

Taiwan's Research Collaboration and Technology Diplomacy Strategies: A Bibliometric Analysis

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Introduction

International Scientific Collaboration for Global Challenges

Global challenges such as the COVID-19 pandemic, climate change, and other socio-economic issues require international collaborative research for solutions. Scientific research thrives in an environment that fosters free inquiry and open exchange. Cross-border collaboration and knowledge sharing are key to driving innovation and addressing complex global issues.

Research sharing & Technology exchange

Promoting cross-disciplinary innovation through collaboration, such as the application of AI in medical diagnostics and environmental monitoring.

Enhancing research efficiency

For example, the International Human Genome Project significantly reduced the time for gene sequencing through multinational collaboration.

Promoting standardization

Establishing global technological standards for emerging technologies such as 5G and AI ethics, to avoid technological isolation or competitive barriers.

Expanding global influence

Science diplomacy has become a part of international dialogue, such as the EU's technological standards agreements, influencing global industry development.

Introduction

Factors Influencing International Collaboration Models

International academic cooperation progresses within the dynamic balance of competition and collaboration, shaped by various factors. These include the demands of the era, the characteristics of specific disciplines, the research and development capabilities of national institutions, national science and technology policies, international political and security considerations, and the mobility of scientific talent. These interrelated factors lead to diverse cooperation models across disciplines and nations.

Team Science and the Shrinking World

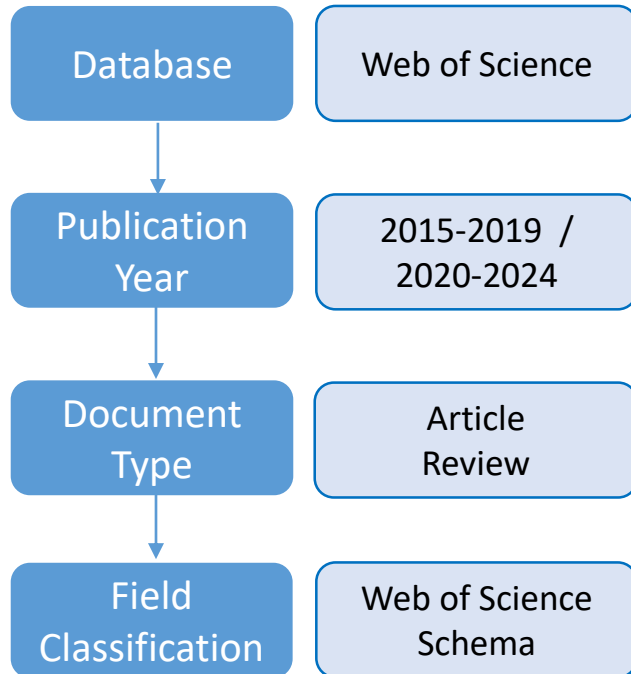
With the rise of data-driven and AI-enabled research, we are entering the era of team science. International academic collaboration has expanded both in breadth and depth. The trend of a "Shrinking World" is evident, with international cooperation networks becoming increasingly tight-knit and national borders having less impact on scientific research. (Okamura, 2023)

