

May 2022

Overview report by Main Panel C and Sub-panels 13 to 24

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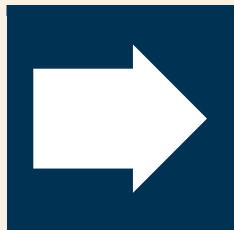
Executive Summary

1. The purpose of this report is to provide an overview of the research selected by Higher Education Institutions (HEIs) and submitted to REF2021 for assessment by Main Panel C.
2. The 12 Units of Assessment (UOAs) within Main Panel C cover 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 to design and engineering, physical and/or biological sciences, humanities, biomechanics, and medicine.
3. The 12 Units of Assessment (UOAs) within Main Panel C assessed 54,226 research outputs (equivalent to 56,650 when double-weighted outputs are counted twice), 2,260 impact case studies, and 658 unit environment templates
4. There has been a substantial growth in Main Panel C in the number of submissions, FTE staff, and outputs since REF2014, more so than in other main panels. Changes to the REF rules mean that direct comparisons of results need to be contextualised and should be treated with caution.
5. Main Panel C was impressed by the high quality of submissions. The overall quality profile showed that 37 per cent of the submitted research was judged to be world-leading (4*), 43 per cent to be internationally excellent (3*), 17 per cent to be internationally recognised (2*) and 3 per cent as nationally recognised (1*).
6. The view of the main panel and its sub-panels is that the overall very high quality of the submissions indicates a vibrant research community in the UK, and although not directly comparable with 2014, quality continues to rise compared with previous exercises. This improvement was found in all three elements of the submissions, and overall disciplines covered by this main panel.
7. Throughout the assessment process, Main Panel C and its sub-panels ensured adherence to published 'Panel criteria and working methods' and consistency in assessment standards through a variety of means including: participating in main panel calibration exercises; receipt and examination by the main panel 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 during the assessment, especially relating to assessment and calibration approaches and the fair and consistent application of the criteria; scrutiny of the profiles recommended by the sub-panels; and advice on the fair and consistent application of the criteria across sub-panels.
8. As a result of these measures, Main Panel C has full confidence in the robustness of the processes followed and the outcomes of the assessment in all its sub-panels.
9. The Covid-19 restrictions inevitably had an impact on the work of the main panel and sub-panels. There were challenges in both managing a revised timetable and in working in a virtual environment. Whether in person, online or hybrid, meetings were co-operative, notwithstanding the sheer volume of work involved for certain sub-panels. Note was taken of Covid-19 statements from HEIs as appropriate.
10. The submissions were very varied in size, with a wide range of disciplines, including both very small and very large units, and well-established and new research groups. There are examples of world-leading and internationally excellent quality across this wide range.

11. There was an increase in the percentage of research outputs awarded 4*, from 21.1 per cent in REF2014 to 31.8 per cent in REF2021. The main panel noted that the increase in world-leading research outputs in part reflects changes in the rules since 2014 but more importantly that this indicates a flourishing research base from which outputs were selected by HEIs.
12. Journal articles are the largest single category across all the UOAs followed by books. The main panel noted the very wide range of journals in which world-leading and internationally excellent research submitted had been published.
13. There was an increase in requests for double-weighting and these were generally accepted. Some submissions could have made more use of double-weighting with the option of a reserve output.
14. There was a wide range of practice in the use of the interdisciplinary research (IDR) flag. Thus, the IDR flag by itself was not the basis for decisions as to how to assess the outputs, which were made with specific reference to the IDR guidance and with input from the IDR advisers. Outputs were neither advantaged nor disadvantaged by the use of the IDR flag. Irrespective of flagging inconsistencies, the sub-panels noted the frequency and vitality of inter-disciplinary and multi-disciplinary approaches.
15. Outputs of world-leading quality were found across the full spectrum of topics, categories of outputs and modes of research. They include outputs arising from theoretical, empirical, and applied research. The trend to multi-disciplinary and interdisciplinary research continues due to a growth in thematic or issue-based research. There was no single mode of excellence in the research outputs submitted to UOAs within Main Panel C.
16. The international advisers attested not just to the robustness of the assessment exercise, but were also greatly impressed by the quality of the outputs of UK social science research and other disciplines covered in Main Panel C.
17. The 12 sub-panels within Main Panel C received a total of 2,260 impact case studies for assessment. The case studies included a wide range of beneficiaries and significant contributions to social, economic and environmental welfare in the UK and internationally; to public discourse and understanding; to professional practice; and to policy making by institutions, companies and civil society organisations.
18. The main and sub-panels were highly impressed by the range of types of impact, by the extent of the beneficiaries, and by the many ways that research is making a difference outside academia to a wide spectrum of organisations, groups and individuals, within and beyond the UK.
19. In many submissions the sub-panels noted improvements in the presentation of case studies which indicated planning and HEI support to achieve external impact is becoming an everyday component of much academic research.
20. Overall, 42.9% of the activity assessed in the research environment was conducive to supporting research of world-leading quality and enabling outstanding impact. This is a small increase since REF2014, reflecting continuing strength and development of systems of support for research and research impact.
21. Approaches to promoting equality, diversity and inclusion in the HEIs were found to be variable across submissions. In the strongest submissions, there was evidence that policy and practice to promote equality of opportunity were embedded in institutions and units, with honesty about challenges and examples of good practice. Issues of

gender were in general addressed in more detail, both in terms of data and actions, than other protected characteristics.

22. The main panel welcomed the increased attention to equality and diversity in HEIs but also noted that there remained gaps and that in some areas progress was slow.
23. The submitting unit's approach to enabling impact was included in the environment template. The strongest submissions included impact at all points of the research strategy and provided support, training and resources to develop external partnerships and relationships.
24. These outcomes show that research in the social sciences, and other disciplines covered by this main panel, continues to produce outputs of world-leading quality, with a wide range of types of impact, with vibrant research environments well connected nationally and internationally. Maintaining and expanding this research base would enable the continuing development and enhancement of this important contribution to our society.
25. The sub-panel sections provide detailed discussion of processes and outcomes for each of the 12 UOAs in Main Panel C.



Section 1. Introduction

1. The purpose of this report is to provide an overview of the research selected by Higher Education Institutions (HEIs) and submitted to REF2021 for assessment by Main Panel C. It provides an overview of the submissions, a summary of the assessment processes, and the results of our assessments. The report also reflects on our overall impressions of the submissions, provides feedback on key aspects, and enables each sub-panel to reflect on the research strengths evidenced in the submissions received for review.
2. The main panel acknowledges the immense amount of effort involved for units in institutions in preparing their submissions, alongside the additional challenges presented by the Covid-19 pandemic. We also appreciate the commitment and hard work of the sub-panels in assessing the material submitted, working to a revised timetable.
3. The units of assessment (UOAs) within Main Panel C remained unchanged from REF 2014, except that separate UOAs were formed for Geography and Environmental Studies (UOA 14) and Archaeology (UOA 15). These 12 UOAs cover 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 to design and engineering, physical and/or biological sciences, humanities, biomechanics, and medicine.
4. The disciplinary diversity was reflected in the wide range of theoretical and empirical methodologies that were found in the work submitted to all sub-panels. This included a wide range of qualitative and quantitative social science approaches and scientific methodologies used in the biological and physical sciences, along with scholarly and textual approaches associated with the humanities. Interdisciplinary and multidisciplinary research was also well represented.
5. The 12 Units of Assessment (UOAs) within Main Panel C assessed 54,226 research outputs (equivalent to 56,650 when double-weighted are counted twice), 2,260 impact case studies, and 658 unit environment templates.
6. Main Panel C was impressed by the high quality of submissions. The overall quality profile showed that 37 per cent of the submitted research was judged to be world-leading (4*), 43 per cent to be internationally excellent (3*), 17 per cent to be internationally recognised (2*) and 3 per cent as nationally recognised (1*).
7. The main panel noted that 97 per cent (639 out of 658) of individual submissions to the 12 UOAs were awarded some world-leading (4*) research quality in their overall profiles. The majority of submissions across all sub-panels had in excess of 25 per cent assessed at 4* in their overall profiles. There were elements of world-leading (4*) or internationally excellent (3*) research in almost all submissions, regardless of the scale of the research activity.
8. These overall profiles are indicative of the strength of the social sciences, and other disciplines covered by this main panel, in the UK. The view of the main panel and its sub-panels is that the high quality of the submissions indicates a vibrant research community, and although grades are not directly comparable due to changes in REF procedures since 2014, quality continues to rise compared with previous exercises. This improvement was found in all three elements of the submissions, and overall.
9. The outputs submitted included many examples of research at the forefront of their disciplines, presenting ambitious and innovative research in outputs of all types. Interdisciplinary research was well represented, contributing important new insights and approaches.

10. The main panel also noted that the range and quality of the impact case studies were very impressive and indicated growing commitment to embedding non-academic impact, and partnerships into research at all stages. Highly graded impact case studies covered a wide range of pathways to impact, including engagement with the public.
11. The international advisers attested not just to the robustness of the assessment exercise, but were also greatly impressed by the quality of the outputs of UK social science research and other disciplines covered in Main Panel C. They concluded that there can be no doubt that - across all the submitting disciplines - the outputs evaluated as world-leading and internationally excellent (4* and 3*) stand amongst the world's best. Similarly, they noted that highly rated impact case studies showed that the UK research in Main Panel C is at the forefront of the world's research endeavours to contribute to social and economic welfare, public discourse, and policy making.
12. The environment templates provided clear evidence of many research environments that were conducive to producing world-leading research and enabling outstanding impact in terms of their vitality and sustainability. The main panel noted variation in the extent of investments in existing research infrastructure, noting that such investments have generally been effective in maintaining and improving quality. The main panel was also pleased to note that there were new submissions with emerging research cultures and potential for the future.
13. However, the main panel also noted reference to potential challenges to future sustainability in the social sciences, and other Main Panel C disciplines, in the changing national and international context for higher education and research, for example in future opportunities for European research partnerships and funding, for the Global Challenges Research Fund, and for financial support for postgraduate research students.
14. As summarised in the 'Summary report across the four main panels', there have been a number of significant changes to the REF rules since 2014, following the 2016 Stern review¹. These include changes in weighting of outputs (from 65% to 60%) and impact (from 20% to 25%); the focus of the assessment on the research unit rather than on its constituent individual researchers; the inclusion of all staff with significant responsibility for research; the removal of the requirements for four outputs per Category A member of staff; the submission of one to five outputs per Category A member of staff, with an average of 2.5 per FTE; the opportunity to include outputs from former staff members; the inclusion of support for impact in the environment template; the enhanced processes for assessing interdisciplinary research (IDR); and the introduction of the institutional-level environment statements. The time period for REF 2021 has also been longer than for REF 2014.
15. These rule changes impacted differently across the main panels (discussed further below) and across the sub-panels in Main Panel C. It is important to note that these changes to the rules and requirements mean that direct comparisons of REF 2021 results with REF 2014 results need to be contextualised and should be treated with caution.

¹ Building on Success and Learning from Experience An Independent Review of the Research Excellence Framework, 2016 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/541338/ind-16-9-ref-stern-review.pdf

Panel membership

16. The membership of the main and sub-panels is available on the REF website (under 'Panels'). The main panel chair was appointed following open advertisement and interview. The appointment of panel members was based on nominations from learned associations and other bodies, with a deadline for nominations of 20 December 2017. The first stage was the applications and appointment of sub-panel chairs and other members of the main panel and to the sub-panels for the development of the 'Panel criteria and working methods'. A further round of sub-panel appointments was made after the survey of submission intentions in late 2019. There were also appointments after the submissions had been received, including for additional output and impact assessors. This ensured that all work submitted in the 12 UOAs was assessed by relevant experts and in its own terms.
17. From the nominations received, care was taken throughout the process to achieve appropriate expertise and diversity on the sub-panels. The analysis of the full panel appointments² to REF2021 highlights significant progress in increasing the representativeness of the panels since 2014.
18. Submissions to the sub-panels covered by Main Panel C varied in size and volume, and this was reflected in the size of the sub-panels, which ranged from under 20 to over 50 members.
19. The inclusion of international, interdisciplinary and impact advisers in the main panel enhanced the confidence with which the main panel fulfilled its advisory and quality assurance roles. These members played an extremely active role in the work of the main panel, as well as attending and observing sub-panel meetings, and their advice was invaluable. The interdisciplinary advisers were members of the Interdisciplinary Research Advisory Panel (IDAP), working across all the main panels. There was also an observer from UK Research and Innovation (UKRI) on the main panel.
20. Each sub-panel had the benefit of its own interdisciplinary advisers and impact members and assessors. The sub-panels were also able to take on additional 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. Impact and output assessors were full members of the sub-panels for those meetings which they attended.
21. The main panel and its sub-panels received outstanding support from the advisers and secretaries, most being seconded from UK HEIs for the duration of the REF criteria and assessment phases. 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 UKRI/Research England has also been excellent.
22. The rest of the main panel report is divided into five sections. The first provides an overview of the submissions to REF 2021 with some comparisons with REF 2014 and presents the overall quality profile for Main Panel C. The next section summarises the main panel and sub-panel working methods. The last three sections address the three main components in turn: outputs, impact case studies and environment.

² Analysis of full REF 2021 panel membership (REF 2021/01) <https://www.ref.ac.uk/publications/analysis-of-full-ref-2021-panel-membership-ref-202101/>



Section 2. Summary of submissions and overall results

23. Table 1 shows the submissions, FTE numbers, outputs and impact case studies for each UOA in Main Panel C. In 2021, there were 658 submissions to Main Panel C, including 23,451.04 Category A FTE staff, 56,650 outputs, and 2,260 impact case studies. The smallest submission was from UOA 15 (Archaeology) with 24 submissions, 496.84 FTE, 1,209 outputs, and 61 impact case studies. The largest was UOA 17 (Business & Management Studies) with 108 submissions, 6,633.52 FTE, 16,038 outputs and 539 impact case studies.
24. All the UOAs included some submissions with under ten FTE, with the smallest being 2.0 FTE (in UOA 20 Social Work and Social Policy) and 3.00 FTE (in UOA 18 Law). The largest were 316.97 FTE (in UOA 23 Education) and 290.69 FTE (in UOA 13 Architecture, Built Environment and Planning). The average (mean) was 35.64 FTE for Main Panel C, ranging from 20.70 FTE (in UOA 15 Archaeology) to 61.42 FTE (in UOA 17 (Business & Management Studies).
25. There were 3,883 Early Career Researchers (ECRs) submitted across Main Panel C, about 16 per cent of the FTE, with little variation across sub-panels.

Table 1: Summary of REF2021 Submissions to Main Panel C (page 10).

Table 1: Summary of REF2021 Submissions to Main Panel C

Unit of Assessment	Number of submissions	Category A staff	Category A Staff FTE	Submission range FTE smallest	Submission range FTE largest	Submission range FTE average	Outputs (accounting for double weighting)	Impact Case Studies
13 Architecture, Built Environment and Planning	37	1,636	1,527.43	6.20	290.69	41.28	3,706	131
14 Geography and Environmental Studies	56	1,948	1,854.58	5.20	95.40	33.12	4,482	185
15 Archaeology	24	539	496.84	3.00	60.23	20.70	1,209	61
16 Economics and Econometrics	25	973	919.52	8.50	83.87	36.78	2,232	91
17 Business and Management Studies	108	6,995	6,633.52	5.40	186.94	61.42	16,038	539
18 Law	69	2,621	2,493.81	3.00	138.23	36.14	5,867	244
19 Politics and International Studies	56	2,011	1,961.82	5.00	171.56	35.03	4,710	191
20 Social Work and Social Policy	76	2,259	2,105.24	2.00	84.50	27.70	5,158	225
21 Sociology	37	1,168	1,103.54	7.60	76.51	29.83	2,669	115
22 Anthropology and Development Studies	26	771	733.44	9.90	63.50	28.21	1,762	78
23 Education	83	2,367	2,168.38	5.00	316.97	26.13	5,278	232
24 Sport and Exercise Sciences, Leisure and Tourism	61	1,513	1,452.92	6.50	94.90	23.82	3,539	168
Main panel C	658	24,801	23,451.04	2.00	316.97	35.64	56,650	2,260

26. Table 2 compares REF 2021 with REF 2014 and shows that there has been a substantial growth in Main Panel C in the number of submissions, FTE staff, and outputs since REF 2014. The number of submissions rose from 614 in 2014 to 658 in 2021, the FTE staff numbers rose from 14,412.74 to 23,451.04, the outputs from 52,212 to 56,650, and the number of impact case studies from 2,040 to 2,260.

27. As noted in the data shown in the 'Summary report across the four main panels', Main Panel C stands out from the other main panels in the extent of change since 2014. Main Panel C is the only main panel with an increase in the number of submissions, with the highest proportionate increase in FTE, and was the only main panel to receive an increased number of outputs.

28. The reasons for these differences from 2014 to 2021 are varied. They include changes in the research landscape of disciplines in Main Panel C; changes in the REF rules and requirements (as summarised in the Main Panel Overview Report); and changes in the submission choices and strategies of HEIs. It is difficult to disentangle these. The increase in the number of submissions may suggest more HEIs developing their social sciences research. The increase in Category A FTE staff also reflects the change since 2014 to the inclusion of all staff with significant responsibility for research.

29. There were also some changes within Main Panel C. Of the 658 submissions in Main Panel C, 109 were new to that UOA since 2014 and there were 66 submissions in REF 2014 that did not submit to the same UOA in 2021³. There were some notable differences across the 12 UOAs since 2014. For example, there were increases in the number of submissions from 62 to 76 in UOA 20 (Social Work and Social Policy) with a large number of new entrants (21) and exits (seven) since 2014. Similarly, in UOA 24 (Sport and Exercise Sciences, Leisure and Tourism) the number of submissions rose from 51 to 61 with 16 entrants and four exits.
30. The proportionate rise in FTE ranged from 21.7 per cent in UOA 16 (Economics and Econometrics) to 99.8 per cent in UOA 17 (Business and Management). The number of outputs rose by 31.4 per cent for UOA 17 (Business and Management) and by 28.3 per cent for UOA 24 (Sport & Exercise Sciences, Leisure & Tourism). This in turn led to an increase in the number of impact case studies. The number of outputs fell by 12.6 per cent for UOA 22 (Anthropology and Development Studies) and by 14.2 per cent for UOA 16 (Economics and Econometrics), but the latter also included a substantial number of outputs cross-referred in (as discussed further below). The number of impact case studies thus also decreased for these UOAs, and for UOA 13 (Architecture, Built Environment and Planning).

Table 2: Overview Comparison of Submissions to REF 2021 and REF 2014 (page 12).

31. The submissions to Main Panel C were thus very varied in size, with a wide range of disciplines, including both very small and very large units, and well-established and new research groups. The missions of HEIs making submissions to Main Panel C varied, including well-established research intensives as well as HEIs where research is located in a teaching or training-led mission. There were different patterns across the UOAs since REF 2014, with some relatively stable in number of submissions but others including more entrants and exits. There were large increases in outputs in some UOAs but falls in others. The sub-panel sections below examine the submissions in more detail, and also consider the impact of other factors such as the use of double-weighting.

³ This may include a very few mergers and splits since 2014.

Table 2: Overview Comparison of Submissions to REF 2021 and REF 2014

REF 2021 UOA	REF	Number of submissions	New submissions (not in 2014)	Submissions in 2014 but not in 2021	Category A staff FTE	% change in Category A FTE	Number of outputs	% change in number of outputs	Impact case studies	% change in number of impact case studies
13	2014	45			1,024.81	49.0%	3,781	-2.0%	146	-10.3%
	2021	37	3	10	1,527.43		3,706			
14	2014	74			1,685.63	39.5%	6,021	-5.5%	239	
	2021	56	10	5	1,854.58		4,482			
15	2014					21.7%		-14.2%		2.9%
	2021	24	2	6	496.84		1,209			
16	2014	28			755.65	21.7%	2,600	-14.2%	101	-9.9%
	2021	25	2	5	919.52		2,232			
17	2014	101			3,320.06	99.8%	12,204	31.4%	432	24.8%
	2021	108	10	3	6,633.52		16,038			
18	2014	67			1,553.41	60.5%	5,525	6.2%	225	8.4%
	2021	69	9	7	2,493.81		5,867			
19	2014	56			1,274.67	53.9%	4,367	7.9%	181	5.5%
	2021	56	7	7	1,961.82		4,710			
20	2014	62			1,301.89	61.7%	4,784	7.8%	190	18.4%
	2021	76	21	7	2,105.24		5,158			
21	2014	29			703.59	56.8%	2,630	1.5%	100	15.0%
	2021	37	11	3	1,103.54		2,669			
22	2014	25			561.60	30.6%	2,015	-12.6%	80	-2.5%
	2021	26	4	3	733.44		1,762			
23	2014	76			1,441.76	50.4%	5,526	-4.5%	218	6.4%
	2021	83	14	6	2,168.38		5,278			
24	2014	51			789.67	84.0%	2,759	28.3%	128	31.3%
	2021	61	16	4	1,452.92		3,539			
MPC	2014	614			14,412.74	62.7%	52,212	8.5%	2,040	10.8%
	2021	658	109	66	23,451.04		56,686			

Note that submissions to UOA14 and UOA15 were made to a single submission in REF2014

Main Panel C: overall quality profile

32. Table 3 sets out the average overall quality profile for each UOA, and for Main Panel C as a whole. The average is calculated by weighting each submission in the UOA (or main panel) by the number of Category A staff FTE⁴. This method is also used to calculate the FTE-weighted average sub-profiles in the sections on outputs, impact and environment below.
33. The overall proportion of the research submitted to Main Panel C in REF 2021 judged to be world-leading was 37 per cent, with a range from 33 per cent to 46 per cent. The proportion judged to be internationally excellent was 43 per cent, with a range from 35 per cent to 50 per cent. Thus, overall 80 per cent of the submissions to sub-panels within Main Panel C were judged to be world-leading/internationally excellent.
34. The overall proportion of the research submitted to Main Panel C judged to be 2* (internationally recognised) was 17 per cent. The value of the contribution which this research makes to the UK research environment should not be underestimated. It provides a pipeline of research and an opportunity for new entrants and emerging research areas to be developed. This research is also important in enabling and underpinning research impact.
35. As the sub-panel sections discuss in more detail below, while the submissions were very diverse – large and small, well established and new, including a range of theoretical and empirical research, partnerships and collaborations, disciplinary and interdisciplinary research – there are examples of world-leading and internationally excellent quality across this wide range.
36. In general, the UOA descriptors (set out in the ‘Panel criteria and working methods’, REF2019/02) reflected disciplinary boundaries and provided appropriate guidance to HEIs in making their submissions. But some disciplinary areas were found across a wide range of subject matter, for example, economics research could be found in many UOAs. The REF provides an assessment of the research submitted to each sub-panel and not an overview of all research in a given discipline.

Table 3: Overall Quality Profile for Submissions to UOAs in Main Panel C (FTE weighted) (page 13).

⁴ The quality profiles for each submission are weighted by volume (submitted staff FTE), rather than each submission profile counting once towards the average. This provides information about the UOA as a whole, rather than simply a summary of the individual submissions that were returned to it. Thus the weighted data provide a national picture of the quality of submitted research activity in the field(s) covered by a given UOA.

Table 3: Overall Quality Profile for Submissions to UOAs in Main Panel C (FTE weighted)

Unit of Assessment	Submissions	% 4*	%3*	% 2*	% 1*	% u/c
13 Architecture, Built Environment and Planning	37	38	48	11	3	0
14 Geography and Environmental Studies	56	37	47	14	2	0
15 Archaeology	24	46	41	12	1	0
16 Economics and Econometrics	25	41	50	7	2	0
17 Business and Management Studies	108	35	44	19	2	0
18 Law	69	39	38	21	2	0
19 Politics and International Studies	56	37	47	15	1	0
20 Social Work and Social Policy	76	33	42	21	4	0
21 Sociology	37	40	38	19	3	0
22 Anthropology and Development Studies	26	40	42	17	1	0
23 Education	83	37	35	20	7	1
24 Sport and Exercise Sciences, Leisure and Tourism	61	34	49	15	2	0
Main Panel C	658	37	43	17	3	0



Section 3. Panel working methods

37. The main panel comprised the chairs of the 12 sub-panels, international, interdisciplinary and impact members, and a UKRI observer, supported centrally by the REF team and panel secretariat. In total, Main Panel C met nine times between April 2018 (the start of the criteria-setting phase) and March 2022 (the end of the assessment phase).
38. Before starting the assessment, all members of the main panel took part in equalities and diversity training, including training for unconscious bias. In addition, the main panel and the sub-panels all developed a Fairness in REF Intention Plan to guide their approach and discussion in the meetings (whether these were virtual, face-to-face, or hybrid). The intention plans stressed the importance of working with openness, transparency and challenge. They were refreshed throughout the process of assessment and referred to explicitly at all meetings. This provided a valuable source of guidance for good practice.
39. Main Panel C met regularly during the criteria-setting phase in 2018, working with the sub-panels and the other main panels to develop a combined set of criteria and working methods, with supplementary criteria for each main panel and its sub-panels, where it was agreed to be justified by differences in the nature of research in those disciplines (see 'Summary report across the four main panels')
40. Throughout the assessment process, Main Panel C and its sub-panels ensured adherence to published 'Panel criteria and working methods' and consistency in assessment standards through a variety of means including:
 - participating in main panel calibration exercises,
 - receipt and examination by the main panel 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 during the assessment, especially relating to assessment and calibration approaches and the fair and consistent application of the criteria,
 - scrutiny of the profiles recommended by the sub-panels and advice on the fair and consistent application of the criteria across sub-panels.
41. In line with Annex D of the 'Panel criteria and working methods', the main panel and its sub-panels maintained records of major and minor interests throughout the assessment process and conflicted panel members were not involved in the calibration or assessment of submitted items or HEIs with which they were conflicted or in which they had declared a disqualifying interest, or in any deliberations about these. They withdrew from any discussion of conflicted individual items or HEI submissions as appropriate. This applied to all members of the sub-panel executives (chairs, deputies, advisers and secretaries), who were also not involved in the allocation of submitting material in which they had declared a disqualifying interest. Sub-panel executives reviewed declarations of minor interest to determine what level of action was needed to avoid inappropriate engagement in the assessment process.

42. The Covid pandemic had an impact on the work of the main panel and sub-panels. There were challenges in both managing a revised timetable and in working in a virtual environment. This undoubtedly placed additional pressure on sub-panel members who also felt the loss of the more informal types of interactions and opportunities for relationship building. Smaller sub-panels were able to adapt to online working relatively easily, but larger sub-panel size was not by itself found to be a barrier to effective meetings. Whether in person, online or hybrid, meetings were 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.
43. The main panel was able to develop a strong peer group, which enabled sub-panel chairs to calibrate judgements, to share best practice, and to make comparisons across a very broad range of material. The main panel found that this brought strength and confidence to its quality assurance role, ensuring consistency of approach and judgements across its constituent sub-panels. For sub-panels, the strong working relationships developed during the criteria-setting phase helped to create a firm basis for virtual working.
44. The balance between face-to-face and virtual or hybrid meetings will need to be addressed for any further exercise. Main Panel C noted the importance of face-to-face especially at the start and end of the assessment process.
45. There were challenges in the development of information technology (IT) systems to support the work of the main and sub-panels, including the shift to virtual meetings. The IT systems caused some delays and difficulties at the early stages of the assessment. The work to adapt and manage these IT issues as quickly as possible was appreciated, and feedback has been provided to support the further development of IT in any future exercises, including systems for both face-to-face and virtual working.

Calibration and oversight

46. Each aspect of the submission (outputs, impact, environment) was subject to a main panel 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 REF 2021. The main panel calibrations were led by the international, interdisciplinary and impact members.
47. There were additional cross-main panel calibration exercises (for outputs, impact and environment) undertaken by the main panel chairs and a selection of 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. International, interdisciplinary, and impact main panel members attended selected sub-panel meetings during the assessment period.
48. The main panel chair attended all meetings (for part of the time) of each of the 12 sub-panels, and other main panel members attended selected meetings. This was facilitated by the online/hybrid format. Main panel members attending sub-panel meetings 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.

49. In order to ensure consistency of approach, the main panel received regular updates from the sub-panel chairs on their sub-panels' progress, the measures they had adopted to promote consistent application of assessment criteria, and any emerging issues relating to assessment and calibration approaches and the fair and consistent application of the criteria within sub-panels.
50. The regular main panel meetings throughout the assessment process also provided opportunities for the sub-panel chairs to share best practice and raise issues for consideration by the panel, thus ensuring consistent treatment of more detailed issues. These detailed issues included co-authorship, double weighting, assessment of inter-disciplinary research, joint assessment, cross panel referrals, criminology assessment, and the consistent assessment of author contributions to outputs with large numbers of co-authors, which had increased markedly compared to REF 2014 (see further discussion of these issues below).

Allocations for assessment

51. 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.
52. 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.
53. All sub-panels allocated outputs for assessment to at least one expert reader to ensure the robustness of the assessment process (as detailed in the sub-panel sections below). The interdisciplinary advisers provided advice on allocation of outputs, as appropriate. Impact case studies 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. Environment templates were in most cases initially assessed by sub-groups of academic sub-panel members; for some, this also included impact members and assessors. There was excellent co-operation between user and academic members and assessors on sub-panels.
54. Wherever appropriate, 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. Some sub-panels appointed members in common to assist in assessing work that spanned their remits. This was the case for UOAs 16 and 17, for UOAs 14 and 7, and for UOAs 13 and 32.
55. In developing the output profiles, each output was assessed and assigned a grading on the 5-point scale 'unclassified' to 4*, using the agreed criteria. Some sub-panels also used an interim 9 or 13 point scale to help with initial calibration or to help reach agreement on the final 5-point grade.
56. In developing the impact sub-profiles, all the sub-panels used the same method of assigning star levels to case studies. Each case study was graded according to the starred level descriptors. A nine point scale was used for impact case studies so that half grades could be awarded. Thus, an impact case study that was judged at 3.5 would then contribute half to the 3* grade and half to 4* grade in the final profiles.

57. 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 between two of the starred levels was assigned a grade of 3.5, 2.5, 1.5 or 0.5. In these cases, 12.5 per cent was awarded to each of the two starred levels that the grade fell between for the relevant section.
58. Each sub-panel graded each section of the environment template, REF5b, taking note of the information in REF5a (the institutional level statement) and any associated Covid-19 statement. The data presented in REF4a (doctoral degrees awarded), REF4b (research income) and REF4c (income in kind) were used to inform the assessment. Some submissions spread information across the whole template rather than restricting it to the relevant section. It was helpful when the information was in the correct section, but submissions were assessed across the entire template and grades given for the most relevant section. Judgements were made, in all cases, solely on the basis of the information submitted by institutions and, where appropriate, on the basis of responses to audit queries, and in accordance with the published criteria.
59. There were some minor differences across sub-panels in the methods of allocation for assessment, but the main panel was satisfied that the arrangements were all consistent with the published 'Panel criteria and working methods' and would lead to a fair and robust assessment of the material submitted. All were approved by the main panel.

Cross referrals

60. Where a sub-panel did not have the appropriate academic expertise to review specific material, either advice was sought by cross-referral to another UOA as in REF 2014 or, in the new arrangement developed for REF 2021, joint assessment was undertaken with another UOA. The final decision about the grade to be awarded to an output 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. A small number of impact case studies (six out and two in) were cross-referred. The main panel noted that the system for cross-referrals and joint assessment worked well to enable dialogue and assessment across sub-panels. Assessment of interdisciplinary research (IDR) outputs also involved assessment within and across sub-panels and is discussed below in the section on assessment of outputs.
61. Table 4 provides details about the number of cross-referrals of outputs within and beyond Main Panel C. There were 2,913 outputs cross-referred into the sub-panels and 3,441 were cross-referred out. These numbers include a relatively small number of joint assessments (147 coming in and 126 going out). The majority of cross-referrals were to other Main Panel C sub-panels (78 per cent of cross-referrals into an UOA and 66 per cent of cross-referrals out from an UOA).
62. There were 1,977 outputs cross-referred out by UOA 17 (Business and Management Studies), within Main Panel C, the vast majority of these to UOA 16 (Economics and Econometrics). Because of the nature of the discipline, a small number of units that submitted to UOA 14 (Geography and Environmental Studies) included outputs that were cross-referred for advice from outside Main Panel C to Main Panel B. There were also cross-referrals out to other main panels from UOA 23 (Education) and UOA 24 (Sport and Exercise Science, Leisure and Tourism).

Table 4: Number of Cross-Referrals and Joint Assessments for UOAs in Main Panel C

Unit of Assessment	Cross Referrals Out			Cross Referrals In		
	Within Main Panel	Outside Main Panel	Total Out	From within Main Panel	From Outside Main Panel	Total In
13 Architecture, Built Environment and Planning	25	125	150	37	56	93
14 Geography and Environmental Studies	23	261	284	162	251	413
15 Archaeology	32	58	90	24	125	149
16 Economics and Econometrics	8	32	40	1,470	4	1,474
17 Business and Management Studies	1,977	424	2,401	24	25	49
18 Law	6	4	10	95	12	107
19 Politics and International Studies	7	7	14	78	20	98
20 Social Work and Social Policy	28	44	72	53	23	76
21 Sociology	13	8	21	166	46	212
22 Anthropology and Development Studies	20	7	27	34	16	50
23 Education	97	145	242	106	42	148
24 Sport and Exercise Sciences, Leisure and Tourism	28	62	90	15	29	44
Main Panel C	2,264	1,177	3,441	2,264	649	2,913

Note that there were few joint Assessments, 273 in total comprising 147 referred out and 126 referred in and these are included in the figures above; they also include cross referred Impact Case Studies, 3 in, and 6 out – 9 in total.

Criminology

63. In the 'Panel criteria and working methods' and the 'Guidance on submissions' (REF 2019/01) criminology was identified as a multi-disciplinary subject and it was expected that most criminological research would fall within the boundaries of UOA 18 (Law), UOA 20 (Social Work and Social Policy) and UOA 21 (Sociology). Systems were therefore put into place to enable collaboration across these three sub-panels in the assessment. As agreed during the criteria-setting stage of the work criminologists from these sub-panels met to discuss the need for consistency in approach across the sub-panels. It had been anticipated that during the assessment period the three sub-panels would meet at the same venues at the same time to facilitate coordination and oversight among the criminologists within each sub-panel. However, the pandemic and the move to virtual meetings meant that this was not possible. Nevertheless, representatives of these three sub-panels held online meetings on four occasions, with one such meeting involving a calibration exercise in regard to outputs prior to the commencement of the assessment period. There were also discussions about the extent and nature of the use of criminology flagging, impact case studies, new topics and emerging themes. The calibration exercise supported consistency in approach. The final meeting focused on a discussion of feedback on criminology across the three sub-panels once assessment had completed.

64. HEIs were given the opportunity to flag outputs for criminology. Criminologists from these three sub-panels observed that the criminology flagging had not worked effectively or consistently, with a considerable number of institutions not flagging criminology outputs or doing so inconsistently. In some cases, articles in criminological journals and books in criminology series were not flagged as criminology. Criminological work is found within and across the disciplines of law, sociology and social work and social policy, with fluid and permeable boundaries that can defy clear flagging, notably gender-based violence/abuse, deviance, criminal justice, criminal law, regulation and social order. This fluidity is perhaps a strength of criminology as a field that is informed by and informs these wider disciplines. It is impossible to give an accurate indication of the extent of a criminology focus in submissions as a result of the inconsistent use of the flagging system.
65. Sub-panels 18 and 20 noted particular strengths in work on gender-based violence, cybercrime, international human rights, border control and crimmigration and the interface between crime control and wider forms of regulation. Sub-panel members observed a good amount of quantitative work, though small-scale studies appear to be in the ascendancy. There were some excellent ethnographies. Also, sub-panel members observed a number of positive attempts to link national and transnational issues. Sub-panel 21 took the position of not naming particular sub-areas as there were strengths across the submission, including much work that could be seen as criminology, but also could be seen simply as good sociology. This feature of the exercise endorses the idea of criminology being submitted to these three sub-panels (though not exclusively of course) where there is appropriate disciplinary and interdisciplinary expertise.

Audit

66. During the course of the assessment, the sub-panels instigated audits to verify specific information included in the submissions, in accordance with the arrangements set out in 'Audit guidance' (REF 2019/04), paragraphs 97-101. The majority of panel-instigated audits related to outputs. Technical issues (for example defective PDFs or queries on output type) accounted for the majority of the output-related audits. Otherwise, audits most commonly related to author contribution in multi-authored outputs and to the eligibility of the output.
67. Where members wished to validate an impact claimed in the impact case studies, an audit was raised to access the details of the corroboration. There was also a small number of panel-instigated audits about the eligibility or quality of the underpinning research in impact case studies. Those institutional responses, which directly addressed the sub-panel's query and did not simply repeat material that had already been submitted, were the most helpful.

Scrutiny of emerging outcomes

68. 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.
69. As the assessment period progressed, the main panel focused on the emerging assessment outcomes. The main panel examined sub-panel profiles (FTE-weighted and unweighted) overall and in the three elements of outputs, impact, and environment. Any substantial differences in profiles were explored to confirm that they reflected differences in the quality of material submitted rather than differences in the application of the criteria. This gave further reassurance of consistency across sub-panels in assessment practices.
70. REF 2021 is an assessment of research at the unit level not at the individual level, and sub-panel members did not have data on the characteristics of attributed authors for outputs. The sub-panels thus did not use or refer to equality and diversity information in relation to authorship of outputs. The REF team, working with the Equality and Diversity Advisory Panel (EDAP), are conducting an analysis of output grades, based upon characteristics of attributed staff members (with data on the characteristics of attributed staff drawn from the HESA staff record 2019/20). An initial version of this was made available to sub-panels towards the end of the assessment period. Main Panel C agreed that the preliminary data were reassuring in some areas but also but also raised important issues which require further analysis and investigation across the REF as a whole. The full analyses and discussion of these data will be published by the REF team later in 2022.
71. As a consequence of the processes described above, and in the sub-sections on quality assurance for outputs, impact and environment below, Main Panel C has full confidence in the robustness of the processes followed and the outcomes of the assessment in all its sub-panels.
72. The following sections present and comment on the profiles for each of the three elements of the assessment and summarise the approach of the main panel and sub-panels to quality assurance in relation to specific issues.



Section 4. Research outputs

73. Table 5 presents the FTE-weighted average output sub-profile for Main Panel C and the 12 sub-panels. This shows that 31.8 per cent of the outputs submitted were assessed as world-leading, with a range from 27.7 per cent to 38.0 per cent across the UOAs. The level of outputs judged to be world-leading and internationally excellent (77.7 per cent) is a welcome indication of the quality of research outputs across the subject areas represented by Main Panel C.
74. There was an increase in the percentage of research outputs awarded 4*, from 21.1 per cent in REF2014⁵ to 31.8 per cent in REF2021, bearing in mind the caveats above about these comparisons. There are increases at 4* level across all sub-panels, though of varying magnitude. The main panel noted that the increase in world-leading research outputs in part reflects changes in the rules since 2014 but more importantly that this indicates a flourishing research base from which outputs were selected by HEIs.
75. The main panel noted that research outputs assessed as world-leading are being produced by units of varying sizes and in many different institutions. 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 performing very well. Those units with the highest proportions of 4* in their outputs are by no means predictable on the basis of previous REF outcomes.
76. Main Panel C 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 and the involvement of international members who attested the appropriateness of the standards being adopted.
77. The main panel noted that there are different development trajectories across the UOAs within its remit, with submissions that included new entrants as well as multiple disciplines or subject areas. These profiles at UOA level therefore reflect significant variation at the level of individual submissions to UOAs, discussed in the sub-panel sections below.

⁵ Research Excellence Framework 2014: Overview report by Main Panel C and Sub-panels 16 to 26, 2015, table 4 <https://www.ref.ac.uk/2014/media/ref/content/expanel/member/Main%20Panel%20C%20overview%20report.pdf>

Table 5: Outputs Sub-Profiles for UOAs in Main Panel C (FTE weighted)

Unit of Assessment	Outputs (inc DW)	% 4*	%3*	% 2*	% 1*	% u/c
13 Architecture, Built Environment and Planning	3,706	29.8	53.6	12.7	3.7	0.2
14 Geography and Environmental Studies	4,482	34.4	49.5	14.9	1.1	0.1
15 Archaeology	1,209	36.0	47.7	15.2	0.9	0.2
16 Economics and Econometrics	2,232	36.1	56.2	6.5	0.9	0.3
17 Business and Management Studies	16,038	30.4	45.9	21.3	2.1	0.3
18 Law	5,867	35.0	39.1	23.3	2.4	0.2
19 Politics and International Studies	4,710	33.7	44.6	20.2	1.3	0.2
20 Social Work and Social Policy	5,158	27.7	47.2	21.1	3.7	0.3
21 Sociology	2,669	38.0	37.7	21.6	2.5	0.2
22 Anthropology and Development Studies	1,762	33.3	44.4	21.1	0.9	0.3
23 Education	5,278	29.8	38.1	23.7	7.6	0.8
24 Sport and Exercise Sciences, Leisure and Tourism	3,539	28.7	55.1	15.1	0.8	0.3
Main Panel C	56,650	31.8	45.9	19.4	2.6	0.3

Types of research output submitted

78. Table 6 shows the numbers and proportions of different types of research outputs submitted in each UOA. Journal articles are the largest single category across all the UOAs, accounting for 46,468 out of the 56,650 outputs (82 per cent). This was followed by authored books (6,631) and book chapters (2,375), but other outputs (for example, edited books, reports, databases, and physical artefacts) were also submitted. The main panel noted the very wide range of journals in which world-leading and internationally excellent research submitted had been published.
79. There was some variability across the sub-panels in the output types, reflecting disciplinary differences. A larger number of authored books were seen in UOA 18 (Law) (1,367) and UOA 19 (Politics and International Studies) (1,473). Authored books were least often submitted in UOA 16 (Economics and Econometrics) (9) and UOA 24 (Sport and Exercise Science, Leisure and Tourism) (55).

Table 6: Output Types for submissions to UOAs in Main Panel C (page 24).

80. Table 7 shows the number of outputs that were assessed as single and double-weighted in each UOA. There were 51,802 single-weighted outputs and 2,424 double-weighted. There was variation in the extent of double-weighting across the UOAs, with the highest proportionate use in UOA 19 (Politics and International Studies), in UOA 15 (Archaeology) and in UOA 21 (Sociology). The main panel noted that some submissions could have made more use of double-weighting with the option of a reserve output. This is discussed further in the sub-panel sections below.

Table 7 Single and Double weighted outputs in UOAs (page 24).

Table 6: Output Types for submissions to UOAs in Main Panel C

Unit of Assessment	13	14	15	16	17	18	19	20	21	22	23	24	MPC
A Authored book	269	388	303	9	222	1,367	1,473	727	781	406	631	55	6,631
B Edited book	49	7	95		9	30	14	38	6	86	21		355
C Chapter in book	168	44	101	8	110	984	129	258	107	77	377	12	2,375
D Journal article	3,046	4,029	698	2,128	15,565	3,401	3,071	4,030	1,754	1,156	4,122	3,468	46,468
E Conference contribution	22	6	4	1	42	4		7	1		15	3	105
K Design	113												113
N Research report for external body	22	3	1		25	43	6	84	11	8	87	1	291
U Working paper	2	3	1	86	58	31	9	6	2	7	7		212
Other Types	15	2	6	0	7	7	8	8	7	22	18	0	100
Total	3,706	4,482	1,209	2,232	16,038	5,867	4,710	5,158	2,669	1,762	5,278	3,539	56,650

Note that the letters are the Output Type codes as listed in the Guidance on Submissions, Annex K: Output glossary and collection formats for REF2 and REF3.

Table 7: Single and double weighted outputs in UOAs

Unit of Assessment	Single-Weighted Outputs	Double-Weighted Outputs	Total accounting for double-weighting	% Outputs double-weighted
13 Architecture, Built Environment and Planning	3,476	115	3,706	3.2%
14 Geography and Environmental Studies	4,162	160	4,482	3.7%
15 Archaeology	925	142	1,209	13.3%
16 Economics and Econometrics	2,228	2	2,232	0.1%
17 Business and Management Studies	15,958	40	16,038	0.3%
18 Law	4,851	508	5,867	9.5%
19 Politics and International Studies	3,582	564	4,710	13.6%
20 Social Work and Social Policy	4,730	214	5,158	4.3%
21 Sociology	2,079	295	2,669	12.4%
22 Anthropology and Development Studies	1,422	170	1,762	10.7%
23 Education	4,874	202	5,278	4.0%
24 Sport and Exercise Sciences, Leisure and Tourism	3,515	12	3,539	0.3%
Main Panel C	51,802	2,424	56,650	4.5%

% double-weighted calculated by (number of double weighted)/(number of double weighted + number of single-weighted)

Mode and focus of research outputs

81. Given the diversity of disciplines and topics found in Main Panel C, it was not surprising to find that a wide variety of modes of conducting research was reflected in the work submitted.
82. Outputs of world-leading quality were found across the full spectrum of topics, categories of outputs, and modes of research. They include outputs arising from theoretical, empirical, and applied research. There was no single mode of excellence in the research outputs submitted to UOAs within Main Panel C.
83. Main Panel C noted that there were excellent examples of outputs that made substantial contributions to the disciplinary development by focusing on theory. Such theoretical contributions also provide an important background to interdisciplinary research.
84. The empirical work submitted was frequently of a high standard, with excellent, rigorous empirical work found across the full range of qualitative and quantitative methodologies. The main panel welcomed the ongoing development of skills and rigour in research methodology, including in the secondary analysis of data and of data from longitudinal studies.
85. The main panel noted developments in the type and range of data used, with increased and more sophisticated use of 'big data' of different types and sources, including for example administrative data, socio-biological data and geo-physical data.
86. The growing importance of co-production in research was noted in the outputs submitted, including research drawing on participatory methods so that the research was designed and carried out in partnerships with a range of individuals, groups, organisations, and communities.
87. With such a diversity of content providing any sort of summary is challenging, with research addressing many issues of social, economic, political, and environmental concern in contemporary society. The research outputs submitted for assessment provided evidence of growing attention to issues of global importance and grand challenge, for example on global health and well-being, on social and economic equality/inequality, on inter-generational welfare, and on sustainability, including the challenges identified within the United Nations' Sustainable Development Goals.
88. There were examples of high-quality research operating across diverse scales (from local to global), bringing together different types of analysis. For some, this was facilitated through international collaborations as well as local partnerships, with research published in a wide range of places, and with contributions from multiple institutions within the UK and beyond, pointing to the scale and significance of the questions being asked, as well as the quality of the resulting research outputs.
89. The trend to multi-disciplinary and interdisciplinary research continues due to a growth in thematic or issue-based research, which draws on a common intellectual framework but does not fit obviously into any discipline. The main panel judged this to be a source of strength and evidence of a vibrant intellectual environment, in which new challenges or issues emerge and generate their own core literatures and data. As noted below, the main panel agreed that the structures put in place in REF 2021 to assess IDR research worked well, but the trajectory towards such research being mainstream in all sub-panels may have implications for the format of future research assessments.

Quality assurance of assessment of research outputs

90. Section 2 above reviewed the general processes of oversight and assurance. Here we focus on some specific issues relating to outputs.
91. One of the specific mechanisms by which the main panel assured itself that international standards had been applied to the assessment of outputs, was the involvement of international members in discussions of output calibration and grading. As noted in section 1 above, 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 and agreed that the outputs evaluated as world-leading and internationally excellent (4* and 3*) stand amongst the world's best in their originality, significance, and rigour.

Interdisciplinary research (IDR) outputs

92. Institutions were given the opportunity to flag outputs which they considered to be interdisciplinary research. There was a wide range of practice in the use of the IDR flag in the UOAs in Main Panel C. Thus, the IDR flag by itself was not the basis for decisions as to how to assess the outputs, which were made with specific reference to the IDR guidance and, where appropriate, with input from the IDR advisers. IDR outputs were usually assessed within the sub-panel. The IDR advisers agreed that there was significant IDR within Main Panel C, but fewer outputs crossing over main panels.
93. The main panel is confident that interdisciplinary outputs were judged consistently with other outputs and in accordance with the 'Panel criteria and working methods'. Outputs were neither advantaged nor disadvantaged by the use of the IDR flag. Irrespective of flagging inconsistencies, the sub-panels noted the frequency and vitality of interdisciplinary and multi-disciplinary approaches.

Double-weighted outputs

94. Institutions were given the opportunity to request double-weighting of outputs of extended scale and scope. Sub-panels within Main Panel C received double-weighting requests for around 4.5 per cent of the material submitted, compared with less than 2 per cent of outputs in REF2014⁶.
95. Requests for double-weighting were assessed separately from the assessment of quality. The majority of requests were for authored books. Sub-panels used the specified criteria to determine whether a request for double-weighting could be accepted. Virtually all (98%) requests for double-weighting were accepted by the sub-panels. 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 made a judgement. Audit was used where appropriate for further information. Where a request for double-weighting was not accepted, the reserve output was assessed, if one had been submitted. Outputs were assessed in line with the published criteria regardless of weighting.

Multi-authored outputs

96. The main panel noted that there was a significant increase in the number of outputs submitted with multiple authors (in some cases running into several hundred co-authors). These were assessed according to the guidance in the 'Panel criteria and working methods'. Where there were queries about the contribution of the member of staff to whom the output was attributed in the submission, audit requests were raised.

⁶ Research Excellence Framework 2014: Overview report by Main Panel C and Sub-panels 16 to 26, 2015 <https://www.ref.ac.uk/2014/media/ref/content/expanel/member/Main%20Panel%20C%20overview%20report.pdf>

97. The main panel noted that this was a growing phenomenon of research collaboration and activity and felt that there could usefully be more detailed guidance to institutions on explaining the significance of a co-author's contribution to the research output in any future research assessment exercise, to encourage such co-operation while recognising the level of rigour and research needed for different types of output. Journal statements of authorship are not necessarily sufficient for REF purposes. The use of standard taxonomy, for example the Contributor Roles Taxonomy (CRediT) should be considered for the future.

Outputs submitted by early career researchers (ECRs)

98. The main panel received an initial analysis of the output grades for ECRs and noted that across Main Panel C as a whole there was little or no apparent difference in the quality profile for outputs submitted by ECRs compared with the overall outputs sub-profile. The EDAP report will include further analysis. The main panel noted that the changes in the submission rules facilitated inclusion of ECRs and that this is a positive development in terms of academic career progression.

Other output assessment issues

99. Some research outputs were received for assessment by sub-panels which they felt to be outside the boundaries outlined in the UOA descriptors contained in the 'Panel criteria and working methods'. Access to cross-referral advice was found to be helpful in assessing this work and in determining the grade awarded.

100. The 'Panel criteria and working methods' provided guidance to sub-panels on the requirement of additional information for outputs with significant material in common with 2014, that is where two or more research outputs within a submission include significant material in common or where a submitted output included significant material in common with an output submitted to REF2014. Where adequate information was provided, sub-panels used their judgement to assess this and where this was not possible, they sought further information via audit.

