

Annex H

Changes in the research landscape including the growth of interdisciplinary and multidisciplinary research and collaboration

Tables H1 and H2 **Number and percentage of collaborative papers published by UK researchers per year from 1981 to 1994**

Number of collaborative papers

Sector	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	Total
Education	5728	6050	6244	6598	7263	7537	8111	8341	8834	9763	10562	12183	12626	13814	123654
Medical	3016	3101	3269	3466	3887	3924	4116	4296	4674	4997	5102	5749	5942	6108	61647
Research Council	1315	1418	1573	1622	1685	1887	1961	1964	2035	2303	2348	2646	2703	2851	28311
Industry	899	979	1080	1045	1156	1173	1340	1426	1522	1705	1809	1976	2063	2125	20298
Government	432	404	442	453	485	527	520	565	568	685	709	772	815	833	8210
Non-profit	204	252	274	329	328	329	358	391	412	506	512	647	606	718	5866
Unknown	40	45	46	66	60	43	48	57	61	46	102	103	98	141	956
Total	8659	9088	9537	10059	10970	11375	12058	12567	13417	14732	15674	17904	18418	19814	184272

Percentage of Sector Papers

Sector	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	Total
Education	31	32	33	35	35	37	39	41	42	44	46	49	49	50	41
Medical	40	40	41	42	42	43	44	44	46	47	48	50	52	53	46
Research Council	37	39	40	44	42	44	50	52	53	56	58	61	61	65	50
Industry	35	38	40	40	42	44	50	49	51	54	57	58	62	63	50
Government	31	32	33	37	37	39	41	45	45	51	51	53	55	55	43
Non-profit	42	45	48	52	53	52	57	57	58	60	60	68	65	71	58
Unknown	37	32	34	46	44	41	52	52	54	51	63	58	63	65	51
Total	28	29	29	31	31	33	35	36	38	40	41	44	45	46	37

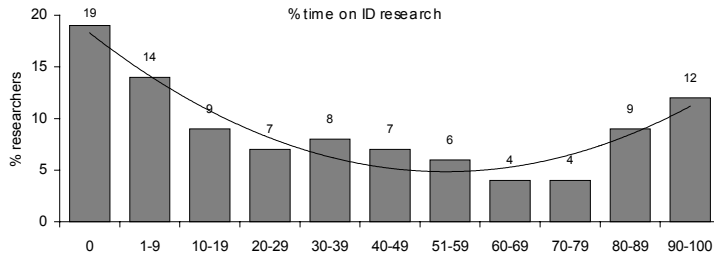
The significant rise in collaborative work indicates that the RAE has not adversely affected collaborative output.

Table H3 **Percentage of internationally co-authored papers for UK researchers compared with those in France, Germany, Italy, Spain and Japan**

	1985	1990	1995
France	20.0	25.7	33.3
Germany	18.4	25.4	32.2
Italy	20.0	26.8	33.0
Spain	13.5	23.5	29.0
Japan	7.1	9.8	14.4
UK	14.0	18.8	26.2

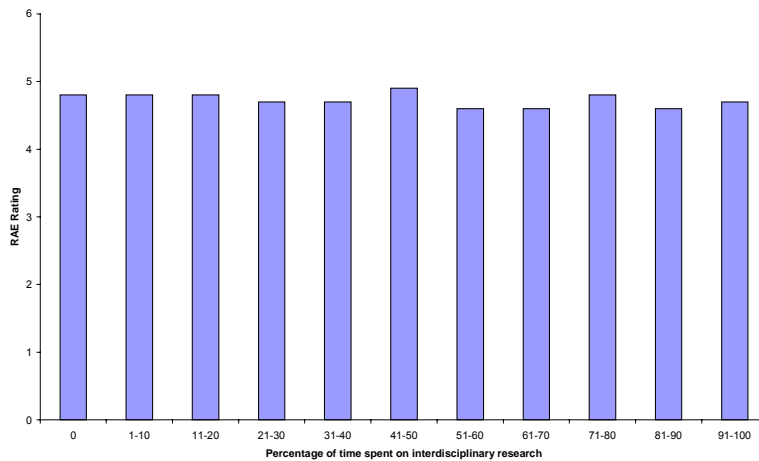
It is clear from this OECD data that UK researchers collaborate extensively with others on an international basis, despite the physical separation from continental Europe.

Figure H1 Proportion of time that researchers spend in interdisciplinary and/ or multidisciplinary research



This shows the results of a study undertaken in response to the Dearing report. A questionnaire asked researchers to indicate the amount of time they spent engaged in interdisciplinary or multidisciplinary research. The responses clearly show that almost all researchers consider themselves to be engaged in interdisciplinary and multidisciplinary research to some extent. These data are further confirmed by evidence from the PREST survey of universities and researchers, which showed that 97 per cent of research staff collaborate with researchers from another discipline.

Figure H2 Relationship between level of interdisciplinarity and RAE rating



This shows that there is no relationship between the percentage of time researchers spend on interdisciplinary and/or multidisciplinary research and the rating of their 1996 RAE submission.

Table H4 Changes in the assessment processes for interdisciplinary and multidisciplinary research in the 2001 RAE

Panels have been assembled so that they cover all key areas, and all include interdisciplinary researchers
Umbrella panels have been established that will provide a forum to discuss cross-boundary work
Panel criteria state explicitly how the assessment of interdisciplinary work will be approached
HEIs are provided with a better opportunity to explain their research structure and how this relates to their submission
Improved mechanism for cross-referral of submissions between panels and for the incorporation of advice received from another panel

Table H5 Areas where panel behaviour may give rise to concern about the assessment of interdisciplinary and multidisciplinary research

Where specialised departments in a field are covered by a single panel - for example textiles, paper science, materials and corrosion all fall under materials
Where a view develops in the sector that in order to get the highest ratings a submission must show a breadth of activity within a discipline
When a large area involves more than one discipline, for example 'development' is spread across economics, politics, and sociology

We believe that assessment of interdisciplinary and multidisciplinary research is not prejudiced and can be reconciled with the continuing negative perception in the sector by the findings of the PREST study. This study suggests that the problems cited are not 'general' but relate to the three distinct areas above, and are a function of panel behaviour rather than of the boundaries between units of assessment.

Table H6 Common themes emerging from an analysis of the changing research landscape

Continued growth in interdisciplinary research
Increased collaboration internationally in the use of expensive research equipment and infrastructure
Increased involvement of users of research
Further growth in applied research
Growing importance of research teams/groups vis-à-vis departments
Emergence of more virtual research teams and the use of remote data gathering
A further drift towards the short-term nature of research, both in terms of employment contracts and the type of research work undertaken

There were differing views about whether the size of research groups would become a more significant issue. Some believed that, in the case of biosciences, larger teams would become more important, while in other subjects, such as social sciences, the view was that size may become less important as IT-mediated forms of collaboration increased. A number of interviewees from the arts and humanities believed that the model of the single scholar working on his or her own was gradually dying out in favour of working more collaboratively with other researchers. As a consequence of increased collaboration and joint working, virtually all respondents believed that multi-authorship of research papers would continue to grow. A number of these UK themes are reflected in international trends, according to the report on international approaches to research policy by SPRU.