

Headline	Measuring research impact		
MediaTitle	The Star		
Date	18 Apr 2017	Color	Full Color
Section	StarSpecial	Circulation	338,368
Page No	P3	Readership	1,032,000
Language	English	ArticleSize	461 cm <sup>2</sup>
Journalist	PROF GRAHAM KENDALL	AdValue	RM 23,200
Frequency	Daily	PR Value	RM 69,600



# Measuring research impact

WHEN you write a scientific paper, you position it in the context of previous research. That is, you build on the work of others and do not reinvent the wheel.

If you look at any scientific paper, you will see a list of papers that have been referenced or cited in the main body of the paper.

These citations are considered important in the context of the paper and recognise the contributions of previous researchers.

Once a paper has been accepted into the scientific archive, every researcher's hope is that other academics will read and cite the paper.

Having your paper cited is receiving the recognition that somebody else believes your research is important. Of course, they may have found some flaws in the research being reported but, more often than not, papers are cited for their positive contribution.

Citations are often referred to in terms of the impact factor, as having a paper cited demonstrates that the research is having an impact in the scientific community.

Using impact factors is not without its problems, and they are often controversial, but it is one of those measures that will be used whether you agree with them or not.

There are many ways to calculate impact factors. One way is to calculate how many times a group of papers has been cited. One of the obvious groupings is to consider all of the papers written by a university or a research institute in a given year.

The table below shows this measure for a few universities and research institutes in Malaysia in the past five years, with the combined average also shown.

Due to space constraint, the table only shows five research universities, four research institutes and one private university.

The statistics were created using a standard tool (SciVal) that is available in most universities, so the figures are an independent measure that can be verified by others.

To provide an example on to how to read the table, papers written at the Institute for Medical Research (IMR) in 2012 have been cited 11.5 times on average.

You will notice a decrease in the citation

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count for papers written more recently as they have not been available for as long and are, therefore, not as highly cited.

Over the last five years, each IMR paper has attracted an average of six citations. The table is sorted according to overall value.

The five Malaysian research universities listed in the table appear above the other 15 public universities in the full data table (not shown here).

This is expected given the investment that has been made in Universiti Malaya, Universiti Sains Malaysia, Universiti Putra Malaysia, Universiti Teknologi Malaysia and Universiti Kebangsaan Malaysia.

It might come as a surprise that one of the country's research institutes tops the overall table, rather than a university. All credit to IMR for its performance over the past five years.

It is also pleasing to see The University of Nottingham Malaysia Campus (UNMC) perform well – something we are proud of given that we only established our Malaysia campus in 2000 and did not start significant research activity until 2005.

An obvious omission from the table is Monash University Malaysia (MUM). As it is not represented explicitly on SciVal, we cannot easily make a comparison. However, based on other forms of analysis, MUM and UNMC perform equally well.

As mentioned above, these figures have to be read with caution as there are many other metrics that we could use, but tools such as SciVal enable easy comparison across different institutions. Deeper analysis and the use of other metrics might be even more illuminating.

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Institution	Overall	2012	2013	2014	2015	2016
Institute for Medical Research (IMR)	6.0	11.5	6.9	4.9	2.3	2.7
Universiti Malaya (UM)	5.1	8.7	7.6	6.1	3.7	1.1
The University of Nottingham Malaysia Campus (UNMC)	4.4	10.0	6.5	4.6	2.5	0.8
Forest Research Institute Malaysia (FRIM)	4.3	6.3	5.6	7.4	2.0	0.5
Universiti Sains Malaysia (USM)	3.7	6.6	5.4	3.4	1.9	0.5
Universiti Putra Malaysia (UPM)	3.5	6.7	4.8	3.3	1.9	0.5
Universiti Teknologi Malaysia (UTM)	3.1	6.2	5.0	3.2	2.0	0.5
Universiti Kebangsaan Malaysia (UKM)	3.0	4.9	4.0	2.9	2.1	0.4
Malaysian Agricultural Research and Development Institute (Mardi)	2.7	5.1	3.3	3.2	1.9	0.3
Malaysian Palm Oil Board (MPOB)	2.5	4.1	4.3	3.2	1.7	0.2

Institutions and the average times their research papers have been cited in a year.

