessable outputs, most of which were special Issues of journals. All outputs were assessed by at least two members of the sub-panel.

8. 30 outputs were cross-referred to other sub-panels, and 42 outputs were received by the sub-panel as cross-referrals from other sub-panels.

9. For the first time for anthropology and development studies, units were invited to request double-weighting for outputs that they judged to be of extended scale and scope, in each case to be accompanied by a supporting statement setting out the case for double weighting. Rather different approaches were adopted by different units in response to this opportunity, with some nominating no outputs for double weighting and others making a substantial number of such claims. Requests were assessed in light of the supporting statement and all decisions were confirmed by the sub-panel as a whole. Where the supporting statement failed to explain how the output was of sufficient scale and scope to merit double weighting, as required by the panel guidance, the claim was rejected. In the rejected cases the sub-panel assessed the reserve output that had been included in the submission.

10. A small but significant number of outputs were judged to be unclassified. In a few cases, unclassified outputs were recorded as a result of a rejection of a claim for individual staff circumstances. In a very few cases, the content of the output was felt not to meet the published definition of research for this assessment. In the majority of cases, however, unclassified grades were assigned to outputs that were found to have material in common, either with other outputs submitted by the same researcher to this exercise, or with outputs submitted to an earlier exercise. The panel judged the originality of these outputs accordingly. In all such cases, audit requests were sent to the submitting institution asking them to identify how much the submitted output had been revised to incorporate new material.

11. In development studies, the 'mature' or well-established areas which remain especially strong and continue to innovate and push knowledge frontiers include: the analysis of poverty and inequality, usually micro based (e.g. households or individuals), with significant innovative work on measures of multidimensional poverty and deprivation; environment and development, with more research on climate change and water (including dimensions of environmental justice and security); migration, within and between countries, with a notable increase in quantitative studies; agriculture and livelihoods; science, technology and innovation in development. In anthropology, political and legal anthropology remain strong subfields for researchers at all career stages, and there were concentrations of world-leading work in visual and material culture, environmental anthropology, the anthropology of religion, medical anthropology and the anthropology of development. Both medical anthropology and anthropology of development seem firmly

embedded in the disciplinary mainstream, with some work in development in virtually every submission. Medical anthropology, in contrast, seems concentrated in a smaller number of centres (some of which are part of larger units for health research and thus not returned to this sub-panel).

12. New areas emerging, or showing evidence of re-invigoration, in development studies include: political economy; informal economy; agrarian development; and health very broadly, in addition to public health and HIV/AIDS and significant research associated with medical anthropology. Emerging areas in social anthropology include ideas of extended sociality (human-animal relations, new modalities of kinship, reinvigorated investigations of animism), ethics, affect and imagination.

13. Biological anthropology is a small but strong area of research that intersects and engages with multiple other disciplinary areas such as archaeology, behavioural ecology, genetics, health, anatomy, psychology, evolutionary theory, and which draws original syntheses in relation to human and primate ecology and evolution, as well as making contributions to broader theoretical debates. The strength of outputs demonstrates the vitality of this sub-discipline in the UK, and its high-level international profile. Rather than significant changes of focus or approach, the outputs assessed for this exercise suggest a period of consolidation of existing areas of strength. Biological anthropology in the UK continues to sustain considerable breadth despite its small total size. This breadth of approaches is a major source of strength which acts against disciplinary fragmentation and over specialisation.

14. World-leading work was demonstrated across a variety of methodological and theoretical approaches, including research that was conceptual, empirical, historical, biological, applied, participatory and laboratory-based and the panel viewed this as a strength of the disciplines assessed within the UOA. There were also strong examples of interdisciplinary and multi-disciplinary research that addressed grand challenges in a way that transcended disciplinary boundaries: exciting new work was found to be emerging from multi-disciplinary investigations into topics like conservation, biodiversity, and bioethics, and health more generally. The panel was especially impressed by the originality, significance and rigour of the monographs submitted, which addressed new questions and set agendas in ways that were often innovative and imaginative. However, over-specialisation sometimes resulted in outputs that did not situate the analysis within a wider contextual frame.

Impact

15. This was the first exercise in which sub-panellists had been required to assess the impact of research conducted by the submitting institutions and the sub-panel was impressed by the scale and extent of impact reported in the impact case studies which will offer a useful resource for institutions seeking to enhance their approach to impact in the future. Impact of outstanding reach and significance was demonstrated across a very broad range of activity in both anthropology and development studies.

16. Each submission was required to submit an impact template, setting out their approach to impact and the mechanisms in place to support impact, and a minimum of two impact case studies. Submissions with 15 or more FTEs were required to add a further case study for each additional 10 FTEs in the submission. The biggest submission thus included an impact template and seven case studies; the smallest, a template and two case studies. Altogether the sub-panel assessed 25 impact templates and 80 impact case studies. For the assessment of impact, an additional impact assessor was recruited to join the two user representatives on the sub-panel. All the impact material was assessed by at least one user representative and one other sub-panel

member, followed by plenary discussion before the confirmation of a final score, to ensure comparability and consistency of approach. The user members and the impact assessor were crucial in assessing the strength of the evidence of the impact claimed and in judging the reach and significance of the impact itself.

17. Impact templates and case studies were assessed individually, employing the scale from 0 to 4, with half marks (1.5, 2.5, etc.) employed in cases where it was agreed the evidence suggested impact was spread across two grades.

18. The impact templates were generally impressive, suggesting high levels of institutional commitment to the idea of taking the best findings of researchers back into the world from which they had first come. In many cases, the templates could report on long histories of collaboration with users and policy makers, but in other cases, there was a sense of new structures and processes being put into place to meet the challenge of the impact agenda. In a few cases, a submission gave the impression that impact was concentrated in one or two specialised fields within a wider unit, but in general there was a strong sense of mainstream engagement. This was especially evident in the case of the underpinning evidence cited in the case studies, which was required to be predominantly of internationally recognised quality, but in many cases was of world-leading quality.

19. Strong templates were characterised by a clear and specific narrative of the context and approach within which impact was understood and pursued, and could include pro-active partnerships with end users, as well more responsive initiatives. They showed evidence of clear thinking in relation to pathways to impact and the mechanisms that might be used, including an explanation of how institutional support and training had led to the development and enhancement of the impact claimed. Strategic goals were clearly identified, together with the means to achieve and measure progress towards them. Some templates confused impact and dissemination or presented superficial or shallow user engagement.

20. The impact case studies were themselves of extremely high quality overall, and provided strong evidence of productive engagement with publics, users and policy makers from all sub-fields of anthropology and development studies. The most convincing case studies gave a clear and coherent account of the relationship between the underpinning research and the impact claimed, what the impact involved and who were the beneficiaries. Weaker case studies failed to identify the link between research and impact or did not supply corroborating evidence that confirmed the impact claimed, or did not explicitly make reference to the underpinning research and/or those who had carried it out.

21. The anthropology case studies included very strong examples from a range of sub-fields, including visual anthropology and material culture, political and legal anthropology, anthropology of development, environmental anthropology and biological anthropology. In development studies, many of the strongest cases rested on long-established collaborative relationships with researchers and institutions in developing countries, and with development agencies, including multilateral and bilateral organisations. Many of the impacts were on policy in developing countries, with strong engagements with governments, communities and businesses, usually also involving donors (such as DFID) and multilateral agencies (such as the United Nations Development Programme or the World Bank). There were also examples of innovative and vibrant partnerships with private sector organisations.

22. Evidencing impact presented certain challenges. In some cases, users and key stakeholders had provided corroborating statements which were cited in the case studies themselves. Some organisations, already charged with evaluating the impact of their own activity

(e.g. public sector museums), provided their own tested strategies for collecting evidence. Many of the strongest cases emerged from research in which user engagement was embedded in the research design itself and the question of impact had been thought through from the outset.

Research environment

23. The sub-panel found evidence of very strong research environments across the full range of submissions, with every submission showing some evidence of an environment capable of producing internationally excellent research, and most submissions having evidence of some aspects of the environment conducive to producing world-leading research.

