Unlocking RCEP Region’s Technological Landscape Through Patent Data

Yan Bowen

Agenda

1 **Motivation**

Why do we study RCEP's technological landscape?

2 **Methodology**

How to compile and interpret patent statistics?

3 **Results**

What's the RCEP region's position in the global tech landscape?

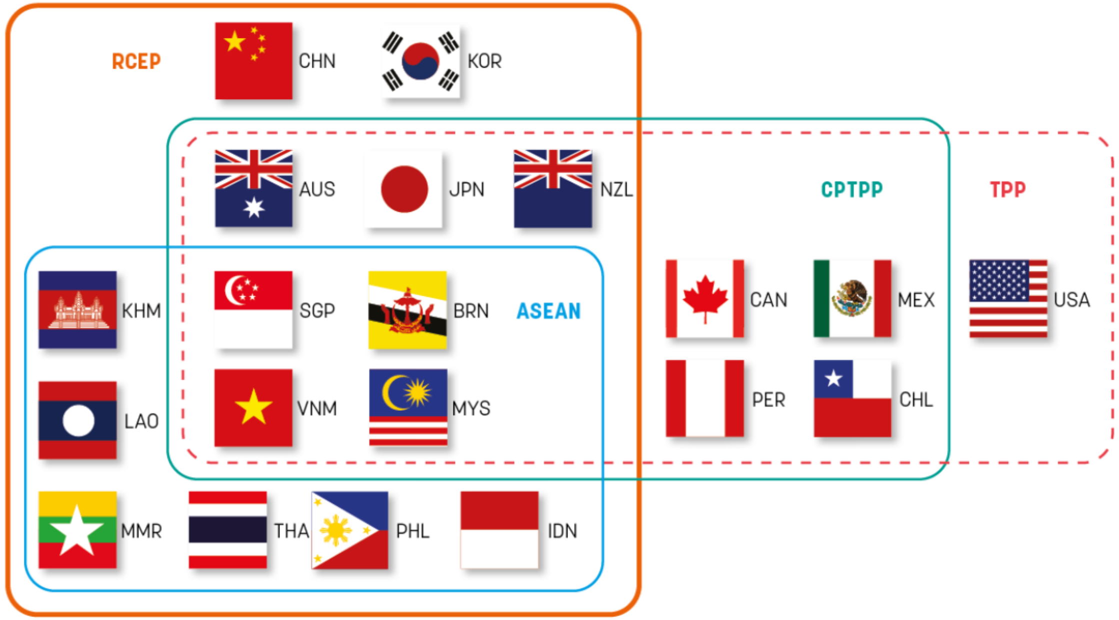
How does technology flow within the region?

4 **Discussion**

How can the RCEP agreement facilitate technology flow?

What Is Regional Comprehensive Economic Partnership (RCEP)?

- RCEP is the world’s largest existing Free Trade Agreement (FTA) in terms of economic size (~30% of global GDP)
- RCEP was built upon the 4 existing ASEAN+1 FTAs with China, Japan, South Korea, Australia, and New Zealand
- It entered into force on 1 January 2022



Source: WCO

Note: Six ASEAN+1 FTAs include ASEAN – China FTA (ACFTA), ASEAN – Japan FTA (AJCEP), ASEAN – Korea FTA (AKFTA), ASEAN – Australia – New Zealand FTA (AANZFTA), ASEAN – India (AIFTA) and ASEAN – Hong Kong, China FTA (AHKFTA).

Technology: A Lesser-Known Side of Economic Integration

- Technology increasingly spans borders through trade and investment
- Beyond conventional tariff liberalisation, RCEP has introduced new disciplines for cooperation, including Intellectual Property (IP), which aims to achieve 2 goals

Deeper economic integration

Freer movement of goods, services and capital

*“**reduce distortion and impediments to trade and investment** by promoting deeper economic integration and cooperation through the effective and adequate creation, utilisation, protection, and enforcement of intellectual property rights”*

