Assessing and Maximising Research Impact

Erasmus+ Capacity Building in Higher Education
Assessing and Improving Research Performance at South East Asian Universities

John Hudson
University of Bath
j.r.Hudson@bath.ac.uk

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein

REPESEA

Outline

We analyse the problems and practices of assessing research impact. This includes traditional measures based on citations and also newer approaches to assessing the impact of research on the economy and society as a whole. With respect to the former we discuss how to write a paper to maximise citations.

With respect to the latter we first define an ideal measure of impact and then compare this with how research impact is done in the UK within the context of the Research Excellence Framework (REF).

Finally we briefly discuss the methods the University of Bath is employing to enhance the research impact of individual academics.

Co-funded by the Erasmus+ Programme of the European Union

Journal Rankings

Fifty years ago there were relatively few economics journals and the discipline was not so wide that an economist might be able to be at least passingly familiar with all of it.

This is no longer so, and when judgements of quality relating, e.g. to promotion or appointment, need to be made, some heuristic is useful. Journal rankings are one such heuristic and have become an important part of academic life, along with ranking individuals and departments. Thus an individual's or department's worth is largely determined by evaluating the quality of their best publications on the basis of where they were published. The underlying logic of this is that a paper in a 4* journal is much more likely to make an impact than one in a 2* journal. Hence they are particularly useful in evaluating recent papers which will have garnered relatively few citations. However, for many in the profession, where a paper is published may be more important than the number of citations even in the long-run.

Co-funded by the Erasmus+ Programme of the European Union

The Economic Journal Paper

In this paper we will explore the objective factors which underlie this list. One of the most meticulous subjective journal ranking exercises was that undertaken by the Australian Research Council (ARC), which is also used in some departments both in the UK and elsewhere, and we shall supplement the analysis of the Keele list by also analysing the ARC rankings.

The Association of Business Schools (ABS) list also ranks many economics journals, and despite its business perspective, it too is used by many economics departments. All of these rankings allocate journals into one of four tiers . There are also other lists, many of which are based more on metrics and considerable effort has been expended on deriving 'the best metric'.

Co-funded by the Erasmus+ Programme of the European Union

Removing the subjectivity from the lists

We will evaluate several widely used metrics to see how well they predict or mirror the economist's views, as reflected in the subjective rankings, and to what extent a single measure is adequate or whether multiple measures are to be preferred.

Apart from current bibliometric measures, we will include factors such as the subject orientation, the age of the journal and the extent to which it is focused on the economics discipline.

We will then be in a position to produce rankings, based partly on metrics which reflect the economist's values, but which remove some of the problems inherent in purely subjective lists.

Co-funded by the Erasmus+ Programme of the European Union

Thus for journal i we regress

$$R_i = \beta_o + \beta_1 Impact_i + \beta_2 Age_i + \beta_3 Theory_i + \varepsilon_i$$

Where R_i is the ranking of journal i in the list
$Impact_i$ is its impact (and also other metrics)
Age_i its age; $Theory_i$ whether a theory journal
And ε_i a random element reflecting bias or subjectivity in the ranking.
Remove this random element by calculating

$$R^p_i = \beta_o + \beta_1 Impact_i + \beta_2 Age_i + \beta_3 Theory_i$$

R^p_i is the predicted ranking of the journal based on its impact, age and whether a theory. This is the ranking we use.
Of course we use more variables than these three to predict impact. But this is the idea

Co-funded by the Erasmus+ Programme of the European Union

Tiers

We can then categorise journals as 4* 3* etc depending on whether R^{p}_{i} is above or below some critical values.

But as with all such exercises this leaves open the possibility that journals which are actually very close on are allocated to different tiers.

This becomes particularly problematic when using ranked journal quality to assess the long term impact of individuals and their papers.

Thus we suggest ranking some journals 'unambiguously' into a tier. Others may then be viewed as 'probably' in a given tier or' possibly' so. This implies that if one wants to evaluate a paper in a journal ranked in one of the two latter categories then it should best be looked at by the evaluator.