101. The majority of the very small number of unclassified grades related either to outputs judged to be ineligible (for example outside the publication dates including some, which had been submitted to REF 2014), or which did not meet the criteria for research, or which did not offer sufficient confirmation of the research contribution of the attributed author. This was confirmed by audit, as necessary. Very few outputs were assessed as unclassified because they did not meet the quality threshold for the 1* grade.



Section 5. Impact Case Studies

102. A number of changes have been made to the submission and assessment of impact since REF 2014, including broadening guidance on impact, incorporation of the impact template into the environment statement, extending the boundaries for allowable teaching impact, and submission of continued case studies. Main Panel C contributed to the preparation of 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.
103. The 12 sub-panels within Main Panel C received a total of 2,260 impact case studies for assessment. Table 8 shows that this varied from 61 in UOA 15 (Archaeology) to 539 in UOA17 (Business and Management). The main panel noted some effects due to the different numbers of impact case studies being required from submitted units (for instance, a 4* case study, when one of two, contributed 12.5 per cent to the final profile, but only 6.25 per cent when one of four case studies). For any future REF, there should be further consideration of the effect of the requirements for the number of impact case studies for HEIs submitting for the first time and for small submissions.
104. Table 8 also shows the FTE-weighted average impact sub-profile for each UOA in Main Panel C, together with the FTE-weighted average sub-profile for the main panel as a whole. The majority of the impact case studies (84.3 per cent) submitted were assessed as either delivering outstanding or very considerable impact in terms of their reach and significance.
105. There was an increase in the percentage of impact grades at 4*, from 39.1 per cent in REF2014⁷ to 44.8 per cent in REF2021. Bearing in mind the caveats about these comparisons, the main panel noted that the case studies submitted represent an impressive impact of HEI research in Main Panel C on all sectors of society, influencing policy at local, national and international levels, working with businesses on new products and approaches, and engaging the public directly and in partnership with others.
106. In addition, in many submissions the sub-panels noted improvements in the presentation of case studies which indicated planning and HEI support to achieve external impact is becoming an everyday component of much academic research.
107. Very few impact case studies were unclassified. Usually, this was because the underpinning research was judged not to meet the 2* quality threshold or in rare cases the submission did not include the required numbers of impact case studies.

⁷ Research Excellence Framework 2014: Overview report by Main Panel C and Sub-panels 16 to 26, 2015, table 7 <https://www.ref.ac.uk/2014/media/ref/content/expanel/member/Main%20Panel%20C%20overview%20report.pdf>

Table 8 Impact Case Studies profiles by UOA (FTE weighted)

Unit of Assessment	ICSS	% 4*	%3*	% 2*	% 1*	% u/c
13 Architecture, Built Environment and Planning	131	49.2	39.4	9.7	1.7	0.0
14 Geography and Environmental Studies	185	41.7	43.3	10.5	3.9	0.6
15 Archaeology	61	59.8	32.7	5.9	1.6	0.0
16 Economics and Econometrics	91	42.6	43.5	10.4	2.6	0.9
17 Business and Management Studies	539	41.7	42.8	13.4	2.1	0.0
18 Law	244	50.2	32.2	16.2	0.7	0.7
19 Politics and International Studies	191	41.9	50.1	7.8	0.2	0.0
20 Social Work and Social Policy	225	42.3	34.6	18.3	4.8	0.0
21 Sociology	115	43.9	39.4	15.7	1.0	0.0
22 Anthropology and Development Studies	78	45.8	38.8	14.7	0.7	0.0
23 Education	232	51.1	29.0	14.3	4.8	0.8
24 Sport and Exercise Sciences, Leisure and Tourism	168	44.1	40.8	13.6	1.5	0.0
Main Panel C	2,260	44.8	39.5	13.2	2.3	0.2

Mode and focus of research impact

108. The case studies provided strong evidence of the contribution of social sciences, and the other disciplines covered in Main Panel C. They included a wide range of beneficiaries and significant contributions to social, economic and environmental welfare in the UK and internationally; to public discourse and understanding; to professional practice; and to policy making by institutions, companies and civil society organisations. Details of types of impact are found in the sub-panel sections below but included case studies in all potential categories set out in Annex A of the 'Panel criteria and working methods', with a strong focus on impact on health and wellbeing, social welfare, public policy, the economy, professional practice, and environment.
109. As in REF 2014, the main and sub-panels were highly impressed by the range of types of impact found in submissions within Main Panel C, by the extent of the beneficiaries, and by the many ways that research is making a difference outside academia to a wide spectrum of organisations, groups and individuals, within and beyond the UK.
110. The main panel welcomed the broadened understanding of impact and ways in which research has underpinned impact. The sub-panels observed that this provision allowed submitted units to recognise the contribution of a wider range of activities than in REF2014, noting that impact did not have to be transformative in order to meet the criteria for the highest grades.

111. Sub-panels identified outstanding impacts, in terms of their reach and significance, in case studies from across submissions of differing size. They included case studies based on the work of one or two main researchers as well as collaborative and co-produced projects. There was evidence of both direct and indirect relationships between the research and the impact, of iterative and non-linear relationships between research and impact, of planned and of unanticipated impacts. There was, in short, a diversity of successful routes to significant impact.
112. A range of research modes, including individual, collaborative, and international, generated high quality impact. Outstanding quality was found across the different impact types and beneficiaries, including examples of challenging the status quo and influencing the terms of debate and public opinion, including through public engagement, as reflected in the attached sub-panel reports, and there were also examples of impact case studies that focused on teaching in HE.
113. The main panel was pleased to note that in many submissions there has been a continuing commitment of resources and investment to enable staff to develop and engage in impact activities, reflecting a maturation of impact strategies in institutions. Research funders have been seen to increasingly require clear impact strategies and plans. Ongoing collaborations between academic and external partners had thus evolved from REF2014. The contribution of research users to providing evidence and testimonials for impact case studies was noted and appreciated.
114. The main panel observed that a number of units had built on their experience of preparing impact case studies for REF 2014, 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. It was noted that case studies judged to have outstanding or very considerable impact were found across both experienced and new entrants.

Quality assurance of assessment of impact

115. The integration and contribution of the impact members on the main panel, and of the user members and assessors on sub-panels, were invaluable. Calibration exercises and the attendance of main panel members at sub-panel meetings, 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. This was a clear strength of the process, despite the challenges of virtual working.
116. In REF 2014, the impact element included impact case studies and a template, setting out the approach to impact. There was no separate impact template in REF 2021 and the approach to impact was integrated into the environment element of the assessment (see further discussion below).
117. The case study template required submitted units to specify underpinning research and provide evidence that the underpinning research, overall, was predominantly of at least 2* quality. Generally, sufficient evidence was provided. Where there were concerns as to whether 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. The introduction of required fields for submitted units to provide key information about the eligibility of the case study was noted as a positive measure.

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118. 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. Note was taken of Covid-19 statements, where these addressed implications for impact case studies.
 119. Case studies continued from cases submitted in REF 2014 were eligible for submission in REF 2021. Main Panel C did not receive information on how any continued case studies related to those submitted in REF 2014 and assessed each case study on its merit.
 120. The main panel observed case studies submitted in a different UOA to the individuals who conducted the underpinning research, noting that this was appropriate only where the underpinning research was demonstrably within the scope of the UOA in which the case study was submitted.
 121. The sub-panels noted challenges in providing evidence. The links between the research and the impact were not always clear in those impact case studies that described, and made claims, across a wide range of impacts. The challenges in obtaining evidence in the context of Covid-19 restrictions were acknowledged by the sub-panels. There were also some challenges in assessing impact case studies where there was a lack of clarity in identifying the beneficiaries of the impact. In cases where this was vague and/or overstated, the impact was more difficult to assess. Audit was used for verification, as appropriate.
 122. For the first time, HEIs were invited to submit impact evidence at the point of submission. There was mixed take up of this option, but the main panel observed that where evidence was submitted, this significantly sped up the assessment process and reduced the audit workload. Many sub-panels expressed a preference for in future having routine access to all items of impact evidence to support the assessment process.
 123. The assessment of impact case studies requiring security clearance raised some issues in ensuring equitable assessment. These were resolved, but the main panel agreed that for any future exercise the sub-panel chairs should be put forward for security clearance if there are any confidential impact case studies submitted to the sub-panel.
 124. As the sub-panels assessed submissions, the main panel kept under review the average impact sub-profiles being awarded in each UOA and the emerging impact quality sub-profiles at a main panel level.



Section 6. Research environment

125. Table 9 presents the weighted average environment sub-profile for each UOA in Main Panel C and for the main panel as a whole. Overall, 42.9% of the activity assessed in the research environment was conducive to supporting research of world-leading quality and enabling outstanding impact. This is a small increase from the 39.9 per cent in REF2014⁸, reflecting continuing strength and development of systems of support for research and research impact.

126. In general, the research environments assessed by all the sub-panels demonstrated significant vitality and sustainability, across very different missions and scale of activity.

Table 9: Environment Sub-Profiles for UOAs in Main Panel C (FTE weighted)

Unit of Assessment	Environment Templates	% 4*	%3*	% 2*	% 1*	% u/c
13 Architecture, Built Environment and Planning	37	52.0	40.5	7.2	0.3	0.0
14 Geography and Environmental Studies	56	40.2	43.2	13.9	2.7	0.0
15 Archaeology	24	62.4	29.6	5.7	2.3	0.0
16 Economics and Econometrics	25	55.8	39.7	4.3	0.2	0.0
17 Business and Management Studies	108	42.4	40.7	15.0	1.9	0.0
18 Law	69	34.9	45.3	17.0	2.8	0.0
19 Politics and International Studies	56	41.7	49.5	8.5	0.3	0.0
20 Social Work and Social Policy	76	37	35.8	23.5	3.6	0.1
21 Sociology	37	41.0	38.3	15.6	4.7	0.4
22 Anthropology and Development Studies	26	60.3	37.5	2.2	0.0	0.0
23 Education	83	45.1	27.5	17.1	9.9	0.4
24 Sport and Exercise Sciences, Leisure and Tourism	61	37.5	39.2	19.5	3.7	0.1
Main Panel C	658	42.9	39.9	14.3	2.8	0.1

⁸ Research Excellence Framework 2014: Overview report by Main Panel C and Sub-panels 16 to 26, 2015, table 8 <https://www.ref.ac.uk/2014/media/ref/content/expanel/member/Main%20Panel%20C%20overview%20report.pdf>

Quality assurance of assessment of environment

127. The main panel considered the emerging FTE-weighted average environment sub-profiles in each UOA. It also considered the pattern of grades that each sub-panel was assigning to the environment submissions, without weighting them by FTE, as the weighting amplifies the contribution of relatively large submissions. The main panel is confident that the judgements made by the sub-panels about environment are robust and appropriate, following the 'Panel criteria and working methods'.
128. 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. These sections are discussed in turn below. Grading using a nine-point scale in each of the four sections meant that the majority of submissions received a distributed quality sub-profile for environment.
129. In general, strong submissions provided better evidence of the claims made. Some submissions did not supply sufficient information on the unit's approach or activities under each of the four assessed headings to enable them to achieve the higher quality assessments.
130. REF 2021 also included an institutional level environment statement (REF5a) and an optional Covid-19 annex. The best of these provided good context for and an overview of the institutional mission for the assessment of REF5b. In general, the main panel was not convinced that the inclusion of institutional statements offered a great deal of additionality to the established approach of a unit-level environment statement. The Covid-19 annex evidenced that the impact of Covid-19 had been similar across all submissions. The main panel noted that it is highly likely that the impact of Covid-19 will be even more evident in the next assessment exercise.

Environment templates

131. 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.
132. The sub-panels considered the data alongside the narrative environment templates to provide context of the size and type of institution, to scrutinise and verify claims made. They found the data to be a useful indicator of achievement over the period.
133. Sub-panels found persuasive evidence of high-quality research environments in many submissions. The very best research environments were judged to be entirely or almost entirely conducive to producing research of world-leading quality and enabling outstanding impacts in terms of vitality and sustainability.
134. The submissions were diverse in their research structures and trajectories. They included well-established research units with previous submissions to their sub-panel, some research areas located in wider interdisciplinary units, which may have been submitted under different UOAs in the past, and some new entrants making a first submission to REF 2021. The latter were acknowledged to be in a difficult position, as even significant investments may take time to deliver a strong environment for

research. However, examples of highly-graded environments for research were found across the board, and the main panel was pleased to note both consolidation of existing strengths and emerging research cultures with future potential.

135. Advice on the assessment of equality and diversity issues was provided by the Equalities and Diversity Assessment Panel (EDAP). Approaches to promoting equality, diversity and inclusion in the HEIs were found to be variable across submissions. In the strongest submissions, there was evidence that policy and practice to promote equality of opportunity were embedded in institutions and units, with honesty about challenges and examples of good practice. Some submissions referred to institutional level policy without specifying the implementation of equality and diversity policies at unit level. There was also variability in the extent to which submissions discussed equality and diversity issues in the process of developing their REF submissions.
136. The main panel welcomed the increased attention to equality and diversity in HEIs but also noted that there remained gaps and that in some areas progress was slow.
137. The unit's approach to enabling impact was included in the environment template. The strongest submissions included impact across all points of the research strategy and provided support, training and resources to develop external partnerships and relationships. As noted above, there was evidence that HEIs were investing more in impact, providing funding and staff time for training and engagement. This was helpful to the development of ongoing partnerships, with the best practices showing an awareness of the need for time and sensitivity in developing relationships. Impact activities were also supported by the requirement for the inclusion of pathways to impact in some research grant applications.
138. The main panel noted that the strongest environments included good use of outward-facing benchmarking, such as Athena SWAN, the Concordat to Support the Career Development of Researchers, UKRI Open Access Policy, the San Francisco Declaration on Research Assessment (DORA) and the Leiden Manifesto for Research Metrics. These were judged as most effective for the research environment where they were embedded into structures and everyday practices

Strategy

139. Strong submissions reflected on changes and achievements since REF 2014, discussing any obstacles encountered during the assessment period. They also demonstrated how institutional support was applied in the submitted 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 submitted unit. Submissions, which graded less well in the strategy section were lacking in evidence for strategy implementation and measures of success. The main panel noted that there was a tendency in some environment templates to stress interdisciplinarity, but without providing evidence to support this.
140. Some sub-panels noted that some submissions were grouped around research themes rather than departmental or research centre groupings. This may reflect the increasing focus on interdisciplinary or multi-disciplinary approaches and the focus of some research funders towards large-scale funding, designed to address major research questions.

People

141. 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. There were 3,883 staff flagged as ECRs, making up about 16 per cent of staff submitted in Main Panel C. This represents a slight fall compared with REF 2014 when ECRs were about 19 per cent of submitted staff. The main panel was pleased to note many examples of good practice in the integration of ECRs and the opportunities for development available to them.

142. Postgraduate research students (PGRs) have also been 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. 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 submitted unit, recognising that a strong postgraduate community made a key contribution to the vitality and sustainability of a submitted unit. Main Panel C was encouraged by the increased provision for professional doctorates, with some using such programmes to enhance pathways to impact.
143. Table 10 shows that there was a total of 38,533 doctoral completions between 2013/14 and 2019/20. There were no consistent trends year-on-year although in general annual doctoral completions were higher towards the end of the time period than at the start, with a slight reduction between 2018/19 and 2019/20. Table 10a shows doctoral completions per FTE were between 0.21 in 2013/14 and 0.24 in 2019/20, with UOA 15 (Archaeology), UOA 22 (Anthropology and Development Studies), and UOA 23 (Education) with the highest completions per FTE.

Table 10: Doctoral Degrees Awarded by Year by UOA in Main Panel C

Unit of Assessment	2013 -14	2014 -15	2015 -16	2016 -17	2017 -18	2018 -19	2019 -20	Total
13 Architecture, Built Environment and Planning	297	353	359	394	402	385	366	2556
14 Geography and Environmental Studies	386	428	419	436	479	448	454	3,051
15 Archaeology	162	158	188	195	161	190	137	1,189
16 Economics and Econometrics	207	218	165	216	245	189	186	1,427
17 Business and Management Studies	1,171	1,220	1,294	1,362	1,412	1,433	1,308	9,200
18 Law	368	426	445	440	495	496	458	3,129
19 Politics and International Studies	447	524	475	497	511	498	462	3,413
20 Social Work and Social Policy	350	381	376	364	439	419	423	2,751
21 Sociology	286	280	291	271	284	296	291	1,997
22 Anthropology and Development Studies	269	263	248	281	272	241	213	1,786
23 Education	774	846	835	890	906	938	965	6,155
24 Sport and Exercise Sciences, Leisure and Tourism	221	255	228	272	249	335	321	1,881
Main Panel C	4,937	5,353	5,321	5,617	5,855	5,868	5,582	38,533

Note that numbers reported are rounded to the nearest whole number

Table10a: Doctoral Degrees Awarded by Year per FTE

Unit of Assessment	2013 -14	2014 -15	2015 -16	2016 -17	2017 -18	2018 -19	2019 -20
13 Architecture, Built Environment and Planning	0.19	0.23	0.23	0.26	0.26	0.25	0.24
14 Geography and Environmental Studies	0.21	0.23	0.23	0.23	0.26	0.24	0.24
15 Archaeology	0.33	0.32	0.38	0.39	0.32	0.38	0.27
16 Economics and Econometrics	0.23	0.24	0.18	0.24	0.27	0.21	0.20
17 Business and Management Studies	0.18	0.18	0.20	0.21	0.21	0.22	0.20
18 Law	0.15	0.17	0.18	0.18	0.20	0.20	0.18
19 Politics and International Studies	0.23	0.27	0.24	0.25	0.26	0.25	0.24
20 Social Work and Social Policy	0.17	0.18	0.18	0.17	0.21	0.20	0.20
21 Sociology	0.26	0.25	0.26	0.25	0.26	0.27	0.26
22 Anthropology and Development Studies	0.37	0.36	0.34	0.38	0.37	0.33	0.29
23 Education	0.36	0.39	0.39	0.41	0.42	0.43	0.44
24 Sport and Exercise Sciences, Leisure and Tourism	0.15	0.18	0.16	0.19	0.17	0.23	0.22
Main Panel C	0.21	0.23	0.23	0.24	0.25	0.25	0.24

144. Equality and diversity issues were key elements in the people section. As noted above, there were excellent submissions that showed the unit and the institution working in complementary ways. However, there were also submissions which showed little evidence of progress and a lack of ownership of the agenda within the unit as opposed to the institution. Issues of gender were in general addressed in more detail, both in terms of data and actions, than other protected characteristics. There were some gaps in inclusion of ECRs and PGRs in equality and diversity initiatives and variable information provided on inclusion of other members of the unit (for example technical staff and research managers).

145. The sub-panels noted that some submissions included staff on fractional appointments, often fixed-term over the REF census date, but their contribution to the vitality and sustainability of the submitted unit was not always well evidenced.

Infrastructure, income and facilities

146. 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 submitted units were not limited to physical space and equipment, but included other non-physical facilities such as digital resources, datasets, archives and computing capacity.

147. Submissions provided strong evidence of success in attracting external funding for research, with total research income over the period of about £3.7 billion as shown in table 11. This includes some income-in-kind (£21.553 million), which includes staff resource, time allocated to use of equipment, spaces and other resources.

148. The average annual research funding from 2015/16 to 2019/20 ranged from about £25 million for UOA 18 (Law) to almost £87 million for UOA 14 (Geography and Environmental Studies). From 2013/14 to 2019/20, the average annual research income per FTE was £22,521, ranging from £9,586 per FTE in UOA 18 (Law) to £60,010 per FTE in UOA 15 (Archaeology).

Table 11: Research Income (£000s) by Year and FTE for UOAs in Main Panel C (page 38).

149. Submissions provided strong evidence of success in drawing on a wide range of peer-reviewed and internationally competitive funding sources. As Table 12 shows, Research Councils, EU funding and UK government were important sources. The sub-panels welcomed the positive effects of large-scale funding from these national and international research funding agencies. There was evidence that this has enabled ambitious and large-scale collaborations, nationally and internationally, enabling teams of researchers to contribute to addressing the biggest societal challenges.

Table 12: Research Income (£000s) by Source for Main Panel C

	2013/14	2014/2015	Annual average 2015/2020	Total (£000s)
BEIS Research Councils, Royal Society, British Academy, Royal Society Edinburgh	155,954	152,709	184,560	1,231,465
UK-based charities (open competitive process)	33,001	39,534	45,766	301,363
UK-based charities (other)	10,461	11,640	12,981	87,006
UK central govt bodies/local and health authorities	78,203	80,901	93,667	627,440
UK central govt tax credits for R&D expenditure	0	21,930	2,306	33,458
UK industry, commerce, and public corporations	27,875	29,787	33,856	226,941
UK other sources	9,740	10,118	8,641	63,062
EU government bodies	90,733	93,929	105,100	710,163
EU-based charities (open competitive process)	1,229	1,072	2,019	12,394
EU industry, commerce, and public corporations	3,235	3,086	4,367	28,156
EU (excluding UK) other	6,985	7,808	9,436	61,975
Non-EU-based charities (open competitive process)	8,481	12,133	13,956	90,396
Non-EU industry commerce and public corporations	5,011	6,022	6,586	43,962
Non-EU other	21,920	20,262	23,104	157,701
Income in kind	1,781	2,842	3,386	21,553
Main Panel C totals	454,608	493,769	549,731	3,697,034

Note that due to changes in financial reporting requirements for financial years 2015-16 to 2019-20 only the average across those five years is reported, to avoid giving misleading trends.

Note that the definitions of the various sources are according to HESA definitions of research income in the Finance Record, Table 5, see: <https://www.hesa.ac.uk/data-and-analysis/finances/table-5>

Table 11: Research Income (£000s) by Year and FTE for UOAs in Main Panel C

Unit of Assessment	2013	2014	Annual average		Total	2013	2014	Annual average		Total
	-14	-15	15-16 to 19-20	13-14 to 19-20		-14	-15	15-16 to 19-20	13-14 to 19-20	
	Income (£000s)					Income per FTE				
13 Architecture, Built Environment and Planning	44,519	47,058	49,762	48,626	340,385	29,147	30,808	32,579	31,835	222,848
14 Geography and Environmental Studies	73,186	78,203	86,920	83,713	585,991	39,463	42,167	46,868	45,139	315,970
15 Archaeology	24,933	31,006	30,554	29,815	208,708	50,183	62,407	61,496	60,010	420,071
16 Economics and Econometrics	24,706	23,496	28,534	27,267	190,871	26,869	25,553	31,031	29,654	207,577
17 Business and Management Studies	65,153	69,536	79,190	75,805	530,637	9,822	10,483	11,938	11,428	79,993
18 Law	19,316	21,091	25,385	23,905	167,334	7,746	8,457	10,179	9,586	67,100
19 Politics and International Studies	30,659	33,852	40,060	37,830	264,812	15,628	17,255	20,420	19,283	134,983
20 Social Work and Social Policy	46,038	48,807	55,348	53,083	371,584	21,868	23,184	26,290	25,215	176,504
21 Sociology	30,625	36,626	41,538	39,277	274,939	27,752	33,189	37,640	35,592	249,143
22 Anthropology and Development Studies	29,247	30,549	32,460	31,728	222,095	39,876	41,652	44,257	43,259	302,813
23 Education	47,653	54,228	56,827	55,145	386,015	21,976	25,009	26,207	25,431	178,020
24 Sport and Exercise Sciences, Leisure and Tourism	18,572	19,317	23,155	21,952	153,662	12,782	13,295	15,937	15,109	105,761
Main Panel C	454,608	493,769	549,731	528,148	3,697,034	19,385	21,055	23,442	22,521	157,649

Note that due to changes in financial reporting requirements for financial years 2015-16 to 2019-20 only the average across those five years is reported, to avoid giving misleading trends. These figures include Income-in-kind.

Collaboration and contribution to the discipline

150. In assessing collaboration and contribution to the discipline, sub-panels noted that simple lists of activities were not in themselves impressive. They were keen to understand the nature of the contribution made by these activities to the wider discipline. Examples of excellent contribution to the disciplines included theoretical and methodological innovations as well as service to the community and collegiate activities.
151. Some sub-panels included professional and applied areas as central to their activities, alongside teaching and research. Strong submissions were able to show how these were complementary and mutually supportive.
152. There was evidence that scholars were collaborating more extensively, with a greater diversity of approach, a wider range of partnerships and the adoption of new methodologies to address major research questions. The many examples of international partnerships and contributions indicate that UK social sciences, and the other disciplines submitted to Main Panel C, are key global players.



Concluding remarks

153. A national assessment of research in HEIs is a major undertaking at the best of times and the REF 2021 exercise was not without challenges, not least in adapting to the changes to the timetable and format of meetings brought about by the Covid-19 pandemic and its impact on individuals. That the assessment was completed on time is a tribute to the commitment of many people. The main panel agreed that REF as a process of peer review provides a robust way to assess research quality.
154. There were some important changes in the rules since 2014 and in how HEIs responded to these. The submissions in Main Panel C were diverse in mission, in size, and included both well-established and newer units. Many different routes to, and patterns of, excellence were identified within the submissions.
155. The outcomes show that research in the social sciences, and other disciplines covered by this main panel, continues to produce outputs of world-leading quality, with a wide range of types of impact, with vibrant research environments well connected nationally and internationally. Maintaining and expanding this research base will be essential to enable the continuing development and enhancement of this important contribution to our society.
156. The sub-panel sections provide detailed discussion of processes and outcomes for each of the 12 UOAs in Main Panel C.



Sub-panel 13: Architecture, Built Environment and Planning

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	29.8	53.6	12.7	3.7	0.2
Impact	49.2	39.4	9.7	1.7	0
Environment	52	40.5	7.2	0.3	0
Overall	38	48	11	3	0

Summary of submissions

1. UOA13 (Architecture, Built Environment and Planning) received 37 submissions, comprising a headcount of 1,636 and an FTE of 1,527.43, of whom 244 FTE (16%) were early career researchers. While the number of submissions has reduced by eight when compared to REF 2014, there was an overall increase of 502 FTE staff in REF 2021. The submission size also varied widely in the UOA, ranging from 6.20 to 290.69 FTE, and 46.5% of staff submitted were concentrated in seven institutions.
2. The sub-panel received and assessed a total of 3,706 outputs, 131 impact case studies and 37 environment templates. 2,556 doctoral degrees were awarded during the assessment period, which was an increase of 83 awards per annum when compared to REF 2014. The average annual research income generated by the UOA during the assessment period was £48,617,174, representing a 9.4% increase from REF 2014.

Sub-panel membership and expertise

3. The sub-panel consisted of 22 full panel members, of whom 18 were academic members and four were user members, with a further appointment of six output assessors and three impact assessors to ensure good coverage of all aspects of the assessment. One additional joint output assessor was appointed who worked across this sub-panel and Sub-panel 32 (Art and Design: History, Practice and Theory). The appointment process took both gender and ethnicity balance into account. Of the sub-panel members, nine were female and four were from ethnic minority groups, and eight had served on REF 2014 offering continuity in terms of experience and working methods. The sub-panel was excellently supported by the sub-panel adviser and secretary throughout the assessment phase to accomplish challenging tasks and complex processes amidst Covid-19 restrictions and online meetings.
4. The main areas of competence covered by the sub-panel members included: Architecture (practice and design; theory and culture; history); Building and Construction (building surveying, science and engineering; construction materials, management and IT); Climate Change, Environment and Energy (disaster resilience; energy; technical and assessment;

policy and governance); Housing and Regeneration (housing; social, community and physical regeneration); Landscape (architecture and design; natural resources; ecosystems); Planning (policy and practice; theory and governance; urbanisation and development; history; methods and analysis); Real Estate (residential and commercial; investment; market analysis and modelling); and others (e.g. development studies, rural planning and development, transport studies). The sub-panel membership was sufficiently broad to cover the submitted research in these areas.

Process and working methods

5. Assessment of all elements in the submissions was subject to oversight by Main Panel C. This included calibration, moderation and audit of assessments, as specified in the 'Panel criteria and working methods' and as reported in the Main Panel Overview Report. During different stages of the assessment process, calibration exercises were conducted at main and sub-panel levels, as well as across main panels, to achieve consistency. The sub-panel closely monitored the emerging profiles for disciplinary sub-areas to ensure that any differences reflected a genuine variation in quality. Additional calibration and moderation exercises were carried out for each element in the assessment.
6. Equality and diversity issues were considered during the recruitment of sub-panel members, in all meetings and in all aspects of the assessment process. All members of the sub-panel participated in REF training workshops on equalities and diversity and unconscious bias. A bespoke equality and diversity Fairness in REF Intention Plan was agreed by the sub-panel at the outset of the assessment stage, which was reviewed throughout the process, to guide the approach and good practice of sub-panel members for each element of the assessment.
7. The allocation of research outputs for assessment was expertise-led. All outputs were double-read and graded independently by the pairs of sub-panel members/assessors and agreed grades were subject to moderation at sub-panel level. The allocation software supplied by the REF team was used for the initial allocation by matching output disciplinary codes with assessor expertise level. The final allocation was confirmed by the sub-panel chair and deputy chair by checking conflicts of interest and workload distribution. Outputs were initially assessed on a 13-point scale to provide fine-grained assessment, before consolidating to the final five-point grades. In most cases the grades of the two assessors were in close alignment; in the few situations where agreement could not be reached, a third or even fourth assessor was called upon. Where institutions had requested cross-referral to another sub-panel and/or where the sub-panel felt that it lacked the relevant expertise, outputs were either cross-referred for advice or jointly assessed with another UOA. Assessment of these outputs was overseen by the sub-panel's two interdisciplinary advisers.
8. Each impact case study was allocated to two academic and one user member/impact assessor, based on subject expertise. Case studies were graded on a nine-point scale by the allocated readers and were then discussed by the three broad subject groups to arrive at a proposed grade. The recommended grade was reported and discussed in plenary sessions by all non-conflicted members/assessors to arrive at an agreed grade. Grading patterns by different subject groups across different grade bands were monitored and discussed in plenary sessions to assure rigour and consistency in assessment.

9. Three academic members and one user member assessed each environment template. The assessment followed the 'Panel criteria and working methods' by taking account of the institution-level statement and being informed by the metric data submitted. Individual grades for the four sections of the template were compiled and the recommended grades for each submission were discussed in plenary session by all non-conflicted members prior to agreeing the recommended environment profile for the submission.

Comments on the work submitted for assessment

Outputs

10. UOA 13 is an interdisciplinary sub-panel, as reflected in the diverse nature of the submitted outputs in terms of research concepts, methodologies and forms of output. These spanned from the physical and natural sciences and engineering, through social sciences, to humanities and practice-based arts. Compared to REF 2014, the UOA observed a continuous expansion of its footprint through a clear trend of internationalisation of research especially related to China and locations in the Global South, as well as in topic areas stretching beyond the disciplinary boundaries of the UOA. A high proportion of the submitted outputs was assessed as being of world-leading (29.8%) and internationally excellent (53.6%) quality.
11. Virtually all sub-disciplines demonstrated world-leading research, in terms of originality, significance and rigour. Such strengths were particularly evident in architectural history research, technical environment assessment, spatial analysis, real estate market analysis, building and construction engineering, planning theory and governance, environmental policy and governance, and landscape architecture and design. The flexibility of selecting between one and five outputs per submitted staff and increasing standards in research have resulted in improvement in the quality profile for outputs in the UOA compared to REF 2014.
12. Outputs which were graded less highly tended to be those with weak conceptual framing, a lack of engagement with wider literature, a lack of robust methodology (for example, poorly executed case studies or surveys), unsubstantiated assertions and a failure to articulate their research contribution. With increasing attention to big data, there was an increase in submitted outputs that presented these data. However, some outputs did not pay sufficient attention to how such data could be interrogated to address research questions and therefore made limited contribution to knowledge development.
13. Over 80% of submitted outputs were peer-reviewed journal articles and there was a small volume of work in the form of authored and edited books, book chapters, and design outputs, as demonstrated in Table 2 below. Excellence was found in virtually all output types. While publication through any given output type was no guarantee of excellence, authored books and edited books of extended scale and scope performed particularly well in terms of attaining world-leading quality.

Table 2: Outputs Types assessed (factoring in double weighting)

Authored Book	Edited Book	Chapter in Book	Design & artefact	Journal Article	Conference Contribution	Report	Other
7.3%	1.3%	4.5%	3.1%	82.2%	0.6%	0.6%	0.4%

14. The sub-panel received double-weighting requests for 118 outputs and the vast majority of these met the criteria of extended scale and scope for double-weighting and were thus accepted. While double-weighting requests were largely associated with authored books, requests were also found in a range of other output types including edited books and design projects.
15. Many of the outputs had an interdisciplinary character, whether or not they were flagged as such by the submitting institutions. A total of 295 outputs (8%) were flagged by the submitting institutions as interdisciplinary in the UOA, of which the large majority (89%) were across sub-disciplinary fields within the UOA. Nearly half of these flagged outputs were closely associated with architecture, building and construction, and planning research areas. A large volume of interdisciplinary research was aimed at addressing global challenges of poverty and well-being, urban issues, sustainable development, carbon reduction and climate resilience. A small proportion of outputs flagged as interdisciplinary covered areas broader than the sub-panel's expertise. In these cases, either joint-assessment or cross-referral was carried out with engineering, science, and other social science UOAs.
16. The sub-panel acknowledged improvements made in REF 2021 in handling cross-referrals and joint-assessments across UOAs, when compared to the last REF. Just over 4% of the submitted outputs from UOA 13 were cross-referred and a small number of outputs were jointly assessed with other UOAs. The recommended grades of these cross-referred outputs were cross-checked by the interdisciplinary advisers and discussed and confirmed by the sub-panel.

Impact

Table 3: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	38.4	42.0	15.3	3.6	0.7
REF 2021	49.2	39.4	9.7	1.7	0

17. Compared to REF 2014, the submitted impact cases included a greater diversity of underpinning research spanning a full range of the disciplinary coverage of the UOA. The key impacts for the sector included energy, decarbonisation and climate change; health and wellbeing; the quality of the built environment and landscape; and practical issues such as disaster resilience and infrastructure development. There was also good evidence for impact on professional and business practice, government policy and inclusive governance. These impacts could be seen at local, regional, national and international scales, demonstrating the UOA's collective research contribution in bringing significant benefit to the UK's business services and practice in this domain, as well as to communities through the effects on policy and the physical environment.

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18. The sub-panel commended the submitted impact cases in terms of the reach and significance of their impact across the board. The large majority of the submitted cases was assessed as producing outstanding (49.2%) or very considerable (39.4%) impacts. Evidence for impact of outstanding reach and significance was found in virtually all sub-disciplines. Especially strong cases demonstrated long-running user collaborations lasting in some cases over decades. These collaborations provided a pathway for knowledge co-production and co-creation which led to successful research application in user organisations.
 19. There were significant variations in the quality of the evidence between submitting units. Cases with outstanding impact were those that could clearly establish links between underpinning research and significant impact on defined beneficiaries, backed-up by credible evidence in the narrative about the reach and significance of the claimed impact. It was harder for a case study to evidence the link between the underpinning research and the impact claimed when a portfolio approach was adopted. This might involve multiple research projects being bundled with a weak chain of evidence for impact, or a single research project for which multiple impacts were claimed but not well corroborated with evidence. The sub-panel observed that there was a tendency for submitting units to make certain claims that were very far-reaching, but for which they found it hard to present strong evidence to support the benefits claimed. This could be seen, even in some cases with very considerable impacts, where one of the claims (for example, impact within an international context) was weakly supported and added no real value to the overall case.
 20. The sub-panel found that the narrative of some impact case studies was masked by a complex writing style, full of acronyms, that was not penetrable to those not working in the niche area. There were also variations in how submitting units cited testimonials to support the claimed impact. Some quotations were extracted and used in a very ambivalent manner, which made it difficult to judge whether it was being taken out of context. This necessitated some auditing of sources to corroborate impact.
 21. A small number of impact case studies mentioned the impact of Covid-19 on their planned engagement and impact-related activities. The assessors paid due consideration to these cases, by taking account of the extent and nature of the impact of Covid-19, when judging the reach and significance of the impact.
 22. User members and assessors of the sub-panel noted that the assessment of impact in the UOA was conducted in a thorough and fair manner. They acknowledged the challenge of assessing a wide range of evidence for social, economic, environmental, and cultural impacts; particularly when the relationship between research and impact was more discursive and implicit (such as the impact of research on changing government policy). The users also endorsed the observation that the evidence cited in the case study should be made routinely available to the sub-panel to verify the impact claimed.

Environment

Table 4: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	43.2	36.8	15.7	4.3	0.0
REF 2021	52.0	40.5	7.2	0.3	0.0

23. The environment statements and metric data submitted gave strong evidence of the vitality and sustainability of research across the UOA and within individual submitting units. The quality profile showed that 52% of the submitted researchers (FTE) were judged to be in an environment that was conducive to producing world-leading outputs and outstanding impacts, with a further 40.5% working in an environment assessed as internationally excellent and producing very considerable impact. Strong submissions were evident in both the richness of data and narrative provided to pinpoint different aspects of their environment. They demonstrated good alignment with institutional level strategies and schemes. Strong environment submissions had a strategic approach to achieving quality and impact from their research, with robust policies and support to staff development relevant to the context of the unit and to its disciplinary composition.
24. Many units had developed comprehensive research strategy, support processes and structures since REF 2014 and there was evidence of the effect of these on submissions. The environment statements showed that architecture, built environment and planning research was increasingly coming together into interdisciplinary structures rather than in traditional single topic departments. Within those interdisciplinary structures, it was however not always easy to see how the environment came together to develop innovative place-based research agenda. Most submissions mentioned the importance of applied research and collaborating with industry and partners to establish strong support for impact and knowledge exchange activities, including dedicated funding, leave and secondment opportunities. In addition, some submissions demonstrated strong social and cultural impacts and partnership in and around creativity, leisure, performance, heritage and the wider well-being agenda.
25. The sub-panel recognised the diversity of submissions in the UOA and the challenges faced by some of the smaller units to embed equality and diversity practice and support in less-developed research environments, though some have made positive changes. Some submissions provided little or no evidence of unit-level support on equality and diversity, as such support (for example, Athena Swan awards) was driven primarily at an institutional level. Weaker submissions tended to primarily focus on gender, rather than on targeted interventions to address issues associated with wider under-representation (for example, ethnicity and disability) within the unit. Whilst there was strong support for early career researchers in most submissions, very few included details on planned actions to address associated equality and diversity issues to enhance the vitality and sustainability of the unit.
26. Nearly all submissions had institutional or faculty level Graduate Schools, in-house development programmes, robust supervision and monitoring arrangements, and support for postgraduate researchers' well-being, though most provided little detail on scale or scope to substantiate the claims. Doctoral studentships from different sources, ranging from research councils through industrial collaboration to institution's own,

were mentioned in the submissions as a means to attract doctoral students. The number of doctoral degree awards of the UOA (see Table 5), showed an upward trajectory up to 2017-8 and then declined over the last two years of the assessment period.

Table 5: Doctoral Awards by Academic Year

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Doctoral degree awards	297	353	359	394	402	385	366
Awards per FTE	0.19	0.23	0.23	0.26	0.26	0.25	0.24

27. The UOA observed year on year reductions in research funding from all sources during the REF 2014 period, but this trend was reversed in REF 2021 (see Table 6). Research in this UOA was heavily reliant on research income from UKRI (40.8%), various EU sources (22.5%) and UK government bodies (18.3%). Despite the applied nature of the UOA, only 7% of research income came from industry and commerce. UKRI income tended to be concentrated in institutions that performed well on outputs and was associated with some of the best impact case studies. Some smaller submissions were heavily dominated by European funding, and the sub-panel was disappointed that rarely did their strategy address the potential impact of Brexit on future research income and thus on their vitality and sustainability. The sub-panel also recognised the importance of industry, UK government and EU funding in generating very strong impact case studies.

Table 6: Research Income (including Income in kind) by Academic Year

Year	2013-14	2014-15	Annual average for 2015-20	Annual average for 2013-20
Total Research Income	44,519,443	47,057,579	49,761,692	48,626,498
Research Income per FTE	29,147	30,808	32,579	31,835

28. A diverse range of infrastructure and facilities were mentioned by the submitting units and most were fit for purpose, with the strongest submissions deploying their resources to foster research synergy, collaboration and impact both within and beyond the unit and the institution.

29. Strong international collaboration was observed across most submitting units, which showed that the UOA continued to play leadership roles in international research within the built environment. As reflected in the internationalisation trend of research outputs and impact cases, the UOA has been rapidly extending its research partners beyond the EU to Asia and the Global South. There was evidence of collaborations forming around emerging areas of intellectual and cultural interest or pressing societal or environmental challenges. Rather than highlighting individuals' research networks and esteem, the stronger submissions tended to clearly articulate the collective activities of the unit and how they contributed to knowledge and impact development and innovation of the discipline.

Comments on the sub-disciplines of the UOA

Architecture

30. Almost half of the outputs in the Architecture discipline were in the sub-area of theory and culture and a significant proportion of outputs were related to practice and design. There were strong submissions of outputs and impact case studies across both established and emerging research areas, including work that challenged existing paradigms in areas such as gender studies, post-colonial theory, climate change and decarbonisation, alongside digital, biomimetic and biological approaches to design. Notable examples focused on unusual and demanding building types and structures, or on previously neglected contexts, often working beyond the boundaries of established research clusters. Environmental design and sustainability were also addressed from an architectural perspective and often within a wider interdisciplinary framework. Strong performance was evident in ancient and modern architectural history, often in the form of authored and edited books, including a good proportion of double-weighted outputs, nearly all of which were of world-leading quality. Often resulting from sustained and long-term projects, these typically presented more coherent and self-contained bodies of work. Many of the strongest outputs in theory, culture and design also demonstrated an encouraging diversity of methodologies, sometimes departing from traditional written forms to include artefacts, installations, exhibitions, and documentary films. The strongest practice-based design submissions had responded well to the REF criteria, clearly identifying the research contribution within the supporting material, as well as the individual contributions of the various participants, thereby generating new understandings of the potential of design as a mode of research. Some less successful examples relied instead on measures of design quality, such as architectural awards, as evidence of high-quality research. In some cases, weaker design submissions simply described their research questions in general terms, failing to demonstrate whether and how these questions had been addressed.
31. Especially strong impact case studies were noted in areas such as arts and cultural heritage and conservation, in both built environment and landscape. These were often underpinned by primary research in modern and ancient architectural history and tended to show significant evidence of wider societal impact in relation to public policy and practice around planning, environment and sustainability, with strong evidence for impacts that made a difference to people's daily lives. Good correlations were generally evident between a strong research environment and high scoring outputs and impact case studies.

Building and Construction

32. Within the building, construction and engineering field, there was a clear change in emphasis away from a narrow focus to a greater diversity of topic areas including a broader more collaborative approach. This holds significant potential for growth in high quality research in this field over the next REF period. The REF 2021 submissions also demonstrated that research in machine and artificial intelligence has resulted in a step change in how large and complex datasets are collected and analysed. The growth in research that focuses on digitising construction offered practical and societal impact when rigorously applied. Outputs that lacked a coherent research question, or which presented limited or poor data, or data that were not clearly related to theory, scored poorly. Energy research showed evidence of maturing from an emphasis on 'fabric-first' into a broader, more systems-based approach, positioning the discipline to support a zero-carbon agenda. Some of the strongest research in this area used robust case studies, linking findings to a broader understanding of the wide diversity of building stock and energy behaviours.

33. Given the essentially interdisciplinary nature of all research in this sub-panel, a large volume of the submitted outputs and impact case studies were undertaken by interdisciplinary teams. Many outputs offered useful linkages with heritage-related topics and were often cross-cutting between understanding materials and structures. The sub-panel noted that collaborations with behavioural sciences, health, business, and digital methodologies often produced impactful research dealing with the many complexities and problems likely to develop in the future built environment.

Environment, Climate Change and Energy

34. The outputs in this sub-discipline showed a high-quality profile, with the large majority rated as being world-leading or internationally excellent. A very small number of double-weighted outputs were submitted, and a small proportion of outputs were flagged as being interdisciplinary. Nearly all outputs were journal articles, with very few authored books. Where books were submitted these tended to feature research in environmental policy and governance. Outputs covered a diverse range of topics within the wider theme of environment, climate change and energy, addressing important environmental challenges (including responses to climate change, emergency resilience, agriculture and food), and more localised issues including acoustics and air quality. The fields of stakeholder engagement, governance, energy transitions, digital technology, neuroscience, and biomimetics were important emergent research areas.

35. The outputs demonstrated a rich diversity of theoretical and methodological approaches, from experimental studies, qualitative research, studies of buildings in use, simulations, and some outstanding critical social science research. The submissions underlined the ability of HEIs to act as knowledge brokers and bring together different expertise, often via professional and government bodies and international NGOs. The best examples questioned received wisdom and wider political initiatives, such as Sustainable Development Goals, often focusing on the Global South. While data are important to this type of research, many studies neglected existing datasets, resulting in missed opportunities and questionable claims of originality. Some weaker studies failed to discuss the quality and provenance of data or the limitations of datasets. Some outputs, assessing particular environmental metrics at a global or national level, did not connect to implications for policy with the built environment.

36. The sub-panel also assessed many impact case studies highlighting research in the environment, climate change and energy that was informing the fast-changing context for developing tools and policy (particularly in relation to energy transition, climate vulnerabilities and environmental technologies). This area is likely to grow strongly as climate change and the United Nations' Sustainable Development Goals continue to drive future policy directions and research.

Housing and Regeneration

37. Outputs submitted under the wider theme of housing and regeneration covered a wide range of topics including supply-side issues and social outcomes including homelessness, welfare reform, poverty, and their socio-spatial patterns. Challenges, including ageing, migration and sustainability were also represented, as well as key dynamics of change in urban environments, such as the decline of high streets. Nearly 90% of outputs were peer-reviewed journal articles, with very few books. The outputs showed a strong international dimension, including studies from the UK, Europe and the Global South, and some excellent comparative analyses. A large majority of outputs was judged to demonstrate world-leading or internationally excellent quality and indicated that UK research was highly rigorous and contributed very significantly to global as well as national research agenda. The outputs demonstrated a rich diversity of theoretical

and methodological approaches, with strong qualitative and mixed-method studies that highlighted new theoretical approaches, and with evidence of fertile collaboration and intellectual exchange with other disciplines. The strongest outputs went beyond the application of established conceptual frameworks and contributed to the development of theory with high methodological rigour. Some more localised and less theoretically guided case studies were amongst the weaker outputs in terms of originality and rigour, and these struggled to show wider significance.

38. Research funding in this area appeared to be healthy. Funding from government departments has declined and there was increased reliance on research councils, including the funding of major collaborative research across the UK university sector. The sub-panel also assessed a number of impact case studies that highlighted that research in the housing and regeneration field was drawn from areas including welfare reform, homelessness, social housing, fuel poverty and enhancing data analysis and that these employed a range of techniques to achieve impacts on legislation, policy and practice.

Landscape

39. The quality of research outputs identified as landscape was high across the whole range of output types. The outputs were rich and diverse indicating a dynamic area of research. While landscape outputs were relatively few, they covered a wide range of subjects over time, space and scale indicating that landscape scholars are pushing the boundaries of their studies and working collaboratively. Many outputs had an urban open space focus with an emphasis either on effective management of these spaces and/or on the multi-functional benefits. There was a welcome interdisciplinary approach in this area of research linking medical, environmental and social data with a green focus. This area of research provided a growing body of evidence relating to the wider social and environmental benefits of greenspace in the urban context. There were some particularly strong outputs, with world-leading quality, relating to plant/horticulture studies and green infrastructure subjects. The importance of landscape design and care for natural resources in relation to heritage was also a feature of a number of outputs. Several internationally excellent outputs that related to a historical perspective were noted.
40. The range of impact case studies submitted to the UOA showed that UK landscape research is having impact on both the national and international scene in respect to policy and innovation and applied research projects.

Planning

41. Outputs were submitted on planning history, methods and spatial analysis, policy and practice, theory and governance and urbanisation and development, the majority being journal articles. The fields of theory and governance and methods and spatial analysis were particularly buoyant, with a large majority of outputs being rated as world-leading or internationally excellent. A small proportion of outputs was flagged as interdisciplinary, with a higher percentage of planning history outputs in this category. The outputs demonstrated a rich diversity of theoretical and methodological approaches, bringing fresh concepts, insights, and evidence to long-established areas of research and investigating emerging areas including climate change, health, marginalisation and power and knowledge within marine, regional, rural and urban planning systems. Methodological developments in the field were largely focused around spatial analysis, including the application of the use of big data to understand changing spatial patterns. The strongest outputs developed - in addition to applying - theory, evidenced rigorous

and reflective utilisation of robust data and articulated the wider significance of case studies and data analysis.

42. The relevance, diversity and importance of the discipline was reflected in the impact case studies many of which were focused on societies' big challenges and included resilience in the face of climate change, addressing exclusionary practices and more effective methods of stakeholder engagement. These were geographically widely spread and often involved practices of co-production. Indeed, there was increasing internationalisation of outputs and impact case studies, including a growing focus on the Global South.

Real Estate

43. Real estate research activity included both commercial and residential real estate management, investment, aspects of development, appraisal, finance and economics. Much real estate research was undertaken by small groups within larger units, with only a handful of larger groupings. There was some evidence of a contraction in the volume of more traditional appraisal and management aspects of commercial real estate, with increasing emphasis on economics and finance, market analysis and modelling, with some units concentrating their real estate activities within a Business School environment. Residential real estate research was more widely spread and integrated into the wider housing research agenda. Research assessing aspects of sustainability in real estate investment, appraisal and finance increased.
44. The quality of the outputs, virtually all journal articles, was generally very high, based upon rigorous methods applied to original topics, contributing to emerging or key research agenda. This applied especially in the areas of market analysis and modelling including international comparisons. UK real estate research maintained its reputation as a global leader, along with the US, applying interdisciplinary techniques from other disciplines, underpinned by better quality real estate and supporting data. The number of impact case studies relating to real estate was relatively low but these case studies, along with other impactful real estate research evidenced in environment statements, addressed some major policy and professional practice issues. The funding levels of commercial real estate were low compared to that secured to underpin residential real estate research activity, with fewer policy initiatives, so industry funding remained an important element, as did the development of and access to private data sources.