Research Questions

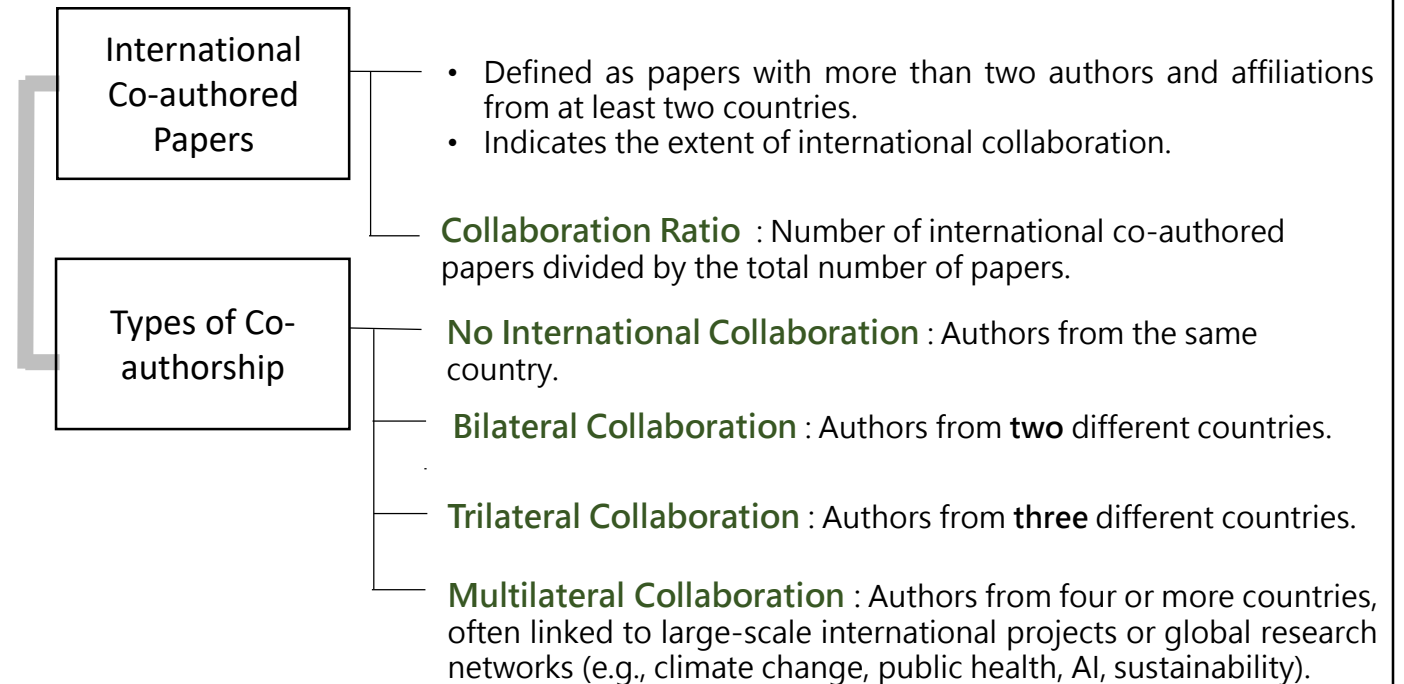
-  **What are Taiwan's international scientific collaboration trends?**
By examining international co-authored papers, we analyze Taiwan's academic collaboration strength and patterns with countries worldwide, and explore Taiwan's performance in different fields.
-  **What are Taiwan's key research partnerships and regional collaboration features?**
We analyze Taiwan's co-authored publications to identify its primary academic partners and observe how these collaborations evolve across different regions and research fields over time.
-  **What strategies can be proposed to strengthen Taiwan's international collaboration?**
We reviewed bibliometric data and current policies to assess and strengthen Taiwan's international collaboration.