Co-funded by the
Erasmus+ Programme
of the European Union

Table 1: Listing of 4* papers, probable and possible 4* papers

	Keele	Prob. Keele	ESA	Predict-Keele	Prob ESA	ARC ESA	ABS: '10	ABS: '09	Adjusted
4s									
American Economic Review	4	0.973	4	4	0.999	4	4	4	4
Journal of Economic Theory	4	0.97	4	4	0.946	4	4	4	34
Quarterly Journal of Economics	4	0.958	4	4	0.997	4	4	4	4
Journal of Political Economy	4	0.934	4	4	0.985	4	4	4	4
Journal of Finance	4	0.928	3	4	0.997	4	4	4	4
Econometrica	4	0.927	4	4	0.986	4	4	4	4
Review of Economic Studies	4	0.895	4	4	0.953	4	4	4	4
Games and Economic Behavior	4	0.84	4	4	0.81	4	4	4	3
Journal of Financial Economics	3	0.824	4	4	0.982	4	4	4	4
Review of Economics and Statistics	4	0.811	4	4	0.962	4	4	4	4
Review of Financial Studies	3	0.787	4	4	0.936	4	4	4	4
Econometric Theory	3	0.702	4	43	0.647	4	3	3	3
Economic Theory	3	0.693	4	43	0.559	4	3	3	3
Economic Journal	3	0.678	4	4	0.919	4	4	4	43
Journal of Economic Literature	4	0.665	4	4	0.943	4	4	4	4
Probable 4s									
Journal of Economic Perspectives	4	0.586	4	4	0.95	4	4	4	43
Journal of Econometrics	4	0.578	4	4	0.914	4	4	4	43
Journal of Monetary Economics	4	0.53	4	4	0.856	4	4	4	43
Possible 4s									
J. of the American Statistical Association	4	0.499	4	4	0.907	4	4	4	34
Journal of International Economics	3	0.471	4	4	0.848	4	3	3	34
International Journal of Game Theory	3	0.466	3	34	0.362	2	.	.	32
Journal of Public Economics	3	0.425	4	4	0.775	4	3	3	34
Journal of Labor Economics	3	0.423	4	4	0.795	4	3	3	34
RAND Journal of Economics	3	0.414	4	4	0.791	4	3	3	34

Co-funded by the Erasmus+ Programme of the European Union

Examining Research Productivity in the UK

The UK has probably progressed further along the line of evaluating research productivity than any other country. The UK's 2014 research Excellence Framework (REF) was the latest in a series of exercises seeking to evaluate the quality of research done in UK universities across 36 subject areas – termed units of assessment (UoAs).

The UoAs included physics, chemistry, mathematics, economics, music and sociology. This continues a series of such exercises which began in the 1980s. The next REF is scheduled for 2021.

An innovation in REF2014 was the provision for impact of academic research, as a measure of research quality. The broad definition of research impact was "*an effect on, change or benefit to, the economy, society, culture, public policy or services, health, the environment or quality of life*" (REF rules). Through the use of case studies, submitting institutions were required to illustrate the impact of their research, and identify that this research had made a demonstrable difference in terms of economic, social and cultural impact.

Co-funded by the Erasmus+ Programme of the European Union

The REF

Each academic entered in the REF was allowed to submit four papers. In economics there were 2600 individual pieces of work submitted.

Each entry to a UoA was scrutinised by a sub-panel working within the framework of 4 main panels – A-D. Economics was in Panel C along with the other social sciences.

The main scrutiny was on the quality of academic research contributions, primarily journal articles and books, which were individually looked at and assessed by panel members.

Each submission was also accompanied by a research environment statement and a number of case studies which highlighted the impact of the university's research on society or the economy, widely defined.

Co-funded by the Erasmus+ Programme of the European Union

The REF

The sub panels consisted of about eight people, academics from different universities. Their job was to assess each submission. This means each publication submitted to the REF had to be given a ranking of between 1 and 4, 4 being the highest. In economics there were about 2600 publications to evaluate.

Informally panel members say they could not fully read each paper. Formally the panels say they do not use lists. Then how did they evaluate the papers they do not read? It seems likely that they did use some form of list, even if it is only one inside their own head. If available, they might also have used citations, although for a new paper these are of limited use.

Co-funded by the Erasmus+ Programme of the European Union

Maximising Citations

I analysed the data for REF2014 in terms of the titles of the journal papers submitted (Hudson, 2016).

