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International research outputs of Can Tho University: The first, the most, and the top

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ABSTRACT

This research reviews the expansion of academic literature generated by Can Tho University (CTU), as indexed on Scopus, Web of Science (WoS), and Dimensions databases. We examine various aspects of CTU's international research outputs, including domains of study, author data, publication statistics, and citation counts. The results reveal that both the quantity and quality of CTU's international research papers have steadily increased over the years. These findings are expected to provide CTU's leaders, administrators, and scholars with a comprehensive overview of the institution's research landscape over recent periods, enabling them to make well-informed decisions regarding the future direction of its research mission.

1. INTRODUCTION

Research outcomes, publications, citations, and reputation are important factors in university rankings or evaluations (Bar-Ilan et al., 2007). University rankings rely on various metrics to assess universities, international students' proportion, international faculty ratio, faculty-to-student ratio, citations per faculty, academic prestige, and employer reputation(Elbawab,2022). Consequently, in recent years, universities worldwide, including those in Viet Nam, have placed significant emphasis on their scientific research endeavors (Nguyen & Le, 2021). The quantity of articles published in esteemed scientific journals indexed in International Scientific Indexing (ISI) or Scopus is consistently pivotal in assessing a university's research effectiveness (Valencia, 2004). Through the analysis of these scholarly articles, one can gain insights into the comprehensive development of a university's research, prevailing research tendency, and other facets such as funding sources and collaborations among different disciplinesand departments within the institution (Nguyen & Le, 2021).

Since 2016, when Can Tho University (CTU) began showcasing its yearly ISI papers (those published in Web of Science-indexed journals) in its annual reports, there has been a consistent increase in the number of these prestigious research papers. This trend has been accompanied by a general rise in CTU's international research outputs overall. The year 2020 alone strikingly accounts for over one-third (260 papers) of the total 729 ISI indexed papers produced over the 2016-2020 period. The year 2020 also marks the first time CTU has 549 Scopus indexed articles (exceeding its yearly target of 500 Scopus indexed articles). This was honored as one of the 55 key milestones in the 55-year development history of Can Tho University (CTU, 2021). Most recently in 2022, of its 2,125 articles published, CTU had 692 Scopus indexed articles and 432 WoS indexed ones (CTU, 2022, p. 44-45).

Established in 1966, CTU has a long history of research activities, boasting thousands of publications across various journals. Nevertheless, up to the present, there has been no comprehensive research initiative aimed at consolidating and analyzing the outcomes of the university's research

endeavors. Inspired by CTU's impressive figures about its international research outputs, this paper takes a step forward to broaden the view by zooming in on this category of research output from international scientific citation indexing services. In providing these details, the paper also touches on other topics such as the most prolific fields and authors, as well as the top journals that cite or are cited by CTU, thereby paving new ways for increasing the quantity and quality of international research outputs.

The study aims to provide CTU's leadership, administrators, and academics a thorough understanding of the university's research history, and help them to shape future research directions.

2. MATERIALS AND METHOD

A comprehensive synthesis and analysis of CTU affiliated articles indexed in Scopus and WoS were conducted. WoS and Scopus have undergone thorough comparisons, encompassing direct assessments of their coverage (Gavel & Iselid, 2008; Mongeon & Paul-Hus, 2016, Vieira & Gomes, 2009) and studies that involve comparing citations (Martín-Martín et al., 2018).

It is noticed that approximately 99.11% of the journals indexed in WoS are also indexed in Scopus (Singh et al., 2021, p. 5113). Our data collection encompassed all journals within the Scopus database from 1991 to 2022, resulting in a total of 3646 articles (Scopus, August 31, 2023). Articles published prior to 1991 were excluded from our analysis due to their negligible quantity. However, these earlier articles were considered solely in the context of the initial recorded publications in Scopus.

