

Publication Output of Bahir Dar University: A Scopus-based Bibliometric Overview

Addisalem Tebikew Yallew

Ph.D. candidate in Higher Education Studies, Faculty of Education, University of the Western Cape, South Africa

Asrat Dereb

Ph.D. candidate in Higher Education Leadership and Management, Faculty of Administrative Science, Tampere University, Finland, and Department of Educational Planning and Management, Bahir Dar University, Ethiopia

Abstract

Bahir Dar University (BDU) is one of Ethiopia's oldest and leading universities and has recently been granted the status of a research university within the country's system of differentiation of higher education. Despite this, there has been a lack of systematic mapping of the research output of the university. To address this issue, this study takes a 22-year dataset of publications from Scopus to analyze publication output affiliated with the university as represented in the international domain. The analysis encompasses several dimensions, including overall productivity, collaboration patterns, dominant research areas, primary publication outlets, and languages of publication. The findings reveal a notable increase in research productivity at the university since 2010. The top five research areas impacting this productivity include medicine, agriculture, environmental science, social sciences, and engineering. In addition, the majority of publications are found to be published in biomedical science journals, English being the dominant language of publication. Though at the institutional level, the university's collaborators are predominantly other Ethiopian public universities, at the country level, BDU's top collaborators come from the USA, Germany, South Africa, the UK, Japan, and Belgium. Based on the results, we argue that the university still needs a robust research funding and incentivization system, though research productivity has considerably improved over the past two decades. Furthermore, we recommend that the university's journals, which the Ministry of Education has accredited, be indexed in reputable international journal databases to enhance their visibility.

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Introduction

The Ethiopian higher education system has traditionally focused on training graduates and the country's elite. However, in recent years, a concerted effort has been made to revitalize the research mission of the country's institutions of higher learning. This effort is evidenced by various

CONTACT Asrat Dereb  asd.dereb5@gmail.com

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initiatives, such as the development of a differentiated higher education system, the adoption of national open access and journal accreditation policies, and the ratification of national science and higher education internationalization policies (MoSHE, 2020a, 2020b, 2020c, 2020d). Against this backdrop, the present study endeavors to assess the research output of Bahir Dar University (BDU) as the institution celebrates its 60th anniversary and needs to see its current status in terms of research productivity. It is noteworthy that the university is among the top five most research-productive universities in the country, according to Web of Science and Scopus-indexed bibliometric measurements (Yallew & Dereb, 2021). For this study, publication productivity refers to the research output of Bahir Dar University published in Scopus-indexed databases over the past 22 years, including articles, books, book chapters, conference papers, proceedings, and other publications.

The study aims to address several research questions pertaining to BDU, including: (1) How has Bahir Dar University's research productivity changed in the past 22 years? (2) Which scholarly sources or publication outlets have been most frequently used by Bahir Dar University's researchers? (3) What does the publication landscape look like considering the main research areas? (4) Through analyzing collaboration and funding patterns, what can we learn about the nature and extent of Bahir Dar University's research partnerships and financial support for research?

Additionally, the study aims to infer insights from an assessment of the languages of publication. Though English is the public universities' instructional language, the issue of publishing in other languages is included in this study since an assessment of the language(s) of research publishing has implications for the quality, accessibility, and relevance of research in such multilingual contexts as Ethiopia.

In the following sections, we provide a brief overview of the use of bibliometrics as a tool for research assessment and Bahir Dar University's evolution as a research-aspirational higher education institution. The methodology adopted for the study and the presentation and discussion of the findings are presented in subsequent sections.

Bibliometrics and Research Assessment

A review of the measurement of university productivity reveals that various quality assurance organizations employ various metrics to evaluate the performance of universities. Commonly, these metrics are aligned with the university's teaching-learning, research, and community engagement missions. However, research has consistently demonstrated that measuring university productivity is a complex task (Massy et al., 2013; Sullivan, 2012), particularly in terms of measuring teaching-Learning and community engagement. In contrast, evaluating university productivity through research output is the most prevalent approach and is favored by the majority of researchers (Adams & Griliches, 2000). This is because evaluating a university's performance using research output relies on data-driven techniques rather than subjective judgments (Hicks et al., 2015).

Bibliometric measurement, adopted in this study, is a popular methodology scholars employ to evaluate university productivity (Gingras, 2016). This method provides comprehensive insight into a university's productivity capacity through quantitative and qualitative indicators. For example, Valérie and Pierre (2010) define bibliometrics as "a set of mathematical and statistical methods used to analyze and measure the quantity and quality of books, articles, and other forms of publications" (p. 342). Researchers utilize these metrics to evaluate the productivity levels of institutions in terms of producing research articles, books, conference proceedings, and the like (Ellegaard & Wallin, 2015).