Co-funded by the
Erasmus+ Programme
of the European Union

Table 2. Characteristics of journal paper titles in the UK REF.

	Length	citat-ions	colon %	? %	Papers %	Word length
Health Sciences (A)	103	11	24.09	2.843	99.52	7.65
Public Health	112	12	58.12	6.278	99.64	7.40
Sciences (B)	89	12	17.25	1.391	99.03	7.78
Physics	77	17	14.73	1.522	99.05	7.50
Maths & Computing	69	4	13.61	0.84	86.97	7.76
Social Sciences (C)	85	5	54.29	12.40	80.07	7.33
Economics	64	2	30.41	9.35	91.79	7.47
Arts & humanities (D)	78	12	62.10	7.48	38.88	7.05
Philosophy	46	na	23.31	9.07	61.67	7.44

Notes: Columns: (i) median character length of title, (ii) median citations, (iii) % using a colon, (iv) % using question mark, (v) % of submissions that are journal papers, (vi) median word length, Health sciences exclude public health, sciences exclude physics, maths and computing, social sciences exclude economics and arts & humanities exclude philosophy. Source: calculated from data on journal papers in the REF.

Co-funded by the Erasmus+ Programme of the European Union

Maximising Citations

The different working patterns of academics as reflected in their journal titles is interesting, but are there any implications?

The answer is yes. The results of regressing citations, where available, on these title characteristics are shown in table 3.

Co-funded by the
Erasmus+ Programme
of the European Union

Table 6 Regressions on citations

	number of authors	colon	question mark	title length	F	Observations
Panel A						
Clinical Medicine	30.923**	10.833**	-15.892**	-27.438**		
	(13.13)	(6.29)	(3.74)	(10.00)	101.92	11945
Public Health	30.955**	0.689	-11.045**	-22.551**		
	(10.90)	(0.28)	(3.26)	(5.48)	35.75	4262
Allied Health	14.294**	-0.552	-3.939**	-7.421**		
	(9.44)	(0.78)	(3.28)	(5.69)	69.63	9404
Psychology	22.175**	1.655	-0.754	-8.346**		
	(11.20)	(1.59)	(0.42)	(4.87)	95.98	7984
Biological Sci	21.873**	8.066**	-3.432	-29.908**		
	(10.21)	(2.64)	(0.99)	(11.06)	81.12	7869
Agriculture	17.813**	3.329*	-5.025	-6.788**		
	(5.75)	(2.51)	(1.91)	(4.17)	24.49	3677

Notes: The coefficients, t statistics in (.) and F statistic on number of citations in a Tobit regression with a lower bound of zero. **/* denotes significance at the 1%/5% levels. Standard errors corrected for heteroscedasticty

Co-funded by the Erasmus+ Programme of the European Union

	number of authors	colon	question mark	title length	F	Observations
Panel B						
Earth Sys	15.861**	0.189	-5.169	-18.051**		
	(5.26)	(0.14)	(1.85)	(7.18)	43.82	4700
Chemistry	8.921**	-1.786	-3.740	-5.709**		
	(3.42)	(1.42)	(1.10)	(3.47)	73.18	4352
Physics	7.442**	17.035**	-5.843	-17.821**		
	(7.04)	(2.80)	(1.26)	(6.55)	27.62	5538
Comp Sci	10.037**	2.044	-2.206	-1.963		
	(6.69)	(1.63)	(0.88)	(1.34)	33.22	5158
Panel C						
Geography	19.387*	-2.789	0.895	-14.071*		
	(2.19)	(0.67)	(0.15)	(2.44)	2.137	46
Economics	5.321**	2.739**	2.024	-4.174**		
	(5.20)	(3.15)	(1.49)	(3.28)	22.05	1988
All panels	0.505**	0.106**	-0.169**	-0.452**	143.09	
	(24.04)	(5.00)	(4.78)	(16.19)		62,235

Citations tend to increase with the number of authors, the use of a colon in the title and decline with title length.

Co-funded by the Erasmus+ Programme of the European Union

The Role of the Title

The answer as to why we get these results lies in the purpose of a title.
It is there to both attract a reader's attention and to convey information.

The longer a title is, the more difficult it is to absorb information., although intuitively the title can also be too short.