Other Sub-Fields

45. There was a small volume of outputs from other sub-fields, including transport studies, development studies, and rural planning and development.
46. A wide range of transport issues was addressed in the submitted research, ranging from technological and economic studies to investigations on justice and equity issues drawing on critical social science. A large majority of outputs was judged to be of world-leading or internationally excellent quality. Nearly all submitted outputs were authored/co-authored journal articles. The methodological range was considerable, with outputs employing an array of methods and theoretical/analytical framings. Research in this sub-discipline made a critical contribution to the evolution of technology and the development of policy, notably in the area of electric and autonomous vehicles.
47. The field of development studies covered a broad range of development challenges across highly diverse settings in the Global South such as poverty, prosperity, sustainable development and communities, conflicts, slum settlements, urban infrastructure, energy access, transport systems, water, and sanitation. Many outputs

had a rich mix of framings, particularly around the United Nations' Sustainable Development Goals and embedding ideas of resilience. The quality profile of outputs was very similar to the average for the UOA as a whole. While a wide range of theoretical and methodological approaches were used, intensive case study and qualitative research approaches were most common with some interesting broader regional perspectives. There were some examples of outstanding methodological innovation, often undertaken in challenging field conditions and building on decades of action research in collaboration with NGOs and local communities. While different forms of outputs were submitted, there was a relatively high proportion of edited books and reports compared with most sub-disciplines in the UOA.

48. With a very small submission from the rural planning and development area, it was more akin to a topic than a discipline. The sub-panel noted that the area could also be linked to landscape and planning policy, with some rural-orientated outputs found in other disciplinary areas of the UOA. Whilst there was a range of output topics, many had an applied policy focus and were based around innovation strategies and uncertainty in a changing policy context. A range of mixed research methods was evident, with many outputs reporting findings from research co-production with users.

Interdisciplinary Research

49. Interdisciplinary research was thriving in the UOA's submitting units, reflected in the content of the outputs, the profiles of the institutions and the breadth of the case studies. The diverse expertise of output authors and the membership of the sub-panel were further indicators of strengths in interdisciplinary research. Three-quarters of the submitting units flagged some outputs as interdisciplinary. Many of the outputs had an interdisciplinary character, though they were not flagged as such. Interdisciplinary research quality was reflected in the methods of research adopted, the subject matter of the research, and the teams of collaborators and co-authors. All outputs, whether or not identified as interdisciplinary, were assessed following the published criteria and procedures, and some were cross-referred to other sub-panels for additional specialist advice.
50. Outputs were deemed as interdisciplinary if they were either flagged as such by a submitting unit, or the sub-panel decided to joint-assess or cross-refer (in some cases requested by the submitting unit) and just over 11% of the UOA outputs fell within this wider definition. Of these interdisciplinary research outputs, the majority were assessed by this sub-panel, a significant number were referred to UOA 5 (Biological Sciences), UOA 6 (Agriculture, Food and Veterinary Sciences), UOA 7 (Earth Systems and Environmental Sciences), UOA 12 (Engineering) and UOA 14 (Geography and Environmental Studies). The remainder was distributed amongst sub-panels dealing with medicine, economics, business and management, health, education, performing arts and film.
51. Assessments and comments from cross-referral assessors were considered by the sub-panel's two interdisciplinary advisers for consistency, giving confidence that interdisciplinary outputs were handled fairly and as a strength of the UOA's disciplines.

Final comments

52. The sub-panel acknowledged the diversity in content, approaches and methods adopted by different disciplines. Collaborations across disciplines within the UOA, as well as interdisciplinary research outside the UOA, contributed to the production of high-quality research in this REF exercise.



Sub-panel 14: Geography and Environmental Studies

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	34.4	49.5	14.9	1.1	0.1
Impact	41.7	43.3	10.5	3.9	0.6
Environment	40.2	43.2	13.9	2.7	0
Overall	37	47	14	2	0

Summary of submissions

1. The REF 2021 assessment by Sub-panel 14 (SP14) demonstrated the continuing leading position of UK research in Geography and Environmental Studies, with in excess of 80% of the overall quality profile in the 4* (world-leading) and 3* (internationally excellent) categories.
2. In REF 2014, the equivalent Sub-panel, 17, included Archaeology which in REF 2021 has submitted to Sub-panel 15 (Archaeology). When comparing the overall profiles of the 50 REF 2014 submissions classed as Geography and Environmental Studies, including several that explicitly combined Geography and Archaeology, with the 56 submissions to SP14 in REF 2021, a significantly larger proportion of submitted material was assessed to be world-leading and internationally excellent, with a notable increase in the world-leading category. In REF 2021 98% of submissions showed some 4* quality within their overall profiles, with 16% (9 submissions) having half or more of their overall profiles judged as world-leading. 80% (45 submissions) had half or more of their overall profile graded at world-leading or internationally excellent: 26 units (over 45%) had in excess of 90% of their profile graded as 4* or 3*.
3. There was considerable diversity within the 56 submissions received by SP14. There were nine submissions with over 50 FTE, and four with 10 or fewer FTE. Actual size ranged from 95.40 FTE to 5.20 FTE (headcounts 103 to 6), with a mean submission size of 33 FTE, a small increase from 29 FTE in REF 2014. Submissions ranged from predominantly geography units, many with near-balanced social science and humanities, and natural science components, through wholly human geography submissions, to environmental studies submissions, many with a dominant focus on ecological aspects of the biological sciences.
4. The overall impression was of a vital and sustainable research base for UK Geography and Environmental Studies. The highest proportions of 4* outputs, impact and environment tended to be found in larger units, those over 40 staff headcount, but pockets – often very sizeable – of world-leading (4*) or at least internationally excellent (3*) research and impact, were identified almost everywhere. Many different routes to and patterns of excellence were identified within the full portfolio of submissions.

5. Six geography/environmental studies/combined units from REF 2014 were not returned to SP14 in REF 2021, while the sub-panel received five submissions from units that had not submitted to SP17 in REF 2014. The sub-panel identified 43 submissions as wholly or predominantly Geography units and 15 as predominantly Environmental Studies submissions, many of which included significant, sometimes dominant, Environmental Science components. Environmental research, often with a strong interdisciplinary flavour, was present in both sets of units. For the Geography units as a whole, overall grade profiles revealed in excess of 40% 4* world-leading quality and 47% 3* internationally excellent research activity. For the Environmental Studies units, the figures were 20% and 47% respectively, with some of these individual units achieving at a significantly high level.
6. The 56 units submitted to SP14 returned 1,948 staff overall (1854.58 FTE), including 312 early career researchers; with 4,482 outputs (with double-weighted counted as two outputs) and 185 impact case studies submitted, 3,050.50 PhD awards reported, and £83,713,035 in research grants managed between 2013/14 and 2019/20. The mean number of PhD awards per submitted staff member was 1.57 (headcount) and 1.64 (FTE); and the mean research income per submitted staff member per annum was £46,436 (FTE).

Sub-panel membership and assessment procedures

7. The membership of SP14 evolved during the REF cycle. At the criteria setting stage membership comprised David Thomas (Chair), Chris Philo (Deputy Chair), Ash Amin, Phil Ashworth, Chris Clark, Siwan Davies, Georgina Endfield, Gary Kass, Cathy McIlwaine and Jane Pollard. Following the submission of HEI submission intentions, membership for the assessment stage was increased to ensure an appropriate expertise and diversity base, with the appointment of Neil Adger, Shonil Bhagwat, Ayona Datta, Giles Foody, Rich Harris, Harriet Hawkins, Miles Ogborn, Sue Page, Joe Painter, Jon Sadler, Andrew Tyler and Rob Wilby.
8. Two members, Ash Amin and Andrew Tyler, resigned at various points due to new professional commitments; they were replaced with individuals in the list above. Martin Todd was appointed jointly with SP7 (Earth Systems and Environmental Sciences) as an output assessor, and Colin Church, Lee Corner, Nuala Gormley, Liam Kelly, Harriet Orr, Moira Sinclair and Claire Souch were appointed from the user community as impact assessors. Neil Adger and Georgina Endfield were designated special responsibility for matters of interdisciplinary research, while Gary Kass was the user-community member of the full sub-panel, having a lighter output assessing and heavier impact assessing role.
9. The sub-panel was indebted to its secretariat, Yvonne Fox (panel adviser) and Alison Honnor during the criteria setting stage, and Pauline Muya (panel adviser), Cheryl Brand and Sarah Howson in the assessment stage, for their highly supportive management of the process, especially conflict of interests, spreadsheet and cross-referral management and meeting planning: all tasks made more challenging by the majority of meetings being held online during the Covid pandemic. The SP executive comprised the chair, deputy chair and secretariat.
10. All sub-panel work took account of individual members' conflicts of interest, which were updated regularly, and a Fairness in REF Intention Plan, developed at the outset of the assessment stage and reviewed constantly through the process. This plan particularly emphasised the importance of: individuals being able to challenge each other's judgements, but always in a respectful manner; guarding against any unconscious

bias for or against, for instance, specific types of output, impact or environment; and guarding against any prejudice that could arise due to the characteristics of authors of outputs or impact case studies. Consideration of equality, diversity and inclusion (EDI) was constant in the deliberations of the sub-panel.

11. The sub-panel developed robust procedures for assessing all elements of the submissions. Several rounds of calibration exercises (in plenary and smaller groups) addressed output, impact and environment assessment and the application of the grading criteria outlined in REF 2021's 'Panel criteria and working methods'. Further reflexive moderation and calibration for all elements was ongoing throughout all stages of the assessment process, up to the production of final grade profiles. The processes and procedures built trust, consistency and confidence within the sub-panel.
12. Differing from practice in REF 2014, when 15-20% of outputs were subject to second reading, all outputs for REF 2021 were independently assessed for their originality, significance and rigour by two sub-panel members, with allocations based on individuals' expertise. At this stage, output scoring utilised a granular 13-point scale, with grades converted to the unclassified to 4* scheme at grade resolution. Final grades for the outputs were agreed by the reviewers. For those where initial grades sat across a grade boundary, a mixture of qualitative discussion and the use of protocols at grade boundaries took place.
13. Where outputs did not align with sub-panel expertise, cross-referral to a more relevant sub-panel occurred, whether initially requested by the submitting unit or not. This approach ensured that all outputs were assessed with an appropriate level of expertise. Normally, one SP14 member was assigned as the handler of the output, liaising with a relevant expert on another SP to identify the appropriate grade, following REF-wide procedures. Joint assessment of outputs, rarely requested by submitting units, involved a similar arrangement but with two assessors possessing relevant expertise, one from within SP14 and the other from another relevant sub-panel, liaising to produce the final output grade.
14. Using a scale of half grades (U, 0.5, 1, 1.5, ... 4.0) every impact case study (ICS) was assessed for its reach and significance. A consensus final grade was agreed after detailed discussion in one of six groups of assessors, two each convened respectively by the chair, deputy chair and user member. Groups were set up to minimise membership conflicts of interest, as well as to spread case studies from each submitting unit across at least two groups. For each ICS, two assessors (one impact assessor and one full sub-panel member) led discussions, with final grades being agreed by all members of a group. A similar grading scale and process was applied for assessing the vitality and sustainability demonstrated in the four sections of each unit environment statement. Discussion and assessment were again facilitated by two lead assessors allocated within one of two groups of full sub-panel members, convened respectively by the chair and deputy chair.
15. All output, impact and environment initial grades and final grades were logged and managed through a series of personal and master spreadsheets. Avoiding conflicts of interests, all data within the latter were repeatedly checked and cross-checked by members of the sub-panel executive. These data were used to determine the final quality profiles.

Outputs

Output types

16. Table 2 records the proportions of output types submitted to SP14. It displays limited diversity, with the overwhelming majority of submitted outputs being journal articles (89.9% accounting for double-weighting). This may reflect that Geography and Environmental Studies are largely physical science and social science-facing, where a publication preference for academic journals predominates, although it also perhaps displays a disappointing conservatism on the part of submitting units. The next highest proportion of outputs was authored books (8.7%, including double-weighting), reflecting that the discipline does also contain scholars shaped by a model of monograph production that influences the humanities but also some parts of social science.
17. The small number of book chapters, 1.0%, raises the question of whether fewer book chapters are being written by scholars submitted to SP14 or if there remains hesitation about their credibility as REF outputs. Edited collections – books or journal special issues – were also almost entirely absent, surprisingly so given that sub-panel members are well aware of, and indeed observed in those few collections submitted, excellent collections produced by geographers. The almost non-existence of other output types adds to concerns about a certain conservatism in how Geography and Environmental Studies research is represented, or worries about what output types will fare well in REF assessment.

Table 2: Outputs Types assessed (factoring in double weighting)

Authored Book	Edited Book	Chapter in Book	Design & artefact	Journal Article	Conference Contribution	Report	Other
8.7%	0.2%	1.0%	0.0%	89.9%	0.1%	0.1%	0.1%

18. Echoing what was found in REF 2014, the wide range of subjects included within the boundary descriptors for SP14 meant that 4,480 articles (including 'reserves' for double-weighted outputs) were published in 809 different journals, of which 440 were used only once. This dispersal across journals is arguably a sign of healthy interdisciplinarity rather than a dilution of disciplinary identities. The emergence of interdisciplinary micro-specialisms with their own niche journals, another dimension of interdisciplinarity pushing at conventional disciplinary borders, was also noted.
19. At the other end of the spectrum, 100 or more outputs were submitted to each of five different journals, with a further 14 journals represented by 50 or more outputs. This continued a trend reported in REF 2014, but to a stronger degree. Many of these journals were interdisciplinary, often but not exclusively from the more natural science end of submissions. More specialist titles were, however, also represented in this group of commonly submitted journals.
20. Notwithstanding these observations, world-leading (4*) and internationally excellent (3*) research were represented within the most and least commonly represented journals, as well as in other output types. The sub-panel hence strongly recommended that scholars be encouraged to publish in journals and other output types that best suit the intellectual ambitions and most informed academic and wider audiences for their work, rather than simply following journal trends and metrics.

Output quality and trends

21. Over 80% of outputs submitted to SP14 were assessed to be of world-leading or internationally excellent quality. Over a third of the submitted outputs were graded as world-leading (4*), with 16 units having at least 40% of their outputs at 4* level, six of which had over 50%. Almost half of the submitted outputs were graded as internationally excellent (3*) and a further 15.4% at a quality recognised internationally (2*).
22. Echoing a conclusion from REF 2014, SP14 assessed outputs that were clearly setting intellectual agenda across the natural and social sciences, while also engaging the humanities and the life, health, computing and engineering sciences. A sizable proportion of the outputs that were assessed can be regarded as occupying a genuinely post-disciplinary space, a trend first observed in REF 2014.
23. Notable strengths were revealed across the whole range of outputs that can be cast as **human geography**. Research areas of human geography have continued developing along lines identified in the REF 2014 report, characterised loosely as environmentalism and justice. This work reached a high level of maturity both conceptually and methodologically, as well as in terms of research findings and insights, while retaining frequent and clear sparks of originality. While some outputs continued the vital task of speaking back to geography, deepening disciplinary self-understanding, many others faced outwards, confidently (but respectfully) widening what human geographers bring to other branches of knowledge, theorising and practice.
24. Research on the environment exploded in many different directions, from the highly applied, including policy analysis, attention to ecosystem services and integration of climate modelling into global sustainability science, through embracing a science and technology studies angle or a critical political ecology stance, to the most theoretically challenging inquiries into the Anthropocene, its histories, geographies, exclusions, threats and possibilities. Glimpses were gained of exciting, potentially transformative, new ways of physical and human geographers working together, reinvigorating an older disciplinary thematic of human-environment relations in the face of unprecedented climatic-environmental challenges to humans and wider species.
25. While not always identified as such, work on social justice has enriched and transcended political and social geography – substantially recasting studies of both the post-political and society-space relations – and has rebounded into new critical engagements throughout environmental, economic, cultural, urban, historical, as well as within what remains cautiously named as ‘development’ geography. New or reframed watchwords in these realms include ‘abandonment’, ‘decoloniality’, ‘the digital’, ‘indigeneity’, ‘infrastructure’, ‘settler’ (societies, economies, sciences), ‘value’ and ‘violence’. A fundamental reassertion of race, allied to critical race studies and recently emerging Black geographies, was clearly evidenced.
26. Methodologically, quantitative human geography has embraced – and is beginning to realise the full potentials of – big data science, while qualitative human geography has continued to deepen its capacities, practically and ethically, for both accessing meanings, politics and (embodied) performances and fostering exciting new geohumanistic vehicles for writing or otherwise representing their gleanings from the world. Attempts to work across the quantitative-qualitative divide have occurred, often alongside experimenting with digital sources and methods, including new ways of tracing, mapping and (geo) visualising social phenomena.

27. Research in **physical geography** displayed some clear changes in the trajectories, first observed in REF 2014, of research practice as well as with the predominant areas that submissions occurred from. Work on earth surface processes continued to be strongly represented, but the decline in work representing traditional geomorphological fields, with for example relatively little pure research on rock weathering, fluvial, coastal and aeolian processes and soils being returned.
28. The trend for integrated, often problem-based, analyses to be submitted continued from REF 2014. For example, work focussing on wide-ranging forms of water science, biodiversity, carbon budgets, integrating hydrology, geomorphology and even geochemistry, continued, with similar trends occurring in investigations of ice systems. This included a substantial body of work addressing the controls and vulnerabilities on ice system stability both in the past (Quaternary) and into the future.
29. Regardless of topic, integrated analyses were generally very innovative in the combination of methodologies used, frequently involving both empirical (field and laboratory) and modelling components. The widespread collation and use of big data, meta-analyses, statistical packages, and high-performance computing was evident, while machine learning and artificial intelligence (AI) are emerging applications. Remote sensing and earth observation technologies was also widely employed throughout physical geography submissions, including satellite, drone, submersible and other data capture methods, which have all become mainstream research elements. Research addressing global problems was also evident in many other fields including, but not confined to, atmospheric science and global warming, coastal and ocean systems, wetlands from high to low latitudes, and tropical forests.
30. Quaternary Science continued to be a significant part of submissions, including both more traditional site-based studies and a wider integration of analyses of the past into studies of current and future system dynamics. There was a notable decline in submissions focussed on methodological and chronometric developments, with the notable exception of tephra studies.
31. **Environmental studies** submissions were predominantly focused on hazards, conservation and ecology. While many outputs integrated human and environmental systems, and some research was clearly interdisciplinary, there was a notable rise in the submission of environmental science outputs to SP14, especially in the fields of biological science, including a growth in genomics and DNA research, planetary science, volcanology and engineering applications. This growth resulted in the need for a substantial body of work to be cross-referred to other sub-panels for assessment.
32. Some significant shifts in patterns of output authorship were detected compared to REF 2014. A major observation was the growth in submitted outputs that were conspicuously multi-authored. This occurred especially with big data and interdisciplinary outputs. SP14 received over 200 outputs with 25 or more co-authors, and many more with in excess of 10 authors. It was not always clear what the contribution of the named author had been to the underlying research, resulting in many audit queries being raised, and sometimes inadequately answered. Another development was an increasing prevalence of co-authorship between UK scholars and researchers from elsewhere, notably the Global South, which is to be applauded where it served to counter older (colonial) models of academic production whereby the latter remain uncredited.

Interdisciplinary assessment

33. Interdisciplinarity was a positive feature of outputs (as well as impact case studies and environment statements) submitted to SP14, as has already been underscored with reference to the substantial range of journals containing submitted outputs. There were nonetheless only 259 outputs (c.5%) where the submitting unit added the interdisciplinary research (IDR) flag. In total 31 of the 56 submitting units did not use the IDR flag at all, including many of the larger established geography departments. Seven units accounted for more than half (148) of the flagged outputs. Within many of the units that elected to use the IDR flag, there was considerable inconsistency in which outputs were or were not flagged (to the point that its use sometimes appeared to be random). Many reasons might account for variable and inconsistent usage of the flag, but whatever the reasons may have been, flag use/non-use did not affect the process or consistency of output assessments carried out by the sub-panel, not least as interdisciplinarity is a well-established research trait within Geography and Environmental Studies research units.

Cross-referral and joint assessment

34. The use of cross-referral requests by submitting units were equally inconsistent. SP14 received 137 requests from units for outputs to be cross-referred to other sub-panels. 71 of those requests were agreed, 65 were rejected (on the grounds of sufficient competence for assessment amongst the membership of the sub-panel) and one cross-referral request was instead jointly assessed. In all, 35 units made cross-referral requests, with seven units (two in common with the seven referred to under IDR use) accounting for well over half of these (173 out of 273). As with the IDRs, there was considerable inconsistency in how units deployed cross-referral requests.
35. SP14's subject descriptors were broad, reflecting the interdisciplinary breadth of UK Geography and Environmental Studies, but the sub-panel still identified many outputs that fell outside the strongest expertise of its membership, requiring expertise elsewhere to ensure fair and appropriate assessment. For six Environmental Studies units, 25% or more of the output submissions had to be cross-referred to another sub-panel for assessment; for one of these units the figure was almost 40% and for another almost 50%.
36. In all, 284 outputs, 202 identified by the sub-panel, were cross-referred out for assessment. Outputs requiring cross-referral included: biological, genetic and evolutionary themes (n = 126), sent to SP5 (Biological Sciences); 'solid rock' geology and volcanology themes (n = 51), sent to SP7 (Earth Systems and Environmental Science); and astrophysics, planetary science and 'space weather' themes (n = 24) sent to SP9 (Physics). The sub-panel was confident of fairly assessing most of the social science or humanities outputs requested for cross-referral, but 22 outputs covering public health, particularly non-spatial epidemiology, were sent to SP2 (Public Health, Health Services and Primary Care). In total, cross-referrals were sent to 22 sub-panels: SP1, SP2, SP4, SP5 and SP6 in Main Panel A (a total of 166 outputs); SP7, SP8, SP9, SP11 and SP12 in Main Panel B (94 outputs); SP13, SP15, SP16 and SP19 in Main Panel C (33 outputs); and one output to SP26 in Main Panel D. The grades entered for cross-referred outputs almost always followed the incoming advice, but with Sub-panel 14 members making the final decisions on grades.

37. The sub-panel also received 413 outputs which were cross-referred to it from sub-panels spanning all four main panels. The majority were received from two sub-panels, 181 from SP 7 (Earth Systems and Environmental Sciences) and 107 from SP 17 (Business and Management). In total cross-referrals were received from 17 sub-panels: SP3, SP4, SP5, SP6 in Main Panel A; SP7, SP9, SP10, SP12 in Main Panel B; SP13, SP15, SP16, SP17, SP20, SP23, SP24 in Main Panel C; and SP26, SP30, SP33, SP34 in Main Panel D. The cross-referred outputs were assessed by SP14 members in the equivalent manner to the outputs submitted directly to SP14.
38. The sub-panel considered that eight outputs would benefit from joint assessment, with two carried out with SP12 (Engineering) and six with SP16 (Economics and Econometrics).

Impact

39. Table 3 includes the impact grade profile achieved across units submitting to SP14, signalling the growing strength of research impacts being achieved by many units. Over 40% of the submitted impact case studies were graded as achieving outstanding impact (4*), with 23 units (nearly half) having 50% or more of their impact cases so graded.

Table 3: Impact Sub-Profiles and for units* submitted in REF 2014

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	34.3	42.2	19.3	3.9	0.3
REF 2021	41.7	43.3	10.5	3.9	0.6

*Geography, Environmental studies and combined units from REF 2014 SP17

40. Most of the observations made about impact case studies submitted to SP17 in REF 2014 continue to be relevant for the experience of SP14 in REF 2021. Impact came in all shapes and sizes – directed at all kinds of users, beneficiaries and audiences; produced for (and often co-produced with) all manner of private, public, voluntary, activist, advocacy and other agencies; seeking to generate wealth or to cultivate health; shaping policy and/or practice; deploying quantitative evidence or qualitative testimony; locally-focused, securely embedded in particular regional or national settings, or globally-facing, spanning nation-states, continents and even the world. Impact cases also ranged from those that could be described as ‘short and thick’, with little lag-time between (or even temporal coincidence of) research and impact and with researchers often heavily involved in the impact process, and those that were ‘long and thin’, with a longer run-in from research to impact and researchers more remote from the latter.
41. It was possible for any form of impact case study to be regarded as producing outstanding (4*) or very considerable (3*) impacts, with the best providing well-argued cases for integrated relationships between research, users, publications and impacts. These presented a clear pathway from the underpinning research to the impact, and showed ample evidence of both reach and the significance of the impact. Case studies claiming many impacts which were subsequently less detailed tended to fare less well. The message is that submitting units should not look for any simple template or ‘silver bullet’ to guide their impact cases study work, but rather should seek the particular array of impactful qualities that can lie within almost any instance of Geography and Environmental Studies research that ‘makes a positive difference’ in the wider world.

42. There is little to be claimed about new emerging areas of impact that SP17 did not see in REF 2014, which is not at all to suggest stasis or complacency in the UK Geography and Environmental Studies community with regard to its impact work. One area of novelty, though, might be loosely described as ‘third party’ impact case studies, wherein a unit’s researchers create a distinctive product – which could be a piece of hardware or software, or might be an online platform or tool – that is then used by third parties (companies, NGOs, campaigners, citizens) to generate tangible impacts in/for given peoples and places. A number of examples were encountered, with those earning high grades clearly narrating and evidencing the relationship between the underpinning research and the grounded impact provided by frontline ‘agents of change’.
43. Very few continuing impact case studies from REF 2014 were flagged, although it was obvious that a number had clear links to impact cases submitted previously. This is not a criticism of the units concerned, but rather an appreciation that they may have feared being marked down for being unoriginal, despite originality not being one of the REF criteria on which the impact case studies were assessed. Indeed, the view of the sub-panel was that even exactly the same type of impact continuing from the same body of prior (or ongoing) research could still earn a high grade, providing that convincing evidence of that impact occurring within the new REF period was adequately demonstrated.
44. The academic assessors on SP14 benefitted immeasurably from working closely with the impact assessors and vice versa – whether as co-leads on given impact case studies or in the wider group settings – and there is no doubt that the professional experience and expertise of the latter sharpened the sub-panel’s critical understanding of what impact could entail and how it can be properly evidenced. One example is that our impact assessors clarified why research that might initially appear as merely evaluative – assessing good practice in a situation where an organisation has already initiated changes – could still be judged to be high-impact, since the evaluation may enable the organisation to continue, extend or up-scale its activities in a beneficial fashion.
45. SP14’s impact assessors were generally very positive about how they were included in the impact assessment process, and also commented on the wider benefits they gained from working with the academic members of the sub-panel. Some impact assessors acknowledged that restricted in-person assessment work under the pressure of Covid generated isolation from the overall endeavours of the sub-panel, but others thought that being able to concentrate solely on their task of impact case study assessment – free from distractions – actually fitted better with their own pressured time commitments.

Research environment

Table 4: Environment Sub-Profiles and for units* submitted in REF 2014

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	40.9	38.2	17.2	3.4	0.3
REF 2021	40.2	43.2	13.9	2.7	0.0

*Geography, Environmental studies and combined units from REF 2014 SP17

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46. Table 4 shows that there was no significant change in the proportion of research environment profiles graded as world-leading (4*) since REF 2014, while the internationally excellent proportion increased by 5%. Compared to enhancements in the output and impact profiles from REF 2014 to REF 2021, this small upward trend might be considered disappointing, but equally it might be viewed as a consolidation of the research base. What is clear is that units that had strongly vital and sustainable research environments in REF 2014 on the whole continued to do so. A number of other units demonstrated notable changes to their research environments during the REF period, resulting in enhanced grade profiles. The size, shape and composition of a significant number of units had evidently changed since REF 2014. The sub-panel also welcomed a number of new submissions, as well as observing significant growth in a number of established units.
47. Over a third of the grades awarded for the four environment statement sections were world-leading (4*), with 17 units (just under a third) having 50% or more of their environment statements graded as world-leading. The vitality and sustainability of the overall research environment for UK Geography and Environmental Studies is readily apparent, it being evident that the excellence of this environment is indeed conducive to the excellence of the research (outputs and impact) evidenced elsewhere throughout the submissions to SP14.
48. In their environment statements, the strongest submissions provided clear evidence of the embeddedness of EDI, with clear attention paid to protected characteristics. These statements went beyond parading principles to evidencing practices. Best practice included statements with a critically honest acknowledgment of areas where changes were required: for example, in equity of opportunities or the provision of specific enabling support, and following up these analyses with actions and plans to address such matters.
49. The sub-panel was much more comfortable when issues and difficulties in any section of the statements were acknowledged, rather than then being ignored. The better environment statements also avoided the use of 'boiler plate' text in their descriptions, instead focusing on the specifics, often with unique unit-specific characteristics that contributed to vitality and sustainability. Where submissions included research and staff from several units or centres, the strongest examples highlighted areas of linkage, be they physical engagements, similarities of practice or equivalent guiding principles.
50. A number of aspects of the environment statements were indicative of vitality and sustainability. The highest-graded units also included evidence of a vibrant, often reflective, research culture that enabled the development of an open intellectual vision, action-orientated strategies, as well as evidencing academic integrity. Their forms of research governance were also facilitative of positive change rather than bureaucracy for the sake of it and convincingly tailored university-level policies to the details of unit-level activity.
51. The strongest statements had clear, inclusive approaches to staffing, gender and race. They were alert to, and where necessary tackled, generational and status imbalances. They evidenced a welcoming context for early career researchers (ECRs, understood both in 'technical' REF and wider, more encompassing terms), striving to reduce unit reliance on fixed-term contracts and/or to ensure effective career development. They provided a similarly welcoming and inclusive context for postgraduate researchers (PGRs) combining essential recruitment, monitoring and progression mechanisms with an ethos focused on integration and encouraging publication, engagement and successful routes post-PhD.

52. Well-developed organisational, operational and physical infrastructures were all a hallmark of the strongest units. These included, where appropriate to the research being conducted, access to well-appointed laboratory, computing and fieldwork facilities. The strongest statements also demonstrated, or showed a clear ambition for, collaborative and partnership working that translated from the academy into the wider world where open-accessible research creates impact.
53. By implication, the weaker units provided insufficient narration of all or many of the aspects highlighted above, as well as being too descriptive, insufficiently unit-specific, and/or failing to capture the strategic imperatives giving shape and direction to the research environment.
54. The standard metrics of research income and PGR awards see Tables 5 and 6 below), were helpful to SP14 when seeking to confirm judgements being made about an environment statement, particularly section 2 ('People') and section 3 ('Income, Infrastructure and Facilities'), but they were never used deterministically or without also attending to the qualitative evidence. Good metrics usually correlated with convincing narratives, although in a few instances they accompanied weaker statements or, indeed, weaker output and/or impact profiles. Conversely, modest metrics occasionally accompanied both stronger statements and stronger output and/or impact profiles.

Table 5: Doctoral Awards by Academic Year

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Doctoral degree awards	386	428	419	436	479	448	454
Awards per FTE	0.21	0.23	0.23	0.23	0.26	0.24	0.24

Table 6: Research Income (including Income in kind) by Academic Year

Year	2013-14	2014-15	Annual average for 2015-20	Annual average for 2013-20
Total Research Income	73,186,430	78,202,508	86,920,461	83,713,034
Research Income per FTE	39,463	42,167	46,868	45,139



Sub-panel 15: Archaeology

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	36.0	47.7	15.2	0.9	0.2
Impact	59.8	32.7	5.9	1.6	0.0
Environment	62.4	29.6	5.7	2.3	0.0
Overall	46	41	12	1	0

1. Archaeology formed its own sub-panel in REF 2021, with 24 HEIs submitting (having been combined with Geography and Environmental Studies in REF 2014). Six units that submitted in REF 2014 (involving just Archaeology or Archaeology and Geography combined) were not returned to SP15, but there were two HEIs that submitted to Archaeology for the first time in 2021. Outputs were also cross-referred from 13 Archaeology clusters returned as part of alternative structures to other UOAs (including the six HEIs mentioned above). In terms of staff numbers, there was limited change since REF 2014, with 539 staff (496.84 FTE, REF 2014 c.454 FTE) returned, including 80 ECRs (15% of staff). Submission size varied from 3.00 to 60.23 FTE, with the majority of submitting units (16/24) under 20 FTE. The overall sub-panel profile confirms that Archaeology is a moderately-sized, very dynamic research community that demonstrably punches above its weight internationally.

Sub-panel membership and assessment process

- Membership of the sub-panel (10 women, 6 men) included representatives from all four home nations and a broad spread of institution type. Members brought an expanded range of specialisms compared to REF 2014, better reflecting the inherent interdisciplinarity of Archaeology. There were initially 12 full members (with a 13th added when the survey of submission intentions clarified need of expertise). Two full members were from the user community (with an impact focus but were also involved in output and environment assessment). When the potential for Covid disruption became clear, two additional output assessors and a further impact assessor were appointed. In addition, three specially appointed language assessors dealt with a small number of outputs relating to ancient Near Eastern and Egyptian languages.
- The sub-panel collaboratively developed a Fairness in REF Intention Plan at the outset, which became integral to its culture of trust, transparency, and fairness. The plan was revisited at each meeting, to increase attentiveness to potential bias. The principle of challenge was encouraged, as well as continuous reflection on consistency and fairness in the assessment process. This was enhanced by mentoring arrangements, especially helpful to new members in the initial stages, and by regular drop-in sessions with the chair.
- The sub-panel met in person in the criteria-setting phase but moved subsequently to virtual meetings (with two hybrid meetings). The sub-panel was well supported by the

sub-panel adviser and secretary to achieve the effective and timely delivery of challenging tasks and complex processes and adjustment to different ways of working amidst Covid-19 restrictions.

5. Assessment of all elements in the submissions was subject to oversight by Main Panel C and calibration exercises were held to ensure shared understanding of criteria and their application to outputs, impact and environment. Calibration for outputs included particular attention to double-weighted monographs and outputs flagged as interdisciplinary (IDR). Every output was graded independently by two assessors on the five-point (*) scale and the final mark confirmed by subsequent agreement discussion. Two sub-panel members were given responsibility for managing the IDR process. The assessment of impact case studies (using a nine-point scale) and environment statements (using a nine-point scale for each section) was initially in groups of three sub-panel members. Consensus reports were then discussed by the full sub-panel to determine an agreed final grade (stringently observing conflicts of interest). The consensus process and discussion at full sub-panel meetings resulted in collective agreement and a process of continuous calibration.
6. SP15 received requests from submitting units for 95 outputs to be cross-referred; an additional 139 outputs were cross-referred by other sub-panels and there were a further 10 requests for IDR joint assessment. HEIs submitting to the UOA made relatively low use of the IDR flag, with 50 such flags utilised, with numbers concentrated in a small number of institutions. However, many of the outputs submitted to the UOA had an interdisciplinary character whether or not they were flagged as such, a feature of Archaeology being its inherently interdisciplinary research methods, subject matters and collaborations. This interdisciplinarity was also reflected in the broad expertise of the sub-panel membership. Both IDR and cross-referral requests were made principally for journal articles within the life and physical sciences (over 75%), with lower proportions for authored books (13.5%), edited books (3.8%) and chapters in books (5.8%).
7. In considering how to assess IDR outputs, the sub-panel adhered to the REF definition of interdisciplinary research as achieving outcomes that could not be achieved within the framework of a single discipline. The sub-panel established two key tests to consider whether an IDR output should be jointly assessed or could be assessed using expertise within SP15: 1) Did the output's research questions/context lie wholly within the boundaries of Archaeology or did they move beyond established disciplinary norms?; and 2) What was likely to be the most appropriate means of assessment? As a result, the majority of IDR-flagged outputs were fully assessed within SP15 (over 50%), using the IDR guidelines, or were cross-referred to other sub-panels (30%), with 13% involving joint assessment with other sub-panels.
8. SP15 sent cross-referred or jointly assessed outputs to 13 other sub-panels and received cross-referral or joint assessment requests from 20 sub-panels across all four main panels (principally in Main Panels D, C and B, in decreasing order). This high level of interaction with other sub-panels (spanning 25/33 other sub-panels) further reflects the interdisciplinary character of Archaeology and its role as a bridge between the sciences, humanities and social sciences.
9. The sub-panel received and discussed data from equality analyses concerning any relationship between protected characteristics and output grades. As discussed in the Main Panel Overview report, the preliminary data across the main panel were reassuring in some areas but also raised issues for further analysis across the REF as a whole.

10. Environment statements showed a range of practice in relation to supporting an inclusive research culture (vitality) and ensuring future diversity and wellbeing (sustainability). In the strongest submissions, commitment to equality and diversity was evident in both the richness of data and narrative provided and the wider range of protected characteristics considered. These units acknowledged under-representation of staff in certain groups and cited positive actions to address the issue, including strategies for recruitment, promotion, mentoring, leadership training and opportunities. Attention to an inclusive research culture was evidenced by engagement with Athena SWAN, mechanisms such as workload management, targeted study leave and research funding, the appointment of local champions for protected characteristics and the integration of equality and diversity within teaching and research strategies. Weaker submissions considered only gender and tended to have implemented generic (HEI-level) initiatives rather than targeted interventions to address identified issues within the unit. Across submissions, there was a strong focus on gender, with less on ethnicity, and relatively little mention of other protected characteristics.

Impacts of Covid pandemic

11. The pandemic disrupted the overall timetable and necessitated the move from face-to-face to virtual meetings for most of the assessment phase. Nonetheless, the sub-panel was satisfied that the mitigation measures put in place enabled the work to be completed without detriment to rigour or fairness. The sub-panel found the HEI statements about the impact of Covid-19 on parts of the submission very helpful. Overall, the pandemic caused minor disruption to publication of outputs, some more significant challenges for impact activities and evidence-gathering late in the cycle and more limited issues in relation to environment. The sub-panel noted that considerable adverse effects could be predicted to continue into the next REF cycle, especially with regard to fieldwork, international collaborations and potentially ECR progression.

Outputs

12. Of the 1,209 outputs submitted to the sub-panel, 1,067 were assessed after consideration of requests for double-weighting and one output was removed following audit as it was ineligible. Having taken into account double-weighted outputs, the following overall numbers and percentages for different types of output were: journal articles, 698 (58%, 2014 54%); authored books, 303 (25%, 2014 15%); edited books, 95 (8%, 2014 8%); chapters in books, 101 (8%, 2014 21%); 'other', 12 (1%, 2014 2%) across several categories (conference contribution 4, software 1, exhibition 1, research report for external body 1, confidential report for external body 1, working paper 1 and 3 other).
13. The main changes from REF 2014 were a rise in the percentage of books and journal articles and a decrease in the numbers of chapters in books. The distinction between monographs and edited books was not always clear-cut, as the latter included some major multi-authored excavation monographs and project reports.
14. World-leading quality (4*) was found across all output types, with the highest proportions in monographs, edited books and journal articles. Overall, double-weighting was used strategically by submitting units with the great majority of double-weighted

outputs judged to be of world-leading (4*) or internationally excellent (3*) quality. It should however be noted that HEIs did not request double-weighting for about one third of authored books and edited books. The numbers of double-weighted outputs and double-weighted 4* outputs were both more than double the 2014 level, accounting for a significant element of the rise in world-leading quality in this cycle.

15. Another factor that contributed to the quality improvement in the overall sub-panel profile since 2014 was the reduction in the total number of outputs submitted, due to the lower average number required per FTE and with a similar number of staff FTE returned. The total number of submitted outputs judged to be of world-leading quality was a little higher than in REF 2014 (334 compared with 318), but this represented c.10% more due to the reduction in the overall pool of outputs (c.1,400 in 2014 compared to 1,067 in REF 2021).
16. Articles were spread across c.200 different journals, reflecting the many sub-fields of the discipline and its strong interdisciplinary links with other subjects (also reflected in the very diverse disciplines of co-authors). Most journals had published fewer than five of the outputs submitted. Among the top 20 publishers in terms of output totals (with between 8-47 outputs apiece), 15 were major international science or archaeological science journals and the remainder were general archaeological journals or ones that specialised in theory and method. Together the top 20 journal titles accounted for c.55% of the total journal articles and just over 50% of the world-leading grades awarded. However, it is important to note that the other half of world-leading articles were widely distributed across more than 40 further journal titles, confirming the sub-panel's focus on the quality of the work, not venue of publication.
17. The sub-panel identified world-leading outputs across all the submitting units and also in the cross-referred outputs returned by archaeological clusters to other sub-panels. The largest overall numbers of 4* outputs were found in the largest submissions; however, in some cases the percentages of 4* outputs in units with less than 30 staff submitted were higher.
18. The discipline has proactively embraced the open access agenda, evident in terms of all submitting units meeting the REF requirements in relation to journal articles and in a number of open access monographs. It was also encouraging to note the presence of outputs that demonstrated further transparency and support for reproducible research via open-license accompanying datasets, analytical scripts, open-source software and/or other important supporting materials.
19. The sub-panel noted an increase in collaborative, multi-disciplinary articles, often arising from large well-funded projects, and placed in journals with broad audiences beyond archaeology. More than 150 articles had 10 or more authors, with an upper figure of 142. The sub-panel would have liked more information on the authorship contributions in such cases, but awarded all articles submitted more than once the same grade where 'a substantial research contribution' was made by each attributed author. The sub-panel noted the importance of PhD students, postdoctoral and ECR staff in the generation of research and saw much good practice in the way their authorship contributions were appropriately recognised.
20. Alongside this trend, however, there was continuing strength in book-length discussions, including many single authored works. There were also numerous examples of world-leading, extensive and highly rigorous field archaeology publications. Some outputs demonstrated innovative ways both to extract extra evidence from traditional, legacy

archaeological sources (e.g. the “grey literature” of primary fieldwork reports) and to bring together large datasets (for instance crossing modern political boundaries and/or including approaches to what may be termed ‘Big Data’) to address problems at large scales. The best of these books not only collated emerging evidence, but typically went well beyond this to offer digested, long-form consideration of wider debates, making them essential points of reference.

21. While UK-based archaeologists continue to work in a strikingly wide range of international research locations, the sub-panel saw high-scoring outputs that focused on British archaeology too, and some submitting units have established a strong position primarily on the basis of such work. Alongside continued numerical strength in UK, European, Mediterranean and SW Asian research, certain geographical regions have seen increased emphasis in the current cycle, primarily Africa and South America, as well as East Asia, and it was reassuring that each of these had outputs from multiple contributors, rather than only from isolated academics. A strong element of broadly comparative research continued to thrive, from the Palaeolithic to contemporary in focus.
22. Increasingly prominent were a series of innovative, contextually embedded methodological developments in archaeological science, including a range of biomolecular techniques (next generation sequencing of ancient DNA, studies of diet and mobility using isotopic approaches, and use of proteomics to identify species and explore human and animal diet, health and disease). Human bioarchaeology continued to be world-leading and many outputs were of contemporary global relevance. These included both osteobiographies and larger population studies using routine but essential (morphological/metric) and more advanced (biomolecular) methods in exploring human history writ large, including identity and life course approaches. Although these trends were identified in REF 2014, the sub-panel observed an increasing integration of methods, a real engagement in multidisciplinary approaches, and serious incorporation of theory in research design, methods, analysis and interpretation. UK research continues to play a leading role in refining different scientific dating techniques, and in material science and environmental science. Overall, c.44% of all outputs led with an archaeological science approach.
23. A relatively small number of outputs were submitted relating to Forensic Archaeology (including some flagged or cross-referred). Some of the work was assessed as world-leading, but a proportion reflected the developmental state of Forensic Archaeology. In relation to human bioarchaeology overall, the sub-panel noted some inconsistencies in the application of ethical standards.
24. The sub-panel recognised an increase in world-leading research in addressing important archaeological questions relevant to contemporary challenges encompassed within the United Nations’ Sustainable Development Goals. This included studies on: past climate: variation, change, and adaptive responses; migration: human and animal population genetics and dynamics, origins, dispersal, admixture, collapse, and continuity at large and small scales; health: the origin, evolution and phylogeny of human pathogens; and subsistence and economy: diet, agricultural innovation and resilience; origins of cereal crops; animal domestication; and the impacts of environmental, sociocultural, political and economic drivers on changes. The sub-panel highlighted the greater attention to climate change, including significant contributions by archaeologists to the direct recovery of new palaeo-environmental archives, to the characterisation of both rapid climate ‘events’ and broader trends such as the Anthropocene from multiple published proxies, and to reflections on how such changes intersect with other archaeological evidence. Multiple outputs offered long-term archaeological perspectives on questions

of social inequality and its consequences, in step with a wider emphasis across the social sciences on this pressing concern. Such work highlighted the relevance and wider social value of archaeological research.

25. The archaeological study of whole landscapes of human activity continued to be a focus, now with added energy from large UK- or EU-funded projects that have allowed a more synthetic view across large areas. There have been impressive attempts in this cycle, visible in applications worldwide, to return to well-known problems of demographic reconstruction in archaeology, such as the estimation or comparison of population dynamics. These have used methods including field survey synthesis, statistical modelling of site duration and/or summed radiocarbon probability distributions.
26. There was much outstanding work in Prehistory, from Human Origins to the Iron Age, some applying cutting-edge science advances to human problems. The archaeology of historical periods also produced a good deal of world-leading quality, in traditional areas of strength like Roman and medieval archaeology, but also with a general expansion of post-medieval/historical archaeology (this was reflected in the sub-panel appointing specialist assessors for this area). There was some excellent interdisciplinary work drawing on global perspectives in relation to critical heritage studies, public archaeology, museology, anthropology and architectural history. A significant development in the area of heritage analysis was the increase in large international collaborative projects that addressed threats to archaeology, illicit traffic of antiquities and the re-building of communities in war zones.
27. Although only a minority of submissions was primarily theory-building in nature, the application of archaeological and anthropological theory to social interpretation remained a vital strength over a large number of the submissions, demonstrating a strong integration of theory with data.

Impacts

Table 2: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	34.3	42.2	19.3	3.9	0.3
REF 2021	59.8	32.7	5.9	1.6	0.0

28. There were 61 impact case studies submitted, with an average of 2.5 staff (and a maximum of 10) associated with authorship of each case study. Table 2 shows the overall sub-profile for impact. Though the figures were not explicitly reported in every case, there was evidence of substantive financial support underpinning impact with around one third of case studies listing grants or funds of over £1 million and just under a fifth with support of between £100k and £500k. The sub-panel noted with interest the growing availability of impact-specific grants and funding, as well as increased HEI investment of staff time in impact work, and how in many cases these developments were instrumental in securing the impacts.
29. Impact has developed and matured through the REF cycle, also reflected in the strong impact strategy elements of environment statements. Some 37/61 impact case studies (61%) were judged to have an element of outstanding reach and significance (scores of 4* or split 3*/4*).

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30. All sub-panel members read all the impact case studies (excepting conflicts of interest), but with groups of three taking the lead for individual impact case studies. Calibration discussions of initial scores were carried out by the lead assessors with their consensus reports then discussed in plenary panel session leading to final collective decisions. These helped guarantee equality of treatment and a broad comparative perspective. Two thirds of submitting units (16/24) were below 20 staff FTE in size and thus required only two impact case studies. Cases that demonstrated outstanding reach and significance had clear pathways to impact and provided good evidence for claims made. Supporting evidence was carefully collated and appropriately cross-referenced within the appropriate section.
 31. Impact case studies of poorer quality often failed to demonstrate the reach and significance of the impacts claimed, lacked clear evidence to support claims, or had unclear pathways linking the underpinning research to the impacts. Quantitative evidence was generally less used, with greater reliance on vague testimonials. Some impact case studies focused too much on creation of content (e.g. media outputs) rather than on the impact on audiences. Many impact case studies claimed multiple different impacts arising from the underpinning research. While in the best examples this resulted in significant impact, elsewhere this complicated the narrative and the evidencing, and a stronger case might have been made by a more selective focus. A few impact case studies fell some way below the allowed page extents, with consequences for a comprehensive presentation of the narrative or evidencing and the narrative of some impact cases could have been more accessible to the non-specialist reader, including by the avoidance of acronyms.
 32. Impact was demonstrated across all potential categories, with most case studies identifying impact in Understanding, Learning and Participation (with a distinctive subset focused on imaginative educational programmes), considerable impacts in Creativity, Culture and Society and in Public Policy, Law and Services, and Practitioners and Professional Services. A small number of impacts were demonstrated on Health and Wellbeing and Social Welfare, with a few on Environment. Archaeological research was demonstrated to enrich lives through enhanced opportunities for educational attainment, personal skills development and with additional impacts on Social and Personal Wellbeing. Impact in this category was supported by Archaeology's long history of public co-participation, co-creation and Citizen Science. Impacts on Public Policy and Practice (38%) and on practitioners (8%) were facilitated by the inclusion of museums, contract-focused research centres or commercial field units within the submissions. Additionally, close relationships have been established with the wider Heritage and Museum sectors, creating a symbiotic benefit in impact planning and delivery, including a submitting unit's staff in strategic advisory roles. The UOA demonstrated the significant societal value of translating 'local' impact into globalised thinking and practices.
 33. The geographic regions in which the impact studies were undertaken demonstrated that, of the 61 impact studies, 32 were within the UK, 21 were outside the UK, and 8 both UK and elsewhere. In other words, almost 50% of the studies either fully or partially achieved impact beyond the UK. There were outstanding examples where generating impacts and gathering evidence across geographical and cultural boundaries have been achieved, such as leadership of international efforts in the protection of endangered heritage, for example in conflict zones. This has resulted in a major collective contribution of British Archaeology to global heritage protection.

34. It was also apparent that impact often builds on long-term strategies and relationships, supported by active investment in time and resources. Many submitting units clearly had additional impact strands in the pipeline beyond the submitted impact case studies.

Environment

Table 3: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	40.9	38.2	17.2	3.4	0.3
REF 2021	62.4	29.6	5.7	2.3	0.0

35. Table 3 highlights the overall environment sub-profile. The environment profiles for the 24 individual HEIs could be clustered into three distinct groups: (1) 8 HEIs with an entirely or majority world-leading profile; (2) 10 HEIs with a minority ($\leq 50\%$) world-leading profile but otherwise internationally excellent; (3) 6 HEIs with no world-leading element in the profile, a minority ($\leq 50\%$) or none of internationally excellent level and a majority ($\geq 50\%$) at internationally or nationally recognised quality. World-leading excellence was therefore recognised across 18/24 HEIs. In the first group in particular, Archaeology emerged as generally well supported institutionally, innovative and demonstrating strong vitality and sustainability. Elsewhere there were striking examples of strong performances – in some cases despite lower levels of institutional support. The sub-panel noted that some weaker statements could have been improved by more strategic presentation and better deployment of content. The REF5a institutional templates provided valuable wider context, and the strongest SP15 environments displayed consonance and synergy with these, affirming active engagement with, and benefit from, wider HEI strategy.
36. The sub-panel was extremely encouraged to note a significant increase in the extent and manifest sincerity of engagement by HEIs with a broad range of key equality and diversity and comparable issues. This was indicated both by current improvement and the development of committed strategies to address longer-term 'pipeline' issues. Most notable is a step-change in the representation of women, both numerically and in terms of senior promotion. Consonant with this, is the large number of HEIs with Athena SWAN Bronze awards at departmental level, or applications in train. Less progress has been made towards greater representation of archaeologists from ethnic minorities, but the sub-panel noted some modest improvements, as well as several examples of proactive strategies designed to remedy this situation. More generally, local and HEI-wide family-friendly policies, career progression mentoring, ethics boards (research integrity), and increasingly affirmative adherence to open access and open data best practice were all strongly evident. The growth of doctoral training consortia has greatly improved the appropriate training, support and provision of placements for PhD students.
37. A number of factors demonstrate that research environments have been greatly enhanced over the census period. The sub-panel agreed that this environment profile is commensurate with the international standing of UK archaeology. The standard data demonstrate the strength of the subject, and its pronounced uplift since 2014, with grant capture and PhD completions as key comparative elements showing exceptional performance relative to discipline size.