Regarding data sources, various databases are employed to assess an institution's productivity. These include Scopus, Web of Science (WoS), PubMed, and Google Scholar (GS) (Falagas et al., 2008; Harzing & Alakangas, 2016). Although each database has its own unique features, they share common characteristics. Some argue that most scholars use Elsevier's Scopus and Clarivate's Web of Science (WoS) as the primary sources to identify research outputs (Vera-Baceta et al., 2019). However, the Scopus database is considered to offer relatively representative coverage of scientific output (Mongeon & Paul-Hus, 2016). Therefore, this study focuses on the research productivity of Bahir Dar University as indexed in the Scopus database. It is worth noting that publishing in Scopus-indexed journals, books, proceedings, and the like is highly encouraged by the Federal Ministry of Education's policy documents (MoSHE, 2020b).

Bahir Dar University: A Brief Overview

Bahir Dar University (BDU) was established on May 6, 1999, because of the merger of Bahir Dar Teachers' College and Bahir Dar Polytechnic Institute, following Council of Ministers Regulation No. 60/1999 (BDU, 2010, 2015). The origins of Bahir Dar Polytechnic Institute, which later became Bahir Dar Technology and Textile Institute, can be traced back to 1963, when it was established through the technical cooperation between the Government of the USSR and the Imperial Government of Ethiopia. The institute was a leading institution in producing engineers and technicians for the country. Ten years later, Bahir Dar Teachers' College, then known as the Academy of Pedagogy, was established in 1972 through a tripartite agreement between the Imperial Government of Ethiopia, UNESCO, and UNDP and began operations the following year under the jurisdiction of the Ministry of Education and Fine Arts. Its primary objective was to train primary school teacher trainers, supervisors, educational leaders, adult education organizers, and community development agents capable of adapting primary education to rural life and development.

BDU currently offers 434 programs, comprising 115 first degrees, 198 second degrees, 99 doctoral degrees, 5 specialty and 11 sub-specialty, and 6 certificates. The university boasts a substantial academic and administrative staff, with 2507 academics and 5,490 administrative staff working across eight campuses located throughout Bahir Dar (BDU, 2023). The university comprises five colleges, four institutes, two faculties, two schools and two academies. These academic units include the College of Science, the College of Agriculture and Environmental

Sciences, the College of Medical and Health Sciences, the College of Business and Economics, the College of Education and Behavioral Sciences, the Bahir Dar Institute of Technology, the Ethiopian Institute of Textile and Fashion Technology, the Institute of Land Administration, the Institute of Disaster Risk Management and Food Security Studies, the Faculty of Humanities, the Faculty of Social Sciences, the School of Law, School of Earth Sciences, the Sports Academy, and the Maritime Academy. Additionally, the university houses 13 research centers. These are: the Blue Nile Water Institute, the Biotechnology Research Institute, Institute of Pedagogical and Education Research, the Energy Research Center, the Textile and Garment Research Center, the Abay Cultural and Language Development Center, the Geospatial Data and Technology Center, , Washera Radar and Geo-Space Research Center, Science, Technology, Engineering and Mathematics (STEM) Center, Entrepreneurship Development and Incubation Center, Mecha Health Research Center, Information, Communication Technology for Development (ICT4D) and Food and Nutrition Research Center.

Despite envisioning to become a research university since a decade ago (BDU, 2010), it was not until recent higher education reforms undertaken by the former Ministry of Science and Higher Education in 2020 that BDU officially became one of the eight research universities in Ethiopia (MoSHE, 2020a).

Methods

To conduct this study, a quantitative approach was employed. The primary data source utilized was the Scopus database, which is widely acknowledged as the most comprehensive database of scholarly literature (Mongeon & Paul-Hus, 2016). This database was chosen due to the lack of alternative institutional and national archives that would have enabled a thorough and comprehensive analysis of the research output of Bahir Dar University.

To gather the data, we first searched for documents affiliated with Bahir Dar University over the past 22 years (2000-2022). Institution-based data, including the years of publication, document types, main research areas, names of prominent publishing outlets, collaborating institutions and countries, and funding agencies, were then downloaded into Microsoft Excel for further analysis. In total, 4,025 documents published by 1,877 authors affiliated with the university were analyzed. The last search was conducted on November 23, 2022.

However, it is worth noting that while the Scopus database is widely used and considered comprehensive, it is not exhaustive and has certain limitations. For example, it does not cover all open-access journals, gray literature, or non-English publications, and it may underrepresent certain fields, such as the humanities and the social sciences (Harzing, 2019). While bibliometrics and databases such as Scopus provide valuable insights into university productivity, it is also worth stating that bibliometrics has been criticized for its emphasis on assessing quantity over quality (Bornmann & Leydesdorff, 2015). Additionally, databases such as Scopus and Web of Science have been criticized for their coverage bias, primarily focusing on publications in English and from

Western countries (Vera-Baceta et al., 2019). Therefore, the results of this study should be interpreted with caution and in the context of these limitations.