The use of a colon helps split the title. The first part to attract attention and the second to provide information, thus achieving both the purposes of the title.

The more authors there are the more chances there are for self citations, or publicising the paper. Although it is not impossible that paper quality increases with author numbers, at least to a certain extent.

Co-funded by the Erasmus+ Programme of the European Union

Maximising Citations

This discussion should alert us to the need to think carefully about each and every aspect of a paper. We write to influence people, we should want to maximise that impact.

Apart from considering the title, the following are also important. Key words, the context of the abstract will be picked up by Web search engines.

Your abstract should reiterate key words from the title, and use common phrases from your field to connect with other researchers interested in this topic.

The abstract is where you sell the title. On search engines many people read the abstract but never download the paper. Use the abstract to sell your paper.

Co-funded by the
Erasmus+ Programme
of the European Union

Further hints

There is research to suggest that more references will increase citations. Why? Because the people you cite will pick up on this. This will make them aware of your research, and they are in a similar field, and they may return the citation in their own work. Once the paper is published, continue to sell it. You can do this via social media. , write a blog, write a newspaper article,

Co-funded by the
Erasmus+ Programme
of the European Union

Writing a paper to maximize citations

Create web-friendly text. Optimizing your article for search engines will greatly increase its chance of being read, and cited. The key areas you need to optimize are the title and abstract, which are free to read online.

Abstract Your abstract should reiterate key words from the title, and use common phrases from your field to connect with other researchers interested in this topic.

Co-funded by the Erasmus+ Programme of the European Union

Non-academic impact

This section is based on Khazragui and Hudson (2014). An economic impact exists when it affects the welfare of consumers, the profits of firms or the revenue of government(s). The counterfactual is a critical concept. What would have been the scenario if the research did not exist, subtract that from the situation we have and that is research impact. And that is very difficult if not impossible to calculate

The scope of economic impacts ranges from those easily quantifiable, in terms of greater wealth, cheaper prices and more revenue, to those less easily quantifiable in monetary terms, such as the effects on public health, the environment, or the quality of life (QOL).

Co-funded by the Erasmus+ Programme of the European Union

Non academic impact

The REF panel guidelines offered examples of impact . Those which related to the sciences, specified impacts “that have provided benefits to one or more areas of culture, the economy, the environment, health, public policy and services, quality of life, or society, whether locally, regionally, nationally or internationally”.

Specific examples were given which included: (i) a spin-out business, (ii) informing policy decisions or changes to legislation, regulations or guidelines, (iii) informing the awareness, attitudes or understanding of the public, (iv) a new drug, treatment or therapy that has been developed, trialled with patients, or adopted, (v) improving the quality of life in a developed or developing country by new products or processes and (vi) changing the management of an environmental risk or hazard.

