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Research Article

The Current Landscape of Cybersecurity in the Philippines: A Bibliometric Analysis

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ABSTRACT

Introduction: Cybersecurity is crucial in today's digital landscape, safeguarding data, networks, and computer systems from emerging threats. As cyber risks escalate, the need for robust security measures becomes increasingly vital for both public and private institutions. This study examines cybersecurity research publications in the Philippines, analyzing trends from 2018 to 2024 using data from the Scopus database. Findings from 36 research publications reveal a growing interest in cybersecurity research, with a noticeable upward trend. The School of Information Technology at Mapua University in Makati, Philippines, leads with the highest number of contributing authors, emphasizing its pivotal role in advancing cybersecurity studies in the country.

Keywords: bibliometric analysis, cybersecurity, Philippines, Scopus, VOSviewer

INTRODUCTION

The advent of technology has brought myriad of opportunities as well as challenges particularly in the domain of cybersecurity [1-3]. Cybersecurity is simply the process of protecting computer systems, data, and networks from unauthorized access and even to digital attacks. Cybersecurity is cardinal for maintaining the confidentiality, integrity, and availability of data which is crucial for both personal information and complex government systems [4]. The landscape of cybersecurity is becoming complex as different nations promote integrating digital solutions across diverse sectors such as finance, healthcare, and education, digital threats and other vulnerabilities have similarly intensified. Digital environment has become a double-edged sword, where the benefits of technological advancements are often countered by the increasing sophistication of cyber-attacks that threaten sensitive data and critical infrastructure. As businesses and government agencies strive to keep pace with these rapid changes, the need for robust cybersecurity measures has never been more critical to safeguard against potential breaches and maintain public trust [5]. Emerging technologies like artificial intelligence and machine learning are now being harnessed not only to enhance security protocols but also by cybercriminals to exploit weaknesses, creating an ongoing battle between defenders and attackers in this evolving digital landscape [6-8].

Cybersecurity in the Philippines represents a complex phenomenon characterized by several challenges and strategic initiatives spanning diverse sectors. The nation is confronted with considerable risks stemming from cybercriminal activities such as phishing, extortion, and non-consensual pornography, which are aggravated by inadequate cybersecurity protocols and a general lack of awareness [9,10]. Initiatives aimed at mitigating these threats comprise gamified educational interventions, the integration of ethical artificial intelligence, and the establishment of comprehensive cybersecurity frameworks particularly the Philippine Cybercrime Prevention Act of 2012 [11,12]. Nonetheless, the efficacy of these approaches is inconsistent, necessitating the development of holistic strategies to fortify cybersecurity throughout the country.

Bibliometric analysis refers to a quantitative research methodology that uses statistical instruments to scrutinize scholarly written publications. The bibliometric analysis framework helps the researchers in evaluating the impact, and understanding the trends of academic work [13,14]. This bibliometric analysis aspires to investigate the current landscape of cybersecurity-researches in the Philippines and identifying principal contributors within this nascent domain. By investigating patterns in publication data, citation frequencies, authorship, and collaboration networks,

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bibliometric analysis yields significant insights into the progression of knowledge, the influence of particular works, and the dynamics inherent in scientific communication [15]. This methodology not only augments the comprehension of research landscapes but also cultivates collaboration among researchers, institutions, and policymakers who are pursuing innovation in cybersecurity [16]. The importance of bibliometric analysis resides in its capacity to elucidate the intellectual framework of a discipline and underscore study the research domains [17-18]. It functions as an indispensable instrument for scholars, academic institutions, and policymakers to assess the efficacy of research endeavors, distribute funding, and inform strategic choices in research and development. As the quantity of academic publications continues to rise at an unprecedented rate, bibliometric analysis becomes progressively vital for navigating the intricate terrain of scientific knowledge and comprehending the broader ramifications of research outcomes [19]. Through its methodology, bibliometric analysis not only measures scholarly production but also encourages a more profound understanding of the interrelatedness of knowledge across various fields.