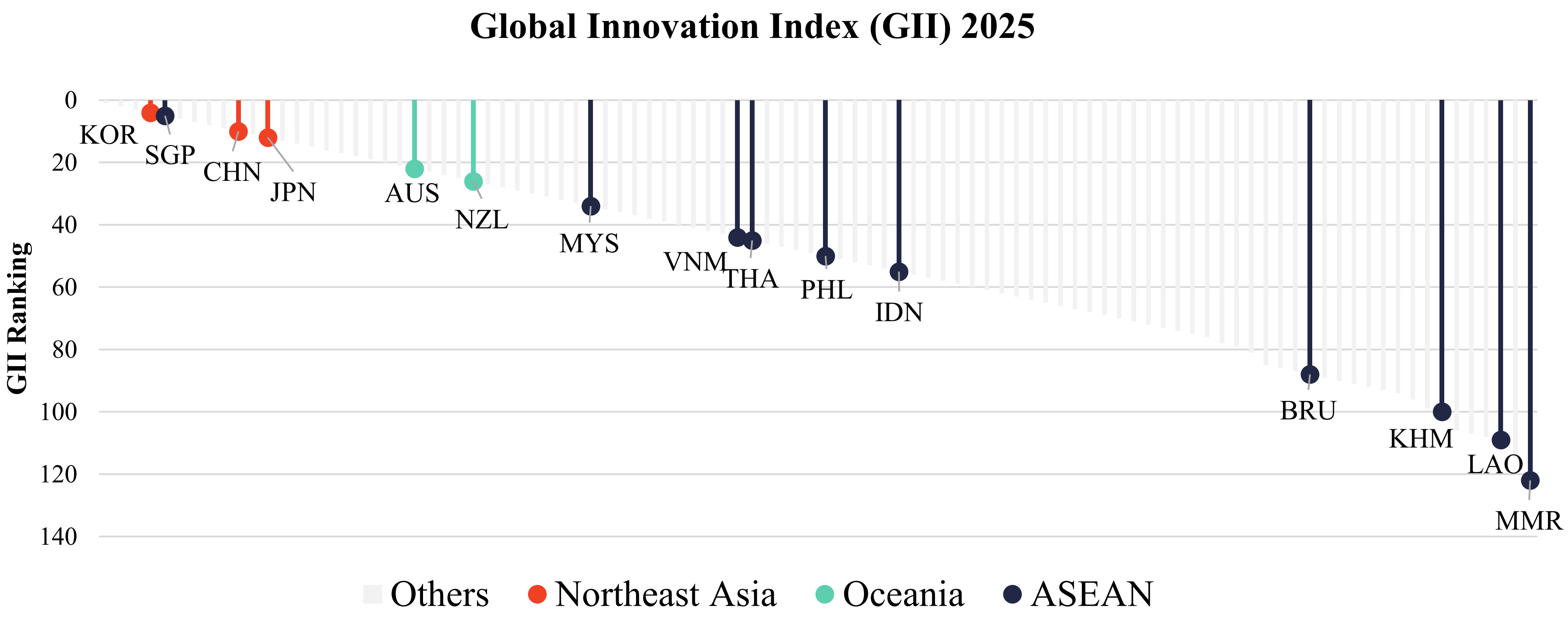
Freer movement of technology

*“contribute to the **promotion of technological innovation and to the transfer and dissemination of technology**, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations”*

Source: RCEP Article 11.1: Objectives

Regional Diversity Through the Lens of Innovation

- RCEP member countries differ significantly in innovation capabilities
  - South Korea and Singapore are the leaders
  - Vietnam, Thailand, the Philippines and Indonesia outperform relative to their income levels



Note: GII is composed of 7 sub-indices (pillars) covering institutions, human capital and research, infrastructure, market sophistication, business sophistication, knowledge and technology outputs, and creative outputs

Source: World Intellectual Property Organization (WIPO)

Research Question & Methodology

- Deeper economic integration under RCEP → more opportunities for technology diffusion
- RCEP member countries can leverage their existing channels of knowledge exchange

- **Question: What is the technological landscape across the RCEP region?**

- **Methodology: Analyse patent statistics (2003-2022) from PATSTAT**

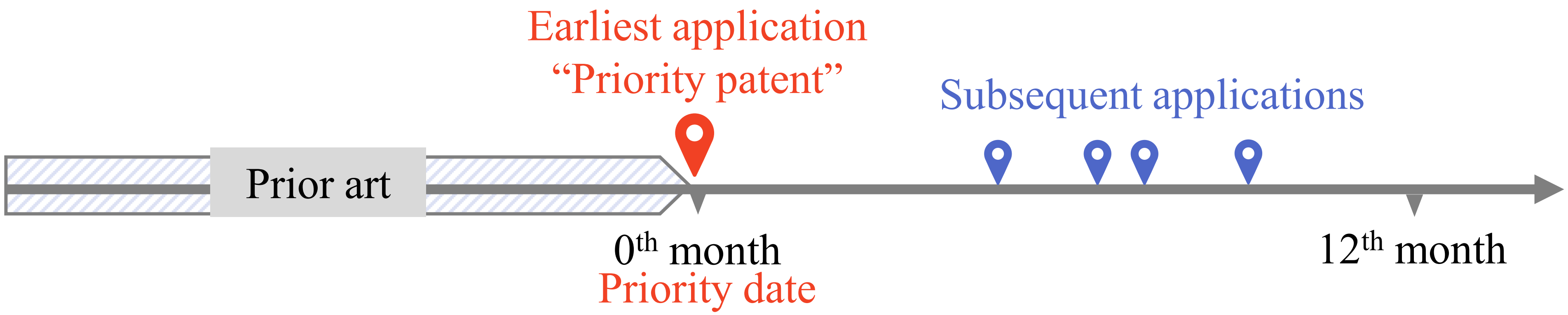
Methodology

How to compile and interpret patent statistics?

- *Essential terminologies*
- *Rules of thumb for counting*
- *Limitations*

Rules of Thumb for Counting Patents

- A **patent** is an intellectual property right (IPR) granted for an invention
- Owners can file **different patent applications** to protect the **same invention** in different jurisdictions



