

**Modelling the Outcome of the UK Business and
Management Studies RAE 2008 with reference
to the ABS Journal Quality Guide**

By

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1. Introduction

The release of the UK Research Assessment Exercise 2008 (RAE 2008) submission data in May 2009 presents an important opportunity for all those interested in understanding the factors underlying the subject outcomes of the RAE 2008 process – a process that has significant implications for the future funding of business and management research in the United Kingdom.

First, it is of interest to us, as editors of the Association of Business Schools (ABS) Journal Quality Guide, to assess what implications the analysis of the submission data might have for its format and future use. The Guide has enjoyed considerable success. It has been widely adopted as a policy tool in UK business schools and indeed in business schools in many parts of the world, but judgements about the overall quality of the research published in particular journals are always likely to be controversial. In preparing for the RAE 2008, many university and business school managers, in the absence of direct knowledge of research quality and in preference to other metrics such as the Thompson/ISI citation impact data, made use of the ABS Guide in planning their submissions. This might seem to have been a risky strategy since in the run up to the RAE the business and management studies panel chair, Professor Mike Pidd, made it plain that reference to journal lists would be eschewed by panel members. The official position that good, bad and mediocre work could be found in virtually all journals meant that panel members had to rely on their own assessment of the quality of an article. The same rationale is repeated in the RAE overview report for main panel I (covering economics and econometrics, accounting and finance, business and management studies, and library and information management), published in January 2009, in which the chair, Professor David Otley, confirms that panel members "... did not use ... place of publication as an evaluative criterion. Although much top-quality work was indeed published in what are generally regarded as leading journals, top-quality work could also be found in journals occupying a lower position in conventional rankings" (HEFCE, RAE 2008 UOA 36 Subject Overview Report, January 2009). The conclusion that "there was not a perfect correlation between the quality of a piece of work and its place of publication" is judicious and entirely logical, but still leaves open the question 'just how strong was the relationship between place of publication and quality as assessed by panel members?' Is the ABS Guide in fact a reliable indicator of the overall quality of research published in particular academic journals when assessed against the judgements made by RAE panel members? Were RAE managers right to make such extensive use of the ABS Guide in shaping their RAE 2008 submissions?

Beyond these specific questions, modelling the RAE 2008 submission data can serve an important function by informing academics and academic managers of the relative importance of various indicators of research performance impacting on RAE 2008 outcomes. The publication of summary RAE quality profiles for each submission suggests that the quality of research outputs was the principal outcome driver. However, there are numerous

other factors bearing upon quality profiles. These include *inter alia* number of staff submitted, number of research students and research funding. By modelling the relationship between quality profiles, expressed as a grade point average (GPA), and the various RAE process input variables we can begin to signify the relative weight of the factors determining the RAE 2008 outcome for business and management studies.

The analysis presented in this paper has a bearing on policy issues relating to the distribution of research funding. Modelling RAE submission data provides evidence of the degree to which a limited number of quantitative indicators is able to reproduce the same or similar outcomes of the complex qualitative processes of peer-review applied hitherto in the UK. Might it be the case that there are more resource efficient and effective ways of measuring research quality than by asking a small group of top academics to reach an independent judgement on the worth of thousands of research outputs before squaring the findings with data on research inputs, environment, esteem and impact? We return to consider this question in conclusion to this paper, but note at the outset that the results of the modelling exercise presented herein demonstrate a high degree of congruity between the judgements reached by the RAE 2008 panel and the journal quality rankings of the ABS Guide.

2. Outcome of RAE 2008 for Business and Management Studies

In research assessment exercises prior to 2008, the practice was to grade each submission within a unit of assessment on an ordinal scale. For RAE 2008, it was decided that each submission would be awarded a research quality profile classifying the proportion of work falling under five categories as follows.

4*	Quality that is world-leading in terms of originality, significance and rigour.
3*	Quality that is internationally excellent in terms of originality, significance and rigour but which nonetheless falls short of the highest standards of excellence.
2*	Quality that is recognised internationally in terms of originality, significance and rigour.
1*	Quality that is recognised nationally in terms of originality, significance and rigour.
Unclassified	Quality that falls below the standard of nationally recognised work. Or work which does not meet the published definition of research for the purposes of this assessment.