Methodology

A. Data Collection



B. International Co-authorship

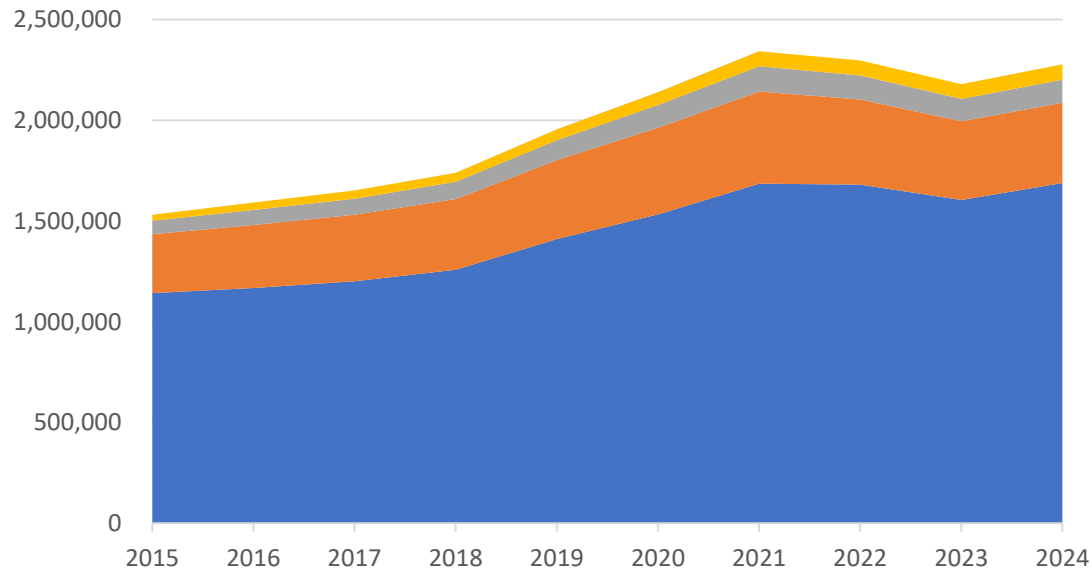


Key Findings

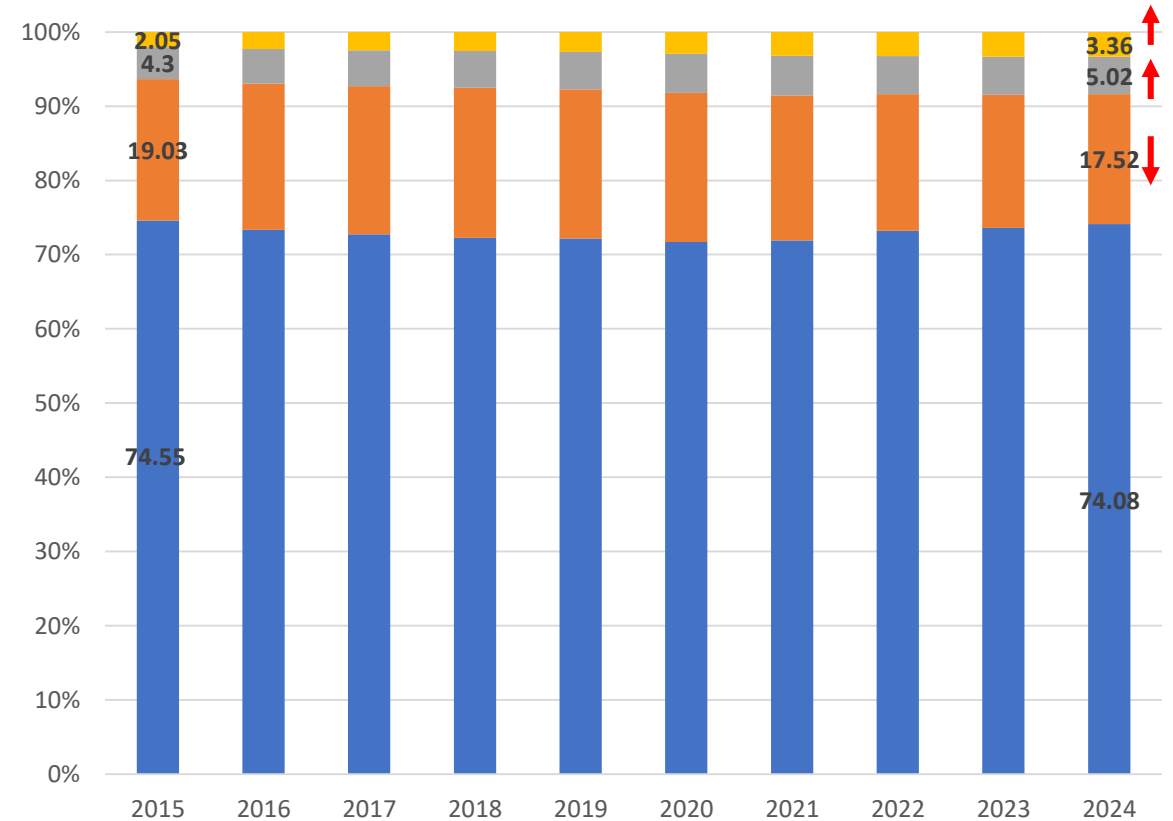
Global Trends and Patterns in International Co-authored Papers

- ❑ Global research output has steadily increased over the past decade.
- ❑ The share of internationally co-authored papers has slightly decreased.
- ❑ Bilateral collaborations declined slightly.
- ❑ Trilateral and multilateral collaborations showed small growth.
- ❑ This suggests a trend toward broader international cooperation, especially among three or more countries.