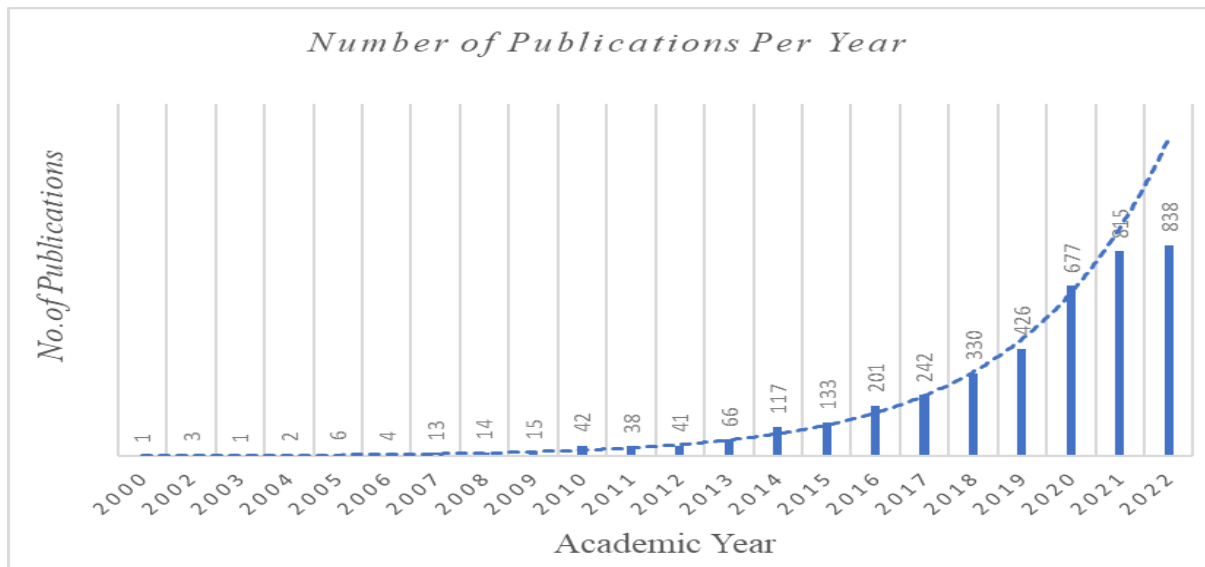
Results and Discussion

In this section, we present and interpret our findings related to the main research variables, i.e., level of productivity, productivity per capita, publication outlet, collaboration, and funding patterns, as well as languages of publication.

Overall Productivity

Figure 1

BDU's Research Productivity over the Past 22 Years



Note. Source Scopus (2022)

As can be observed from Figure 1, the research productivity trends at Bahir Dar University (BDU) demonstrate a marked increase. A closer examination of the data reveals that this growth has been consistent over the past 15 years. Notably, 22 years ago, the university had only published a single paper in the database under analysis. However, by 2022, the staff's publication output had risen to 838 research papers. On average, academic staff productivity at BDU has been increasing by approximately 38% per year. Furthermore, since 2012, the overall productivity capacity of the university has significantly improved.

The study results suggest that research production at BDU is trending upward and aligning with the university's vision and mission (BDU, 2014). However, it is crucial to consider the potential influence of the university's expansion on these findings. Since acquiring the status of a university, BDU has undergone both horizontal and vertical massification, which has led to an increase in the number of academic programs and staff.

Productivity per Capita

Though the publication productivity of BDU has exponentially increased, one may wonder what causes an increase in research productivity. Table 1 shows the per capita research productivity, which gives insights into the productivity per eligible staff member. This can help answer the question of whether the increase in research productivity is due to the expansion of the university in staff number and program diversity or a change in institutional culture concerning publications.

Table 1

Productivity per Capita

Year	No. of publication	No. of Eligible Staff	Per Capita output	Remark
2010	42	681	0.06	
2011	38			No data available
2012	41	831	0.02	
2013	66	-	-	No data available
2014	117	836	0.14	
2015	133	-	-	No data available
2016	201	1337	0.15	
2017	242	1126	0.21	
2018	330	-	-	No data available
2019	426	1483	0.29	
2020	677	2065	0.33	
2021	815	2183	0.37	
2022	838	2190	0.38	

As a way to answer the questions, it would be appropriate to calculate the productivity level of staff per publication output. In this case, data from those staff members who are eligible to publish could be taken and calculated according to the university's regulations. The university legislation allows staff whose rank is lecturer or above to publish their research products so as to claim academic promotion (MOSHE, 2020b). Accordingly, in this analysis, we included staff whose academic rank is lecturer or above. Technical assistant and graduate assistant I and II are

not included in this calculation since the legislation does not demand publications as a requirement for any career promotion for staff in these categories.

For instance, in 2010, there were 42 publications and 681 eligible staff, giving a per capita output of 0.06. Similarly, in 2022, there were 838 publications and 2190 eligible staff, giving a per capita output of 0.38. This data revealed that in 2010, the research output was limited to only six staff members per 100, whereas in 2022, this number significantly increased to 38.