OBJECTIVES

This research endeavors to investigate the present state of research publications in the realm of cybersecurity in the Philippines. The domain of cybersecurity research publications has undergone substantial transformation in the past years, mirroring the escalating intricacy and significance of cybersecurity within the contemporary digital landscape. The importance of cybersecurity in today's digital world should be a top concern in all the private and public sectors. Bibliometric analyses pertaining to cybersecurity research unveil pivotal trends, themes, and contributors, thereby offering an in-depth comprehension of the discipline's evolution and prospective trajectories. These findings will not only highlight the key areas of focus within cybersecurity research but also identify gaps in knowledge and potential avenues for future exploration, particularly as they relate to enhancing the security of digital assets in the Philippines.

METHODS

Scopus, a popular scholar database, was used by the researcher for this bibliometrics research [20]. As seen on Figure 1, the data collection and analysis started by entering keywords in the search fields [21] of the Scopus database. The following collection of terms were used in this study: "cybersecurity" and "Philippines" or simply: TITLE-ABS-KEY (cybersecurity) in search field number 1. Similarly, the term "Philippines" or simply: TITLE-ABS-KEY (Philippines) was used in search field number 2. The search results returned 37 papers. After applying the year filter, search results 36 papers.

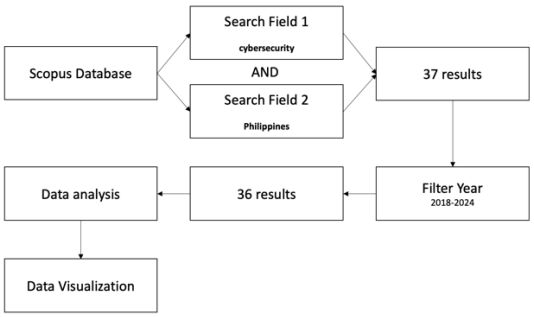

Figure 1. Data collection and analysis

Using the Scopus database, the keywords on search fields 1 and 2 have been filled out. Search result shows 37 papers. After applying the year filter, 36 results appeared. The researcher then began the data analysis. The research papers used in this study have the following subject areas: Computer Science; Social Sciences; Decision Sciences; Mathematics; Engineering; Medicine; Materials Science; Economics, Econometrics, and Finance; Dentistry; Business, Management, and Accounting; and Arts and Humanities.

RESULTS AND DISCUSSION

Table 1 shows that majority of the paper publications are from the conferences which account 72.2% of the total paper publications. This highlights the importance of research conferences in showcasing research papers, and the

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opportunity for publication is what authors are also looking forward to. Article publications shows 19.4% of the total paper publications. Book chapter publications at 5.5% and Short survey at 2.9%. Article publications are those from peer-reviewed journals or other academic platforms.

Table 1. Categories of Publication Documents

Document Type	Number	Percentage
Conference Paper	26	72.2%
Article	7	19.4%
Book Chapter	2	5.5%
Short Survey	1	2.9%

The data on Table 1 indicates that conference papers dominate the document types, accounting for 26 out of 36 total documents (72.2%). This suggests that most contributions in this field are presented at conferences rather than in journal articles or book chapters. Articles represent a smaller but significant portion, making up 19.4%, while book chapters and short surveys are minimal at 5.6% and 2.8%, respectively. The prevalence of conference papers implies that rapid dissemination of findings is prioritized. The lower number of articles and book chapters suggests that fewer studies undergo extensive peer review for journal or book publication.

Figure 2 shows the trends in annual publication. 2024 shows 14 publications, 2023 shows 10 publications, 2022 shows 5 publications, 2021 shows 3 publications, 2020 shows 2 publications, 2019 shows 1 publication, and 2018 shows 1 publication. It is evident that the publication rate is increasing.