38. Comparisons between the research grant income reported for REF 2014 and REF 2021 are complicated by different cycle lengths and the difficulty of disaggregating the REF 2014 data for Archaeology and Geography. Income has also not been adjusted for inflation between REF cycles. Despite this caveat, it was clear that grant income had increased from c.£123 million (2014) to £209 million (2021). Annual average per FTE income, arguably a more comparable indicator, has increased from £31,850/FTE (2014) to £61,295/FTE (2021) as shown in Table 4. Particularly important has been success of submitting units in winning >50 European Research Council (ERC) grants in Archaeology, with EU funding up 260% across the census period (£25 million 2014; >£65 million 2021) and the annual per FTE figure up 200% (from c.£9,000 to £18,756). The highly competitive nature of ERC grants makes this a reliable indicative measure of international esteem. In addition, four HEIs substantially augmented their income (to the tune of 36-58% of their total) from the research component of their commercial operations, largely through attached developer-led field units.

Table 4: Research Income (including Income in kind) by Academic Year

Year	2013-14	2014-15	Annual average for 2015-20	Annual average for 2013-20
Total Research Income	24,933,001	31,006,199	30,553,754	29,815,424
Research Income per FTE	50,183	62,407	61,496	60,010

39. PhD completions have risen in this cycle from 922 to 1,189 and the PhDs per staff FTE likewise confirm uplift, from 1.8/FTE (2014) to 2.39/FTE (2021) as shown in Table 5.

Table 5: Doctoral Awards by Academic Year

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Doctoral degree awards	162	158	188	195	161	190	137
Awards per FTE	0.33	0.32	0.38	0.39	0.32	0.38	0.27

40. The sub-panel found Archaeology in UK HEIs to be healthy and vital, innovative in its questions and methods, of significant social value and in the majority of cases robustly sustainable. It is characterised by impressive global reach (with activity on all inhabited continents), ambitious time-depth (2.5+ million years) and an outstandingly broad range of methods, from social theory to biomolecular analysis. In several submitting units it further embraced human evolution, classics, ancient languages and/or heritage studies. This breadth stimulated an exceptional degree of internal interdisciplinarity, and likewise encouraged a notably high frequency of creative collaboration.

41. Archaeology in submitting units varied markedly in its wider institutional placement within arts, humanities, social sciences and sciences, as well as in size (FTE) and the diversity of research strengths. Most submissions derived from dedicated Departments of Archaeology (in a minority of cases plus cognate fields). In terms of size, there were

four relatively large submissions (c.35-60 FTE), four medium large (20-34 FTE), 10 medium (10-19 FTE), and six small (<10 FTE). In the majority of cases, and reflecting the demanding scope of the subject, large or medium size correlated with the strongest performances in terms of research environment, and a few of the smallest submissions revealed challenges in demonstrating coherence and sustainability in this regard. Equally, however, there were encouraging instances of medium to small submitting units demonstrating vitality and sustainability by targeting specific regional, method-based or other strengths. The sub-panel was encouraged to note the distribution of flourishing smaller, sometimes upwardly mobile, submitting units among all the constituent nations - ensuring sustainable centres of excellence across the UK.

42. Research strategies varied between broad spectrum engagement and a more focused approach. Most of the larger submitting units offered impressive global, temporal and methodological cover, including a major scientific component, involving significant investment in laboratory facilities and supporting infrastructure. Smaller submitting units varied more between a science-rich and humanities/social science focus, or pursued a mixed approach with the science focused on a few areas of strength. It was very notable that the strongest submissions produced evidence of wider institutional capital investment, in people and infrastructure (especially laboratories specialising in new and developing techniques). Metrical data in turn indicated notably high returns where such investment had been made.
43. The sub-panel observed evidence of the quantity and quality of PGRs and ECRs, from standard metrics, ERC starter grants, prestigious prizes and (for ECRs) output scores. The range of international origins and destinations of both groups was notable, as was the demonstrably high level of onward progression within Archaeology and cognate areas of employment. Such career pathways affirmed the success of internally and externally funded investment in the sustainability of the discipline.
44. Submitting units produced much evidence of collaborations, both within/across HEIs in and beyond the UK, and outwardly facing towards broader society; these were often conducive to supporting production of world-leading research. Partnerships across HEIs were increasingly important given the complex collaborations driving much archaeological research, as well as the cost-effectiveness of sharing access to key laboratory infrastructure. Importantly, strong collaborations have facilitated impact and collaborative research and impact was nested at a variety of scales from the local doorstep to the trans-continental, with examples of outstanding calibre across the spectrum, as well as strikingly multi-scalar 'glocal' applications. Strong partnerships were noted with museums (in a few cases within HEIs, but primarily external, whether local, national and international), schools, and local communities within the UK and across the globe (with an emphasis on stakeholder well-being and social inclusion via public engagement, Citizen Science, and other forms of volunteering). In a minority of cases this engagement was powerfully augmented by embedded, but outwardly facing, development-led commercial archaeological field units (or work with external units of this kind). Collaborations and knowledge exchange with local, national (e.g. Historic England, Historic Environment Scotland and Northern Ireland, Cadw [Welsh Historic Environment]) and international (notably UNESCO) archaeological, heritage and equivalent bodies shaped policy debate, disseminated best practice and built capacity via training partnerships and infrastructural support.

45. Overall, the sub-panel observed several positive trends and changes since REF 2014. All the areas of research prominent in 2014 remained healthy in REF 2021 (see above under outputs for further comments on research directions). The stand-out new excellence was the innovative application and adaptation of (and institutional capital investment in) the revolution in biomolecular archaeology, in pursuit of major social questions about how past people lived. More generally, the rising and widening application of archaeological science to social interpretation of the past has played an increasingly integrative role across this inherently interdisciplinary UOA, which remains exceptionally well placed to span and bring together the full spectrum of research potential between STEM and SHAPE disciplines.



Sub-panel 16: Economics and Econometrics

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	36.1	56.2	6.5	0.9	0.3
Impact	42.6	43.5	10.4	2.6	0.9
Environment	55.8	39.7	4.3	0.2	0.0
Overall	41	50	7	2	0

Summary of submissions

- 25 submissions were made to SP16, three fewer than the 28 submissions in REF 2014. This reflects five exiting institutions, and two entries. The five exiting units from REF 2014 became part of their institutions' submission to SP17 (Business and Management Studies). Of the two UOA entries in REF 2021, one was a re-entry which did not submit to Economics and Econometrics in 2014, and one submitted for the first time. 920 FTE (Category A) staff were included, reflecting a 22 per cent increase compared to the 756 from REF 2014. Outputs were also attributed to a further 53 former staff to give a total of 973, as compared to 798 in 2014, again an increase of 22 per cent
- A total of 2,232 outputs were submitted, down 14 per cent from 2,600 last time. The overwhelming majority were journal articles (2,128, or 95 per cent). The rest were: 86 working papers, 9 authored books, 8 chapters in books and 1 conference contribution. Under the new rules for REF 2021, requiring submission of 2.5 outputs per FTE, 2.30 outputs were returned per submitted staff member, down from 3.26 in 2014. 8 submissions returned more than 100 outputs (with 210 being the largest), 12 between 75 and 100 outputs, and 9 returned fewer than 75 outputs (with 21 being the smallest).
- 91 impact case studies were submitted for assessment. The largest submission included seven case studies, three units submitted five case studies, nine units submitted four case studies, and 11 submitted three case studies. One HEI did not submit any impact case studies. All 25 HEIs submitted completed environment statements.
- The sub-profiles show a tendency, on average, for environment scores to be above impact scores, and for both to be above output scores. However, it is noteworthy that all institutions submitted in SP16, apart from one, have some outputs assessed as world-leading (i.e. 4* 'world-leading in terms of originality, significance and rigour'). The highest-scoring submission has 72 per cent of its outputs in the 4* category.
- As far as the overall quality sub-profile is concerned, the relatively high average scores for Economics and Econometrics reflect both the self-selection of submitting units (discussed more below) and very strong performance by the highest-scoring institutions. 12 out of the 25 institutions submitted have over 30 per cent world-leading grades (average across the 12 is 48 per cent), while the remaining 13 institutions have on average 19 per cent

world-leading grades. Across all institutions, there is a strong profile of internationally-excellent and world-leading quality scores; 23 of the 25 submitting institutions have over 80 percent of their grade profile at this level.

6. Overall, the sub-panel concludes that the quality level of Economics and Econometrics research being conducted in the UK is very high and internationally competitive, contributing a significant amount of world-class research from the discipline. There is evidence that the discipline is flourishing. Some units show exceptional improvement over REF 2014: six submissions have above 50 per cent of outputs scored 4* compared to three submissions last time. The performance of the top five submissions (based on overall research quality profiles) changed from REF 2014, another sign that the discipline is in good health. Coupled with the cross-referred outputs of economics and econometrics research from the Business and Management sub-panel, the overall picture is of a thriving and influential economics profession that is producing high quality, world leading research and impact in UK academia.

Sub-panel membership

7. The SP16 membership comprised 19 sub-panel members who assessed outputs, impact case studies and environment. One sub-panel member was appointed jointly between SP16 and SP17 and played a vital role on the large number of incoming cross-referrals from SP17 (see below). One of the Main Panel C members, who is an economist, left the main panel and joined SP16 as a sub-panel member in the assessment phase. The areas of expertise in Economics and Econometrics for the appointed sub-panel members matched closely to the information in the survey of submission intentions. This worked well. But the scale of SP17 cross-referrals – and the areas covered by these cross-referrals – brought some challenges that needed to be dealt with.
8. The sub-panel had five research users, one of whom was a sub-panel member and four assessors, representing private, public and not-for-profit sectors and bringing a broad range of expertise on evidence and methodologies covered in the SP16 impact case studies. The impact assessors were very engaged in the assessment process, impressively so given that they are all senior people in their respective institutions with significant other demands on their time.

Assessment Process

9. The process worked smoothly with respect to the allocation of outputs, impact case studies and environment statements, and with respect to the sub-panel calibration exercises undertaken for each of these.
10. All outputs were assessed by two assessors. The initial allocation was done by an algorithm, designed and implemented by the sub-panel chair and deputy chair, with manual adjustments for conflicts of interest and/or imbalances in the allocations. Impact case studies were assessed by an impact assessor and a sub-panel member who were paired by the SP executive. Environment statements were read by groups of four or five panel members; the chair and deputy chair oversaw this process each taking half of the statements and joining the respective groups.
11. For all three assessments, the calibration exercises undertaken, including analysis of pairwise grading of outputs and impact case studies and comparisons of individual

grades across sub-panel members, proved helpful and constructive to the SP's deliberations.

12. The substantial number of incoming cross-referrals from SP17 offered more challenges, which are further elaborated on below in the outputs section of this report.
13. The sub-panel initially used the 13-point scale, which subsequently aggregates to the 5 point-scale used for the finalised, agreed grades. The finer gradation proved extremely valuable for assessing, and reconciling, grade discrepancies, and for determining threshold crossing (or not) between the more aggregated final categories. It also allowed assessors to recognise properly research that was exceptionally high quality (by awarding it the highest score, 12, where the 13-point scale ran as integers from 0 to 12) and therefore avoided the problem of truncating the top of the distribution and, by consequence, potentially downgrading other (slightly lower quality) research that was nevertheless world-leading.

Outputs

14. With 2,232 outputs submitted directly to SP16, all sub-fields of Economics and Econometrics were well represented. The wide expertise of sub-panel members made it possible to grade almost all these outputs directly, with only a few, more specialised outputs needing to be cross-referred out to other sub-panels. Consistency of grading across sub-panel members was assured by assigning outputs to two readers (and even a third reader in a very small number of cases where it was felt to be helpful), by extensive cross-checks throughout the process, and by a detailed econometric analysis of all individual grades by sub-panel members at various stages throughout the process. The latter showed differences of very modest magnitude in output grades between sub-panel members when controlling for several characteristics of submitted outputs.
15. Easily the largest category of outputs submitted was journal articles. A number of working papers were also received. There were only two requests for double-weighting, both for authored books, and both were accepted. The sub-panel found instances of world-leading or internationally excellent quality in all forms of output submitted.
16. The sub-panel judged there to be strength in all areas of economics as a 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 dynamic political economy were also well represented. However, only a small number of outputs were submitted in economic history, and a very small number in the methodology of economics. The latter areas did appear more frequently in the cross-referrals received from SP17.
17. The sub-panel was impressed by the consistently high level of rigour which was exhibited by the vast majority of papers submitted. This spans the range of economic analysis, from theory to empirics. Outputs that exhibited appropriate levels of originality and significance in addition to using rigorous methods were graded as internationally excellent or world-leading. This is in line with the published criteria, and 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, to highly novel data analysis and or to establishing that the evidence reflected the mechanisms being studied, rather than being explained by confounding factors.

18. Given the changes to submission rules from REF 2014 to REF 2021, direct comparisons are not helpful. However, it was clear that the percentage of Economics and Econometrics outputs awarded the highest grades rose, with a corresponding decrease in outputs judged to be internationally recognised.
19. The sub-panel also noted increased selection of higher quality submissions to SP16, continuing the pattern seen in previous assessment exercises.
20. A total of 1,450 outputs were cross-referred from SP17 to SP16. This represented almost forty per cent of all outputs graded by SP16. This turned out to be the most difficult, practical issue for SP16 to deal with, in part because there were many more cross-referral requests than expected, based on REF 2014 and the survey of submission intentions. In many cases, the number of outputs per unit referred was relatively small, but there were 24 institutions where 21 or more outputs (the minimum that institutions directly submitted to SP16) were cross-referred from SP17 to SP16 and one institution with 61 outputs that were cross-referred. This highlights that a very significant amount of economics research is being undertaken in business schools and that UK economics is not fully represented just by the SP16 submissions. It was notable that there are many areas of world-leading research in economics within economic groups in business schools: in terms of 4* output grades, the highest grading economics groups in the SP17 submissions would have been among the top quarter of the combined SP16 and SP17 submitted outputs. However, the majority were below the SP16 average. This may suggest that, in some institutions, strategic decisions are being taken to submit economics units within a wider business school submission when these units could be submitted to SP16.
21. The sub-panel looked carefully at the scores for these cross-referrals and how they compared to SP16 submissions. Outputs submitted directly to SP16 were, on average, assessed to be of a higher quality than those cross-referred from SP17. A smaller proportion of cross-referred outputs were assessed to be at the world-leading 4* quality level, whilst a higher proportion were assessed to be at the internationally-recognised quality at 2* or above. The sub-panel looked carefully to ensure that this pattern did not reflect any bias in grading, and that the same standards were applied to both groups of outputs. Further analysis revealed differences in the profiles of own-referred economics outputs (submitted to SP16) and cross-referred outputs (submitted to SP17) in terms of the journals that the outputs were published in and the fields within economics. In a statistical analysis controlling for output characteristics cross-referred outputs scored very similarly. This pattern was confirmed by analysis of a small number of outputs that were submitted by different co-authors to SP16 and to SP17. These findings allay possible concerns of any differential assessment of the SP16 outputs and the SP17 cross-referrals.
22. The assessment process for other cross-referrals out from, and in to, SP16, and joint assessments, was less labour-intensive and, for the most part, operated smoothly. 41 outputs were cross-referred out – comprising 29 to SP10, one each to SP5, SP11, SP12 and SP14, and eight to SP17. The 29 outputs cross-referred to SP10 (Mathematical Sciences), were from one HEI and this did result in extensive discussion about how to best assess these. As already discussed, the vast number of SP17 cross-referred outputs coming in to SP16 caused a large amount of work for sub-panel members, but there were also 17 additional cross-referrals coming in (one each from SP7, SP10, SP13, SP20, SP24, SP28 and SP34, plus two from SP23, three from SP19 and five from SP14) and 19 joint assessments (one each from SP18 and SP24, five from SP17 and six each from SP14 and SP22).

23. P16 was the only sub-panel in Main Panel C to make use of citation data. In practice, these data were only used in a small number of cases of discrepancies across grade boundaries, and, 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 assessment period. They proved useful in a few marginal judgements.
24. The IDR flag was used inconsistently by submitting units. The flagged outputs were concentrated in a small number of submissions with many not using the IDR flag at all. However, the interdisciplinary advisers noted the presence of high-quality interdisciplinary research among the submitted outputs, including many outputs that were not flagged as interdisciplinary
25. A total of 207 journals were represented by the 2,128 articles submitted to SP16. The articles judged to be world-leading in terms of their quality were published in 63 journals, showing a wide spread of top-quality economics. In a discipline where a “top 5” set of journals are held in particular esteem, it is worth noting that the majority of articles judged to be world-leading were published outside this set of journals. This included submissions in more than 20 journals that are outside economics, in other disciplines such as management, science, statistics, finance, mathematics and political science. There were 40 journals with 10 or more submitted articles. Of these, there was no single journal for which all submitted articles were judged to be world-leading; 11 of the 40 journals had a mix of some articles that were judged world-leading, some internationally excellent and some internationally recognised. This indicates that publication in any given journal is not a proxy for research quality (judged by the criteria of originality, significance and rigour) and that peer review of outputs plays a critical role in the assessment of research quality in Economics and Econometrics.

Impact

Table 2: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	36.3	44.7	14.1	3.4	1.5
REF 2021	42.6	43.5	10.4	2.6	0.9

26. Assessing the quality of impact case studies was enormously assisted by the expertise and experience of the senior, high-profile impact assessors who joined the sub-panel for this stage of the evaluation process. It proved relatively straightforward 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 impact where academic work not explicitly targeted at policy debates was shown to have an unanticipated but significant impact on users.

27. In terms of geographic scope, of the 91 impact case studies submitted to SP16 47 per cent were UK-based case studies, and the other 53 per cent were international. Around one third (30 of the 91) were on macroeconomic issues in areas such as ageing/pensions (3), central banking (11), growth (3) development (6), finance (1), fiscal policy (2) and trade (4); the other two thirds were on microeconomic issues including health (9), industrial organisation/regulation (12), crime (1), education (12), immigration (4), minimum wages (3), unemployment (2), behavioural (2), taxes (3) and wellbeing (2). The topics reflect issues of long-standing importance (education, health, central banking), along with issues that became important because of events (trade, immigration) and where research has been able to respond. Additional areas showed significant impact where economic research has arguably driven the policy agenda (for example, wellbeing, productivity, minimum wages, nudges, and market design).
28. Some HEIs submitted case studies that concentrated on particular policy areas (e.g. health, regulation) reflecting, for example, notable areas of strength or an established research centre. However, in most cases, submissions evidenced strength in breadth across multiple policy areas. This points to the positive impact environment of many economics departments.
29. It is possible to stylise different types of case studies submitted to SP16. The first type is empirical evaluation studies of the effect of X on Y (generated outside policy-making bodies) that led to a change in policy outcomes (both individual studies and production of datasets). This is the most common type. A second type is research that led to methodological innovations in the way policy is implemented. Note that this includes some pure theory research that, for example, led to innovations in market design. A third type, where in some cases it proved slightly more difficult to establish impact of research, involved individuals acting in specific roles that had an influence on policy (because of their expertise). In some of these, the link between the research and the impact was perhaps not as clearly articulated as it could have been.
30. As made clear in the 'Panel criteria and working methods', the quality of the underpinning research was only a threshold requirement, and, once agreed to be of internationally recognised quality, played no role in the evaluation of the impact case study. Nonetheless, and in common with REF 2014, 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.
31. The agreed scores show an increase in quality since REF 2014 (see Table 2 above), but the scale of the increase is modest. 42.6 per cent (FTE weighted) of submitted case studies were scored at 4* this time, compared to 36.3 percent for impact in REF 2014. But the level of 3* impact barely changed, dropping a little to 43.5 per cent from 44.7 per cent in the previous REF. Thus, the share of 2* and lower reduced from 20.0 to 13.9 percent. This overall smaller increase of impact case study scores relative to outputs and environment may reflect the new REF rules requiring submission of all individuals, which resulted in more impact case studies needing to be submitted per HEI in REF 2021. Reflecting on the process, the sub-panel members also felt that the required use of a 9-point grading scale in this part of the exercise could have truncated the top of the distribution (where there were some truly outstanding impact case studies).

32. Empirical analysis of the 91 case studies, and the individual researchers named in them, reveals a number of interesting patterns. The number of named researchers varies from one to nine, with 61 per cent having a single researcher, 22 per cent having two, 10 percent having three and 7 per cent naming four or more. Only 23 per cent of all named researchers were women. Moreover, a quarter – six of the 24 HEIs submitting impact case studies - returned submissions with no named women. 24 out of 155 named researchers were ECRs. In most cases, these were part of wider groups rather than single researchers. The sub-panel were very impressed to see several case studies that were generated by ECRs. Several HEIs returned multiple case studies with the same researcher(s), including groups and single individuals (working on different areas). In these cases, the sub-panel noted the importance of confirming that the environment was conducive to generating impact more widely.

Environment

Table 3: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	33.4	48.6	17.6	0.4	0.0
REF 2021	55.8	39.7	4.3	0.2	0.0

33. Environment has been part of the research assessment process for some time, so best practice approaches have disseminated throughout institutions. The sub-panel was impressed with the procedures that most submitted units had in place for recruitment, fostering research, supporting graduate students and early career researchers. It also recognised recent progress made in Economics and Econometrics with, for example, increasing participation by institutions in the internationally competitive US and European job markets and significant developments and innovations in PhD programmes. Especially at the highest scoring institutions, but broadly speaking in almost all cases, there were many strong examples of international linkages with other globally-leading institutions and wider contributions to the discipline, testifying to the high degree to which UK academic economics is integrated into, and is a key player in, the worldwide profession. Although some progress has been made in documenting what units have done with regard to improving diversity and equality in hiring and progression, the sub-panel noted that there remain challenging issues in Economics and Econometrics around equality and diversity. This included among the highest scoring units that are world-class in every other dimension but who did not demonstrate the commitment to addressing and promoting equality and diversity that the sub-panel expected. Even among institutions with the very highest environment scores, there is a clear need going forward to engage with, monitor and improve these initiatives.

34. The environment scores for SP16 are higher than they were in 2014 (see Table 3 above). 4* environment scores rose from 33.4 percent in 2014 to 42.6 percent, as the 3* and 2* percentages fell (respectively from 48.6 to 36.8 percent for 3* and 17.6 to 4.7 percent for 2*). This is due in part to increased selectivity of submitted institutions but also reflects the significant strengthening of the research environments at many economics departments in the UK discussed above. As one would expect with such high selectivity that characterises SP16, the percent of below 2* remains negligible at 0.2 percent.



Sub-panel 17: Business and Management Studies

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	30.4	45.9	21.3	2.1	0.3
Impact	41.7	42.8	13.4	2.1	0.0
Environment	42.4	40.7	15.0	1.9	0.0
Overall	35	44	19	2	0

Summary of submissions

1. UOA 17 (Business and Management Studies) (B&M) received 108 submissions, compared with 101 in REF 2014. These included 10 new entrants, whilst three institutions that submitted in 2014 chose not to make a submission this time. There was a wide distribution in the size of submissions, the largest being 186.94 FTEs and the smallest 5.40.
2. A total of 6,633.52 Category A FTE staff (6,995 headcount) was submitted, representing more than a 100% increase over 2014. The largest 26 submissions accounted for 50% of the total submitted staff FTEs. 1,035 staff were designated Early Career Researchers (ECRs), an increase of 41% over 2014 (731).
3. The sub-panel received 15,998 outputs compared with 12,204 in 2014: a rise of 31%. Of these, 43 had a double-weighted request.
4. Key changes in the REF 2021 submission criteria from 2014, led to an increase in the number of submitted impact case studies. In 2021, the sub-panel received 539 impact cases for assessment, an increase of 107 (25%) from 2014. In 2021, 17 institutions submitted nine or more impact case studies; 35 institutions submitted seven or more, accounting for more than half of those submitted (291); while 25 submissions included two impact case studies.
5. A total of 9,200 doctoral degrees were awarded during the assessment period, an average of 1,314 per annum compared with 961 per annum in REF 2014.
6. Such substantial changes in the volume of material submitted to REF 2021 were not unexpected. The REF 2021 timetable was longer than that of REF 2014 so care must be taken in making absolute comparisons. However, the increase in outputs and impact cases submitted to UOA 17 was high compared with Main Panel C and across all main panels, demonstrating the significant contribution of B&M to the social sciences (see Main Panel C Report) and the university sector in general.
7. The quality profile for UOA 17 shows that the majority of the submitted material was assessed to be of world-leading or internationally excellent quality at 35% and 44% respectively. This represented a substantial improvement on REF 2014.

8. Although comparisons between REF 2014 and REF 2021 should be treated with caution, given the changes in submission rules, this improvement in quality suggests research in UK B&M has not been diminished by an increase in the volume of research submitted.

Sub-panel membership and expertise

9. The increase in the volume of research to be submitted was first shown in the survey of submission intentions of institutions in 2019. This helped to shape the size, disciplinary breadth and expertise of the sub-panel for UOA 17. Recruitment to the sub-panel was mainly in two phases, corresponding to the criteria setting phase (2018-20) and the assessment phase (2021-22). Sub-panel members were selected from nominations, principally on the criteria of meeting the expertise required to cover the UOA descriptors and to avoid concentration in particular institutions and locations. Guidance and briefings were also received from the Equality and Diversity Advisory Panel to ensure that nominations and appointments ensured a spread of diversity characteristics.
10. The criteria-setting phase allowed for a detailed familiarisation and consideration of the provisional guidance for submission and the need for any adjustments to the 'Panel criteria and working methods' set out by Main Panel C. During this phase, the sub-panel comprised 13 members, five of whom had been involved in REF 2014. The outcome was to finalise and agree on the 'Guidance on submissions' and the 'Panel criteria and working methods'.
11. In the assessment phase, the sub-panel consisted of 36 full sub-panel members, 12 impact assessors and two output assessors. One full sub-panel member was jointly appointed with Sub-panel 16 (Economics and Econometrics) because of the large number of outputs expected to be cross-referred to that sub-panel. Two sub-panel members were appointed as interdisciplinary advisers. The sub-panel also received support from an international member, and an impact member and user member of Main Panel C. Eight of the full sub-panel members and two of the impact assessors had served in previous REF assessments. This ensured some continuity in experience whilst expanding the pool of assessors.
12. Full sub-panel members normally had three main roles: the assessment of outputs within their areas of expertise; as primary and secondary assessors of environment statements for a set of HEI submissions; and as assessors of impact cases for the HEI submissions where they had primary and secondary responsibilities.
13. The sub-panel executive comprised the chair and two deputy chairs, who led the assessment process. The executive was supported by three members of the secretariat, including two sub-panel secretaries and a sub-panel adviser, who worked closely together throughout the process. The secretariat was further strengthened with support for the processing of the impact case studies.
14. The impact of Covid-19 on such a large sub-panel should not be under-estimated. The already complex demands on the secretariat and sub-panel were heightened by the additional complications arising from Covid-19. This involved switching between face-to-face, virtual and hybrid meetings and assisting sub-panel members in the assessment phase. A number of sub-panel members and their immediate families were affected by Covid-19, but they continued to work as hard as they could to stick to the task as much as possible to complete the assessment.

15. The sub-panel required competences and expertise to cover a range of subject areas, including: accounting; banking; business analytics; business and industrial economics; business ethics; business history; consumer behaviour; corporate governance; corporate social responsibility; critical management studies; employment relations; entrepreneurship; finance; human resource management; information systems management; innovation management; international business; leadership; management education; management science; marketing; operations management; organisational psychology; organisational studies; project management; public policy; public sector management; risk management; service management; small firms; strategic management; supply chain management; sustainability; technology management; third sector management. The boundaries within these areas were permeable, reflecting the interdisciplinary nature of some of the research activity and methodologies used by business and management scholars. Sub-panel members worked diligently and as a team, to ensure that all elements of the submitted work were treated fairly and assessed with the appropriate expertise.

Sub-panel working methods

16. The assessment process was guided and overseen by Main Panel C and the main panel chair. The chair of SP17 attended Main Panel C meetings ensuring consistency in the approach taken between all sub-panels within the social sciences. The sub-panel and main panel advisers also provided guidance when necessary, such as in relation to EDI.
17. To ensure a robust and consistent assessment of the submissions, SP members and assessors made themselves familiar with the guidance documentation and all took part in training activities. Prior to the assessment phase, SP17 members participated in workshops provided by the REF team, including training for Equalities and Diversity and for unconscious bias. A Fairness in REF Intention Plan was adopted to guide the approach and good practices of sub-panel members for each assessment element.
18. The volume of material to be assessed and concomitant size of the sub-panel required the assessment of the impact and environment submissions of institutions to be undertaken in three clusters to ensure efficient working methods. Each cluster comprised a chairperson, (the SP chair and each of the two deputy chairs), supported by a member of the secretariat. The 108 institutions were allocated to the clusters (approximately 36 per cluster) to maintain the same size distribution of institutions across clusters.
19. SP17 members, output assessors and impact assessors were allocated to one of these clusters to ensure no conflicts of interest arose. Each sub-panel member was allocated to a set of institutions, acting as the primary and secondary co-ordinator, assessing both their impact cases and environment statements. Impact assessors worked with sub-panel members as part of a triplet to assess the impact cases.
20. The clusters worked in parallel within a framework agreed by the sub-panel. Checks were put in place to ensure the quality criteria were consistently applied across the sub-panel, carried out through on-going quantitative and qualitative calibration exercises between the clusters and reports on generic issues in plenary sessions.

Calibration of Outputs, Impact and Environment

21. To ensure robust, fair and consistent outcomes, the calibration of emerging scores was embedded throughout the assessment process. Prior to assessing the submissions (output, impact and environment), SP members were involved in a series of calibration workshops to establish consistency in the application of the quality criteria. The exercises were participative and mainly used 'live' materials submitted to SP17. The sub-panel executive, secretariat and experienced members of the sub-panel often led the exercises, with input from the international, impact assessors and impact advisers.
22. In addition, calibration was also performed at regular intervals during the process and for each aspect of the submission to ensure consistency. Each sub-panel meeting provided the opportunity for members to share their observations, best practice and solutions to challenges faced when assessing submissions.
23. The executive closely monitored the emerging sub-panel profiles, including at sub-discipline level, to ensure that any differences were a genuine reflection of quality of the submitted material. After each sub-panel meeting, notes, guidance and conclusions from the sub-panel's discussions were circulated to sub-panel members to generate an additional cycle of calibration based on reflection.

Assessment Processes

Outputs

24. Outputs were allocated to expert assessors. In preparation for the assessment, sub-panel members formed groups according to subject area expertise. These varied in size according to the expected number of outputs. Some members spanned more than one group.
25. Outputs were initially allocated by matching keywords in the output title and/or journal title to the subject group that was most competent to assess them and from there, to an appropriate assessor. Approximately two thirds of outputs were initially allocated using this approach. Prior to allocation to individual assessors, checks were made by the executive with support from the secretariat to avoid conflicts of interest and to ensure a balanced workload. Where minor conflicts of interest did arise, outputs were re-allocated to another sub-panel member or output assessor with the appropriate subject expertise. One of the advantages of having a large sub-panel was the wide pool of members and assessors that could be drawn upon when finding appropriate subject expertise. There was no allocation of blocks of outputs by institutions to the same individuals, thus reducing risk of bias. In accordance with the 'Panel criteria and working methods', sub-panels were reminded that no journal lists or metrics were to be used to judge quality.
26. Within the subject area groups, outputs were assessed normally by one person on a five-point scale (0, 1, 2, 3, 4). Where an output was borderline, assessors were able to discuss the output with another sub-panel expert in that area. As mentioned above, ongoing calibration was included in sub-panel meetings, allowing members to share best practice and observations. If the output fell outside the area of expertise, it could be sent to another member of the sub-panel or, if outside the expertise of UOA 17, be cross referred.

Cross-referrals and joint assessment

27. The sub-panel cross-referred (or jointly assessed) 2,400 (15%) of all outputs (and 1 impact case study) submitted to UOA 17 (see Table 4 in Main Panel C Overview Report).

These included some of the outputs flagged by institutions, as well outputs where the expertise was deemed to fall outside the boundaries of UOA 17 or if the sub-panel did not have sufficient in-house expertise to assess the output. The sub-panel retained responsibility for the final grades for all outputs originally allocated to it, based on the advice received.

28. A significant number of cross-referrals submitted to UOA 17 fell clearly within the remit of UOA 16 (Economics and Econometrics) (1,443 outputs). This cross-referral process was overseen by a sub-panel member jointly appointed with SP16 and SP17, with appropriate measures put in place by the executive to manage conflicts of interest.

Interdisciplinary Research Outputs (IDRs)

29. Submitting institutions were invited to flag those outputs that they deemed 'interdisciplinary'. The IDR flag was used extensively by some institutions but not at all by others. Given these different interpretations of IDR, the outputs that were flagged were scrutinised by the two SP17 interdisciplinary assessors, who decided whether they could be assessed within UOA 17 or should be cross-referred or jointly assessed with another sub-panel.

Impact Case Studies

30. Each of the 539 impact case studies (ICS) was allocated to a group of three members – a 'triplet' - for assessment. This comprised the primary and secondary sub-panel members allocated to each institution and one user member/impact assessor. Each sub-panel member was responsible for assessing around 30 impact cases and each impact assessor around 40 case studies. Using a nine-point scale, members of the triplet scored cases independently before meeting to review and agree a provisional grade. Sub-panel agreement of provisional grades took place in the cluster to which institutions were allocated for impact assessment, with direct discussion of approximately 50% of all case studies across the clusters. This process assured rigour, fairness and consistency in the treatment of all impact cases in terms of the application of the criteria.
31. Ensuring that the application of the criteria for impact cases within the clusters was consistent across the sub-panel was achieved by three means. Firstly, at the sub-panel meeting where the impact cases had been discussed and grades scrutinised, plenary sessions were held to allow generic issues to be raised regarding the application of the quality criteria. Secondly, the executive, working with a selection of sub-panel members, undertook a quantitative and qualitative evaluation of the grades assigned within each cluster. This revealed no significant differences between the clusters in the application of the criteria. Finally, where an impact case posed a particular challenge, such as in reaching a common understanding or because it was on the boundaries of B&M, the Main Panel C impact adviser was able to provide guidance based upon main panel experience.

Environment

32. The assessment of the 108 institutional environment statements was undertaken by the primary and secondary assessor of each institution, following the quality criteria. Assessors were required to separately grade each of the four elements of the environment (Strategy; People; Income, Facilities and Infrastructure; and Collaboration and Contribution to discipline), equally weighted, on a nine-point scale. This assessment drew mainly from the submitted unit environment statement and the standard analysis and staffing data, although the institutional environment statement (and Covid-19 statement if submitted), provided helpful contextual information.

33. The initial assessments of the primary and secondary assessors were presented to members of their cluster to stimulate discussion and facilitate calibration. Following the cluster presentation and feedback, the assessors were requested to reflect on the feedback and adjust any grades accordingly. Plenary sessions were held to discuss any generic issues and report back on observations from the clusters. Further calibration was undertaken across the sub-panel by the selection of institutions and their initial grades.
34. As part of their submission, UOA 17 received 91 Covid-19 statements. These set out the challenges emanating from Covid-19, what actions had been taken their research activities and their impact cases. As with the institutional statement, this was not separately graded or assessed by the sub-panel but helped the assessors to understand the context of the submitting units.

IT systems

35. The software systems allowed the executive to monitor progress of the assessment and the emerging quality profiles and the results were presented to regular meetings of the sub-panel. This helped sub-panel members to understand how their assessment scores compared with the rest of the sub-panel, although there was no requirement for them to produce identical profiles. This also helped motivate sub-panel members to progress with their assessments, especially given the relative absence of face-to-face contact during the assessment period. These profiles were also shared at the Main Panel C meetings to assure members that the same quality standards were being applied across all sub-panels.

Comments on the work submitted for assessment

Outputs

36. As in 2014, journal articles comprised over 97% of all outputs submitted for assessment (see Table 2 below). This was followed by authored books (1.4%) and book chapters (0.7%) with small numbers of other output types. The Business and Management field has a wide range of journal outlets and this was reflected by the fact that articles submitted were published in over 1,550 different journals. However, in some sub-fields there was a concentration of articles in a small number of journals, as reported in the subject area statements. The proportion of books submitted remained relatively low.

Table 2: Outputs Types assessed (factoring in double weighting)

Authored Book	Edited Book	Chapter in Book	Design & artefact	Journal Article	Conference Contribution	Report	Other
1.4%	0.1%	0.7%	0.0%	97.1%	0.3%	0.2%	0.4%

37. All outputs were assessed and the grades awarded showed a significant improvement in quality since 2014, even when the changes between REF 2014 and REF 2021 were taken into account, with 30% classified as world-leading and 45% as internationally excellent. Outputs of this quality were found across all sub-disciplines as reported in the subject reports.
38. The majority of outputs flagged as being interdisciplinary were assessed within SP17 because of their close association with subjects within B&M. Where cross-referrals were required, the majority went to other sub-panels within Main Panel C (e.g. Economics, Politics, Law, Geography, Education). However, it was pleasing to see a rise in the number of outputs spanning disciplines outside the social sciences, such as engineering and public health. On receipt of the advice and recommended grade for cross-referred outputs, the nominated SP17 member responsible for the cross-referred outputs used their professional judgement to assign a final grade.
39. 1,450 outputs were cross-referred to Sub-panel 16 (Economics and Econometrics), co-ordinated by the jointly appointed sub-panel member who worked with members of SP16 and SP17 to ensure the fair and consistent treatment of these outputs. On receipt of the advice from SP16, the SP17 assessment was guided by the joint sub-panel member regarding the advice received. Following various checks for consistency in grades with those submitted directly to UOA 16, SP17 was satisfied that the recommended grades from SP16 were fair and consistent.
40. Similarly, for the 951 outputs cross-referred to all other sub-panels, SP17 undertook a comparison of recommended grades with the distribution of grades awarded by the relevant sub-panel to ensure a fair and consistent treatment of all cross-referred outputs

B&M Impact

Table 3: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	37.7	42.5	17.0	2.2	0.6
REF 2021	41.7	42.8	13.4	2.1	0.0

41. This is the second REF with impact as an element for assessment and most submitting institutions had made significant investments in their support infrastructure, as evidenced in their strategy and environment statements. The large number of impact cases submitted to UOA 17 showed a wide range of impacts on the economy and society, the pathways to impact and various indicators of reach and significance.
42. As shown in Table 3 above, the overwhelming majority of submitted impact cases were assessed as demonstrating impacts that were outstanding (42%) or very considerable in terms of their reach and significance (43%). This was a significant improvement on REF 2014.
43. The impacts on public policy were widespread. These included, for example, impacts on policies for social inclusion, finance, policy, promoting sustainability, improved medical and healthcare systems, promoting business growth, the submission of highly influential evidence or advice on inquiries and the setting of standards within public bodies. Public policy impacts were seen across local, regional, national and international levels. A large number of international policy impacts involved collaborations with partners,

particularly on programmes within the European Union. Some concerns were raised about the ability to continue such relationships since Brexit, although some submitting institutions had already started to develop strategies to mitigate its effects.

44. Impacts were also found at the organisational level, including in private and not-for-profit organisations. Examples included impacts that have affected strategic change in organisations, stimulated innovations in practices and those that have affected organisations' approaches to corporate social responsibility. There was also a significant number of impact cases linked to changes in professional practices, such as through curricula and standards setting in the Accounting and Finance profession.
45. Given the variety of impact cases demonstrating outstanding impacts and the need to treat each impact case on its own merits, there appeared no 'blueprint' or model for an outstanding case. Assessors treated all types of impacts and evidence to support the impact equitably, irrespective of the type of impact case. This required some empathy to understand the approach taken in each impact case and the claimed impact, but at the same time applying the assessment criteria robustly.

Environment

Table 4: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	36.8	39.7	21.0	2.4	0.1
REF 2021	42.4	40.7	15.0	1.9	0.0

46. Generally, the environment statements submitted were assessed as providing strong evidence of the vitality and sustainability of the research across SP17. As shown in Table 4, the quality profile showed that 42.4% of submitted researchers worked in an environment that was judged to be conducive to producing research of world-leading quality and enabling outstanding impact in terms of vitality and sustainability, with a further 40.7% in an environment assessed as internationally excellent and enabling very considerable impact. This represented an improvement on the quality profiles from REF 2014, especially at the four-star level, as well as reflecting the vibrancy of the field of Business and Management reflected in the outputs and impact case elements of SP17.
47. The sub-panel was pleased to be able to award 100% four-star to a number of submissions and whilst this did not mean these were perfect research environments, it did indicate that they were conducive to producing world-leading research and enabling outstanding impact. The strongest environment statements paid attention to all sections of the environment template and provided a clear strategic thread throughout their submission.
48. Environment submissions were assessed independently of outputs and impact and followed the four sections of the environment template. The narrative was supplemented with data from the standard analyses. The institutional level environment statement (REF 5a) of each submission was read with a view to setting the context of the unit. The optional Covid-19 annex, submitted by 91 institutions, provided evidence of the impact of Covid-19 on the submissions.

49. As indicators of the B&M sector's sustainability, the sub-panel noted an uneven distribution of PGR activity between institutions in SP17, with the strongest environments having higher numbers per FTE. Assessors noted that some of the smallest institutions were building up their PGR numbers drawing upon institutional-wide support and structures, showing different models of resource mobilisation than those drawing upon research council and university-funded scholarships. The strongest submissions provided evidence on the career destinations of these PGRs.

Table 5: Doctoral Awards by Academic Year

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Doctoral degree awards	1171	1220	1294	1362	1412	1433	1308
Awards per FTE	0.18	0.18	0.20	0.21	0.21	0.22	0.20

50. In assessing the Income, infrastructure and facilities section, the sub-panel found evidence of support for environments that were conducive to producing research of world-leading quality and enabling outstanding impact across the B&M sector. A significant number of submitting institutions reported having new buildings as well as increasing their digital capabilities for staff and PGR students. This certainly demonstrated a commitment by institutions to invest in B&M studies as well as to continue its growth and momentum.
51. Income levels submitted by UOA17 in 2021 showed an upward trajectory over REF 2014 from an average of £67.644m p.a. (2008-13) to £75.805m in 2021 (2013-2020) as shown in Table 6 below. Income has also not been adjusted for inflation between REF cycles. The sources of income were widespread although there was a significant proportion (£2,497 of the £11,428 per FTE p.a. submitted) deriving from European Union bodies, which may be a cause of concern for the immediate future. The diverse types of funding are a reflection of the range of research undertaken by B&M and the various ways in which researchers they engage with society and the economy. The strongest submissions provided a coherent and sustained strategy for external income generation that was appropriate for the types of research within that institution. This involved looking to sources beyond the EU, especially in cases where units had developed strong European collaborations and was facing uncertainty. For some units, there was evidence of sustainability and vitality through involvement in large-scale grant awards involving collaborations across institutions.

Table 6: Research Income (including Income in kind) by Academic Year

Year	2013-14	2014-15	Annual average for 2015-20	Annual average for 2013-20
Total Research Income	65,152,836	69,536,456	79,189,592	75,805,321
Research Income per FTE	9,822	10,483	11,938	11,428

52. There was extensive evidence of Collaboration and contribution to the research base, economy and society within Business and Management. Overall, the sub-panel was impressed with the quality and reach of the researchers across all aspects of this section of the submission, showing the strength of the Business and Management research base worldwide.
53. The strongest submissions provided an underpinning strategy for collaborations and contributions or built upon those that existed, often aligning with research groupings or areas of research strengths in the submission. This contrasted with some submissions that relied heavily on a small number of individuals, their networks and esteem. Whilst commendable and in some cases showing vitality, these submissions were less likely to demonstrate sustainability for the unit. This was particularly challenging for smaller institutions with only a few individuals engaged in research and reliance on personal networks rather than larger-scale projects and research consortia. There was an emerging body of evidence of interdisciplinary collaborations across institutions, spanning disciplines beyond the social science.
54. Those submissions that showed the strongest contributions to the discipline did so by linking these activities to the strategy of the unit, presenting the contributions thematically or by sub-discipline. These were able to show a contribution to an environment that was vibrant and sustainable and was conducive to producing world-leading outputs and outstanding impacts. Weaker submissions descended into lists of activity, although these were often able to demonstrate significant contributions at an individual level.

Reflections by the sub-panel on Business and Management Studies as submitted to REF 2021

Accounting

55. Approximately 1,000 outputs were submitted to the field of accounting, consisting roughly of 600 financial accounting outputs, and 400 management accounting outputs. This was a significant increase of about 50% compared with REF 2014. A significant number of outputs was judged to be of world-leading quality and these were found across a broad range of publication outlets.
56. Outputs covered a wide range of accounting and social issues. In financial accounting, world-leading and internationally excellent outputs were found in the emerging field of new technologies in accounting and auditing, big data and forensics, as well as in the more established fields. In management accounting, world-leading and internationally excellent outputs were on budgeting and investment appraisal,

performance management and measurement, and strategy, particularly in emerging economies where macroeconomic policies have critical impacts on economic outcomes. A significant number of world-leading accounting history papers dealt with accounting in military and government settings.

57. A substantial number of outputs dealt with the consequences of the 2007/08 financial crisis and the impact of government policies to mitigate its severity. There was a significant increase in outputs on public sector and not-for-profit accounting since REF 2014, and this was also reflected in some of the impact case studies submitted. There was a notable increase in outputs that dealt with multiple topics, combining various accounting issues. There continued to be a rich eclectic/pluralistic methodological tradition in accounting research. Outputs of world-leading and internationally excellent quality were found across all methodologies. Such outputs were clearly conceived and rigorously theorised and were underpinned by original and extensive longitudinal/national/international datasets (including 'hand-collected data'), ethnographies and qualitative data. Some ethnographic papers dealing with indigenous accounting practices, along with critically-interpretative studies of the accounting profession and governments in emerging economies, were classified as world-leading. Social media as a data source emerged in studies of performance measurement in unusual settings. There was a greater depth in the analysis of language and visual data. A small set of outputs were conceptual and theoretical; a few were literature review based. Other topics covered included: corporate influences on accounting information; the effects of regulation and disclosure requirements on the type and quality of accounting information and how they in turn affected market performance; creditor rights and investor protection; and financial regulation. Several outputs were concerned with multinational research findings.
58. Based on the submissions received, UK accounting research improved both in terms of the quality and quantity of research outputs when compared with REF 2014. There was greater diversity and sophistication in research contexts, types of datasets used, the issues addressed, methods and theories applied.

Finance

59. Around 1,800 outputs submitted to SP17 were in finance, showing a significant increase on REF 2014. Most outputs were in the form of journal articles and were concentrated in the areas of asset pricing and related topics (c.650), banking (c.425), and corporate finance (c.725). Most of these outputs were assessed within SP17, but a small number were cross-referred to SP16 Economics and other sub-panels. Papers assessed as world-leading and internationally excellent typically developed theoretical insights with interesting research designs or novel conceptualisations of problems that meaningfully extended understanding of finance issues.
60. Topics that related to asset pricing included: tests of asset pricing models; predictability; behavioural finance and pricing anomalies; FinTech; derivatives; macro-finance; market microstructure; international finance; investments and investment funds; household/personal finance; and financial market regulation. World-leading outputs compared financial markets across countries. For banking, much of the submitted research was tied to ongoing developments in the banking industry, risk-taking and regulatory environment, providing insights regarding the evolution and impact of organisational forms, business models and corporate governance on bank risk and performance. Some world-leading outputs used bank-firm matched datasets and innovative econometric designs to investigate linkages between the banking industry and the real economy.

Corporate finance topics included: mergers and acquisitions, capital structure, pay-outs, IPOs, behaviour of institutional investors, corporate social responsibility, sustainability/ climate finance, and corporate governance (including board composition, executive compensation, and gender diversity in boards). Some world-leading outputs brought together corporate finance research questions with insights regarding the role of institutions, regulation and political economy.

61. The bulk of the outputs submitted were empirical, underpinned by theoretical insights from cognate disciplines, especially economics (but also drawing on accounting, history, psychology, mathematics, and statistics). There were a small number of purely theoretical outputs often assessed as world-leading. Empirical outputs utilised cross sectional and longitudinal datasets assembled and made available by commercial organisations and government agencies, with a growth in the use of administrative and hand collected data sets from the internet and social media. There was a notable increase in quasi-experimental research designs, to interrogate research questions relating to the impact of sudden exogenous events and public policy interventions on the behaviour of financial markets, financial institutions, and corporations across various geographies.
62. Based on the submissions received, the overall quality of outputs has increased since REF 2014, with more submissions graded as world-leading. World-leading and internationally excellent outputs were often found in top US finance journals, but a significant proportion were also published in leading UK and European journals. Such papers typically included predictions from a theoretical model combined with rigorous empirical design and novel datasets.

Marketing

63. The size of the marketing submission has risen roughly in proportion to the increase in size of the B&M submission, with approximately 1,400 submitted outputs in REF 2021. The period has also seen an improvement in the quality of outputs over REF 2014, with a substantial majority of outputs recognised as being world-leading or internationally excellent. Marketing remains a strong, vibrant and healthy sub-field of academic research within B&M.
64. Marketing academics have continued to publish in what are often considered the world's leading journals. Outputs assessed as world-leading, in terms of originality, rigour and significance, were published across a range of marketing and non-marketing journals. Although the number of authored books submitted was relatively low, their quality was consistently of international or world-leading standard.
65. Since RAE 2008 and REF 2014 there has been a notable expansion in the range of journals in which submitted marketing outputs have been published. This changing landscape was also reflected in the important observation that UK marketing academics are publishing world-leading and internationally excellent research in journals outside marketing, in sub-disciplines of management and beyond, a practice that is welcomed.
66. While the assessed outputs continued to address core substantive topic areas across the breadth of the sub-field, it was pleasing to see an increase in the variety of subject content addressing the grand challenges; for example, equality, diversity, inclusivity, sustainability, health and wellbeing, internationalisation, artificial intelligence and machine learning.
67. The sub-panel noted that marketing outputs have contributed to innovative theoretical and methodological approaches across a range of output types. While much research

remains framed within established discourses, it was very encouraging to see fundamentally challenging and difficult questions being addressed. Relatedly, there was considerable diversity in the research design and methods. This could be a consequence of marketing academics working in a more cross- and inter-disciplinary way and encountering a broader range of methods. Indeed, interdisciplinarity was clearly embedded as a key feature of marketing submissions. Thus, the vigorous heterogeneity of methodological perspectives, noted for REF 2014, continues to evolve.