Publication Volume



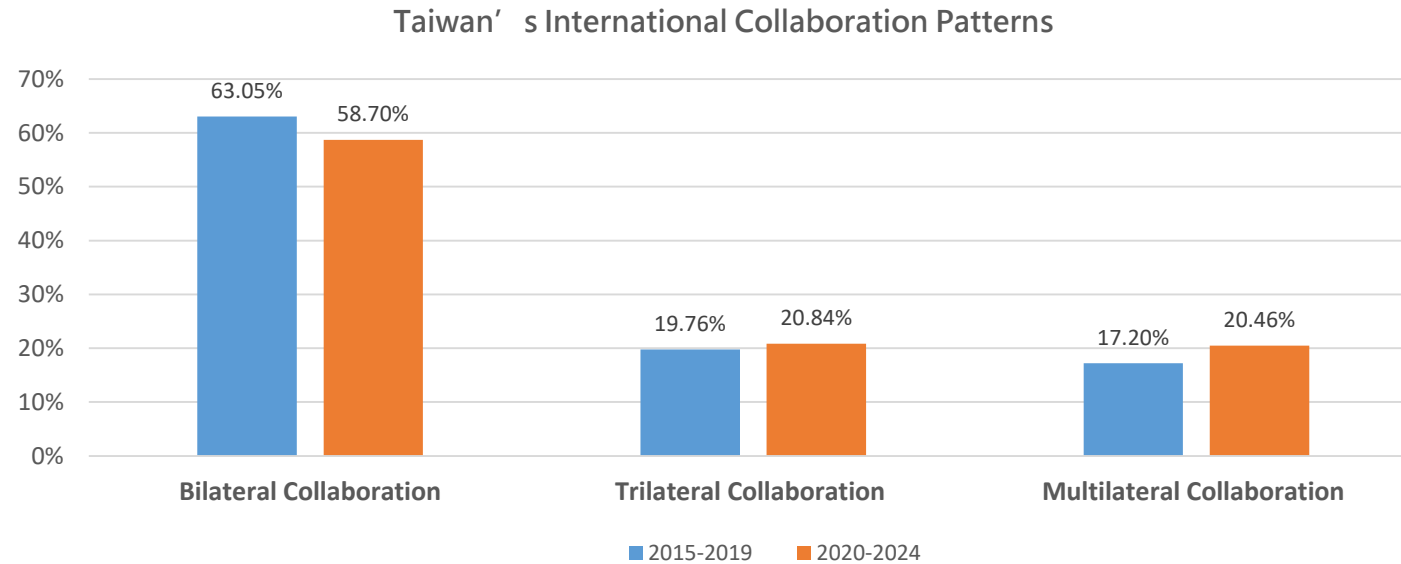
■ No International Collaboration ■ Bilateral Collaboration
■ Trilateral Collaboration ■ Multilateral Collaboration



■ No International Collaboration ■ Bilateral Collaboration
■ Trilateral Collaboration ■ Multilateral Collaboration

