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Mapping SDG Contributions of Top Higher Education Institutions in the Philippines: A Bibliometric Study

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Abstract

Higher education institutions (HEIs) contribute to sustainable development by producing research that supports the 17 Sustainable Development Goals (SDGs). This study mapped the research contributions of top HEIs in the Philippines to the SDGs. It examined the number of research outputs associated with each goal and analyzed correlations in contributions across regions. The study also identified leading authors, institutions, highly cited works, and recurring research themes. Using a bibliometric research design, data were collected from the Scopus database at the institutional level, covering 61,440 documents from selected top universities identified through purposive sampling based on merged EduRank and UniRank listings. The data were analyzed using bibliometric techniques, including citation analysis, co-authorship analysis, keyword co-occurrence, and correlation analysis. Findings showed that HEIs were most productive in research related to SDG 3 (Good Health and Well-being) and least productive in SDG 1 (No Poverty) and SDG 5 (Gender Equality). The analysis also revealed that some SDGs demonstrate strong interconnections, while others show weaker relationships. Additionally, the study highlighted factors influencing research productivity at individual, institutional, regional, and international levels. It demonstrated how science mapping can be used to track research trends and patterns over time. The findings help identify gaps in SDG-related research, particularly in underrepresented targets. Future research may explore SDG interrelationships further to develop strategies that address multiple goals simultaneously and guide more integrated and impactful research efforts.

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Introduction

Higher education institutions (HEIs) play a critical role in advancing sustainable development through research that provides knowledge-based solutions in the 17 Sustainable Development Goals (SDGs). Globally, universities have increasingly aligned their

research outputs with the SDGs. Nonetheless, despite the leading role played by HEIs in realizing the SDGs, there has been a neglect of highlighting the provision of an all- encompassing overview of the SDGs and the HEIs (Fauzi et al., 2023).

In the Philippines, research productivity has significantly increased, with top universities consistently producing outputs indexed in international databases such as Scopus. Despite this progress, there is no holistic mapping of how these research outputs contribute to the SDGs. Though other studies exist on global SDG research trends, country-specific analysis of Philippine HEIs is limited. The study closes this gap by enumerating and ranking research outputs of top HEIs in the Philippines according to their alignment with the SDGs. The results will provide feedback on the research priorities of Philippine HEIs, determine areas of high contributions, and indicate areas that need further research focus.

This study will yield informative findings on reconciling the research activities of the Philippine HEIs towards global sustainability objectives. By determining strengths and weaknesses, the study can guide policy suggestions and institutional plans in augmenting the contributions to sustainable development. The study will also be used as a reference for future regional frequency-based studies. The findings will improve the policy formulation of the higher education sector and strategic research planning.

Literature Review

SDG advancement in the Philippines

The Sustainable Development Goals (SDGs) adopted by the United Nations Member States in 2015 provide a shared vision to address global challenges such as poverty, inequality, the environment, and inclusive economic growth. For developing countries like the Philippines, the SDGs present both opportunities and challenges. The country has subscribed to the 2030 Agenda and committed to conducting regular, inclusive, and country-led performance monitoring, as clearly stated in the Philippines' Voluntary National Review (Reyes et al., 2019). This ensures that national development priorities are consistent with global goals, and that internal programs effectively cater to particular social, economic, and ecological concerns.

Achieving the SDGs is important for the Philippines due to issues such as poverty, regional inequality, limited access to services, and vulnerability to climate-related disasters. The implementation of the SDGs should fit the local context and should find ways to make this goal achievable at the community level. Roldan (2018) pointed out that universities can support poor communities by using research, resources, and outreach programs. He also noted that government and private initiatives could align more effectively with the SDGs through stronger collaboration and planning.

Besides exploring how individual targets are being met, universities can understand relationships among SDGs. Previous studies provided information regarding positive and negative interactions of SDG targets in the Philippine context (Bongolan, 2021; 2022). Their study emphasized that some targets interact synergistically while others are counterproductive. It is important to recognize these interactions to effectively draft policies targeting multiple SDGs, especially in a country with limited resources. Policymakers and planners can use this information to concentrate on goals that produce widespread benefits and address potential trade-offs in multi-sector development initiatives.

Beyond broad mapping of SDGs, sector-specific studies further demonstrate the relevance of the SDGs in tackling national issues such as employment, environment, and education. Yap et al. (2020) looked at how national labor policies relate to the aims of SDG 8, which advocates for inclusive and sustainable economic growth and decent work for all. 테레사 (2023) also examined the trend and characteristics of the environmental sustainability of different regions in the Philippines using SDG Pillars. Baniaga (2024) evaluated how universities in the Philippines contribute to the SDG agenda, primarily through research, outreach, and internal policies. These studies show how SDGs could be explored holistically, focused, and specific to a few or several goals.

Despite ongoing efforts, several institutional and structural factors make measuring the SDG framework's achievement in the Philippines hard. The global SDG agenda did not provide clear guidance on how countries should prioritize goals or develop

funding strategies that address local needs (Akenroye et al., 2018). Many developing countries do not have enough data and technical skills to conduct initial assessments through baseline studies and monitor achievement progress through data-driven research. Orhan and Guajardo (2022) highlighted the importance of data and analytical tools in attaining the Sustainable Development Goals (SDGs). Unfortunately, these tools are difficult to access or rarely used in countries like the Philippines. This limitation creates a major barrier to making sure policies are based on real data and fit the local conditions.