24. The most striking feature of the research environments assessed by the sub-panel was the difference in scale, between units of less than 10 researchers, to those with more than 50. Some of the largest submissions looked more like assemblages of loosely linked and relatively autonomous units, but others were remarkably cohesive and impressively coherent in their activity: these have matured and the networks surrounding them have grown denser, forming linkages across institutions. It is important to note, however, that quite small units could provide evidence of coherence and ambition, and all the units showed themselves capable of producing research outputs of world-leading quality, albeit under rather different conditions.

25. The procedure for assessing the research environment for each submission was slightly different from that employed in RAE2008. Information was submitted on an environment template, subdivided into an introductory overview and four sections: on strategy, people (both staff and research students), income, infrastructure and facilities, and collaboration and contribution to the discipline. There was no separate assessment of esteem for this exercise, although some information of that kind was returned in the section on collaboration and contribution to the discipline. The sub-panel was also provided with statistical information on research income and research doctoral degrees awarded for each submission. Information on studentships and research student numbers, included in previous exercises, was not required this time.

26. Each of these four sections of the template was scored separately on a scale from 0 to 4, using half-marks as in the impact assessment, with the final mark for research environment aggregated from these individual marks. Initial assessments of each submission's research environment were made by pairs of panellists, and the grades moderated and confirmed in plenary discussion. The sub-panel felt that this more structured approach to assessing research environment was an improvement on the RAE2008 arrangements.

27. Evidence on research environments submitted for assessment reflected a period of significant change in the sources and scale of external income. Full Economic Costing was introduced towards the end of the assessment period for 2008, resulting in sharp growth in reported spend of external research income. That upward trend has continued overall, reinforced by the arrival of major new sources of funding like the European Research Council, and expanded government initiatives like the DFID's Research Centres, and ESRC-DFID funding schemes. The development of funding collaborations between DFID and the Research Councils has been especially significant in consolidating and deepening centres of excellence, and further expanding international collaborations and interdisciplinary innovations, for both development studies and anthropology.

28. The total spend on external research income reported to the sub-panel was £129.1 million. The biggest source of funding was the Department for Business, Innovation and Skills Research Councils (£43,986,000), with UK central government sources (£33,665,000) not far behind. EU sources contributed £20,584,000, but as this was concentrated towards the end of the assessment cycle, it might be expected to increase in importance in the years to come. While

UOA 24 as a whole reported the highest overall research income per staff FTE in Main Panel C, there were huge variations between submissions, from less than £10,000 per staff FTE submitted, to over £500,000 per FTE. This variation correlated to some extent with the scale of the submission itself, and the field in which it operated. Biological anthropology still looks to be seriously under-served by virtue of straddling a number of research councils, and external research funding does not look to be commensurate with the very high quality of the work in this sub-field. A small number of development studies units received very substantial investment from the DFID. In general, research income is very unevenly distributed across the units under review. The top five submissions (in terms of external income) reported over £68 million in income between them (54 per cent of the total for the sub-panel). In contrast, the bottom five reported £1.4 million, or less than 2 per cent of the total. This imbalance is more evident with some kinds of income: two submissions shared £21,689,002 of UK government funding (64 per cent of the total in this category); 10 institutions at the other end of the funding spectrum shared between them just £41,413 in this category.

29. Although the distribution of research degrees awarded is also unequal, it is much less strikingly so than the distribution of research income. Altogether 1,129 completed PhDs were reported across the submissions, resulting in UOA 24 having the second highest PGR awards per staff FTE in Main Panel C, and testifying to the vitality and sustainability of research environments in the anthropology and development studies submissions. In RAE2008, the combined total for PhDs in anthropology and development studies was 1,001 over the period of the exercise (6.58 years compared to the five years covered in the REF2014 figures). The average unit submitted to RAE2008 was graduating 5.25 PhDs a year. (This figure is almost identical for anthropology and development studies.) The average in this exercise was nine a year in each submission, with 20 of the 25 submissions reporting PhD completions averaging five or more a year – enough to form a coherent cohort at each stage of the training process. There has been a significant growth in PhD completions in all but three of the submissions for which we have comparable data for 2008 and 2014, but that growth has been most marked in small and middle-sized units. All but one of the ‘traditional’ big centres of PhD training in the Oxford-London-Cambridge triangle reported relatively low growth in numbers of research degrees awarded, while units elsewhere in the UK frequently reported a doubling, or even trebling, of degrees awarded per annum.

30. Midway through the assessment period the ESRC reorganised doctoral training into a limited number of Doctoral Training Centres (although the impact of this change, in the form of completed PhDs, will not be visible until the next assessment exercise). The sub-panel did not receive information on sources of support for PhD students in this exercise. Research council funding (currently running at around 60 studentships a year for anthropology, area studies and development studies) is one important source of support, among a wide range of other sources, including support for high numbers of students from non-EU backgrounds working in the disciplines within this Unit of Assessment. In this context, the sub-panel was impressed by some imaginative initiatives to attract and support PhD students, especially those from the Global South. Such support represents a major initiative to increase research capacity in developing countries, while contributing to the international reputation and profile of the discipline. It also noted that two institutions with particularly impressive track records in training PhD students in development studies did not have DTC funding. All units aimed to support a vibrant group of PhD researchers as an integral part of the research environment. This appeared more sustainable in units that were part of a DTC, although the number of DTC studentships noted was generally low.

31. There was evidence of strong and imaginative strategies to build research careers. Most submissions provided examples of work to support ECRs (although, in one or two cases, this was

belied by a relative paucity of ECRs in the submitted staff). One or two of the larger submissions continued to rely on relatively high proportions of staff on fixed term contracts, and reported institutional barriers to longer term career planning. All submissions reported on strategies to address equality and diversity issues, with a number of examples of good practice to encourage research activity for researchers after, for example, maternity leave.

Sub-panel 25: Education

Quality profiles

Profile Type	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	21.7	39.9	29.5	7.8	1.1
Impact	42.9	33.6	16.7	6.0	0.8
Environment	48.4	25	18.1	7.8	0.7
Overall	30	36	26	7	1

Summary of submissions

1. Education is a relatively large field of research activity. There were REF submissions from 76 different institutions involving 1,606 individual researchers. Of these 224 were early career researchers. During the review period over 3,625 doctoral degrees were awarded by submitting institutions – the highest output per FTE within the social sciences. Average external research income for each year of the REF period was over £58 million, a total of almost £292 million. Viewed another way, over the five years as a whole, each FTE of staff submitted in education generated an average of £202,000 of external research income.

Submission strategies

2. Institutional REF submission strategies in education have become increasingly selective. For example, 82 institutions submitted returns in the RAE of 2008, but of these, 15 opted out of the 2014 REF. In contrast, just nine institutions made new submissions. Similarly, the FTE of research active staff submitted in 2014 (1,442) was 15 per cent less than in the RAE of 2008, which was itself more than 15 per cent down from the 2001 RAE. The number of outputs submitted dropped by almost 23 per cent from the 2008 RAE to reach the 2014 figure of 5,526. Institutions appear to have been strategic in their entry policies, and comparison with 2012-13 HESA data suggests a relatively high degree of selectivity in many submissions.

3. Exceptionally, SP 25 received 47 'small' submissions (less than 15 FTE) – a figure which is twice the average for MPC. This phenomenon appears to reflect the commitment to educational research within a wide range of institutions. When ranked by FTE of research active staff returned in education, 40 institutions entering small submissions made up one quarter of the FTE submitted. In contrast, the quartile with larger submissions by FTE is based on just five institutions.

Overall quality

4. The REF outcome demonstrates the high quality of much of the educational research which was submitted. Many universities submitting to the UOA for education produce work which is among the best from anywhere in the world. This work also compares well with the UK's best social science, to which it contributes. Across REF submissions to education as a whole, 92 per cent of activity was judged to be of international standard (2* or above); 66 per cent was judged to be internationally excellent or better (3* or above) and 30 per cent was judged to be world-leading (4*). In 23 education submissions, more than a quarter of the work submitted was judged to be 4* – a rise from just five submissions of such quality in 2008. This is a similar figure to that reported by the Quacquarelli Symonds (QS) World University Rankings (2014), which lists 19 UK education

departments in the top 100, including the first, fourth and seventh institutions. Using multiple bibliographic indicators, the strength of educational research was also highlighted by the Department of Business, Innovation and Skills in its report on the 'International Comparative Performance of the UK Research Base – 2011'. As part of the REF process, contributions to the assessment process, and checks on it, were made by research users, international observers and the Main Panel. Overall then, we can be confident about these outcomes. The REF confirms that considerable improvement in research quality in education has taken place compared with 2008, and that a significant proportion of the submitted educational research is world-leading.