Looking at the trend over the years, it is clear that Bahir Dar University's research productivity per capita has been increasing steadily from 2010 to 2022, with the highest values recorded in the last few years. This information suggests that Bahir Dar University is making strides in research and increasing its research productivity, which can have positive implications for the university and the broader research community in Ethiopia. It is, however, worth noting that there are several years with missing data for eligible staff, which can affect the accuracy of the per capita output.

While the increase in research productivity at BDU may be attributed in part to the university's expansion in staff number and program diversity, the increase in per capita output indicates that there has been a change in institutional culture concerning publications. This could be due to factors such as increased support for research activities, more emphasis on research in faculty evaluations, or increased collaboration and networking opportunities. It could also be due to the implementation of incentive packages for researchers who publish in peer-reviewed, reputable journals (BDU, 2019).

Table 2

Document Types (# 4025)

No	Document types	No.	%
1	Article	3378	83.93
2	Review	275	6.83
3	Conference Paper	222	5.52
4	Book Chapter	74	1.84
5	Data Paper	9	0.22
6	Editorial	8	0.2
7	Book	3	0.07
8	Short Survey	1	0.03
9	Other types	55	1.36

The findings presented in Table 2 reveal a significant dominance of journal articles in Bahir Dar University's research productivity, accounting for 83.93% of the total documents published in the Scopus-indexed database. This is a noteworthy observation as it indicates that researchers in the university placed a high emphasis on disseminating research findings through this publication type, which is considered to be a high-impact medium in the academic community. It is also worth noting that the proportion of reviews and conference papers is relatively low, accounting for only 6.83% and 5.52%, respectively. This observation may suggest that the university is less focused on disseminating research findings through these publication types.

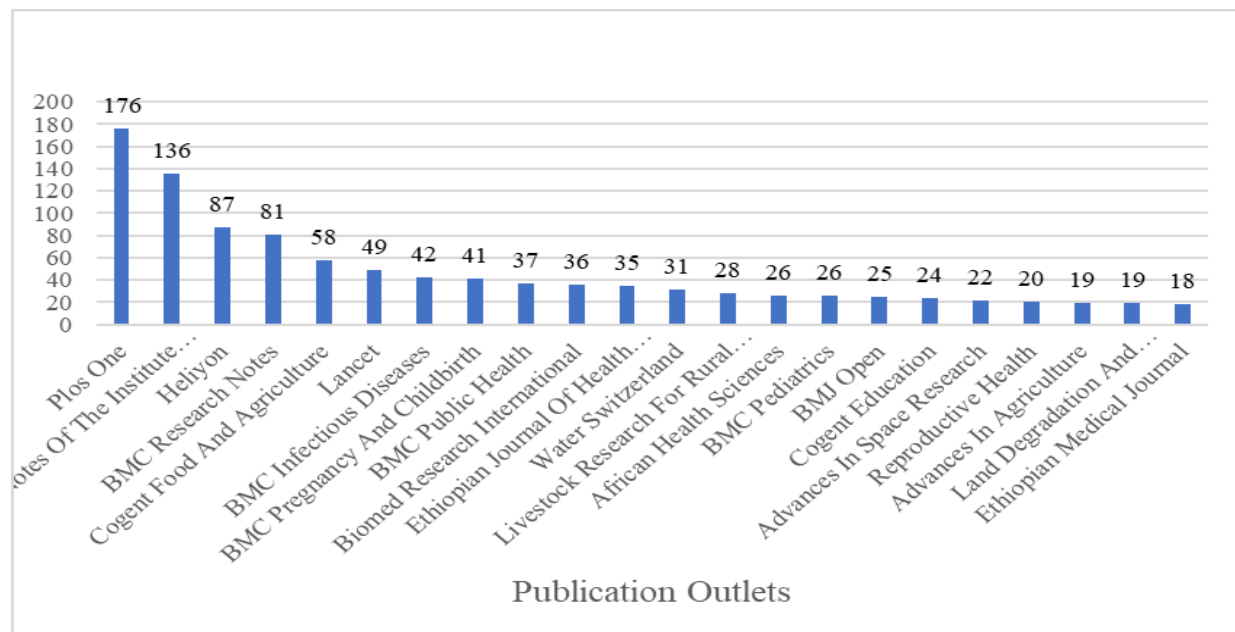
Only 0.07% of the total 4025 documents were also found to be books. This may indicate a lack of emphasis on the publication of monographs and edited volumes within the university's research culture. This is particularly concerning given the fact that books can serve as an important means of disseminating knowledge and establishing scholarly expertise. One possible explanation for this phenomenon could be the lack of financial and logistical support for book publications. Book publications tend to be more time-consuming and expensive than journal articles or conference papers, and the university may not have adequate resources to support such endeavors.