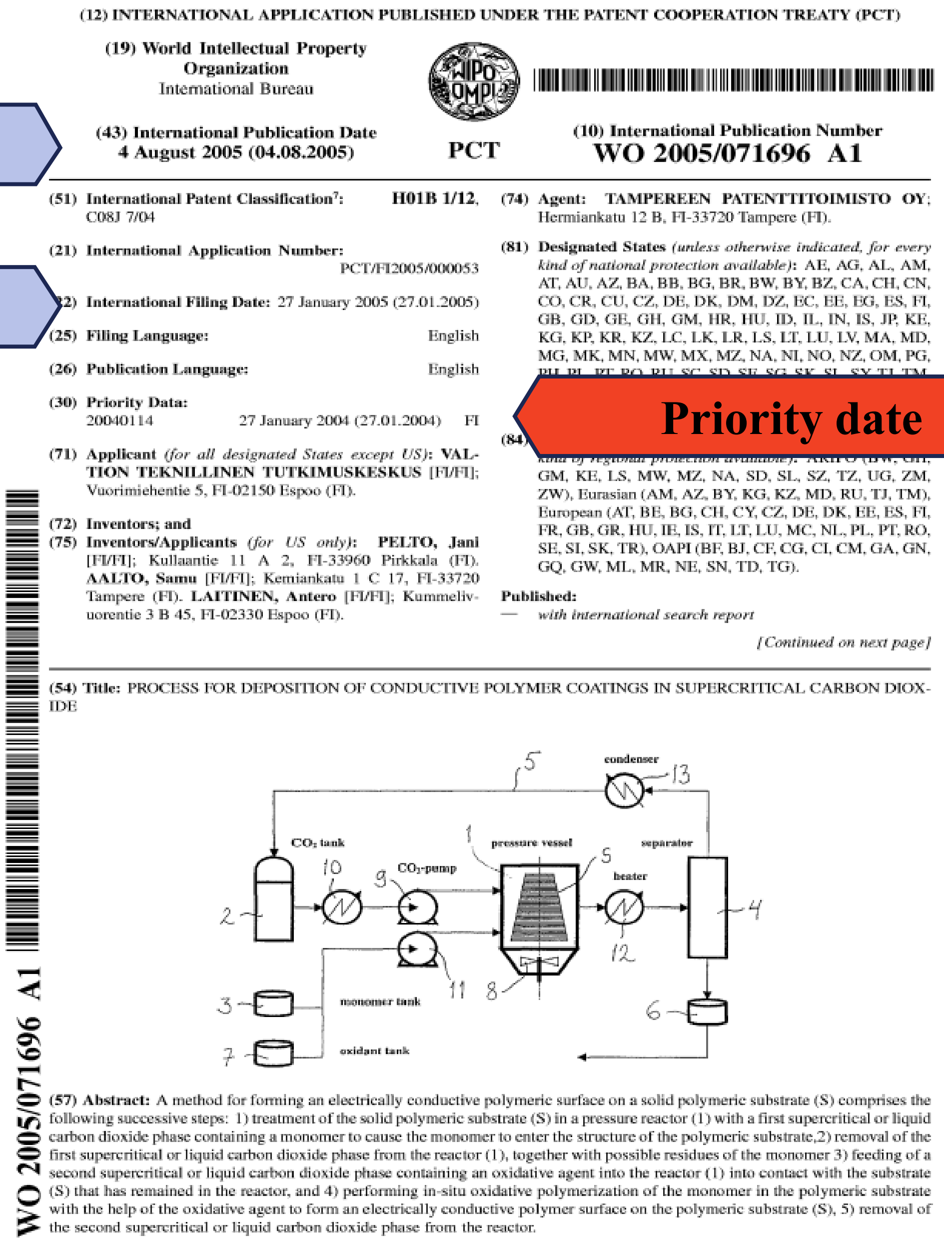
- These applications share identical/similar technical content **("priority"),** forming a **"patent family"**
- Application – the intention to **commercialise** the technology in the destination market
- Invention (priority patent/patent family) – the capability to **develop** technology

Front Page of Patent Application (1)

Publication date

Application date

Priority date



(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
4 August 2005 (04.08.2005)

PCT

(10) International Publication Number
WO 2005/071696 A1

(51) **International Patent Classification**^{7}: **H01B 1/12**, C08J 7/04

(21) **International Application Number:** PCT/FI2005/000053

2) **International Filing Date:** 27 January 2005 (27.01.2005)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**
20040114 27 January 2004 (27.01.2004) FI

(71) **Applicant** *(for all designated States except US)*: **VALTION TEKNILLINEN TUTKIMUSKESKUS** [FI/FI]; Vuorimiehentie 5, FI-02150 Espoo (FI).

(72) **Inventors; and**
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(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,

(84)

GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

[Continued on next page]

(54) **Title:** PROCESS FOR DEPOSITION OF CONDUCTIVE POLYMER COATINGS IN SUPERCRITICAL CARBON DIOXIDE

(57) **Abstract:** A method for forming an electrically conductive polymeric surface on a solid polymeric substrate (S) comprises the following successive steps: 1) treatment of the solid polymeric substrate (S) in a pressure reactor (1) with a first supercritical or liquid carbon dioxide phase containing a monomer to cause the monomer to enter the structure of the polymeric substrate,2) removal of the first supercritical or liquid carbon dioxide phase from the reactor (1), together with possible residues of the monomer 3) feeding of a second supercritical or liquid carbon dioxide phase containing an oxidative agent into the reactor (1) into contact with the substrate (S) that has remained in the reactor, and 4) performing in-situ oxidative polymerization of the monomer in the polymeric substrate with the help of the oxidative agent to form an electrically conductive polymer surface on the polymeric substrate (S), 5) removal of the second supercritical or liquid carbon dioxide phase from the reactor.