However, for the assessment of CTU article citations and citation patterns, data were also sourced from Dimensions, which is a newlylaunched publication and citation database. It is internationally recognized for its extensive coverage, boasting 82.22% more journals than WoS and 48.17% more journals than Scopus (Singh et al., 2021, p. 5113).

All datasets drawn were specified to have fields such as title, authorship details, institutional affiliations, publication year, and field of research for the articles. Since the three databases utilize different research field classification systems: Dimensions following the Australian and New Zealand Standard Research Classification (ANZSRC) (Dimension, 2022), WoS has its 153 WoS Subject Classification (Kedrick et al., 2022, p. 16), while Scopus tracking around 27 major subject categories and over 300 minor subject fields (Pranckutė, 2021, p. 24), the authors had to decide upon one system. Eventually, the subject areas filter from Scopus was used, given that most of the by-area analyses were run on the Scopus dataset.

3. RESULTS AND DISCUSSION

3.1. General statistics about CTU's publications

Based on statistical data, the outcomes of international publications within the Scopus and WoS databases tended to increase. In recent times, publications falling within the scope of journals indexed by the Scopus database have, in comparison to the WoS database, constituted the majority.

By the end of 2022, Can Tho University (CTU) had accumulated over 3,600 publications in the Scopus database, covering a period of three decades from 1991 to 2022. This significant surge in published works over a relatively short span underscores a commendable endeavor, confirming the accuracy of CTU's operational practices, and its direction and strategic focus on international research.

In the CTU Annual Report for the year 2022 (p. 28), it was reported that CTU is actively engaged in 461 scientific research projects funded with a total of 43 million VND. Additionally, the university is involved in 40 international collaboration projects with a combined funding of 21.9 billion VND. Moreover, the report highlights the publication of a total of 2,125 research articles, comprising 432 articles indexed in WoS, 692 articles indexed in Scopus (p. 44-45), and an additional 966 articles published in international scientific journals (p. 39). In this section, we present statistical results regarding the publications of CTU in journals indexed in various databases. Specifically, we will analyze the publications by type, area, and year.

3.1.1. Publication output by types

The CTU's documents published in Scopus are classified into various categories.The number and classification of documents published by CTU from 1991 to 2022 are presented in Table 1. The dominant type in international publications is journal articles with approximately 78.5% of the publications, while conference papers accounted for 15.3%. Other document categories, suchas book chapters and reviews, account for negligible portions.

Table 1. Document types of all CTU's publications

	Types	No.
1.	Article	2743
2.	Conference paper	534
3.	Book chapter	113
4.	Review	77
5.	Others	27

Source: Data from Scopus database, August 31, 2023

3.1.2. Publication output by area

The Scopus database categorizes research across a diverse array of disciplines. Figure 1 illustrates the representation of CTU publications within the top 10 main fields. As per the data provided in Table 2, the five top prevailing domains of research encompass Agricultural and Biological Sciences, each constituting almost 20% with over 1400 publications, while Computer Science, Environmental Science, and Engineering account for approximately 10% each around 700 publications. A noteworthy observation is Mathematics, with an aggregate of over 400 research outcomes with 5.9% of the subject areas.

This genuinely mirrors CTU's research landscape, emphasizing its well-established, influential, and central areas of study. This finding underscores the importance of channeling investment and focus into emerging interdisciplinary fields while also necessitating targeted and constructive strategies moving forward. From a strategic standpoint, it is imperative to allocate resources toward establishing robust research teams, constructing pivotal laboratories, and fostering enhanced research collaborations with both domestic and international individuals and institutions (CTU, 2021).

These highly published areas of CTU can be seen consistently reported in its annual reports since 2013. The Faculty of Agriculture stands out as the most enduring and earliest-supported faculty, under the auspices of Japanese investment during the period of 1969-1976, boasting substantial resources and the longest operational history. Within grant categories, they consistently engage in research, training, and resource provision. This assertion gains validation from the initial CTU articles, which materialized when faculty members pursued education in Japan.