In addition, the pressure to publish in high-impact journals and present at prestigious conferences may discourage researchers from investing time and effort into book projects. It is also worth noting that the Scopus-indexed database is highly involved in publishing articles (Pranckutė, 2021). This could be one factor contributing to the high proportion of journal articles in the university's research productivity.

Publication Outlets

Figure 2

Publication Outlets



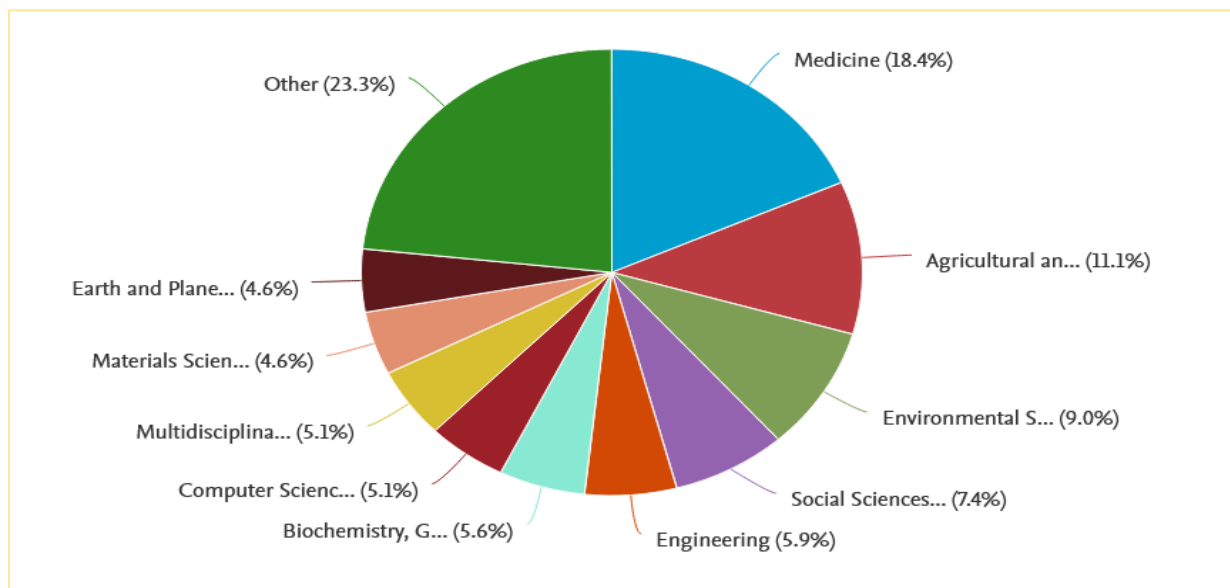
The analysis of the publication outlet data revealed that Bahir Dar University staff publications are predominantly featured in journals within the field of biomedical sciences. Figure 2 above illustrates the diversity of publication outlets used by the staff, with 156 different outlets being utilized. However, a notable finding is the limited representation of journals with roots in the country, with only two journals indexed in the database being of Ethiopian origin: the Ethiopian Journal of Health Development and the Ethiopian Medical Journal. This highlights the potential for greater visibility and international recognition by indexing more national-level journals in such databases.

It is important to acknowledge that the choice of publication outlet is crucial for academic success and the field's potential impact. Academics often strive to publish in prestigious journals, as it is closely correlated with tenure, promotions, and other benefits (Savage & Vickers, 2009; Spector, 2014). In light of this, it is noteworthy that recent higher education publication guidelines stipulate that staff should publish their articles in Scopus, Web of Science (WoS), or PubMed-indexed journals (MoSHE, 2020b).

Research Areas

Figure 3

Dominant Research Areas



Another notable finding is the dominance of the medical field as the most research-productive area at BDU, accounting for 18.4% of total publications. This is followed by agriculture (11.1%), Environmental Science (9.0%), Social Science (7.4%), and Engineering (5.9%). While this suggests that BDU is achieving success in these fields, it also highlights the potential disparity in research productivity among different academic units. For example, the Institute of Technology and the College of Education and Behavioral Sciences, which have a long history within the

university, may not be contributing to research productivity at the same level as more recently established units such as the Health, Medical, and Agriculture fields of study.

