UbuntuNet CONNECT 2017

Research Metrics: Does it matter in the African scholarship and collaboration?

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Objectives of the paper

1. Examine the trends in research evaluation
2. Investigate the strengths and weaknesses of research metrics in research evaluation
3. Identify areas of collaboration in the use of research metrics in the African region.

Outline of the paper

- Introduction
  - Background
  - The Problem (dilemma)
- Methodology
- The Findings
  - Current trends in Research evaluation Overview
  - Strengths/Benefits of research metrics in research evaluation (benefits)
  - Weaknesses/barriers in the use of metrics
  - Areas of collaboration in research metrics in the African region
- Discussion and conclusions
- Recommendations

Introduction

Background

- In the last 50 yrs: An exponential growth in scientific and knowledge expansion
- In the recent past there has been interest in the trends in research in Africa
- Spending in R&D is on the rise in sub-Saharan countries driven by investments by both public and private investment (UNESCO, 2015)

Introduction

Background

- Research in sub-Saharan increased in both quality and quantity, with increased global share from 0.44% to 0.72% between 2003-2012 (World Bank, 2015)

- During the same time the share of the world's articles with African authors almost doubled from 1.2% to around 2.3%

Introduction

Background

- Africa's outputs overall and as a share of total articles globally, that the continent is starting to emerge scientifically onto the world stage. (Schemm, 2013)

- In the same report it was however noted that research in Africa relies mostly on international collaboration with limited intra regional collaboration.

Background

- Amidst of the this growth humongous resources are annually expended into the research sector

- Therefore research assessment/evaluation is an critical element of the research ecosystem:
  - ROI of investment in research,
  - Sustainability of the research ecosystem
  - Performance to justify certain decisions regarding resource allocation and career promotions