Tackling local development concerns in the context of the SDGs offers an avenue to connect global standards with practical, measurable, and inclusive goals. While a few sectors have started attempting this, enhanced coordination, improved utilization of data, and careful prioritization are required to make the country's advances meaningful and lasting. An in-depth analysis of the SDGs, in this instance, in a developing country, is therefore not only appropriate but also necessary for the creation of a development trajectory that is inclusive and resilient.

This study will yield informative findings on reconciling the research activities of the Philippine HEIs towards global sustainability objectives. By determining strengths and weaknesses, the study can guide policy suggestions and institutional plans in augmenting the contributions to sustainable development. The study will also be used as a reference for future regional frequency-based studies. The findings will improve the policy formulation of the higher education sector and strategic research planning.

Measuring SDG Advancement

Despite the availability of the global framework, there is still no clear guidance on determining if national development efforts are sustainable or effective in advancing the SDGs. Dasgupta et al. (2015) explained that the goals lack guide on how countries should measure the sustainability of their strategies or assess the long-term impact of their development programs.

Different approaches and methods have been explored to measure SDG progress because there is no standardized system. Studies highlight that tracking progress is particularly difficult in countries with weak data infrastructure (Edouard & Bernstein, 2016; Shinwell & Cohen, 2020). Data gaps, inconsistent methods, and poor alignment with national priorities further complicate assessment efforts. Although there are many indicators for tracking progress, Giles-Corti et al. (2020) noted that not all are suitable for every context, especially in developing countries. Moreover, while these indicators provide a general overview, they often fail to reflect regional differences and local realities (Diaz-Sarachaga et al., 2018).

Monitoring progress is more than a technical task. It guides decision-making, sets priorities, and ensures accountability. Pintér et al. (2017) noted that measurement helps people, organizations, and governments understand complex development challenges. It also supports planning, evaluation of past actions, and anticipation of future needs. In practice, monitoring systems work best when they match the capacity and context of a country. For instance, developed nations often prioritize social and environmental concerns, while developing countries focus more on economic and social issues (Bali Swain, 2020). Therefore, progress measurements should adapt to each country's unique development situation rather than rely on a one-size-fits-all approach.

Several measurement frameworks were proposed to meet the need for more tailored monitoring. Rocchi et al. (2022) proposed an SDG achievement index that evaluates contributions from different development areas while accounting for country-specific contexts. Some scholars have taken more data-driven approaches. Gennari and D'Orazio (2020) applied a statistical method that uses national indicators aligned with SDG targets. Similarly, Huan et al. (2021) introduced a systematic approach for comparing SDG progress across countries. Bidarbakhtnia (2020) also presented a comprehensive framework that integrates social, economic, and environmental indicators.

However, these assessments produced different results because of the varying methods used. Miola and Shiltz (2019) found that some methods even gave conflicting outcomes when measuring the same country. Similarly, Lafortune et al. (2020) observed inconsistencies across different methods. These findings show the importance of contextualized mea-

surements. For example, a village-level monitoring project in rural Indonesia used Precision Village Data, which allowed more accurate tracking of SDG progress (Sjaf et al., 2021). For countries like the Philippines, where regional diversity is high, using similar localized frameworks could lead to more accurate and relevant SDG assessments.

Selecting the right indicators depends on the goals of the evaluation. Gebara et al. (2024) emphasized that indicators should be chosen based on whether the goal is to assess progress and gaps at the global, national, or organizational level. This underscores the importance of flexibility and clarity in defining goals and evaluation criteria. Measuring contributions to the SDGs goes beyond tracking global indicators. It requires selecting metrics that reflect each specific needs of each country or region and applying methods that balance statistical accuracy with local relevance. Without effective monitoring, it becomes difficult to determine whether strategies are working or where improvements are needed. As countries move closer to the 2030 deadline, building strong measurement systems will be essential to achieving the targets and promoting sustainable and equitable development.

Bibliometrics as a Measure

Since 2015, universities have attempted to realign their research agendas to contribute and stay relevant to the SDGs. As a result, research performance has become a valuable indicator of SDG achievement among higher education institutions. Bibliometric analysis offers a useful tool for tracing how universities contribute to each goal through their scholarly publications in indexed journals and conferences. Bibliometric indicators are valuable for research and the scientific contribution to knowledge (Shah & Mahmood, 2016). Such analysis could also be used by libraries in informing library acquisition, access, and services (Balbin, 2025), for mapping and visualizing research productivity and networks (Chhtrapati et al., 2021), and for understanding publication and citation trends across countries, organizations, authors, and keywords (Islam & Hu, 2024).

Scholars have shown how bibliometric tools can explore various dimensions of research related to the SDGs. For instance, Yamaguchi et al. (2023) analyzed literature on sustainability and found that certain SDGs receive significant attention from researchers, while others remain underexplored. Similarly, Mishra et al. (2024) examined global research contributions to the SDGs and observed that some goals are extensively studied, whereas others continue to lack sufficient focus.

Other bibliometric studies have focused on specific SDGs. Sweileh (2020) examined publications related to SDG 3 on good health and well-being and identified significant regional disparities in research output. Likewise, Prieto-Jiménez et al. (2021) analyzed studies on SDG 4 and highlighted the evolving trends in educational research in response to sustainable development goals. These findings demonstrate how bibliometric analysis can uncover equity issues in research participation and track the shifting interests of researchers toward the SDGs over time.

