

Trends and Distribution of Domestic and International Research Collaboration: An Asian View

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Introduction

It has been decades that collaboration is taken as a good strategy in research development, and attracts the researchers or policy makers to either take actions to exercise the collaborative strategies or set-up the criteria to encourage the action (Katz & Martin, 1997; Kyvik & Reymert, 2017; Ponomariv & Boardman, 2016). In this study, the authors saw the co-authorship as a presentation of research collaboration and took the universities from Asian countries as tokens to investigate the following themes from a macro view, country, and observe the impact of COVID-19 on the collaboration. The following are the research questions targeted in this work.

- The trends of the collaborations in research of Asian countries.
- The distributions of the domestic and cross-countries collaborations in research of Asian countries
- The similarity of the collaborative actions among the universities that are with different research strength of Asian countries

Method and data

The authors adopted the bibliometrics approach, and the description of the details of the research design is followed.

Study informants

In this study, the authors obtained a list of Asian universities from the NTU World University Rankings and gained the lists of universities from 30 Asian regions as the

study targets, and the publications done by the affiliated members of the selected universities included in this study published in 2017 and 2022 were searched from WoS for the further analysis.

Indicators and data process

The following indicators, such as CC_j and CoC_j, were developed to present the results statistically.

-*Research Productivity Index*. CC_j, Number of publications count by country j (CC_i)

$$CC_j = \sum_{i=1}^n P_i, \quad i=1 \text{ to } n, \quad n=\text{number of universities of the target country.}$$

P_i =publication count of the university i of country j .

-*Collaborative Effort Index (Inter-institutional co-authored publications identifying and tagging)*. CoC_j, Number of co-authored of publications count by country j (CoC_j)

$$CoC_j = \sum_{i=1}^n CoU_i, \quad i=1 \text{ to } n, \quad n=\text{number of universities of the target country,}$$

CoU_i =co-authored publication counts of the university i of country j .

-*Domestic and international collaboration detecting and tagging*

The information of all the affiliations of the co-authors was paired accordingly, and if the affiliations are the same or located in the same region, the work would be marked domestic collaborative works. The work would be marked as a cross-country collaborative effort If different country information showed.

Results

The following are the preliminary results of the analysis, which includes the productivity, collaboration, and the distribution of the collaboration by domestic and international. The discussion starts from an overall viewpoint and further breaks down to three productive tiers, and all from a macro level-countries point of view.

Affiliations and productivities

There were around 2 million (2017, 726,323; 2022, 1,276,611) scholarly publications that were done by the associates of the designated universities.

Single and collaborative research effort

High percentage research collaboration. Figure 1 shows the distribution of the single authored and co-authored papers by the presentation of the percentages, including total count, average, minimum and maximum results are shown.

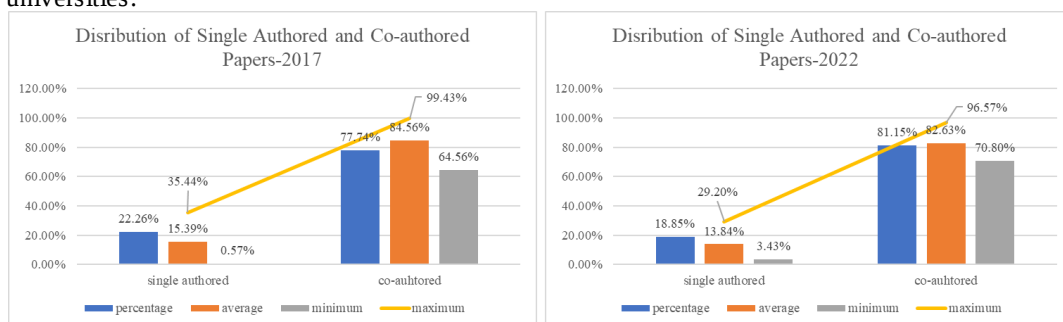


Figure 1. Distribution of Single Authored and Co-authored papers, 2017 and 2022.