68. While relatively few submitted impact cases focused exclusively on marketing, there were high-quality examples of cases addressing a range of subject specific areas including retail marketing, supply chain issues, digital marketing and a variety of consumer behaviour change issues. Many impact cases employed and embedded ideas and principles from the sub-discipline. Examples included applied behaviour change principles from consumer behaviour or social marketing to bring about public behaviour change; the development of digital domains, involving impact activities that were heavily influenced by marketing thought; and the different kinds of marketing communications to create and sustain impact.

International Business

69. The overwhelming majority of the papers submitted in International Business were empirical rather than theoretical, and compared with the previous period there was an increase in the number of qualitative papers, with a pleasing number of cross-country qualitative papers.
70. The outputs rated as world-leading included a range of approaches. There remains an essential distinction between work that focused on the management of the multinational firm, covering areas such as mode of entry, or knowledge management within the firm, and that which sought to explain performance. The qualitative outputs tended to be at the international management end of the discipline. It was clear that obtaining qualitative data to facilitate internationally excellent work in international business remained a challenge, though it was pleasing to see papers reaching the highest threshold. Indeed, the percentages of qualitative and quantitative papers that received the highest grades were very similar.
71. A large number of the quantitative outputs were concerned with understanding the implications of multinational activity for host or home locations, in terms of the impacts on employment, productivity or innovation. The papers that attracted the higher grades in these areas demonstrated a contribution to other disciplines as well as IB, including for example, Area Studies or Economics, and drew on the state of the art in terms of modelling and estimation from these disciplines, rather than solely on IB research.
72. It was 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. Finally, it was also 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.

Strategic Management

73. Strategic Management research continues to be an inherently multi-functional and multi-disciplinary field which draws on a wide range of theoretical underpinnings. As a result of this diversity, the estimated 350 outputs submitted were published in a

wide range of journals, both specialist strategy and general management journals. As in REF 2014 outputs in the strategy area tended to be concentrated in a limited set of submitting units.

74. Research in Strategic Management is predominantly empirical. The vast majority of the submitted research outputs in this area were journal-based. Very few books were submitted. It was hard to identify particular topics with a greater body of research than others, but areas such as dynamic capabilities and ambidexterity were more common than others.
75. The methodologies employed were predominantly quantitative. However, the sub-panel noted that there were still a significant proportion of submitted articles using qualitative methodologies. Many of these were assessed as world-leading, demonstrating strong originality and significance, accompanied by clear rigour. It was also pleasing to see that the rigour of qualitative papers in the strategic management field was often exemplary. On the other hand, qualitative studies graded at a lower level often suffered from a lack of rigour, which suggested a need to focus on more consistency in rigour in qualitative strategic management research. The rigour of quantitative work, by comparison, was typically high, and it was pleasing to see how much was ranked as world-leading. Here, where research was graded at a lower level, it was more likely a result of lesser originality, with lower graded papers contributing only incremental advances to knowledge. The concepts and principles in the field of strategy, such as organisational change, strategic decision making and organisational ambidexterity, were to be found in a range of impact cases submitted to the UOA.

Human Resource Management and Employment Relations

76. This subject area continued to comprise a significant part of the submissions to the sub-panel, with virtually every submitting unit, regardless of size, having outputs in the area. Boundaries between this area and cognate ones are necessarily inexact, but approximately 2,000 outputs from the area were assessed. High quality outputs were found in a very wide range of mainly British, European and US journals, and also in books and book chapters. It was pleasing to see books and research monographs submitted in this area and the quality of these was exceptionally high. The majority of papers were empirical with some notable theoretical papers. The review papers offering a summary of existing literature were much weaker in offering new theoretical insights or distinctive agendas for the future.
77. The field is highly diverse, drawing on disciplinary insight from organisational sociology, organisational psychology and labour economic and political economy. However, there was also some evidence of greater inter-disciplinary working at the intersect of HRM and Employment Relations to address substantive theoretical and society issues around the changing nature of work and organisation.
78. In terms of substantive topics, the areas within HRM were wide-ranging capturing HRM as function and process, as well as the focus on components of HRM as levers or antecedents of individual and organisational outcomes. In the Employment Relations domain, established areas remained prevalent such as voice and representation (including works councils and collective bargaining) and union strategies. However, there was also substantial research attention on the experience of work, through lenses including gender and diversity and a considerable number of papers looking at 'dirty work', and the different dimensions of precarious work and precariousness.

79. The interest in international and comparative issues noted in assessment reports from RAE 2008 and REF 2014 has been further developed. There was growing attention to the dynamics of the global economy, HRM in the context of multinational organisation, in emerging markets, and in global supply chains. These areas provided fertile ground for theoretical innovation and rigour.
80. There was further enhancement from REF 2014 in terms of the rigour and significance of research on inequalities, quality work and health and wellbeing, and a notable growth in submissions that tackled the need and complexity of developing dynamic and multi-level theorising. Alongside theoretical innovation, the world-leading and internationally excellent research demonstrated methodological rigour and innovation with the use of high investment qualitative methodologies (such as ethnography and longitudinal cases), and time intensive multi-source and multi-level methods and analysis. There remained some limitations in weaker outputs, for example, cross-sectional surveys of a relatively superficial kind. The single respondent cross-sectional survey tool proved to be of greater value in highly novel contexts. Weaker qualitative research tended to lack rigour in the methods, relying too often on limited data and descriptive and suggestive presentation of results. There was notable use of secondary data sources, employing panel data or nested data and combining interdisciplinary expertise, and advances in the adoption of sophisticated causal and experimental modelling. Together these advances put the academic community in a strong position to innovate theoretically, and create policy and practice change across a wide spectrum of societal, work and employment issues.

Small Business and Entrepreneurship

81. Approximately 700 outputs were identified in the field of Small Business and Entrepreneurship. However, this is likely to be an under-estimate because of its interdisciplinary nature, with papers straddling many other subjects such as innovation, marketing and regional development. Small Business and Entrepreneurship is, therefore, a significant focus for Business and Management research. Outputs were overwhelmingly published in North American and European Small Business and Entrepreneurship journals, with a significant minority in general Business and Management journals. Around 70% of these outputs were assessed to be of world-leading or internationally excellent quality.
82. Outputs used a broad definition of entrepreneurship, spanning social entrepreneurship, community entrepreneurship, self-employment, family business, conventional for-profit entrepreneurs and small- and medium-sized enterprises (SMEs). Diverse types of entrepreneurs were studied, including women and ethnic minority entrepreneurs, graduate entrepreneurs, portfolio workers and informal/hidden entrepreneurs. Digital entrepreneurship was the dominant focus from a sector/industry perspective. Although a majority of outputs were UK orientated, a significant number focused on other geographical contexts, such as China, including developing, transitioning and emerging countries; also reflected the international authorship and co-authorship of many outputs.
83. The vast majority of outputs were theoretically-framed empirical studies covering diverse topics and perspectives. Some covered traditional themes of 'who becomes an entrepreneur', who succeeds, opportunity desirability and feasibility, and the journey from venture idea to venture formation. There was a particular focus on access to finance, with crowdfunding as an emerging topic. Some outputs addressed 'the firm' or the SME, with attention to venture performance, growth and transitions, turnarounds and pivots. Entrepreneurship education, learning and graduate entrepreneurs and job satisfaction, well-being and mental health were prominent themes. There was a strong

emphasis on 'context' and eco-systems, notably embeddedness and the situated nature of entrepreneurship and entrepreneurship specific geographical contexts, including deprived areas and rural areas.

84. Methodologically, the majority of outputs were based on large-scale, cross-national, third-party surveys and databases, analysed using a variety of statistical techniques. The use of subjective measures, including Likert scales, was common. Despite the application of sophisticated techniques some of these studies offered limited insights, an observation made in the REF 2014 subject review, with the emphasis on hypothesis testing impeding further exploration of the data. Qualitative studies accounted for a significant minority of outputs, drawing upon interviews and surveys. There were few examples of the use of more sophisticated qualitative methodologies (e.g. diary studies) or longitudinal data. The growth in the field of entrepreneurship was reflected in the impact cases submitted, for example focusing on policy interventions for enterprises.

Public Sector Management

85. Public Sector Management remains a strong and healthy area of research within Business and Management, with a significant and increased majority of outputs assessed as being of internationally excellent quality or world-leading. Around 400 outputs were submitted in this field, and many more overlapped with other areas within and outside the UOA.
86. The overwhelming majority of all the outputs submitted were journal articles although there was a small increase in the submission of both books and book chapters and a small but encouraging number of commissioned reports. This reversed the trend reported for REF 2014 when fewer books and book chapters were submitted than in RAE 2008. Although most of the books submitted were research monographs there was a greater variety of submissions and books on average were assessed to be of a higher quality than other submissions.
87. The type of research varied widely from more theoretical papers to empirical studies. Qualitative research remained the prevailing form in the field but there were many impressive examples of quantitative research, and there was a greater proportion of quantitative-based submissions than in 2014.
88. There was a significant number of impact cases that related to the public sector. The majority of the impacts claimed were again centred around policy influence and advice, but there was a much greater variety in type of impact and in the evidence submitted to support the case studies. There were outstanding impact case studies at local, national and international scales both in the UK and globally.

Business Ethics, Responsibility, and Sustainability

89. Business ethics, responsibility, and sustainability have a strategic role to play in the submitting institutions as was evident from the environment statements and the approximately 400 outputs submitted. The United Nations' Sustainable Development Goals were offered as a guiding framework for research in areas such as decent work, climate change and inequalities, and supporting corporate social responsibility and ethical leadership. There was a diverse breadth of outputs in business ethics, responsibility, and sustainability, with examples across Business and Management. While most outputs were published in field journals there was a substantial increase in outputs in general management journals. The outputs included some world-leading research monographs. Many contributions were made at intersections with other

subject areas, such as in Marketing and Corporate Governance. There was also evidence of inter-disciplinary work, with some outputs published in applied sciences, political sciences, humanities, law and the arts.

90. The outputs submitted spanned the full quality assessment range, although a majority was assessed as internationally excellent or world-leading. This speaks to a relatively growing and sustainable area of study. Literature reviews were a weaker element, offering little in the way of new conceptual or theoretical trajectories. Emerging areas of study included sustainability transitions, digital work, artificial intelligence, modern slavery and forced labour, and the use of non-traditional organisation, social and moral theories. Recent research challenging the organisation of business in the Covid-19 pandemic, looks set to build on an ongoing trend to understand business in its political-social-environmental context. These developing strands of work show important promise for the future growth, impact, and relevance of the subject.
91. The extremely wide variety of beneficiaries and partners in the generation of social and environmental impact was impressive, including policy makers, the general public, workers, and public and private sector managers. So too was the geographic scope, being primarily evident in the UK and other European countries but with strong instances of global engagement, including with some developing economies. Private sector businesses of all sizes were the primary conduits of ethics, responsibility, and sustainability-related impact, though examples from social enterprises, charities and the public sector were also evident. A challenge remains in securing robust quantitative and qualitative evidence of social and environmental impact.

Organisational Behaviour and Psychology

92. Outputs in this field covered a broad spectrum of topics, including research on creativity, selection, coaching, communication, the role of gossip, performance, decision-making, and leadership. There was also a considerable body of work on individual and organisational well-being with a focus on work stress, bullying, moral behaviour. The field also demonstrated some methodological innovations, including the use of intensive research methodologies such as multi-source, diaries and longitudinal designs. A large number of the outputs were assessed as being world-leading and internationally excellent in this subject area, with qualitative as well as quantitative research well-represented in the world-leading outputs.
- 93 Work assessed as world-leading often used multiple methods and/or multiple studies to tackle subjects and phenomena of real significance in B&M. There was some evidence of creativity in combining different data sources, and high levels of methodological sophistication, with choices rooted in theory. In the world-leading outputs, this technical sophistication was deployed to address pressing theoretical and/or practical issues. Review articles (including meta-analyses and systematic reviews) featured quite prominently, and some of those that offered creative syntheses, theoretical or conceptual extensions, and/or innovative suggestions for future research were viewed as being world-leading.
94. In comparison to REF 2014, an increasing number of outputs based on qualitative methods were assessed, with world-leading outputs covering a range of creative methodologies, including an increasing use of visual approaches. There was an increased tendency for outputs to take account of the organisational and economic context, demonstrating the multi-level elaboration and evolution of theory and methods. The overwhelming bulk of 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. These included papers that were limited to testing an established variable in a slightly different context.

Leadership, Knowledge and Management Learning

95. There was evidence of an increase in the number of outputs in Leadership, knowledge and management learning, continuing a trend identified in REF 2014. Within these areas there was evidence of an increase in interdisciplinary work, particularly with fields such as health and medicine.
96. Outputs submitted covered a wide spectrum of areas, from empirical studies of Leadership within different sectors to critical examinations of the nature of Leadership in a range of different contexts. Many were judged to be of world-leading quality demonstrating analytical depth and theoretical sophistication. Rigorous methodologies were evident in several of the outputs, incorporating a range of qualitative and quantitative approaches.
97. Outputs were submitted that focused on many aspects of learning and pedagogy, and addressed topics and issues pertinent to management educators, trainers and learners. Additionally, there were outputs that dealt with areas of social and educational policy. Outputs assessed as internationally excellent or stronger were substantially grounded in the literature and built their contributions on empirical findings. The outputs judged as being nationally recognised within this area were limited in their rigour and significance. The internationally excellent and world-leading outputs were notable for their contribution to policy, practice and academic debate.

Organisation and Critical Management Studies

98. The sub-panel received approximately 1,000 outputs in this field. A large number of these outputs overlapped with other disciplinary areas such as Leadership, Strategy, HRM, Management Accounting, Information Systems, Marketing, Public Sector Management, and Organisational Psychology. More than 75% of the submitted outputs were assessed to be of world-leading or internationally excellent quality. It is also noteworthy that the field provided underpinning support for a large number of impact cases submitted.
99. Submitted outputs covered a highly diverse range of topics such as change, culture, work, leadership, temporality, identity, platform work, ethics, new forms of resistance, innovation, education, and methodology. Approaches to these topics included narrative analysis, discourse analysis, labour process analysis, socio-materiality, performativity, practice theory, and institutional theory. The majority of outputs was more qualitative-oriented but there were also some quantitative outputs submitted and assessed as world-leading. As with REF 2014, the influence of institutional theory on organisation studies remained considerable. Concomitantly, a lack of substantive new theoretical innovations in the field was somewhat disappointing.
100. The number of outputs in critical management studies was less well represented than in REF 2014. Nevertheless, the quality of this work, in terms of theoretical development, was of world-leading or internationally excellent quality. Thematically areas that were relatively prominent include work on environmental activism, aesthetic labour, secrecy, debt, and critiques of neo-liberal practices and platform capitalism, amongst others. The majority of organisation studies books submitted were in critical management

studies. Books were often assessed as internationally excellent or better with a high percentage graded world-leading. The sub-panel noted that this form allowed for a more substantive analysis and development of an argument.

101. Some outputs in CMS demonstrated high levels of rigour but were sometimes weaker in terms of originality or significance. This might be attributed to them dealing with comparatively trivial or abstruse topics, making a more limited contribution to existing knowledge and the wider discipline. For quantitative studies this often involved focusing on the extension of one particular variable by testing it in a slightly different context. Future research might usefully pay more attention to improving theoretical and analytical rigour whilst also becoming more relevant to diverse organisational forms and broader societal concerns.

Operations Management and Supply Chain Management

102. Around 700 outputs were submitted for assessment in operations and supply chain management, spanning a wide range of topics. The number of outputs in supply chain management reflected the increased popularity of the discipline in the UK and worldwide. While there was a clear emphasis on traditional and well-established topics such as, lean and agile supply chains, supply chain networks and manufacturing supply chains; new topics within these fields have emerged and attracted significant interest including sustainability, circularity, technological aspects (particularly blockchain, artificial intelligence, big data and analytics), humanitarian and relief aspects and innovation. A wide range of sectors was considered although key, traditional sectors such as agri-food, automotive, defence and healthcare have been favoured by researchers within the subject area.
103. Research methods employed included both qualitative (case studies) and quantitative (surveys and modelling) whilst a small number of outputs adopted a mixed methods approach. The latter indicated methodological plurality in this subject area. In a small number of outputs there were a number of models of hypothetical situations with less apparent empirical motivation and even less empirical application. The vast majority of outputs were empirical rather than theoretical whilst of the theoretical outputs many were judged to be of world-leading quality, signifying the importance of theory development in this subject area. Outputs were published primarily in well-established subject-related field journals with a large number also published in Production and Manufacturing journals. This was not surprising, representing the evolution of this subject area over the past decades.
104. Finally, the subject area was well represented in impact cases in REF 2021. This was largely to be expected considering the recent, increased role of both operations management and supply chain management for businesses, policy makers and other stakeholders. It also indicated the highly applied nature of this subject area.

Management Science and Operational Research

105. Approximately 1,000 papers were submitted in the general area of Management Science/Operational Research (MS/OR). These were submitted from a wide range of institutions, showing that the discipline remains an important and growing area of activity in B&M studies. Most institutions submitted at least one output assessed as being of world-leading quality. Amongst these institutions, there was a number that demonstrated clear excellence and a critical mass in the field. Although there was a positive correlation between the size of the return and the grades, there were some smaller submissions which scored very highly with outputs judged to be of world-leading quality from individuals in institutions without a designated MS/OR group.

106. It was noted in REF 2014 that topics covered within the field of MS/OR were widely dispersed, with no concentration on any particular technique or on any particular domain. In REF 2021 there seemed even less concentration on particular themes, techniques were hard, soft, and hybrid mixtures. Forecasting and risk were a couple of themes with more outputs than others.
107. Although outputs appeared in a wide range of journals, much of the MS/OR work was published in established field journals. Project Management formed a significantly smaller part of the submission than in REF 2014 and was not of sufficient critical mass to provide an overall impression. Many of the outputs submitted represented work at the interface with other disciplines, in particular Statistics but also Economics, Engineering, Finance, Marketing and Operations Management. Outputs judged to be world-leading included applied research in many domains. These not only showed how MS/OR methods could be used in that sector but also contributed to the development of MS/OR methodology and its application. Some of the outputs graded below internationally excellent were 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; there were also some literature reviews that had little contribution beyond describing recent work in the area.

Information Systems

108. The outputs submitted to REF 2021 showed an on-going growth in the discipline of Information Systems (IS). This growth has continued from REF 2014, with papers submitted in the general area of IS from a wide range of institutions. A small number of large centres demonstrated excellence and critical mass. In addition, many institutions provided evidence of small pockets of high-quality activity. There were also outputs judged to be world-leading from individuals in institutions without an IS subject group. Overall, the IS subject area performed well, with over 75 per cent assessed as world-leading or internationally excellent in terms of originality, significance, and rigour. World-leading IS research was present in leading journals in the field and also in some less well-known field journals.
109. In REF 2021, the breadth of research approaches, identified in 2014, continued to be evident, with a more even distribution between qualitative and quantitative approaches. There was also a clear emphasis on papers being theoretically grounded. Outputs assessed as world-leading provided highly original and significant contributions, included multiple data sources, employed highly rigorous analysis and were theoretically sophisticated. Outputs assessed as being below internationally excellent tended to have limitations in either meaningful empirical data, analyses undertaken, or made a limited contribution to knowledge and the wider discipline.
110. A relatively wide range of areas was examined in the field, offering continuities with previous studies and insights into new areas, adding to the accumulation of knowledge and contributing to theory. Prominent theoretical orientations included: actor-network theory, affordance theory, affect theory, institutional theory, practice theory, and socio-materiality. Thematic areas included: big data and analytics, cyber security, data privacy, digital business platforms, digital innovation, e-government, enterprise systems, ethical use of IS, fintech, IS development, IS for crisis management, IS in health, IS strategy, mobile working, outsourcing, social media, socio-technical studies, and technology adoption. Although there was a strong empirical focus in the research, some outputs also made strong theoretical contributions. In addition, the strong empirical focus demonstrated robust connections with industry, government, and

societal issues in established and emerging economies. Thus, the sub-panel considered that the IS discipline was in a reasonably strong position and still reflected the centrality of IS in B&M practice.

Innovation and technology management

111. Innovation and technology management, is a broad field with approximately 600 outputs submitted, and with strong established links to economics, development studies, strategy and entrepreneurship. There were also increasingly strong links to other B&M areas including International Business (IB), Human Resource Management (HRM), marketing, and operations and supply chain management, as well as to inherently multidisciplinary domains such as sustainability research. The diffusion of innovation studies to other domains reflected a growing appreciation of the significance of innovation and its management to organisational performance, and indeed to challenges beyond B&M research.
112. There are strong clusters of innovation researchers in many institutions across the UK with innovation-related outputs submitted by authors based in most submitting institutions. Journal articles made up the vast majority of assessed outputs in the discipline, with a very small number of books submitted. Reflecting the breadth of area, these outputs were published in a wide variety of journals, including highly-regarded B&M journals and field journals across a range of disciplines.
113. Most of the outputs assessed were empirical, with a strong bias towards quantitative studies. As in other areas of B&M research, more sophisticated quantitative methods were routinely deployed, especially in work considered to be world-leading and internationally excellent. The scale of work ranged from single firms through sector or industry analysis, to international studies. Qualitative studies were less common, and future qualitative efforts applying strong methodological rigour to understand the processes of innovation should be encouraged, especially in less understood domains of innovation, such as service innovation, experience innovation, how creative activities link to innovation and innovation activities in the developing world. Wholly theoretical or conceptual papers were rare.
114. While most of the outputs were academically-oriented, some were concerned with the practical management of innovation; there was also a growing cluster of outputs focused on sustainability and sustainable transitions. Another substantial set of outputs contributed insights into developing innovation policy, especially through a 'systems lens'.
115. A number of the submitted impact cases related to innovation, some of which were assessed as displaying outstanding impact. These included cases to support change within individual companies by applying innovation tools, and the development and diffusion of innovative practices within public bodies, such as police forces and parts of the National Health Service. Other highly graded impact case studies concerned developing policies to support innovation, and innovation in policy.

Tourism, Hospitality and Events

116. Tourism, Hospitality and Events has emerged as a vibrant research area within the field of B&M with its contemporary, creative research ideas, innovative methodologies and research outputs of practical value and relevance responding to global challenges. Submitted outputs were both inter- and multi-disciplinary in nature, demonstrating strong evidence of both national and international collaborations among researchers and studies were largely international in their context and scope.

117. Approximately 350 outputs were submitted in this sub-field, demonstrating an upward trajectory compared with REF 2014. Although some outputs were conceptual, the majority were empirical. Most submitted outputs were published in five main journals. The outputs covered a wide range of topics on tourist/consumer behaviour, leadership and employee behaviour, risk/crisis management, destination marketing and sustainable tourism development, with emerging thematic research areas in technology, social media, tourist/consumer engagement and experience, 'responsible' destination management, environmental management, and corporate social responsibility. Outputs assessed as world-leading drew from the theories outside of the B&M field, thereby enhancing knowledge by being informed by disciplines such as psychology, sociology, economics and politics.
118. The outputs used qualitative and quantitative research approaches, surveys and case studies; with the quantitative/positivist approach being the dominant methodology. Most studies were cross-sectional with a few taking a longitudinal and ethnographic approach. Innovative research methodologies were used, including creative mixed methods, the use of experiments for tourist/consumer and employee behaviour studies, the use of grounded theory for 'theory building exercises' and utilising secondary data such as online consumer reviews. Social and responsible values underpinned many studies.
119. Overall, the multi- and inter-disciplinary nature and the international focus of the discipline demonstrated a focus on current global challenges including climate change and the environment, an ageing population, societal wellbeing and the quality of life and global inequality. It was noted, however, that relatively few impact cases were submitted in the tourism, hospitality and events area.

Business History

120. The upward trajectory of the Business History discipline related to Business and Management since REF 2014 is reflected in the increase in both the number and quality of submitted outputs.
121. The majority of the submitted outputs were deemed to be world-leading or internationally excellent, in terms of originality, rigour and significance. Outputs displayed strength from both empirical and theoretical perspectives. In addition, a pleasing number of outputs addressed methodological advancements within the domain. While the vast majority of submitted outputs were journal articles, authored books were also a feature, with the majority of submitted books judged to be of world-leading quality.
122. Several key issues were characteristic of the discipline's development since REF 2014 and worthy of note. Firstly, the growing importance of the role of Business History in advancing theory; secondly, the increasing interdisciplinarity of the area, evident, for example, in the emergence of historical organisation studies. Methodologically, the discipline embraced diverse approaches. However, archival research dominated those outputs judged to be world-leading. A striking feature of the discipline was the very high level of rigour evident across the returned outputs.
123. Business History clearly reaches across the range of B&M disciplines, making contributions, for example, to Entrepreneurship, International Business, Marketing, Retailing, Strategy, Accounting, Political Economy, Finance and Economics.

Economics and Econometrics

124. The main review of outputs in Economics and Econometrics can be found in the subject review provided by UOA 16. Compared with REF 2014, the number of institutions with economics outputs submitting their research in the B&M UOA 17 has increased, whilst the number submitting directly to the Economics and Econometrics UOA 16 has declined. As a result, the number of economics outputs submitted to B&M increased since 2014.
125. Given the expertise on the UOA 16 sub-panel, a total of 1,450 outputs were cross-referred from UOA 17. This represented around 9% of all outputs received by UOA 17 and almost 40% of outputs assessed by sub-panel 16. Of the 108 institutions that submitted to B&M, 90 institutions had some of their outputs cross-referred to UOA 16. In many cases, the number of outputs cross-referred per unit was relatively small, but there were eight institutions that had between 30 and 61 outputs cross-referred to UOA 16.
126. There were differences in the types of outputs submitted directly to UOA 16 compared with those cross-referred from UOA 17, with the main difference being the publication outlet. Specifically, relatively little work was submitted directly to UOA 16 in agricultural and heterodox economics and history of economic thought, while more research in these areas was seen in outputs cross-referred from UOA 17. A detailed quantitative analysis of all individual grades assessed by the UOA16 sub-panel showed no statistical difference in output grades after controlling for these differences. It was also notable that there are many areas of world-leading research in economics units within business schools.

Interdisciplinary

127. The sub-panel received a range of outputs flagged as interdisciplinary research (IDR). Some of these brought together disciplines within the field of B&M, while others combined elements of B&M with quite distinct disciplines, for example from the medical sciences. The priority was to ensure that in each case the output was considered by those competent to judge the work. In some cases, this involved seeking advice from outside UOA 17, and then considering the advice received along with the judgement of the IDR assessors on any aspects of the output that was based on B&M research. In other cases, where there was appropriate expertise within the sub-panel, to ensure that the output could receive a fair evaluation, one of the members of SP17 assessed the output.
128. Some outputs submitted to the sub-panel not flagged as IDR by submitting institutions on inspection were found by sub-panel members to include aspects of interdisciplinary work. These were usually cross-referred so that receiving advice from another REF sub-panel might enable a fairer evaluation than having it reviewed without the benefit of such advice.
129. There was thus a rigorous and complex process of ensuring that whenever a submission contained elements of IDR, that work was given full appreciation and proper evaluation, regardless of whether it had been initially flagged as IDR or not. This gave the sub-panel confidence that IDR submissions were not disadvantaged in any way, and on the contrary received the benefit of advice from SP17 supplemented by additional advice as appropriate to ensure that the quality was properly appreciated and recognised.



Sub-panel 18: Law

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	35	39.1	23.3	2.4	0.2
Impact	50.2	32.2	16.2	0.7	0.7
Environment	34.9	45.3	17	2.8	0.0
Overall	39	38	21	2	0

Summary of submissions

1. The sub-panel received 69 submissions, up from 67 in REF 2014. They included nine submitted units which had not submitted to REF 2014, most of which were submitting to Law for the first time. 2,493.81 FTE Category A staff (including 455 ECRs) were submitted, up from 1,553 FTE Category A staff (including 311 ECRs) in 2014. This substantial increase in staff FTE numbers reflected both growth in the legal education sector during the assessment period and rule changes in REF 2021 requiring the submission of all staff with significant responsibility for research. There has been an increase too in the number of larger submissions: 28 submissions were returned with more than 35 FTE (compared to 11 in 2014), 25 comprised between 15 and 34.99 FTE (down from 30 in 2014) and 16 institutions submitted fewer than 15 FTE Category A staff (compared to 26 in 2014). The total number of outputs submitted was 5,867. There were 244 impact case studies submitted, up from 225 in 2014.
2. The sub-panel consisted of 21 members, including two user members. To aid the assessment, 10 additional output and six additional impact assessors were appointed. Appointing additional assessors after the survey of submission intentions enabled the sub-panel to ensure sufficient coverage in all areas of submitted research, adding additional expertise, for example, in international human rights, criminal, and humanitarian law, intellectual property, IT and digital technologies law, and legal theory/ jurisprudence. Within the formal constraints of the appointments process, efforts were also made to ensure a diversity of members and assessors, both in terms of type of institution and geographical location, and legally protected characteristics.

Assessment Process

3. Throughout the assessment process the sub-panel followed the procedural framework laid out in the 'Panel criteria and working methods' (PCWM).
4. All outputs were assigned to at least two members/assessors. Impact case studies were assigned to at least three members/assessors, including, so far as possible, at least one research user. Environment statements were assigned to three sub-panel members. In each context, assessments were carried out independently before opinions and grades were compared. All grades were agreed by the sub-panel in plenary taking into account conflicts of interest, after considering the judgements and comments of assigned members/assessors.
5. Calibration exercises were conducted with all sub-panel members and assessors prior to the commencement of each of the three elements of the assessment process. These helped to promote a shared understanding of the assessment criteria and ensure consistency of application. Everyone involved in the assessment process undertook a bespoke unconscious bias training programme and together a Fairness in REF Intention Plan was agreed which formed a standing item on the agenda of every sub-panel meeting. These steps helped to keep equality and diversity concerns at the forefront of sub-panel members' minds during the assessment and promoted a collective environment in which all members were more aware of (and therefore better able to mitigate) unconscious biases as well as those of other colleagues.
6. To support the assessment of interdisciplinary research, two members of the sub-panel were appointed as interdisciplinary research (IDR) advisers. IDR advisers provided advice on the identification, assignment, and assessment of outputs with a strong interdisciplinary component and/or those which straddled UOA boundaries. They also represented the sub-panel on the Interdisciplinary Advisers' Network. Where appropriate, and with the involvement of IDR advisers, the sub-panel used the arrangements facilitating cross-referral, joint assessment, and specialist (language) advice. The sub-panel noted the use of flags to identify interdisciplinary and /or criminological research although the number of outputs with an interdisciplinary and/or criminological content far exceeded those that were flagged. This was unsurprising given the inherently interdisciplinary nature of much legal research. The appointment of IDR advisers worked well to highlight and address any issues which did arise in relation to the assessment of interdisciplinary research.
7. Because criminology outputs were submitted to several sub-panels in Main Panel C, procedures were agreed and implemented to ensure a broad consistency of approach. Representatives of Sub-panels 18, 20, and 21 met on four occasions to oversee the operation of agreed procedures. These included conducting a calibration exercise regarding outputs across all three sub-panels. Discussion also took place around impact case studies, new topics, and emerging themes. Calibration helped to confirm consistency in approach. There were some initial differences amongst the representatives, but these did not reflect disciplinary boundaries. Where relevant, some limited use was made of joint assessments across sub-panels supported by the network of IDR Advisers.
8. Requests to double-weight outputs were independently considered by the two assessors assigned to those outputs. They were then agreed in plenary by the sub-panel based on the assessors' joint recommendation. Because the guidance on the application of double-weighting has been further clarified since REF 2014, the sub-panel took particular care to apply the guidance correctly and consistently, including the supplementary guidance on

double-weighting provided by Main Panel C in the PCWM.

9. In assessing the environment, the sub-panel drew appropriately on data submitted in REF 4a/b/c, the institutional statement (REF5a), and the Covid-19 appendix, to inform and contextualise the assessment of the unit environment statement (REF5b).
10. All elements of the assessment were graded by individual assessors on a nine-point scale (including half-marks). Output grades were agreed on a five-point scale (whole marks); grades for impact and for each element of the environment statement were agreed utilising the nine-point scale (including half-marks).

Outputs

11. The sub-panel received outputs judged to be of world-leading quality from over 94% of submissions and a significant majority of work submitted was of at least internationally excellent quality, contributing very important knowledge and ideas likely to have a lasting influence on the intellectual agenda. The majority of outputs exhibited high degrees of originality, significance, and rigour, thus confirming both that legal research in the UK continues to reach the highest quality standards, and that excellence can be found across the range of submitting HEIs. Many outputs were problem-focused, responding to the multiple challenges posed by economic, social, and political volatility, climate and ecological emergency, and rapid technological change. While much of the research assessed was jurisdictionally based, the global legal order has become an increasingly significant focus of research. Legal research continued to make a key contribution to the knowledge bases of legal practice, adjudication, government, law reform, charities, public policy, and campaign groups. Legal researchers are also engaging with other disciplines to devise regulatory solutions to complex multi-dimensional challenges. Increased range and methodological diversity remained a notable feature of contemporary legal research, confirming the view expressed by the Law sub-panel in REF 2014 that peer review remained the most reliable method of assessing research quality in law.
12. Table 2 below shows the distribution of outputs factoring in double weighting. Of the individual outputs assessed, over half (58%) took the form of journal articles. In addition, the sub-panel assessed 862 authored books (23%), 985 book chapters (16%) and significantly fewer edited books, research reports for external bodies, digital or visual media, and other output types. As has been the practice in the past, the sub-panel made no distinction for purposes of assessing quality between types of outputs, applying the criteria consistently across all output forms. The sub-panel found instances of world-leading and internationally excellent quality regardless of the form of output or where the research was published. Assessors took no account of authorship other than to ensure that outputs complied with the terms of submission set by the assessment process. The sub-panel noted some outputs with significant material in common with other outputs published before the REF period or forming part of the same submission. The originality of such outputs was judged accordingly. In most (but not all) cases where new editions or revised works were submitted, the opportunity was taken to explain what material was new in the REF period.

Table 2: Outputs Types assessed (factoring in double weighting)

Authored Book	Edited Book	Chapter in Book	Design & artefact	Journal Article	Conference Contribution	Report	Other
23.3%	0.5%	16.8%	0.0%	58.0%	0.1%	0.7%	0.6%

13. The sub-panel received 516 claims for double-weighting, compared to 166 in REF 2014. Almost all double-weighting requests pertained to monographs or standard-length authored books. Following the supplementary guidance provided by Main Panel C (particularly PCWM, para 247), the vast majority of such requests were approved. In determining double weighting requests in other contexts, including in relation to 'short book' forms (which appear to be an emerging trend in law), the sub-panel evaluated the academic investment and intellectual scope of the research therein. The sub-panel observed that HEIs continued to adopt inconsistent and diverging approaches to double-weighting requests, notwithstanding that the criteria for deciding double-weighting have been further clarified since the REF 2014 exercise.
14. A very large volume of outputs addressed areas of international law, particularly human rights, criminal, humanitarian, and public law. Much of this research was of high quality but some outputs simply reworked existing analyses and debates, making it difficult for the sub-panel to identify originality. Domestic public law was also well represented, encompassing human rights, constitutional and administrative law, and, unsurprisingly, a number of outputs addressed the legal consequences of Brexit, in which context those which transcended immediate controversies to generate deeper and more lasting insights inevitably were graded higher in terms of originality and significance. EU law continued to feature in legal research but perhaps not so visibly as in prior assessment exercises. This may be because EU law has become increasingly absorbed within the substantive scope of legal sub-fields. There was a healthy proportion of outputs in fields such as commercial and corporate law, trade and investment law, bankruptcy and insolvency law, and financial regulation. Many of these also included an EU and/or international dimension. Several outputs addressed global and/or transnational law, bridging sub-disciplines in international law and perceived divides between international, regional, and national legal systems. Comparative law continued to be an important field of legal studies, and the sub-panel saw much rich and insightful comparative work, although there was a tendency to privilege certain familiar (usually common law) jurisdictions at the expense perhaps of less studied alternatives. Comparative studies in criminal law and justice (including criminology) often spanned many jurisdictions, but with fewer in-depth studies.
15. The sub-panel observed continued growth and diversity in the sub-fields of law and religion, transitional justice, intellectual property, and IT law. There was a notable increase in outputs focusing on legal history and/or law and history. These covered a range of time periods and jurisdictions, including some comparative studies, and evidenced diverse methodologies/theoretical frames, suggesting that the sub-field has become broader and more dynamic. The sub-panel also noted real strength and development in the fields of feminist, queer, and sexuality legal studies, recognising rigour in the variety of approaches from theoretical and conceptual, to more social justice and reform-focused studies. The regulation of the digital environment, including the development of online financial transactions and digital currencies, was a burgeoning area of growth. A growing number of outputs addressed the legal and

ethical questions posed by other technological developments, such as cyber warfare and artificial intelligence (AI). Research on issues of race, empire and colonialism was also developing apace, responding to the rise of nationalism and the challenges and opportunities presented by a multiracial, multicultural Britain. A significant proportion of outputs addressed issues of climate change and environmental governance with a strong tendency to relate these issues to human rights. Competition law, family law, and labour law continue to thrive and there appeared to be a marked uptake in research engaging law and the humanities. Medical law has broadened to encompass a much wider range of ethical and regulatory issues pertaining to rights and the delivery of healthcare in local, regional, national, and international contexts.

16. A very substantial number of outputs (situated both domestically and internationally) were submitted in the areas of criminal law, criminal justice, and criminology. Of these, the sub-panel received more in criminal justice and criminology than in substantive criminal law, the latter mainly addressing new doctrinal or legislative developments. Criminal justice and criminology outputs addressed national, comparative, and global issues in interdisciplinary ways, or through analysis of cross-cutting themes. Penology and the policing of organised and transnational crime were significant strands of this work.
17. The field of legal theory (encompassing jurisprudence, legal philosophy, and social and critical theory) appeared to have grown and was becoming increasingly diverse. The sub-panel welcomed this as a sign of the vitality of the field, further evidenced by the high quality of much of the work assessed. Again, some outputs tended simply to rework existing debates and at times the narrowness of the theoretical enquiry begged questions of originality and significance which were not always spelled out.
18. There was healthy engagement with private law issues particularly tort and equity/trusts (less so in relation to contract and property). Much of this work was inflected with human rights or broader social justice considerations, encompassing, for example, issues of poverty, inequality, housing, consumer protection, and/or environmental harms. The sub-panel detected a subtle reconfiguration in the substance and scope of these most traditional areas of legal research, while acknowledging that it remained important to engage with core conceptual tools and underpinning normative frameworks (as was the case in some of the private law outputs assessed). The sub-panel noted that legal research on tax and/or fiscal regulation was less well represented, notwithstanding its potential role in the meta theme of social justice/wealth distribution.
19. The sub-panel received a number of outputs relating to legal education, although perhaps fewer than expected. Moreover, as noted by the REF 2014 sub-panel, the methodological rigour and significance exhibited by some of these outputs remains uneven. The sub-panel welcomed the emergence of clinical legal studies as a growing field of research in the UK.
20. As with the previous assessment exercise, there were numerous examples of research contributing to understanding of the fundamental issues affecting society or responding to major topical concerns. This has encouraged the further blurring of established sub-disciplinary categories and the development of new sub-disciplinary clusters and frames, for example, in relation to the interface of law and science and the adaptation/transformation of legal conceptual frameworks to meet the regulatory challenges of an increasingly digital business environment.
21. The sub-panel particularly welcomed the innovation and development of new legal methodologies such as judgment (re)writing and empirical analysis of bodies of case

law, both of which were indicative of the vitality and sustainability of law as a discipline. The sub-panel continued to regard the diversity of methodologies and theoretical frames adopted by legal researchers to be a key disciplinary strength. Assessors found examples of excellence across the range of methodological and theoretical orientations including doctrinal, contextual, historical, comparative, socio-legal and social theoretical, philosophical and jurisprudential, critical, and empirical approaches. Bodies of knowledge and thought were drawn upon from across the social sciences and humanities, and increasingly from the natural sciences, confirming the hybrid nature of law as a discipline lending itself easily to multidisciplinary and interdisciplinary research. Socio-legal and contextual approaches to law and legal phenomena continued to be popular among legal researchers but the sub-panel also detected a revival of interest in philosophical engagements with law and many examples of excellent doctrinal research, particularly those which engaged analytically with core legal concepts and values. Empirical studies employed both qualitative and quantitative methods. There were some excellent outputs involving in-depth analysis of original data, with well supported conclusions that demonstrated the legal and policy impact of the research. Lower graded outputs did not situate empirical findings within wider legal, theoretical, and contextual frameworks.

22. The sub-panel received a considerable number of co-authored outputs. Multiple authorship was rarer and presented no problems of assessment in this sub-panel. The sub-panel rigorously applied the assessment criteria to all outputs, drawing no distinctions between single-authored or other work for purposes of applying the assessment criteria, and recognising excellence across all types of authorship. Where an output was submitted by more than one institution (whether due to co-authorship or individual mobility), the sub-panel ensured that those outputs were assessed consistently.
23. The sub-panel considered itself to have sufficient expertise to reach a robust judgement in relation to nearly all outputs. In a small number of cases, outputs were cross-referred to another sub-panel. The sub-panel received considerably more cross-referrals from other sub-panels, confirming that some legal researchers work in departments other than law. The sub-panel made use of the new joint assessment process in relation to a few outputs and was invited to jointly assess some outputs from other sub-panels. A small number of outputs were sent for specialist (language) advice where the sub-panel lacked the linguistic capacity to assess effectively.

Impact

Table 3: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	38.3	41.1	17.7	2.4	0.5
REF 2021	50.2	32.2	16.2	0.7	0.7

24. The sub-panel was impressed by the scale and extent of the impact that legal research continues to have in shaping and supporting social, economic, political, and cultural institutions and practices. As shown in Table 3 above, the sub-panel judged 50.2% of impact to be outstanding and 32.2% to be very considerable in terms of reach and

significance. The higher sub-profile for impact in law compared to REF 2014 evidenced more effective engagement of legal researchers with organisations and activities outside academia. The sub-panel welcomed this increasingly outward-facing stance, viewing it as of vital importance to social progress and development, particularly given the ubiquity of law/regulation in virtually every facet of human existence.

25. Case studies varied considerably in terms of range and types of impact. Quite a few case studies were concerned with influencing judicial decision-making. Others engaged directly with law reform or public policy bodies. The sub-panel noted a significant number of case studies which contributed to improvements in the delivery of public services, and to a lesser extent private and/or professional services. Others provided an important knowledge base for civil society activities, enhancing the influence of NGOs and charities on public and/or political decision-making. Perhaps disappointingly, although assessors saw several strong examples, few case studies were concerned solely with shaping or influencing cultural or public understanding, suggesting that HEIs continued to adopt a risk-averse approach to certain kinds of impact. Benefits to culture or public understanding did sometimes form an element of case studies claiming multiple impacts. Some case studies also focused on supporting business and commercial activities and promoting ethical investment and trade. Impacts from legal research occurred at local, regional, national, and international levels.
26. Legal research is impacting across a wide range of areas of public and private life, including civil and criminal justice, health and social care, trade and investment, environmental justice and climate change, business efficacy and consumer rights, equality and human rights, anti-terrorism, dispute resolution, peace and reconciliation, the digital environment, education, poverty, housing and social welfare, work, and family life. Some of these areas were better represented than others. In particular, a significant number of case studies addressed criminal justice matters, for example, issues of policing, prisons, sexual violence, domestic abuse and human trafficking. Human rights also featured prominently in case studies, whether concerned with legal and political decision making, ethical business practices, rights to basic needs such as housing, food, and water, or diverse interventions to promote equality and social justice. A number of case studies addressed issues of healthcare provision, particularly in relation to reproductive rights. Case studies also engaged with aspects of working life, whether focused on improving and enhancing workers' rights or promoting work-based productivity via regulatory interventions. Economic, commercial, business, and financial concerns featured in some case studies, but the impression of the sub-panel was that there were fewer of these than expected. A handful of case studies addressed issues of insolvency and a cluster concerned aspects of consumer protection. Access to justice, both civil and criminal, was also a focus, often viewed through an equality and diversity lens, and/or social inclusion. Many case studies were concerned with generating impact overseas and/or internationally. The sub-panel found the international flavour of many case studies impressive but were pleased also to see examples of excellent impact occurring at local and regional levels, attesting to the important contribution legal researchers are making to the regions in which their HEIs are located. As with outputs, Brexit featured in quite a few case studies, and the sub-panel welcomed the engagement of legal researchers with the complex regulatory challenges that leaving the European Union has generated. Moreover, the collaboration of legal researchers in efforts to manage and mitigate the effects of the Covid-19 pandemic indicated that legal researchers can respond in an agile manner to social crises when required.

27. The strongest case studies combined a coherent and convincing narrative with a clear account of the issue addressed by the underpinning research, and how that research was utilised to achieve the change, effect, or benefit claimed. Highly graded case studies effectively pinpointed the nature, scale, and beneficiaries of the impact, describing not just what change, effect, or benefit had occurred (and for whom) but the extent and depth of that change on those affected. This enabled assessors to gauge the quality of the impact in terms of reach and significance. Strong case studies also identified a clear evidentiary link between the underpinning research and the resulting impact.
28. By contrast, weaker case studies did not set out clearly the issue(s) the research addressed and/or how the research was utilised to achieve the effect, change, or benefit claimed. Some case studies clearly outlined the significance of the impact but failed adequately to demonstrate its full reach or were insufficiently precise about the chain of evidence linking the research to the claimed impact. In some instances, better use could have been made of testimonials and other forms of evidentiary support in the case study narrative. Although most case studies provided evidence to support the quality of research, a few did not. Regrettably, a small number of case studies failed to show that the research underpinning the claimed impact met the 2* quality threshold. Moreover, some case studies did not provide convincing evidence to support the impact(s) claimed.
29. Quite a few case studies claimed more than one impact. While a number of these were impressive in their degree of reach and significance, the inclusion of multiple impacts was sometimes accompanied by exaggerated claims, uneven evidence, and/or a less coherent overall narrative. Moreover, some of these case studies did not sufficiently distinguish between pathways to impact (for example, public dissemination of research findings) and impact itself (that is, the effect, change or benefit produced by the disseminated research). For example, simply engaging with a public body or parliamentary committee, does not, of itself, constitute impact. While the sub-panel ensured that credit was given for all impacts adequately supported by evidence, it would advise greater care in the crafting of multiple claims in impact case studies in the future.
30. The sub-panel welcomed the participation of user assessors in the process and benefited hugely from the insights and perspectives they provided on how academic research was utilised by non-academic communities and how well the chain of evidence linking the research to the impact had been established.

Research Environment

Table 4: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	43.6	43.1	11.7	1.6	0.0
REF 2021	34.9	45.3	17.0	2.8	0.0

31. The sub-panel considered that, in terms of vitality and sustainability, the majority of submissions convincingly demonstrated that they were providing a research environment conducive to producing research of at least internationally excellent quality and enabling at least very considerable impact as shown in Table 4. Moreover, over 40% of submissions showed that they were providing research environments with elements

that were conducive to producing research of world-leading quality and outstanding impact. There was some unevenness in terms of how well individual submissions demonstrated strength in each of the four elements of the assessment of research environment. For example, some submissions gave a lot of attention to detailing the unit context, structure, and research and impact strategy and substantially less to describing how people were supported, how much support was in place to stimulate research funding bids and funding success, the level of investment in the physical and research infrastructure, and the extent to which the research environment promoted collaboration and contribution to the research base, economy, and society. The best submissions were well-balanced in terms of addressing all four elements of the assessment.

32. Most submissions provided a clear account of the unit context and structure and demonstrated at least the basics of a research and impact strategy. The sub-panel recognised that smaller submissions tended to be more closely integrated into multi-disciplinary structural and strategic frameworks, and it was useful to see illustrations of how these were operationalised within the submitted unit. Some of these submissions successfully demonstrated synergies with other disciplines with which they were structurally embedded. The institutional statement also provided valuable context in relation to the assessment of small submissions.
33. In accounts of research strategy, the sub-panel noted a significant trend toward clustering research into defined groupings. The best submissions showed how such groupings helped to foster a vibrant research environment, for example, by attracting new staff and ideas, stimulating funding applications, and building teams around impact activities. This approach was well articulated by many HEIs. However, the sub-panel had concerns about the sustainability of research groupings configured around the research agenda of one or two senior members of staff. Stronger submissions detailed a clear strategy for promoting and supporting research quality and impact. Such submissions did not simply list various groupings and achievements but related these to clearly expounded strategic goals and accompanying support mechanisms. Some submissions gave insufficient attention to research governance and the procedural frameworks for decision-making, for example, how research strategy was determined and how far were researchers included in the design and operationalisation of research objectives and policies. Moreover, perhaps as a result of changes since REF 2014, requiring the incorporation of impact strategies directly into the environment template, the sub-panel found less evidence across the board of dedicated impact strategies forming an integrated part of the overall research strategy. The better impact strategies supported public engagement activities and identified how pathways to impact were being encouraged and developed. Dedicated resource and governance structures for the management and development of impact did appear to lead to improved impact. Most environment statements averred a commitment to interdisciplinarity, but the best provided examples of how interdisciplinarity was embedded in the overall research culture. Similarly proactive open access policies did not feature as prominently in submissions as expected with the best submissions evidencing open access practices which went beyond the standard provision of an institutional research repository.
34. Submissions varied considerably in terms of approaches to people management and development. The strongest submissions offered an account which not only described formal mechanisms of staff support but provided concrete examples of their application and effects. The sub-panel was particularly interested in examples of good practice which extended beyond the bare framework of line management tools (such as appraisal/ performance review and workload allocation models) and tailored staffing strategy to

nature, scope, and ambitions of the particular research environment (dependent on submitted unit size, stage of development etc). The sub-panel found strong evidence of vitality and sustainability in research environments, regardless of the size and stage of development of the submitted unit. Regarding equality, diversity, and inclusion (EDI) the best submissions were clear as to why EDI policies were central to a successful research strategy (by creating an open, inclusive, and diverse research environment conducive to producing the highest quality research). Such submissions also demonstrated policies going beyond the bare minimum legal requirements, and beyond engaging with gender/ Athena Swan, paying attention to other protected characteristics such as race/ethnicity, sexuality, disability, and caring responsibilities. The sub-panel particularly welcomed evidence of the integration of EDI initiatives into all aspects of the research environment. Strategies to facilitate research re-engagement following return from maternity, parental or extended care/health-related leave was identified as good practice, and there were also a number of examples of initiatives to promote better mental health and wellbeing, make adjustments to include researchers with disabilities, and facilitate flexible working (including preparing for retirement).

35. Postgraduate researchers form an increasingly prominent part of legal research environments. The doctoral path to a legal academic career is now firmly embedded in UK law schools. During the assessment period a total of 3,130 doctoral degrees were awarded by submitted units (see Table 5). This was almost twice as many as the 1,586 reported in REF 2014. While the recruitment and training of so many postgraduate research students is impressive, attesting, inter alia, to the strength and vibrancy of legal research, the sub-panel continued to attach more importance to the quality of postgraduate research support and the integration of postgraduate researchers into research communities, than to numbers of students recruited.