Bibliometric analysis has become increasingly important with the inclusion of sustainability metrics in global university rankings. For example, the Times Higher Education Impact Rankings consider research outputs related to the SDGs as part of their evaluation. At the institutional level, bibliometrics enables higher education institutions to assess their contributions through data-driven analysis. Raman et al. (2023) demonstrated how bibliometric techniques can help universities evaluate their research and identify strengths and weaknesses. Similarly, Alfirević et al. (2023) examined variations in research productivity and impact across universities, showing that SDG-related outputs differ based on institutional priorities and geographic contexts. Armitage et al. (2020) also emphasized the need for careful design and interpretation of bibliometric analyses to ensure consistency and reliability of results.

Besides assessing institutional performance, bibliometrics have also been applied to specific research areas and their connections to sustainable development. Several studies have analyzed publications on poverty (Yu & Huan, 2021), solar energy innovations (Obaideen et al., 2023), management (Pizzi et al., 2020), and psychology and social psychology (Bulut & Çağlar, 2025; Sánchez et al., 2022). These analyses demonstrate how SDG

contributions can be mapped within disciplines. They also help determine whether specific fields contribute to multiple or only a few SDGs. Moreover, broader bibliometric reviews have shown that while interest in the SDGs continues to grow, research output remains unevenly distributed across goals (Meschede, 2020).

Bibliometric analysis has been a widely used method in understanding how universities and research communities contribute to sustainable development. It provides a clear, evidence-based way to map research trends, assess institutional impact, and identify areas for improvement. As sustainability takes center stage in academic work, bibliometrics serves as a practical tool for measuring and guiding the contributions of higher education institutions to global goals. Furthermore, Van et al. (2026) highlighted that results of bibliometric studies provide a conceptual and empirical basis for future work seeking to design, monitor and refine research support policies in universities.

Objectives

Generally, the study aims to map the research contributions of the top higher education institutions (HEIs) in the Philippines to the United Nations' Sustainable Development Goals (SDGs). Specifically, the study aims to attain the following:

1. Identify the number of research outputs published by top HEIs in the Philippines that contributes to the different SDGs
2. Determine the correlation between the contributions per SDG
3. Determine the research priorities of different regions per SDG
4. Identify the top contributing author and institutions and highly cited works, and authors
5. Investigate the recurring topics of interest for HEI research
6. Determine collaboration patterns among authors, institutions, and countries

Methodology

Generally, the study aims to map the research contributions of the top higher education institutions (HEIs) in the Philippines to the United Nations' Sustainable Development Goals (SDGs). Specifically, the study aims to attain the following:

Design

Bibliometric analysis was employed to count and rank research outputs of top universities in the Philippines indexed in Scopus. Frequency analysis was used to determine the volume of research outputs aligned with the 17 Sustainable Development Goals (SDGs). The initial list of institutions was created by merging the 2025 rankings from EduRank and UniRank, resulting in 158 universities. Inclusion criteria covered both private and public institutions affiliated with universities in the Philippines that had a significant volume of research outputs indexed in Scopus. Institutions and independent campuses without Scopus publications were excluded, resulting in the removal of 42 institutions. In contrast, campuses and colleges with separate bibliographic data were retained. For example, contributions of the University of the Philippines were attributed either to the system level, specific campuses, or, in some cases, to institutes such as the Marine Science Institute, while De La Salle University included institutes such as the Medical and Health Sciences Institute.

The retrieval of data was conducted at the institutional level through Scopus, not by search terms. Scopus provides bibliographic records tagged with the relevant SDGs, and these tags formed the basis for classification. When an article was tagged as contributing to multiple SDGs, it was counted under each relevant SDG. This means that the same article could appear in more than one SDG category; however, deduplication was applied at the institutional level to ensure that the total number of unique articles analyzed was 61,440 (Balbin et al. 2026). To enhance analysis, institutional data was enriched with variables such as region and type of institution.

Table 1 presents the distribution of selected higher education institutions per region and type. Most institutions included were in the National Capital Region and were primarily state-run. While other rankings could potentially offer broader coverage of Philippine higher education institutions, the merged list from EduRank and UniRank provided a practical basis for identifying top-performing universities.

The use of publicly accessible rankings also enhances transparency, as readers may validate the data and monitor future revisions that could inform regional or sectoral analyses.

Table 1: Distribution of Selected HEIs

Region	SUC/LUC	Private
BARMM	1	0
Bicol Region	4	0
Cagayan Valley	3	1
CALABARZON	7	8
CAR	6	4
Central Luzon	5	2
Central Visayas	3	5
Davao	2	3
Eastern Visayas	7	0
Ilocos Region	2	5
MIMAROPA	2	0
NCR	9	20
Northern Mindanao	5	1
SOCCSKSARGEN	1	1
Western Visayas	5	2
Zamboanga Peninsula	1	0
CARAGA	1	0
Total	64	52

Data Gathering

The bibliographic data of contributions to the database were extracted per institution and subsequently merged into one CSV file, resulting in a total of 101,110 records. Duplicate entries appeared for articles co-authored or produced through inter-institutional collaborations. After deduplication, 61,440 documents remained eligible for analysis. The earliest document was published in 1905, and the most recent included was published on April 7, 2025, the date of data extraction. Publications released after this date were not part of the dataset. Although the Sustainable Development Goals (SDGs) were formally established in 2015, the dataset includes publications from earlier years because the database retrospectively tags relevant works as contributing to or aligned with the SDGs. This demonstrates that institutions had already been producing research relevant to the SDGs prior to their adoption. Future studies may benefit from explicitly comparing research trends before and after 2015 to capture the potential influence of the SDGs on scholarly production.

