

## Evaluating the research productivity of a state university in Central Luzon, Philippines: Basis for policy recommendations

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### ABSTRACT

This descriptive study evaluated the research productivity of a state university in Central Luzon, Philippines, for the past five years (2016-2020) as basis for policy formulation. The study used document analysis to ascertain the research productivity in terms of: i) Number of papers published in refereed international journals such as Scopus and Commission on Higher Education (CHED) accredited journals; ii) Number of faculty researchers with publication to these journals; and iii) Total number of citations. The data were obtained primarily from online publications found in the Google Scholar and Scopus databases. Results revealed that the state university's research productivity is relatively high in terms of published papers in refereed international journals for the past five years. However, the published papers in Scopus-indexed journals and CHED accredited journals are relatively low. An average number of faculty researchers publish their works in reputable journals, but very few faculties publish in the journals recommended by the CHED. Likewise, the university had a remarkable research citation record for the past five years. The findings of this research have important implications for policy to improve research productivity and enhance the research culture in higher education institutions (HEIs). Such policies include the need to have strong support to faculty researchers, forge research collaborations, source external research funding, and establish a sound incentive mechanism.

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## 1. INTRODUCTION

Higher education institutions (HEIs) are mandated to impart knowledge, create new knowledge, extend the created knowledge to the community, and develop products to uplift life quality. From conceptualization to dissemination, research is one of the critical functions of universities and colleges to help society progress and prosper. The creation of new knowledge and its dissemination through peer-reviewed journals is a vital role of research communities that include universities, laboratories, and research centers [1]. However, HEIs in the country still lags behind its neighboring universities in terms of research productivity.

The world declaration on higher education for the 21st century [2] articulated that knowledge creation, transmission, and application are the lifeblood of the knowledge-based economy, and HEIs are among the primary actors tasked to generate, transmit, disseminate, and apply knowledge. The role of HEIs

to create and disseminate knowledge is critical in the fourth industrial revolution (FIRE) and the context of volatile, uncertain, complex, ambiguous, diverse, and disruptive (VUCAD<sup>2</sup>) world.

The Philippines commission on higher education (CHED) tags the universities as research and development laboratories in building the human capital for the global economy [3], [4]. Based on the CHED [5] data, the total number of HEIs in the Philippines is now 1,975, they are 112 state universities and colleges (SUCs), 121 are local universities and colleges (LUCs), 1,729 private HEIs, and 13 special HEIs. The research productivity of the Philippines HEIs has been increasing for the past years though it still lags behind our neighboring countries in Southeast Asia [6].

The countries in Southeast Asia perform well in the global innovation index (GII) 2020, including Singapore, which ranked 8th, Malaysia (33rd), Vietnam (42nd), and Thailand (44th). The Philippines, which rose to rank 50th among the 131 economies, ranked in 80+ indicators grouped into innovation inputs and outputs [7]. The respective ranking of the Philippines in the different pillars are the following: knowledge and technology outputs (26th), business sophistication (29th), creative outputs (57th), infrastructure (63rd), market sophistication (86th), human capital and research (86th), and institutions (91st). Based on these data, the country still has to work on human capital and research, ranked below average.

According to the Scimago Institutions Ranking [8], the Philippines ranked sixth out of 10 member states in the Association of Southeast Asian Nations (ASEAN) region based on the April 2020 Scopus data. The country has 38,024 documents in the Scopus database and 34,839 of which are citable. The country recorded a total of 571,112 total citations with 55,765 self-citations. An average of 15.02 citations per document was recorded with an h-index of 246.

The Duterte administration (2016–2022) implemented a mechanism of enhancing and improving innovation under several programs: the collaborative research and development to leverage Philippines economy program (CRADLE), the niche centers in the regions for R&D program (NICER), the R&D leadership program (RDLead), and the business innovation through science and technology for industry program. In accordance, the CHED has also reformulated the national higher education research agenda (NHERA) III for 2019–2028. This agenda accentuates the unity of research with instruction and extension based on the 21st-century Humboldtian education concept. The NHERA III cultivates the networks of research excellence and research agenda with data-driven and comparative policy analysis [9]. The research plan also highlights global competitiveness and international scholarly standards. It could serve as an enabler of the evolution of bona fide research and innovation universities to revive the curiosity and creativity.