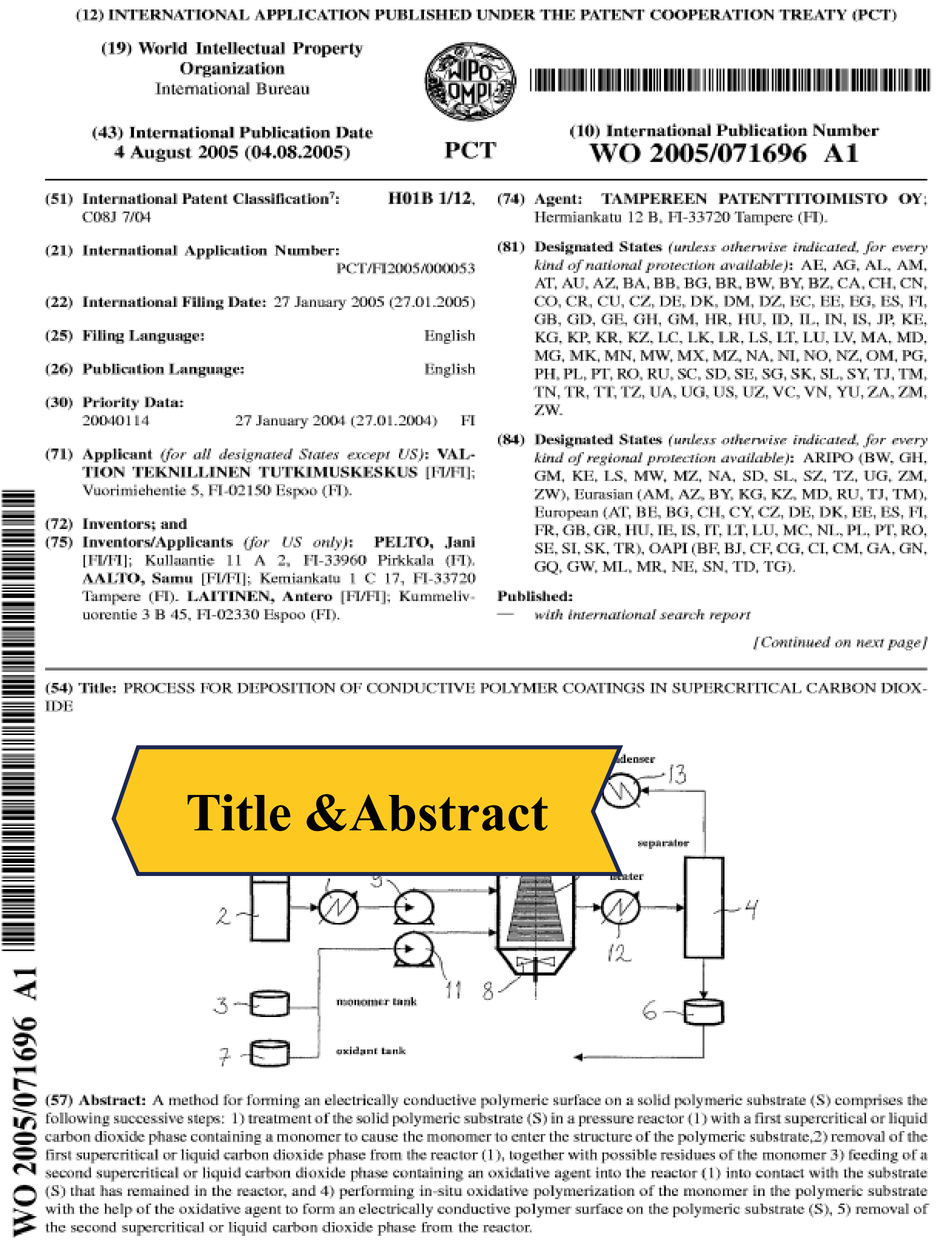
WO 2005/071696 A1

Source: Ruotsalainen, Laura

Front Page of Patent Application (2)

Classifications

Applicant & Inventor



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Title &Abstract

Citations

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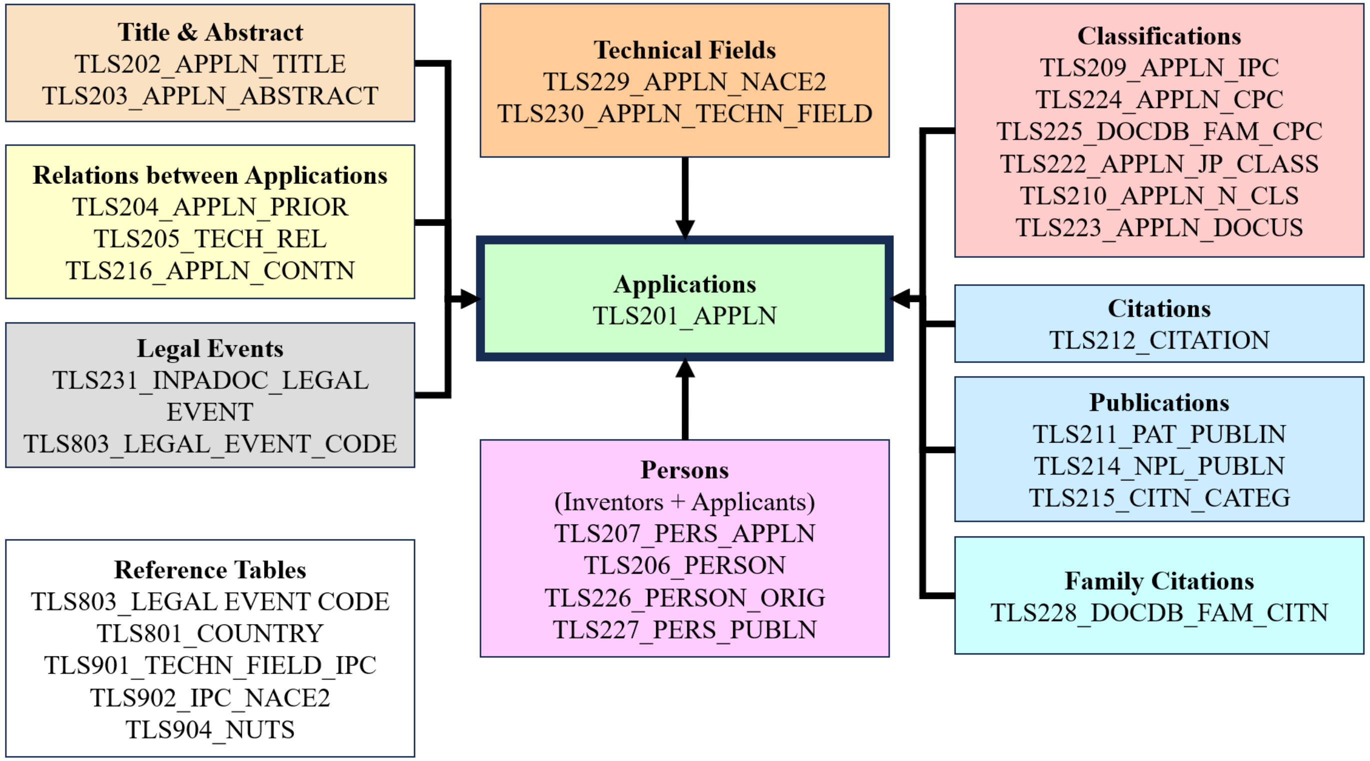
Patent Database