Data Analysis

The final dataset of 61,440 documents (Balbin et al., 2026) was cle aned and organized using Zotero to ensure consistency of bibliographic records. Bibliometric techniques were employed to analyze research productivity, impact, and thematic trends. Descriptive statistics (frequency counts and rankings) were used to examine the distribution of outputs across the 17 Sustainable Development Goals (SDGs). Citation, co-authorship, and keyword co-occurrence analyses were conducted to identify influential publications, collaboration patterns, and research themes. Correlation analysis was applied to explore relationships among SDGs. Science mapping and network visualization using VOSviewer were used to identify clusters, research hotspots, and thematic interconnections.

Findings

SDG Contributions of HEIs

The results show that top HEIs contributed the most research publications related to SDG 3 (Good Health and Well-being), with 14,093 documents. This was followed by SDG 14 (Life Below Water) and SDG 11 (Sustainable Cities and Communities), with 4,739 and 4,075 documents, respectively. Most SDGs had around 3,000 to 4,000 related publications. However, five SDGs 17, 19, 16, 5, and 1 were the least addressed, with only 1,000 to 3,000 documents each. Figure 1 illustrates the volume of documents contributed by top HEIs for each SDG, highlighting the large gap between SDG 3 and SDG 1. Overall, the findings suggest that most research from top Philippine universities focuses on health, while topics related to poverty alleviation and gender equality receive less attention.

Data revealed that most Scopus-indexed publications of leading universities align with SDG 3. This shows that many universities are conducting research relevant to health due to increasing demand and

Fig. 1: Visualized presentation of SDG-relevant contributions of Top HEIs

funding for health research innovations. Lopez et al. (2019) stated that the Philippines envisioned creating an enabling health research system by 2040. This indicates that the Philippine government prioritized health research and provided funding, which attracted many researchers to conduct health-related studies. Furthermore, Asiri (2024) cited Statista data on the Philippines' problems with sustainability in 2023 and revealed that health, employment, and education were among the leading problems that prevented sustainable development in the country.

Correlation of SDGs

The results also explored the correlation between the contributions per SDG to determine which targets are commonly related to each other and which are counterproductive. Table 2 shows the correlation matrix revealing significant correlation between all targets. However, several targets exhibited stronger correlation with others. Specifically, SDG 8 yielded the highest correlation with SDG 17 (0.996) and SDG 1 (r=0.984). SDG 17 also showed high correlation with SDG 1 (r=0.985), SDG 16 (r=0.977), and SDG 14 (r=0.847). SDG 1 also exhibited high correlation with SDG 16 (r=0.990) and SDG 8 (0.984). This reveals the interrelatedness of studies that address goals on poverty, employment, marine life protection, peace, and global partnerships. This indicates that universities that contribute scholarly outputs relevant to SDG 8 tend to contribute to SDGs 1, 14, 16, and 17. High significant correlation was also found between SDG 12 and 13 (r=0.991). This indicates a strong connection between studies exploring responsible consumption and climate change. This implies that universities contributing to SDG 12 also perform well in research outputs relevant to SDG 13. Similarly, SDGs 2 and 15 were found to have significantly high correlation with an r value=0.980. This illustrates the relationship of studies that address hunger with studies in plant and animal life on land. This indicates that universities that contribute scholarly outputs addressing SDG 15 also tend to contribute to SDG 2. Furthermore, the high significant correlation revealed the interconnectedness of gender studies with research relevant with health and reduction of inequality. Specifically, SDG 5 exhibited strong correlation with SDG 10 (r=0.994) and SDG 3 (r=0.948). Additionally, SDG 10 and 3 yielded an r value of 0.924 which also indicates a strong significant correlation. Therefore, universities that contribute to SDG 5 tend to contribute to SDGs 10 and 3 as well.

Lastly, SDGs 6, 11, 7, 9, and 4 exhibited a trend of significant yet descending values of correlation. Specifically, SDG 6 significantly correlated with SDG 11 (r=0.976), then SDG 11 correlated with SDG 7 (r=0.961), then SDG 7 correlated with SDG 9 (r=0.954), the SDG 9 correlated with SDG 4 (r=0.934). This shows a connection between studies relevant to clean water, sustainable communities, clean energy, innovation, and education. This indicates that universities contributing to SDG 6 eventually leads to SDG 11, 7, 9, and 4 contributions.

The analysis also revealed the SDG targets with the weakest correlations. Specifically, SDG 9 exhibited

Table 2: Correlation Matrix of SDG contributions

1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	–																
2	0.884	–															
3	0.864	0.747	–														
4	0.902	0.732	0.811	–													
5	0.965	0.808	0.948	0.909	–												
6	0.955	0.905	0.805	0.865	0.892	–											
7	0.883	0.741	0.693	0.906	0.822	0.933	–										
8	0.984	0.910	0.835	0.925	0.938	0.973	0.922	–									
9	0.815	0.662	0.655	0.931	0.784	0.837	0.954	0.876	–								
10	0.981	0.815	0.924	0.916	0.994	0.914	0.854	0.953	0.805	–							
11	0.956	0.813	0.794	0.903	0.903	0.976	0.961	0.960	0.875	0.933	–						
12	0.902	0.853	0.716	0.921	0.842	0.927	0.944	0.960	0.945	0.858	0.914	–					
13	0.924	0.863	0.724	0.908	0.857	0.944	0.947	0.970	0.927	0.878	0.935	0.991	–				
14	0.865	0.784	0.723	0.708	0.802	0.904	0.790	0.848	0.653	0.824	0.888	0.765	0.813	–			
15	0.902	0.980	0.752	0.738	0.818	0.935	0.773	0.919	0.666	0.831	0.859	0.853	0.877	0.862	–		
16	0.990	0.833	0.882	0.929	0.979	0.935	0.887	0.971	0.836	0.992	0.956	0.892	0.911	0.844	0.852	–	
17	0.985	0.900	0.862	0.927	0.955	0.968	0.916	0.996	0.872	0.966	0.957	0.952	0.963	0.847	0.908	0.977	–