Table 5: Doctoral Awards by Academic Year

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Doctoral degree awards	368	426	445	440	495	496	458
Awards per FTE	0.15	0.17	0.18	0.18	0.20	0.20	0.18

36. Most submissions set out clearly their provision for supporting, training, and developing postgraduate researchers and the sub-panel was impressed by how well this is now embedded in postgraduate programmes. Most submissions also provided good evidence of the integration of postgraduate researchers into the research environment and the opportunities provided for teaching and career development. There continue to be challenges around the funding of PhD studies in law although some HEIs have invested quite significantly in law studentships as well as, in some instances, post-doctorate opportunities. The sub-panel viewed the presence and participation of postgraduate and early career researchers in a research community as positively contributing to the vitality and sustainability of the research environment. In this context, adequately funded studentships help to ensure that postgraduate researchers are not required to take on a significant teaching burden in order to fund their studies.

37. The total amount of research income received by submitting HEIs in law in this REF period was £167.3 million (an average of £23.9m per annum as seen in Table 6 below). This represented a significant increase on the £74.8 million returned in REF 2014. Income has also not been adjusted for inflation between REF cycles. The submissions showed that many units have put in place enhanced levels of support for research funding and the best submissions provided a clear account of the steps they have taken to improve and diversify grant capture and embed it in structures and processes, from the earliest stages of thinking and developing ideas, through to research design and development. In some instances, the sub-panel had concerns about the long-term sustainability of the research funding strategy, particularly where funding was unduly tied to a small number of staff or funding sources. The sub-panel welcomed a nuanced and flexible approach to research funding generation, recognising that some kinds of legal research required/ attracted little or no external funding while others cannot effectively be conducted without it. The sub-panel approached the assessment of income, infrastructure, and facilities holistically and welcomed details of research infrastructure, including physical space for research activities, investment in libraries and digital research resources, and enhanced professional services support. Because submitted units are at different stages of infrastructure development, the sub-panel was pleased to receive submissions that drew direct links between income, infrastructure, and facilities and the unit context, structure, and research and impact strategy. A few submissions referred to how their infrastructure and facilities responded to the need to reduce their carbon/ecological footprint which the sub-panel considered to be emerging good practice in research environment arrangements.

Table 6: Research Income by Academic Year

Year	2013-14	2014-15	Annual average for 2015-20	Annual average for 2013-20
Total Research Income	19,316,269	21,091,010	25,385,352	23,904,862
Research Income per FTE	7,746	8,457	10,179	9,586

38. The submissions provided a rich source of evidence of collaboration and contribution activities. Legal researchers are collaborating widely within and beyond the academy, making an extensive and diverse contribution to the research base, economy, and society. In some cases, this contribution exceeded the support provided by the research environment, suggesting that the conditions necessary to sustain these activities in the longer term may not (yet) be in place in some submitting units. The sub-panel formed the overall impression that arrangements to support collaborative research engagements have improved, while the REF focus on impact has encouraged submitting units to develop networks and partnerships outside academia. The sub-panel particularly welcomed evidence of innovative forms of collaboration and contribution. Some submissions tended to emphasise well established and/or esteem-based activities rather than to value and showcase new and different approaches to knowledge generation, transfer, and exchange (including those which extended beyond the formal parameters of REF-defined impact). The sub-panel welcomed submissions which evidenced contributions to sustaining the discipline, both in terms of research vitality and infrastructural support (journal editing, engagement with subject societies etc).

Concluding comments

39. UK legal researchers are performing at an impressively high level, making diverse contributions to scholarly, legal, and political life, and to civil society, reaching outwards to other disciplines as well as beyond academia. They are attracting unprecedented (for the discipline) levels of external funding, and training over twice as many new researchers as in REF 2014. Legal research is characterised by a rich diversity of methodological and theoretical approaches, underpinned by a deep vein of interdisciplinarity and an increasingly outward-facing stance. Many of the impact case studies assessed were stunning in their scope and application, reach and significance. The sub-panel has repeatedly seen how legal researchers respond to social, political, economic, and ecological challenges and noticed many instances where legal research is informing and shaping key agendas etc. The overall picture is of highly committed research community working to high standards of originality, significance and rigour while simultaneously producing innovative and impactful knowledge.
40. As with any discipline, legal research is subject to trends and fashions. The sub-panel has observed the emergence of new legal sub-fields and the expansion, development and /or reconfiguration of sub-fields already well established. When particular fields of legal research gain popularity, there is always a risk that they will grow stale or become stuck within accepted frames and paradigms. Quantity can subsume quality at the expense of originality, significance, and rigour. A strategically underpinned approach to research development, tailored to the challenges and exigencies of particular research environments, helps to mitigate this risk. For example, entrenching funding support for postgraduate research within the strategic goals and missions of research environments is one way of ensuring that research training is strategically aligned and research needs driven. The sub-panel saw some evidence of this in the submissions assessed, and it is a development the sub-panel would certainly encourage in the interests both of maintaining the diversity of legal research and enhancing its responsiveness to economic, social, and political challenges. Building a more secure funding base for postgraduate research within UK legal research environments also enabled submitted units to take a more strategic approach to issues of equality, diversity, and inclusion within their research communities.
41. The sub-panel saw limited evidence of the effects of sector volatility – in terms of student numbers and changes in funding arrangements - on the quality and impact of the legal research submitted to this UOA. However, the lower environment sub-profile for the UOA as a whole, compared to REF 2014, does signal some concern about the vitality and sustainability of high performing legal research environments in the longer term, should such destabilising effects continue.



Sub-panel 19: Politics and International Studies

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	33.7	44.6	20.2	1.3	0.2
Impact	41.9	50.1	7.8	0.2	0.0
Environment	41.7	49.5	8.5	0.3	0.0
Overall	37	47	15	1	0

General

1. In total, 56 submissions were made to Sub-panel 19 (Politics and International Studies) (henceforth SP19) in REF 2021. 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 SP19. The following general comments and feedback concentrate on work submitted directly to SP19. Overall, SP19 read in detail, evaluated and graded 4,146 outputs (including 564 double-weighted outputs), 191 impact case studies and 56 environment statements.
2. In REF 2014, 56 units were submitted to the equivalent sub-panel. Seven units which entered in 2014 did not submit to SP19 in 2021, whilst seven that had not submitted to this sub-panel in 2014 did so in 2021.
3. The overall number of researchers submitted to Politics and International Studies was considerably higher than in REF 2014. Category A equivalents have increased in consecutive RAE and REF assessments, from 1,076 in 2014 to 1,275 in 2014. In 2021, 1,961.8 Category A staff were submitted. From the REF5b (environment statement) narratives it was clear that this was not wholly an effect of the change in REF submission regulations but reflected an expansion of numbers of researchers in Politics and International Studies in many, though not all, units over the REF period. In 2014, the mean size for units submitted was 22.8 FTE and in 2021 it was 35.0. Further, in 2014, the smallest submission was 3 FTE and the largest 98.3, whereas in 2021, the smallest submission was 5 FTE and the largest 171.56. Over 50% of units submitted with an FTE of 30 or above (see Table 2 below).

Table 2: Breakdown of submissions by FTE

Number of Category A FTE	Number of Submissions REF 2014	Number of Submissions REF 2021
0 - 14.99	23	9
15 - 24.99	17	11
25 - 34.99	10	15
35 - 44.99	1	10
45+	5	11

4. Full information about the breakdown of staff FTE according to protected characteristics was not available at SP level at the time of writing. However, 17% of staff submitted (340 FTE) had ECR status.

Sub-Panel Assessment Process

5. In accordance with REF guidelines, a sub-section of the SP19 membership participated in the criteria-setting phase, with the full academic membership of 23 (10 women/13 men) plus one full user member involved in the assessment phase of the REF process. The range of members' expertise reflected the sub-fields indicated in HEIs' survey of submission intentions and was maintained in cases of replacement. After the original chair of SP19 resigned in 2018, the deputy chair from the REF 2014 sub-panel took over. When she resigned the deputy chair of SP19 took over the role of chair and a new deputy chair, a member of the 2021 sub-panel who had also served in REF 2014, was appointed. Academic membership was drawn from 22 UK HEIs from all constituent parts of the UK and from different types of institution. All efforts were made to recruit as diverse a sub-panel as possible. The sub-panel was assisted by eight additional user assessors in the evaluation of impact cases (two men and six women). User assessors offered a broad range of professional expertise in different kinds of research impact in national and international political contexts.
6. Some alterations to the sub-panel assessment process were made in line with the shift in REF requirements since 2014 and the move towards a stronger focus on assessing research excellence at the unit rather than individual level. All outputs were independently evaluated by two assessors who then agreed a grade. All impact cases were assessed independently by two academics and one user assessor, who then agreed a grade. All environment statements were independently assessed by three academic assessors, who then agreed a grade. Whole profiles for submissions were not considered until after all the separate elements of the profile were in place and were all considered by the sub-panel in their entirety before being finalised. Two institutional assessors (four in the case of one very large submission) were allocated to each unit and shared the role of 2nd assessor for outputs across that unit along with an expert assessor. Where the two members judged they did not have sufficient expertise to make an evaluation, they asked for a third opinion, either within SP19 or, more rarely, by cross-referring outputs to another sub-panel as appropriate. One of the assessors for each impact case was an institutional assessor, and both institutional assessors were involved, along with a

third academic, in the grading of environment statements. Institutional assessors had responsibility for taking the lead on checking the overall unit profile at the end of the assessment process and, after consultation with the whole of SP19, drafting feedback to the units for which they were responsible.

7. The sub-panel identified a range of potential sources of bias in its Fairness in REF Intention Plan (See REF EDAP Report) and held detailed calibration sessions in relation to all the elements of assessment to ensure consistency of approach in line with guidance from Main Panel C. Review and audit mechanisms were put in place to check for and address bias or anomalies in individual or group grading patterns throughout the assessment phase. All sub-panel members were encouraged to raise any concerns about the assessment process at any stage.

Outputs

8. The changes made to the REF rules since 2014 preclude straightforward comparisons with the outcomes of that assessment exercise. The sub-panel received outputs judged to be world-leading from the vast majority of submissions (54 out of 56). In REF 2021, almost 80% of outputs were judged to be of world-leading or internationally excellent quality. Examples of world-leading outputs were found in each area identified in the unit of assessment descriptor, demonstrating research of exceptional quality across all sub-fields of Politics and International Studies.
9. SP19 cross-referred only a very small number of outputs that reached beyond the remit of Politics and International Studies to other disciplinary sub-panels (See Main Panel C Overview Report). All of these cross-referred outputs were also examined by at least one sub-panel member. The sub-panel ensured 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.
10. As in REF 2014, the sub-panel's judgements were sensitive to the interdisciplinary character of much of the work submitted to it, given the inherently inter- and cross-disciplinary nature of Politics and International Studies as fields of inquiry. In addition to work that drew on Area Studies, Business Studies, Cultural Studies, Development Studies, Economics, Education, History, Law, Literature, Philosophy, Public Health, Public Management, Social Policy, Social and Evolutionary Psychology, Sociology, the sub-panel also read work that drew on interdisciplinary methodologies and methods ranging from natural experiments to the performative arts. The overall quality of interdisciplinary work was commensurate with that of the SP19 submission as a whole. Given the way in which many units expressed their explicit support for interdisciplinary work and the range of interdisciplinary outputs they submitted, the sub-panel noted that few of them made extensive use of the opportunity to flag interdisciplinary work in their output submissions.
11. SP19 was careful to read all outputs in their temporal context, given the length of the review period and the potentially distorting effects of hindsight.
12. In line with the guidance set out in the 'Panel criteria and working methods', SP19 accepted requests made in submissions for double-weighting of longer-form outputs such as books and monographs. It also accepted double-weighting requests for a small number of journal articles and other types of output. It was noted that some submitting

units were not consistently double-weighting outputs that were otherwise similar and that the choices made in this respect did not always work to the submitting unit's advantage.

13. The sub-panel was pleased to note that research of world-leading quality in terms of originality, significance and rigour was being undertaken in units of all sizes and across the full range of sub-fields embraced by Politics and International Studies. As in REF 2014, it was impressed by the methodological and substantive pluralism evident in the content of research outputs submitted. There has been a consolidation of the step-level increase, noted in 2014, in the rigour with which methodologies, both qualitative and quantitative, were operationalised, described and reflected upon. The growth in FTE of many of the submitted units has allowed them to extend the range of substantive research areas and methodological approaches that they support.
14. The sub-panel noted the exceptional quality of work being conducted in Political and International Studies in all areas covered by the unit descriptor: comparative politics; area studies, international development, national and sub-national and grassroots politics; political institutions, public administration, policy and governance; power, authority and legitimacy; political behaviour, political sociology, political economy; political theory and philosophy, history of political and international thought; international relations theory; security and strategic studies, war and peace studies; conflict research; international history; international political economy; and foreign policy analysis. Significant volumes of world-leading work were found in each of these sub-fields. Particular strengths were noted in sub-fields of electoral politics and political behaviour, the politics and international relations of Africa, political and international theoretical work drawing on arts and literature, history of political thought, empirical and theoretical work on race, gender and queer politics. SP19 also noted an increase in numbers of outputs in certain research areas, notably decolonial research, research on populism, quantitative research on international relations, and research dealing directly with issues of pedagogy in Politics and International Studies.
15. SP19 noted a modest increase in the number of multiple authored outputs. This did not present a major difficulty for SP19 in REF 2021, but it is likely to become a more established trend in the future. As discussed in the Main Panel C Overview Report, the sub-panels should develop more explicit and detailed guidance on what counts as a 'substantial research contribution' at an early stage in future REF exercises.
16. As shown in Table 3 below, the majority of outputs were in the form of journal articles, authored books, edited books and chapters in books. The largest categories received were journal articles (3,065), double-weighted authored books (556) and single-weighted authored books (361). There was a dramatic decline of around 75% in numbers of chapters in books (129) and edited books (14) submitted compared to REF 2014. The sub-panel noted that Politics and International Studies remained quite conservative in terms of the types of output submitted, with very few examples departing from the article, monograph or chapter format. The few non-standard output submissions were well-received, though it was noted that in some cases these kinds of output needed more contextualisation in the accompanying statement. As in REF 2014, it was journal articles and, above all, authored books which were most likely to be judged world-leading.

Table 3: Outputs Types assessed (factoring in double weighting)

Authored Book	Edited Book	Chapter in Book	Design & artefact	Journal Article	Conference Contribution	Report	Other
31.3%	0.3%	2.7%	0.0%	65.2%	0.0%	0.1%	0.4%

17. The 831 journal articles judged world-leading in terms of their quality were published in over 200 different journals. Of the 31 journals with more than five articles submitted, none were judged 100% 4*. We can therefore repeat the findings of the 2014 exercise that: “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 shared the view of all of its predecessors that sub-panel peer review of outputs remains the most reliable method of assessing research quality in Political Science and International Studies”.
18. The removal of the requirements for four outputs for each individual submitted meant that there were fewer problems of material in common or duplication than in previous exercises. 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. In a small number of cases material in common between separately submitted articles and chapters with monographs affected judgments of the originality of one of the items. Unclassified grades were given where submissions did not meet REF criteria for research, for reasons of staff eligibility or in cases of exact duplication across different outputs.

Table 4: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	40.0	44.2	13.1	2.7	0.0
REF 2021	41.9	50.1	7.8	0.2	0.0

19. In REF 2014, the impact element of the quality profile was composed of two elements, the grade for the impact case studies and the grade for the impact template. In REF 2021, it was based solely on the impact case studies with impact strategy incorporated in the environment statement. The sub-panel noted that, as in 2014, the case studies demonstrated the breadth and diversity of effective engagement of Politics and International Studies researchers with the realm of practice. Many cases built on long-term embedded relationships with non-academic governmental, inter-governmental and/or civil society partners. The success of this work was evidenced by outstanding impact being recognised in elements of the submissions for 49 out of 56 institutions. Nearly 95% of all submitted impact cases included elements judged to be either outstanding or very considerable in their reach and significance.
20. The sub-panel found impact of outstanding reach and significance arising from underpinning research conducted in all sub-fields within the discipline and drawing on all methodologies, qualitative and quantitative, including interdisciplinary methodologies. As in REF 2014, a large proportion of impact case studies demonstrated

the impact of research findings in the development and implementation of different areas of policy, legislation and regulation in national and international contexts. In addition, a significant number of cases demonstrated the impact of research findings in enhancing accountability, democracy and inclusion in different kinds of governmental and non-governmental institutions and processes. A smaller number of case studies demonstrated the impact of research findings in informing wider public debate and understanding of national and international politics and policy, including through teaching resources and mechanisms such as exhibitions, film and social media. The case studies demonstrated an impressive range of impacts at local and national level both within and beyond the UK as well as at international level.

21. The strongest impact cases identified the relevant research findings concisely and clearly, demonstrated the link between those findings and the impact claimed, were scrupulous in explaining the specific role of the case study author(s) in generating the impact, where applicable, and provided strong evidence to support the impact claims. Weaker cases often focused too much on explaining the research topic or process, were imprecise about which findings of the research were relevant to the impact claimed, failed to tell clearly the story of how findings from the research led to the impact or were imprecise about the nature of the impact and provided vague, weakly-linked or over-generalised supporting evidence.
22. As in 2014, the sub-panel noted that 'additive' case studies – in which a number of separate claims to impact were made - were generally graded lower than more specifically focused 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 and its findings to the impact itself.
23. Several of the impact cases referred to public engagement activities to substantiate claims to impact, but statistics on public engagement and dissemination activities were not always accompanied by explanations of, or evidence for, the effects of those activities in delivering impact related to the research findings described.
24. SP19 was disappointed to see that, as in REF 2014, submitting units remained reluctant to submit case studies developed from collaborative research. The sub-panel was careful to identify overlapping/ duplicate cases to make sure that the same standards were being applied, but it did not always work to the advantage of a unit not to have collaborated fully in the writing up of cases based on shared research. It also remained the case that narratives in impact case studies did not always give sufficient recognition to research conducted elsewhere in the generation of the impact they were claiming, even though this was strongly advised under REF regulations. Not a single example of a jointly-submitted case study was received by the sub-panel, despite the encouragement in the submission guidance.
25. The work of the user assessors was invaluable and involved considerable time and effort on their part. The sub-panel canvassed the user assessors at the end of the exercise to get a sense of their experience of the REF assessment process. On the basis of this consultation, it was concluded that the user impact assessors were much better embedded in the process than they had been in REF 2014. They generally reported that they had been given clear guidance about their roles and enjoyed their work.
26. Given the very broad range of research impact within the submissions to this UOA, the sub-panel noted that in future exercises it would be desirable for the recruitment process to start as early as possible and, as with the recruitment of sub-panel members, to draw on a wide range of nominating bodies to maximise the pool of expertise available.

Environment

Table 5: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	41.3	38.6	16.5	3.2	0.4
REF 2021	41.7	49.5	8.5	0.3	0.0

27. The main change since REF 2014 in relation to judgments of research environment was that there was no separate impact template and units were required to integrate their strategies and support for research impact into the main environment statement. Institutional environment statements (REF5a) were also submitted to REF for the first time.
28. The sub-panel evaluated the unit's research environment on the basis of the unit environment statement (REF5b). Evaluations were informed, where relevant, by metrics on PGR awards and research income (REF4 a/b/c), by the institutional statement (REF5a) and by Covid-19 statements. As in REF 2014, each aspect of the unit environment statement was graded to build up an overall profile.
29. The sub-panel judged that over 90% of the unit submissions had elements that were world-leading or internationally excellent in their support for the vitality and sustainability of research (compared with 79.9% in REF 2014). Overall, the sub-panel noted a significant improvement in research environments, as judged by an analysis of the environment statements and supporting metrics returned to it.
30. There was evidence that units were giving greater priority to issues of equality, diversity and inclusion (EDI) than in REF 2014. Many units reported a growth in diversity in their staff and PGR cohorts. However, in general, commitment to EDI was much more developed in relation to gender than to other protected characteristics. In some cases, units confined attention to EDI only to certain levels of appointment/seniority. In some cases, as in 2014, there was a lack of specificity about the precise ways in which units were delivering on their stated commitments to EDI. More detail was needed on the relation between strategic objectives and mechanisms to enable those objectives to be met. There was also a tendency to confine discussion of EDI to the 'people' section of the statement and not demonstrate how EDI strategy worked through all aspects of the research environment.
31. Most units of assessment provided good evidence of strategic thinking about research and research impact in the period since REF 2014. The best statements of research strategy demonstrated a clear understanding of the actual and potential strengths of the unit in question, with strategy building directly on existing research foci within the unit. They had clearly articulated goals and explained structures and systems in place to achieve those goals. They made illuminating use of metrics as well as examples to show how those structures and systems had worked successfully in practice to enable research and research impact. In the best statements, research clusters, disciplinary or interdisciplinary themes at the centre of research strategy were strongly rooted in a unit's research culture, with good evidence of enabling internal and external synergy within and beyond the unit.
32. SP19 judged that weaker research strategies were less clearly rooted in the unit's research profile or history and outlined generic goals without explaining how they were to be achieved. They were also more likely to have fitted their research priorities into the

terms of broader institutional strategies regardless of whether this made sense in the terms of the unit.

33. The sub-panel was extremely impressed by the procedures and policies typically in place to mentor and support early career researchers. This included support for writing and publication, developing grant funding applications, and for generating research impact delivered through teaching or administrative relief in the initial years of employment, well-structured probation schemes, strong internal cultures of peer review and dedicated internal funding and training. The very best research environments embedded support for staff to develop their research and research impact at all stages of their career, including the provision of regular, internally-funded sabbatical leave.
34. The sub-panel was also impressed by the procedures and policies in place to support doctoral students and to integrate them within research environments. 3,412.97 doctorates were awarded during the assessment period, an average of over 487 a year (see Table 6). This compares to under 440 a year in the previous REF 2014 period. There were also some excellent examples of good practice in relation to EDI, for example the provision of dedicated funding for ethnic minority PGRs.

Table 6: Doctoral Awards by Academic Year

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Doctoral degree awards	447	524	475	497	511	498	462
Awards per FTE	0.23	0.27	0.24	0.25	0.26	0.25	0.24

35. External research income generated over the whole assessment period by the total number of submitted units exceeded £264 million in value (an average of £37.8m per annum, see Table 7). Of this more than £87 million derived from Research Councils or similar sources, whilst £23 million came from UK industry, commerce and public corporations, £18 million from other government bodies in the UK, £72 million from EU sources and £22 million from UK-based charities. Research income per annum during the REF 2021 assessment period was £37.830m compared with £27.782m in the REF 2014 period. Whilst not directly comparable due to the difference in reporting periods, the increased generation of research income was welcomed, though in some units it was associated with a small sub-set of research foci (and individuals) rather than being spread more widely across the unit.

Table 7: Research Income by Academic Year

Year	2013-14	2014-15	Annual average for 2015-20	Annual average for 2013-20
Total Research Income	30,659,194	33,852,092	40,060,134	37,830,279
Research Income per FTE	15,628	17,255	20,420	19,283

36. SP19 examined the relationship between research income and unit size and performance in terms of outputs and impact. There was no clear correlation between these, with units of all sizes producing strong outcomes in both categories. However, there was some evidence that very small units (under 15 FTE) were less likely to score very highly for their research environment, in part because of less capacity to generate internal and external research funding and sustain significant PGR programmes.
37. SP19 judged that mechanisms and procedures for supporting, nurturing and rewarding the generation of research impact had become embedded in units' research culture since REF 2014 to a very considerable degree. Many units had support in place to cultivate and sustain appropriate networks of research dissemination and engagement with potential beneficiaries in government, think tanks, NGOs, the third sector and beyond. The best examples of this explained specific strategies pursued by units and provided concrete illustrations of how those strategies were operationalised.
38. In some cases, research impact strategy involved a decision to concentrate on particular types of impact and a particular set of users. There was evidence that this could be a very fruitful strategy leading to excellent synergies in setting research agenda and, in some cases, the co-constitution of innovative research. However, the sub-panel noted that over-concentration of efforts to generate impact from research with particular users could result in the narrowing of units' research agendas.
39. As in REF 2014, weaker accounts of research impact strategy tended to list examples of research impact or relations with research users but did not explain how that research impact had been enabled, developed and supported by the submitting unit.
40. As in 2014, 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 was similarly impressed by the extent, range and diversity of the networks of national and international collaboration. The strongest examples on research collaboration showed well-organised provision of support for the development and sustenance of networks and research exchange and interchange within the discipline and, where appropriate, across disciplinary boundaries.

Overall

41. It is difficult to make direct comparisons of the outcomes of REF 2014 with REF 2021, given the changes in the rules governing the exercise. Moreover, the submission to REF 2021 should not be conflated with research and research impact in Politics and International Studies as a whole within the UK. Nevertheless, the strength of the unit of assessment's overall profile in terms of outputs, impact and environment from the REF 2021 assessment suggested a very healthy picture in terms of research and research impact across all of the sub-fields of Politics and International Studies. This was particularly praiseworthy in a context in which many researchers have also been responding to sharp rises in student numbers since 2014 in a significant proportion of the units submitted to SP19.
42. It is likely that the shift in guidelines on double-weighting in Main Panel C and the greater selectivity involved in determining submitted outputs may in part explain the improvement in the strength of the outputs profile at the 4* and 3* level. However, it is notable that this improvement is very clear in spite of the fact that units were obliged to

submit 100% of staff with significant responsibility for research and the numbers of staff submitted had grown significantly since REF 2014. There were also improvements in 4* and 3* level performance for impact and for research environment, with notably low levels of 2* or 1* performance in both of these categories.

43. The implications of the growth in Politics and International Studies in combination with the new requirements of the REF exercise are not entirely clear. We have smaller units with large elements of world-leading quality across their profiles, but also small units who have carried a particularly heavy burden in terms of the requirements for the provision of impact case studies. The sub-panel noted that for smaller units there tended to be a larger gap between their strongest and weakest case study scores than for larger units. At the same time, larger units now submitting all research active staff, or ones that had rapidly expanded, have been obliged to submit outputs that they may not previously have submitted and to identify additional high quality impact case studies. There were excellent examples of vitality and sustainability of research environments across different sizes of unit, but the degree to which this depended on central institutional structures is greater for smaller than for larger units, especially when it comes to the generation of research income. Overall, then, the outcomes of the REF assessment exercise reflected a range of variables. In particular, the potential for greater selectivity of outputs, the effects of double-weighting decisions, and the greater weighting for impact case studies has affected different units differently, so that there may sometimes be less close alignment between the various elements of the assessment than in previous iterations of research assessment in the UK.
44. The outcomes of the REF 2021 assessment for Politics and International Studies demonstrate that these fields of research are flourishing. Units submitting to SP19 predominantly produce world-leading and internationally excellent research outputs, generate research impact of outstanding or very considerable reach and significance, and develop and maintain vital and sustainable research environments. This is an exceptional set of achievements in the context of rapid growth, increasing, diverse demands on all active researchers within the sector, increasing uncertainty about the research funding landscape post-Brexit and post-pandemic. One of the most admirable aspects of the submission as a whole was how colleagues had worked over and above reasonable expectations in maintaining and adjusting research agendas and finalising the REF submission itself at the height of the effects of the Covid-19 pandemic in the UK.
45. A huge strength of Politics and International Studies is the amount of investment in PGR and ECR support. The submissions to SP19 in REF 2021 demonstrated tremendous dedication on the part of established researchers to the future of research within the field. This was true in small, new units, just establishing research programmes in Politics and International Studies, and in old and very large submissions with a long record of research in this area. Across all submissions, the sub-panel found robust evidence not only of strength and depth in terms of research quality and the reach and significance of research impact, but also of intellectual and material investment in further developing and strengthening research in Politics and International Studies into the future.



Sub-Panel 20: Social Work and Social Policy

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	27.7	47.2	21.1	3.7	0.3
Impact	42.3	34.6	18.3	4.8	0.0
Environment	37.0	35.8	23.5	3.6	0.1
Overall	33	42	21	4	0

Overview

1. As set out in its panel descriptor, UOA 20 covered a broad range of subject fields, with the emphasis on social work, social policy and criminology, but not restricted to these core areas. The overall profile for Sub-panel 20 has shown an increase in the proportion of research judged to be of world-leading and internationally excellent quality since REF 2014.
2. The sub-panel received 76 submissions from a wide diversity of institutions, 15 more than in REF 2014. Of these, 39.5% came from pre-1992 institutions and 60.5% from post-1992 universities. Six units that submitted to Social Work and Social Policy (SP22) in 2014 did not submit to SP20 this time, while 21 units that submitted to SP20 in REF 2021 did not submit to the sub-panel in REF 2014. Of these, 14 had not submitted to a Social Work and Social Policy panel in previous RAE/REF exercises. Although the profile of these submissions was generally lower than the overall sub-panel profile, these submissions displayed a number of key strengths and were welcomed by the sub-panel as evidence of an expansion of the discipline, and an indicator of the diverse range of institutions that are currently engaged in social work, social policy and criminological research.
3. As an interdisciplinary panel, the sub-panel attracted a wide range of submissions. These included units that displayed features predominantly associated with research effort in one or more of the core sub-disciplines covered by the sub-panel, to others that had a wider disciplinary mix. Conversely, not all units with significant elements of social work, social policy or criminological research capacity submitted to SP20, meaning that by no means all the research effort in these disciplinary areas was assessed by the sub-panel.
4. The sub-panel carried out the assessment in accordance with the published REF 'Panel criteria and working methods' (PCWM). As a result, the sub-panel had full confidence in the procedures it followed and in the robustness with which it approached the assessment process.
5. The sub-panel membership consisted of 26 academics (including one Interdisciplinary adviser), three research users, six impact assessors, one panel adviser and one panel secretary. The sub-panel also benefited from the advice of an international adviser from Main Panel C. Twenty-four sub-panel members (63%) were women and 14 (37%) were

men. Twenty-one percent of the sub-panel were from Black and minoritised ethnic communities. Institutions from each of the UK's four nations were represented.

6. Taken together, the sub-panel members provided a range of interdisciplinary and methodological expertise in addition to expertise in the three main disciplinary sub-areas and expertise relating to research by, and research engagement with, groups with protected characteristics (embracing work relating to disability and sexuality, for example). Impact assessors were appointed for their practice-based expertise across the three main sub-disciplinary areas and were drawn from a range of non-HEI settings.
7. The 2,105.25 Category A FTE included in submissions to the sub-panel, including a headcount of 339 ECRs, represented an increase of 803 (61.8%) from REF 2014. This rise was largely due to the fact that, following the Stern Review, all university staff with significant responsibility for research had to be included in the exercise. The sub-panel noted that, of the units that had submitted to Social Work and Social Policy in REF 2014, the great majority had increased their FTE count.
8. Despite this overall increase, the size of submissions varied significantly: 21 submissions (27.6%) returned more than 35 FTE Category A staff; 36 submissions (47.3%) returned between 15 and 34.99 FTE; and 19 submissions (25%) returned 14.99 FTE or fewer. The largest submission received by the sub-panel consisted of 84.50 FTE and the smallest 2.00.
9. The sub-panel, along with other sub-panels and the main panel, developed a Fairness in REF Intention Plan to guide approach and discussion in the meetings (whether these were virtual, face-to-face, or hybrid). The plan was updated throughout the process and referred to at all meetings, serving as constant reference point and reminder about the risks of unconscious bias and providing a valuable source of guidance for good practice.
10. The Covid-19 pandemic had a significant impact on the activities of the sub-panel. From the beginning of the assessment phase in early 2021, the great majority of sub-panel meetings were held virtually. 'Hybrid' meetings were held towards the end of the process. Although the sub-panel was able to carry out its business efficiently, sub-panel members nevertheless missed the opportunities provided by in-person meetings to reflect upon progress 'in the round' and to engage informally with others about assessment issues and the REF process in general.
11. The sub-panel was especially grateful to its hard-working and dedicated secretariat who unfailingly provided support in the form of data updates, output allocations and reallocations, spreadsheet maintenance, often at very short notice. Sub-panel members also wished to record their profound thanks to the sub-panel's research users and impact assessors for all their work and commitment, particularly during the impact assessment phase of the exercise.

Outputs

General Observations

12. The sub-panel read a wide range of outputs from across the three main sub-disciplines and beyond. Sub-panel members saw evidence of imagination and creativity in many outputs, including instances of methodologically innovative research design and rigorous conceptual engagement.
13. Following an extensive calibration exercise, each output was assessed by two readers: a designated institutional assessor (chosen to assess all three components of a unit's submission) and a subject expert. Where the two readers were unable to agree a grade, a third reader was appointed and their input informed the final agreed grade.
14. The sub-panel adopted a 13-point scale for the initial grading of outputs to allow assessors sufficient flexibility within the final REF grades (1*, 2*, etc) to promote detailed consideration of each output. The grading process was kept under constant surveillance throughout the exercise and, with continuous analysis of assessors' grading patterns and particular attention to borderline grades. These latter were revisited at several points with many outputs being reviewed a second and third time.
15. Judged on the rough indicator of numbers of second reader (expert) allocations, the sub-panel received outputs totalling approximately 1,400 for social work, 2,220 for social policy and 1,130 for criminology. In many cases, assessors had the expertise to read across disciplines and this benefited the sub-panel's work.
16. Submitting institutions were invited to 'flag' criminology outputs but the system was not used consistently (see paragraph 38).
17. As agreed with the chair of Main Panel C, representatives of Sub-panels 18 (Law), 20 and 21 (Sociology), to which a substantial number of criminology submissions were made, met to discuss a broad wish for consistency in approach across the sub-panels. The representatives met on four occasions, with one such meeting involving a calibration exercise. There was also discussion about the extent and nature of flagging, impact case studies, new topics, and emerging themes.
18. 72 cross-referrals were made to a range of other sub-panels within the social sciences (28) and a number of sub-panels in the arts and sciences (44). 76 cross-referral requests were received by the sub-panel, these coming mainly from Sub-panels 17 (Business and Management Studies) and 23 (Education) within Main Panel C, and Sub-panel 3 (Allied Health Professions) in Main Panel A.
19. In REF 2021, the PCWM outlined stronger guidance on the submission of double-weighted outputs as these were under-represented in the REF 2014 submissions. The process took a more consistent approach to the double-weighting of outputs in 2021 than was the case in 2014 when relatively few double-weighting requests were accepted. 222 double-weighting requests were received and 214 (96.3%) were accepted. The sub-panel noted, however, that more outputs (particularly books) would have been accepted for double-weighting had requests been made.
20. The sub-panel received a total of 5,158 outputs, an increase of 8% from REF 2014. Of these, Category A FTE had 4,844 outputs attributed to them (of which 577 outputs were attributed to ECRs) and 314 outputs were attributed to former staff.
21. Nine per cent of the 2,105.25 Category A FTEs had five outputs attributed to them in the submission, 9% four outputs, 15% three outputs, 22% two outputs and 45% one output.

22. 727 books, 38 edited books, 4,030 journal articles, 258 book chapters and 84 research reports were received by the sub-panel (see Table 2 below). The majority of outputs was judged to be either of world-leading (27.7%) or internationally excellent (47.2%) quality.

Table 2: Outputs Types assessed (factoring in double weighting)

Authored Book	Edited Book	Chapter in Book	Design & artefact	Journal Article	Conference Contribution	Report	Other
14.1%	0.7%	5.0%	0.0%	78.1%	0.1%	1.6%	0.3%

23. 546 outputs with an Interdisciplinary Research (IDR) 'flag' were received, amounting to approximately 11% of the output total. This flag was not used consistently, however, and the IDR flag notwithstanding, each of the sub-disciplines within the panel were required to deal with knowledge and methods that embraced sociology, political science, economics, education and health. In keeping with the sub-panel's published descriptor, a high number of interdisciplinary outputs were assessed within the sub-panel. However, where expertise was felt to be lacking, in consultation with the interdisciplinary adviser, outputs were cross-referred to appropriate sub-panels (see paragraph 18).
24. The highest grades were awarded to all types of outputs across a wide range of outlets, ranging from solely theoretical work to empirical and applied research.
25. The sub-panel noted further growth in quantitative work, including the use of different types of 'big data', building on, and consolidating, the increase noted in 2014. Outputs also reflected the ongoing increase in research across social work, social policy and criminology that addresses issues of policy and practice at international/global level. The sub-panel judged much of this work to be of either world-leading or internationally excellent quality.
26. In many instances, theoretical insights were used in a sophisticated and creative manner to inform policy analysis, applied research and practice debates. In other instances, however, the sub-panel considered that theoretical work – and theoretically informed work – could be 'synthetic' and risked simply recasting existing debates.
27. Sub-panel members were generally impressed by the richness of research that investigated the nature and workings of complex institutional (sub)systems, whether the focus was on single institutions, or groups of institutions – e.g. care homes, prisons – or wider institutional systems (such as local, regional, national, supranational systems of governance).
28. The sub-panel noted increased attention in all three sub-disciplines to issues relating to migration and immigration, and the experiences, and treatment, of asylum seekers and refugees.

Social Work

29. Generally, social work research was judged to have harnessed methods appropriate to research questions and to conduct robust analysis. Effective use had been made of significant levels of funding to produce some large-scale and high-quality studies. In line with the trend identified in REF 2014, alongside some strong ethnographic and theoretical studies, social work outputs included an increased number of mixed methods and quantitative studies as well as longitudinal studies and analyses of administrative data, some of which involved linking data sets. Violence and abuse (including online forms of harm) in relation to both children and adults was a key research theme as was work on child protection, looked after children and young people. Research on ageing and dementia constituted another key theme with a significant number of outputs. The impact of digital technologies on social work practice is an emerging research area – with such technologies also being valued as a research tool.
30. The sub-panel noted growth in work addressing social work with refugees, asylum seekers and Black and minoritised communities with some high-quality outputs identified. A significant number of outputs addressed issues of sexuality and LGBTQ+ groups.
31. The sub-panel also observed a continuation of social work's strong focus on the user voice, with evidence of co-produced work with people with dementia, mental health needs and physical impairments. In similar vein, the sub-panel assessed a considerable body of work on children's and young people's participation that showed increased sophistication and acknowledgement of the complexity of children's engagement with both services and research. Exploration of place and space was a recurring theme across social work research, with loneliness, work and retirement, cultural gerontology and death and dying all key areas of research on adults. There was a good body of international and comparative work addressing social work and social need across the globe with some institutions taking a particular focus on low and middle-income countries.

Gerontology

32. The sub-panel received a substantial number of outputs relating to ageing and gerontology. Key themes with a significant number of outputs included dementia, death and dying, work and retirement, neglect and abuse, social care, carers and isolation and loneliness. There was also a strong focus on environmental and cultural gerontology and increasing work on gerotechnology. The sub-panel also observed a continuation of gerontology's strong interdisciplinary and intergenerational focus, although the interdisciplinary flag was seldom used. Many of the outputs deemed as gerontology crossed into social policy and social work (e.g., safeguarding and points made under these headings in the overview report should be noted, see for example paragraphs 26, 28 and 30).
33. Of note was the evidence of co-produced work with people with dementia, mental health needs and physical impairments, as well as LGBTQ+ and excluded communities. There was evidence of increased use of longitudinal and administrative data sets and quantitative methods alongside rigorous qualitative ethnographic studies. The sub-panel observed that some outputs were located in theoretical paradigms and some work advanced theoretical frameworks around ageing.

⁹ Gerontology is included here as a 'sub-sub-discipline' partly to provide continuity with the approach taken in REF 2014, and partly because a REF-wide analysis of gerontology/ageing (analysing main and sub-panel submission choices) is currently being conducted with which SP20 was keen to engage.

34. The sub-panel noted that outputs on ageing came from a wide range of institutions, not only those with well-established centres of ageing research.

Social Policy

35. Social policy outputs covered a wide range of topics and themes including work on all the core areas of UK social policy – housing, social security, health, poverty and inequality, social exclusion and social justice – in historical and contemporary perspective. International and comparative research, including work that blended social policy and development themes, constituted a significant element of the overall social policy output portfolio. Quantitative research had increased in all areas of the discipline since REF 2014. Sub-panel members commented on the methodological rigour evident in many outputs and, beyond that, the ‘reflexive’ quality that was frequently displayed in the conception, design and analysis of research projects and the outputs arising from them.
36. The sub-panel noted a significant increase in research activity concerned with migration/immigration, together with work that focused on the experiences of Black and minoritised communities (roughly 450 outputs). The sub-panel saw evidence (e.g. strategies set out in environment statements) that work in these areas is likely to expand further in future as the impact of social policies (including policies concerned with citizenship and (im)migration) on Black and minoritised communities across the four nations of the UK (and beyond) becomes an ever more significant research theme.
37. The sub-panel commented on the creativity of research design in many outputs, particularly the use of imaginative mixed methods strategies. Health-related research, of which there was a good deal, was a case in point with outputs frequently judged to be either world-leading or internationally excellent, particularly where theoretical/conceptual insights were woven into empirical discussions. Sub-panel members also observed an increase in co-produced work, particularly where disability research was concerned, but noted that co-production strategies were being adopted more widely across many areas of social policy.

Criminology

38. Sub-panel members observed that the flagging system did not work particularly well for criminology, even from self-described criminology centres where criminological research was taking place. Many outputs were interdisciplinary with work crossing with the fields of social work and social policy. Research on domestic abuse, for instance, was a good example of this. The sub-panel observed criminology submissions from a number of post-1992 universities which had not previously submitted to Sub-panel 20, and also observed a high number of early career researchers in the submissions. Both these observations reflect the widespread growth in criminology as an academic discipline.
39. The sub-panel noted a number of newer themes in the work submitted: e.g. cybercrime, green criminology, research on veterans and criminal justice, narrative criminology, arts-based criminal justice interventions, back-stage decision-making in the criminal justice system, international and comparative work addressing criminological and criminal justice issues (including criminology in the Global South), crimmigration, policing

and transnational prisoners. There was also a marked interest in gang membership and its meaning. Moreover, a good number of outputs focused on Black and minority experiences of criminal justice.

40. Methodologically, a high number of research outputs reflected small-scale studies, and the sub-panel noted the emergence of new work employing auto-ethnographic approaches, as well as more traditional ethnography. Quantitative and qualitative work was fairly well balanced, with a significant number of outputs using mixed methods approaches to an excellent standard. Overall, there was good attention to ethical dimensions of research compared to REF 2014, and an increased number of outputs offered important critical reflections on the research process itself. Theoretically, the sub-panel noted new interest in procedural justice and conceptions of legitimacy.

Impact

Table 3: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	43.8	36.0	14.9	4.1	1.2
REF 2021	42.3	34.6	18.3	4.8	0.0

41. The sub-panel was impressed by the range and types of impact displayed by a wide variety of submissions, with strong evidence of the contribution being made to policy and practice in each of the sub-disciplinary areas and beyond. Extensive evidence of outstanding or very considerable impact in terms of reach (taking account of the depth and quality of impact on organisations, individuals and social groups) and significance (understood as how impact enables, enriches, influences, informs or changes policies, practices, understanding) was observed by sub-panel members as shown in Table 3.
42. The sub-panel received 225 impact case studies. Despite HEIs being permitted to submit continuation case studies from REF 2014, only one such study was received by the sub-panel.
43. Two impact calibration events were held before the assessment phase began: one informal event with impact assessors using case studies from REF 2014 to familiarise them with the assessment and grading process, and one formal event involving the full sub-panel.
44. Each impact case study was graded by a team of three assessors, one of the three always being the designated institutional assessor for the submission under review. Assessment was conducted in three phases. An initial grading round was followed by a meeting to discuss the emerging profiles. The meeting decided that a quality assurance exercise was required to ensure the accuracy of the grading process so the sub-panel's executive, together with the interdisciplinary adviser conducted an exercise with a representative sample of case studies (13% of the total). Following this exercise, a further round of assessment saw all the case studies revisited and discussed, and appropriate adjustments made.
45. Particular efforts to achieve sustainable impact through the development of long-term research relationships were observed in a range of different institutions. These included, but were not confined to, relationships with regional organisations, including devolved

governments, in addition to a wide range of local and community organisations.

46. The sub-panel judged that case studies considered to have either outstanding or very considerable impact succeeded in demonstrating clear and well-described links between underpinning research and impact. Further, they highlighted the nature of the pathways to impact and how these were evidenced through well-specified connections between academic researchers and research users. The strongest case studies were able to show how research findings had been taken on by users in ways that shifted practices and/or agenda beyond the parameters originally established by the research itself.
47. The sub-panel noted that case studies could on occasion mistake dissemination for impact. Moreover, case studies were not always considered to be well evidenced – for example, relying too heavily on a selected quotation(s) from individual users to justify ambitious claims. Sub-panel members observed that prior experience tended to yield dividends in constructing impact case studies and considered that some of the institutions new to REF would have benefited from greater support and guidance, particularly with respect to crafting impact case studies.
48. The sub-panel considered that the inevitable difficulties of maintaining and developing close user relationships, and particularly the audit trails required to substantiate impact, was likely to require more systematic institutional support.

Social Work

49. The sub-panel was impressed by the strength of the social work impact case studies which demonstrated a wide range of practice and policy outcomes with impact reaching service users and excluded groups and communities. Many were of excellent quality, and many were interdisciplinary. High levels of impact were achieved at local, regional, national and international levels and over three-quarters of the impact case studies identified as predominantly social work were judged to be outstanding or having very considerable impact in terms of their reach and significance.
50. Impact was frequently assisted by researchers engaging with key stakeholders from an early stage and planning for impact from the outset. Impact acceleration funding had contributed to supporting ongoing relationships with key stakeholders in a number of cases. Including practitioners in research teams was another effective means of achieving impact. A range of digital technologies was also utilised to increase impact.

Gerontology

51. The increasing diversity and interdisciplinarity of gerontology were also reflected in the ICS, including new areas of environmental and cultural gerontology with impact reaching beyond social work and social policy. 18 case studies were identified under the umbrella of gerontology with impact activity covering safeguarding, social and health care, social care funding, well-being of older people, people living with dementia, nutrition, design, and housing in later life. Over three-quarters of the case studies were rated as outstanding or having very considerable impact in terms of their reach and significance. Although no case studies were continuations of those submitted in REF 2014, several were building on long established relationships. A number of case studies demonstrated policy and practice outcomes with tangible impact in the public sector and very considerable impact being co-produced with, as well as reaching, service users and adults in vulnerable situations. Impact was found at all geographical levels (local, regional, national and international) including policy and practice settings in all the devolved nations and internationally.

Social Policy

52. Social Policy impact case studies offered a rich diversity of impact activity and engagement covering poverty and inequality, health and social care, migration, housing and labour markets. The sub-panel observed considerable strength in the case studies with approximately three-quarters found to have had either outstanding or very considerable impact in terms of reach and significance.
53. The sub-panel noted the extent of engagement with regional and local bodies, including devolved parliaments and assemblies, to produce instances of lasting policy impact and/or significant organisational change. Some case studies benefited from a slow-burn approach that saw impact develop organically over time, whereas others displayed an ability to respond to immediate, sometimes urgent, issues in ways that mitigated risk, shifted perceptions of emergent difficulties, or challenged accepted practices. Elsewhere, the sub-panel saw evidence of strength in co-produced research and impact where local groups and communities were closely involved with the design and delivery of the research, in addition to benefiting from the impact achieved.

Criminology

54. The sub-panel observed some creative initiatives (e.g. digital technologies) to reach wide audiences including policy-makers and practitioners via the case studies. Some of the impact case studies were of excellent quality showing real engagement with a range of stakeholders from the moment of design through to dissemination. Just under three-quarters of the case studies were judged to have either outstanding or very considerable impact in terms of their reach and significance. Topics were quite varied, with some impact case studies having been developed over a long period of time. Others reflected a particular focus on contemporary issues ranging from debates about crime in the public eye to the need for a reconceptualisation of policy and law reform in regard to concerns about environmental harms and specific areas of discrimination, and the need for improved interventions in the criminal justice system for specific groups of offenders or victims/survivors.
55. A good number of the impact case studies were interdisciplinary. Overall, there was strong evidence of impact at international, national, regional and local levels, and evidence of sustained relationships with a wide range of stakeholders. The strongest impact case studies reflected close relationships with professionals and practitioners which researchers had developed at various levels. This was perhaps more easily visible in devolved administrations but was in evidence across the board.

Environment

Table 4: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	36.9	39.3	20.5	2.6	0.7
REF 2021	37.0	35.8	23.5	3.6	0.1

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56. Of the three assessment categories, environment illustrated the breadth and complexity of the SP20 submission taken in the round. Although the majority of submissions were focused around either one, or a combination, of the three sub-disciplines covered by the sub-panel, more specific sub-themes were also observed in some cases – health research is an important example, as is research focused on ageing. The sub-panel found clear evidence of high-quality research environments in a large number of submissions as seen in Table 4.
57. With respect to the introduction of the institutional-level statement (REF5a), the sub-panel noted that the information contained in these statements was helpful in some instances, for example in the supply of supporting information about institutional staffing strategies, training and mentoring opportunities that either supplemented or substituted for unit-level provision. Institutional statements were judged to be particularly helpful where small units needed to rely on central support to achieve economies of scale in these areas. Less helpful statements were considered to be too general in nature, providing insufficient detail about the relationship between the wider institution and submitting unit.
58. The assessment of environment statements was preceded by calibration, designed to familiarise sub-panel members with the structure of the statements and the nature of the grading system (i.e. the independent rating of REF5b, sections 1-4). This exercise was followed by further discussion and the production of an aide memoire, to accompany REF guidance and assist members in their grading of the vitality and sustainability of submitting units.
59. Environment statements were assessed by groups comprised of institutional assessors and two other sub-panel members. Where the assessors were unable to agree a grade, or where groups were unsure about an aspect of the statement, a fourth reader was selected to advise the group.
60. The sub-panel considered that submissions distinguished by a clear organisational focus – whether comprised of one or more research units/centres – were more likely to be able to articulate strategic strength with specific attention paid to research and publications strategies, the further development of impact activities and future plans. These statements contrasted with others that were judged to be less strategically coherent and less clear about future development.
61. In a welcome shift following changes in the REF guidelines, statements considered Equality, Diversity and Inclusion (EDI) issues more systematically than was the case in REF 2014. Stronger statements went beyond general institutional policies to detail unit-level reflections on progress made since REF 2014 with respect to the under-representation of staff with protected characteristics. Significant progress towards, or the achievement of, key EDI benchmarks was observed in some cases, although the sub-panel noted that this tended to be better evidenced in relation to gender than to ethnicity or other protected characteristics, where it is clear that more work needs to be done.
62. The sub-panel welcomed increased strength in PhD support across a variety of different institutions with many submissions providing details of mentoring schemes, writing workshops and peer support systems in addition to formal institutional training provision.
63. There had been a significant uplift in PhD completions over the REF period, rising from 350 to 423 per annum – an increase of 20.9% as seen in Table 5. The sub-panel also

observed that some institutions that were not part of Doctoral Training Partnerships were nevertheless registering notable increases in PhD awards.