5. Grades given for research impact were, in many cases, also strong. The best case studies demonstrated the extensive reach and significance of educational research for both policy and practice. There were many examples of close engagement with research users by individual researchers, project teams, research centres, etc. Impact templates describing institutional infrastructures to support user engagement, communication and impact recorded commendable activity, but also often showed scope for further development. Overall, weighted by FTE, 43 per cent of impact activity within submissions to education was judged to be outstanding in its reach and significance.

6. The best research environments reflected coherent strategies which were followed through in policies, practices and provision to enable sustainable, creative and participatory research cultures. 48 per cent of submitted staff were associated with research environments judged to be conducive to producing work of world-leading quality (4* or above). This suggests that there is capacity in the field for a further expansion of very high quality work in the future.

7. In reviewing these outcomes as a whole, there was a tendency for higher scores to be associated with larger submissions, though several small but more specialist submissions also scored highly. For education overall, just 1 per cent of research activity submitted was judged not to comply with the REF definition of research, to fall below the standard of nationally recognised work or failed an audit process. In the entries of nine institutions, 4 per cent or more of their submission was judged as 'unclassified'.

8. At a time when there is increasing divergence in the educational systems and aspirations of each country within the UK, the REF indicates the extent of specialised educational research capacity within each country. From England, there were 64 submissions overall, with a total of 1,226 FTE staff (85.0 per cent of the UK education researchers submitted). Eight submissions came from Scotland, with an FTE of 155 (10.7 per cent of the whole). Northern Ireland provided three submissions, with a total FTE of 40 (2.8 per cent of the UK-wide submission.) There was a single submission from Wales, with just 21 FTE (1.5 per cent of UK FTE submitted).

Outputs

9. A descriptor of the field of Education was developed for REF2014 and published in REF 01.2012, 'Panel Criteria and Working Methods'. It has been used to provide structured feedback within this section.

10. Education was broadly described as being concerned with research in the areas identified in four illustrative lists. These concerned sectors of educational provision, substantive issues, theoretical frameworks and methodologies drawn from disciplinary traditions, and other related fields of activity, such as pedagogy in higher education (HE).

Sectors of educational provision

Early childhood education: Outputs of world-leading quality were reported in this REF from large scale, longitudinal research investments. Such work provided strong examples of research

impact. Other early childhood work focused on the workforce, with particular attention to professionalism, identities, qualifications and leadership. The use of digital technologies in early education appeared to be a growing field. There were some studies of pedagogies for early education practitioners, but more theorised and sustained studies of curriculum, pedagogy, play, assessment and work with parents in early education appear to be needed.

11. **Primary education:** The quality of some work on primary education stood out – particularly that drawing on large scale quantitative datasets. Other highlights were provided by work on children’s rights and participation. Overall, the volume of work submitted on aspects of primary education was lower than expected. Some studies, close to practice, lacked originality, significance and rigour in terms of this exercise. To understand the consequences of changing structures of provision, more high quality studies are needed on curriculum, pedagogy and assessment in primary education.

12. **Secondary education:** A broad range of curriculum areas were represented among outputs, including science, mathematics, English, information and communication technology, geography, environmental and citizenship education. Contributions were usually strong (sometimes very notably so). Citizenship education occasionally appeared to reflect value commitments that were not always sufficiently analysed. It was notable that work on some particular areas of curriculum appears to be concentrated among a very small number of institutions and/or individuals. This reflects a broader point about a growing concentration of disciplinary and/or methodological expertise in education, with expertise sometimes located in small pockets rather than evenly spread. There was a considerable amount of world-leading, sociologically-informed work on assessment, league tables and school choice. Outputs on pedagogy, teaching and learning at secondary level spanned the spectrum of quality, including notably strong work in philosophy and theory of pedagogy. However some of the work submitted was characterised by small-scale work of modest analytical or theoretical rigour.

13. **Higher education:** The sub-panel found growing strength in research on HE, the best of which was world-leading. This was characterised by close theoretical engagement, a focus on contemporary social issues, and the ability to engage in comparative and international studies. Reflecting a policy priority and sustained funding, there was particularly strong sociological work on widening participation, using both qualitative and quantitative data. Weaker work tended to be focused on provision or student experience in particular universities and to lack analytical rigour. Higher education research remains an area with great potential.

14. **Medical and healthcare education:** A diverse group of outputs were submitted including medical and other health professions education, mental health (including counselling and psychotherapy), child health and public health (e.g. sexual health, health behaviours etc.). In terms of quality, there were examples of world-leading, internationally excellent, internationally and nationally recognised outputs in all sub-fields. Scores were more likely to relate to the type of studies and their scope rather than discipline. For example, large qualitative and quantitative multi-site studies that were theoretically and methodologically sophisticated and good quality reviews (e.g. systematic, meta-analyses etc.) were often of a high standard. Whilst reflecting scholarship, outputs with less apparent methodological rigour typically attracted lower scores.

15. **Leadership, management and school effectiveness:** After some years of deepening sophistication, work on Leadership and Management was felt to have stalled slightly with lower originality. Outputs reporting on the effectiveness of educational interventions were generally considered to be of a high quality, as were the more theoretical outputs in the field. There was evidence of the value of interdisciplinary study, and of its potential. However, some outputs on

school effectiveness were poorly conceptualised and a-theoretical; others used highly selective or very small samples.

16. **Teacher education:** Teacher education remained an important topic for research during this assessment period. Overall the quality of this work was strong with the majority of outputs being judged to be of international standing or better including a good proportion that were world-leading. Outputs addressed a wide range of different issues including student development, mentoring and coaching, and continuing professional development; there was a growing number of studies of the impact of ICT on all forms of teacher professional learning. While the majority of the studies were qualitative and often small-scale in nature there was an important subset that utilised larger quantitatively based methodologies; for the most part these were of high quality. One weakness of the field is that many of the outputs submitted on teacher education were not strongly theorised, with the exception of those that drew on sociocultural theories.

17. **Further, adult and vocational education:** Further, higher and vocational education are the focus of a significant amount of research in a few institutions. For the most part outputs were of high quality, with the proportion of internationally excellent and world-leading work in keeping with the UOA as a whole. However, the sub-panel noted the lower than expected volume of submitted outputs in these areas, and it was felt that this may reflect a longer-term decline in major research investments with a programmatic focus.

18. **Comparative education and international development:** Much educational research is not only internationally excellent; it is also truly international in terms of reach and significance. It is clear from many of the impact case studies and outputs submitted that UK educational research is leading the way in terms of building a robust evidence base for improving education in developed and developing countries. Closer to home, a significant development since RAE2008 is the growing strength in 'home international' comparative research which uses the increasingly divergent policy approaches to education in England, Northern Ireland, Scotland and Wales to understand the differential impact of policy and provision.

Substantive issues

19. **Teaching and learning:** This area generated outputs across the full range of quality. Some were really excellent, including many deriving from TLRP and other large scale investments which benefited from sophisticated theorisation, design and analysis. The strongest small-scale enquiries were characterised by a rigorous design and methodology.

20. **STEM education:** Overall the quality was strong with most work rated as internationally excellent or world-leading. The best work was characterised by rigorous design, and the use and/or development of theory, to address questions of significance to policy, practice and academic knowledge. For example, where STEM education research interacted with gender, social justice and equality of access to higher education, important work was often produced. Mathematics education was on the whole very strong, particularly in innovative collaborations between mathematics educators and research mathematicians. Science education was also strong at the top end, but with more spread in quality. There was less work in environmental education and technology education but, nonetheless, there was some work of the highest quality. The ESRC's targeted initiative on science and mathematics education had a noticeable effect in producing world-leading research.