Co-funded by the Erasmus+ Programme of the European Union

Non academic impact

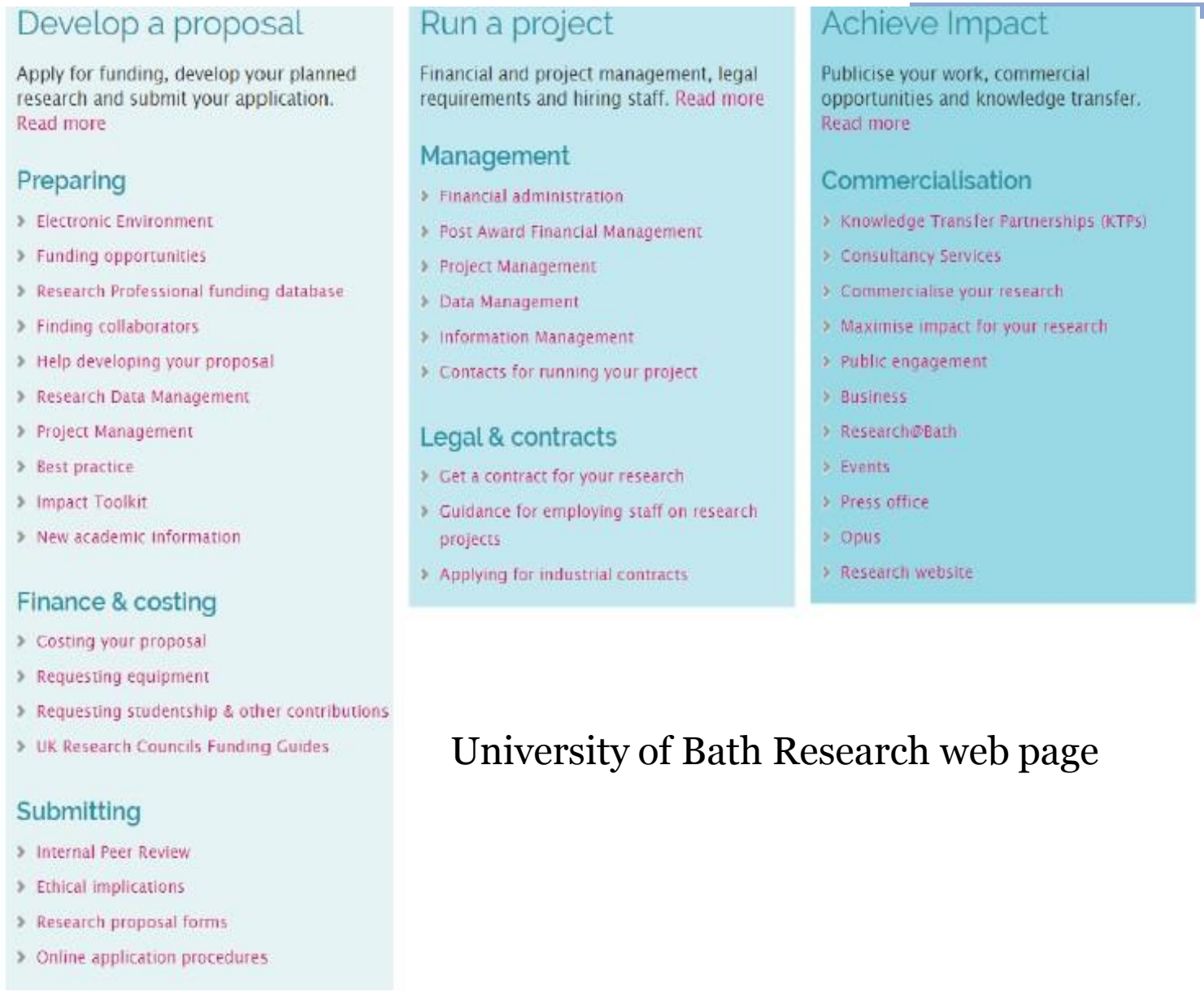
The Guidelines emphasised that all types of impact would be considered equitably in terms of the assessment of the 'reach' and 'significance' achieved during the assessment period and that there is no spatial discounting. Thus all research impact counted equally and improving lives in the UK counted the same as improving lives in other countries. This is in the best of academic traditions of course, but given that the whole exercise is driven by the need to justify UK taxpayers expenditure, one wonders if it is appropriate.

Co-funded by the
Erasmus+ Programme
of the European Union

Supporting and Evaluating Academics in UK Universities

Most, if not all UK universities, have a period of probation for new academics, that is academics who have not previously taught at another university. This is often three years but can be extended. Academics are required to complete a course where they are taught how to teach and how to do research. Not everyone gets through probation. Frequently some form of conditions have to be met, fulfilling minimum publishing targets such as one or two three * publications – difficult enough for a normal academic in a three year period. Grants too have to have been at least applied for, if not secured.

Co-funded by the Erasmus+ Programme of the European Union



Develop a proposal

Apply for funding, develop your planned research and submit your application. Read more

Preparing

- Electronic Environment
- Funding opportunities
- Research Professional funding database
- Finding collaborators
- Help developing your proposal
- Research Data Management
- Project Management
- Best practice
- Impact Toolkit
- New academic information

Finance & costing

- Costing your proposal
- Requesting equipment
- Requesting studentship & other contributions
- UK Research Councils Funding Guides

Submitting

- Internal Peer Review
- Ethical implications
- Research proposal forms
- Online application procedures

Run a project

Financial and project management, legal requirements and hiring staff. Read more

Management

- Financial administration
- Post Award Financial Management
- Project Management
- Data Management
- Information Management
- Contacts for running your project

Legal & contracts

- Get a contract for your research
- Guidance for employing staff on research projects
- Applying for industrial contracts

Achieve Impact

Publicise your work, commercial opportunities and knowledge transfer. Read more

Commercialisation

- Knowledge Transfer Partnerships (KTPs)
- Consultancy Services
- Commercialise your research
- Maximise impact for your research
- Public engagement
- Business
- Research@Bath
- Events
- Press office
- Opus
- Research website

University of Bath Research web page

Co-funded by the Erasmus+ Programme of the European Union

will be using it.

