Title:	The use of FWCI as a metric at UCC
Author:	David Hogan Data & Institutional Research Officer On behalf of the UCC Research Impact Working Group.
Summary:	This paper helps to inform the research community on the appropriate use of Field-Weighted Citation Impact (FWCI) and shares practical guidance and some high-level guiding principles to adhere to, for its use at UCC

The purpose of this short paper is twofold. Firstly, to help inform the research community on the appropriate use of Field-Weighted Citation Impact (FWCI). Secondly, to share practical guidance and some high-level guiding principles to adhere to, for its use at UCC.

Background:
Regarding the bibliometric element of the assessment of research output, FWCI is widely used as a proxy to assess research impact and/or research quality.
Elsevier's FWCI, indicates how the number of citations received by an entity's publications compares with the average number of citations received by all other similar publications in the data universe (field): how do the citations received by this entity's publications compare with the world average?
It is a metric used to assess **the relative citation impact of a researcher's publications compared to others in the same field.** It adjusts for factors like differences in citation patterns across disciplines, research types, and publication years, offering a more normalized view of citation impact.

How it works:

- **A FWCI of 1.00** indicates that the entity's publications have been cited exactly as would be expected based on the global average for similar publications; the FWCI of "World", or the entire Scopus database, is 1.00.
- **A FWCI of more than 1.00** indicates above the global average for similar publications; for example, 2.11 means 111% more than the world average.
- **A FWCI of less than 1.00** indicates below the global average for similar publications; for example, 0.87 means 13% less than the world average.

Similar publications are those publications in the Scopus database that have the same publication year, publication type, and discipline, as represented by the Scopus journal classification system. The discipline is defined by the Scopus ASJCs given to an article via the journal in which it is published.

SciVal often displays FWCI in a chart or table with years. These years are always the years in which items were published, and do not refer to the years in which citations were received. The citations received in the year in which an item was published, and the following 3 years, are counted for this metric.

The key caution is that the research community should be careful when using it in situations where the entity (e.g. a Researcher, Group, School, College) has a small number of publications over the period. A few highly cited publications can really skew the FWCI value.

It is generally accepted (and suggested in Elsevier's guidance) that it is not used in circumstances where the size of the dataset is less than 1,000 publications.
Also, it should not be used (or at least used with caution) when most the entity's research outputs are skewed towards the recent past. This can lead to volatile movements in FWCI numbers.

For this reason, FWCI is generally used as a 5-year (or more) rolling cumulative figure and annual assessments of FWCI are generally avoided.

There are numerous **merits and demerits** of FWCI:

Merits of FWCI:

1. **Field Normalization**: FWCI adjusts for disciplinary differences in citation practices, allowing comparisons between researchers from diverse fields. This makes it more fair than raw citation counts, especially when comparing fields with vastly different citation rates.
2. **Publication Context**: It accounts for the context of a publication, factoring in the field, year, and document type, making it a more nuanced measure than just citation count.
3. **Balanced Metric**: Unlike metrics like the h-index, which are influenced by both productivity and impact, FWCI primarily reflects the impact relative to what is expected within a field, giving a clearer picture of the true citation impact.
4. **Reflects Quality**: It emphasizes how often a publication is cited compared to others in the same field, focusing on the quality of a paper's influence rather than its sheer quantity of citations.
5. **Useful for Comparing Across Institutions**: FWCI can be useful for comparing the research outputs of institutions, countries, or individual researchers across different disciplines, as it adjusts for the varying citation behaviours in those fields.

Demerits of FWCI:

1. **Dependent on Accurate Field Classification**: The accuracy of FWCI relies on the correct classification of research into fields, which can sometimes be subjective or imprecise, especially for interdisciplinary research.
2. **Overemphasis on Citations**: Like many citation-based metrics, FWCI could encourage a focus on publishing work that is more likely to be cited, potentially encouraging quantity over quality, or promoting certain research areas over others.
3. **Ignores Non-Citation-Based Impacts**: FWCI doesn't capture non-citation-based measures of research impact, such as societal or policy impact, or influence on teaching and practice.
4. **Potential for Manipulation**: Researchers or institutions might proactively endeavour to positively skew the number through narrow citation strategies, as opposed to the focus on quality work and scientific advancement.
5. **May Overestimate Impact in Small Fields**: FWCI might overestimate the impact of research in smaller or less-cited fields where citation practices are less robust, as fewer papers might skew the expected citation count for that field.
6. **Publication Bias**: It might also favour publications in certain high-impact journals or conferences, ignoring the significance of work published in less-cited but still valuable outlets.

And of course, FWCI as a metric (similar to other Elsevier metrics) will only pick up output from source titles that are indexed in Scopus. In some subject areas Scopus coverage is not as strong as in other areas and disciplines.

In summary, while FWCI provides a more normalized and fair comparison across disciplines, it also has limitations tied to citation bias and field-specific challenges.

The practical application of FWCI

As so many universities around the world use both the Scopus database and Scival tool from Elseiver, FWCI has become an 'accepted standard' in bibliometrics, in the assessment of research output and performance. Scival allows for the assessment of research outputs from the researcher level up to an including to the institution level. FWCI (or derivatives of it) also feed into many university ranking mechanisms.

In the Irish context, FWCI is used a benchmarked datapoint in the HEA Systems Performance Dashboard. In UCC, it is a Key Performance Indicator (Measure of Success) in the current Strategic Plan – Securing our Future 2023-2028 and was also included in the Strategic Plan 2017-2022.

Conclusion & Recommended Principles for its appropriate use:

UCC is committed to the responsible use of metrics. FWCI should not be over-relied upon as a measure of research impact or research quality at UCC and works best when used alongside other metrics and qualitative assessments.

- **Appropriate Level**: In the UCC context, FWCI is most applicable to instances where the entity being assessed is the University, College, School, Research Institute, UCC Futures Area etc., and where the publication set is > 1,000 papers over the given period.
  FWCI should not be used for purposes of assessment at the individual researcher level.
- **Appropriate Domain**: Like all metrics, FWCI may have less relevance in some domains as opposed to others. For example, in the Arts and Humanities, it may be less relevant than in the Life or Natural Sciences. While it may be used to measure performance (over time) in any single domain, we should avoid cross-domain comparative analysis. i.e. comparing one college to another.
- **In Scope or Out**: In circumstances where an entity does not have more than 1,000 publications over a period, FWCI should only be used in exceptional circumstances. Such as if the entity has close to 1,000 publications. Other metrics relating to research impact and quality could be used to supplement your quantitative and qualitative analysis.
- **Scival Tool Use**: When using FWCI for an entity (other than the Institution) remember to switch on the home institution button, such that publications attributed to UCC only inform the metric. Ensure that underlying data underpinning the entity being assessed, is as accurate as possible.
- **Time Period**: FWCI should be used by examining a 5-year (or more) cumulative, period of time. We should avoid the use of annualised FWCI numbers where possible.

All metrics and/or summative-type performance assessments should be balanced in equal measure by qualitative assessment.

David Hogan
Data & Institutional Research Officer

On behalf of the UCC Research Impact Working Group:
Donna O Doibhlin (Chair), Hardy Schwamm, David O'Connell, Siobhan Cusack, Sean Lucey, Allen White, Lindie Van Rensburg, Eoin Gunnigle, Martin Galvin, David Hogan, Helene O'Keeffe, Sarah O'Connell, Felicity Lee, Julie O'Donoghue.