most of the correlations below 0.7. The target poorly correlated with SDGs 2 (0.662), SDG 3 (0.655), SDG 14 (0.653), and SDG 15 (0.666). This indicates a weak synergy of innovation and technology related research with studies targeting goals on hunger, health, marine, and terrestrial life. This indicates that universities that perform well in SDG 9 tend to lack contributions in SDG 2, 4, 14, and 15. This also indicates that universities that are strong in research relevant to SDG 2, 4, 14, or 15 also lack contributions to SDG 9. Additionally, a weak correlation was also found between SDG 3 and 7 (r=0.693). This indicates a weak relationship between health-related studies and alternative energy research. Universities that contribute scholarly outputs relevant to SDG 3 tend to have least contribute to SDG 7.

The correlation revealed that the productivity of universities in particular SDGs relates to other SDGs. Several synergies or interactions were found between the targets. Particularly, universities that are productive in SDG 8 are also productive in SDG 1, 14, 16, and 17. Many studies also confirm the interaction between these SDGs (Linner et al., 2023; Sturesson et al., 2018; Wang et al., 2024; Lopez et al., 2021). This reflects the studies' shared emphasis on inclusive development, government, and collaboration.

It was also observed that universities with high research productivity in SDG 12 tend to be equally productive in SDG 13. This reflects that achieving climate goals mainly depends on transforming current production and consumption systems. Various studies have also revealed this synergy between SDG 13 and 12 (Perović et al., 2025; Thapa et al., 2023; Srinivas, 2024; Wang et al., 2025).

Universities with strong research output in SDG 15 also tend to be productive in SDG 2. The correlation between these two goals is conceptually consistent, as both goals are achieved by agricultural research. Various research also revealed the interaction between SDG 2 and 15 (Okigbo, 2021; Lile et al., 2023; Morgera, 2022). This relationship likely reflects the agroecological and rural development research commonly undertaken in universities with strong environmental science and agronomy programs.

Universities with high research productivity in SDG 5 also tend to be productive in SDGs 10 and 3. These SDGs are fundamentally social, with overlapping concerns related to vulnerability, equity, and access to health and social services. Several studies also confirm the synergistic interaction among SDGs 3, 5, and 10 (Venkatesh, 2022; Howden-Chapman, 2017; O'Brien et al., 2024; Meier, 2023; Ghosh et al., 2023; Pradhan et al., 2017). Their strong correlation in research productivity may reflect an interdisciplinary approach common in public health, gender studies, and development research that treats these issues as mutually reinforcing.

Lastly, the research productivity of universities in SDG 6 is closely associated with their productivity in SDGs 11, 7, 9, and 4. The strong interrelations suggest a trend in integrated urban systems research, where energy, water, education, and innovation are key components of sustainable city design and resilient infrastructure planning. Various studies have also revealed that these SDGs are interlinked (Nahabhatla & Brahmbhatt, 2020; Ramasubramanian & Ramakrishna, 2023; Mantlana & Maoela, 2020; Khuryati et al., 2023; Hall et al., 2017).

Weaker correlations also indicated that certain goals have limited interaction with one another. Universities that perform well in SDG 9 research tend to produce less research on SDG 2, 3, 14, and 15, and vice versa. These results suggest that industrial and innovation-related research remains relatively disconnected from agricultural, ecological, and pedagogical domains, possibly due to divergent disciplinary traditions and priorities. According to Mantlana and Maoela (2020), SDGs 9 and 2 should co-interact. There should also be synergy with SDG 9 and 3 (Alfehaid et al., 2025). This indicates that HEIs in the Philippines have yet to comprehensively strengthen the connection of SDG 9-related research with SDG 2 and 3.

On the other hand, studies also revealed the low correlation of SDG 9 with 14 and 15 (Mantlana & Maoela, 2020; Fonseca et al., 2020). It shows a global trend where studies addressing SDG 9 lack connection with SDG 14 and 15 research. This also shows that universities must explore avenues that connect or link the said targets. In addition, universities that are productive in SDG 3 are less productive in SDG 7-related research. This may stem from the limited cross-pollination between public health research and energy studies, despite emerging evidence linking energy access with health outcomes. The disconnect could reflect the lack of interdisciplinary collaboration between the health sciences and energy engineering or policy communities. However, Fonseca et al. (2020) found a high correlation between SDG 3 and 7 highlighting the need for universities to explore potential studies that link both the SDGs.

For universities and funding agencies, this suggests a need to incentivize cross-SDG research collaborations, for example, through joint research initiatives, interdisciplinary curricula, and targeted funding for underexplored SDG linkages. Additionally, bibliometric analyses such as this inform institutional strategies to align research programs with global sustainability priorities, helping ensure that no goal is pursued in isolation. This further shows that studies can reveal research gaps and potential research that universities could fund to address multiple SDG targets (Raman, et al., 2024; Mishra, et al., 2024; O'Donoghue, et al., 2025).

SDG per Region

To further understand these contributions, HEIs were grouped according to regions. Considering unique conditions per region, comparing their contributions potentially reveals the differences of their priorities and capacities in achieving SDGs through research. Table 3 shows the distribution of SDG contributions of HEIs per region. It shows the frequency of documents per SDG but highlights the highest and least contributed SDG. The focus of this is to determine the priorities of certain regions to which they are most capable of contributing. Simply comparing the number per region would be a skewed analysis given that fewer universities were included in some regions like BARMM, Zamboanga and Caraga Region.