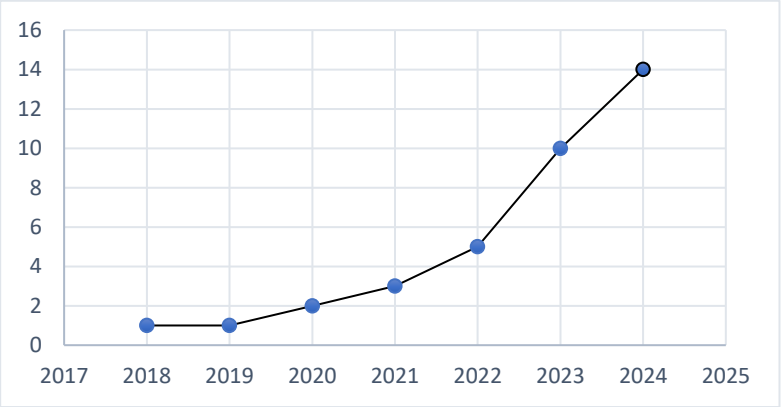

Figure 2. Annual publication trend

The data on Figure 2 reveals a clear upward trend in the number of publications over the years, indicating growing research activity. The highest number of publications was recorded in 2024 (14), showing a significant increase compared to previous years. From 2018 to 2020, research output was minimal, with only one or two publications per year. However, a steady rise began in 2021, reaching 10 in 2023 and peaking in 2024. This suggests increasing academic engagement, improved funding, or heightened interest in the field. The sharp rise from 2022 to 2024 highlights accelerated contributions, possibly due to emerging research trends or collaborative efforts.

Figure 3 shows the occurrence of keywords using VOSviewer. VOSviewer is used to present the network of keywords. Some of the keywords are cybersecurity, cyber security, artificial intelligence, and many more. It's also shows that there are keywords that are not part of the network.

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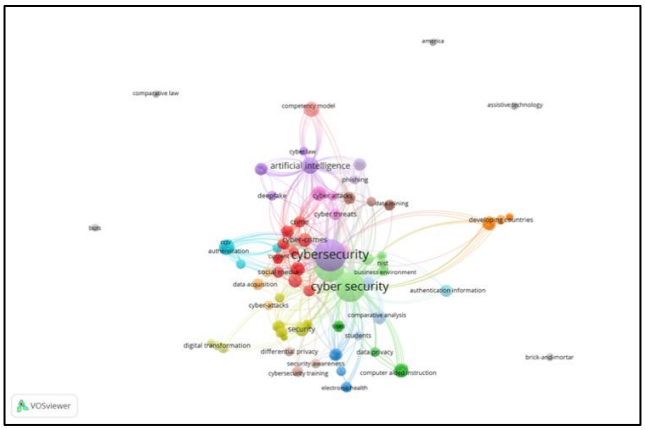

Figure 3. Co-occurrence of keywords

The data on Figure 3 highlights the interconnected keywords. The red cluster shows cyber threats, cybercrimes, social media, phishing, and cyber law—suggesting a focus on cybercrime and legal frameworks. The purple cluster shows artificial intelligence, deepfake, data mining—indicating AI-driven cybersecurity applications. The green cluster shows security awareness, data privacy, and authentication—emphasizing human factors and privacy concerns. The yellow cluster shows digital transformation, differential privacy—pointing to evolving security challenges in technology adoption. These clusters are the core focus of cybersecurity.

Figure 4 shows the network of co authorship using VOSviewer. It is clear that some authors have networks with other authors. It also shows that some authors have no network at all. The author named Blancaflor has the most network.

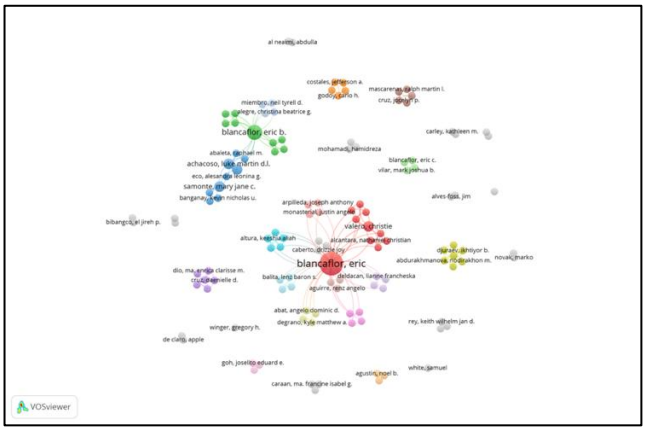

Figure 4. Co authorship

Figure 4 highlights the interconnection of co authorships. The VOSviewer co-authorship network visualization reveals that the author Eric Blancaflor as the central figure, indicating his extensive collaboration across multiple clusters. His network connects with diverse author groups, suggesting a key leadership or coordinating role in multi-author research projects. Several distinct clusters, each color-coded, represent sub-groups of co-authors, likely affiliated by topic or institution. Notable collaborators like Valerio Christie and Luke Martin Achacoso appear as secondary hubs. The dense central connections reflect strong collaborative ties, while isolated nodes suggest independent contributors or limited collaborations. In general, the map emphasizes interdisciplinary teamwork and core leadership figures in the research network.

