

RESEARCH OUTPUT & COLLABORATION AT THE UNIVERSITY OF GHANA

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What was the purpose of the study?

- (i) To determine, by means of a bibliometric profile, the research output of Ghanaian-affiliated researchers, and to investigate the extent and nature of research collaboration.
- (ii) To gain insight into the motivations and activities that underlie research collaborations, within Ghana, with the rest of Africa, and beyond Africa.

Why are the findings of this study useful?

- (i) They show that research collaboration has significantly increased Ghanaian research productivity.
- (ii) Collaboration, especially with colleagues out of Africa, allows access to expertise and funds, while enhancing productivity, which contributes to the dissemination of knowledge and ultimately uptake.
- (iii) They provide information on Ghanaian research output, which is needed to inform uptake strategies.
- (iv) The analysis of the Ghanaian research system provides valuable insight into how its various components could contribute towards research output and uptake.

INTRODUCTION

Ghanaian research institutions are mandated to undertake research and disseminate the results in various publications. The core role of universities include to teach, undertake research, disseminate knowledge, and foster relationships with external entities.

Research collaboration allows institutions access to expertise, while enhancing productivity and contributing to the dissemination of knowledge. Collaboration happens when individual researchers, institutions, and/or industry work together to achieve the common goal of producing new scientific knowledge or solving a scientific problem¹. Collaboration also occurs when sharing knowledge at seminars, workshops and conferences.

While Ghanaian researchers collaborate with researchers within Ghana and further afield, not much is known about research outputs and trends. One study has found that little research cooperation occurred among the three countries it examined, namely Benin, Senegal and Ghana². In the few instances where collaboration did occur, it was because a third party, typically from a developed country, was part of the collaboration.

Despite some attempts to measure research collaboration in Ghana, a systematic and comprehensive study to assess this has never been undertaken. This represents a major research gap, and it is against that backdrop that this research project was undertaken.

The study has a special interest not only in the patterns of co-authorship of Ghanaian-

¹ Katz and Martin, 1997, p. 7

² Mègnigbèto, 2013a

affiliated researchers, but also in trends in different categories of research collaboration in Ghana. It describes the research system in Ghana and highlights factors that trigger and enable research collaboration.

The bibliometric profile identifies the research output of Ghanaian researchers and examines the extent and nature of research collaboration at higher education institutions. This sheds some light on why and how research collaborations take place within Ghana, with the rest of Africa and beyond.

The key research questions for this study were:

- (i) What have been the levels of research output of Ghanaian researchers between 1990 and 2013, as measured by article publication?
- (ii) Which sectors in the research system published more articles?
- (iii) Which broad fields or scientific disciplines published more articles?
- (iv) What is the extent and nature of research collaboration in Ghana, as measured by co-authorship of publications?
- (v) What factors influenced research collaboration in Ghana? How did the collaboration start and what were the reasons for collaboration? Did collaborations differ within Ghana, in the rest of Africa, and beyond?
- (vi) What roles did partners in the collaboration play?

LITERATURE REVIEW

The literature review found that many sub-Saharan African countries have policies on science and technology performance, and many have set the target of expending 1% of GDP on research and development, but not one has achieved this³.

Because of the continent's weak research infrastructure and capabilities, its share of world output is negligible. The biggest science producers on the continent are Egypt in the North, South Africa in the South, Kenya and Tanzania in the East, Nigeria in the West, and Cameroon in the Central region.

Africa's contribution to the global science output was about 1.8% between 2000 and 2004⁴. What is more, its share of the global scientific output is markedly less than that of other developing regions such as Latin

America, with the figure for Africa's contribution declining.

To increase their scientific output, African researchers usually collaborate with European and American researchers. The general trend is that: the less productive a developing country is in terms of scientific output, the greater its dependence on international research collaboration.

Except for Southern Africa, and South Africa specifically, there are currently only a small number of studies that have been done to examine the regional research landscape in Africa. A 2013 bibliometric study reviewed the research landscape in Benin, Ghana and Senegal⁵. Ghana was ranked first in cumulative scientific output, ahead of Senegal and Benin. Benin, in turn, had the highest international collaboration rate, and it also cooperated more with Africa and Europe than the other two

³ Mouton and Waast, 2008

⁴ Pouris and Pouris (2009)

⁵ Mègnigbèto (2013a)

countries. Very little collaboration took place among the three countries.

This study reviews patterns of collaboration among researchers within Ghana, as well as collaborations with researchers from the rest of Africa and outside the continent.

METHODOLOGY

The scientific research output and co-authorship patterns of Ghanaian researchers were investigated in a bibliometric analysis, and the nature of research collaboration was further explored in an online survey.

The bibliometric study analysed papers that appeared in journals indexed by the Web of Science⁶. All articles published between 1990 and 2013 were extracted and exported into a database. The data were cleaned and classified into various categories. Altogether 5,750 unique articles were identified as belonging to Ghanaian researchers and used for the bibliometric analysis.

An online questionnaire subsequently solicited information from the authors of selected co-authored articles. Altogether 548 emails were delivered to the Ghanaian-affiliated authors and 190 valid responses were received, resulting in a survey response rate of 35%.