Several studies have been conducted in the Philippines regarding research productivity. These studies have focused on the research productivity of basic education schools [10], [11], research productivity of SUC leaders and their leadership orientation [12], research productivity of faculty [13], [14], implications of research productivity in HEIs [15], research productivity in specific fields [1], [16]–[18], barriers to research productivity [19]–[21], the role of government in research productivity of HEIs [22], building research culture and improving scientific productivity [23]–[26], and the performance of the Philippines scientific enterprise system [27].

The SUC leveling instrument measures the outcomes on key results area 2 (research capability and output) in terms of: i) Research center; ii) Externally-funded research; iii) Completed research-based paper published in the past three years in Scopus, Web of Science (WoS), and CHED accredited journals; iv) Research-based paper presented; v) Citations; and vi) Inventions. The present study, however, focused its inquiry on the research productivity of a state university, including: i) Number of papers published in refereed international journals such as Scopus and CHED accredited journals; ii) Number of faculty researchers with publication to these journals; and iii) Total number of citations. Monitoring the research productivity of an institution is very important to address the problems in terms of research and publications.

The SUC-respondent in this study envisions to be a progressive learner-centered research university and be recognized in ASEAN region. Hence, the researchers are interested in evaluating the institution's research productivity for the past five years (2016–2020) as baseline data for recommendatory policies to improve the institution's research culture and measure how near the university from achieving its vision. In particular, the study aimed at answering the following research questions: i) How many papers were published in refereed international journals, Scopus-indexed journals, and CHED Accredited journals?; ii) How many faculty researchers published their works in refereed international journals, Scopus-indexed journals, and CHED Accredited journals?; iii) How many citations did the university have for the past five years?; and iv) What are the most productive colleges in publishing their works in Scopus journal?

## 2. RESEARCH METHOD

The study adopted a descriptive research design utilizing document analysis. The source of publication data was the university's Google Scholar profile, which can be accessed online. The researchers also used the open-access Scopus preview database to obtain the publication data of the faculty research.

## 2.1. Data collection tools and procedure

Prior to data collection, the researchers created a Google Scholar profile of the university in January 2019. The set of publications included in the profile was obtained from the Google Scholar database using the following search parameters:

Address="Ramon Magsaysay Technological University," "President Ramon Magsaysay State University"  
Timespan=1999-2020

The publications that were not indexed in Google Scholar were manually entered by the researchers based on the data obtained from Google. The researchers also coordinated with the office of the university director for research and publications to countercheck the faculty researchers' publications. The setting up of the Google Scholar profile account took three months to finalize since this involved manually searching and correcting author-related and institution-related artifacts.

The researchers enabled the automatic updating of the university's Google Scholar to monitor new articles published and new citations. A subscription email for this purpose was also enabled. After almost a year of monitoring, the researchers have started documenting the number of publications per year and the number of citations. The researchers used data matrices using Microsoft Excel to update the publication data regularly.

For the Scopus publication, the researchers set up a Scopus profile account. They utilized the author search option to view the publication data of faculty researchers who have published papers in Scopus-indexed journals. For the CHED accredited journals, the researchers obtained a copy of CHED CMO 50, series of 2017, which contains the CHED-JIP (journal incubation program) recognized journals for 2017 to 2019. The journal titles were manually checked in the data matrix. For ASEAN citation indexed journals included in the Philippines association of state universities and colleges (PASUC) advisory No. 52, S. 2019 (guidelines in determining the reputability of journals for professorial accreditation under NBC No. 461), the same manual process was done.