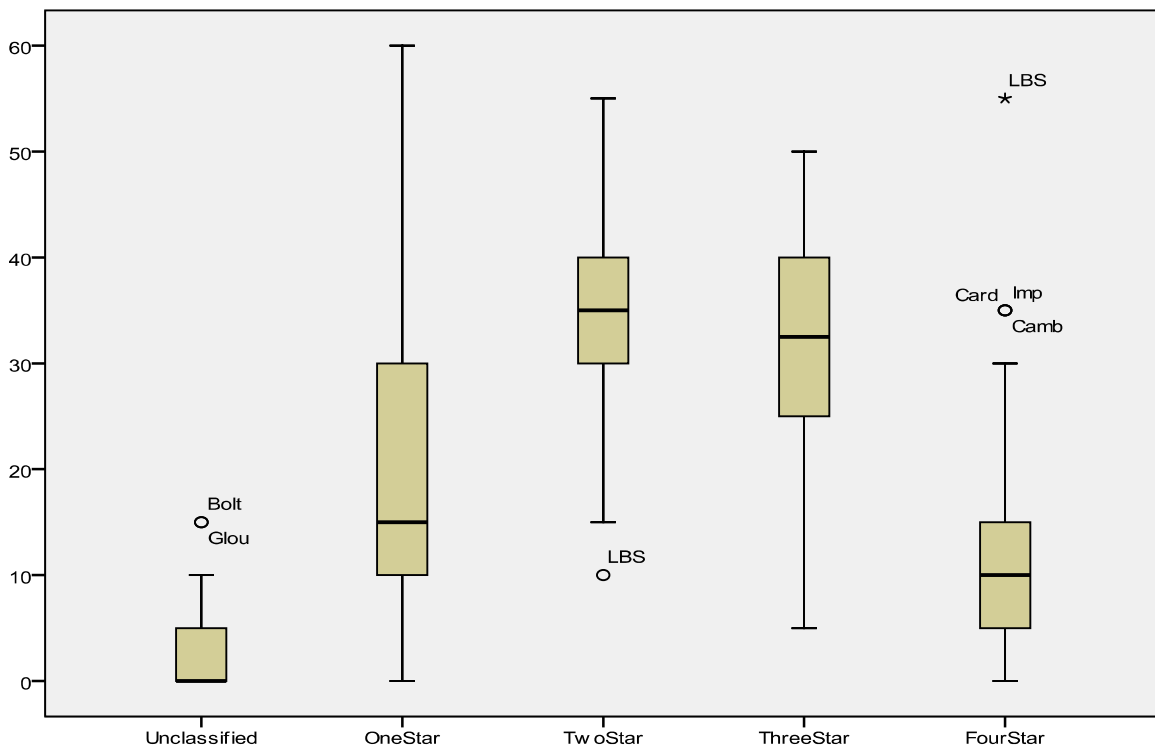
The outcome for business and management studies as an academic field is summarised in Table 1. Ninety higher education institutions from England, Scotland, Northern Ireland and Wales made submissions to unit of assessment 36 (UoA 36), the panel for business and management studies. This considered the work of 3,337 researchers who submitted 12,575 research outputs. Across the ninety submissions, just 11 percent of research was classified as four-star. The most highly graded submission was that of the London Business School (LBS) with 55 per cent of its research at four-star. At the other extreme were the submissions of Gloucestershire and Bolton with 15 per cent of the research they produced rated as unclassified by the panel.

Table 1. Summary of quality profiles for Business and Management Studies submissions at RAE 2008 (%)

Quality Rating	N	Minimum	Maximum	Mean	Standard Deviation
Four-star	90	0	55	10.9	10.4
Three-star	90	5	50	31.3	11.3
Two-star	90	10	55	35.9	9.0
One-star	90	0	60	19.3	13.3
Unclassified	90	0	15	2.6	3.9

The quality distribution for the field is represented graphically in Figure 1, which highlights the stellar performance of a small group of high performing research intensive institutions led by the LBS, and followed by Imperial College, Cambridge and Cardiff each with 35 per cent of their research rated four-star.

Figure 1: The Distribution of RAE 2008 Profiles



A one-dimensional distribution of RAE profiles can be constructed by adding up the weighted proportions of the quality classified outputs. Using the weights 4, 3, 2, 1, 0 each institution's profile was transformed into a sum of weighted proportions: the weighted quality profile RAE 2008. The sums of weighted proportions were divided by 3.4 to return the scale limits to approximately 0 to 100. In fact the range became 36-99 percent. The histogram for this variable is described in Figure 2.

Figure 2: Histogram of Weighted RAE Quality Profile (2008)