21. **Language, literacy and applied linguistics:** The submission revealed a rich and diverse body of research covering all educational phases, and a breadth of topic areas from new literacies and digital literacies, second language learning, applied linguistics, educational psychology and literary research. The submission included a substantial amount of interdisciplinary research,

crossing the disciplinary boundaries of literature and literary criticism, psychology, sociology and linguistics. It also covered a wide range of themes and topics beyond the traditional confines of pedagogical and school-based research. In particular, there was clear evidence that applied linguistics has developed much broader scope to include multilingual and intercultural communication in non-educational settings such as the workplace, health, law and other contexts and addressed issues such as migration, globalisation, identity and ideology. The research submitted represented a wide range of methods and approaches, both qualitative and quantitative, and including standard experimental and quasi-experimental designs, corpus linguistics, multimodal and visual methodologies, linguistic ethnography, and narrative inquiry. Particular strengths were evident in strong sociological research, especially on contemporary culture and on digital literacy practices; educational psychology, particularly on reading. Within applied linguistics, research on bi/multilingualism was exceptionally strong in originality, theorisation and in applying innovative methods for data collection and analysis. Some of the research in the more traditional areas such as teaching English to speakers of other languages was also sociologically informed. Critical studies of language teaching and learning in diverse cultural and linguistic contexts were often based on ethnographically rich data. There were also world-leading strengths in psycholinguistic and cognitively oriented research, for example in the area of second language acquisition and learning strategy research. Less strong research in the submission was often the small-scale professional research or action research which was frequently insufficiently theorised to make a contribution to knowledge and/or was low in rigour, with poor use of statistical data or inappropriately selective reporting of qualitative data.

22. **Children and young people:** Research on student identities was often world-leading. This included, for example, gender, 'race', social class and sexuality and the way these were constructed in a diverse range of educational and peer contexts. This work had extended to innovative areas and issues, and tended to be drawing on and contributing to cutting edge theory, as well as presenting new empirical findings.

23. **Parents, families and communities:** There was some impressive research undertaken using existing datasets, and in particular the successive British Cohort Studies, which have provided a world-leading resource for understanding the long term effects of children's home circumstance on their future outcomes.

24. **Inclusion and special education:** The strongest outputs in these sub-fields offered valuable insights and understanding, with clear implications for policy and practice. Weaker outputs often lacked conceptual foundations and were less rigorous methodologically.

25. **Participation, rights and equity issues:** There were a large number of outputs in this area and many were internationally excellent and world-leading. Research addressing the influence of race, gender, social class and disability on education remains an area of considerable strength, providing strong innovative datasets (including mixed methods), critical analysis and offering important theoretical insights. Such research remains a point of reference for policy and practice and is contributing to the wider sociology. Some very small-scale and less theoretically developed studies made incremental contributions to the field.

26. **Technology enhanced learning:** Highly innovative work, much of which was judged to be world-leading, appears to have been stimulated by recent Teaching and Learning Research Programme (TLRP) Technology-Enhanced Learning investments by ESRC and EPSRC. Other work of exceptional quality was recorded in studies of the educational implications of social media and learning in environments beyond schools. Weaker outputs lacked conceptual foundations and methodological rigour.

27. **Education policy:** There was significant strength in studies of policy in education. The best were analytical, made careful use of evidence, and were often international and comparative. There are increasing strengths in the use of statistical and comparative data to evaluate the impact of education policies. Weaker work often had polemical tendencies.

28. **Workplaces and industry:** Whilst there was some world-leading research on workplace and work-based learning, this was highly concentrated in a very small number of submitting units. Research tended to focus on the learning of educational and health professionals rather than on learning in other sectors. There was some high quality work on the development of specifications and standards for industrial application.

Theoretical frameworks and methodologies drawn from disciplinary traditions

29. **Philosophy of education:** Although modest in volume, the quality of philosophical outputs was generally very high. World-leading conceptual work addressed and illuminated complex educational issues and contributed to the refinement of theoretical understanding.

30. **History of education:** There was some excellent research in the history of education, though the volume of outputs reflected contemporary pressures on the discipline. The best historical research was well-sourced with primary materials and demonstrated its significance for contemporary issues in education. However, some other outputs from the history of education were less rigorous and sometimes polemical.

31. **Sociology of education:** Theoretical work in sociology and social theory was judged to be very strong, and often innovative. This included, notably, research on gender, race and education. Whilst exploration of theory and its application to empirical research was a particular strength, much of this work was exclusively qualitative. Sociological work combining quantitative and qualitative evidence tended to be of very high quality, but there appears to be scope for more mixed-method designs.

32. **Psychology of education:** A number of psychology outputs were received, mostly cognitive and developmental, and often in relation to health. Generally, these were of good quality. There was also some world-leading and internationally excellent work on applications of socio-cultural theory and on the work of key theorists. However, the way in which psychological research has become separated from education as a field of application over the past 40 years was apparent in the outputs submitted to this REF. As in 2008, a small amount of work on neuroscience was submitted, often with a link to psychology. In the submissions received, there was little sign of the much-discussed potential of interdisciplinary work bridging education, neuroscience and psychology.

33. **Qualitative research:** Research designs focused on the collection of qualitative data remain common in education and much of it continues to be internationally excellent or world-leading in its originality, significance and rigour, as it has been for the past 30 years. Ethnographic and narrative enquiries tended to be more rigorous than interview-based work. Qualitative evidence was often used in small-scale action research, case studies and classroom enquiry, but generated outputs of more variable quality. The rigour and sophistication of qualitative analysis was often a crucial differentiator.

34. **Quantitative research:** Compared with 2008, significantly more outputs were submitted based on structured research designs and quantitative data. The growing volume of outputs deriving from large-scale datasets and longitudinal cohort studies was particularly impressive, and a high proportion were judged to be internationally excellent or world-leading. It was appropriate to see the submission of world-leading datasets and resources as outputs. Having said that, there

is considerably more scope for exploitation by educational researchers of secondary datasets such as the National Pupil Database/Pupil Level Annual Schools Census, British Household Panel Survey and the cohort studies – particularly, of course, for longitudinal research. A growing number of outputs based on randomised controlled trials in education was also apparent. Many of these were judged to be excellent. The highest quality trials were judged to be those that recognised the complex nature of the issues under investigation and were theoretically informed. Key quality differentiators for quantitative outputs concerned sampling design in relation to the research questions, and the analysis of data collected. It was heartening to see examples where complex data structures were modelled appropriately, using for example multilevel or structural equation models. Nevertheless there were also examples of a misunderstanding of such techniques and their limitations. There were also examples of poorly designed and weakly conceptualised randomised controlled trials. There remains a continued need for the provision for capacity building with regard to quantitative research.

35. **Classroom enquiry:** There were many examples of practice-focused research, the best of which drew on social scientific theory, method or both. Some of these were world-leading, particularly those featuring co-production or close collaboration between learners, teachers and researchers. Weaker outputs were often descriptive and were judged to be of modest originality, significance and rigour. Such research is a very important form of professional activity in the development of self-improving education systems but is, by its very nature, contextually variable. Conducting professional classroom enquiry of consistent quality requires a stable infrastructure of multi-level support for teachers, departments, schools and networks with the support of local and national governments. Given such circumstances, researchers and teacher educators are well placed to collaborate with teachers and the potential quality of such work is very high. In the future, initiatives such as the Teaching Schools in England may generate opportunities to develop such expertise.

36. **Evaluation:** This was seen as a growing area reflecting greater collaboration between academic researchers and user organisations, including government. Since 2011 in England, this is reflected in the growth of funding from the Education Endowment Foundation (EEF), supported by the Department for Education. The EEF's emphasis has been on funding evaluative research that is able to determine the effects of educational programmes on pupil outcomes – often using randomised controlled trials. The findings from the first of these were beginning to be reported in the last year of the current REF period. Overall, relatively few evaluations, whether making use of randomised controlled trials or other methods, were submitted as outputs. Of these, few addressed wider debates on evaluation or showed awareness of its history or the full range of evaluation methodologies. Collaboration with non-academic specialists in evaluation was generally beneficial and appeared to have the potential to enhance the range and diversity of evaluation work in the future.