LIMITATIONS

Co-authorship of published articles is usually the main measure of research collaboration⁷. Yet care needs to be taken when interpreting the findings of bibliometric studies, since this is only a partial indicator of collaboration. It does not reflect instances where researchers work together but publish separately, or those when collaboration does not lead to joint publication. Furthermore, authorship is an imperfect indication of collaboration—for example, a

researcher may be listed as a co-author simply for providing information.

Despite limitations, co-authorship is the most widely used measure for scientific research collaboration. It is verifiable, stable over time, the data is available and it is easy to measure⁸.

RESULTS

The results of the bibliometric analysis showed that Ghana's research output had increased from 67 articles in 1990 to 637 articles in 2013 (about 850%). Public universities were found to be the major producers of research, contributing more than half of Ghana's scientific output. Health sciences produced more papers than any other scientific discipline.

Collaboration was found to have increased the productivity of Ghanaian researchers, with papers produced as a result of collaboration increasing from 60% in 1990 to 95% in 2013. Indications are that Ghanaian researchers collaborate significantly more with international counterparts than with local researchers. Within this category, collaboration takes place more frequently with those outside Africa than those inside. This confirms earlier findings that collaboration among African countries is weak. Reasons are that such collaborations give researchers access to expertise and funds, while simultaneously enhancing productivity.

The online survey revealed that an *already existing personal or working relationship* and *postgraduate supervision* were the main factors that influenced the initiation of collaboration. *Having an informal conversation at a social event* and *having discussions on online platforms* were lesser contributors. *Access to expertise* and *enhancement of productivity* were the core reasons why

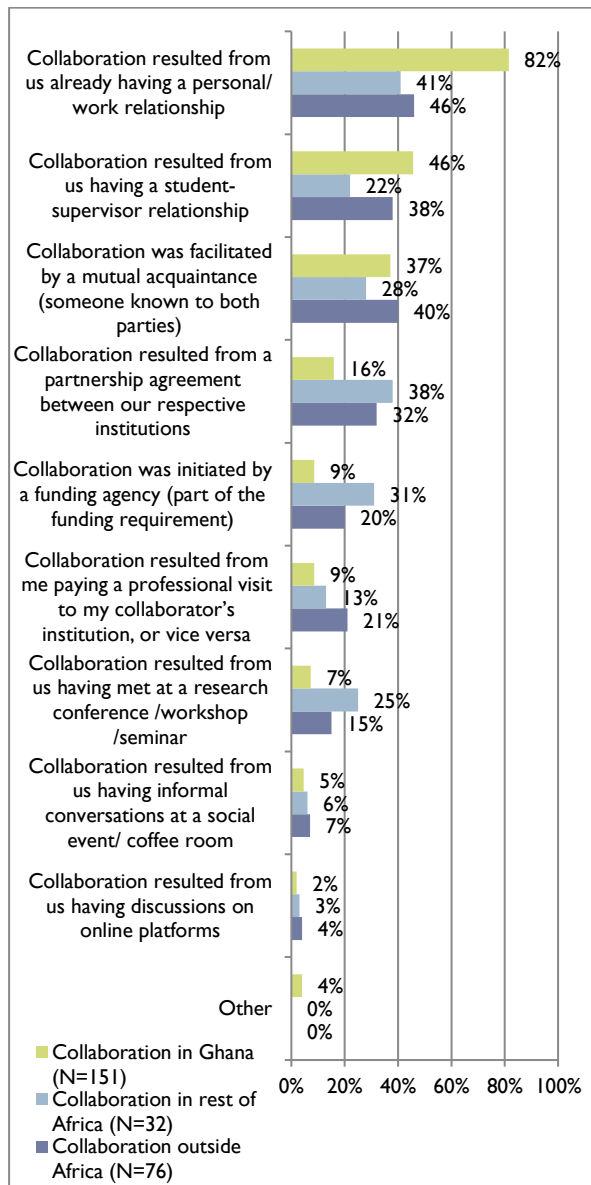
⁶ The Web of Science is an online subscription-based indexing service maintained by Thomson Reuters that provides a comprehensive citation search.

⁷ Ubfal, 2011

⁸ Katz and Martin, 1997

researchers collaborated. In terms of researchers' roles, those within Ghana were involved mainly in the *collection of data or field work*, while those outside Africa were instrumental in *providing resources* and *helping secure funds*.

Figure: Factors that initiate collaboration



CONCLUSION AND RECOMMENDATIONS

Research output among Ghanaian-affiliated researchers increased between 1990 and 2013.

The rate of increase among researchers within Ghana was lower than those from Ghana and beyond. Public universities were the major producers of research, contributing more than half of Ghanaian scientific output. The University of Ghana produced most research output, while the health sciences produced more papers than the other scientific disciplines.

A core finding is that research collaboration has increased the productivity of researchers with the percentage of papers produced by Ghanaian-affiliated researchers through collaboration increasing from 60% in 1990 to 95% in 2013. Ghanaian researchers collaborate significantly more with international counterparts than with researchers in Ghana, since this allows greater access to funding and expertise, while enhancing productivity.

AUTHOR'S REFLECTIONS

While this study does not directly contribute towards institutionalising research uptake at the University of Ghana, it does give a good indication of its research output and how researchers collaborate with other colleagues inside and outside Ghana. Such information on research output is needed before uptake can even be considered.

The research project provides an understanding of the research system existing in Ghana and how its various components can contribute towards research output and uptake.

Subsequent to completion of this study and the work done by the DRUSSA programme, research uptake at the university has become a central focus of research.