Key Findings

Taiwan's International Collaboration Patterns

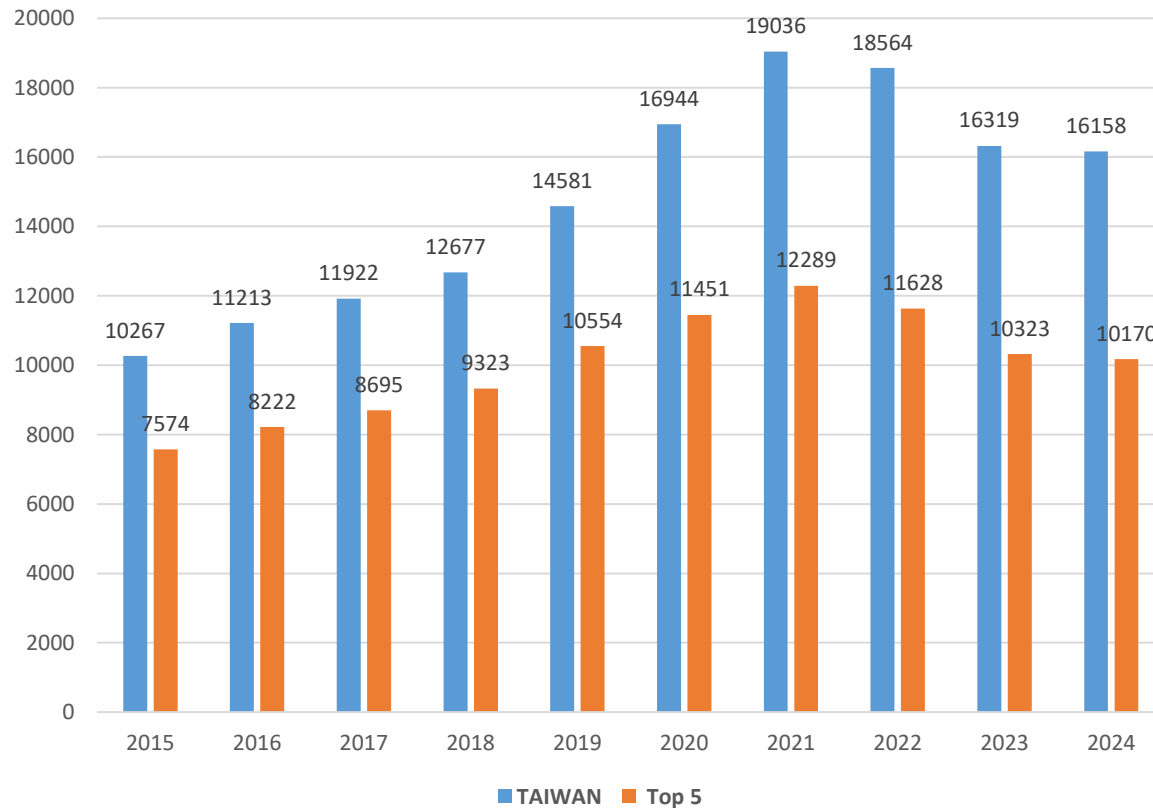


- ❑ Taiwan's international collaborations are still mostly bilateral, but their share has decreased from 63.05% to 58.70%.
- ❑ Trilateral collaborations have grown from 19.76% to 20.84%, and multilateral ones increased from 17.20% to 20.46%.
- ❑ This shift indicates a move towards more diverse and complex research networks, with larger cross-country and cross-disciplinary projects becoming more common.