## 2.2. Data analysis

The researchers prepared data matrices using Microsoft Excel to analyze the publication data based on the research problems easily. Manual coding was utilized by the researchers in preparing the publication data matrices. The research productivity indicators in this study were only confined in the number of papers in refereed journals, including Scopus and CHED accredited journals. The number of citations was also considered. The publication data included in the analysis were from the year 2016 to 2020. Publications that were published in the Ramon Magsaysay Technological University/President Ramon Magsaysay State University (RMTU/PRMSU) Journal were not included since they do not have an online version. Descriptive statistics such as frequency counts and percentages were used to present and describe the data. Validation of data was also conducted to establish reliability through correspondence to the concerned offices.

## 3. RESULTS AND DISCUSSION

### 3.1. Publication in international refereed journals

Table 1 shows the number of papers published in international refereed journals from 2016 to 2020. As presented in the table, there are 140 papers published in international journals for the past five years. These research outputs clearly demonstrate the research capability of the faculty and staff of the university. In 2016, very few papers were published by faculty researchers (9.29%), but the number was almost tripled in 2017 (24.29%). The highest number of published articles was in 2019 with 39 (27.87%) and the lowest was in 2016 with only 13 documents (9.29%). For 2020, publication frequency was lower (19.29%) compared to the previous year (27.86%). This could be attributed to the COVID-19 pandemic which was declared as a global health emergency in March 2020.

Table 1. Number of papers published in international refereed journals

Year	Frequency	Percentage
2020	27	19.29
2019	39	27.86
2018	27	19.29
2017	34	24.29
2016	13	9.29
Total	140	100.0

### 3.2. Publication in Scopus-indexed journals

Table 2 shows the number of papers published in Scopus-indexed journals from 2016 to 2020. As shown in the table, the university registered 18 documents in the Scopus database from 2016 to 2020. This figure is relatively low considering the number of faculty members holding associate professor to professor ranks. It can be noted that 2016 had the highest number of papers published in Scopus journals (38.89%), which are all engineering-related papers. In 2017, no document was published in Scopus. Although very few articles were published in 2018 (11.11%), Scopus outputs are increasing. Published papers in 2019 are under the science education discipline. In 2020, five published papers were related to science education, environmental science and biological science.

Table 2. Number of papers published in Scopus-indexed journals

Year	Frequency	Percentage
2020	5	27.78
2019	4	22.22
2018	2	11.11
2017	0	0.00
2016	7	38.89
Total	18	100.0

### 3.3. Publication in CHED accredited journals

Table 3 presents the number of publications in CHED accredited journals for the past five years. It can be gleaned from the table that only seven papers were published in CHED accredited journals, including ASEAN Citation Indexed (ACI) journals for the past five years. Only one (14.29%) was published in 2016, and no CHED accredited publication was published in 2018 and 2019. Three papers (42.86%) were published in 2017 and 2020. The faculty published their articles in LPU's Asia Pacific Journal of Education, Arts and Sciences (four papers), LPU's Asia Pacific Journal of Multidisciplinary Research (two papers), and PNU's The Normal Lights (one paper). These three journals are ACI journals, and the last two journals are CHED-JIP recognized journals.

Table 3. Number of papers published in CHED accredited journals

Year	Frequency	Percentage
2020	3	42.86
2019	0	0.00
2018	0	0.00
2017	3	42.86
2016	1	14.29
Total	7	100.00

### 3.4. Published faculty researchers

Table 4 presents the number of faculty researchers who published in international refereed journals, including Scopus-indexed and CHED accredited journals from 2016-2020. As shown in the table, there were 56 researchers of the university published their scholarly papers in international refereed journals for the past five years. This figure implies that there is an average number of researchers who disseminate their research results through publication. However, only ten faculty researchers were able to publish in Scopus-indexed journals, and only eight faculty researchers published their works in CHED accredited journals. The results suggest that although many faculties publish works in international journals, very few of these journals are indexed in Scopus and recognized by CHED. This has important implications in the selection of journals for publication.