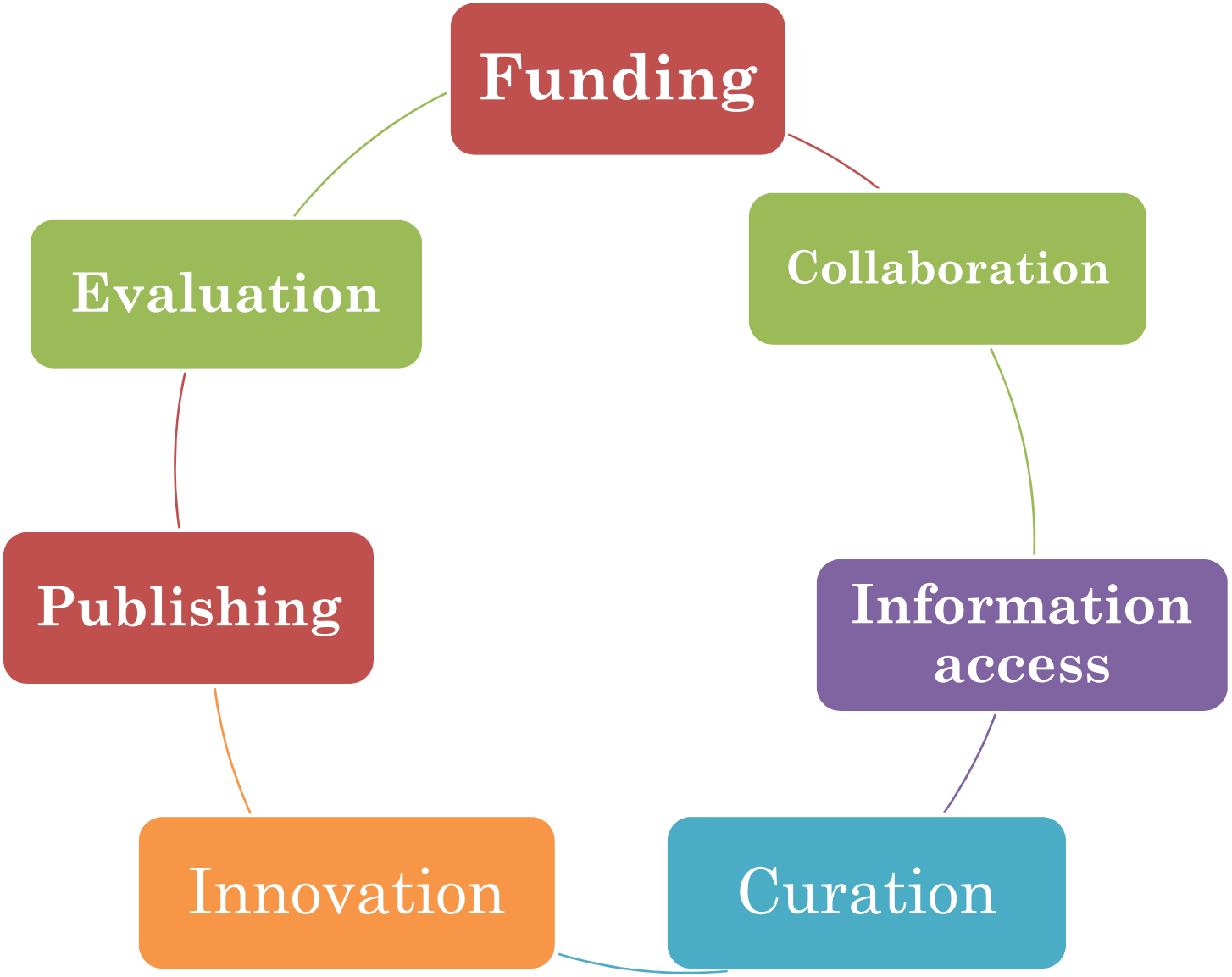
Introduction

Background

- Research assessment also includes:
  - ❖ Evaluation of research quality
  - ❖ Measurements of research inputs, outputs and impacts,

- Qualitative and quantitative methodologies, including the application of bibliometric indicators and peer review.

Figure 1: Research Ecosystem (Process view)



Background

- It measures the research performance in terms of the impact it has within the academic community and beyond.

- **Research funding agencies** are keen to judge the merit of research proposals on:
  - Intellectual merit and
  - Broader impact
  - Possible output and
  - Cost factors

- **Researchers** need to demonstrate the academic, societal and economic impact of their research.

The Problem: Peer review Vs Metrics

- In recent times there has arisen heated debate on the best way to assess both the quality and impact of research

- Notably there is a growing focus on research metrics in the evaluation of research (Woulters, 2014)

- The key dilemma as been the choice between **peer review and research metrics** (Kostfoff, 1997)

The Problem: Peer review Vs Metrics

- **Peer review: E**xpert review practices for e.g.
  - Journal review of manuscripts,
  - Applications for research funding
  - Application for career promotions,
  - National peer review-based research assessments.
- **Research metrics: A** variety of measures and statistical methods for assessing the quality and impact of research based on
  - Bibliometrics (metadata, citations, usage, etc.
  - Alternative metrics,

The Problem: Peer review Vs Metrics

- However there remains contestation on the production and application of research metrics, (Kostof, 1997; Wilson, 2015)
- A subsidiary dilemma but equally critical especially with the rising popularity of alternative metrics
  - **Which metrics are most appropriate with what implication for the research ecosystem.**
  - **What is the best way forward in the use of research metrics in the African region**

The Problem: Peer review Vs Metrics

Bibliometrics

- **Citations**—the number of peer-reviewed papers that refer to a researcher's peer-reviewed, published articles
- Proxy for the attention granted to a candidate's work by colleagues.
- Funding bodies and university promotion committees, among others, use citations to evaluate scientists and the impact of their work. (WoS, Scopus, Scival, Google scholar)

Taxonomy of Bibliometrics (Examples)

Metric	Description
Citation count (h-index, g-index, hg-index, JUF, JIF, Eigen factor	Absolute number of citations per publication
Field-weighted citation impact (FWCI)	Normalised citations using benchmark in that field.
Source-normalised impact per paper (SNIP)	Ratio of citation count and citation potential in that subject field.
SCImago Journal Rank (SJR)	The scientific influence of journals, accounting for citation count and importance of journal citation.
Collaboration	More than one author from different countries.

The Problem: Peer review Vs Metrics

- **Altmetrics?**
  - Measure of the number of times a research paper gets cited, tweeted about, liked, shared, bookmarked, downloaded, mentioned, reviewed, or discussed in the social web to assess its popularity or societal impact

Taxonomy of research metrics

- These data are collected from a wide variety of
- **Social-web services** e.g. open access journals, scholarly citation databases, web-based research sharing services,
  - Examples: Altmetrics, Impact Story, Researchgate and Academia (Kulkarni, S. (2015))
- **Social media platforms such as tweets**, Facebook pages, blogs, YouTube and news media.

Altmetrics

Metric	Description
MendeleyRead	Number of Mendeley article bookmarks and article sharing.
SciDir_Dwnld	Number of ScienceDirect publication downloads or full-text views.
Tweet	Number of times tweeted (this is not restricted to the reference REF dates).
GS_count	Number of times cited on Google Scholar (this is not restricted to the reference REF dates).

Methodology

- This paper is based on a systematic review of current literature undertaken to achieve the stated purpose and objectives.
- There dire absence of literature on use of metrics in the African region as well as local approaches to research assessment, including the role of quantitative indicators.
- Based on the existing literature, this paper investigates the possible implication and make some recommendations on the same

Current Trends in Research Evaluation

- **Key highlights**

- High use of existing multidisciplinary indexes to generate citation metrics (Thomson Reuters web of science, Elsevier Scopus, Google scholar). **However the usefulness/relevance of these metrics is being questioned globally**
- Increased use of Almetrics to gauge individual research performance using metrics derived from social media (Facebook, LinkedIn, Wikipedia, twitter, etc and open access research sharing forum e.g. Researchgate and Academia: **Again the intrinsic value of altmetrics has been severely questioned.**