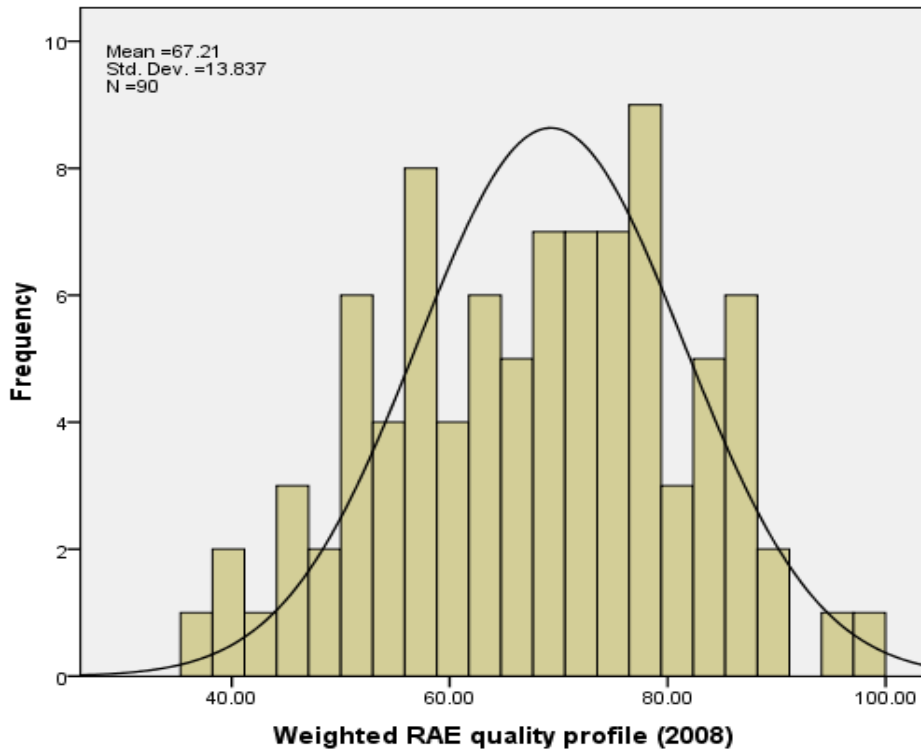
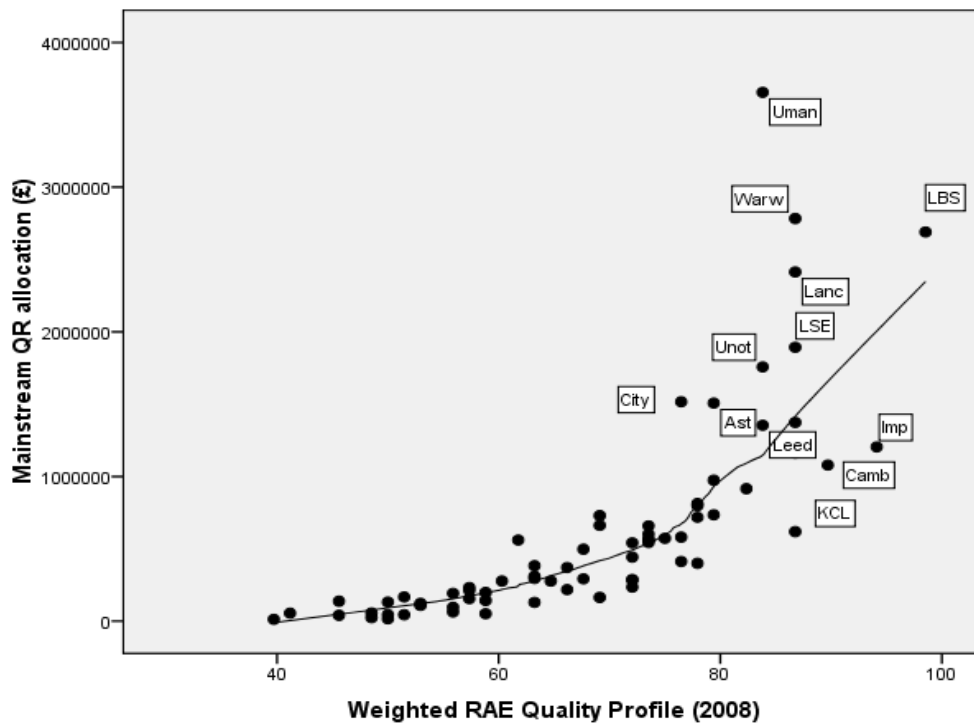


Figure 2 shows that the weighted proportions of the RAE 2008 profile for each institution are distributed in such a way as to approximate to some degree to a normal distribution of research quality.

Figure 3: Mainstream QR Allocation by Weighted RAE Quality Profile (2008)



The financial consequences of the RAE 2008 quality decisions for business and management research in the English Universities are indicated in Figure 3.

3. Potential Predictors of Outcome of RAE 2008

In making judgements of the quality of the submissions, panel members were invited to consider a number of quantitative and qualitative indicators of the volume and quality of research activity. These were:

- i. staffing levels
- ii. research student numbers
- iii. research income
- iv. types of research output
- v. subject area of outputs
- vi. quality of outputs
- vii. indicators of esteem

In the following sections each of these is considered in turn, excepting the qualitative indicators of esteem. This is preliminary to the modelling of RAE 2008 outcomes presented in section 4 below.

3.1 Staffing Level

Staffing level is a direct indicator of the volume of research activity but may also be associated with the quality of research outputs since the number of staff employed within an institution is in part a function of previous research performance, and top researchers are likely to be attracted to larger UoAs that have practices and infrastructure supportive of high quality research activity.