The results revealed the targets which most regions contribute to, and which targets were least addressed. As shown in the table, most of the regions contribute to SDG 3, followed by SDG 2 and 4. Except for MIMAROPA, which contributed the most in SDG 14, and Caraga Region, which contributed the most

in SDG 11. On the other hand, most of the regions least contributed to SDG 5, followed by SDG 1. Some regions were also found to contribute the least to certain SDGs. For example, BARMM least contributed to SDG 7, CAR in SDG 14, Region 9 in SDG 17, and Caraga Region in 10.

Most regions' priorities are research relevant to SDG 2, 3, and 4, while MIMAROPA prioritized SDG 14, and Caraga prioritized SDG 11. On the other hand, most of the regions least prioritize research in SDGs 5 and 1, while several regions least prioritize certain SDGs. BARMM lacked research on SDG 7, CAR lacked research on SDG 14, Region 9 lacked research on SDG 17, and Caraga lacked research on SDG 10. The findings emphasized that although most regions share the same priorities in SDGs, several regions reflect their region's unique conditions, strengths, and weaknesses in contributing to SDG-relevant research.

Studies have also highlighted that the achievement of SDGs must be localized to address regional disparities (Reyes et al., 2019; Diokno-Sicat et al., 2021). The regional disparities could be attributed to various factors that differ from region to region. Reyes and Arboneda (2022) identified poverty and inequality, health and nutrition, education, environment and natural resources, and access to basic services and utilities. In this study, the economic, environmental, and educational factors most likely affected the SDG contributions of HEIs per region. Regions with more universities tend to contribute more output, like CAR, NCR, and CALABARZON. Regions with better economic status have research outputs that address SDG targets like NCR, CALABARZON, Region 7, and Region 3. Lastly, natural and environmental resources are key factors that regions prioritize or focus on to achieve SDGs. MIMAROPA's strength on SDG 14 makes sense because it has the most extensive coastline among the regions compared to CAR, which has no coastlines. However, inland bodies of water in CAR enabled HEIs to contribute a few SDG 14-related studies. This further proves that these differences in economic, environmental, and educational capacity of regions influence their ability to contribute to SDG-related research (Gopez et al., 2024). HEIs must develop research policies that align with their region's uniqueness and limitations.

4.4. Performance Analysis

Table 3: SDG Contribution per Region

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
BARM	3	6	35	15	6	9	2	4	7	4	8	8	10	14	15	5	3
CAR	23	82	162	131	27	47	27	48	64	44	60	70	53	22	85	38	32
NCR	897	2124	11827	1946	1000	2424	2965	2273	2967	1956	3131	2241	2159	3438	2184	1638	1897
R1	8	40	55	62	6	18	25	22	040	11	19	24	15	29	33	15	12
R2	8	64	54	89	8	46	31	33	41	11	19	48	32	33	41	14	18
R3	21	92	230	129	18	61	64	72	80	25	84	81	51	116	59	22	40
R4-A	105	904	685	249	66	385	280	375	290	128	252	425	385	287	738	125	289
R4-B	1	11	5	7	0	6	6	10	5	3	4	2	5	20	9	8	11
R5	4	18	28	36	6	9	5	7	13	6	18	11	13	23	14	20	5
R6	20	56	136	59	31	65	33	53	38	35	44	54	37	347	63	39	37
R7	28	70	282	180	36	66	124	109	107	48	115	143	69	179	86	55	67
R8	15	96	96	40	6	24	24	32	17	13	26	31	27	27	59	25	15
R9	4	7	10	33	13	7	7	3	4	3	5	7	4	3	9	3	1
R10	22	86	205	99	22	122	178	61	97	30	132	109	84	114	179	40	49
R11	24	89	87	50	10	36	61	56	55	22	68	55	38	56	76	25	24
R12	4	37	126	14	7	9	6	12	7	13	7	12	9	9	45	9	10
R13	4	34	70	28	2	49	43	27	32	3	83	47	22	22	53	11	20

Top Contributing Authors

The following table presents the top contributing authors in Scopus from the Philippine HEIs. Most of the prolific authors are from De La Salle University. This shows that faculty and researchers from DLSU contributed most of the documents indexed in Scopus. Some authors from other universities also contributed the most in terms of Scopus-indexed publications. This includes Siquijor State College, Cebu Technological University, Mapua University, UP Diliman, UP Manila, MSU-IIT, and University of the Cordilleras. The most recent and dominant affiliation of the authors was selected in this study as some may have various affiliations over the years.

Table 4: Frequency Distribution of Individual Authors

Author	Documents	Institution
Dadios, Elmer P.	541	DLSU
Tan, Raymond R.	534	DLSU
Bandala, Argel A.	413	DLSU
Aviso, Kathleen B.	266	DLSU
Concepcion, Ronnie	254	DLSU
Vicerra, Ryan Rhay P.	250	DLSU
Medina, Ruji P.	226	Siquijor State College
Ragasa, Consolacion Y.	223	DLSU
Culaba, Alvin B.	195	DLSU
Ubando, Aristotle T.	186	DLSU

Top Contributing Institutions

Table 5 shows the different HEIs that contributed most of documents in Scopus indexed journals. It was revealed that UP system with their other campuses mostly dominated the list of top contributing institutions. This is followed by DLSU, Mapua, AdMU, UST, MSU-IIT, and USC. It also highlights the number of contributing authors per institution which contributed the documents. This data confirms that the most prominent institutions also contribute the most Scopus-indexed publications.