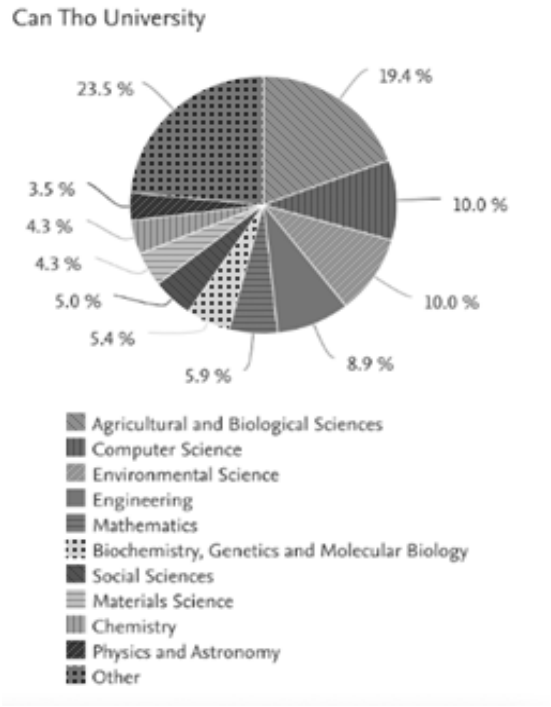

Figure 1. CTU Papers by Subject Areas

Source: Data from Scopus database, August 31, 2023

Table 2. Top 5 Subject Areas

Areas	Publications
1. Agricultural and Biological Sciences	1430
2. Computer Science	740
3. Environmental Science	735
4. Engineering	658
5. Mathematics	432

Source: Data from Scopus database, August 31, 2023

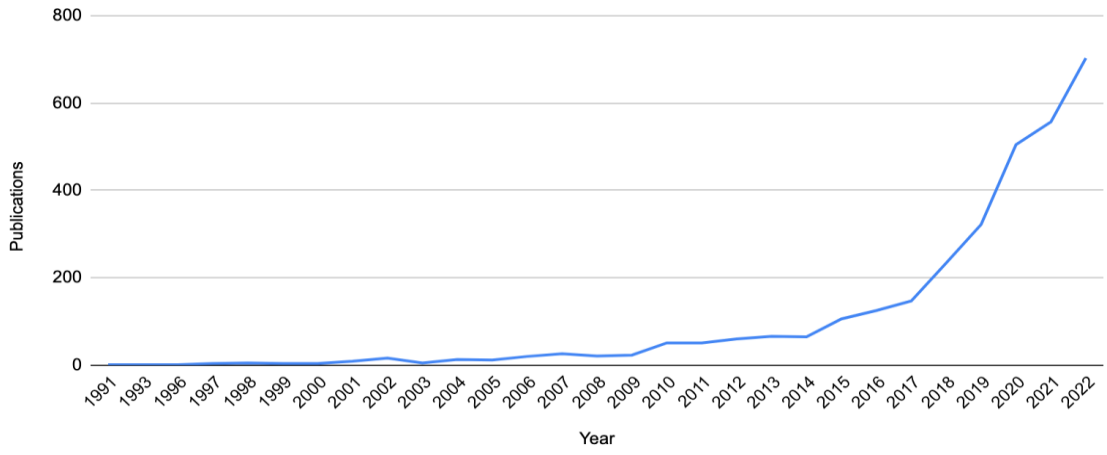

Figure 2. CTU's international publications in the period 1991 – 2022

Source: Data from Scopus database, August 31, 2023

3.1.3. Publications output by year

The analysis focuses on the number of CTU publications from 1991 to 2022 (Figure 2) because, prior to 1990, Can Tho University was newly founded and faced significant challenges. During this period, it had to navigate the complexities of being in a war-torn country, including managing construction, institutionalization, staffing, and training. In the subsequent years, CTU had to restructure its operations and develop within a new socio-political and economic context. The quantity of CTU papers during the years 1991 to 2000 was quite limited, consistent with the reported data from CTU. For the next 10 years, CTU had to gather momentum to join the trend of innovation and integration emerging in the higher education community worldwide (CTU, 2021).