Table 5: Doctoral Awards by Academic Year

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Doctoral degree awards	350	381	376	364	439	419	423
Awards per FTE	0.17	0.18	0.18	0.17	0.21	0.20	0.20

64. In respect of research income (see Table 6), the sub-panel noted that direct comparisons with REF 2014 were not appropriate given the different time periods. However, the sub-panel welcomed the fact that overall research funding reported across the sub-panel had increased by an average £4.2m per annum over the REF period.

Table 6: Research Income by Academic Year

Year	2013-14	2014-15	Annual average for 2015-20	Annual average for 2013-20
Total Research Income	46,037,971	48,807,273	55,347,688	53,083,383
Research Income per FTE	21,868	23,184	26,290	25,215

65. The sub-panel noted the strength of intra- and inter-institutional collaborations (including Doctoral Training Partnerships, funded research centres and other inter-institutional funded projects) as well as the commitment in many units to local, regional, national and international research networks. Also of note was the commitment on the part of many submissions to contributing to the activities of journals and key learned societies.

Conclusion

66. In the great majority of submissions, the sub-panel saw evidence of outputs and impact that were judged to be of either world-leading or internationally excellent quality. The sub-panel welcomed the fact that, for the majority of units that had submitted to REF 2014, overall quality profiles had improved. As mentioned in paragraph 2, the sub-panel was pleased to see that 14 new units had submitted to SP20 for the first time, welcoming this as a sign of the ongoing expansion of social work, social policy and criminological research throughout the HE sector. All of the submissions provided evidence of critical engagement with policy and practice at one or more levels – local, regional, national or international. Submissions evidenced engagement (and in some cases, co-production) that was responsive to the needs of a variety of stakeholders ranging from policy makers in central and local government, to specific local communities and organisations, and to groups and individuals with protected characteristics. Taking the evidence provided by

the 76 submitting units in the round, the sub-panel considered the disciplines assessed to be in good health with all units having made positive research contributions to what are highly significant areas of the social sciences in the UK and beyond.

Finally, the sub-panel would like to remember one of its original members, Professor Sir John Hills, who very sadly died just before the beginning of the assessment phase. John was well known to us all, not just for his extraordinary contribution to social policy, but also for his kindness, good sense and wisdom. His presence was much missed by the sub-panel, and we hope and trust that we conducted our business with the dedication, commitment, and indeed good humour, of which he would have approved.



Sub-panel 21: Sociology

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	38.0	37.7	21.6	2.5	0.2
Impact	43.9	39.4	15.7	1.0	0.0
Environment	41.0	38.3	15.6	4.7	0.4
Overall	40	38	19	3	0

Summary of submissions

1. The Sociology submission to REF has grown in size and quality since REF 2014. Thirty-seven (37) universities (Higher Education Institutions, HEIs) made submissions to Sociology, up from 29 in 2014. There were 1,168 Category A staff submitted, which amounts to 1,103.54 in full-time equivalents (FTE), an increase of around 400 FTE.
2. There were 2,669 outputs and 115 impact case studies submitted. Overall, the proportion of outputs judged to be world-leading (four star) was 38%, for impact 44% and environment 41%.

Sub-panel working methods

3. Sub-panel 21 (Sociology) consulted on the definition of Sociology with its professional community to produce the descriptor, reported in the Guidance at paragraphs 113-118 ('Panel criteria and working methods' (2019/02) - REF 2021), used during the exercise.
4. Sociology is a discipline with plural approaches. These were recognised and accommodated throughout the process of reaching consensus.
5. Members of the sub-panel were recruited from those nominated by the relevant professional associations in two stages, first for the fine-tuning of the criteria, and secondly for the assessment phase. The responses to the survey of submission intentions from HEIs, which identified the intended areas of specialism of their submissions, were taken into account in the second round of recruitment. The sub-panel had 22 academic members and four users, all of whom were full members. There was a sub-panel executive composed of the chair, two deputy chairs, panel secretary and panel adviser.
6. Equality and diversity issues were considered during the recruitment of sub-panel members, in all meetings, and in all aspects of the assessment process. All members of sub-panels were trained in these issues, including unconscious bias. At the start of each meeting, colleagues were reminded of these commitments, in our Fairness in REF Intention Plan. Reports from the REF Equality and Diversity Panel (EDAP) were regularly discussed.

7. Assessment was against benchmarks for world-leading (four star), internationally excellent (three star), internationally recognised (two star), nationally recognised (one star), and unclassified where these standards were not met or the item was ineligible.
8. Assessment was separately done for the components of outputs, impact case studies and environment. Full profile grades were only reviewed in the final stage.
9. The process of assessment against benchmarks involved calibration and dialogue. Calibration meant reading (the outputs, impact case studies, environment statements), independently grading, then discussion with other sub-panel members to seek consensus through mutual adjustment.
10. Each output was read and graded by at least two sub-panel members, one more specialised and one more general reader, first separately, then, following discussion, an agreed grade was reached. There was no single reader per institution. The sub-panel did not use measures of citations or journal rankings. If agreement could not be reached, a third reader was identified by the sub-panel chair and deputies.
11. Each impact case study was graded by three sub-panel members, one of whom was a user, first separately, then, following discussion, an agreed grade was reached. If agreement could not be reached, a further reader was identified by the sub-panel chair and deputies.
12. Each environment statement was graded by approximately half the sub-panel members, first separately, then, following discussion among one half witnessed by the rest of the sub-panel (taking into account conflicts of interest), an agreed grade was reached. Within the context of the multiple issues addressed in the statements, standard data on staff, early career researchers, research doctoral degrees awarded, and external research income were considered.
13. The detailed process to reach these grades was agreed by the whole sub-panel. The results were signed off as a fair reflection of the research activity in the submissions, which had been assessed consistently against the published criteria and examined in sufficient detail to form robust judgements.
14. Careful attention was paid to avoid grading or discussion by those with conflicts of interest; a register of these was updated in each meeting. Such members were withdrawn from grading and from discussions.
15. There was a reflexive process of considering the implications of practices throughout the assessment at different stages; and action was taken as needed to achieve consistency across the sub-panel in line with the REF quality standards.
16. The sub-panel worked in person until the Covid lock-down. Thereafter, meetings were conducted virtually.
17. The Sociology sub-panel provided a report to the REF director on how challenges concerning IT might be addressed in the short-term and for the next REF. In ensuring that these challenges did not prevent robust assessment, considerable time was expended in developing strategies to address this within the sub-panel.

Interdisciplinarity

18. The assessment of interdisciplinary research (IDR) was a regular topic for discussion at meetings. Two members of the sub-panel were IDR advisers and had responsibility for raising issues and for reporting on discussions of broad interdisciplinary issues discussed at the (IDR) network meetings. The sub-panel also included several other members with extensive experience of interdisciplinary research.
19. Institutions had been invited to flag outputs that they considered to be interdisciplinary using the definition provided in the REF 2021 'Guidance on submissions'. In total 17% of outputs submitted to Unit of Assessment (UOA) 21 (Sociology) were flagged as interdisciplinary. There was considerable variation in the extent to which institutions flagged outputs as interdisciplinary. Of the thirty-seven submissions to UOA 21, ten submissions had no outputs flagged as interdisciplinary, while four submissions had fifty percent or more flagged as interdisciplinary. The IDR advisers and the sub-panel considered that these flags had been applied inconsistently across institutions. Within the IDR network meetings across all four main panels, concerns were further raised over the differing approaches taken by HEIs with regards to the flagging of interdisciplinary outputs. It was agreed that this would make it difficult to draw firm conclusions from any analysis of grades attributed to IDR-flagged outputs in comparison with non-flagged outputs.
20. Outputs flagged as interdisciplinary were allocated to members of the sub-panel by the executive using the same principles as when allocating other outputs. Outputs flagged as interdisciplinary were also included in the calibration process. In assessing interdisciplinary outputs, the sub-panel followed the guidance provided by the Interdisciplinary Research Advisory Panel (IDAP) that "originality and significance can be identified in one, some or all of the constituent parts brought together in the work, or in their integration. They do not need to be demonstrated across all areas" (paragraph 196 'Panel criteria and working methods').
21. The interdisciplinary flag was visible to all sub-panel members when assessing outputs. Members of the sub-panel were able to assess the majority of outputs that were interdisciplinary without the need for joint assessment with other sub-panels. The majority of interdisciplinary outputs were examples of interdisciplinary working across the humanities and social sciences.
22. Among the outputs included in submissions to UOA21 (Sociology), 0.9% were either cross-referred to other sub-panels for advice or assessed jointly.
23. The Sociology sub-panel received more requests for advice from other sub-panels (joint assessment and cross-referral) than it made requests to other sub-panels. These requests for advice from other sub-panels amounted to 8% of the volume of outputs assessed by the sub-panel.
24. Main Panel C supported collaboration between criminologists who were members of three sub-panels: 21 (Sociology), 18 (Law) and 20 (Social Work and Social Policy). They met in the early stages of the assessment exercise to engage in shared calibration. They reported back to their specific sub-panels on their progress. These practices facilitated appropriate levels of consistency across sub-panels combined with disciplinary specificity. Institutions had been invited to flag outputs that they considered to be Criminology. There was wide variation in the extent to which institutions flagged outputs as Criminology. Within the Sociology sub-panel there were areas of research that are constituted both within Criminology and Sociology, such as gender-based violence.

Outputs

25. There were 2,669 outputs submitted to the Sociology sub-panel. There were fewer items (2,374) than outputs, since the number of outputs reflects double-weighting.
26. Of these outputs, 38.0% were graded four star, 37.7% three star, 21.6% two star, 2.5% one star and 0.2% were unclassified.
27. No significance was attached during the process of assessment to format of the output. The formats were: authored book (781), edited book (6), chapter in book (107), journal article (1,754), conference contribution (1), research report for external body (11), research data set and databases (6), working paper (2), and translation (1). No outputs were submitted in the other categories.

Table 2: Outputs Types assessed (factoring in double weighting)

Authored Book	Edited Book	Chapter in Book	Design & artefact	Journal Article	Conference Contribution	Report	Other
29.3%	0.2%	4.0%	0.0%	65.7%	0.0%	0.4%	0.4%

28. Any correlation between grades and format was not due to the assessment method. Four star outputs were found across output forms, and especially among books.
29. Almost all (97%) requests for double-weighting on the basis of the output's scale and scope were accepted, and in the remaining cases the reserves were assessed. The request to double-weight outputs (which almost entirely concerned books) was varied between institutions, with the proportion of books for which double-weighting was requested ranging from 0% to 100%. Well over half of books were double-weighted. Among double-weighted books, many were graded four star, but some books were also graded at three star, two star, one star and unclassified.
30. The requests for double-weighting of outputs increased around tenfold from REF 2014 to REF 2021, from 1.2% (31 of 2,630 outputs) to 12.8% (304 of 2,374 outputs).
31. While REF 2014 and REF 2021 are not directly comparable because of the change of methodology regarding outputs, there was a higher proportion of four star outputs in REF 2021 than previously. There are several possible reasons for this increase in quality, including increased use of double-weighting; the change in the number of outputs submitted per person; the change in submitting institutions; the increase in the proportion of the environments in which submitted sociologists worked that were four star.
32. The increase in the number of double-weighted outputs had a positive effect on output grades.
33. The change in the number of outputs permitted to be submitted per person was between one and five, instead of four each in REF 2014. This potentially allowed for greater selectivity of high-quality outputs for submission.
34. The 37 institutions submitting to Sociology in REF 2021 have a different profile from the 29 institutions submitting to Sociology in REF 2014. Some of the institutions present in 2021 but not in 2014 were long established universities and some were from newly establishing universities.

35. Overall, the proportion of four star environments in which sociologists worked increased from 35.1% in REF 2014 to 41.0% in REF 2021.
36. The excellence of the outputs reflects the originality, significance and rigour of Sociology in the UK. Several areas previously identified as separate sub-fields are now part of the mainstream of sociology, including gender, racialisation and ethnicity, science and technology studies. Research at the intersection of sociology and criminology is thriving. Quantitative methods, as well as other methods, are flourishing both in large externally-funded centres and more generally across the discipline.
37. The sub-panel decision at the start of the process was not to provide submitting units with a predetermined list of sub-fields, but to invite institutions to describe their intentions to submit using their own classifications. In being consistent with this decision, which produced a large list of specialisms and areas, the sub-panel has not identified specific sub-fields for comment in the overview report other than those which were flagged as part of the REF process: thus, interdisciplinary research, and criminology.

Impact

Table 3: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	43.2	39.4	13.6	3.3	0.5
REF 2021	43.9	39.4	15.7	1.0	0.0

38. There were 115 impact case studies submitted to this sub-panel in REF 2021. The sub-panel graded all impact cases using a nine-point scale. The profile (see Table 3) showed that 43.9% of ICS submissions were judged to have achieved outstanding impact (four star) quality, 39.4% to have very considerable impact (three star) quality, 15.7% considerable impact (two star) quality, and 1% recognised but modest (one star) quality. This continues the practice of Sociology being highly impactful, with similar results to those in REF 2014 (43.2% four star, 39.4% three star, 13.6% two star, 3.3% one star, and less than 1% unclassified).
39. The expertise of the four user members of the sub-panel in this evaluation was appreciated. These members commented favourably on the impact of sociology on the world, noting that this is often under-recognised. They commented positively on the extent of co-production of knowledge between researchers and practitioners, which improves on the traditional route whereby researchers promote the relevance of their research to end users.
40. Case studies included the full range of impact types. Many impact case studies identified more than one type of beneficiary in the same field, where the research had produced varied reach and significance of impact. The interconnections between entities on the pathway to impact were often identified.
41. A high proportion of impact case studies included policy-makers among the beneficiaries.
42. There were also case studies that involved evidence of new ways of shaping public discourse and knowledge. This development in the type of impact case study, including

new ways of thinking about the significance of sociological concepts in shaping emergent thinking, was welcomed. The inclusion of a wide range of impact types was also welcomed.

43. The impact described in the case studies submitted has been achieved at local, national, and international levels. UK Sociology impacts on the world not only on the UK.
44. The provision of sufficient and/or appropriate evidence of impact in the five pages available was sometimes challenging. A number of case studies were audited.
45. The topics of the impact were diverse. The quality and range of the impact case studies demonstrated the very substantial contribution made by Sociology to the wider society.

Environment

Table 4: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	35.1	44.9	18.5	1.4	0.1
REF 2021	41.0	38.3	15.6	4.7	0.4

46. The four components were separately considered, in order to assess the vitality and sustainability of the research environment: research and impact strategy; people; income, infrastructure and facilities; collaboration and contribution to the research base, economy and society. The standard data of staffing (including early career researchers), research doctoral degrees awarded, and external research income were considered in their specific contexts. The sub-panel also drew on the institutional environment statement and Covid-annex for contextual information.
47. The quality of the research environments of the submitting units was similar to those submitted in REF 2014, despite the challenges in funding and reorganisation. As shown in Table 4, world-leading (four star) quality was identified in 41% of submissions, internationally excellent (three star) in 38.3%, internationally recognised (two star) in 15.6%, nationally recognised (one star) in 4.7%, and 0.2% were unclassified.
48. Research and impact strategy: Most units had a clear strategy. Many of the successful units managed to combine activities that focused on the development of the sociology discipline with engagement in interdisciplinary centres that had sustained engagement with other disciplines and the non-academic world. However, there were a few units where the account of the unit did not provide a clear strategy to address what appeared to be in decline.
49. People: Many units had well developed and multi-faceted policies to develop research staff and PGR students. This included attention to equality and diversity issues and to sociologists at all career stages. Good practices included those that protected research time for all. However, there was some variability in people policies and practices.
50. Income, infrastructure and facilities: Levels of external research income per FTE staff member varied enormously across units. Some received very little. In others, sociologists were leading substantial investment in research and infrastructure. In some instances, sociologists were leading major multi-disciplinary and multi-institutional research initiatives.

51. Collaboration and contribution to the research base, economy and society: The level of engagement with others inside and outside of the academy was impressive, in both world-leading units and also those that were less well-endowed with resources. There was, however, variability.
52. The top research environments are conducive to producing research at a world-leading level and enabling outstanding impact. These units tended to have received sustained investment, to be growing in quality and quantity, and to be working in a coherent disciplinary context.
53. However, the majority of submitted units had no world-leading components in their research environments. As well as sociology in sites of excellence, there is sociology conducted in research environments of lower levels of quality, including where staff are working in a more dispersed context.
54. Some small units on an upward trajectory constitute a distinct subset of sociology units. There are some clusters of sociologists with low levels of institutional provision and external funding which yet have a good strategy, even if it is sometimes more aspirational than implemented in practice. There are several instances of upward trajectory that bode well for the vitality and sustainability of the discipline across a diverse range of institutions.
55. A small minority of submitted units appeared to be suffering a decline in the quality of their research environment. The implications for outputs may be masked in the short run because of outputs being submitted for staff formerly present, but now departed. Some reflection on potential processes to repair problems of decline might have been more fully included in some statements on strategy.
56. The case for further investment in the infrastructure and practices needed by sociological research today is strong, especially given the high quality of research and impact on the world that can be achieved.
57. The achievement of cooperation and collaboration despite the competitive environment has significantly aided the quality of sociological research.

Final points

58. The assessment is multi-faceted. The quality levels of the three components of the assessment exercise, outputs, impact and environment, show some level of correlation. The variations in strategy and in histories of development caution against any simple reduction of one to another. Sustained investment is key to the development of the sociology units that produce the highest level of quality of outputs and impact.



Sub panel 22: Anthropology and Development Studies

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	33.3	44.4	21.1	0.9	0.3
Impact	45.8	38.8	14.7	0.7	0.0
Environment	60.3	37.5	2.2	0.0	0.0
Overall	40	42	17	1	0

Summary & background

1. For REF 2014 and REF 2021, anthropology and development studies have been combined in a single assessment panel. There were some initial concerns that merging the two disciplinary areas within a single such unit might undermine the distinctiveness of each. Some anthropologists, for example, see their approach as utterly separate from that of development studies; some economists have hesitated to submit their work to a development studies sub-panel that places interdisciplinarity at centre stage. The sub-panel has been attentive to such concerns when selecting sub-panel members, and maintains that there are advantages to the collaboration. Submitting units were able to apply for 'multiple submissions', and four did so, but two opted for joint submissions. This, plus a shared emphasis on public engagement/policy impact, the use of ethnographic approaches across both areas, and the strength of development anthropology in the UK, shows that the sub-panel continues to have a coherence that outweighs these concerns. REF 2021 bore out this view and this also meant that the sub-panel could achieve synergies and economies of scale in relation to reviewing processes.

Details of overall submission and assessment process

2. The sub-panel received 26 submissions from 22 HEIs. Four institutions prepared separate submissions for development studies and anthropology, 14 submitted as anthropology departments, 10 submitted as development studies departments. Two further universities opted not to draw a firm boundary between the two areas. Three institutions that had submitted to UOA 24 (Anthropology and Development Studies) in REF 2014 did not submit this time and four institutions submitted to this UOA in REF 2021 for the first time. A total of 771 staff were returned. In FTE there were 733.44 compared to 562.1 in 2014 (increase of 31%). The scale of the submissions ranged from 9.90 to 63.50 FTE. Of those which had submitted in 2014, three submitted fewer staff (reduced by 16% or less), and 19 submitted more staff (six of these with an FTE bigger than 25% or more).
3. New procedures for assessing staff circumstances were followed in REF 2021. Requests for reductions were considered by the Equality and Diversity Advisory Panel (EDAP)

and adjustments were made to the number of required outputs in accordance with EDAP's decisions. All reductions requested were approved, consequently no unclassified outputs were applied within any submissions in this UOA. Reductions were applied to 10 different submissions varying between 1 and 17 outputs. The proportion of early career researchers in individual submissions varied from 0% to 35%. The percentage of the total headcount of ECR staff submitted remained relatively static comparing REF 2014 to REF 2021 representing around 18% of staff in both exercises.

4. For assessment of outputs, the sub-panel was joined by three additional assessors, brought in to strengthen and broaden expertise in certain areas. The sub-panel assessed a total of 1,592 outputs, but accounting for double weighting this was 1,762 outputs (see Table 2). Of these the biggest component was made up of journal articles (1,156), followed by authored books (406), edited books (86), and book chapters (77). To the anthropology assessors, 187 monographs were submitted; the development studies assessors read 53. In development studies, economists tended to publish in journals while those hailing from other disciplines in development studies, such as historians and anthropologists, tended more towards monographs. There was a very small number of visual submissions (exhibitions, digital or films plus websites), and a larger number of other outputs, comprising working papers, research reports for an external body, scholarly editions or other eligible output types. All outputs were assessed by at least two members of the sub-panel.

Table 2: Outputs Types assessed (factoring in double weighting)

Authored Book	Edited Book	Chapter in Book	Design & artefact	Journal Article	Conference Contribution	Report	Other
23.0%	4.9%	4.4%	0.0%	65.6%	0.0%	0.5%	1.6%

5. Cross-referral or joint assessment procedures were followed for 27 outputs. One institution requested cross-referral to Sub-panel 15 (Archaeology) for a quarter of its outputs, making this effectively a joint social and biological anthropology and archaeology submission. Joint assessment with various other sub-panels accounted for a further 20 outputs, and 48 outputs were received by the sub-panel as cross-referrals from other sub-panels, with two joint assessment requests.
6. As in REF 2014, Main Panels C and D strongly encouraged the submission of outputs of extended scale and scope for consideration as double-weighted outputs, in each case to be accompanied by a supporting statement setting out the case for double-weighting. The sub-panel followed the Main Panel C supplementary criteria of the 'Panel criteria and working methods' guidance that the production of longer-form outputs demonstrating sustained research effort warranted double-weighting, unless this was not evident from the output or the accompanying statement. As was the case in REF 2014, different approaches were adopted by different submitting units in response to this opportunity, with some nominating no outputs for double-weighting and others making a substantial number of such claims. In some cases, the lack of requests for double-weighting, particularly for authored books, was noted by the sub-panel as a missed opportunity given the high proportion of world-leading and internationally excellent outputs assessed. The sub-panel received 173 requests for outputs to be double-weighted, with all but three accepted by the sub-panel.

7. The sub-panel awarded unclassified scores where submitted outputs failed to meet the published definition of research for this assessment, or where a co-author's contribution to an output could not be verified by audit. Where the number of outputs submitted was lower than the number required, missing outputs received an unclassified grade.
8. Impact was assessed by impact case studies and - new compared to REF 2014 - the inclusion of the submitted unit's approach to impact and the mechanisms in place to support it as part of their environment statement (REF5b). The biggest submission submitted five case studies while the smallest submitted two. Altogether the sub-panel assessed 78 impact case studies. Two user members were recruited to the sub-panel. All the impact material was assessed by at least one of them and at least one other sub-panel member, followed by plenary discussion and, in some cases, further moderation to ensure consistency of approach, before the confirmation of a final grade. The two user members played a crucial role in assessing impact case studies. Impact case studies were assessed using a nine-point scale.
9. Each environment statement was assessed against the criteria for vitality and sustainability, informed by an institutional level environment statement (REF5a), accompanying Covid-19 Annex (where provided) and data on doctoral completions and research income (REF4a, REF4b and REF4c).
10. Each of the four sections of REF5b was graded separately using a nine-point scale, with the sub-profile for research environment aggregated from these individual grades. Initial assessments of each submission's environment statement were made by pairs of panellists, with an additional assessor in the case of larger submissions or those submitting across a range of disciplines. The grades were then moderated and confirmed in plenary discussion.
11. The sub-panel found that the 26 submissions provided evidence of the vitality and sustainability of research activity in both anthropology and development studies. It was impressed by the extremely high quality of the outputs submitted for assessment and by the research environments from which those outputs were produced. Impact, with increased weighting in this exercise, was both impressive and inspiring, as well as demonstrating innovative ways to collaborate and interact with the world beyond academia. The impact case studies expressed and built on a long history of non-academic engagement in anthropology, and a commitment to interaction with a wide range of development actors in development studies. Research in UK anthropology and development studies has demonstrated the production of lasting, meaningful and significant impacts.

Outputs

12. Most of the submissions returned outputs that were judged by the sub-panel to be of world-leading quality, and the majority of outputs submitted were of at least internationally recognised quality, confirming the excellence of research being carried out by UK development studies and anthropology departments.
13. In development studies, the sub-panel noted some important ways in which funding has enabled the production of outputs. Submitted units with a diversity of funding were seen to be more conducive to producing world-leading and internationally excellent research than those whose research culture was driven by two or three large grants. The sub-panel also noted that, over the course of several research assessment exercises,

funding has tended to set agendas in development studies. With the current uncertainty about research funding (see Environment, below), this is likely to change.

14. The mature or well-established areas in development studies, which remained strong and continued to push the frontiers of knowledge, included the analysis of poverty and inequality, with a continued (and growing) emphasis on the latter and studies stretching from the individual and household level through to international comparisons. Classical development studies concerns, such as agricultural and rural development, persisted, with a focus on land rights and cooperative farming. This was accompanied by the continued flourishing of work on the environment and development, particularly in the area of conservation. However, few submissions engaged with development theory, concerned themselves with the boundaries of development studies (e.g. on global development) or dealt seriously with recent/major challenges (e.g. on decolonising development). Although there was much collaboration with southern-based researchers, there was less co-authorship with them. There was some excellent comparative work that really shifted fields forward, as well as pieces based on single case studies. For some of the latter, the wider significance was drawn out while others remained narrower in focus. Additionally, relatively little use was made of comparative analysis as a means of generating theoretical development and more nuanced/ contextualised policy recommendations.
15. New growth areas included politics and development, with specialist areas in political settlements and tax reform; global governance ranging from trade to peace-building, including humanitarian issues, refugees, and post-conflict reconstruction; urban development and cities. The trend of growth in quantitative methods continued from REF 2014 into current submissions. Political economy remained a robust area of investigations, and trade, including fair trade, global commodity chains and regional trade were important topics. Global health was a significant new growth area. There was a closer interchange, this time, between development studies and history in ways that promoted more critical engagement, on the one hand with development assumptions and ideas and on the other with development policy, such as examples which transcended the monocausal preoccupations of path-dependency explanations and embraced the complexities of process, context and contestation that preoccupy mainstream historians.
16. The economics-oriented development studies submissions followed trends in economics more broadly, showing the growing prominence in that discipline of development economics, and with methods being imported from the rest of economics (like advanced econometrics), or methods being tried and then re-applied to the rest of economics (for example, Randomised Controlled Trials (RCTs)), which indicated a growing confidence of development economists as economists. The application of advanced quantitative techniques to classical development studies topics, such as poverty, inequality, gender, agriculture, rural development, education and health, was widespread. But the economic submissions also used economic methods to make inroads into new areas (for them), such as political economy, reflecting trends in economics more generally. Some of the submissions utilised innovative data sets that have increasingly become available in the last decade - these include data based on satellite observations, or administrative data sets. There was a particular focus on establishing causality. The methods ranged from conventional instrumental variables techniques at different levels of sophistication, to RCTs. While the application of RCTs as a method by and large met international standards, there was variation in the extent to which authors took on board critiques of the method - technical (internal versus external validity), cost effectiveness, and ethical

limits of conducting experiments. The majority of economic submissions to this UOA were microeconomics-oriented compared to a smaller number of macroeconomic or structural investigations. The sub-panel welcomed the interaction of development economists with other disciplines in development studies, to contribute, and to learn from them, especially in light of the decline in mixed methods work that combined qualitative and quantitative approaches.

17. In anthropology, several classic areas have strengthened and acquired new impetus. Ethnography remained of key importance to the best work in the discipline, as did the centrality of regions that to other scholars might appear marginal, peripheral, or transitional. Anthropologists challenged such assumptions by putting studies of such zones at centre stage. One classic topic with ongoing relevance concerned changing practices of sex, gender and kinship (with novel insights into such topics as arranged marriages and bridewealth in contemporary/urban settings). Another theme of ongoing importance, but with interesting new angles, encompassed economic anthropology, gift exchange and contract. Submissions in the anthropology of politics have explored some well-established areas such as violence and conflict; citizenship; and cultural revival; but taken these into new directions. Within the overlapping areas of economic and political anthropology, some insightful ethnographic studies of labour and industrial life were submitted. Anthropology of creative arts and museum anthropology continued to enjoy prominence, as did the anthropology of migration and borders.
18. Some emerging areas noted last time have been both deepened and diversified. Studies of infrastructure have intensified their engagement with central political and economic themes. The anthropology of ethics, already noteworthy in REF 2014, has expanded and overlapped with issues of energy, conservation, and extractive economic arrangements/mining (including artisanal/informal mining). Overlapping with these are several innovative outputs concerned with environmentalism and conservation. A novel area of research was individual biography (in some cases with a historical bent and/or based on archival material, in others showing innovative methodological approaches that went beyond conventional interviewing). Sexual transition and the anthropology of modern/Euroamerican political institutions were other new areas. In terms of methods, the use of documentary and archival sources was noteworthy.
19. Another innovation was the use of rigorous and evidenced research to inform outputs that were aimed more at a broader audience beyond the discipline. As well as being more accessible to a wide audience, such outputs really engaged with and pushed forward methodological/representational approaches in anthropology such as collaborative ethnography and co-authorship, and were underpinned by an awareness of the political implications of voice and power that are at the heart of the discipline.
20. Medical anthropology remained a key area. Outputs ranged from those documenting unequal donor/recipient relations between healthcare bureaucracies in Africa, through ethnographic studies in the UK, to accounts of earlier pandemics.
21. Finance and financialisation proved to be central in both international development and social anthropology; submissions covering this topic ranged from ethnographic studies of management consultancies and other similar institutions to critical accounts of so-called (but deleterious) financial 'inclusion'.
22. In anthropology, especially, there were several multi-component outputs; many including websites, exhibition catalogues and films. The sub-panel recognised the important contribution of these non-standard scholarly outputs.

23. 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, and 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 demonstrated the vitality of this sub-discipline in the UK, and its high-level international profile. The sub-panel received 12 cross-referrals and two joint assessments from other sub-panels in this area. The outputs assessed for this exercise suggested that the discipline has continued to conduct research in its traditional areas and has further consolidated its existing areas of strength. In addition, bioanthropology experienced significant changes of focus or approach since REF 2014. In particular, there was an increase in research with intellectual and methodological overlap with evolutionary psychology, social anthropology and life history biology. Biological anthropology in the UK continued to sustain considerable breadth despite its small total size. This breadth of approaches was a major source of strength which acted against disciplinary fragmentation and over-specialisation.
24. Overall, work that was judged to be of world-leading quality was demonstrated across a variety of methodological and theoretical approaches - including research that was qualitative, quantitative, conceptual, empirical, historical, biological, applied, participatory and laboratory-based - and in a range of output types, from detailed monographs to concise articles. Books showed a commitment to detailed empirical (often ethnographic) research, coherence and theoretical innovation: they addressed new questions and set agendas in ways that were often innovative and imaginative. Outputs of all types drew on concrete evidence and demonstrated originality, often building on existing insights from the literature but expanding on these imaginatively while harnessing them to novel areas of research, or alternatively challenging them fundamentally.
25. The sub-panel viewed the variety as a strength of the disciplines assessed and noted an improvement in the quality of outputs facilitated by the lower number of outputs required per researcher and the slightly longer REF publication period. Being permitted to submit fewer than four outputs was likely particularly beneficial for early career researchers. Some of the best submissions were co-authored and/or resulted from collaborative work, and many of the strongest outputs had a deliberately public-facing element. World-leading research was published in a wide range of presses and journals. The sub-panel noted that this confirmed the criteria used: that no output would be privileged or disadvantaged on the basis of the publisher, where it was published or the medium of its publication, and that it affirmed the continuing importance of expert peer review as the principal mode of quality assessment.

Interdisciplinary research (IDR)

26. The interdisciplinary research in this UOA reflected well on the long-standing commitment to collaboration across discrete disciplines: something that has long been a feature of the work submitted to the sub-panel, mainly across the social sciences and particularly in development studies. It was evident in both analytical aspects (as seen in research questions that straddled disciplinary boundaries) and methodological tools (as seen in the combined use of ethnographic and quantitative methods). Compared to REF 2014, however, there was greater evidence of multidisciplinary collaboration outside or beyond the social sciences, for instance with engineering, life sciences, technology and

innovation, global health, business and management, finance, but also the humanities, with more interdisciplinary research with history and literature featuring in this REF.

27. Some of the very best research was explicitly interdisciplinary, making two disciplines illuminate each other's concerns across the divide. Very little of it was flagged in submissions. Since some institutions used the flag much more than others, it did not provide a reliable indicator of interdisciplinarity. As an indication of the interdisciplinarity inherent in the two linked fields, the sub-panel noted that anthropologists continued to work in development studies departments, and (for those HEIs with multiple submissions) submitted to that section of the sub-panel. Assessors were allocated as appropriate. In similar vein, some submissions reported that anthropologists on their staff were returned to other units of assessment.
28. The flagged IDR outputs included a wide range of influences. Examples were philosophy with neuropsychology; anthropology, geology and archaeology; plant science and anthropology; philosophy and anthropology; creative arts and anthropology; museum studies and art; geology and geography and anthropology; agricultural innovation and media studies; public health, law and development; carbon dating and environmental science. Many others - that remained unflagged - likewise straddled disciplinary areas. Some integrated social science and science, technology, engineering and mathematics (for example, in the areas of natural resources, conservation, design, environment, food and development; life sciences/health and development; ICT/internet/digital sciences and development, energy and development, space and development). Within anthropology, work with the creative arts, including literature and material culture, was a growing area of strength. The sub-panel noted, in particular, research in archaeology, material culture and public health and strong interdisciplinarity between almost all the social sciences and arts disciplines. Examples of strong interdisciplinary research clusters were gender, museum anthropology, migration, water security, global environmental justice, climate change and behavioural development economics.
29. In all but a very small minority of outputs the sub-panel had the necessary expertise to assess the output internally. Cross-referral and joint assessment were used for some flagged outputs and for others where this was deemed necessary by the sub-panel. The system of cross-referral worked well, though some cross-referrals looked to be motivated by institutional organisational structures and included outputs where the exact disciplinary focus was less clear than their being embedded in a regional setting - examples included Africa, Middle East and North Africa, South and East Asia, post-socialist Eurasia, which might have been submitted to the Area Studies UOA.
30. Interdisciplinarity was often brought about through collaborative projects. The growth in large grants, in particular, created opportunities for interdisciplinary collaboration at scale. Although much high-quality research can be conducted with small and medium levels of funding, as noted earlier, it was also the case that some original and impactful research in anthropology and development studies depended crucially on the availability of large-scale international collaborative funding, such as that made available through the Global Challenges Research Fund (GCRF) programmes.
31. Some environment statements gave detailed and useful summaries of the interdisciplinary research being undertaken, particularly in relation to area studies clusters or research groups focused on particular social issues. For example, some research studied indigenous international interactions for sustainable development, using political science, geography and anthropology, and collaboration between social and environmental sciences in the qualitative comparative analysis of climate change hotspots.

32. Water research integrated expertise in water resources management, transboundary basins, irrigation, and water politics and governance. Natural resources interdisciplinary research units focused on global food security, sustainable development and poverty reduction. Researchers in such units included agricultural, environmental and development economists, social anthropologists, sociologists and others. Research on modern slavery adopted an interdisciplinary approach with team members from many social science disciplines.
33. There were examples of methodological innovation from the use of interdisciplinary approaches, including the use of logical Bayesianism from physics to mitigate confirmation bias.
34. The sub-panel noted considerable potential for further interdisciplinary collaboration between bio- and social anthropology.

Impact

Table 3: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	40.8	43.2	11.3	3.8	0.9
REF 2021	45.8	38.8	14.7	0.7	0.0

35. In both anthropology and development studies, impact of outstanding reach and significance, much of it exceptionally imaginative and inspirational, was demonstrated across a broad range of activities, as shown in Table 3 above.
36. The impact case studies provided strong evidence of productive engagement by various sub-fields of anthropology and development studies with publics, users, policy makers and government departments. The sub-panel noted a greater variety than in REF 2014 of types of impact (including 'indirect' types of impact on public policy or contributing to public debate). It also noted progress since REF 2014 from case studies demonstrating the impact of a specific project to more sophistication evident in designing impact upstream and ensuring delivery over the longer term. The higher-scoring case studies showed a clear line of connection between the underpinning research and the outcome, specifying detail about who the beneficiaries were. Some of the best cases proved their impact with both quantitative indicators and qualitative evidence and were able to demonstrate counterintuitive (but beneficial) results alongside those that were planned for.
37. In many case studies judged to have outstanding reach and significance, it was generally evident from the outset how impact was planned and monitored, whilst in weaker examples the impact was considered only after the end of the project. In some cases, the work of a single researcher was able to demonstrate significant and far-reaching impact, whilst other cases claimed that the impact had been solely the result of the named researcher's work when acknowledging the contribution of others would have been appropriate. Many impact case studies claimed multiple different impacts arising from the underpinning research. While in the best examples this was well-evidenced, elsewhere it complicated the narrative: a stronger case would have been made by a more selective focus. Case studies with lesser reach and significance often failed to

adequately identify the link between research and impact, 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.

38. 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. Some examples concerned justice and equity, global health, conservation, land tenure rights, sexual health, women's education, and tax reform.
39. In anthropology, impacts ranged widely from direct effects on government practice, through impacts on policy and on the modus operandi of NGOs, through to work on transforming and shaping social norms and public representations, all three evidenced in case studies relating to migration. Policy impacts were achieved – both in the UK and abroad - in relation to medical and public health practice (including pandemic responses), education, gambling, and indebtedness. Impacts on commercial activities were documented. Impacts in anthropology depended on the successful tackling of social and cultural misunderstandings, including those that underpinned prejudice. There were impacts on settings of social conflict and the understanding of war, and on humanitarian responses to these. There was important work on cultural heritage, from case studies documenting the reversal of negative stereotypes of indigenous groups (by others and by themselves), through those helping to create more positive images of migrants and refugees abroad, to those aimed at preserving the language and culture of communities in the UK. Cultural heritage work was also seen in case studies documenting successful museum exhibits with widespread reach and significance.
40. The sub-panel were strongly in agreement that they would have welcomed routine access to the corroborating evidence that accompanied impact case study submissions. It recognised the significant effort and resources required to gather and prepare this information.

Research environment

Table 4: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	44.6	47.0	8.4	0.0	0.0
REF 2021	60.3	37.5	2.2	0.0	0.0

41. Environment has been part of the research assessment process for some time, so best practice approaches have disseminated throughout institutions. 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 an environment which was conducive to producing world-leading research. Table 4 shows the sub-profile for the UOA as a whole.
42. As in REF 2014, the difference in size of submitted units was noteworthy, between units of fewer than 15 FTE and those with more than 40. Some of the largest submissions were sub-divided into separate research groups or clusters whose activities seemed to be well-integrated internally; in other cases, there was less co-ordination between these.

43. There was evidence of innovative structures having been devised to support research and to facilitate productive interaction between researchers (e.g., committees, regular seminars, structured opportunities for peer review), with the strongest submissions providing some detailed and substantive examples of what those structures achieved. For the first time in REF 2021, strategies and support for impact formed part of the unit's environment template. The sub-panel was impressed by the even higher levels of institutional commitment than previously to using the best findings of researchers to achieve impact. Strong statements of impact strategy were characterised by a clear and specific narrative of the context and approach within which impact was understood and pursued, and the mechanisms that might be used. They included both pro-active and more responsive partnerships with end users, and an explanation of how institutional support and training had led to the development and enhancement of the impact claimed, not just for impact case studies but more broadly. Some environments (in both anthropology and development studies) demonstrated impressive social responsibility agenda, especially those involving local-level engagement around public awareness and local campaigns. Innovative structures and processes had been devised to meet the challenge of the impact agenda. In a few cases, new research administrator posts and committees had been devised, in others there was special study leave granted to those working on case studies. In general, there was a strong sense of mainstream engagement with the world beyond academia.
44. The average income in REF 2021 was £43,259 per FTE/annum. Annual average data are provided in Table 5 below. As was the case in REF 2014, the biggest source of funding was from the UK Research and Innovation (UKRI) Research Councils, from which an average annual income of £9,270,936 was won across the UOA as a whole. The second largest source reported was from EU sources contributing a total average per annum income of £7,927,808. In REF 2014 it was reported that EU funding was concentrated towards the end of the assessment cycle and that it might be expected to increase in importance in the years to come. This is borne out by such funding being the second largest income source in this submission, although Brexit may impact this funding in future. Uncertainties surrounded funding from DfID, which was abolished in September 2020 and merged with the FCO. The sub-panel noted large variations in research funding between submissions. In the lowest quartile, the average per FTE was around £14K (roughly in line with REF 2014), while in the highest the average was around £73K and the highest actual figure was £93,039 per FTE.

Table 5: Research Income by Academic Year

Year	2013-14	2014-15	Annual average for 2015-20	Annual average for 2013-20
Total Research Income	29,246,546	30,549,200	32,459,893	31,727,887
Research Income per FTE	39,876	41,652	44,257	43,259

45. Although the distribution of research degrees awarded is also unequal between submissions, it is much less striking than the distribution of research income. Overall, 1,786 doctoral degrees were awarded across the submissions (an increase from 1,129 in REF 2014) as seen in Table 6. The average number of doctoral degrees awarded for submissions per annum in REF 2021 was 9.83 (comparable to the nine reported in REF 2014), with 21 of the 26 submissions averaging five or more a year – enough to form a coherent cohort at each stage of the training process.

Table 6: Doctoral Awards by Academic Year

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Doctoral degree awards	269	263	248	281	272	241	213
Awards per FTE	0.37	0.36	0.34	0.38	0.37	0.33	0.29

46. The strongest submissions evidenced growing strength, numbers, energy and activity of the unit and/or its constituent research groups. Many submissions mentioned their redoubled success in acquiring large grant funding and/or by diversifying the sources of funding sought, thus ensuring sustainability in a post-Brexit context and after ODA and GCRF have been discontinued. Directive strategies attempting to focus funding applications more narrowly were not necessarily as successful as empowerment and facilitation to respond to emerging opportunities. In some cases, success with large grants was balanced by showing that smaller/individual projects were still supported – for example by internal/self-funded initiatives – and furthered sustainability.
47. Some submissions showed that greater physical integration had been achieved between disparate parts of the submitted unit (for example by consolidating within a single building); others went further by demonstrating the processes and activities through which researchers from different clusters interacted, and the benefits of such integration. The strongest submissions demonstrated how greater cohesion enhanced the vitality of the research environment and showed a link between grant income and the unit’s research culture.
48. Doctoral training featured as part of the environment with the strongest submissions not only including teaching of research methods and professional training but also giving attention to integrating graduate students into the life of the unit, and showed evidence of awareness that mental health problems – especially evident in recent times – required particular types of support.
49. Strong submissions were forward-looking and evidenced strategies of sustainability, including on staffing strategies. They showed, for example, how retirements had enabled future research strategies through new hires that played into department themes/ strengths as well as rebalancing the weighting of senior/junior staff and bolstering or enabling greater gender or ethnic diversity. In many cases, new postdoctoral scholars on grants (from Research Councils and via GCRF) enabled career prospects for ECRs by leading to new permanent posts from shorter-term positions, in addition to grants supporting the production of world-leading articles and monographs. Some submitted units showed a commitment to providing job security whilst a high proportion of temporary contracts in others caused concern. Some environment statements demonstrated how promotion strategies facilitated a vital and sustainable environment by offering recognition and achieving high staff retention rates. Equality and diversity issues and attention to the balance between temporary and permanent staff have had more prominence in this REF compared to REF 2014. Important points here included the establishment of structures such as diversity committees, flexible working arrangements and parental leave. In some cases, the intention to diversify the profile of researchers and professors in departments was made evident, thus showing a commitment to future

sustainability, while in others important achievements had already been demonstrated in the REF cycle. Strong submissions highlighted how such considerations had played a part in building the REF submission and evidenced their approach by providing the necessary data.

50. For certain key areas, such as equality and diversity (including disability issues), research ethics processes, infrastructural provision and strategies to enhance Open Access, it was important to establish how the unit-level approach interlocked with the institutional one documented in REF5a. In this sense, reading the two templates together provided necessary information. Evidencing both vitality and sustainability were those submissions that detailed their support for PGR and ECR researchers, outlining for example the extent of reduced teaching loads, showing how research funds (including internal funds for study leave/sabbatical) and other important factors played their part in facilitating the career development of such colleagues, and demonstrating how they had been integrated into the broader research environment.
51. Regarding collaboration and contribution to the discipline, the strongest submissions demonstrated the creation and maintenance of extensive networks and partnerships, from the local to the international level (including with research interlocutors themselves) and set out the structures through which these were produced and sustained in a collaborative and equitable way. An impressive number of submissions showed evidence of commitment to their disciplines and to social sciences more broadly, for example by playing active roles in learned associations with significant time commitment.



Sub-panel 23: Education

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	29.8	38.1	23.7	7.6	0.8
Impact	51.1	29.0	14.3	4.8	0.8
Environment	45.1	27.5	17.1	9.9	0.4
Overall	37	35	20	7	1

1. Summary of submissions

- 1.1** Education is a large, diverse and interdisciplinary field of research. The sub-panel received submissions from 83 HEIs for REF 2021, an increase from 75 HEIs in REF 2014, with 14 institutions making new submissions and six institutions choosing not to re-submit.
- 1.2** Submissions involved 2,367 individual researchers (2,168.38 FTE). This was a substantial increase of 47% from 1,606 (1,442 FTE) in REF 2014. Of these, 271 were submitted under the REF definition of early career researcher (previously 224). A total of 5,278 outputs, 232 impact case studies and 83 environment statements were received. The sub-panel received 203 requests for double weighting and all but one was accepted. 5,076 individual outputs were assessed.
- 1.3** Over the REF assessment period 6,155 doctoral degrees were awarded by submitting institutions. This was a 70% increase on the 3,625 recorded in REF 2014, a significant increase even considering the longer reporting period.
- 1.4** The average external research income for each year of the REF period was over £55 million, a total of over £386 million for the whole assessment period. The annual average in REF 2014 was £58 million, a decline even before accounting for inflation.
- 1.5** Submissions ranged widely in size, with the smallest being five FTE and the largest involving over 300 FTE. Five submissions were over 50 FTE. Almost three-quarters of submissions were under 30 FTE.
- 1.6** Of the 83 submissions, 68 HEIs were based in England with a total of 1,810.43 FTE (83.5% of the total FTE submitted). Nine HEIs were from Scotland with an FTE of 241.8 (11.1%). The sub-panel received three submissions from Wales with an FTE of 62.6 (2.9%) and three from Northern Ireland, with an FTE of 53.6 (2.5%).

2. Assessment process

- 2.1** Under the guidance and direction from Main Panel C and the REF Team, the sub-panel adhered to the published REF 2021 'Panel criteria and working methods' (PCWM) in all aspects of its processes throughout the planning and assessment phases.
- 2.2** Led by the chair and deputy, 35 sub-panellists included 22 full members, five impact assessors and eight output assessors. A sixth appointed impact assessor had to leave the REF process, and a full member with relevant experience covered the role. Six full members had been involved in REF 2014, including the chair and deputy. One adviser and two panel secretaries supported the sub-panel and together with the chair and deputy, they formed the Executive Team.
- 2.3** Sub-panel members' expertise and experience covered a wide range of areas within the field of education research, including assessing and/or using research. Impact assessors' experience included commissioning, funding and using educational research in policy and practice.
- 2.4** Confidentiality and conflicts of interest (Cols) were agenda items at each sub-panel meeting and a register of major and minor Cols was maintained. Panellists also took care to continually remind colleagues of their Cols and to alert the Executive Team to any emergent or arising Cols throughout the assessment phase. The protocol requiring sub-panel members with Cols to leave sub-panel meeting discussions was strictly followed for all parts of the REF assessment.
- 2.5** During the planning stage, the sub-panel undertook unconscious bias training and developed a Fairness in REF Intention Plan to minimise and mitigate unconscious bias and ensure fair and equitable judgements using the REF criteria. The Intention Plan was an active document, discussed at all sub-panel meetings.
- 2.6** The sub-panel conducted detailed calibration exercises for all parts of the assessment. Calibration also included Main Panel C members, and the Chair participated in calibration exercises across sub-panels under the auspices of Main Panel C.
- 2.7** The chair and deputy allocated outputs to sub-panel members based on their expertise, taking Cols into account. Processes for moderation were used throughout, and included paired assessment, monitoring of scoring patterns from the sub-panel (individually and collectively) and from the main panel. Moderation was given close attention during executive and sub-panel meetings.
- 2.8** Two sub-panel members acted as interdisciplinary research (IDR) advisers representing the sub-panel at the IDR network meetings and advising on best practice during sub-panel meetings. Of 5,278 outputs, 535 (10%) were flagged in submissions as IDR. These came from 45 different HEIs. Interdisciplinarity is addressed throughout this report but specifically in section 3.6.
- 2.9** The sub-panel received 119 HEI requests for specific outputs to be cross-referred, and 100 of these (84%) were accepted. A further 142 outputs were added to these, giving a total of 242 (4.7%) of outputs cross-referred to other sub-panels for advice, mostly within Main Panel C and Main Panel D. The sub-panel also received and responded to inward cross-referrals, giving advice for 148 outputs and one impact case study.
- 2.10** The sub-panel worked in six groups to assess impact case studies and the allocations were made by the chair and deputy taking Cols into account. Each group was chaired by an impact assessor. The chair, deputy and an experienced sub-panel member acted as impact moderators throughout the process. Panellists undertook preparatory

impact training delivered by the REF team. The effects of Covid-19 were not prominent or widespread across the case studies, though there were some examples of planned activities and events which could not take place, and the sub-panel took these into account.

- 2.11** The environment statements were assessed in five groups of four members with the chair and deputy acting as moderators. The composition of these groups was deliberately different to those formed earlier for impact assessment. Allocations were made by the chair and deputy taking CoIs into account.
- 2.12** The sub-panel used the nine-point grading scale for all parts of the REF assessment. This enabled productive conversations in pairs, groups and at sub-panel meetings. A transparent process on the reconciliation of grades and conversion of grades to the status of panel agreed grades was documented and signed off by sub-panel members.
- 2.13** Due to the Covid-19 pandemic, most sub-panel meetings were held virtually with three being hosted as in-person/hybrid format. To ensure a robust and fair process, two additional sub-panel meetings were added to the assessment schedule. The sub-panel adhered to guidance and best practice from the REF team and Main Panel C regarding ways of working and online systems.

3. Outputs

3.1 General reflections on quality

While it should be noted that due to changes in submission rules, results from REF 2021 cannot be directly compared with REF 2014, it is worth highlighting that there was an increase in the proportion of outputs judged to be world-leading (4*), rising from 21.7% in 2014 to 29.8% in 2021. The proportion scoring 3* and 4* combined rose from 61.6% in 2014 to 67.9% in 2021.