Highly Cited Works

Table 6 shows that most of the highly cited articles among the Scopus-indexed publications of Philippine HEIs are from The Lancet. Among the articles, Abbafati (2020b) received the highest number of citations with 11,164, followed by James (2018) with 9,949 and Roth (2020) with 6,432 citations.

Highly Cited Authors

The table shows that authors from UP dominated the top cited authors, specifically from UP Manila and UP Diliman. Other top authors that also earned

Table 5: Top Institutions

Institutions	Documents	Authors
University of the Philippines (system)	27309	767
University of the Philippines Diliman	10883	3799
De La Salle University	8535	4533
University of the Philippines Manila	7012	2444
University of the Philippines Los Banos	6101	3314
University of the Philippines College of Science	4878	44
Mapua University	3975	5447
Ateneo de Manila University	3842	1959
University of Santo Tomas	3664	3581
Mindanao State University - Iligan Institute of Technology	2323	1464
University of San Carlos	1251	726

Table 6: Top Cited Works

Document	Citations	Source title
Abbafati (2020b)	11164	The Lancet
James (2018)	9949	The Lancet
Roth (2020)	6432	Journal of the American College of Cardiology
Naghavi (2015)	6250	The Lancet
Vos (2017)	5970	The Lancet
Vos (2016)	5831	The Lancet
Bentham J. (2017)	5781	The Lancet
Roth (2018)	5737	The Lancet
Abbafati (2020a)	5698	The Lancet
Vos (2015)	5386	The Lancet

Table 7 Top Cited Authors

Author	Institution	Documents	Citations
Tan-Lim, Carol Stephanie C.	UP Manila	27	14462
Yñiguez, Aletta T.	UP Diliman	33	6220
Cruz, Lourdes J.	UP Diliman	52	5875
De Luna, Mark Daniel G.	UP Diliman	138	5167
Dadios, Elmer P.	DLSU	541	4672
Sollano, Jose D.	UST	38	4632
Aviso, Kathleen B.	DLSU	266	4376
Chiu, Anthony S.F.	DLSU	68	4138
Culaba, Alvin B.	DLSU	195	3842

cumulative citations came from DLSU, UST, and Siliman University.

Co-Word Analysis

Top Recurring Topics

Table 8 presents the top recurring topics among Scopus-indexed publications con-tributed by HEIs from the Philippines. Excluding the 'Philippines' keyword, Covid-19 is the top recurring topic for Scopus- indexed publications. This is followed by Machine Learning, Deep Learning, and Image processing. This indicates that the pandemic propelled the contribution of HEIs in research. The analysis also revealed that information technology-related themes dominated the most recurring topics, which suggests a significant interest in digital innovation and technical subjects.

Figure 2 illustrates the connection between the top recurring topics among research outputs of top HEIs in the Philippines. It shows that 'sustainability' and 'sustainable development' are the central nodes in the network which means that most of the topics revolve around sustainable development.

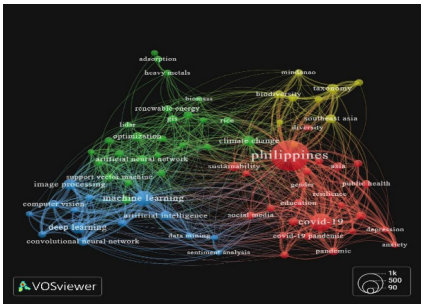

Fig. 2: Network Visualization of Keywords. Also available at: https://tinyurl.com/24qpj6k3

Table 8: Keyword Occurrences

Keyword	Occurrences	Total Link Strength
Philippines	3222	3941
Covid-19	1061	1684
Machine Learning	747	1211
Deep Learning	477	674
Image Processing	389	532
Climate Change	327	475
Artificial Intelligence	307	500
Taxonomy	298	474
Sustainability	265	321
Southeast Asia	254	302
Optimization	250	276
Convolutional Neural Network	245	343
Computer Vision	240	368
Biodiversity	231	307
Artificial Neural Network	227	269

The top keywords reveal that the pandemic and digital innovation propelled the re-search productivity of top HEIs. Zhang and Ming (2023) showed that digital trans-formation emerged as a strategy among research institutions to respond to the COVID-19 outbreak. Despite the negative effects of the pandemic, the positive effects outweighed the negative ones (Omeluzor et al., 2023; Li et al., 2025). As seen in the findings, the rise in pandemic and digital-related research is among the positive effects of the pandemic. Ahrabian et al. (2024) showed that research activity and output grew significantly in the early stages of the pandemic. This indicates a surprising resilience in the scientific community. Studies have also shown how institutions, specifically educational institutions, turned the pandemic crisis into an opportunity through a digital transformation strategy as part of their pandemic response (Cardoso et al., 2025; Nousopoulou et al., 2022). This increased research outputs as a by-product of those innovations submitted to Scopus-indexed journals. This also explains the productivity of HEI institutions in SDG 3 and 9, where topics on pan-demic and ICT usually fall.

Network Analysis

Author Collaboration

Figure 3 presents the network visualization of Filipino researchers' collaboration patterns. The network revealed a scattered structure where several isolated clusters exist, connected by few author collaborations. This suggests that collaborations mostly occur within specific groups rather than across groups or disciplines. Despite these clustered networks, there exist a single network that connects all authors into one inter-institutional collaboration.