37. **Cross-UK comparison:** Education provision within the four devolved administrations of the UK was a noticeable topic for submissions to the REF, particularly from Scotland, Wales and Northern Ireland. The comparative method which devolution enables yielded some valuable analyses. There seems to be potential for considerably more work of this sort.

38. **Interdisciplinary/multidisciplinary research:** The number of outputs drawing on several disciplines appears to have risen slightly since 2008, perhaps as a by-product of attempts to increase relevance and user engagement. Whilst the best was world-leading and demonstrated the rewards, the challenges of interdisciplinary work were also apparent. In some cases, for instance research on medical and healthcare education, work sometimes lacked theoretical development.

39. **Knowledge synthesis:** The sub-panel recognised knowledge synthesis as an important research activity. A modest number of systematic reviews were submitted, and rather more expert reviews of various sorts. Whilst some were judged to meet very high quality standards in terms of originality, significance and rigour, others were deemed to be of lower quality in relation to the open-minded use of valid and reliable evidence.

40. **Reporting of methods:** A common weakness of outputs judged to be of poorer quality concerned the reporting of research design and methods, thus failing to demonstrate rigour. Some accounts also appeared to understate methodological issues, thus weakening authenticity. Procedures for analysis were sometimes not explained at all. A minority of outputs were explicit about ethical issues and approval processes, and this too appears to need more sustained attention. It was however notable that outputs from some fields (such as medical and healthcare education) tended to be more thorough and transparent in terms of their reporting of methods including study designs, sampling and recruitment, data collection, data analysis and ethics (e.g. with authors typically citing ethics approvals and ethical considerations). Outputs from medical education journals also made clear author contributions to outputs and any possible conflicts of interest between, for example, researchers and funders. The use of appropriate reporting protocols might helpfully be considered by the editorial boards of journals and by the education community as a whole.

Related fields

41. **Pedagogy in higher education:** Although prepared for such work, the sub-panel assessed only a small number of submissions related to teaching and learning in various subjects within universities and colleges. These tended to be of high quality, some reflecting former TLRP investments.

Processes of output assessment

42. Sub-panel 25 conformed to the working methods described in the MPC overview. Members had between them a very broad range of experience in conducting, assessing and/or using research across the areas within the education descriptor. Additionally, in accordance with REF procedures, further assessors were appointed to augment the initial sub-panel membership. Detailed calibration processes took place both within MPC and across the membership of SP 25 – the latter extending over five weeks. Proposals for double weighting were assessed by a sub-group of members, and their recommendations were considered by the full sub-panel. Outputs were allocated to panellists based on the relevance of their expertise. Assessment took place in alphabetical order, by author. Moderation was mainly based on monitoring of scoring patterns, allocation of additional assessors and discussion at sub-panel meetings in output sub-groups. All proposed scores were presented to the full sub-panel for consideration, discussed as necessary and agreed in plenary. The protocol requiring withdrawal of conflicted members from sub-panel discussions about areas of conflict was strictly followed. A very small proportion of outputs considered by SP 25 appeared to have an uneasy relationship to the panel's descriptor. Where appropriate, these were cross-referred.

Impact

43. Case study submissions in UOA 25 reflected a very wide range of types of impact, from policy to practice in all sectors. In most instances, the threshold of underpinning research quality was comfortably passed, but in a few cases the underpinning research was judged not to meet the quality threshold. The selection of case studies by submitting institutions appeared to be particularly influenced by the availability of evidence of the relationship between research and impact, so that some areas of activity where evidence may have been intangible were probably

under-represented. Nevertheless, the case studies overall were extremely impressive. There were many examples of longstanding relationships with users and high impact in local, national and international arenas.

44. User members and impact assessors on SP 25 commented that many impact case studies were excellent and set out very clearly ways in which policy or practice had changed as a result of the research. Others were felt to have over-claimed on impact and included too much focus on dissemination. An important observation, also made by user members and impact assessors, was that users and funders also have responsibilities for increasing the impact from research. The sub-panel was aware of the particular case of policy related research for which impact could be amplified or minimised depending on considerations beyond the control of researchers.

45. The quality of impact templates was, in general, rather weaker than that of case studies – with less certainty perhaps about REF requirements. The best submissions specified the context of their work in terms of potential stakeholders in research outcomes. They were able to tangibly describe the pathways to impact to which they aspire and the infrastructural mechanisms to support staff in achieving impact, for instance, through promotion of user engagement, targeted staff development, promotion policies, publication of research summaries, creation of media strategies, etc. At their best, such strategies were tailored to specific research centres or investments, and built on long term relationships with user stakeholders and on specific development plans. Reflecting an explicit TLRP recommendation, some strong submissions identified users in specific research sites who provided authenticity and validation, as well as national user organisations providing leverage for communication and impact activities of high reach and significance. Most statements of strategy and plans indicated awareness of necessary future developments, but the sub-panel felt that more might have already been achieved in terms of building infrastructures to support impact activities.

Processes of impact assessment

46. The sub-panel conformed to the working methods described in the MPC overview. The submissions for both case studies and templates attracted some very polished texts, which often required careful deconstruction. SP 25 had the benefit of three users as full members and six users as additional impact assessors. Detailed calibration processes took place both within MPC and across the membership of SP 25 – the latter, for impact, extending over four weeks. All impact templates and case studies were allocated to at least one user member/assessor and two academic members of the sub-panel, each drawn from impact sub-groups within SP 25. Moderation took place through monitoring of scoring patterns, allocation of additional assessors and discussion at sub-panel meetings in impact sub-groups (with memberships different from that of output and environment sub-groups). All proposed scores were presented to the full sub-panel for consideration, discussed as necessary and agreed in plenary. International and user members of MPC audited a sample of submissions. The protocol requiring withdrawal of conflicted members was strictly followed.

47. In a retrospective survey of opinion, user members and impact assessors on SP 25 reported that the assessment process had worked well overall, and that they had felt part of the team and listened to as equals. The process was felt to be clear and well-organised. The gradual build-up of understanding through calibration and practice exercises prior to the main assessment phase was seen as very helpful. They believed that they had brought something useful to the process, and had also taken away new knowledge, contacts and learning that will influence thinking in their own organisations. However, they also raised queries about the value for money of such a time-consuming exercise.

Environment

48. When weighted by FTE, almost half of environment activity in education was judged to meet the standard for 4* in terms of its vitality and sustainability to support world-leading research. However, the level of 1* and unclassified activity was also high so that, overall, a very wide range is indicated in the quality of research environments in education. This effect is caused by a relatively small number of large and high quality submissions, combined with a significant number of small submissions in education which were, in general, less strong.

49. Research environments judged to be strong tended to be found in either relatively large submissions from established universities or from small, coherent, specialist submissions. Weaker research environments were often identified where submissions were small and fragmented.

50. **Strategy:** Strong submissions provided a clear evaluation of progress since the RAE2008 and explicitly identified their objectives for research topics, funding, staffing, research students, facilities, etc., including new initiatives of importance. The best included coherent rationales for their priorities, demonstrated how the research environment was strategically aligned and were convincing in terms of the sustainability of their strategic commitment.

51. **People:** Submissions were highly rated when they demonstrated a strong policy and practical infrastructure for research capacity building and staff development. This frequently included evidence of recruitment and promotion policies, including the advancement of equality and diversity. Explicit provision for part-time and for research contract staff was often associated with strong submissions. Systems, for example, to ensure the quality of funding proposals, to maintain ethical standards and authorship protocols, or support career development were noted positively. The best submissions were able to demonstrate the intellectual vitality of the research environment for postgraduate research students, as well as having a high scale of enrolment, excellent supervision and sustained completions.

52. **Income, infrastructure, facilities:** The level and nature of research funding was considered as an indicator, with the strongest submissions sustaining high levels of funding throughout the REF assessment period, particularly from RCUK, EU and charitable sources. Infrastructure to support research activity, such as buildings, libraries and IT systems, together with administrative, technical and IT support staff, were noted. The best submissions demonstrated the vitality and sustainability of the activities generated by available facilities.