There was a modest increase, with minor fluctuations observed between 2001 and 2009. Subsequently, there was a slight uptick during the latter part of the innovation phase over the following five years (2010-2014). This increase in research outputs is due to the increased number of faculties, which were the 14 schools and colleges having been [re]established from the 4-5 faculties since 1995 (the first phase of innovation), the strategic enhancement of teaching quality and methods, research capability, foreign language competence, and information technology skills (the four-fold innovation strategy pursued throughout the innovation phase), and the flux of international collaborations ventures that came upon CTU being able to prove itself as an institution highly capable, with its enhanced human resources, for transnational partnership (CTU, 2021).

The further enhancement is well reflected in the consistent rise of international research output, which is the significant growth observed from 2015 up to the present. Although there were still fluctuations and unstable increases in previous years, CTU seemed to gain momentum from the latter part of the innovation phase; therefore, the number of publications increased since then. Remarkably, the initiative to advance research-based education being acted on at CTU since 2015 led to the significant rise in the number of publications from 2018 to 2022 (CTU, 2021). This surge can be attributed in part to changes in CTU's priorities, which placed greater emphasis on research and international engagement (CTU, 2022).

3.1.4. The first publications from CTU that can be found

Exploring the first CTU-affiliated publication was a concern because this revealed the first publications depending on the publication year, the first author being the CTU's faculty member or the time when the CTU was officially established. Although CTU was established in 1966, the first publications were found in publishing databases from the year 1973.

Table 3 lists several international articles with authors affiliated with CTU at the time of publication. Vo Tong Xuan was the first main author of a conference paper in 1973 from Google

Scholar. In addition, an international article by Inouye and Xuan published in 1973 was found in Dimension, in which Xuan was the co-author. Other articles from Can Tho University that can be found in Scopus were about Hereditary changes in Capsicum annuum. The main author of these papers was Ohta Yasuo, and the co-author was Phan Van Chuong, CTU's staff at that time. In other international papers, Tran Phuoc Duong was the first main author found in the academic international journal *Plant and Soil*. These articles were about applying rhizobium inoculation and using ash and mulch in soybean planting. He published Response of soybean to rhizobium inoculation and Response of soybean to chemical nitrogen fertilizer and rhizobium inoculation in Plant and Soil Journal in 1984, co-authoring with Cao Ngoc Diep, Nguyen Huu Hiep, and others. After that, also in Plant and Soil, he published an inexpensive cultural system using ash for the cultivation of soybean on acid clay soils in 1986, this time co-authoring with Cao Ngoc Diep. Through this information, we can see that CTU began publishing international publications, and this can be considered a turning point in the development of scientific research from the 1970s and 1980s.

Table 3. The first publications of CTU

	Publications	Sources
1.	Xuan, V. T. (1973). Double transplanting of rice in Mekong Delta. In *International Rice Research Conference*.	Google Scholar
2.	Inouye, J., & Xuan, V. T. (1973). On the Growth Habits of Floating, Single-and Double-Transplanting Rice Plants in South Vietnam I. Mesocotyl elongation in darkness. *Japanese Journal of Tropical Agriculture*, *17*(2), 75-80.	Dimension
3.	Ohta, Y., & Van Chuong, P. (1975a). Hereditary changes in Capsicum annuum LI Induced by ordinary grafting. *Euphytica*, *24*(2), 355-368.	Scopus
4.	Ohta, Y., & Chuong, P. V. (1975b). Hereditary changes in Capsicum annuum L. II. Induced by virus-inoculated grafting. *Euphytica*, *24*(3), 605-611.	Scopus
5.	Duong, T. P., Diep, C. N., Khiem, N. T., Hiep, N. H., Van Toi, N., Van Lich, N., & Le Nhan, T. K. (1984). Rhizobium inoculant for soybean [Glycine max (L.) Merrill] in Mekong Delta: I. Response of soybean to Rhizobium inoculation. *Plant and soil*, *79*, 235-240.	Scopus
6	Duong, T. P., Diep, C. N., Khiem, N. T., Hiep, N. H., Van Toi, N., Van Lich, N., & Le Nhan, T. K. (1984). Rhizobium inoculant for soybean [Glycine max (L.) Merrill] in Mekong Delta: II. Response of soybean to chemical nitrogen fertilizer and Rhizobium inoculation. *Plant and soil, 79*, 241-247.	Scopus
7.	Duong, T. P., & Diep, C. N. (1986). An inexpensive cultural system using ash for cultivation of soybean (Glycine max (L.) Merrill) on acid clay soils. *Plant and soil*, *96*, 225-237.	Scopus