Table 2. Staffing levels – descriptive statistics and correlation with RAE 2008 profile

Staff Type	N	Min no.	Max no.	Mean	Standard Deviation	Pearson's 'r'
Category A Research Active Staff	90	3.0	198.0	38.9	32.5	0.68
Category A Research Active FTE	90	2.6	182.2	37.1	30.8	0.69
Category B Staff	90	0.0	51.0	8.1	9.1	0.59
Category C Staff	90	0.0	4.0	0.5	0.9	0.07
Category D Staff	90	0.0	5.0	0.1	0.6	0.21
Research Assistants	90	0.0	36.9	5.4	7.1	0.55
Research Officers	90	0.0	1.0	0.0	0.2	0.08
Other Staff	90	0.0	16.6	1.6	3.3	0.34

Table 2 shows the wide of variation there is in the distribution of research active staff (category A) across business and management submissions. The average FTE number is 37 but rises to 182 in the largest submission, that of Manchester University. There are similarly large variations in research active staff departing before the census date (category B) and in the numbers of research assistants. The scale of research activity reflected in these indicators is clearly linked to the 2008 outcomes, the highest correlations being for the number of research active category A staff ($r = 0.69$). At this bivariate level of analysis, the number

(FTE) of research active academic staff accounts for over 40 per cent of the variance in the weighted RAE quality profile.

3.2 Research Student Numbers

The relationship between research student numbers and RAE profiles is complex. High quality institutions attract more and probably more of the best students. The success of a department in obtaining funding for student places on programmes also can reflect its past performance and reputation for high quality research. It is also the case that larger numbers of doctoral students may lead to more opportunities for research active staff, as supervisors, to publish research results in high quality journals.

Table 3. Research students by funding source – descriptive statistics and correlation with RAE 2008 quality profile

Student Type	N	Min no.	Max no.	Mean no.	Standard Deviation	Pearson's 'r'
OST/OSI Research Councils	76	0.0	168.5	18.8	24.6	0.37
UK-based charities	33	0.0	8.3	1.6	2.1	0.18
UK central government	44	0.0	28.4	3.2	5.3	0.33
UK local government, health & hospital authorities	38	0.0	5.0	1.2	1.3	0.07
UK industry, commerce and public corporations	55	0.0	26.4	5.0	5.7	0.28
Institutional self-funded	83	1.0	122.4	22.5	23.2	0.61
Overseas Other	79	0.0	296.2	41.1	48.5	0.54
Total Masters Students	89	0.0	138.0	5.1	15.7	0.29
Total Doctoral Students	90	1.0	284.0	38.8	44.7	0.63
Total Students	85	2.0	587.0	83.1	90.6	0.56

Table 3 displays the distribution of student numbers by funding sources. As indicators of quality, however, the best predictor of RAE quality profile is the number of doctoral students.

3.3 Research Income

Research income generated is to a degree a measure of both the volume and quality of research. It may be a function of the infrastructure needed to support the preparation of sound and attractive research proposals. It is likely that panel members expected high quality submissions to be those enjoying significant success in generating research income. Table 4, again, exposes a wide variation in performance and predictive value.

Table 4. Research income by source – descriptive statistics and correlation with RAE 2008 quality profile

Funding Type	N	Min £	Max £	Mean £	Standard Deviation £	Pearson's 'r'
OST/OSI Research Councils et al	90	0	9,135,121	989,254	1,827,886	0.65
JREI - OST/OSI Research Councils	90	0	129,784	1,664	13,819	0.18
UK-based charities	90	0	2,782,316	230,118	401,541	0.55
Other government bodies in the UK	90	0	13,422,676	1,167,710	1,899,670	0.36
Regional Development Agency	90	0	4,280,317	120,996	479,611	0.05
UK industry, commerce and public corporations	90	0	10,005,882	628,099	1,386,939	0.48
Government bodies in the EU	90	0	7,330,954	480,062	928,349	0.13
EU other	90	0	855,911	49,456	132,548	0.10
Other overseas	90	0	3,672,109	105,222	438,842	0.37
Other Income	90	0	3,582,249	183,589	533,086	0.29
Total Income	90	0	27,427,375	3,956,170	5,456,976	0.59

It can be seen that OST/OSI research funding is most closely linked to RAE quality profile ($r = 0.65$). Other government bodies, while contributing more on average to total research income, is not as closely related to quality profile ($r = 0.36$) as private sector funding ($r = 0.48$).

3.4 Types of Research Output

A journal article is the classic outcome of research activity within business and management studies and has a perceived high value across the field. The number of journal articles included in a submission is likely to be associated positively with the outcome of any research quality assessment. The number may be more important than the proportion since it reflects both the quality and the volume of research activity.