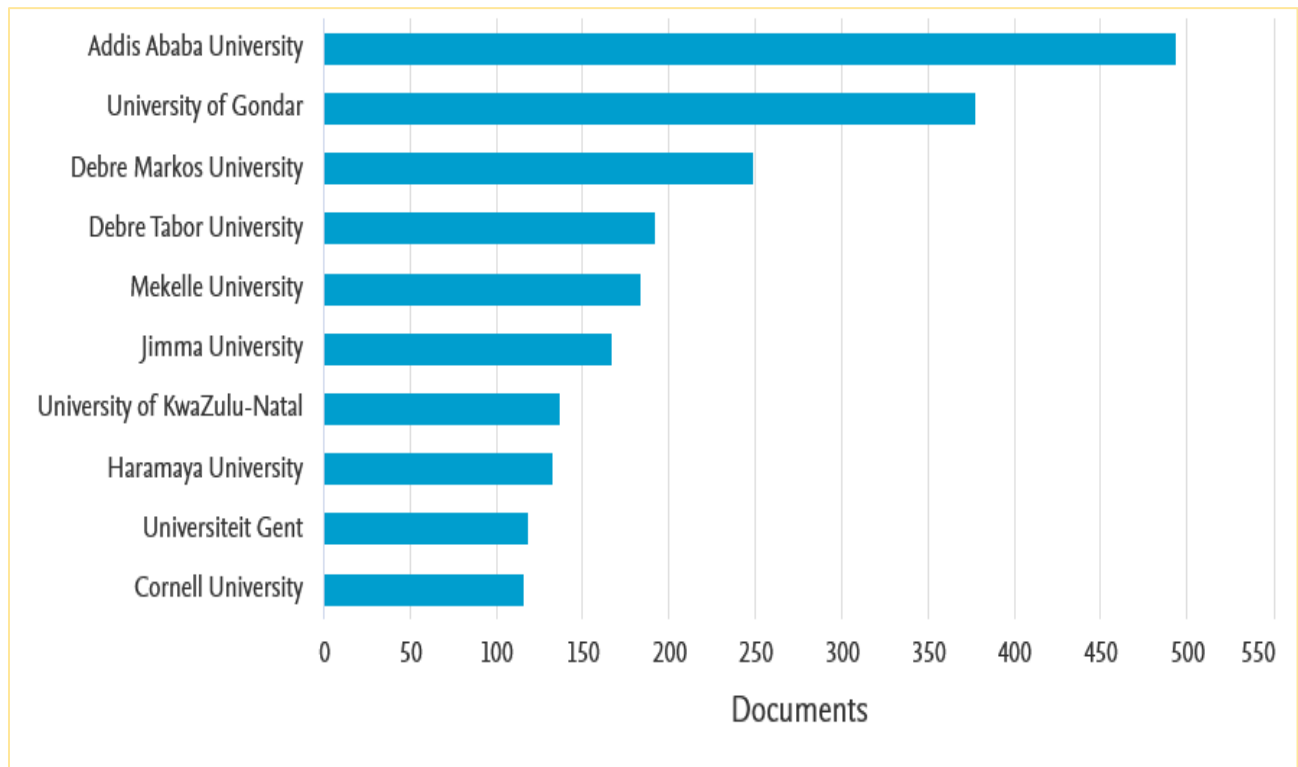
This finding is not unexpected, since fields such as medicine and agriculture tend to have a more direct impact on society, which can also lead to increased funding and support for research in these areas. However, it is important to note that the relative lack of research productivity in certain fields should not be interpreted as a lack of potential for research in those fields, for research productivity is often influenced by a variety of factors, including funding, resources, and societal priorities. Therefore, it is important for the university to continue to invest in and support research in all fields to fully realize the potential for research productivity across the institution.

Collaboration Patterns

The BDU has collaborated with different higher education institutions worldwide for the last 22 years. Figure 3 shows the top ten universities where researchers collaborated to enhance university research capacity and publish. Accordingly, seven of the top 10 collaborators are from other Ethiopian public universities, suggesting stronger links among Ethiopian researchers. This indicates a strong national research network within Ethiopia, which is essential for developing the country's research capacity.

Figure 3.