Source: Data from Scopus database, August 31, 2013

Table 4. Top publishing authors from CTU

Authors	Specialization	Publications
1. Huynh Xuan Hiep	Information Technology	103
2. Nguyen Thanh Phuong	Aquaculture	91
3. Dinh Minh Quang	Biology	82
4. Lam Quoc Anh	Mathematics	68
5. Huynh Trong Phuoc	Civil Engineering	64

3.1.5. Top publishing authors from CTU

In this section, we analyze which researchers working in which fields have contributed to a substantial number of international scientific publications. Due to the time constraints, the research aimed to pinpoint the five most prolific and highly cited authors during the period spanning from 2019 to 2022. The list of authors and the number of their articles is presented in Table 4. Author Huynh Xuan Hiep, specializing in Information Technology, emerged as the standout figure with an extensive body of work, surpassing 100 publications in the field of informatics. Another notable contributor is Nguyen Thanh Phuong, specializing in Aquaculture, who has accumulated an impressive 91 publications, while Dinh Minh Quang, with a specialization in Biology, has an admirable record of 82 works. As for the remaining authors, Lam Quoc Anh, who specializes in Mathematics, and Huynh Trong

Phuoc, specializing in Civil Engineering, each have approximately 60 publications.Hence, researchers in the field of information technology tend to publish more international. Papers compared to other fields such as fisheries and biology.

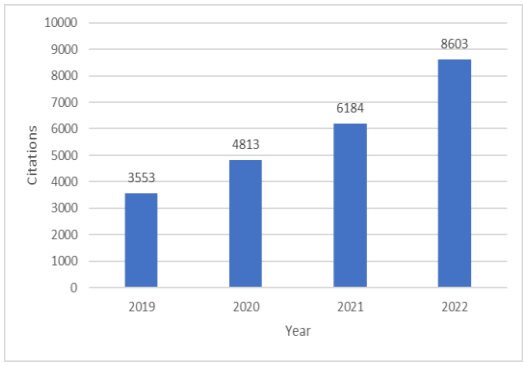

Figure 3. CTU Citation Review 2019-2022

Source: Data from Scopus database, August 31, 2023

3.2. General citation statistics about CTU's publications

In this section, we focus on analyzing variousparameters related to CTU's articles, such as the number of citations, the top authors affiliated with CTU who receive the most citations, the articles and fields that are most frequently cited by CTU, and the journals that CTU cites the most and is cited the most by others.

3.2.1. CTU citation review

Citations examined in Figure 3 from Scopus exhibit a notable increase, progressing from 3,553 citations in 2019 to 4,813 in 2020, surpassing 6,184 in 2021, and exceeding 8,603 citations in 2022. This illustrates that the substantial surge in the quantity of citations in recent years represents a significant endeavor aimed at assisting CTU in its gradual progression toward meeting international research benchmark.

3.2.2. Publications most cited in 2021-2022

Table 5 exhibits the leading 5 CTU publications that garnered the highest citation counts in the fields of Agricultural and Biological Sciences, along with Chemistry, during 2021-2022. The paper authored by Le et al. (2021) has garnered the most citations and was published in the Method Journal, focusing on the field of Bioinformatics. The other three publications, namely Hessel et al., 2022; Chen et al., 2021; and Le & Ho, 2022, each have around 50 citations, and the fifth highest is Pham et al., 2021, with 42 citations.