Table 5. Research outputs by type – descriptive statistics and correlation with RAE 2008 profile

Output Type	N	Min no.	Max no.	Mean	Standard Deviation	Pearson's 'r'
Authored book	90	0	22	3.2	3.8	0.46
Edited book	90	0	10	0.7	1.6	0.31
Chapter in book	90	0	23	3.7	5.1	0.36
Journal article	90	10	612	126.4	103.5	0.68

Conference contribution	90	0	13	0.9	2.0	-0.13
Software	90	0	1	0.0	0.1	0.02
Internet publication	90	0	27	3.5	5.2	0.63
Research report for external body	90	0	16	1.1	2.4	0.10
Total no. of outputs	90	12	702	139.7	114.8	0.67

Table 5 reflects the volume effect of outputs and reveals a strong correlation between the total number of outputs and the outcome of the RAE 2008 ($r = 0.67$). Of the various types of output, journals articles are the best predictor ($r = 0.68$) but internet publications ($r = 0.63$), which includes journal articles published electronically but not yet in print, is almost as good and books in their various forms are moderately good predictors too.

Table 6. Research outputs by type – descriptive statistics and correlation with RAE 2008 quality profile

Output Type	N	Min %	Max %	Mean %	Standard Deviation	Pearson's 'r'
Authored book	90	0.0	8.2	2.3	2.3	0.10
Edited book	90	0.0	6.7	0.5	1.1	0.05
Chapter in book	90	0.0	12.6	2.6	2.9	-0.09
Journal article	90	62.5	100.0	90.3	7.3	0.13
Conference contribution	90	0.0	31.3	1.3	4.1	-0.38
Software	90	0.0	0.7	0.0	0.1	0.02
Internet publication	90	0.0	8.7	1.9	2.0	0.49
Report for external body	90	0.0	12.5	0.9	1.9	-0.24

In Table 6 the form of publication is expressed as a proportion of total output to eliminate the volume effect and measure the implications for quality ratings of publishing in different formats. The impact of journal articles is slight largely because the degree of variation is so low. Internet publications are moderately highly correlated with outcomes ($r = 0.49$), indicative perhaps of putting before the panel the latest and best work of researchers, whilst conference contributions ($r = -0.38$) and research reports have a negative impact on quality profiles ($r = -0.24$).

3.5 Subject Area of Research Outputs (Journal Articles¹)

The Business and Management schools of the UK have been developed from a variety of institutional contexts and have a combination of subject specialism reflecting this context and

¹ Across all business and management there were 11,374 journal articles submitted for assessment (90.4% of the 12,575 assessable outputs), with the proportion of articles varying between 62 and 100 percent of all outputs.

the strategic decisions taken by senior managers to benefit from the market for students and the potential for research. For these historical and strategic reasons, the subject profiles of submissions vary considerably and this is likely to affect the RAE 2008 quality ratings awarded. Some research areas within the field are more established than others and have developed distinctive research agendas and themes. In these areas there is a coherent body of prior literature to build on, tried and tested methodologies and the potential to add incrementally to the established knowledge base. In newer and emergent subject areas this is not the case, which in turn may depress the perceived quality of research outputs. Table 7a shows that the more established sub-disciplines such as organization studies, management science, accounting and finance have higher mean journal quality ratings than management development and education, tourism and hospitality and other sector studies.

Table 7a. Specialist subjects within business and management studies ranked by the mean quality score (ABS 2009) of articles submitted to RAE 2008

Subject Area Specialism	Mean	Std. Deviation	N
Organization Studies	3.5	0.8	557
General Management	3.2	1.0	830
Social Sciences	3.2	0.8	689
Psychology	3.1	1.0	196
Human Resource Management and Employment Studies	3.1	0.8	803
Accountancy and Audit	3.0	0.7	534
Management Science and Operations Research	3.0	0.5	498
Business and Management History	2.9	1.0	94
Finance	2.8	0.8	754
International Business and Area Studies	2.7	1.0	231
Entrepreneurship and Small Business	2.7	0.9	286
Information Systems and Management	2.7	0.6	365
Economics	2.6	0.9	1041
Business Ethics and Corporate Governance	2.6	0.6	163
Strategic Management	2.6	0.8	196
Public Sector Management	2.6	0.6	391
Operations and Technology Management	2.6	0.7	591
Tourism and Hospitality Management	2.5	0.9	234
Marketing	2.5	0.8	955
Law	2.4	0.7	33
Research and Innovation	2.3	0.8	122
Sectoral Studies	1.9	1.0	211
Management Development and Education	1.8	0.6	168
All Journal Articles	2.8	0.9	9942

Table 7b. Proportion of outputs by subject area – descriptive statistics and correlation with RAE 2008 profile