The fragmented nature of author collaborations revealed by our network analysis reflects a persistent structural challenge within Philippine academia: research is predominantly conducted in small, often institution- or discipline-bound clusters. This pattern underscores the need to foster cross-institutional and interdisciplinary collaboration to build more cohesive research networks and enhance productivity.

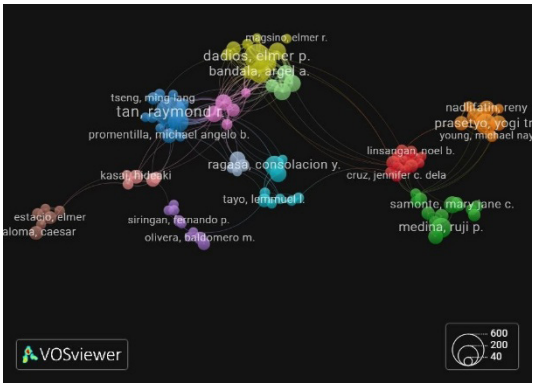

Fig. 3: Network Visualization of Author Collaboration Network of Filipino Researchers. Also available at: https://tinyurl.com/29p3sf6h

Institutional Collaboration

The network visualization in Figure 4 confirms that the majority of contributions originated from DLSU. Other institutions show weaker link strengths with the remaining nodes. The interactive visualizations in each figure allow for a more detailed examination of the presented networks.

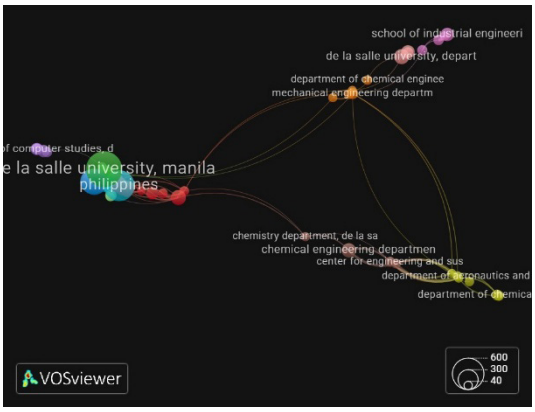

Fig. 4: Network Visualization of Collaboration Network of Institutions. Also available at: https://tinyurl.com/28xw7bsh

Country Collaboration

Figure 5 shows the overlay visualization of country collaborations. It shows that the Philippines partnered with institutions from different countries. It also showed that recent collaborations are with Saudi Arabia and China.

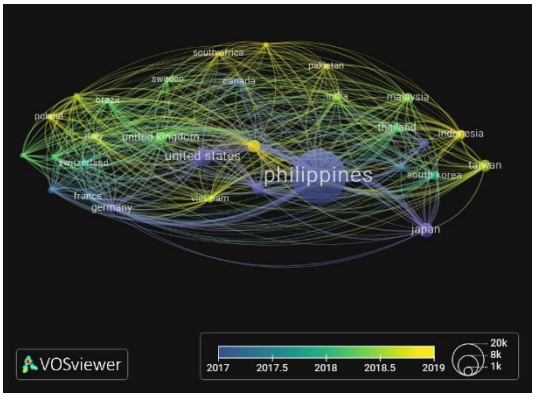

Fig. 5:Overlay Visualization of Collaboration Network of Countries. Also available at: https://tinyurl.com/2bxzucr5

The findings further show that recent international engagements of Philippine HEIs are with Saudi Arabian and Chinese institutions. Studies have also confirmed the rise of international collaborations of Saudi Arabia (Mhamdi, 2025) and research collaboration of China with ASEAN countries (Liang et al., 2023). These findings suggest that Philippine HEIs should strategically expand domestic cross-institutional networks and international partnerships, capitalizing on the proven value of collaboration, not just for research output, but for elevating the country's presence in global SDG-related scholarship. Studies support the strong correlation of collaboration and increased research productivity (Ceballos et al., 2017; Aldieri et al., 2018; Bikar et al., 2019).

Conclusions

The study determined the productivity of higher education institutions in SDG-related research or research that address specific SDG targets. HEIs in the Philippines mostly contributed health-related research because of the national thrust to address health issues in the country. The lack of reliable data for poverty indicators and lesser prioritization of gender-related studies resulted in lower research productivity in these SDG targets. Although all SDGs significantly correlated with each other, certain SDGs have stronger synergy with others while some SDGs have weaker connection. Researchers must maximize these interactions to draft future research that address significantly correlated SDGs. It could also be an opportunity to conduct research that strengthens the connection between weakly correlated SDGs.

Furthermore, HEIs can also prioritize targeting SDGs that align with their region's economic, environmental, and educational conditions because several regions have their own strengths and weaknesses in terms of addressing SDGs through research. Besides regional factors, institutional setting, specifically research culture among HEIs, also affect the productivity of SDG-related research. Universities can benchmark from the research policy of these highly producing institutions or high impact authors to boost their performance.

The rise of scholarly contributions of HEIs can also be attributed to global trends and events, such as the COVID-19 and digital transformation. As shown in the recurring topics, the pandemic and digital innovation were among the most productive research topics. This is an indication that current trends also affect which research topics are most interesting for scholars.

Lastly, the importance of establishing international and local collaborations can also increase research

productivity. Institutions can partner with other institutions to expand their capacity through resource and expertise sharing. The findings revealed several factors affecting research productivity from individual, institutional, regional, to international level. Productive research areas addressing SDGs were identified as well as the ones that need further exploration. Institutions can inform their research policies to foster a research culture driven by sustainable frameworks, aligned with regional and institutional conditions, towards local and global partnership for the goals.

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