- **PATSTAT** standardises **bibliographic** information contained in **patent applications** and legal event patent data
  - One of the most reliable reference databases for studies integrating patent data
  - Sourced from ~200 patent offices globally
  - 6000+ Google Scholar publications referencing PATSTAT (as of 2025 June)



Title & Abstract
TLS202_APPLN_TITLE
TLS203_APPLN_ABSTRACT

Relations between Applications
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TLS205_TECH_REL
TLS216_APPLN_CONTN

Legal Events
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Persons
(Inventors + Applicants)
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Classifications
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Family Citations
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Source: Author’s creation based on PATSTAT (2025 spring version)

Limitations of Using Patent Data

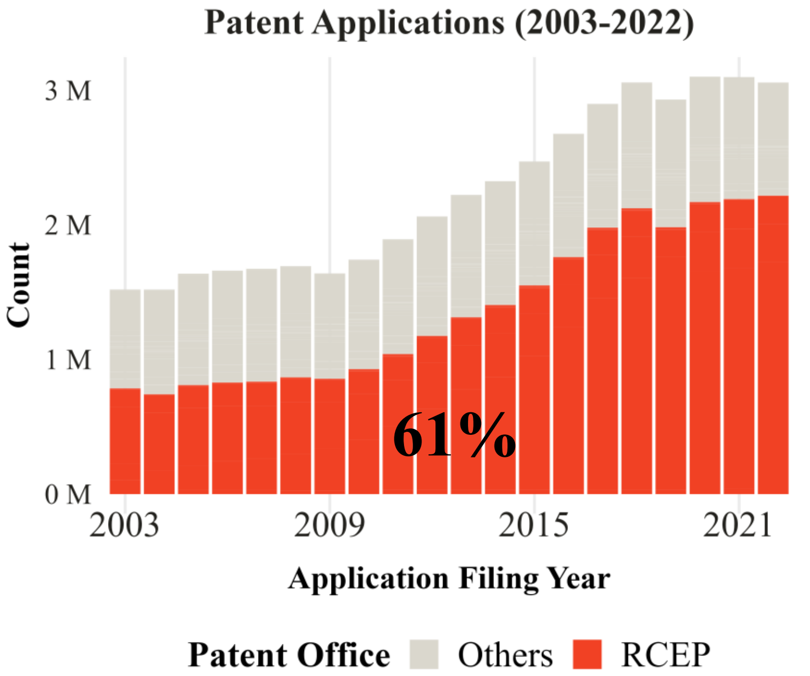
- Missing **geographic locations** of inventors/applicants → data imputation
- The **value** distribution of patents is highly skewed → patent quality metrics (e.g. family size)
- Measuring the **genuine outcome of innovation**? Not necessarily
  - Not all inventions are patented
  - Not all granted patents are commercialised into physical products

Results

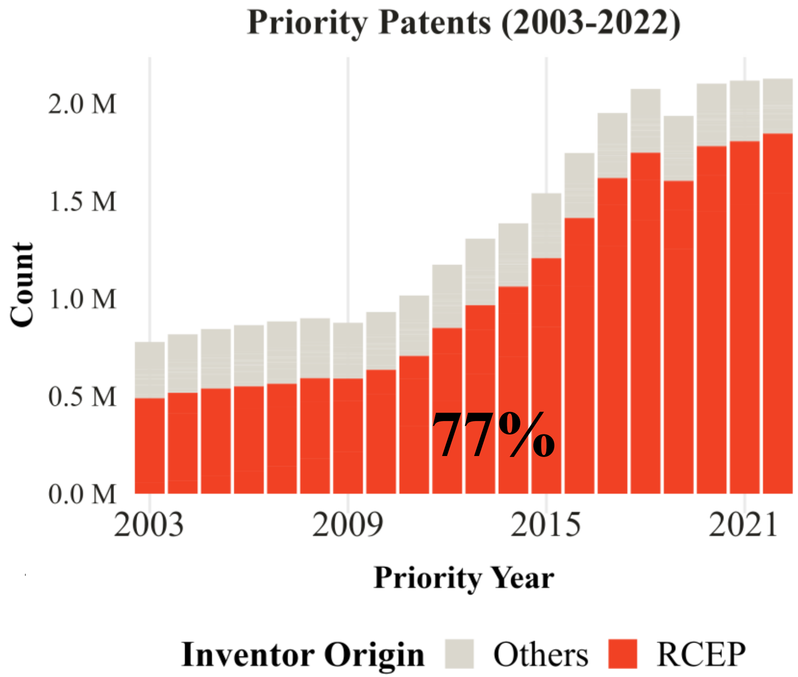
- *What is the RCEP region's position in the global technological landscape?*
- *How does technology flow within the region?*

The RCEP Region's Position: A Growing Technological Hub

- A prime destination for patent protection
  - Global share of patent applications: 52% in 2003 → 73% in 2022
- A prolific source of knowledge generation
  - Global share of priority patents: 63% in 2003 → 87% in 2022
- Only 11% of RCEP's inventions were "high-quality", yet to match the US and EU


Patent Applications (2003-2022)

61%


Priority Patents (2003-2022)

77%

Share of High-quality Priority Patents (2003-2022)