Table 4. Number of faculty researchers who published their papers in refereed journals

Campus	Refereed journals	Scopus	CHED accredited
A	4	2	1
B	2	2	0
C	4	0	0
D	31	4	5
E	0	0	0
F	15	2	2
G	0	0	0
Total	56	10	8

Moreover, Campus D had the most significant number of faculty researchers, followed by Campus F. Faculty from Campus E and G have not yet published any paper in international refereed journals. Campus D had the highest number of faculty who published their works in Scopus with four followed by Campus A, B, and F with two researchers each. The results suggest that faculty researchers are distributed across the seven campuses of the university. Young campuses such as Campus E and G must be encouraged to publish their works in refereed journals.

### 3.5. Research citations for the past five years

Table 5 shows the number of research citations of the published papers of the faculty for the past five years. There is a remarkable number of research citations of the papers published by the university. From 2017 up to the present, the research citations had an increasing trend. For 2020, there were 157 citations, which was higher compared to the previous years. This suggests that the papers published by the faculty of the university are recognized and considered important sources of other researchers.

Table 5. Number of research citations

Year	Frequency	Percentage
2020	157	31.46
2019	106	21.24
2018	82	16.43
2017	64	12.83
2016	90	18.04
Total	499	100.0

### 3.6. Most productive colleges in terms of Scopus publications

Table 6 shows the most productive colleges in publishing their scientific publications in Scopus journals. Regarding research productivity in Scopus publications, the college of teacher education ranked first with eight scientific papers, followed by the college of engineering with six and college of arts & sciences and college of fisheries with two papers each. The results imply that Scopus publications are mostly in education and social sciences, engineering, life sciences, and fisheries. Faculty specialized in business and hospitality management, technology, pure sciences, nursing, forestry, agriculture, and veterinary medicine may consider publishing their works in Scopus-indexed journals.

Table 6. Most Productive Colleges in terms of Scopus publications

College	Frequency	Percentage
College of Arts & Sciences	2	11.11
College of Engineering	6	33.33
College of Fisheries	2	11.11
College of Teacher Education	8	44.44
Total	18	100.00

### 3.7. Discussion

The study gauged the research productivity of a HEI in the Philippines. Research productivity includes all research outputs in terms of published journal articles, copyrights and patents, conference proceedings, funded research, citations, and other scholarly papers [28]. In terms of publication in international refereed journals of the university, the publication is relatively high for the past five years. However, for the year 2020, the university recorded a very low publication frequency. This may be due to the COVID-19 pandemic, limiting the researchers to conduct studies and eventually publish them. However, this figure is expected to rise further towards the end of the year due to papers still pending publication. HEIs are perceived as fountainheads of great ideas, the center of creativity and innovations, and providers of intelligent solutions to human problems besetting society [29]. Acknowledging research as a crucial element of their responsibilities, faculty members of HEIs have constantly demonstrated research productivity and other aspects that contribute to the procedure [12]. Suson *et al.* [20] averred that with the advent of internationalization, research productivity within an HEI is significant for its survival and sustainable development. Knowledge-based and innovation-driven development is likewise imperative.

The institution recorded very few publications in Scopus-indexed journals. The results are parallel with Anito, Limjap, and Padagas [30], which revealed that their HEI-respondent registered only three Scopus

papers within a 10-year period (2008-2017). This implies that while the institution consciously endeavors to generate several studies, very few of these papers are published in refereed journals, including those indexed in Scopus. The university must continue to promote among its faculty publications of journal articles to refereed journals indexed in WoS, Scopus, ASEAN citation index, and those which are CHED-recognized. In this way, the scientific productivity of Filipino scholars and researchers will be reflected through these databases. Barrot [16] reiterated that to improve an educational institution's research performance, the government needs to provide assistance such as funding, research facilities, and human resources.

As to journals recognized by the Philippines higher education commission and ASEAN citation index (ACI), the university recorded a very low output. The results imply that more faculty must be encouraged to publish their scholarly papers in the CHED-recognized journals. HEIs may also consider subjecting their institutional journals for CHED accreditation and possible indexing to other citation databases such as ACI. While research is etched in government policies on higher education, Philippines HEIs need to introduce innovative research programs that could help accelerate the production and publication of research [30], specifically in Scopus-indexed journals.