3.2 Patterns in output quality. The sub-panel paid constant and close attention to the criteria of originality, significance and rigour, and to the published guidance. The sub-panel's general reflections include the following:

- Outputs gaining the highest grades demonstrated their originality, significance and rigour in diverse ways;
- Outputs gaining the highest grades included qualitative, quantitative and mixed methods studies, and there was no strong association between research excellence and particular methods or approaches;
- Outputs gaining the highest grades included theoretically driven as well as empirically driven work;
- Outputs directly concerned with aspects of professional practice gained grades across the whole range, though those gaining lower grades included some that were limited to descriptive or experiential accounts;
- Whilst clearly of value, lower-graded outputs were often characterised by one or more of the following: over-claiming of contribution to knowledge; weak location in a field; insufficient attention to the justification of samples or case selection; under-development of criticality and analytical purchase.

3.3 The following sub-sections are organised using the three main segments of the descriptor as set out in the PCWM, namely: sectors of educational provision; substantive

issues; interdisciplinary and theoretical/methodological orientations. They offer a flavour of the work assessed but are not comprehensive or exhaustive.

3.4 Sectors of educational provision

3.4.1 Early childhood education. A rich body of work included notable strength in the areas of early years education and social inequality; concepts and measures of educational quality; children's rights, participation and voice; digital childhoods and digital play; parental engagement; post-humanist/new materialist analyses of children's experiences across formal and non-formal learning spaces; critical analyses of play and pedagogy; historical and comparative analyses.

3.4.2 Primary education. Wide-ranging topics included outdoor learning, inclusive practice, teachers' attitudes to inclusion, arts-based learning, social care and safeguarding, and critical analysis of the effects of policy. Highlights included longitudinal analyses of children's experience across early years, primary and secondary schooling, creative approaches to participatory research, and qualitative studies that developed understanding of children's interactions with digital environments and devices. Other strong contributions challenged deficit understandings of educational disadvantage or explored educational experience in relation to gaming, disability and SEND, mobile language learning, and deaf education.

3.4.3 Secondary education. Much of the work here dealt with issues of gender, ethnicity, social class, identity and equity. Several outputs drew on classroom approaches used in other countries, for instance mastery within mathematics education. Compared to REF 2014, there was a reduction in work on school effectiveness and teacher education, and an increase in that on governance, neoliberal forces and managerialism. Science education, sport science and physical education, sex and relationships education and digital technologies were also well represented.

3.4.4 Further education, vocational education and lifelong learning. Work included studies of skills policy and vocational provision, incorporating international comparisons, and some newer work on apprenticeships and on governance at system and college level. It also included research bringing a social justice perspective to patterns of participation, inequalities, and vocational routes as vehicles for widening participation. There was significant attention to professional learning, especially in medical settings, but also in fields such as architecture and engineering.

3.4.5 Higher education. Outputs reflected both UK and international systems and concerns. A large number examined aspects of policy and practice, with a particular focus on social mobility and inequality. Internationalisation and international student and staff mobility were a strong feature, often in comparative studies. In general, work with a policy focus was strong, and much of this drew upon sociology, economics or critical policy studies. The sub-panel noted growth in this area since REF 2014.

3.4.6 Clinical, health and allied professions education. Medical, veterinary, psychological, nursing, pharmacy and physiotherapy professions were represented across the continuum of training, from undergraduate to continuing professional development. Outputs included a focus on mental health and wellbeing; special educational needs and disability; educational inclusion; the role of families; service user 'voice' and perceptions; bullying; children's rights and human rights; professional learning, development and regulation; leadership; organisational effectiveness and quality improvement. There was also high-quality research synthesis and a wide range of predictive and associative research on, for example professional recruitment and performance, and clinical risk management.

3.4.7 Teacher education. Work encompassed initial and continuing professional learning and spanned early years, primary, secondary, further and higher education. Its focus included the impact of information and communication technologies (ICT) and the recruitment, retention, mentoring, identities, wellbeing and motivation of both student teachers and teacher educators. A strand of work on divergence in policy and practice across the jurisdictions of the UK, most notably recent changes in England, provided valuable evidence and critical comparative analysis.

3.4.8 Potential areas for further development. The sub-panel felt that certain topics were under-represented across the whole submission. These included:

- Early years - equality, diversity and inclusion in work on provision and the workforce;
- Early years and primary - integrated approaches to STEM, issues of race, LGBTQ, linguistic diversity (including translanguaging, plurilingualism), the experiences of refugee and asylum seeker families and children;
- Secondary - subject-specific curricula, pedagogies and assessment;
- Further/vocational/lifelong – technician-level education and training and responses to the changing nature of work, especially through digital disruption;
- Higher- technological change, internationalisation, decolonisation and related themes.

3.5 Substantive issues

3.5.1 Leadership, management and school effectiveness. Outputs addressed a wide range of sectors and settings and included attention to historical development, changing conceptualisations, performance, identities, practices, school improvement, and governance. Several sought to delineate or augment the field, focusing for example on post-colonial approaches or education for sustainability across national contexts. Many drew on sociological concepts and theory.

3.5.2 Comparative education and international development. Work in this area was more prominent than in REF 2014, reflecting increased funding from sources such as the European Commission's Horizon 2020 and UK Research and Innovation's Global Challenges Research Fund (GCRF), coupled with increases in international/overseas students in UK higher education. There was some decline in home international (England, Scotland, Wales and Northern Ireland) studies, though other international comparisons often included at least one of these, or focused on topics pertaining to two or more, such as Welsh and Gaelic medium education. The United Nations' Sustainable Development Goals and pressing issues such as climate change makes this sub-field one of vital importance.

3.5.3 Teaching and learning. Notable work included that offering new insights for pedagogical practice in physical education, sport, mathematics, geography, and in ICT within higher education. The conceptualisation and facilitation of creativity across settings from early years to lifelong learning remained a strength. Whilst the number of outputs focused directly on teaching and learning was smaller than expected, many studies addressing specific policy priorities were concerned to weigh effects on teaching and learning.

3.5.4 Science and mathematics education. A large body of work on science education included interdisciplinary research at the interface of linguistics and science pedagogy and collaborations between educators and academics based in the physical sciences. Other notable work drew upon sociological perspectives and was concerned with

identity, gender and social class. The development of argumentation in the STEM classroom was another strong focus, incorporating discourse analysis. Studies of citizen science have increased, highlighting the affordances of digital media within and beyond more traditional pedagogic practices and settings. The volume of work on mathematics education appears to have reduced compared to REF 2014, though it continued to be a central element in six institutional submissions. The strongest work included that dealing with the teaching and learning of mathematical proof; mastery learning; philosophical and social issues; language and mathematics; mathematics and the body. Implications for teaching, learning and teacher education were regular concerns within this work.

3.5.5 Language and literacy. A rich and diverse body of research addressed themes and topics within and beyond school contexts and pedagogical research. An impressive breadth of approaches included a noticeable increase in multimodality, visual analysis and new materialism and attention to participatory research. Work specifically related to primary literacy and secondary English, however, was less prevalent than in REF 2014. The sub-panel noted that some language education research tended toward a monolingual view of language, seeing it as principally a structural and autonomous system, and positioned EAL learners as being in deficit. There was a limited focus on the education of linguistic minorities, other than Welsh, Gaelic and Irish.

3.5.6 Children and young people. The sub-panel noted especially strong work on the identities of children and young people, focused on gender, sexuality, race, ethnicity and socioeconomic background and the way these were constructed in a diverse range of educational, spatial, peer, community and family settings. Advances were evident in the study of sexualities and identities and implications for pedagogy, curriculum, safe relationships, and staying safe online. Research on the reframing of young people as consumers in higher education is a developing area and has provided a solid foundation for future research.

3.5.7 Parents, families and communities. Some of the strongest research examined the socioeconomic contexts of parents and families and the impact on educational outcomes, resilience and aspirations, and on parents'/guardians'/carers' attitudes, values and practices in relation to their children's digital and home lives. Work exploring what it means to be a parent or part of a community, across international contexts, was also prominent. Research drawing on sociological theories provided robust critique of deficit models of parenting. Interdisciplinary studies were particularly effective at generating new understanding of relationships between schools, parents, children and learning, especially when considering families of different structures/compositions and the impact of changing work patterns.

3.5.8 Special educational needs and inclusion. Strong interdisciplinary work spanned early years to higher education and focused on a wide range of needs including sensory impairment, neurodiversity, attention deficit hyperactivity disorder (ADHD) and mental health. Some large scale and longitudinal research highlighted significant implications for policy and/or practice. There were also innovative and critical investigations across related themes including: dis/ableism, educational inclusion, the impact of stigma, the role of context at family, school and wider societal levels, educational transitions, and the use of assistive technologies.

3.5.9 Participation, rights, and equity issues. A large body of work related to schools, higher education, and society more generally. As well as exploring the significance

of specific social characteristics (such as sex, gender, race, social class, sexuality, and disability), research in this area often took an intersectional approach. Whilst some work focused on children and young people in general, other work centred on those who had been in care, and on international students. Research often involved co-production with participants.

3.5.10 Education policy. This continued to be a strong area of research, covering a rich variety of topics, systems and sectors. The sub-panel noted increasing analyses of higher education and the use of big data. Much of the work in this area was sensitive to the changing policy environment and examined a wide range of contemporary reforms in the UK and internationally. Work on governance, neoliberalism and responsabilisation was especially prominent.

3.5.11 Technology, digital media, and data. Work demonstrated a growing emphasis on the effects of wider use of social media and mobile technologies on everyday lives and learning beyond institutional boundaries, including digital citizenship and civic participation. It also reflected the rising interest in the implications for learning and assessment of coding, computational thinking, and gaming. Learning analytics was an emerging area. Research on technology enhanced learning in STEM was prominent and had grown since REF 2014. Despite the timing of the submission deadline, a few studies addressed online learning related to Covid-19. Work in this general area continued to demonstrate strong interdisciplinarity and overlap with scholarship in communication, culture, and media studies.

3.5.12 Workplace learning. Topics included workplace learning, training, skill formation and development of occupational expertise, public and private sectors, and the changing nature of work. Professions, labour markets and implications of change for expertise, training and development were also prominent. Most research had an empirical focus. Internationally-oriented research included some strong comparisons between countries. Many outputs in this area were interdisciplinary, drawing on a range of perspectives particularly sociology, economics, and education.

3.5.13 Potential areas for further development. There were fewer than expected outputs focused on environmental education and sustainability, or which tackled STEM education in international development whilst engaging with such issues as indigenous local knowledge. For a small number of research projects known to have collected data from across the whole of the UK, there appeared to be scope for more comparative analysis. The sub-panel noted that research on parents, families and communities could profitably incorporate intersectional frameworks to a greater extent. It was also noted that significant contemporary challenges associated with digital disruption and technological change make lifelong learning an urgent area for renewed research activity that could benefit policymakers, employers, and citizens. Research concerned with young people as learners in settings other than schools and universities, and that focused on the education/work relationship, also appeared to be under-represented.

3.6 Interdisciplinary and theoretical/methodological orientations

3.6.1 Interdisciplinarity. Educational research is highly interdisciplinary. Nevertheless, submissions varied greatly in the use made of the facility to flag outputs as IDR. Selected outputs were signalled in this way in 45 of the 83 submissions, with a total of 535 (10%) outputs flagged as IDR. Only 20 of these were simultaneously flagged by HEIs for cross-referral.

3.6.2 The sub-panel noted that outputs flagged as IDR were graded marginally higher than those which were not flagged. However, the sub-panel assessed many outputs that were clearly interdisciplinary, but which had not been flagged as such by submitting HEIs, indicating that caution is needed in reaching conclusions. Interdisciplinarity is a constitutive and long-established feature of educational research, often taking the form of sub-fields in which disciplines such as psychology, sociology and philosophy frame the conception, design and analysis of research on educational matters. Relatedly, many educational researchers themselves embody interdisciplinarity (for example, applied linguistics scholars who mainly study educational questions). Other strong senses of interdisciplinarity include research projects or centres that deliberately bring together two or more (sometimes several) disciplinary backgrounds. In this context, it seems likely that many submitting institutions will have felt that the specific definition of IDR in the REF guidance did not apply to outputs in a field that is already and inherently interdisciplinary.

3.6.3 Whilst interdisciplinary research is addressed throughout this report, the following four sub-sections focus on examples of the constitutive interdisciplinarity of a large segment of outputs from the current submission.

3.6.4 Philosophy, history and education. Educational research drawing on philosophy and history was mainly of very high quality, and the sub-panel noted its clear contribution to contemporary debates about core epistemic questions in educational practice, especially around its purposes and responsibilities. There was particularly strong work concerned with articulations of the epistemic, moral and social complexity of education in response to growing structural constraints on what is possible in schooling, and how education should respond, for example, to the emergence of contested conversations on decolonisation. Also notable was work on the overlaps between traditional philosophical questions and social and literary theory, and implications for the curriculum. In terms of history, the strongest work included that focused on how history frames the present, the historical unconscious and on the lived sense of history. There was also impressive work on emancipatory themes and on revisiting forgotten figures who nonetheless were seminal in shaping the development of education. The sub-panel noted concentrations of high-quality work in both philosophy and history within some smaller submissions. The evidence suggests that both these areas continue to be vibrant and important contributors to educational scholarship.

3.6.5 Sociology and education. Submissions demonstrated that sociology and education continue to constitute a dynamic sub-field. Work rooted in sociology and social theory across all phases and sectors, in national, international and transnational contexts, was judged to be very strong, and often innovative. This included, notably, intersectional research on gender; race; sexualities; social class; space and place; technology; and education policy. Material and cultural inequalities remained central concerns. Sociology of knowledge was also a strength, as was research into young people outside formal education contexts.

3.6.6 Psychology and education. High-quality outputs came from cognitive, developmental and social psychological approaches to educational questions. These addressed a range of topics, including children's learning and problem solving; personality, behaviour, emotional development and mental health; educational inclusion; children/young people's relationships, interactions and communications with peers/siblings, teachers and other adults; reading and language development, and mathematical

thinking; and professional and child/young person attitudes and perspectives. Some high-quality research examined developmental differences relating to specific language impairment, ADHD and autism. Work in cognitive psychology often had high conceptual significance for education policy and practice. Other high-quality contributions were seen from positive psychology and from work evaluating the role of neuroscience in education.

3.6.7 Applied Linguistics. While many outputs in applied linguistics are submitted within UoA26 (Modern Languages and Linguistics), the sub-panel received a substantial body of research investigating language use and communication in both educational and non-educational settings such as health, law, politics and the workplace, concerned with issues including social justice, migration, globalisation, identity and ideology. There were significant conceptual advances in multilingualism with creative tension in conceptualisations towards translanguaging and plurilingualism.

3.6.8 Research methods. The sub-panel noted that a higher proportion of outputs than those submitted in REF 2014 offered rich detail of methods. There was also greater attention paid to research ethics. The submission demonstrated that educational research continues to embrace and develop a very wide range of research methods, reflecting its inherent interdisciplinarity. Across all methods, there was discernible growth in the use of technology.

3.6.9 Research designs focused on the collection and analysis of qualitative data remain common in education and much of this work continued to be of the highest quality. Innovative approaches included multimodal and participatory methodologies which were often visual and arts-based; the creative use of a range of technologies, such as specifically designed apps and game interfaces; and GPS mapping. There was also very strong work in ethnographic and narrative research that used more traditional approaches to data collection, such as interviews and observations. The strongest outputs presented a clear rationale or warrant for the methods and cases selected, justified the approach undertaken and offered in-depth, critical and theoretical analyses. Several exemplified a critical and extensive use of secondary data sets. Qualitative elements within mixed methods studies were particularly strong. Amongst higher-scoring outputs, the sub-panel noted evidence of a growing consciousness about the theoretical contribution qualitative research can make.

3.6.10 Quantitative research included strong examples of the use of longitudinal data to track long-term outcomes in education, health, wellbeing, and employment, including world-class datasets submitted as outputs. However, submissions included fewer than expected examples of the wider linked national administrative datasets now available: this may reflect complex and restrictive access requirements acting as a barrier to high quality inter-disciplinary research. The sub-panel noted many more Randomised Control Trials (RCT) than were submitted in REF 2014 and detected an increasing sophistication through the assessment period. Later RCT studies were more likely to use trial registration and pre-published protocols, to analyse sub-groups to look for differential effects, and to employ theory of change approaches to process evaluation to better understand why an intervention might, or might not, have an effect. Research routinely modelled complex and multi-level structures.

3.6.11 The sub-panel observed an increase in research employing mixed methods, compared to REF 2014, and a high proportion of this work was world-leading and internationally excellent. The best mixed methods research showed a good balance

and integration between the distinctive contributions of quantitative and qualitative elements. It also demonstrated how the combination of methods had enabled specific research questions and purposes to be addressed, or particular insights to be gained.

3.6.12 Potential areas for further development. With some notable exceptions, there were fewer than expected outputs representing co-production with key stakeholders (such as teachers, learners, parents, community groups, industrial/commercial partners, NGOs) even where it was clear that research practices had included such relationships. This seemed surprising in the light of recent policy initiatives, funder emphasis on knowledge co-production and indeed a long tradition of action research/teacher-as-researcher initiatives in the field of education. It may however reflect a pattern in submission choices about the types of output perceived to be likely to gain higher grades. Within the realm of health education, relatively few evaluations were submitted as outputs. The strongest of these addressed empirical, conceptual or methodological issues beyond the concerns of the original evaluation, whilst the weakest lacked criticality. A small minority of outputs indicated scope for further capacity-building in some aspects of quantitative methods (e.g., the limits of Structural Equation Modelling). A few outputs employing quasi-experimental designs were found to have an underdeveloped criticality regarding the measures used (e.g., psychometric instruments).

4. Impact

Table 2: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	42.9	33.6	16.7	6.0	0.8
REF 2021	51.1	29.0	14.3	4.8	0.8

4.1 As shown in Table 2, there was a significant increase in the proportion of impact assessed as outstanding, from 42.9% (2014) to 51.1% (2021). The combined proportion of impact judged to be very considerable (3*) and outstanding (4*) rose from 76.5% (2014) to 80.1% (2021). This reflects continuing improvement in impact quality, notwithstanding the changes in REF requirements between 2014 and 2021.

4.2 Outstanding impact. The sub-panel saw a range of impressive impact case studies, confirming that UK-based educational research is having a positive influence on the quality of life of individuals, organisations and communities locally, nationally and internationally. Many different types of impact were represented, though contributions to policy, professional practice and understanding were prevalent. The sub-panel paid constant and close attention to the criteria of reach and significance and to the published guidance throughout the assessment process. The strongest case studies:

- Provided a succinct summary of the impact which clearly related to the structure of the rest of the template so that the narrative was strong and coherent;
- Ensured that the relationship between the underpinning research and impact claims was clearly articulated;
- Ensured that all claims made were supported by robust evidence, and where appropriate, used testimonials judiciously to support claims made;

- Stated not only the way in which the research had impacted on the specific area in question, but also provided a convincing demonstration of both reach and significance.

4.3 Enabling impact. There were several examples where strong impact appeared to have been enabled or fostered by being a planned and scheduled feature of research design and conduct, and/or through ongoing researcher/stakeholder relationships. The sub-panel also noted innovative approaches to communication likely to foster impact which made good uses of technology, such as the production of MOOCs, videos, animations, and the effective use of social media.

4.4 The range and nature of impact. Impacts on educational policy, practice and understanding were wide-ranging and included a diversity of stakeholders and beneficiaries such as educational institutions; governments; NGOs; international and national cultural institutions (e.g., museums); industrial, commercial and media sectors; learners, clients and professionals in education, social work, health-care settings; parents and carers; and the public. Whilst many of the strongest case studies were geographically focused, demonstrating impressive depth in terms of impact on a specific group of stakeholders, sub-panel members were also struck by the international reach of others, demonstrating the leading role of UK educational research on an international stage. GCRF and EU funding had played a significant part in supporting and enabling the latter. Finally, there was also outstanding and very considerable impact on the quality of research resources, research training and educational policy and practice in HEIs themselves, which was often international in reach and contributed to the quality of research environments.

5. Research environment

Table 4: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	48.4	25.0	18.1	7.8	0.7
REF 2021	45.1	27.5	17.1	9.9	0.4

5.1 Although 14 of the 83 submissions (17%) were from institutions that had not submitted to the equivalent sub-panel in REF 2014, there was general continuity in the collective research environment profile. As shown in Table 4, there was a small decrease in the proportion judged as conducive to producing world-leading research (4*) (45.1%, compared to 48.4% in 2014). However, the proportion of 3* and 4* combined remained almost the same (72.6%, compared to 73.4% in 2014).

5.2 Assessment of the strongest research environments. Throughout the process of assessing research environments the sub-panel paid constant and close attention to the criteria of vitality and sustainability, and to the published guidance. The strongest submissions:

- Provided convincing statements pertaining to strategy, vision, and values, which were then carried through all elements of the document, making a coherent narrative;
- Articulated how far the research objectives from the previous period had been addressed and presented a strong and appropriately ambitious set of objectives for the future;

- Made clear how the research strategy had informed all aspects of the unit's work and supported claims with evidence such as the inclusion of specific examples;
- Were analytical and not just descriptive in relation to EDI, and paid attention to a range of characteristics;
- Provided a strong and convincing account of how researchers featured in the submission had contributed to the discipline;
- Articulated clearly how knowledge exchange and support for impact were part of the research environment, beyond a focus on submitted impact case studies.

5.3 Other observations arising from the assessment of environment. Additionally, the sub-panel noted the following:

- The international dimension of many submissions was striking, with examples of UK researchers playing a leading role in international institutions and learned societies, working with international governments or global NGOs. The best accounts showed connections between such activities and the unit's strategy and research groups;
- Strategies for staff development were impressive in many cases, with strong systems for work allocation, study leave, seed-funding of projects, conference attendance support, and mentoring. The best statements also addressed issues related to wellbeing;
- The 83 submissions varied greatly in size and character. Whilst valuing this diversity, the sub-panel noted that in several cases amongst the smaller-sized submissions, the assessment of the research environment produced grades that were significantly lower than those gained for outputs and impact, with potential implications for longer-term sustainability;
- Amongst submissions from institutions that did not submit in 2014 there were some impressive examples of research collaboration with: (a) larger and longer-established educational research institutions; and (b) individuals and organisations from policy and practice communities;
- Some statements did not clearly identify recent strategy and the extent to which goals had been realised, or listed constraints whilst saying little about what had been done to support or shape research;
- Some statements were disappointing in the level of attention paid to characteristics beyond gender, especially race/ethnicity and disability;
- There was great variety in how much and how well statements addressed support for the developmental needs and career aspirations of PGRs and contract researchers. The strongest statements related the unit's work to national frameworks where relevant (e.g., Vitae, the Concordat).

5.4 The sub-panel also noted that the assessment of some elements of environment was complicated by two specific considerations. The first related to institutional categorisations of staff. For example, variation in staff contracts across HEIs meant that some were more able than others to meet the REF definition of Early Career Researcher for staff at similarly early stages of their development as researchers. The second issue was that not all income constituting de facto support for research activity, and which featured in the narrative account, was classified as research income in the standard analyses.

6. Conclusion

- 6.1** Whilst the REF does not encompass all research activity, submissions to the Education sub-panel demonstrated that education research is an extensive, diverse and interdisciplinary field, encompassing a large number of units that vary greatly in size and character. All submissions included outputs that the sub-panel judged to be of world-leading or internationally excellent quality.
- 6.2** Compared to REF 2014, the sub-panel judged that the quality of outputs had risen markedly, and a substantially greater proportion of impact was judged to be outstanding in terms of its reach and significance. Research environments remained strong whilst bearing witness to different institutional histories and different arrangements in how institutions combined their purposes and missions.
- 6.3** The sub-panel noted two matters they felt to be fundamental to the health, sustainability, and vibrancy of the discipline. The first concerned the nature and general level of research investment. Where total external research income across all Education submissions in REF 2014 had an annual average of £58 million, the figure in REF 2021 was £55 million, a decline that is even starker in real terms. While recognising that there are other components to spending on educational research, the sub-panel noted that £55 million is a very small amount in the context of annual public spending on education and that there has been a decline in major national programmes of educational research compared to the period considered in REF 2014. Together with specific reductions (e.g., in Official Development Assistance funding) and uncertainties following Brexit, the current level of investment in educational research along with reduced potential for international collaborations and impact presents considerable risks to the discipline. Secondly, the sub-panel noted a more specific concern that while there were notable exceptions, little of the research seen focused on educational engagements with climate change, or on education for environmental sustainability.
- 6.4** Educational research plays a vital role in supporting the many organisations, individuals and activities involved in education, providing independent analysis and insight to promote reflection, understanding, effectiveness, improvement, and renewal. The sub-panel saw strong evidence that educational research has impressive national and international reach and responds well to the needs of policy, relevant professional groups, the public and specific communities. Crucially, however, the best educational research is not confined to the role of a supplier responding to demands that are articulated by - or on behalf of - these stakeholders: educational research is also itself a vital source of new ideas, insights, perspectives, and challenges to current thinking, policy and practice, making a valuable and distinctive contribution to democratic life.



Sub-panel 24: Sport and Exercise Sciences, Leisure and Tourism

Table 1: Quality Profiles (FTE weighted) for the UOA

	% 4*	% 3*	% 2*	% 1*	% Unclassified
Output	28.7	55.1	15.1	0.8	0.3
Impact	44.1	40.8	13.6	1.5	0.0
Environment	37.5	39.2	19.5	3.7	0.1
Overall	34	49	15	2	0

Summary of submissions

1. The sub-panel received submissions from 61 HEIs which compared to 51 in REF 2014 and represented further significant growth in research activity in this subject area. 13 HEIs were first time submissions, three were returners who had previously submitted to this sub-panel but did not return in REF 2014 and there were four HEIs who submitted to this Unit of Assessment (UOA) in REF 2014 which did not submit this time. Submissions came from HEIs in England (51), Scotland (five), Wales (four) and Northern Ireland (one).
2. A total of 1,452.92 FTEs were included in submissions to the sub-panel with just under 15% of these being defined as early career researchers. Submissions ranged in size from 6.50 FTE for the smallest to 94.90 FTE for the largest. The average size of submissions also increased to 24 FTE from 16 FTE in 2014 (and 12 in 2008). When categorised by numbers of FTE there were 36 (59%) small submissions (up to 19.99 FTE), 13 (21%) medium sized submission (between 20 and 34.99 FTE), 6 (10%) large submissions (between 35 and 49.99 FTE), and 6 (10%) very large submissions (between 50 and 94.99 FTE). Submissions were received from 18 pre-92 institutions and 43 post-92 institutions.
3. 67% of FTE staff included in the 2019-20 HESA return for Sport Science and Leisure were included in submissions by HEIs. The proportion of staff with Significant Responsibility for Research who were included in the HEI returns ranged from 27% to 100%. Comparing the 61 submissions with the eligible pool of staff returned to HESA, 13 submitted less than 50%, 17 submitted between 50 and 75%, 13 submitted between 75 and 100% and 18 submitted 100% of eligible staff.
4. The sub-panel members were recruited from nominations received from a range of bodies including subject association and societies, professional bodies, foundations, charities etc. Nominations were reviewed to ensure a balance of types of institution, sub-discipline coverage and representation across all four of the devolved nations. Consideration was also given to equality and diversity. Three research users and two impact assessors were also appointed to the sub-panel to assist with the assessment of impact. Research users also assessed outputs.
5. All members of the sub-panel received unconscious bias training prior to assessment taking place. In addition, the sub-panel developed a Fairness in REF Intention Plan to guard against unconscious bias and this was a standing agenda item which was considered at the beginning of each meeting.

6. A conflicts of interest register was created, and all members were required to disclose major and minor conflicts and update this register during the assessment period. Anyone with a disclosed conflict did not take part in any assessment or related discussions on submissions from conflicted institutions.

Outputs

7. The sub-panel assessed 3,527 outputs, factoring in double weighting this equated to 3539 outputs, 98% of which were journal articles (n=3468); books, book chapters, conference contributions and research reports for external bodies comprised the remaining outputs submitted (see Table 2). Outputs were published in over 871 journals. A request for double-weighting was received for 16 outputs. 12 of these requests for double-weighting were accepted with the reserve output being assessed for the remaining four outputs.

Table 2: Outputs Types assessed (factoring in double weighting)

Authored Book	Edited Book	Chapter in Book	Design & artefact	Journal Article	Conference Contribution	Report	Other
1.6%	0.0%	0.3%	0.0%	98.0%	0.1%	0.0%	0.0%

8. Outputs were assessed according to the working methods described in the 'Panel criteria and working methods' and were judged for their originality, significance, and rigour. All outputs were independently assessed by two sub-panel members who then agreed grades. On the small number of occasions where agreement was not possible, a third sub-panel member was asked to assess the output and a consensus grade was reached.
9. The sub-panel recognised a general improvement in the quality of outputs between REF cycles consequent in part to improved methodological rigour including greater sophistication in study design and enhanced approaches to data analysis. A move towards larger studies, for example using longitudinal study designs and/or a larger numbers of study participants, resulted in the inclusion of more supplementary material or appendices to published outputs.
10. The sub-panel welcomed the receipt of a breadth of outputs employing a variety of methodological approaches but noted that, in some cases, the link to sport, exercise, leisure or tourism was tenuous. Where relevance to the UOA was unclear and the output was judged to be a better fit to another UOA, it was cross-referred (68 outputs) to the most appropriate UOA. In addition, outputs which crossed UOA 24 and other discipline boundaries were jointly assessed by sub-panel members from UOA 24 and another sub-panel (18 cases). Cross-referral and joint assessment was undertaken by or with 16 other sub-panels with the bulk of these assessments being undertaken with UOA 1 (Clinical Medicine); UOA 4 (Psychology, Psychiatry and Neuroscience); UOA 5 (Biological Sciences); and UOA 17 (Business and Management Studies).
11. The descriptor for this UOA incorporated a large number of related disciplines and received an extremely wide variety of outputs in terms of research topics and methodological approaches to the research. The addition of Tourism to the sub-panel title in REF 2014 expanded the sub-disciplines covered. 16 HEIs returned tourism research outputs to this UOA with eight continuing to return to UOA 17 (Business and Management Studies) reflecting the location of these subjects within different HEIs.

12. A large proportion of outputs submitted were in the areas of exercise physiology, physical activity, sport and exercise psychology, and sports biomechanics. Such outputs would not have been out of place if the UOA had been situated in Main Panel A. However, several academic units submitting to this UOA included a range of specialisms covered by the sub-panel and, in that respect, the sub-panel represents the way in which cognate disciplines are organised within several HEIs.
13. Research collaboration and mobility between institutions was evidenced in the number of outputs submitted to UOA 24 by two or more HEIs (n=615). 266 outputs were returned to UOA 24 by 2 HEIs, 25 outputs were returned by 3 HEIs, and 2 outputs were returned by 4 HEIs.
14. Collaboration across subject areas was evidenced by the number of outputs returned to UOA 24 as well as to other sub-panels. 352 outputs were returned to UOA 24 and at least one other sub-panel. 10 sub-panels (1-6, 12, 17, 20 and 23) received outputs which were also submitted to UOA 24. This included multi-authored outputs some of which were returned in seven submissions across four units of assessment.
15. Collaboration across subject areas within HEIs was evidenced by the number of outputs (109) submitted by an individual HEI to two or more UOAs, one being UOA 24. The majority of these involved one output being submitted to two UOAs. There were five instances where a single output was submitted by an HEI to three UOAs and two instances where the same HEI submitted an output to four different UOAs.
16. Outputs from large scale multi-centre studies or data pooling have increased over the REF 2021 cycle. These often addressed important research questions which could not be addressed by smaller studies. For such team science outputs, published by consortia with many hundreds of authors, defining author contribution, beyond sharing existing data, in line with the REF criteria, was a challenge which necessitated audit in some cases. The application of journal authorship guidelines varies considerably and is often insufficient to distinguish author contribution.
17. The sub-panel was impressed by the extent of interdisciplinary research across the sector and recognised the strength of this approach for addressing important novel questions. Interdisciplinarity is inherent to UOA 24 but different approaches by HEIs to flagging interdisciplinary outputs meant that less than 10% of items (339 outputs) were identified as interdisciplinary. This was not a true reflection of the actual volume of interdisciplinary work which the sub-panel assessed.
18. The sub-panel noted increased collaboration between researchers and industrial or business partners. This engagement, especially when longer-term, often resulted in strong outputs and underpinned the development of tangible impact. Knowledge exchange activities with external partners, sponsors and end-users is seen as a key strength of the subject area.
19. There was evidence of a growing divide between increasing sophistication of more fundamental and mechanistic work, and studies of a more applied nature. This was notable across sports performance-related research, despite many strong examples of rigorous, novel and significant outputs.
20. The sub-panel identified a need to encourage more inclusive representation of gender and other characteristics in outputs to enable robust translation to the entire sport and exercise community.

21. In sport and exercise physiology, nutrition, sports medicine, and biochemistry there was an increase in the number and quality of outputs. The highest quality outputs were typically characterised by offering mechanistic insight, using sophisticated techniques or ambitious research designs, or studying populations that enabled better translation of the findings to end-users. This was most evident in fundamental studies using longitudinal approaches. Some cross-sectional and applied work was limited by the cohorts and methodological approaches utilised and tended to be descriptive or incremental in nature. There was a notable increase in molecular approaches and the use of animal models, but translation to sport, exercise and physical activity was not always clear. There was extensive evidence of national and international collaborations that illustrated the reach, relevance and interdisciplinarity of research arising from the discipline.
22. Within sport and exercise psychology, the sub-panel observed rigorous and theoretically informed research across the full range of qualitative and quantitative methodologies employed including mixed-methods. There were numerous examples of outputs describing multi-study programmes of work and/or adopting longitudinal designs which addressed significant questions in the field. Evidence of collaborative efforts across multiple research groups was noted (both national and international), along with multi- and interdisciplinary research integrating psychological processes and outcomes with physiology, biomechanics, and/or nutrition.
23. The outputs reflected the role that psychology plays in original knowledge advancement as well as policy and practice in sport (e.g., coach education and effects of coaching; welfare and well-being considerations) and other contexts (e.g., physical education, military, performing arts). The discipline was also characterised by a resurgence of evidence-based research on sport participation and sporting performance in addition to exercise, health, and physical activity. Finally, the sub-panel noted an increase in the number and breadth of cognitive psychology and neuroscience outputs submitted. Overall, the outputs in sport and exercise psychology indicated a vibrant research discipline with a strong commitment to further understanding of the fundamental issues affecting society or responding to major topical concerns.
24. In biomechanics and motor control there was an increase in the number and quality of outputs and the sub-panel noted more diverse and wide-ranging research compared to REF 2014 with topics spanning sport and exercise, physical activity, ageing and clinical conditions. There was an increased focus on modelling and simulation approaches for understanding fundamental mechanisms in performance and injury prevention in sport, alongside outputs investigating health and performance within elite able-bodied and disabled athletes. Interdisciplinary research outputs were submitted in topics spanning biomechanics and other related areas (mainly psychomotor performance, rehabilitation, and ageing) and also equine biomechanics.
25. Advances in microsensor technology facilitated more field-based biomechanics outputs and some large-scale prospective studies. The sub-panel noted more outputs based on technological advances and methodological developments - in particular, the combination of various imaging techniques such as MRI and ultrasound with computer modelling and simulation, and motion analysis methods being applied to a wide spectrum of sport, exercise, ageing and clinical conditions. The emergence of theoretical concepts based on systematic reviews and data-driven approaches using big data, artificial intelligence and machine learning methods were also evident in the outputs.

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26. The number of outputs in physical activity and health has continued to increase since REF 2014. While the number of outputs from high-quality longitudinal research grew, there was still a greater proportion of cross-sectional studies, which limited the ability to inform policy. There was marked growth in the number of outputs reporting on physical activity and sedentary behaviour interventions, but relatively few that included economic analysis of these interventions. There were also a small number of studies which looked at translation of interventions into policy and/or practice. The number of systematic reviews submitted increased substantially and the rigour and quality of reporting has improved. However, in many instances the reviews had narrowly focused and/or overlapping research questions. There was a limited number of studies submitted which used qualitative methods, and these tended to be part of mixed methods designs. There was a marked expansion in the number of studies that focussed on sedentary behaviour including the use of devices to measure both sedentary behaviour and physical activity. There was a clear trend towards improved quality in research methods and the standard of statistical analysis and reporting since REF 2014.
 27. Physical education outputs often centred on curriculum policies, models and designs through a combination of evaluation studies and those exploring wider outcomes related to learning and development. A greater focus on health-related agendas was also apparent. Physical education outputs were predominantly qualitative in nature, often focused on students' and teachers' views, reflections, and perceptions. Conceptually focused outputs were evident, though others were relatively descriptive and/or modest in scope. There was a limited volume of outputs focused specifically on physical education and coaching pedagogy. Outputs in coaching frequently had theoretical and conceptual emphases.
 28. The sub-panel received a substantial volume of high-quality outputs in the social sciences particularly in the sociology of sport. These outputs demonstrated the increased influence of sociological work in several related disciplines and fields including health and wellbeing, leisure studies, sport policy, psychology, physical education and sport development. This reflected the interdisciplinary reach and scope of the social sciences broadly and in sociology specifically. The sub-panel noted the range and depth of substantive topics; originality and adventure in theoretical development and analysis; and, increasing innovation, rigour, and real-world application with respect to methods, enabling greater high-quality impact.
 29. The sub-panel received a small body of submissions in philosophy which included some high-quality work. A notable proportion of these outputs focused on substantive ethical issues within sport. The sub-panel noted the particular strengths of outputs that included a high level of theoretical innovation, analytical rigour, and significance in findings and conclusions.
 30. The sub-panel noted an increase in high quality tourism outputs. Tourism research is still largely underpinned by concepts from social sciences and applied management. The sub-panel noted the use of more sophisticated and innovative methodological rigour compared with REF 2014. There continued to be an increase in rigorous literature review papers which used sophisticated bibliometric methods. Research areas that were particularly strong included outputs related to policy, planning and development, the impact of tourism, sustainability, climate change, wellbeing, consumer behaviour, and the use of technology in tourism, particularly as related to phone tracking, Big Data, Artificial Intelligence, and wearable technology. As in REF 2014, the sub-panel noted an over-reliance on outputs submitted to a small number of highly regarded tourism

journals. This may be explained by institutions directing outputs to these journals at the expense of others.

31. The sub-panel noted a significant growth in the number of outputs related to events studies and particularly to sports events or mega-events. These were underpinned by concepts in social sciences, management, and urban studies literature. These outputs were mostly sport-related, with the 2012 London Olympic and Paralympic Games and the 2014 Glasgow Commonwealth Games being significant catalysts for research in sport events and for generation of the evidence of impact that was required by funders, politicians, and policy makers. The nature of the research has developed from mostly economic impacts to the wider societal impacts of sport mega-events or other mega-events, and there were some high-quality outputs in this area. The sub-panel also saw a growth in research focused on cultural events and festivals. The outputs were broad in range and related to the production, delivery and leisure consumption of such events and the concomitant implications for governments, policy makers, event owners and citizens.
32. The sub-panel noted the focus of leisure studies had broadened to include leisure experiences, and experiential participation in leisure, sport, tourism, festivals and events. The sub-panel also noted a modest growth in outputs around sport and human rights, protest, climate change, and their relationship to United Nations' Sustainable Development Goals. The outputs showed a diversification of research approaches and research agendas, alongside greater use of interdisciplinary research strategies to understand broader social outcomes.
33. The sub-panel noted the continued volume and strength of outputs in sport management. These outputs employed techniques from a wide range of functional management disciplines including economics, finance, marketing, human resource management and organisational development. There was welcome growth in outputs on law, notably in fields such as anti-doping and Financial Fair Play. Business aspects of professional team sports were a popular area of research and the sub-panel noted increased sophistication and methodological advance in the outputs submitted. The vibrancy of the subject area is underpinned by a network of highly active global and continental bodies, such as the European Association for Sport Management, which organise their own conferences and have associated journals with major publishers. Functional management was noted as an important underpinning of interdisciplinary outputs in new areas of corporate responsibility such as Environmental, Social and Governance.

Impact

Table 3: Impact Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	39.2	32.4	21.8	6.3	0.3
REF 2021	44.1	40.8	13.6	1.5	0.0

34. The sub-panel assessed 168 impact case studies as part of the submissions. A small number of impact case studies (four) required cross-referral to, or joint assessment with, other sub-panels with the remainder being independently assessed for reach and significance by three sub-panel members. The sub-panel membership included two impact assessors and three research user members who had expertise in the use and impact of research in practice. In accordance with the 'Panel criteria and working

methods', the sub-panel did not make any distinction between continuing and new impact case studies. As shown in Table 3, the sub-panel judged approximately 85% of all case studies to be have demonstrated outstanding or very considerable impact.

35. Case studies described a wide range of impacts on health and wellbeing (62); practitioners and delivery of professional services, enhanced performance, or ethical practice (39); understanding, learning and participation (21); creativity culture and society (15); social welfare (23); and public policy, law and services (16). A large number of the impact case studies focused on physical activity/exercise and health and sports injury/sports medicine but submissions included impacts derived from research in nutrition, psychology, physical education, biomechanics, social inclusion, anti-doping in sport, sports policy, coaching, tourism and hospitality and events.
36. Approximately 60% of the impacts described were in sport. Some impact focused on elite sport including performance enhancement, talent development, injury prevention, anti-doping, the promotion of sustainable sport events and optimising mega-sport events, increasing representation and equality. A significant proportion of this impact was within the settings of youth sport, recreational and community sport facilitating sustained and optimal engagement, promoting public health using sport to make a better world. These impacts were at the local, regional, national, and international levels and drew on research from a variety of sport and exercise science sub-disciplines including sport physiology, sport psychology, coaching, sport nutrition, biomechanics and sport technology, sports medicine/rehabilitation as well as sport sociology and sport policy.
37. A strength of the sub-panel is that the research has real world impact with a clear focus on societal change and benefits to health and performance, reflecting the highly applied nature of the discipline and the close collaboration between academics and research users. In many impact case studies there was explicit alignment to informing the development and implementation of public policy in sport, leisure and tourism and enhancing professional practice. The impact case studies evidenced how excellent research brings significant social welfare, public health and wellbeing and quality of life benefit to a wide range of individuals and groups, demonstrating the importance of impact for wider society and stakeholders from a diverse range of organisations. Building strong partnerships and connections with these stakeholders is an important feature of research and impact in the applied disciplines covered by the sub-panel.
38. The sub-panel considered the reach and significance of all impact case studies, judging that there was no precise formula for a strong case. Good cases were found with local, national and international reach and varying degrees of significance in line with the published criteria. The sub-panel noted that the clearest case studies were those that articulated a small number of impact claims, rather than seeking to make multiple claims.
39. Case studies with outstanding or very considerable impact were characterised by a clear narrative with well-defined links between the underpinning research and the impacts claimed along with demonstrable change to policy, practice or performance.
40. There was no hierarchy of types of impact. Equally the sub-panel received impact cases which were drawn from the work of individuals and from teams, with no differentiation in terms of quality. Outstanding impact was found across a wide range of HEI type, size and structure. Impact cases were also submitted for more recent work and that which had developed over the longer term. Outstanding and very considerable impacts were found in all types and forms of case study.

Environment

Table 4: Environment Sub-Profiles

	% 4*	% 3*	% 2*	% 1*	% Unclassified
REF 2014	34.2	40.7	21.7	3.4	0.0
REF 2021	37.5	39.2	19.5	3.7	0.1

41. The sub-panel assessed 61 environment statements, drawing on the additional information provided in the Covid statement, institutional statement, and data related to PGR completions and research income. Environment statements were independently assessed for their vitality and sustainability by three sub-panel members, with grades being agreed for Strategy, People, Income, Infrastructure and Facilities, and Collaboration and Contribution to the discipline sections to derive the final profile which is shown at UOA level in Table 4.
42. The sub-panel noted that the submitted statements evidenced a healthy and vibrant research environment in the discipline, which reflected the diverse range of sub-disciplines. Articulation of strategy and institutional context evidenced the growth in the subject area since REF 2014.
43. The sub-panel noted an increased significance for policy and practice within submissions illustrating strong engagement with a wide range of external stakeholders, such as policy makers, sport clubs and federations, and non-governmental organisations, at national and international levels. This often included co-production and conceptual collaboration. This continuity of collaboration was notable for enabling greater scope for impact, through the cyclical refinement of knowledge informing practice and practice informing knowledge.
44. ECRs comprised 14.7% of the submitted staff. This is in line with Main Panel C where the proportion of ECRs was about 16%. There were world-leading and internationally excellent outputs attributed to ECRs, illustrating the quality of research being undertaken by early career researchers in the subject area. The sub-panel noted some inconsistency in support for ECRs and the approach taken to nurturing research careers more generally across HEIs. It was pleasing that some HEIs prioritised the succession of completed PGRs through to an ECR position with a view to supporting them through a research career. The sub-panel also welcomed evidence that some HEIs had a tailored training and support structure for each stage of a researcher's career through to professorial level. The sub-panel appreciated the clear evidence of succession planning to support sustainability of the research environment described in several submissions.
45. A total of 1,881 research doctoral degrees were awarded in the subject area during this REF cycle as seen in Table 5. The sub-panel noted an increase in number of postgraduate researcher completions over the REF period, increasing from 221 in 2013/14 to 321 in 2019/20. There has also been an increase in number of degrees awarded per staff FTE over the REF period. Submissions provided information on the infrastructure and training in place at institutional and unit level to support postgraduate researchers. Environment statements also described participation in Doctoral Training Partnerships and Centres for Doctoral Training, although this was often as part of a broader partnership and was rarely focused exclusively in the discipline.

Table 5: Doctoral Awards by Academic Year

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Doctoral degree awards	221	255	228	272	249	335	321
Awards per FTE	0.15	0.18	0.16	0.19	0.17	0.23	0.22

46. The sub-panel noted that the discipline had received considerable investment by institutions in the REF period to strengthen infrastructure and facilities, underlining that the discipline has experienced a period of growth. Submissions where investment was evident were more likely to be highly graded in the Income, Infrastructure and Facilities element of the submission.

47. The total research income included in the submission to sub-panel 24 was £154 million. Annual average data are provided in Table 6 below. Mean and median research income by source is shown in Table 7. The proportion of funding from Research Councils remained similar to 2014, accounting for approximately 15% of total income. The largest source of funding in UOA 24 continues to be derived from central government bodies/ local authorities and health and hospital authorities (26%), with a further 8.5% coming from EU sources. Charities continue to be an important source of funding for UOA 24, accounting for 21% of the total research income, with a further 15% derived from Industry, commerce, and public corporations.

Table 6: Research Income (including Income in kind) by Academic Year

Year	2013-14	2014-15	Annual average for 2015-20	Annual average for 2013-20
Total Research Income	18,571,553	19,316,904	23,154,756	21,951,749
Research Income per FTE	12,782	13,295	15,937	15,109

48. Funding for sports performance research was generally less developed than health research. Nonetheless, UOA 24's sport and human performance research makes high quality contributions that have important wider socio-economic implications. Despite the challenging funding landscape for sport performance research, the sub-panel recognised the need to support the UK's efforts to maintain its world-leading contributions that are critically important to the parent discipline and wider society.

Table 7: Mean and median research income by type (excluding Income in kind)

	Average annual income per staff head count	Median - submission average annual income per staff head count	Average annual income per staff FTE	Median - submission average annual income per staff FTE
BEIS Research Councils, The Royal Society, British Academy and The Royal Society of Edinburgh	2,147	721	2,236	735
UK-based charities (open competitive process)	1,867	614	1,944	624
UK-based charities (other)	968	326	1,008	343
UK central government bodies/local authorities, health, and hospital authorities	3,586	1,693	3,735	1,800
UK central government tax credits for research and development expenditure	149	4	156	4
UK industry, commerce, and public corporations	2,122	851	2,210	878
UK other sources	375	170	391	176
EU government bodies	1,209	618	1,260	639
EU-based charities (open competitive process)	42	0	44	0
EU industry, commerce, and public corporations	191	58	200	59
EU (excluding UK) other	179	90	187	98
Non-EU-based charities (open competitive process)	118	0	124	0
Non-EU industry commerce and public corporations	669	156	697	162
Non-EU other	533	126	556	132
All sources	14,162	6,453	14,748	7,046

49. The sub-panel noted that many submissions reflected a strong contribution to the wider discipline and evidence of strong partnerships with a wide range of stakeholders and policy makers. In most submissions there was clear evidence of the esteem in which researchers are held internationally and the extent of their contribution to the sub-disciplines globally.

50. The impacts of Covid-19 on submissions were considered in line with the published guidance. There was evidence that the discipline made a strong contribution to the Covid-19 response, through Covid-related research and impact. Examples included important contributions to assessing physical activity levels and advising on return to exercise after long Covid. It is likely that Covid-related outputs and impact will feature in future REF submissions.

Concluding Comments

51. The outputs, impact case studies and environment statements submitted to UOA 24 suggest a vibrant research culture in the subject area. Submissions provided evidence of academic and non-academic collaborations both nationally and internationally. These collaborations facilitate world-leading advances in knowledge and extensive opportunities for knowledge exchange. Public, commercial and third sector organisations are important partners in effective and timely knowledge translation and the realisation of impact across the subject area.
52. While many submissions referenced data on and efforts to support staff and PhD researchers with protected characteristics, there was a strong focus on gender with less focus on ethnicity and very little mention of other protected characteristics. There is less diversity in this UOA than in others in Main Panel C, with a small number of submissions describing strategies to address under-representation of staff groups.
53. This UOA has experienced significant growth since REF 2014. Notwithstanding changes in assessment criteria, there was a noticeable improvement in research quality since REF 2014 with over 28% of outputs, 44% of impact and 37% of environment being judged as being of world-leading (four star) quality. Excellence was noted in many submissions irrespective of size, configuration, and research focus. Indeed, in this subject area, much of the research conducted in UK HEIs is world-leading and admired by many other countries. The sub-panel considers that the disciplines represented by UOA 24 are well placed to achieve even greater prominence over the next decade.

Annex 1 Glossary

DFID

Department for International Development

ECR

Early career researcher, defined as members of staff who meet the definition of Category A eligible on the census date, and who started their careers as independent researchers on or after 1 August 2016.

EDAP

Equality and Diversity Advisory Panel

EU

European Union

FCO

Foreign and Commonwealth Office

FTE

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

GCRF

Global Challenges Research Fund

HEI

Higher Education Institution

HESA

Higher Education Statistics Agency

HRM

Human Resource Management

ICS

Impact case study

IDAP

Interdisciplinary Research Advisory Panel

IDR

Interdisciplinary research

IT

Information technology

MS/OR

Management Science/Operational Research

NGO

Non-governmental organisation

PGR

Postgraduate researcher

ODA

Official Development Assistance

RAE

Research Assessment Exercise

REF

Research Excellence Framework

SP

REF Sub-panel

SHAPE

Social sciences, humanities and the arts for people and the Economy

STEM

Science, technology, engineering and mathematics

UKRI

UK Research and Innovation

UOA

Unit of assessment

UNESCO

United Nations Educational, Scientific and Cultural Organization



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