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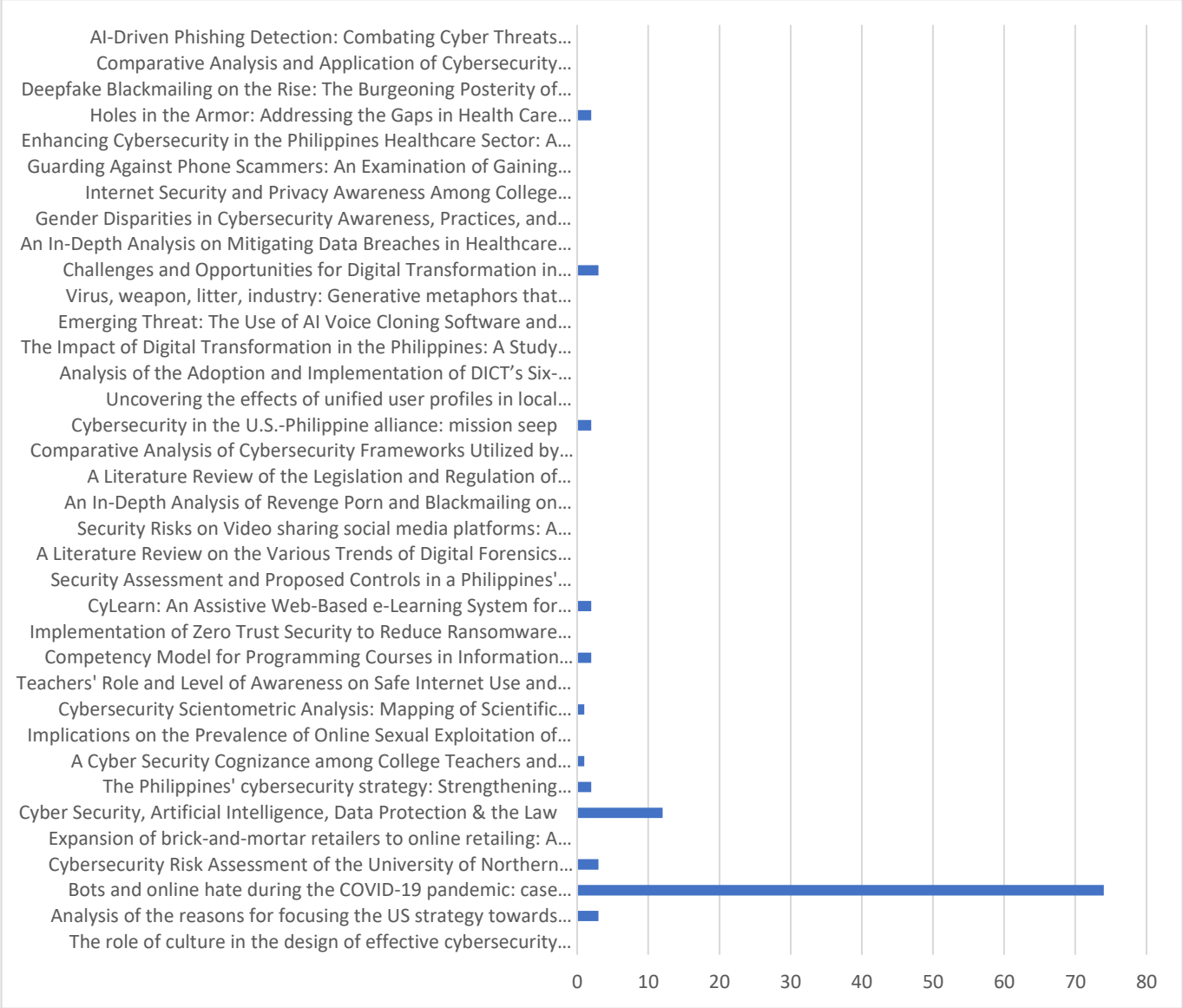