Collaborating with Higher Education Institutions

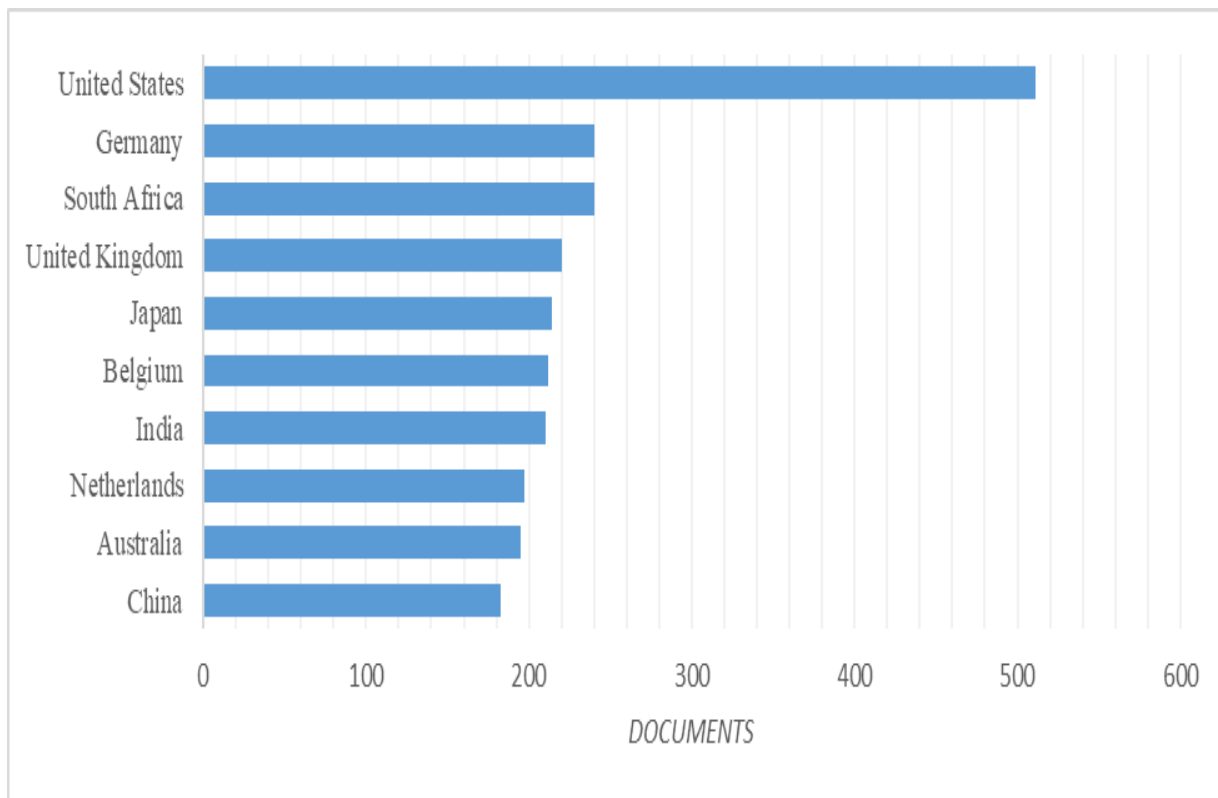


Collaborating Countries

Figure 4 presents the top 10 countries with which Bahir Dar University has collaborated for the past 22 years. The collaboration pattern reveals that university researchers have been working with different countries—accordingly, the USA, Germany, South Africa, the UK, Japan, and Belgium were the top six collaborative countries for the university's researchers. Collaboration with different countries brought academic staff up to a higher standard while simultaneously increasing the university's visibility.

Figure 4.

Top 10 Collaborating Countries



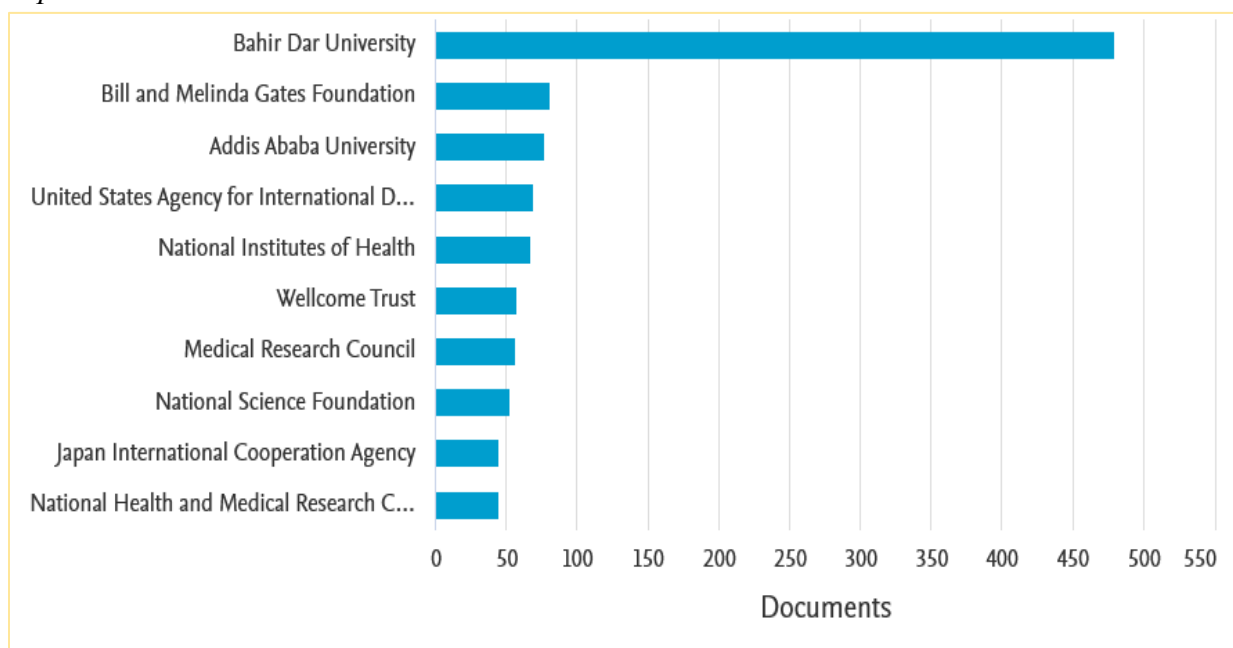
This finding could be an indication of the university's dedication to fostering international collaborations in order to enhance its research capacity and reputation. However, it is also important to note that the majority of these collaborations are with countries located in the global North, which may indicate a lack of engagement with countries in the global South. This could be an area for improvement in the university's international collaboration strategy, as engagement with developing countries could lead to more inclusive and equitable partnerships.