Subject Area	N	Min %	Max %	Mean %	Std. Dev.	Pearson's 'r'
Accountancy and Audit	90	0.0	22.8	3.8	4.1	0.43
Business and Management History	90	0.0	8.5	0.8	1.6	0.17
Economics	90	0.0	50.0	7.7	8.2	0.39
Entrepreneurship and Small Business	90	0.0	38.5	3.8	5.7	-0.28
Business Ethics and Corporate Governance	90	0.0	6.3	1.6	1.8	-0.03
Finance	90	0.0	28.7	4.7	5.8	0.52
General Management	90	0.0	18.0	6.8	4.1	0.44
Human Resource Management and Employment Studies	90	0.0	36.0	7.3	6.1	0.09
International Business and Area Studies	90	0.0	16.7	2.2	3.0	-0.02
Information Systems and Management	90	0.0	16.6	2.7	3.2	0.14
Research and Innovation	90	0.0	8.3	1.0	1.5	0.11
Management Development and Education	90	0.0	21.1	2.2	3.5	-0.46
Marketing	90	0.0	36.0	9.2	8.6	-0.18
Operations and Technology Management	90	0.0	22.2	5.0	5.2	0.06
Management Science and Operations Research	90	0.0	20.3	3.5	4.2	0.20
Organization Studies	90	0.0	22.8	5.0	4.7	0.27
Psychology	90	0.0	11.1	1.4	2.4	0.26
Public Sector Management	90	0.0	29.1	3.9	5.0	-0.19
Sectoral Studies	90	0.0	26.9	2.2	3.5	-0.30
Social Sciences	90	0.0	25.5	5.6	4.1	0.19
Strategic Management	90	.00	14.3	1.9	2.4	-0.10
Tourism and Hospitality Management	90	.00	34.4	2.7	5.6	-0.29
Unlisted in ABS 2009	90	0.0	75.0	14.7	12.0	-0.53

Table 7b reveals the influence that historical context and local subject mix can have on RAE outcomes. Finance is the subject most highly correlated with RAE 2008 weighted quality outcomes ($r = 0.52$) followed by general management ($r = 0.44$), accounting ($r = 0.43$) and economics ($r = 0.39$). If a high quality research profile is the object of a submission then some subject areas such as management development and education, entrepreneurship and small business and sector studies seemingly are best avoided. It is perhaps surprising to see

that marketing is negatively associated with success when measured by the weighted proportions of the RAE 2008 profiles. The last row of Table 7b demonstrates that publication in a journal not listed in the ABS Guide is strongly associated with a poor profile outcome in RAE 2008. These were journals whose subject area is not classified by the Guide and these comprised 12.4 per cent of the 1,698 journal titles represented in the business and management UoA.

3.6 Quality Rating of Outputs

The distribution of journals cited across the grading of the ABS 2009 Guide is as displayed in Table 8.

Table 8. Quality Rating (ABS2009) of RAE 2008 Journal Articles

Quality Rating	Frequency	%
4*	2302	20.2
3*	4262	37.5
2*	2531	22.3
1*	850	7.5
N	16	.1
Unlisted	1413	12.4
Total	11374	100.0

Twenty per cent of the journal articles submitted for assessment came from ABS Guide 4* journals, 38 per cent were in the modal 3* category, 22 per cent were in the 2* category and just 7.5 per cent were in the lowest ABS category. A surprisingly large number of the articles submitted, 12.4 per cent, are not listed in the ABS Guide.

Table 9. Quality Rating of Outputs: Descriptive Statistics and Correlation with RAE 2008 Profile

	N	Min.	Max.	Mean	Std. Dev.	Pearson's 'r'
Mean Quality Grade (ABS2009) of Journal Articles	90	1.4	3.6	2.6	0.4	0.89
% Grade 4* journal articles	90	0.0	71.8	18.5	13.2	0.78
No. of Grade 4* journal articles	90	0.0	186.6	28.7	34.4	0.79
Grade 4* journal articles per category A staff	90	0.0	2.1	0.6	0.4	0.78
Five Year Citation Impact*	89	2.0	3.6	3.0	0.3	0.50
Citation Impact 2007*	90	2.0	3.6	2.9	0.3	0.53
Immediacy 2007*	89	2.0	3.3	2.8	0.3	0.47

* indicates the ISI/Thompson citation impact factor standardized by subject area as per Kelly et al (2009)

Table 9 shows the comparative impact of a number of methods of assessing journal quality on the weighted RAE 2008 profile. The mean journal quality as assessed by the ABS 2009 guide is by far the best predictor of RAE outcomes: with an 'r' of 0.89 the quality measure represented by the ABS guide accounts for 80 percent of the variance in RAE 2008 outcome at the bivariate level. This is a very high degree of association. The variants of the ABS 2009 measure that use the number, proportion and per capita adjustments of 4* quality ratings are lower but still explain over 50 percent of the variance at the bivariate level of analysis.

4. Regression Modelling of Outcome of RAE 2008

The dependent variable for the modelling exercise is the weighted proportions of output for each institution as determined by the RAE 2008. This is an interval level variable that approximates to a normal distribution.