Remarkably, the fourth most cited publication of author Le and Ho stands out with the highest field-weighted citation impact (FWCI) of 13.59, whereas the other works range from 1.44 to 8.42 in their field-weighted citation impact. This highlights that the impact of citations on publications is not solely contingent on the quantity of citations they receive. The recent articles by CTU authors have garnered a significant number of citations. This demonstrates that the research quality of CTU authors has notably improved, with their publications attracting the attention of many other researchers.

Table 5. The Most Cited Publications of CTU 2021-2022

	Publications	Citations	FWCI
1.	Le, N. Q. K., Ho, Q. T., Nguyen, T. T. D., & Ou, Y. Y. (2021). A transformer architecture based on BERT and 2D convolutional neural network to identify DNA enhancers from sequence information. *Briefings in Bioinformatics*, *22*(5), bbab005.	66	8.42
2.	Hessel, V., Tran, N. N., Asrami, M. R., Tran, Q. D., Long, N. V. D., Escribà-Gelonch, M., ... & Sundmacher, K. (2022). Sustainability of green solvents–review and perspective. *Green Chemistry*, *24*(2), 410-437.	55	4.76
3.	Chen, J. S., Le, T. T. Y., & Florence, D. (2021). Usability and responsiveness of artificial intelligence chatbot on online customer experience in e-retailing. *International Journal of Retail and Distribution Management*, *49*(11), 1512-1531.	53	5.16
4.	Le, N. Q. K., & Ho, Q. T. (2022). Deep transformers and convolutional neural network in identifying DNA N6-methyladenine sites in cross-species genomes. *Methods*, *204*, 199-206.	50	13.59
5.	Pham, D. T., Chokamonsirikun, A., Phattaravorakarn, V., & Tiyaboonchai, W. (2021). Polymeric micelles for pulmonary drug delivery: A comprehensive review. *Journal of Materials Science*, *56*, 2016-2036.	42	1.44

Source: Data from Scopus database, August 31, 2023

3.2.3. All time most cited publciations

An overview of CTU's most frequently cited publications spanning from 1991 to 2022, assourced from the Scopus database, is described in Table 6. These publications predominantly revolve around subjects like Food Research, Chemical Technology, Aquaculture, Agricultural and Biological Sciences. The top-ranking publication, with 1104 citations and an impressive field-weighted citation impact of 13.9, was featured in the Journal of Food and Drug Analysis. One of the co-authors, Huynh Lien Huong, whose major is Chemical Technology, as indicated by information available on CTU's website as of 2023. The second and third most cited publications have citations totaling approximately two-thirds of the top-ranking publications. Furthermore, the fourth most cited paper, with 300 citations and a field-weighted citation impact of 9.53, is authored primarily by a CTU staff member, distinguishing it from the author's other works where they do not hold the primary authorship role. Even though they are not the main authors, the articles with CTU-affiliated authors have a substantial number of citations. This also indicates that the quality of these articles can be considerable and have a high impact on the research community.