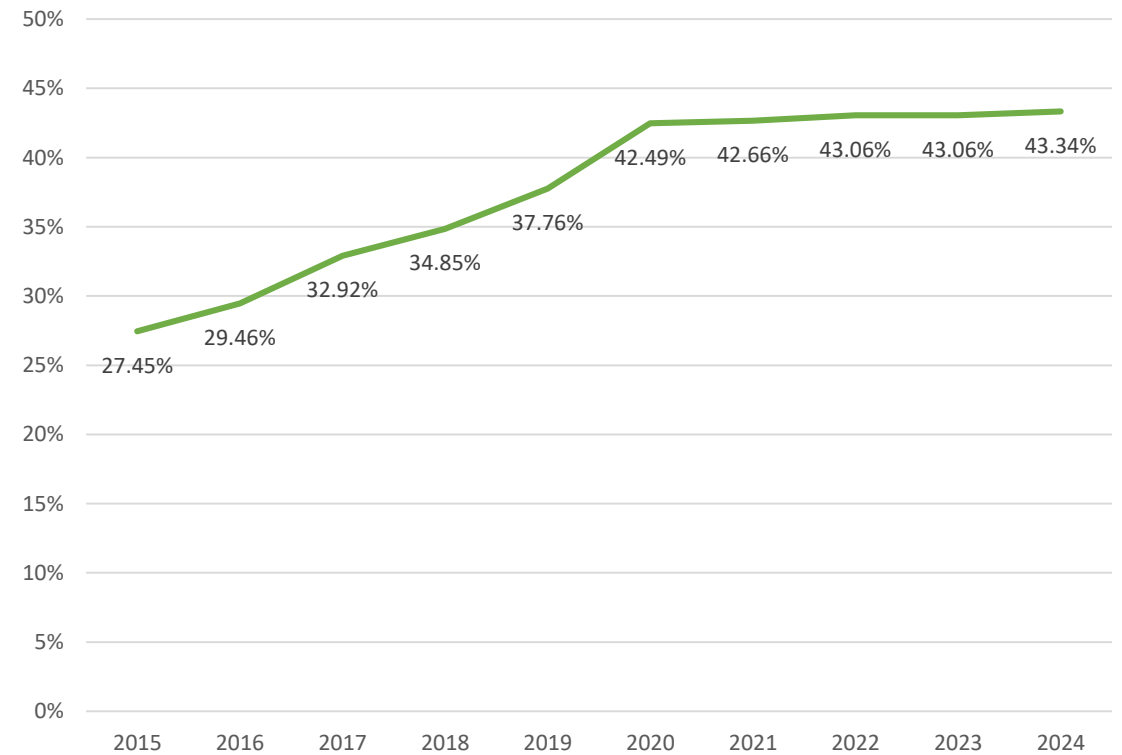
Key Findings

Overview of Taiwan's International Research Partners (2015–2024)

- From 2015 to 2024, the countries with the highest number of international collaborative papers with Taiwan were **the United States, China, Japan, India, and the United Kingdom**. Collaborations with these 5 countries accounted for an average of 68.69% of Taiwan's total international collaborative publications.
- From 2015 to 2024, the total number of papers published by Taiwan increased each year, and the proportion of international collaborative papers also showed a continuous upward trend.



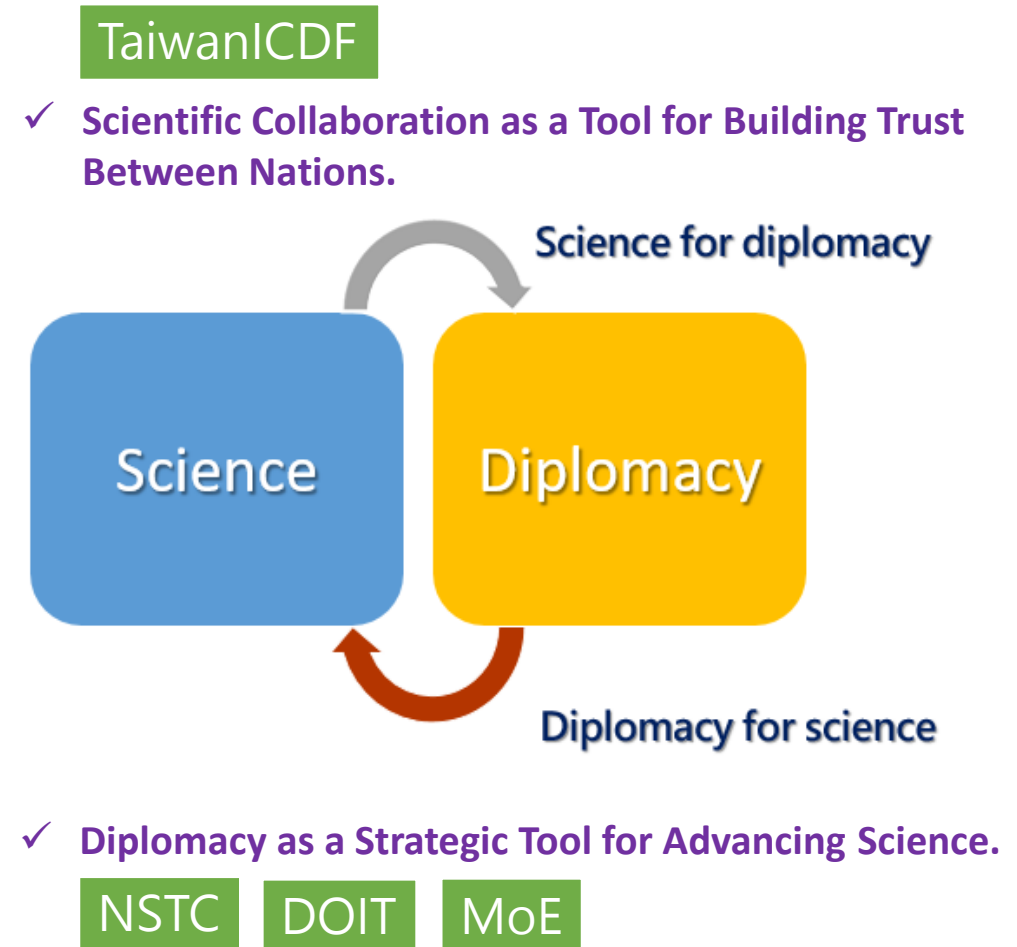
Share of Taiwan's International Collaborative Papers