53. **Collaboration and contribution to the discipline:** SP 25 was impressed by the extent of reported collaboration and contributions within education. As is necessary for the development of the field as a whole, the strongest submissions provided evidence of extensive networking across institutions (within the UK and internationally) to develop expertise in relation to particular substantive issues, theoretical frameworks, designs and methodologies. Weaker submissions appeared to be more insular. Contributions to the infrastructure and social capital of the field, though work on journals or in professional associations and learned societies, were highly regarded. The strongest submissions also demonstrated efforts to enhance research capacity of various sorts. These included not just methodological training (for instance, in advanced quantitative techniques), but also provision to advance the synthesis of knowledge, media engagement and knowledge transfer.

54. In summary, the overall environment profile for education was impressive. There is a strong infrastructure of established university departments, with excellent contributions also being made by institutions which have been able to sustain specialist research teams. Many other submissions provided evidence of environments conducive to producing work at nationally or internationally recognised quality (1* and 2*).

55. Research, scholarship and related activities are essential to underpin high quality teacher education, and they distinguish the university contribution to both initial training and continuing professional development. However, the REF outcomes demonstrate that the increasingly competitive arena of social scientific research on education, as reflected in REF 3* and 4* scores, calls increasingly for particular forms of specialist expertise.

Processes of environment assessment

56. Sub-panel 25 conformed to the working methods described in the MPC overview. Detailed calibration processes took place both within MPC and across the membership of SP 25 – the latter extending over four weeks. Environment templates were allocated to at least three panellists, working within three environment sub-groups (with different memberships than those for outputs and impact). Available quantitative data were reviewed with awareness of their strengths and weaknesses. Moderation took place through monitoring of scoring patterns, allocation of additional assessors and discussion by email and at sub-panel meetings. All submissions and proposed scores were reviewed by the chair and deputy chair, avoiding conflicts of interest, and were presented to the full sub-panel for consideration, discussion and agreement in plenary. The protocol requiring withdrawal of conflicted members was strictly followed.

Sub-panel 26: Sport and Exercise Sciences, Leisure and Tourism

Quality Profiles

Profile Type	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	19.5	42.2	31.3	6.1	0.9
Impact	39.2	32.4	21.8	6.3	0.3
Environment	34.2	40.7	21.7	3.4	0.0
Overall	25	41	27	6	1

Summary of Submissions

1. Sub-panel 26: Sport and Exercise Sciences, Leisure and Tourism recorded significant increases in both the quantity and quality of submissions to REF2014 compared to submissions to UOA 46: Sport-Related Studies in RAE2008.
2. The sub-panel received 50 submissions to REF2014 from 51 institutions; an increase of 31 per cent on the 39 institutions that made submissions to UOA 46 (Sport-Related Studies) in RAE2008 and a 50 per cent increase on the 34 submissions to UOA 69 (Sport-Related Subjects) in RAE2001. The percentage of overall research activity submitted to the sub-panel in REF2014 and judged to be of four-star quality was 25 per cent. This lifted the average in REF2014 to the level of the very best in RAE2008 when the top three submitting institutions to Sport-Related Studies were each judged to have 25 per cent overall research activity at four-star level.
3. There were 16 new submissions to SP 26 in REF2014 from institutions that did not submit to UOA 46 in RAE2008. Five institutions that made small submissions to UOA 46 in RAE2008, and which were judged to be among the lower performing submissions, did not submit to SP 26 in REF2014. All other institutions that submitted to UOA 46 in RAE2008 and again to SP 26 in REF2014 were judged by the sub-panel to have demonstrated improvement.
4. The sub-panel received two large submissions (35 or more Category A FTE), 14 medium-sized submissions (15-34.99 Category A FTE) and 34 small submissions (fewer than 15 Category A FTE staff). The mean size of submission increased from 12 in RAE2008 to 16 in REF2014. The number and size of submissions demonstrate significant growth across the sub-panel's remit since RAE2008 when there was one large submission, 10 medium-sized submission and 28 small submissions.
5. The percentage increase in the number of submissions mirrors the increase in the number of staff reported to the HESA cost centre of Sports Science and Leisure Studies over the REF cycle: in 2007-08 there were 1,170 FTE staff recorded in the cost centre and the number of FTE in teaching and research staff rose to 1,524 in 2012-13 (an increase of 30 per cent). The number of Category A staff submitted increased by 58 per cent from 500 in RAE2008 to 790 (844 Category A and C staff) in REF2014. Thus while the number of staff recorded in the HESA cost centre increased by 30 per cent between 2007-08 and 2012-13, the number of staff entered to REF2014 increased by 58 per cent compared to RAE2008. In REF2014 51 per cent of eligible Category A staff were submitted compared to 42 per cent in RAE2008. The sub-panel recognised, however, that a number of staff submitted to the sub-panel were recorded against HESA costs centres other than Sports Sciences and Leisure Studies.

6. Further evaluation is required to explain the increase in the number and proportion of Sport Science and Leisure Studies staff submitted to REF2014, an assessment exercise that is widely accepted to have been a more selective than RAE2008. The following factors, however, are worthy of note in explaining higher levels of both research activity and research quality within units:

- a. increased levels of institutional investment in both staff and infrastructure within the subject area; increased capture of external research funding;
- b. development of existing staff and increased levels of recruitment of well-qualified early career researchers and experienced international scholars; the hosting of the Olympic Games in London in 2012 and the Commonwealth Games in Glasgow in 2014 which resulted in increased levels of investment in sport more generally;
- c. the wider linkage of exercise-related research to better-funded health research and policy agendas;
- d. the increasing recognition of tourism, particularly by Local Enterprise Partnerships, as a contributor to sustainable economic growth strategies;
- e. increased Research Council funding for sport, exercise, physical activity and tourism research including from the Medical Research Council, Biotechnology and Biological Sciences Research Council (BBSRC), EPSRC, ESRC and AHRC and, particularly, via specific initiatives such as the funding of two joint BBSRC – UK Sport research programmes supported by ESRC to facilitate research into elite athlete performance;
- f. the inclusion of the terms ‘Exercise’ and ‘Sciences’ within the sub-panel’s title; and the general maturing of the sport and tourism-related subject areas.

7. The UOA’s title was expanded for REF2014 to include ‘Tourism’ and this appears significant in explaining some of the increase in the number and size of submissions, particularly where large and medium-sized departments combining sport and tourism chose to submit both subject areas together to SP 26 and where new submissions were received from large tourism departments for the first time. However, a number of tourism departments continued to submit to SP 19 (Business and Management) and SP 26 received a total of 184 cross-referred outputs, mostly from SP 19.

Outputs

8. Sub-panel 26 judged 19 per cent of all outputs to be of four-star quality and a further 42 per cent to be of three-star quality thus demonstrating that over 60 per cent of all submitted outputs in sport and exercise sciences, leisure and tourism were judged to be of world-leading or internationally excellent quality. The percentage of four-star outputs for Sub-panel 26 was 1.7 per cent below the average for Main Panel C; significantly closing the gap in the quality of outputs identified in RAE2008.

9. The sub-panel received and reviewed 2,943 outputs including 184 outputs cross-referred by five other sub-panels. Outputs submitted directly to SP 26 comprised 2,665 journal articles, 42 authored books, 33 chapters in books, 10 research reports for external bodies, six conference contributions, one edited book, one website and one confidential report for an external body. One output was submitted in a language other than English and requests for double-weighting were received for four outputs and accepted for three.

10. The sub-panel received a large volume of outputs across the sport and exercise sciences disciplines within which the most marked increases in volume, compared to RAE2008, were in the

areas of i) physical activity and health and ii) physiology of sport and exercise. These two areas, in particular, demonstrated significant collaboration with research groups in medicine and health and the increase in quality of outputs in part reflects these new strategic alliances.