Figure 5. Number of citations

Figure 5 shows the paper title and its number of citations. The paper titled "Bots and online hate during the COVID-19 pandemic: case studies in the United States and the Philippines" got 74 citations. The paper title " Cyber Security, Artificial Intelligence, Data Protection & the Law" got 12 citations. The papers titled "Cybersecurity Risk Assessment of the University of Northern Philippines using PRISM Approach", "Analysis of the reasons for focusing the US strategy towards Asia-Pacific" and "Challenges and Opportunities for Digital Transformation in Philippine Microfinance Institutions" got 3 citations respectively.

Figure 6, on the other hand, shows the affiliations and number of authors. It is clear that Mapua University has the most number with 87 authors. Other affiliations are as follows: SecureTech, LLC, Abu Dhabi, United Arab Emirates with 2 authors; Shahid Beheshti University, Tehran, Iran with 1 author; Kharazmi University, Tehran, Iran with 2 authors; Ateneo de Manila University, Philippines with 1 author; CASOS Center, Institute for Software Research, Carnegie Mellon University, Pittsburgh, United States with 1 author; University of Northern Philippines, Vigan City, Philippines with 1 author; Information Technology Department, Occidental Mindoro State College, Philippines with 2 authors; School of Information Technology, Mapua University, Makati, Philippines with 87 authors; Bayan Academy, Quezon City, Philippines with 4 authors; Eulogio "Amang" Rodriguez Institute of Science and Technology, Manila, Philippines with 1 author; De La Salle University, Philippines with 11 authors; La Salle Green Hills,

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Philippines with 1 author; Claret School of Quezon City, Philippines with 1 author; Information Systems Program, De La Salle – College of Saint Benilde, Manila, Philippines with 3 authors; CCIT, National University, Philippines with 1 author; National University, Philippines with 1 author; School of Public & International Affairs, University of Cincinnati, Cincinnati, OH, USA with 1 author; Adelaide Law School, The University of Adelaide, Australia with 1 author; Polytechnic University of the Philippines, Philippines with 1 author; Nueva Ecija University of Science and Technology, Cabanatuan City, Philippines with 2 authors; College of Computer Studies, Carlos Hilado Memorial State University, Bacolod City, Philippines with 1 author; Information Technology Department, University of Technology and Applied Sciences, Shinas, Sultanate of Oman with 1 author; Center for Secure and Dependable Systems University of Idaho,Moscow,Idaho,USA with 1 author; Goldenstate College of Malungon,Department of Education,Malungon,Sarangani,Philippines with 1 author; RTI International Philippines, Ortigas Center, Pasig City, Philippines; and Regional Office 8, Philippine Health Insurance Corporation, Cebu City, Philippines with 1 author.