The modelling process was initially based on indicators chosen to be the best of each batch of measures as surveyed in previous sections. With a reasonable number of independent variables backward de-selection processes worked effectively. The possibility of mis-specification of the model was checked by two means:

- a) the use of forward de-selection to identify possibly important variables to be added to the model;
- b) the correlation of all un-used variables with the model residual and the inclusion of those correlated at any reasonable degree.

The modelling was carried out as a two stage process. First, only indicators of quality and volume were included. Second, we assessed the degree that only quality indicators were important in predicting RAE 2008 outcomes, other measures of university origin (three 'dummy' variables for each of the modern, new and traditional universities), panel membership and sub-national location were included.

Table 10 displays the results of the first stage using only quality and volume indicators.

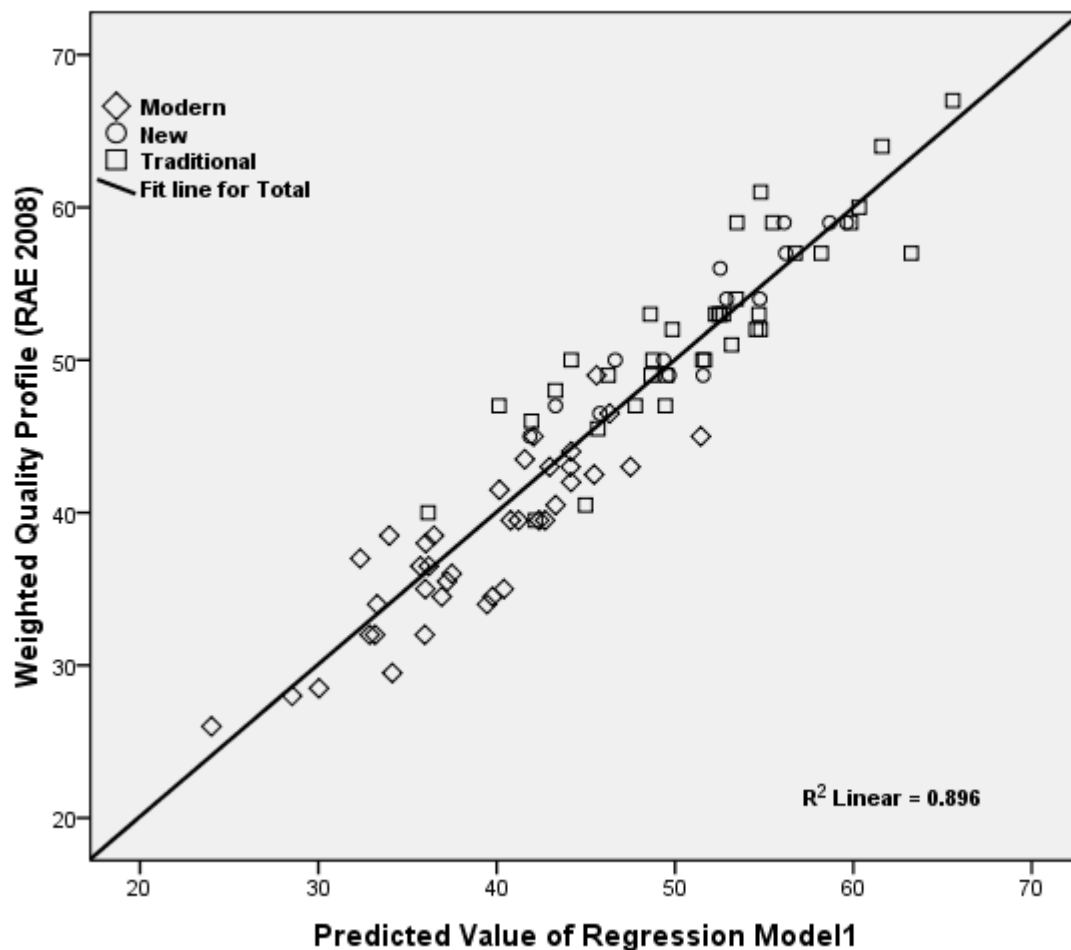
Table 10. Model 1 Coefficients

Model 1 explains 90% of the variance in the weighted quality profile (RAE2008)	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	-4.09	4.41		-0.93	0.36		
Mean Rating of Journal Articles (ABS 2009)	14.06	0.97	0.65	14.46	0.00	0.62	1.61
Category A Research Active Staff – FTE	0.09	0.01	0.32	7.84	0.00	0.76	1.32
% of Income that is OSI/OST	0.03	0.01	0.15	3.69	0.00	0.72	1.39
% of Outputs that are Journal Articles	0.09	0.04	0.07	2.06	0.04	0.99	1.01

In Table 10, the size of the beta coefficient indicates the relative importance of the variable to the overall effectiveness of the model. The model is highly successful in that the variables combined in a simple additive way account for 90 percent of the variance in the weighted index of proportions. This is an unusually high degree of explanatory power.