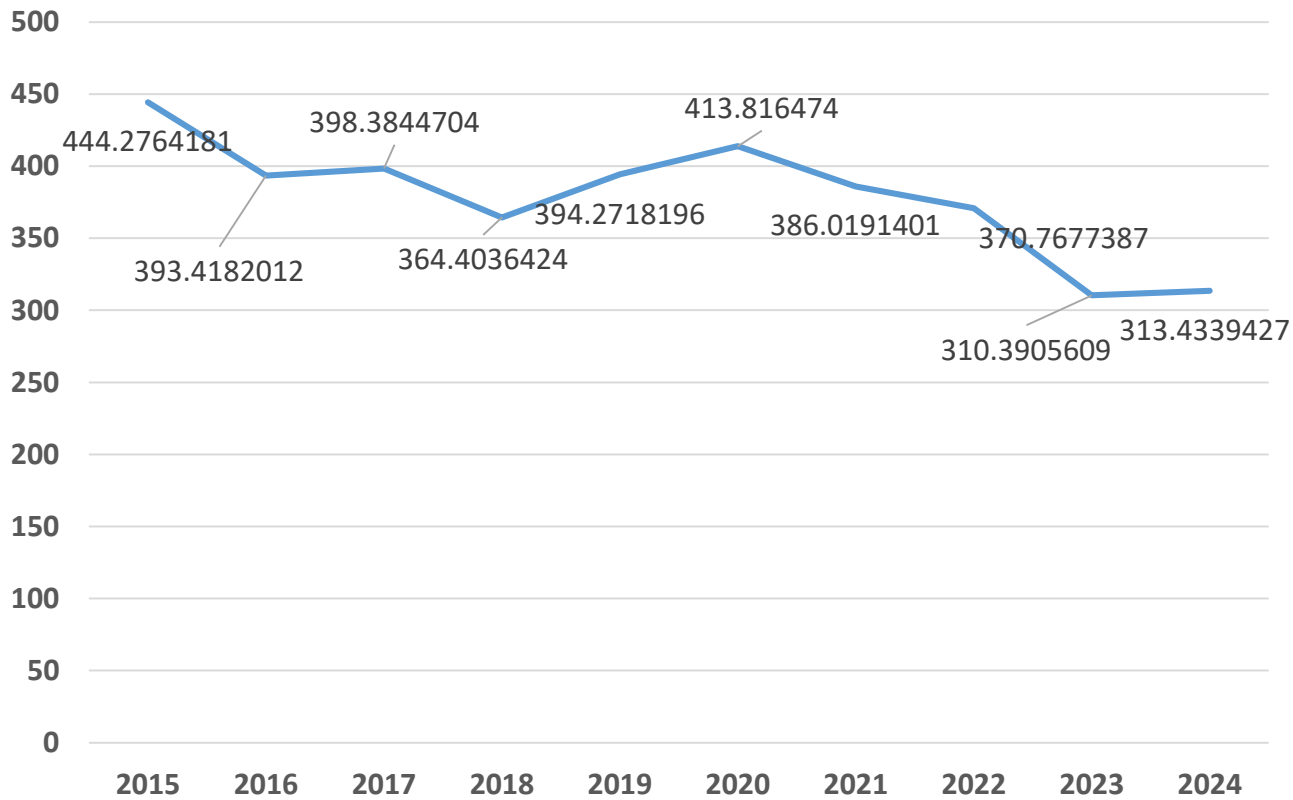
Conclusion

Review of Current International Cooperation Initiatives in Taiwan

| Type | Organization / Institution |
|--------------------------------------|---|
| International Development Assistance | International Cooperation and Development Fund (TaiwanICDF) |
| Academic Research Collaboration | National Science and Technology Council (NSTC) |
| Industrial Technology Cooperation | Department of Industrial Technology (DOIT) |
| Higher Education Cooperation | Higher Education Institutions (Ministry of Education, MoE) |



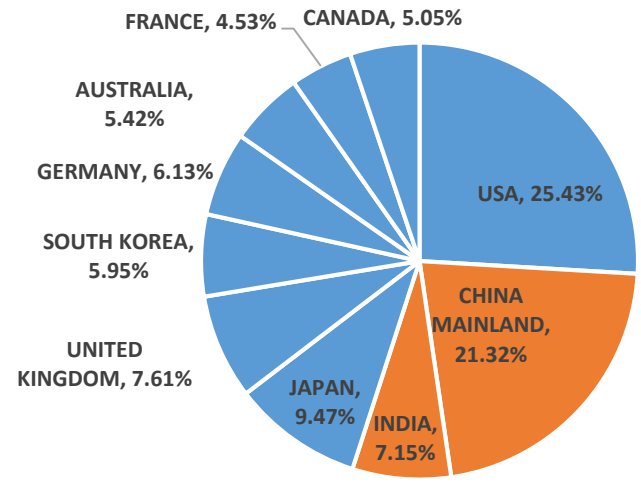
Conclusion



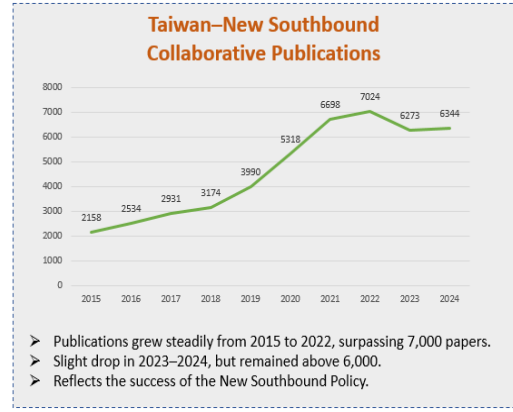
Taiwan's International Research Collaborations Have Become More Diverse (2015–2024)

As Indicated by the Herfindahl-Hirschman Index (HHI)

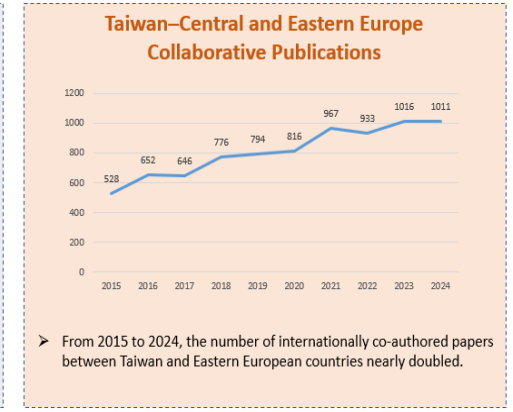
Co-authorship with Advanced Countries Still Leads, Collaboration on Forward-Looking Issues Deepens



Growing Number of Co-authored Papers with Emerging Economies



- Publications grew steadily from 2015 to 2022, surpassing 7,000 papers.
- Slight drop in 2023–2024, but remained above 6,000.
- Reflects the success of the New Southbound Policy.



- From 2015 to 2024, the number of internationally co-authored papers between Taiwan and Eastern European countries nearly doubled.

Conclusion

- Future Research Directions -

-  **What are the primary research domains in which Taiwan engages in co-authorship with emerging countries?**
-  **Which institutions in emerging countries are the main partners in Taiwan's international scholarly collaborations?**
-  **What strategies or mechanisms can Taiwan adopt to strengthen international collaboration — such as establishing a dedicated agency?**

Thank you for your attention.