Only 56 researchers in the university were able to publish in international refereed journals. This figure is relatively low against the total faculty population in the university (N=313). Seven major factors that lead to low research productivity in select Philippines HEIs include having limited time, lack of training on publication, fear of rejection, lack of interest, faculty laziness, limited funds, and lack of institutional support [31]. The high research citations of the papers published by the institution is an indicator of high-quality research publications. Because of the connection between research collaboration, publications, and citations, higher learning institutions consider various methodologies to forge more collaboration [23].

The college of teacher education and college of engineering were considered as the most productive colleges in publishing their scientific works to reputable journals. Faculty in tertiary educational institutions are researchers and scholars who need to be in active engagement in instruction, research, and extension works. They must also publish their scholarly works to get promotions and secure tenure. However, for several faculty, the great demand for teaching time leaves very limited time to conduct research [15].

Assessing research productivity is a significant process because it identifies the available pool of experts in an institution or country, determines the effectiveness and quality of their researchers, and determines less explored topics [32]. Research productivity evaluation likewise serves as a baseline for decisions regarding tenure and promotion, research grant allocations, higher education reform agenda, and recently as an indicator of university quality [32], [33]. Moreover, Darmadji *et al.* [34] emphasized that HEIs are mandated to enhance research as a pivotal element for a country's competitiveness.

#### 4. CONCLUSION

The state university's research productivity is relatively high in terms of published papers in refereed international journals from 2016 to 2020. However, the published papers in Scopus-indexed journals and CHED accredited journals are relatively low. There is an average number of faculty researchers who have published their works in reputable journals, but very few publications in the journals indexed in Scopus and recognized by CHED. Furthermore, the university had a remarkable research citation record for the past five years. The college of teacher education and college of engineering are the two most productive colleges in terms of research publications in Scopus. The findings of this research have important implications for policy and guidelines to improve research productivity and enhance the research culture in HEIs. A viable and strong faculty and staff development program shall be developed, including the pursuit of advanced studies, attendance to retooling programs, and participation in research capability-building activities. Relevant in-house training and workshops on research conceptualization, proposal preparation and research publication may be spearheaded to capacitate the faculty and staff to get more research funding and grants. Sustain the conduct of in-house research evaluation to encourage faculty to present their ongoing and completed papers. Likewise, allocate adequate funds for research presentations in reputable conferences, colloquia, and other academic fora at regional to international levels.

Sound incentive mechanisms can be institutionalized to faculty members who engage in research activities, specifically those who have published their papers in Scopus, WoS, and CHED recognized journals. These incentives may be in the form of monetary reward, provision of equivalent teaching load (ETL), and other relevant support. In this way, faculty researchers will be attracted to publish their papers in different reputable publications. An annual awarding ceremony may be done to recognize outstanding research projects/activities and researchers to boost the morale of the researchers in the university. The university may consider the yearend assessment and evaluation of research outputs to ascertain the congruence of the research outputs to the university's research agenda. The review of the university research agenda may also be done at least every five years to include the current and emerging trends in research, development, and innovation.

Establish linkages, partnerships, research networks with national and international organizations and with other HEIs for mentoring purposes and for external research funding. Establish research centers on engineering, teacher education, forestry, and technology development, to create more knowledge for the benefit of the people and adopted communities. Encourage faculty researchers to create their researcher profiles such as Google Scholar, ORCID, and ResearchGate, to widen the dissemination of their published research for higher citations. Moreover, these profiles will also help future researchers easily check the publication metrics of each researcher of the university and identify a pool of experts. Faculty who has scientific publications may also be encouraged to apply for membership to scientific organizations such as the DOST-National Research Council of the Philippines (NRCP) to widen their networks and get external research grants. Products of research and development such as IEC materials, instructional tools, creative works, policy manuals, and guidebooks may be submitted for copyright and patents.

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