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Collaborating internationally

IN last month's *Postgraduate*, we showed how many times scientific papers had been cited. To recap, a citation takes place when a researcher refers to your scientific paper in his own research.

Citations are one way to measure the impact of your research. As papers are generally cited in a positive way, they indicate that your research is useful.

There are other ways that indicate your research's impact, such as generating intellectual property, commercialising the output of your research or informing government policy, but citations to academic papers remain an important measure.

Generally, researchers strive to have more citations as they can help with job applications, promotions and recognition from the scientific community that your research is important.

Studies have shown that citations increase if you collaborate with international partners – one 2013 study showed that citations increased the more geographically distant the institutions are.

It is unsurprising that the number of internationally co-authored papers doubled between 1990 and 2000 – a trend that continued after 2000, no doubt due to the Internet easing collaboration when writing scientific papers.

The table below shows how often researchers from Malaysia's institutions co-author papers with international partners. It features a sample of Malaysian universities and research institutes from both the public and private sector.

The statistics are compiled using SciVal, a popular academic tool that enables easy comparison of this type of statistics. It also enables other researchers to verify the analysis, which is important as academics like to be able to reproduce the results of any study.

Last month, we looked at the number of citations per paper. This month, we used SciVal to report the percentage of scientific articles co-authored by researchers from different countries.

The table reports a five-year period (2012 to 2016) and shows the percentage of papers written by the respective institutions with authors from more than one country. The overall average is also provided.

The first observation we can make is that the percentage of co-authored papers with international colleagues generally increases year on year.

If we extend the analysis back a few years, this trend is also apparent. In fact, all the institutions, apart from one, had a higher percentage of internationally co-authored



By PROF GRAHAM KENDALL

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papers last year than they did in 2012.

Based on the overall percentage, it is good to see that private universities, public universities and research institutes all figure in the top few places. This means that the top places are not dominated by, for example, Malaysia's research institutes.

This gives some confidence that all three sectors are contributing to the research landscape of Malaysia with regards to international collaborations.

It is particularly pleasing to see, from a personal perspective, that The University of Nottingham Malaysia Campus (UNMC) is featured so highly. It is only a small measure of what we do, but a measure that is considered increasingly important.

The question remains: are the statistics reported last month (citations per paper) and this month (international collaborations) correlated, as previous studies suggest should be the case? To answer this question definitively would require a much larger study than we have done here and a more rigorous analysis, but eyeballing the two sets of data does suggest a correlation.

The take-home message appears to be that international collaborations are important and Malaysian research entities, in all their forms, are improving year-on-year using this measure.

This bodes well for the sustainability of the country's research and shows that we are collaborating internationally more than ever before.

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Institution	Collaboration (%)					
	Overall	2012	2013	2014	2015	2016
The University of Nottingham Malaysia Campus	49.9	38.1	46.5	51.8	51.5	56.4
Universiti Malaya	47.4	44.7	41.9	45.6	50.1	53.1
Sunway University	47.3	45.6	43.0	39.0	51.5	52.2
Universiti Putra Malaysia	36.2	31.9	35.5	38.2	36.2	38.8
Forest Research Institute Malaysia	35.9	28.2	30.8	43.6	32.5	44.2
Universiti Teknologi Malaysia	35.7	34.4	33.0	34.3	35.5	40.7
Universiti Sains Malaysia	35.3	34.1	32.7	36.5	38.3	35.2
Taylor's University Malaysia	33.5	33.8	25.9	34.0	34.6	37.1
Institute for Medical Research Kuala Lumpur	31.0	27.9	32.6	30.7	28.2	35.6
Universiti Teknologi Petronas	26.8	22.3	25.4	24.0	34.4	28.5
Universiti Kebangsaan Malaysia	26.0	20.7	24.2	26.9	26.5	32.0
Malaysian Agricultural Research and Development Institute	21.5	33.3	18.9	16.4	28.1	15.2
Malaysian Palm Oil Board	16.7	9.9	13.9	16.7	17.7	22.7

Percentage of internationally co-authored research papers by institutions in Malaysia.