Domestic and international collaboration

Domestic collaboration was preferred, but the further analysis indicates the diverse strategies in the research collaboration from region to region. The distribution of the percentages of the domestic authored works of the

collaborative works was from 2.87% to 63.25% in 2017 and 3.05% to 69.11% in 2022, and the one for cross-countries collaboration was from 36.75% to 97.13% in 2017 and 30.89% to over 96.95% in 2022. (Figure 2)

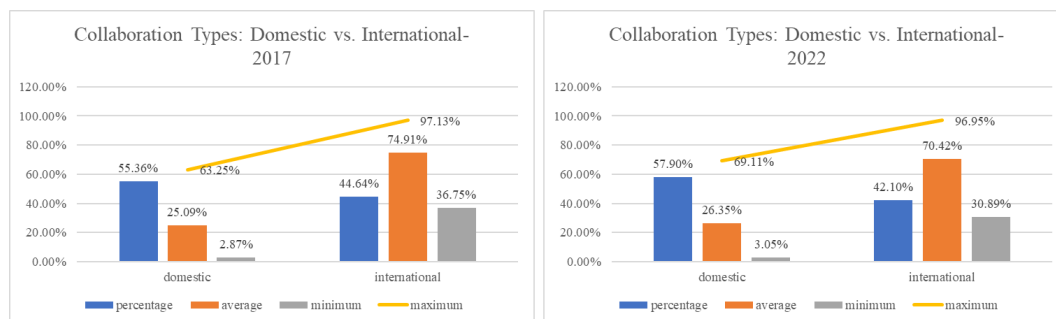


Figure 2. Distribution of Collaboration types: Domestic vs. International Collaboration, 2017 and 2022.

Collaboration and productivity

The study further investigated if the different collaborative strategies might be taken by various research productive entities, the authors grouped the regions into three tiers, core, intermediate, and peripheral, by the research productivities, by referencing the idea of Bradford Law. The results show that

the universities of the three different tiers all have more research work done by collaborating with peers from the academic community. It was found that several areas do either attract or rely on the knowledge or resources input from other areas in the research work. (Figure 3)

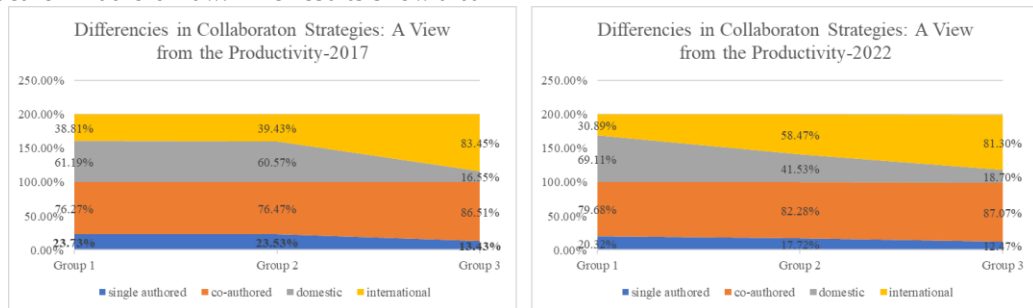


Figure 3. Collaboration Preferences: A View from the Different Productivities.

Conclusions and discussion

The results of this study show the high percentage of research outputs were done under the collaborative efforts, the collaborative scenes were not changed under the impact of COVID-19, for the two sampled years. Generally speaking, domestic collaboration is preferred, however there is evidence that the universities with less research productivity do devote more effort into international collaboration.

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References

- Katz, J. S., & Martin, B. R. (1997). What is research collaboration? *Research Policy*, 26, 1-18. [https://doi.org/10.1016/S0048-7333\(96\)00917-1](https://doi.org/10.1016/S0048-7333(96)00917-1).
- Kyvik, S., & Reymert, I. (2017). Research collaboration in groups and networks: Differences across academic fields. *Scientometrics*, 113, 951-967. <https://doi.org/10.1007/s11192-017-2497-5>

- Ponomariov, B., & Boardman, C. (2016). What is co-authorship? *Scientometrics*, 109, 1939-1963. <https://doi.org/10.1007/s11192-016-2127-7>