11. Across sport and exercise sciences many outputs demonstrated world-leading originality, rigour and significance by developing and/or utilising advances in methodological techniques, including the use of large sample sizes in the case of clinical research and more sophisticated analysis in the case of outputs in sport performance. Research was also published in a wider range of outlets compared to RAE2008, including in highly regarded journals in single disciplines and in highly regarded multi-disciplinary scientific journals likely to reach larger audiences.

12. In sport and exercise physiology the higher grades were awarded to outputs that used state-of-the-art techniques to address issues of importance rather than those outputs that were descriptive, confirmatory or incremental. The sub-panel assessed outputs that utilised advanced techniques to address fundamental questions related to human health and performance across the lifespan. The number of outputs in molecular biology was higher than anticipated and an additional Output Assessor was recruited to support this aspect of the assessment. The application of physiological research from sport and exercise sciences to wider health research agendas was identified by the sub-panel as an area with further growth potential.

13. Within sport and exercise psychology the sub-panel observed a considerable increase in the quality of outputs in sport and exercise sciences journals and the quantity of outputs published in highly regarded single disciplinary or sub-disciplinary journals. The sub-panel noted the strong contribution of psychology to physical activity and health research and the application of psychology research to addressing this key area of public policy has potential to increase further over the coming years.

14. In sport and exercise biomechanics the sub-panel noted that submitted motor control research showed considerable growth in volume and quality compared to RAE2008. The sub-panel also noted that the volume of world-leading multidisciplinary studies combining biomechanics with physiology and motor control, and biomechanics with psychology and physiology, had increased considerably since RAE2008. The sub-panel received a number of outputs with a focus on cognitive neuroscience and this area has the potential to develop strongly towards the next REF.

15. There was very marked growth in the volume of outputs in physical activity and health combined with a clear development of the subject area since RAE2008. World-leading research was evident in many submitting units and evidenced by an increase in the number of large-scale and longitudinal studies compared to RAE2008. Research was also reported in a wider range of outlets compared to RAE2008 and these outlets comprised journals in public policy, health and medicine likely to reach wider audiences.

16. The sub-panel recognised the very significant potential for further growth in the field of physical activity and health research over the next research assessment period. In addition to research informing health promotion and illness prevention the sub-panel noted the significant development of research investigating the role of physical activity and exercise medicine in rehabilitation from illness and injury. The sub-panel also noted the increasing research links between education, pedagogy, physical activity and health in developing more sophisticated understandings of the behaviour changes required to increase levels of physical activity among the general population.

17. The social science of sport was dominated by sociological research, which had grown markedly since RAE2008. While it is clear that the UK is the world leader in the sociology of sport,

the sub-panel did express some concern that much of the focus of this research has become concentrated in only a few sports, most notably football.

18. The sub-panel also noted that other social science disciplines had not developed at the rate seen in sociology and there were few outputs submitted from the social science disciplines of anthropology, economics and geography. Moreover, outputs submitted from the humanities disciplines of history and philosophy had decreased compared with RAE2008. These trends are of concern to the sub-panel, particularly as the solutions to many of society's global challenges are increasingly found through multi- and inter-disciplinary research.

19. The sub-panel did note, however, that social science research in sport and leisure was reaching wider academic audiences through its publication in single disciplinary journals in geography and sociology. This was particularly true for leisure research where the sub-panel noted, as had been the case in RAE2008, that although there had been little growth in leisure studies research, UK-based researchers continued to dominate the subject field.

20. Research in physical education and sport pedagogy had increased since RAE2008. The increase in outputs was particularly notable in coaching although the variable quality of outputs was also noted. There was evidence that pedagogy outputs were published in specialist and also general education journals. Pedagogy researchers were also collaborating increasingly with researchers in other sub-disciplines, particularly with those in physical activity and health, reflecting the increase in studies of physical activity and health in school age children and in school settings. These inter-disciplinary developments offer potential for larger and longitudinal studies and the prospect of enhanced support for physical activity researchers developing interventions in authentic everyday settings.

21. Tourism research had improved noticeably since RAE2008 with many submissions addressing the recommendation made in the 2008 Subject Overview Report that 'Tourism research will be strengthened through greater integrated development of theoretical and empirical work and a progression from single case study-based analyses'. Here, the panel was pleased to see greater and more effective engagement with theory and outputs with considerable methodological rigour. There was an increase in original, significant and rigorous overview papers reviewing the field and testament to the maturing nature and contribution of the subject area. The sub-panel also assessed world-leading tourism research that employed innovative methods of analysis of large and new datasets. The sub-panel was pleased to see a larger number of submissions from event management researchers and, although this field is still at an earlier stage of maturity, outputs were particularly focused on the impacts and sustainability of events. It was noted, however, that tourism research outputs were concentrated in a small number of tourism journals which may be explained by departments only submitting outputs in highly regarded tourism journals rather than those in journals reflecting single disciplines or other multi- and interdisciplinary fields. The Sub-panel identified the dissemination of tourism research within the journals of underpinning disciplines as a further means of advancing the subject field.

22. The sub-panel noted both the increasing dominance of a small number of highly regarded journals and the increase in the number of 'niche' journals. The concentration of work in a relatively small number of highly regarded journals, particularly in the social sciences, appeared to have been supported by increases in the number of issues produced annually by these journals. Somewhat paradoxically, the social sciences also seemed to have experienced a proliferation of new 'niche' journals that tended to have small readerships, low impact ratings and lower scoring outputs. Some outputs from these newer journals were judged to be rather detached from the larger fields or disciplines in which they might be contextualised or in which they could potentially have greater impact.

23. The criteria of 'originality', 'significance' and 'rigour' are now widely recognised as the measures of success for research outputs. The panel noted, however, that some outputs that were reliant on empirical research provided insufficient information on the research methods employed. Similarly, some outputs, and particularly those in the social sciences, were unclear as to what the original contribution to knowledge comprised.

24. The Sub-panel cross-referred 39 outputs to six other sub-panels. Most cross-referrals were made to four Sub-panels in Main Panel A: SP 1 (Clinical Medicine), SP 2 (Public Health, Health Services and Primary Care); SP 3 (Allied Health Professions, Dentistry, Nursing and Pharmacy) and SP 4 (Psychology, Psychiatry and Neuroscience). Cross-referrals were also made to one sub-panel in Main Panel C: SP 24 (Anthropology and Development Studies) and one sub-panel in Main Panel D: SP 30 (History).

Impact

25. The sub-panel judged 39 per cent of all impact to be of world-leading quality and this reflected exactly the same percentage of four-star impact for Main Panel C as a whole.

26. The sub-panel received and reviewed 128 case studies and the applied nature of the majority of research within the sub-panel enabled outstanding and very considerable levels of impact to be demonstrated by many submitting institutions.

27. Many of the strongest impacts that evidenced outstanding reach and significance were the result of research developed over the whole REF impact cycle. A number of case studies demonstrated widespread international impacts in tackling some of the most significant and entrenched global challenges of the 21st century including: the prevention of non-communicable diseases such as obesity, cardiovascular disease, depression and cancer; international development, conflict resolution and peace-building; sustainable economic development and regeneration; and child protection and athlete welfare.

28. The majority of impact case studies were in two broad areas: i) elite performance in sport and ii) physical activity and health.

29. The impact of research designed to enhance elite performance in sport, and the impact of sport itself, had undoubtedly been strengthened by the targeted approach of sport funding and preparations during the REF cycle for the hosting of both the London 2012 Olympic Games and Glasgow 2014 Commonwealth Games. These and other major events have provided both a context and a demand for research in a range of areas of relevance to the sub-panel. Many of the impact case studies assessed by the sub-panel provided evidence of growing relationships between academic institutions, sports institutes, governing bodies of sport and other sporting organisations to provide vital intelligence to support British athletes in competing successfully on the world stage.

30. The call for a health legacy from major sport events consolidated the demand from policy makers for robust public health advice and evaluation and academics submitting in this unit of assessment responded clearly and comprehensively to this policy agenda. Case studies in physical activity for health ranged from small-scale community interventions to large-scale international collaborative and longitudinal research. The challenge of physical inactivity is a global one and the strength of the UK's research teams means that they are well placed to continue to influence policy across the globe. However, the stubborn social patterning of inactivity, and its correlation with other socio-economic indicators, is likely to require innovative solutions by researchers and practitioners to target the wider determinants of inactivity and to supplement and complement individual behaviour change.