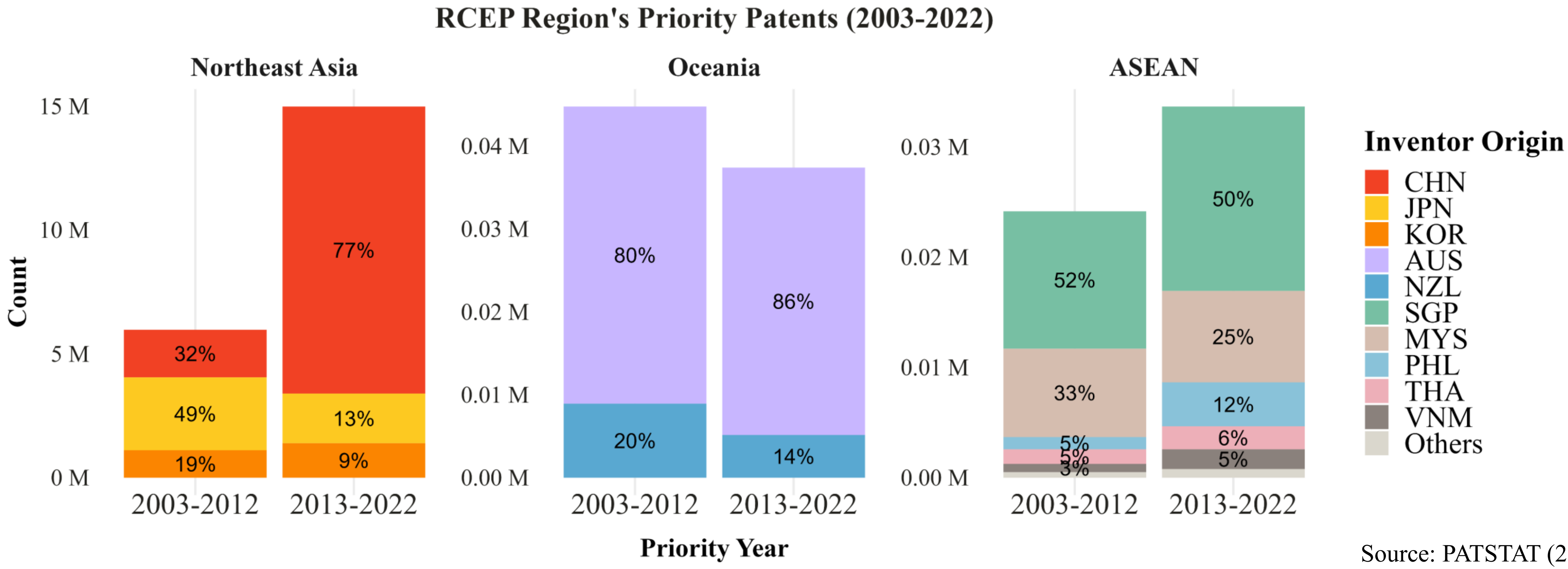
RCEP	11%
US	54%
EU	55%

"High-quality" priority patents are those whose patent family size >=2

Source: PATSTAT (2025 spring version)

Northeast Asia, Particularly China, Leads in Technology Creation

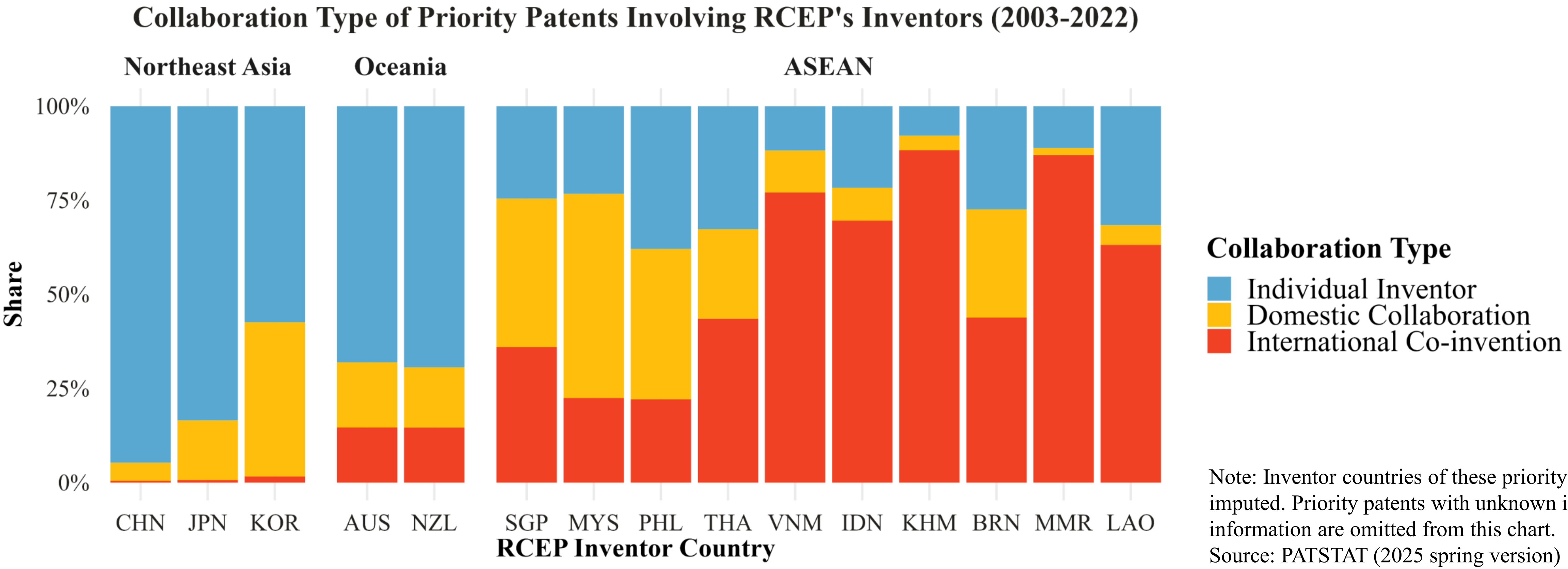
- China replaced Japan as the RCEP region’s main contributor
- Oceania experienced a contraction
- ASEAN showed a growing trajectory
  - Singapore and Malaysia maintained their leading positions within ASEAN
  - The Philippines, Thailand, and Vietnam carved out larger percentages in the recent decade