Current Trends in Research Evaluation

- **Key highlights**
  - Review of policies and guidelines for research evaluation, the place of both qualitative and quantitative indicators
  - Increased triangulation of research evaluation techniques , peer review and metrics, and indicators to assess the research performance

Reasons rising popularity research metrics

- Apparent shortcomings of peer review
  - Slow and results are not immediately available
  - Lack of accountability on the part of reviewers
- Increasing prominence of open research, open data and open access hence increased availability of database (Wilson, 2015)

Reasons for rising popularity of metrics

- Increased **competition** within and between institutions for prestige, students, staff and resources;

- Increase in the availability **'big data'** on research output and the capacity of tools for analysing them through open science

Benefits of using metrics

- Uncover **opportunities for collaboration** from among their peers thus promoting intra-Africa collaboration among scholars and institutions in the region

- Provide **transparency** and objectivity in the research review process: Hirsch, (2005)

- Identify gaps in the research agenda in terms of disciplines in relation to the needs

Benefits of using metrics

- **Demonstration of or showcasing excellence:** In situations of competitive funding, marketing/promotion
- **Evaluate the sustainability of the research ecosystem:** Provides tangible evidence of benefit to weigh against the costs of research.
- **Scenario Modeling**: To provide recruitment, re-organization and investment.
- **Benchmarking/Comparison:** Provides an engaging way of comparing peer research programmes across the globe/disciplines/entities

Barriers to the use of metrics

- **Difficulties in standardizing the use of metrics across disciplines** due to uniqueness of research and publication cultures e.g. STEM and the arts and humanities) (Battista, 2006)
  - ❖Not ideal for making comparisons across disciplines.

- **Discourage relevant research or application of research findings in the region** as researchers and institutions pursue agenda that suits north-based "high impact journals" which are beyond access by local research community

Barriers to the use of metrics

- **Discourages interdisciplinary work** in the various fields

- **Does not address the contextual issues**: Size of entities, publication type, disciplinary differences, and input factors such as funding, number of PHDs, etc (Lyons, 2015)

- **Ambiguity:** Danger of limiting research assessment to only that which can be measured using metrics:
  - Measuring **effect** or **influences** or **attention or dissemination** ? HEFCE (2015)

Barriers to the use of metrics

- **Open to gaming:** 'behaviour that is meant to unfairly manipulate those metrics, generally for one's benefit. E.g.
  - **Citation rings: G**roup of authors agree to cite each other extensively, regardless of the actual mutual impact of the papers.
  - **Self-citation and tweeting about one's own work (Lyons, 2015)**
- **Concerns over encroachment on academic freedom and creativity,** and the effects on the well-being of researchers of working in a culture of measurement.

Barriers to the use of metrics

- **Metrics are narrow:** Neglect impact outside the academia & ignore the context and reasons for citation.
  - Influential work may remain uncited.
  - Fail to capture many research outputs e.g. data sets contributed to digital repositories
- **Validity issues for decision making:** E.g. the JIF, which measures journals' average citations per article, is often incorrectly used to assess the impact of individual articles.
  - Relies on surrogates e.g. measure of the impact of a journal, instead its constituent papers and therefore not reliable. (Thelwall)

Areas of collaboration in research metrics

- The key to creating metrics that have a acceptability among stakeholders in the research enterprise is collaboration (Research and education networks, research organizations and universities):

- Initiative to create a regional standard of metrics that would be a reference point, comparable acceptable and can be applied across the board: publishers, research funding bodies, librarians and higher education providers in the region

Areas of collaboration in research metrics

- Developing guidelines on best the practices in research evaluation and the use of research metrics
- Benchmarking between institutions on experiences
- Developing the prerequisite data infrastructure for positive use of research metrics: This includes open and interoperable data infrastructure e.g. Institutional and collaborative repositories

Conclusions

- The era of research metrics is here and here to stay
- The question is how to ensure that evaluation using metrics is reliable and that the indicators are appropriate.
- Quantitative measures can complement qualitative forms of evaluation and decision-making.
- Need for use of multiple metric and review approaches to get a better picture of the quality of research output **(triangulation):** indicators

Conclusions

- **Go beyond a traditional bibliometric analysis of academic outputs to consider how wider societal needs have been met by research efforts.**
  - Influencing practice or policy,
  - Generating wealth, driving industrial innovations,
  - Tackling pressing societal questions or problems, or meeting the needs of a particular community.
- **Use the right metric for the right purpose:** Consider what is being measured against the strength of the evidence the metric provides for the impact of the entity of interested.
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Recommendation

- Research institutions (research networks, HEIs, research funders) need to develop principles on their approach to research management and assessment, including the role of quantitative indicators.
- There is need for research into the general question of use of the exiting tools of research metrics in African scholarship:
  - Uncover the relevance, reliability and practical implications of their application

Recommendation

- There is need to develop metrics that address the socio-economic context of the region in terms of research

- There is need for collaboration among stakeholders in the region in developing valid, reliable and comparable metrics

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