31. Impacts were also demonstrated in new product design and development, methodological innovation and advances and novel modelling techniques to measure impacts such as service level take-up in sport, economic benefits of hosting events and environmental change resulting from tourism. The sub-panel also saw excellence in tourism impact case studies that provided outstanding insights into the role of these and related events in supporting economic growth, particularly through the development and application of new digital technologies, transport, marketing and related infrastructure.

32. From a user perspective, there is a strand of research in sport and leisure studies that could be of significant value to the public sector in supporting responsibilities relating to equality and human rights legislation. While there was some case study evidence of research teams working effectively with policy makers and practitioners to influence and support understanding and responses to inclusion and diversity, there is also a significant body of research outputs that could achieve greater impacts with more sophisticated user collaboration.

33. Where impact case studies did not score highly it was often because the material link between the research cited and the impact claimed was unclear.

34. Overall, impact templates submitted to SP 26 were judged to be not as strong as the impact case studies. In some cases weaknesses in the templates reflected similar weaknesses seen in the research strategy section of a number of the environment templates. The sub-panel recommends that institutions work with submitting units more closely to develop coherent institutional and unit strategies for research environment and impact.

35. It is evident that the field's impact has developed and grown significantly since RAE2008. There are clear examples of research groups and centres working in significant and meaningful collaborations with policy makers and practitioners to achieve impacts. There is also scope for individuals, groups and teams to move well beyond dissemination of their published outputs through conference presentations and committee work, towards a more iterative, interactive and engaged collaboration with research users. Investment in understanding and supporting the skills and attributes required to do this successfully may be needed.

36. The sub-panel regarded the addition of the assessment of impact as a significant improvement to the research assessment process. The contribution of policy makers and practitioners to the work of the sub-panel was highly valued.

Research Environment

37. The sub-panel noted significant improvements in the research environment for sport and exercise sciences, leisure and tourism since RAE2008 with 34 per cent of environment judged to be conducive to producing research of world-leading quality. However, this was over 4 per cent below the average for Main Panel C and reflects a wider gap than seen in relation to either outputs or impact.

38. Many submitting departments had clear and focused strategies that had resulted in measurable improvements in outcomes and outputs since RAE2008. Some departments, particularly smaller ones, would benefit from more focused strategies and the development of larger research clusters with a greater critical mass of researchers working within a specific field. The sub-panel noted that, with only one exception, small submissions tended not to score as highly as medium-sized or large submissions.

39. A total of 222 early career researchers were submitted to REF2014 compared to 100 in RAE2008. Staffing strategies outlined in the environment templates evidenced extensive and

appropriate policies and practices for recruiting, inducting, developing and retaining early career researchers, almost all of whom entered their ECR post having completed a PhD.

40. A total of 921 doctoral degrees were awarded during the five-year REF period from 2008-09 to 2012-13. This demonstrates a significant increase in comparison with the 551 doctoral degrees awarded during the six-year RAE period from 2001-02 to 2007-08. The mean number of PhD completions per full-time member of staff over the REF cycle was 1.17 with a range from zero in four institutions to 3.3 in one institution.

41. The total research income submitted to REF2014 was £80.323 million with a mean income per submitted FTE of £102,000. External research income increased significantly since RAE2008, growing from a median per FTE submitted of £23,348 in RAE2008 to £34,397 in REF2014. The divergence between the mean and median continues to be a challenge for the field although the gap appears to have narrowed since RAE2008 reflecting the development of a wider research base and the maturing of the subject area.

42. The composition of funding sources has changed since RAE2008 with funding from Research Councils, Royal Society, British Academy and Royal Society of Edinburgh increasing from 6 per cent of funding in RAE2008 to 18 per cent in REF2014. The largest proportion of funding continues to be derived from UK central government bodies, local authorities, health and hospital authorities and increased from 29 per cent in RAE2008 to 31 per cent in REF2014. The proportion of funding derived from UK-based charities has decreased from 27 per cent in RAE2008 to 19 per cent in REF2014 and funding from commerce and industry, which comprised 23 per cent of research funding in RAE2008, made up only 10 per cent in REF2014.

43. This shifting pattern again reflects the maturing of the subject area evidenced by greater capture of more prestigious research funding from highly competitive peer-reviewed sources. However, the data also point to an absence of commensurate growth in industry funding of research in sport and exercise sciences, leisure and tourism over the REF period and this is a cause for concern. To stimulate growth in industry-funded research the sub-panel recommends that consideration be given to the establishment of a ring-fenced joint Research Councils funding stream with match-funding from industry.

44. Many submissions showed extensive evidence of leadership of international research collaborations and networks, journal editorial boards, academic and professional associations and international conference organising committees. Most of the major international conferences during the REF cycle had one or more keynote speakers from a UK institution and UK academics were highly visible in examining international PhDs. The sub-panel recommends that consideration is given to the establishment of a funding stream to support the hosting of prestigious international conferences that could attract world-leading international academics and postgraduate students to visit the UK and, subsequently, apply to work or study in the UK.

45. The rising profile of and investment into elite sport and its underpinning science in countries such as China will present significant international competition to UK academic institutions. Investment in the capital infrastructure, which was evident in many submissions, will support high quality sport and exercise sciences to be sustained in the UK. However, if this field of research is to grow and develop at a pace commensurate with that of global competitors then longer-term strategies for continued investment will be required.

46. While a number of sub-disciplines within the sub-panel's descriptor can be supported with limited resources and infrastructure, many require significant investment. It was clear that a number of institutions, particularly those making large submissions comprising groups of researchers in sport and exercise sciences, had undertaken significant capital expenditure to

invest in facilities. As the funding climate for higher education shifts, and institutions are encouraged to consider shared services and resources, there may be scope for further interdisciplinary and inter-institution collaborations to develop world-leading research and economies of scale simultaneously.

Concluding comments

47. The sub-panel judged that across sport and exercise sciences, leisure and tourism there had been a marked improvement in the **quality** of research since RAE2008 underpinned by significant growth in the **quantity** of research over the same period.

48. The sub-panel concluded that the UK has the potential to develop strongly as the world leader across **all** aspects of sport and exercise sciences, leisure and tourism. The world-leading research identified by the sub-panel was judged to have particularly positive impacts on public health.

49. To ensure this upward trajectory in research volume, quality and impact continues at a similar rate the sub-panel suggests that consideration be given to establishing a range of funding mechanisms designed to maximise levels of growth, quality and impact of research in sport and exercise sciences, leisure and tourism.

50. Continued investment in the research environment is central to ensuring further improvement in the quality of outputs and impact required to expand the UK's role in producing world-leading research in sport and exercise sciences, leisure and tourism.

Glossary of terms

AcFin

Accounting and Finance

AHRC

Arts and Humanities Research Council

BBSRC

Biotechnology and Biological Sciences Research Council

BIS

Department for **b**usiness, Innovation & Skills

BME

Black and minority ethnic

DFID

Department for International Development

ECR

Early career researcher, defined in the REF as members or staff who meet the criteria to be selected as Category A or Category C staff on the census date, and who started their careers as independent researchers on or after 1 August 2009.

EEF

Education Endowment Foundation

EPSRC

Engineering and Physical Sciences Research Council

ESRC

Economic and Social Research Council

ET

Environment templates

EU

European Union

FTE

Full-time equivalent. Used as an alternative to headcount to indicate the actual volume of activity.

GIS

Geographic information systems

HEI

Higher education institution

HESA

Higher Education Statistics Agency

HRM

Human Resource Management

ICS

Impact case study

IS

Information systems

ICT

Information and communications technology

MPC

Main Panel C

MS/OR

Management Science/Operational Research

NERC

Natural Environment Research Council

NGO

Non-governmental organisations

PGR

Postgraduate researcher

RAE

Research Assessment Exercise

RCUK

Research Councils UK

REF

Research Excellence Framework

SP

Sub-panel

TLRP

Teaching and Learning Research Programme

UOA

Unit of assessment