Source: PATSTAT (2025 spring version)

Collaboration Compensates for Weak Innovation Capabilities

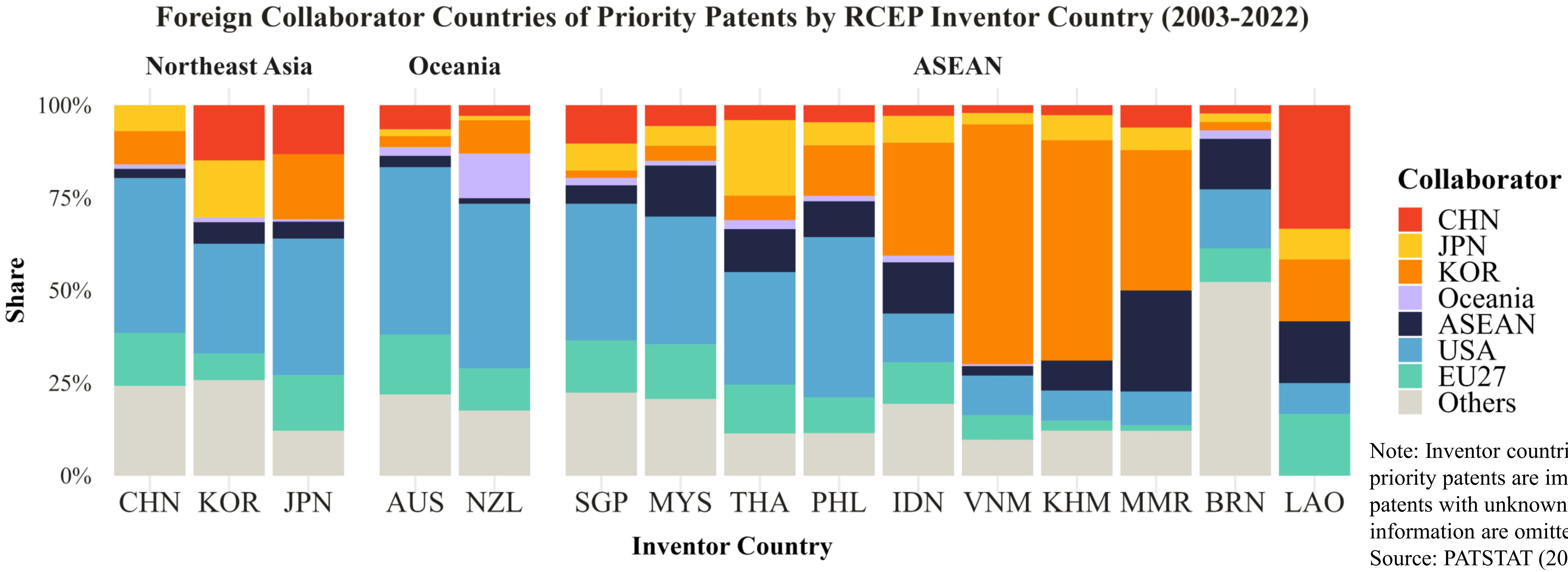
- Inventors residing in Northeast Asia and Oceania favour individual work
- ASEAN relies more heavily on collaborative activities
  - Singapore, Malaysia and the Philippines have a stronger domestic research network than their neighbours
  - Cambodia (88%), Myanmar (87%), and Vietnam (77%) had the highest international co-invention shares



Note: Inventor countries of these priority patents are imputed. Priority patents with unknown inventor information are omitted from this chart.
Source: PATSTAT (2025 spring version)

RCEP Countries’ Co-inventing Activities Remain Largely Extra-Bloc

- Only 29% of RCEP’s co-inventions were intra-bloc
- The USA remained the top external collaborator for China, Japan, Korea, Australia, New Zealand, Singapore, Malaysia, and the Philippines
- Other ASEAN countries collaborate more with Northeast Asian countries, particularly South Korea