Table 6. The most cited publications of CTU all time

	Publications	Citations	FWCI
1.	Do, Q. D., Angkawijaya, A. E., Tran-Nguyen, P. L., Huynh, L. H., Soetaredjo, F. E., Ismadji, S., & Ju, Y. H. (2014). Effect of extraction solvent on total phenol content, total flavonoid content, and antioxidant activity of Limnophila aromatica. *Journal of Food and Drug Analysis*, *22*(3), 296-302.	1104	13.9
2.	Kuenzer, C., Bluemel, A., Gebhardt, S., Quoc, T. V., & Dech, S. (2011). Remote sensing of mangrove ecosystems: A review. *Remote Sensing*, *3*(5), 878-928.	499	4.42
3.	Nguyen, T.D., Phan, N.H., Do, M.H., Ngo, K.T. (2011). Magnetic Fe2MO4 (M:Fe, Mn) activated carbons: Fabrication, characterization and heterogeneous Fenton oxidation of methyl orange. *Journal of Hazardous Materials*, *185*(2-3), pp. 653–661	312	5.59
4.	Nguyen, K. H., & Kakinaka, M. (2019). Renewable energy consumption, carbon emissions, and development stages: Some evidence from panel cointegration analysis. *Renewable Energy*, *132*, 1049-1057.	300	9.53
5.	Rico, A., Phu, T. M., Satapornvanit, K., Min, J., Shahabuddin, A. M., Henriksson, P. J., ... & Van den Brink, P. J. (2013). Use of veterinary medicines, feed additives and probiotics in four major internationally traded aquaculture species farmed in Asia. *Aquaculture*, *412*, 231-243.	260	7.79

Source: Data from Scopus database, August 31, 2023

FWCI: Field Weighted Citation Impact

3.2.4. Top publishing sources

In this section, we analyze the journals in which CTU staff have typically published their research. Table 7 provides insight into the leading ten source titles where CTU research papers are commonly featured, as per Scopus data from 2023. The top title in this list encompasses more than 60 published papers, spanning topics within Computer Science, Artificial Intelligence, and Bioinformatics. The second-ranked title group contains approximately 40 publications distributed across journals and conferences focusing on diverse fields like aquatic science, technical mechanisms, and pharmaceutical technology. The last title group, though slightly smaller in volume compared to the second group, maintains a relatively consistent range of subject areas.

Remarkably, the journals in which CTU publishes articles have relatively high rankings. Specifically, by using the Scimago Journal Rank (SJR) website, we can determine the rankings of these journals. For instance, in Table 7, *Aquaculture* holds a first quartile ranking (Q1), *Global Pharma Technology* and *Food Research* are in the third quartile (Q3). Additionally, *Communications in Computer and Information Science* is ordered within the fourth quartile (Q4). The quartile rankings are also presented in the CTU Annual Report in 2022. It indicates that the distribution of papers in various quartiles is as follows: 29.3% in Q1, 24.4% in Q2, 32.1% in Q3, and 14.2% in Q4 (p. 41). This bodes well for CTU's future research endeavors.

Table 7. Top titles of sources in which CTU papers are frequently published

	Journals	Numbers
1.	Lecture Notes in Computer Science Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics	63
2.	Aquaculture Aacl Bioflux (Q4)	45
3.	ACM International Conference Proceeding Series	43
4.	Journal of Global Pharma Technology (Q3)	40
5.	Iop Conference Series Materials Science and Engineering	38
6.	Communications in Computer and Information Science (Q4)	38
7.	Aquaculture (Q1)	37
8.	Food Research (Q3)	34
9.	Lecture Notes in Networks and Systems (Q4)	32
10.	Lecture Notes of The Institute for Computer Sciences Social Informatics and Telecommunications Engineering Lnicst	30

Source: Data from Scopus database, August 31, 2023

3.2.5. Top journals citing CTU

We also analyze which journals cite CTU's articles. Since citation data cannot be extracted from WoS and Scopus, in this section, we used data from Dimension. The journals that frequently reference CTU's research outputs indirectly reveal the target audience for CTU's research. As depicted in Table 8, the journals with the most citations among CTU publications in the realms of aquaculture and the environment are notable. They amassed around 400 citations, marking the highest category. The second-highest citation bracket encompasses journals related to Sustainability, CTU Journal of Science, and Environment, with just over 300 citations. The remaining categories, which encompass subjects like Construction, and Cleaner Production fall into the last tier with more than 200 citations. Most of the journals citing the CTU's papers are in Q1 or Q2 that demonstrates the quality of the school's publications in the research community.