Funding

As depicted in Figure 5, our analysis of funding sources for Bahir Dar University (BDU) over the past 22 years revealed a total of 159 different funding organizations. These funding organizations have played a significant role in the production of research output at the university. Specifically, out of 4025 publications indexed in Scopus, 2955 (73.4%) were sponsored by various organizations, while the remaining 26.6% were either self-funded or had unidentified sponsors. This suggests that the university has been successful in securing external funding to support its research endeavors.

Figure 5

Top Ten Research Funders



A closer examination of the funding organizations reveals that the university itself has played a significant role in funding research, providing 11.9% of the funding for the 2955 sponsored publications. This is a positive indication of the university's commitment to investing in its research capacity. Additionally, the wide range of funding organizations, including international and national organizations highlight the diversity of research opportunities available to BDU researchers.

Languages of Publication

The findings of our research on the language of publication for research output at Bahir Dar University (BDU) reveal a striking dominance of the English language. Specifically, 99.9% (4,021) of the total 4025 documents in the database are published in English, with a mere 0.1%

being published in other languages such as Chinese, French, and Russian. No document is published in Amharic or other official languages of the country in this database. This is a significant finding, as it highlights the dominance of the English language in academic research publishing and its implications for the visibility of research conducted in other languages, particularly in Ethiopia.

Table 4.

Languages of Publication

Language	Number of Documents	Percentage
English	4,021	99.9%
Chinese	2	0.04%
French	2	0.04%
Russian	1	0.02
Unidentified	1	0.02

As Mendisu and Yigezu (2014) argue, the invisibility of Ethiopian languages in research publishing raises critical questions about the accessibility and dissemination of knowledge produced in these languages. They assert that the underrepresentation of Ethiopian languages in research publishing may limit the reach and impact of this knowledge within the Ethiopian academic community and society at large. Furthermore, Yallew and Dereb (2021) have emphasized the need to investigate the reasons behind the underrepresentation of Ethiopian languages in research publishing and devise strategies to overcome this challenge.

It is worth noting that the use of English as the primary language of publication in academic research is a global phenomenon (Vera-Baceta et al., 2019), and it is not unique to Ethiopia. However, it is crucial to investigate the specific factors that contribute to this trend within the Ethiopian context and to consider the implications of this dominance for the dissemination and accessibility of knowledge in the country. One possible reason for the dominance of English in research publishing at BDU may be the pressure to publish in internationally recognized journals. Many prestigious journals are published in English, and thus, researchers may feel compelled to publish in this language to increase the visibility and impact of their work.

Conclusions and Recommendations

This study, which sought to assess the research productivity of Bahir Dar University over the past 22 years, demonstrated that productivity had been increasing. The Scopus-based study

also showed that at the institutional level, the university's most robust collaboration is with other Ethiopian public higher education institutions. In contrast, at the country level, researchers affiliated with BDU predominantly collaborate with researchers from all around the world. As also suggested by the dominant publishing outlets, a bulk of the university's publication output comes from fields related to biomedical sciences and agricultural sciences. It is interesting that a university based on engineering and teacher education does not strongly feature output from these areas compared to other recently introduced academic programs. Regarding research funding, the findings demonstrated that much of the funded research comes from international funders, with the university funding close to 12% of it.

Based on our analysis of the findings, we argue that to enhance research productivity at the university level, further measures need to be taken to undertake in-depth qualitative studies to understand the factors behind the findings presented in this paper. The university also needs to strengthen its capacity to strengthen its own publication outlets. Publishing in Ethiopian languages also needs to be encouraged and incentivized to increase the meaningfulness and relevance of research in local contexts and to expand the freedom of researchers to conceptualize and publish their work in languages which they are comfortable with. In addition to improving the culture of research, concrete measures need to be undertaken to improve research funding and incentivization mechanisms.

Limitations of the Study

It is important to note the limitations of this study. Firstly, the research outputs analyzed in this study are limited to those that are exclusively available in the Scopus-indexed database. It is possible that the university has additional research outputs that have been published in other recognized national and international journals, that are not included in this analysis. Therefore, the results of this study may not provide a comprehensive picture of the university's overall publication status. Instead, it provides an understanding of the university's presence in international academic domains. Secondly, this study only focuses on the productivity of the university in terms of the number of research outputs; it does not evaluate the quality of the research itself. It is recommended that future studies take into account both the productivity and the quality of the research by analyzing the impact of the research on its respective field and also taking into consideration the research output from other databases.

Declaration

The authors declare no conflict of interest.

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