Dr Marianne Ellis
Chemical Engineering

School of Management

BATH

Top Tips for Impact

PLAN for impact in your research design	**ENGAGE** non-academic stakeholders in your research	**EVIDENCE** your impact as you go
• Plan for impact at an early stage of your research design	• Identify your stakeholders/ audiences and think about why they might want to engage with you	• Keep documents that show how people have engaged with, and benefited from, your research
• Remember that in your grant application you can cost in impact activities	• Consider why, when and how you will engage with each group	• Work with the Press Team so they can capture your media coverage
• Consider the wide range of activities that can enhance impact (see the Impact Gateway)	• Think through what you want to happen as a result of your engagement	• Record evidence on Pure

Co-funded by the
Erasmus+ Programme
of the European Union

REPESEA

Events

Shut-Up and Write

A drop-in session to work on your proposal, consult with Research and Innovation Services (RIS) research development staff while enjoying tea, coffee and snacks.

Date: Monday 4 September 2017
Time: 10:15am-1:05pm
Location: 8W 4.23

European Events
European Commission events

@Home with Horizon 2020: upcoming 2018-2020 funding period

Dr Caroline Ang, European Research Development Manager, will give a brief introduction to the Horizon 2020 programme. She will focus on the next funding period covering 2018-2020, present highlights from the upcoming calls and discuss how to get involved.
Date: Thursday 7 September 2017
Time: 11.15am to 12.05pm
Location: 8 West 2.1
Please register by Wednesday 6 September.

Wellcome Trust Visit

Roger Blake, Grants Liaison Manager from the Wellcome Trust, along with Senior Portfolio Managers, will be providing an overview talk. This will be followed by lunch and then three parallel workshops.
Date: 27 September 2017
Time: 11:30 am
Location: CB 5.1
Further information and registration.

Co-funded by the Erasmus+ Programme of the European Union

Conclusions

There is no closely guarded secret to achieving academic success. In economics, write an innovative paper with interesting and relevant conclusions and publish in a top journal. Then go out and advertise the paper in conferences, social media, etc.

I sometimes hear such advice and think, I already know this, but getting into top journals is not easy. Getting into any journal is not easy.

For economics, rightly or wrongly, technique is critical. Either mathematical technique or econometric technique. If you go down the former road learn Mathematica and Matlab, and read one paper from the *Journal of Economic Theory* or the *Review of Economic Studies* every three months or so and then write papers in a similar manner. If you choose the econometric route, get STATA or EVIEWS, or perhaps R.

Co-funded by the Erasmus+ Programme of the European Union

Conclusions

- Become adept in their use. But don't just use a technique everyone else is using, look at some new innovative technique from *Econometrica* or the *Review of Economics and Statistics*. Think too about looking at maths or statistics journals and going to maths or statistics seminars. This sounds like a lot of work, but having mastered some technique you can then use that for perhaps a decade, before it becomes dated.
- But never forget that technique should always be a means to an end. The end is to analyse some economic or social problem. The means, is the most sophisticated analysis that can be done. This quantitative sophistication is the hallmark of the economist. But at the end of the day, you should be able to say in words, this is what my paper has contributed to human knowledge.

Co-funded by the Erasmus+ Programme of the European Union

References

Hudson, J. (2016). An analysis of the titles of papers submitted to the UK REF in 2014: authors, disciplines, and stylistic details. *Scientometrics*, *109*(2), 871-889.

Khazragui, H., & Hudson, J. (2014). Measuring the benefits of university research: impact and the REF in the UK. *Research Evaluation*, *24*(1), 51-62.

Hudson, J. (2013). Ranking journals. *The Economic Journal*, *123*(570).

Co-funded by the Erasmus+ Programme of the European Union