3.2.6. Top journals cited by CTU

This part analyzes which journals are frequently cited in CTU's articles. The citation data in this section is similarly extracted from Dimensions. Table 9 displays the top five journals frequently referenced by CTU. Leading the list is the Aquaculture journal from Elsevier, with CTU citing it a remarkable 1010 times, while Plos One follows closely with nearly 600 citations. The second tier includes journals that span a range of fields, including food chemistry, construction, and bioresource technology, each accumulating over 400 citations. The remaining journals in this ranking have garnered more than 350 citations and are linked to topics such as nature, agriculture, food chemistry, physics, and the environment.

Similar to the discovery in section 3.2.5, this finding will aid in tracking the rankings of journals whose publications contribute to CTU's research outputs. In other words, it sheds light on the types of journals that CTU's researchers seek to form foundations for their research.

The quantity of CTU's international publications in both the Scopus and Web of Science databases has shown a gradual and consistent increase. The scope of research fields has expanded over time, with a specific emphasis on areas such as Aquaculture, Environmental Science, Food Technology, and Engineering with the first quartile (Q1). This pattern aligns well with CTU's strengths. Additionally, there have been positive developments in both the quantity and quality of research in other domains, reflecting the attention and investment allocated during this period. The prevalence of articles in the quartile ranking category has also been presented in recent years. However, the increase in CTU's publications necessitates further improvement in the publication rate in high-quality journals in the near future.

Table 8. Top 5 journals citing CTU

	Journals	Publishers	Citations
1.	Aquaculture (Q1)	Elsevier	467
2.	The Science of The Total Environment (Q1)	Elsevier	391
3.	Sustainability (Q2)	MDPI*	350
4.	CTU Journal of Science	CTU	324
5.	Environmental Science and Pollution Research (Q1)	Springer Nature	314
6.	Research Square	Research Square Platform LLC	268
7.	Construction and Building Materials (Q1)	Elsevier	256
8.	Journal of Cleaner Production (Q1)	Elsevier	233
9.	Scientific Reports (Q1)	Springer Nature	227
10.	Molecules (Q2)	MDPI*	225

Source: Data from Dimension database and SJR, September 02, 2023

**Multidisciplinary Digital Publishing Institute*

4. CONCLUSION

This paper analyzed CTU's international journals, examining article numbers, citations, and research fields. Notably, the first CTU authors, the most and the top highly-cited articles and prolific authors in various fields have been identified. We have also examined the citations of CTU's journal publications. The results show a significant recent increase in the number of CTU's international articles, many of which have received substantial citations. CTU contributes to a variety of fields, particularly aquaculture, agriculture, and information technology. This analysis is timely given CTU's evolving status and the need for informed decision-making. It provides valuable insights for enhancing both the quantity and quality of future publications.

Table 9. Top 5 journals cited by CTU

	Journals	Publishers	Citations
1.	Aquaculture (Q1)	Elsevier	1010
2.	PLOS ONE (Q1)	Public Library of Science (PLoS)	581
3.	Scientific Reports (Q1)	Springer Nature	485
4.	Food Chemistry (Q1)	Elsevier	473
5.	Construction and Building Materials (Q1)	Elsevier	466
6.	Bioresource Technology (Q1)	Elsevier	418
7.	Nature (Q1)	Springer Nature	385
8.	Journal of Agricultural and Food Chemistry (Q1)	American Chemical Society (ACS)	380
9.	Physical Review B (Q1)	American Physical Society (APS)	376
10.	The Science of The Total Environment (Q1)	Elsevier	365

Source: Data from Dimension database and SJR, September 02, 2023

CTU is transitioning into a research-focused institution. Towards this goal, annual, stage-wise departmental assessments using research and publication data are essential, albeit not detailed here due to scope limitations. Scopus was the primary data source, limiting insights; future research should utilize multiple databases for comprehensive assessments. Several recommendations are suggested: (1) Address research field imbalances through incentives. (2) Promote interdisciplinary collaboration for innovative studies. (3) Prioritize Q-category journals to boost national and international academic reputation.

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