By far the most important variable in the model is the mean rating of a department’s journal article submission as assessed by the application of the ABS 2009 ranking. This means that the mean ABS rating of journals on its own accounts for nearly 48% of the variance when controlling for the other variables in the model. This purely quality based indicator is then supplemented by a volume indicator, namely, the number of category A research staff (FTE) included in the submission. In addition, the proportion of all research income that is from OST.OSI sources and the proportion of outputs submitted that are journal articles have small effects but meet the tolerance requirements for inclusion that the default in the PASW programme.

Figure 4 Weighted Quality Profile by Predicted Value of Regression Model1



These results fully confirm the confidence many have placed in the ABS Guide. Application of the quality grades proposed in the Guide effectively serves to reproduce the judgements of RAE 2008 panel members regarding the quality of articles. In other words, the overall quality of a set of journal articles might efficiently and effectively be measured by the quality ranks of the journals in which they were published. This appears to justify the assumption underpinning journal ranking schemes that the overall quality of a journal is a good guide to the quality of the research published therein.

The next stage of the modelling exercise was to incorporate into the model variables relating to the institutional location of departments submitting to the business and management panel.

Table 11. Model 2 Coefficients

Model explains 92% of the variance in the weighted quality profile (RAE2008)	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
	(Constant)	3.48	4.20		0.83	0.41	
Mean Rating of Journal Articles (ABS 2009)	12.45	0.94	0.57	13.26	0.00	0.53	1.89
Category A Research Active Staff – FTE	0.08	0.01	0.27	7.13	0.00	0.70	1.43
Modern University	-4.89	0.81	-0.27	-6.06	0.00	0.51	1.97
% of Outputs that are Journal Articles	0.10	0.04	0.08	2.50	0.01	0.99	1.01

In model 2, a new variable is introduced called modern university to discriminate between the two main sources of submissions: those from institutions granted university status before 1992 and the post-92 or modern universities. This dummy variable has a negative coefficient indicating that there is a factor that depresses the quality profile of modern universities that is not accounted for by other variables inside or outside the model. Thus controlling for variations in the quality and quantity of outputs there remains a relationship between university type and RAE 2008 outcome. This is likely to reflect the lower scores for environment and esteem awarded by the RAE 2008 panel to generally smaller submissions from institutions with a less established track record in research.

5. Conclusion

The outcome of RAE 2008 for business and management studies was based on careful scrutiny by panel members of a large number of research outputs, mainly journal articles, and supporting statistical and documentary evidence. This is a resource intensive process that involves significant opportunity costs. This paper has presented the results of a modelling exercise based on the hard RAE 2008 submission data for business and management studies, while setting aside the myriad of qualitative indicators relating to environment and esteem.

In modelling the outcome of RAE 2008, it has been found that a very high degree of variance is explained by simple additive models with four variables. The model explains 90 per cent of the variance in the weighted quality profiles established by the business and management panel. The best predictor in the model is the mean quality score for journals in a submission as measured by the ABS Journal Quality Guide 2009. This suggests that the Guide in large measure mirrors the quality judgements made by the RAE panel, and that the institutional and subject managers who used it to help plan their submissions are vindicated in having done so.

We asked at the beginning of this paper, echoing current policy debates in the UK, whether subject based research quality evaluation exercises such as RAE 2008 might be conducted in a more resource efficient and effective way. The answer, we suggest, is a qualified yes within business and management studies. On the one hand, our findings suggest that simple volume and quality indicators based on journal rankings might offer a sound metric to help inform

funding decisions. The high degree of congruity that exists between predicted outcome based on the ABS Guide and actual outcome from intensive peer review is satisfying both because it confirms that the panel did its work well and because it validates the rankings within the Guide. On the other hand, our findings suggest that due caution should be exercised with respect to the choice of metrics. In particular, we find that citation impact data, which did not qualify for entry into the regression models presented here, are inferior to the ABS Guide in replicating peer quality assessments of research quality.

This leads to our final point, which, in effect, is an expression of belief in the value of competition within the world of academic publishing. The intense and on-going competition that takes place to get published 'in the best places' is orchestrated through the process of peer review. The highest ranking journals, by citation and by consensus, maintain their reputation for publishing the most original and impactful research by excluding the vast majority of papers submitted. Only the *crème de la crème* are able to satisfy the exacting demands of the editors and reviewers of tier 1 journals, and in this way papers that do not meet the very highest standards, either as a result of calculation or previous rejection, come to be submitted to lower tier journals. In other words, competition leads to stratification within the academic field as editors and reviewers seek to protect and improve the position of their journal within the pecking order and would-be authors devise sophisticated publication strategies in search of status and influence. The ABS Guide, which establishes rankings based on a combination of citation and expert opinion, recognizes and responds to the operation of competitive forces within the field of business and management. It implicitly captures and respects the knowledge and expertise of editors, reviewers and authors, and it is this fact that makes it such a valuable tool for researchers and research managers within the field.

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