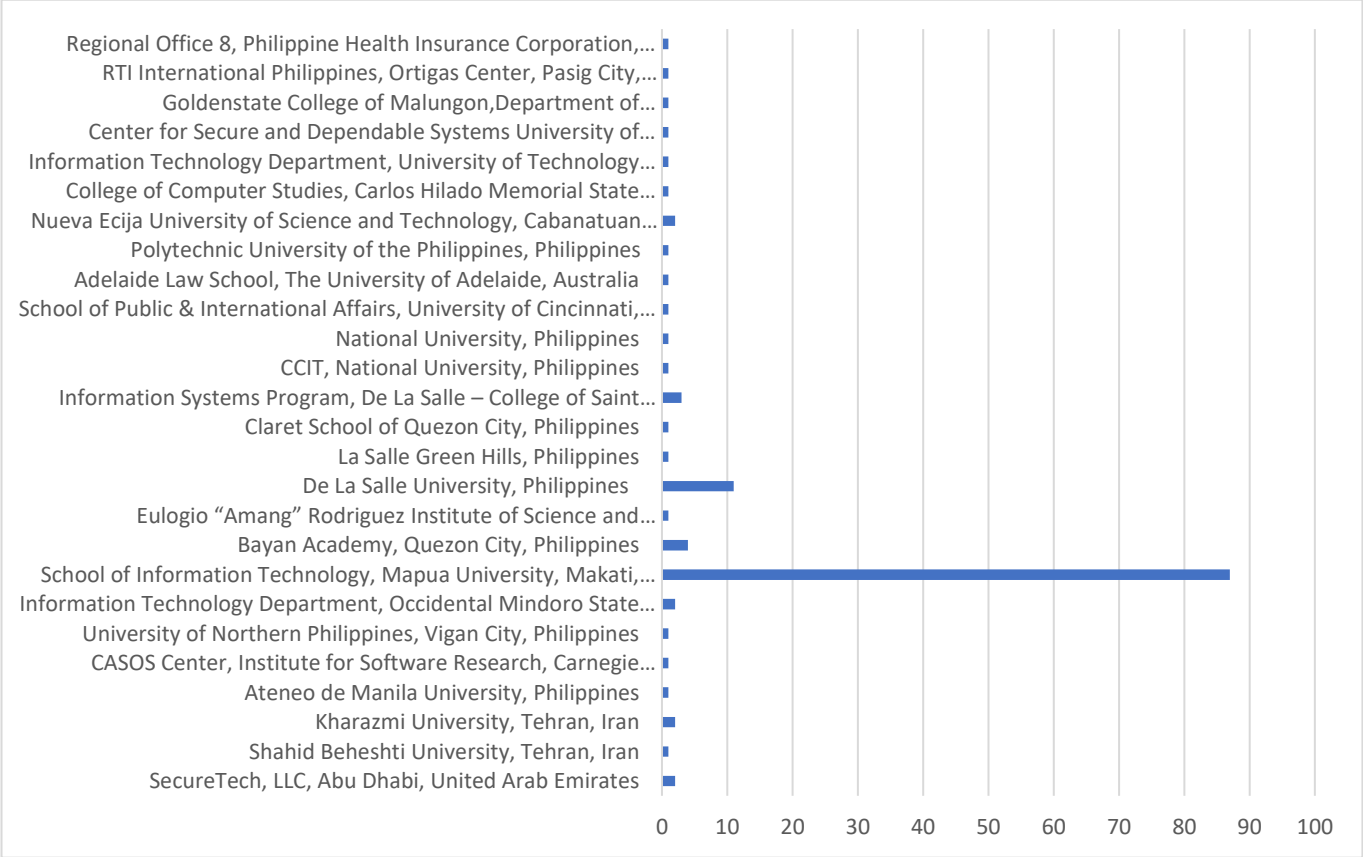

Figure 6. Affiliations and number of authors

The data on Figure 6 presents 131 total authors from 26 institutions across six countries namely: United Arab Emirates, Iran, Philippines, United States of America, Australia, and Oman. The Philippines dominates the list, contributing 120 authors (91%), with the School of Information Technology, Mapua University leading at 87 authors (66.4%). Other significant contributors include De La Salle University (11 authors) and Bayan Academy (4 authors). Outside the Philippines, Iran (3 authors), United Arab Emirates (2 authors), United States (2 authors), and Australia, Oman (1 each) show minor representation. The high concentration of authors in select institutions suggests large-scale collaboration or institutional research programs. Meanwhile, the presence of international institutions indicates some level of global engagement. The dominance of Filipino institutions suggests a regional research focus with a strong academic network within the country.

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CONCLUSIONS

The trend of paper publication in the realm of Cybersecurity in the Philippines in indeed increasing. However, it is only evident in certain higher education institution. This trend points to a concentration of research activity on few schools. Such disparity may indicate possible reasons like limited access to funding, limited access to information e.g. cybersecurity curriculum, or absence of policy support. Similarly, conferences provide platforms to researchers to showcase their papers. The prevalence of conference papers indicates that this method allows faster dissemination and feedback rather than journal publication. Additionally, the relatively low number of journal articles and book chapters reflects a gap in sustained, in-depth research.

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