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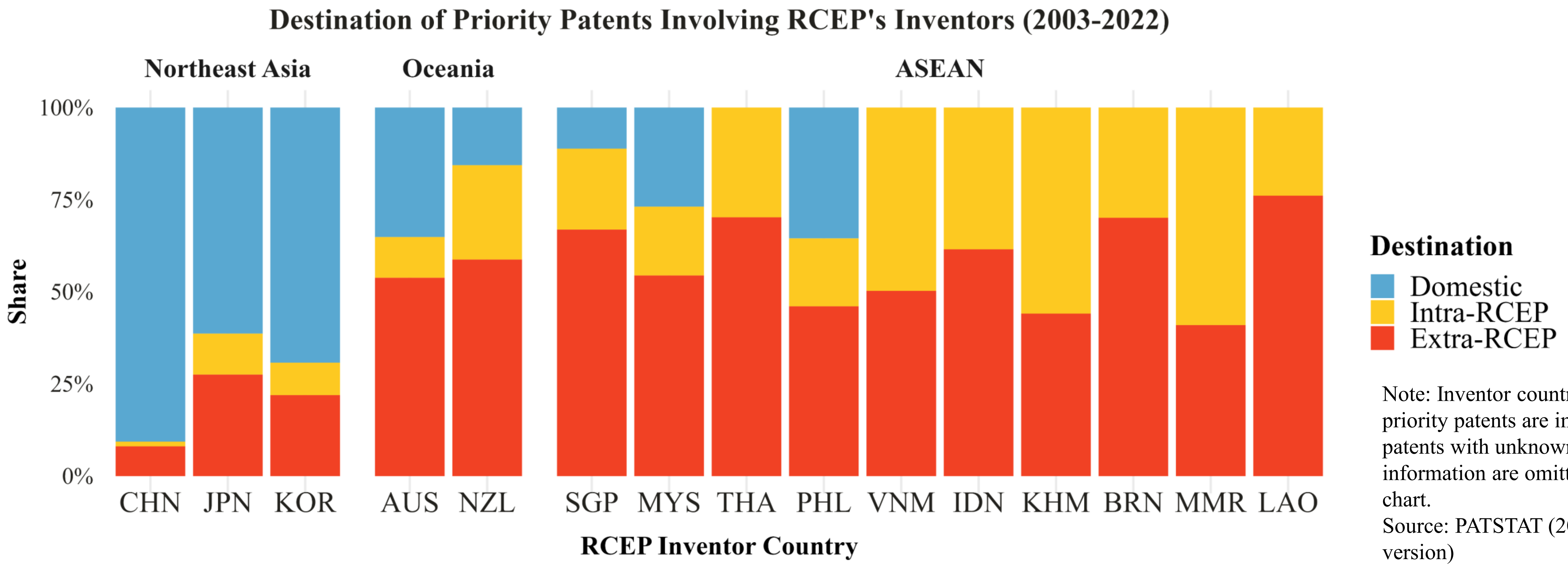
Source: PATSTAT (2025 spring version)

Northeast Asia's Inventions Stay Home While ASEAN's Go Global

- A majority of priority patents involving Northeast Asian inventors targeted their domestic markets
- In contrast, most ASEAN-originated inventions sought patent protection in overseas markets
  - Reflecting a potential reliance on foreign legal jurisdictions for IP protection
- RCEP inventors are generally less interested in patenting in each other's markets



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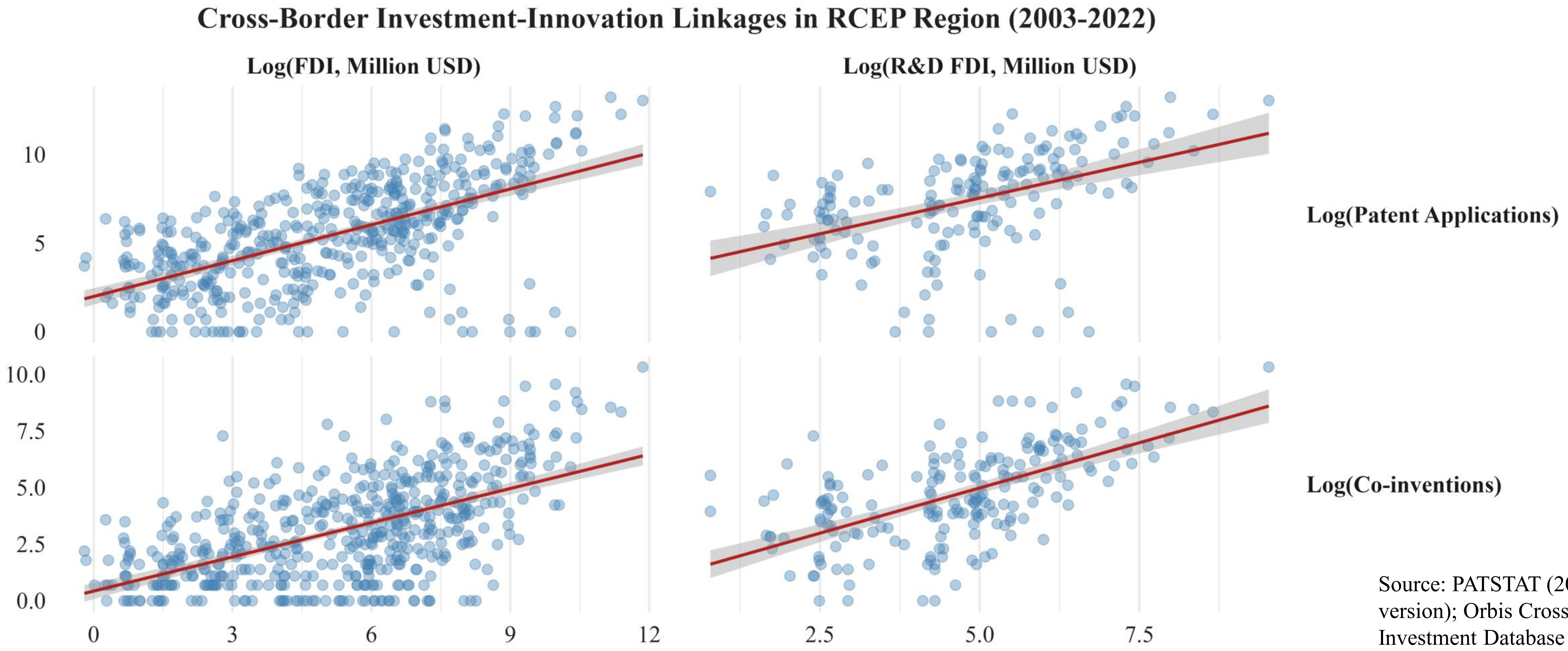
Source: PATSTAT (2025 spring version)

Discussion

- *How can the RCEP agreement facilitate technology flow?*

FDI Contributes to Technology Internationalisation

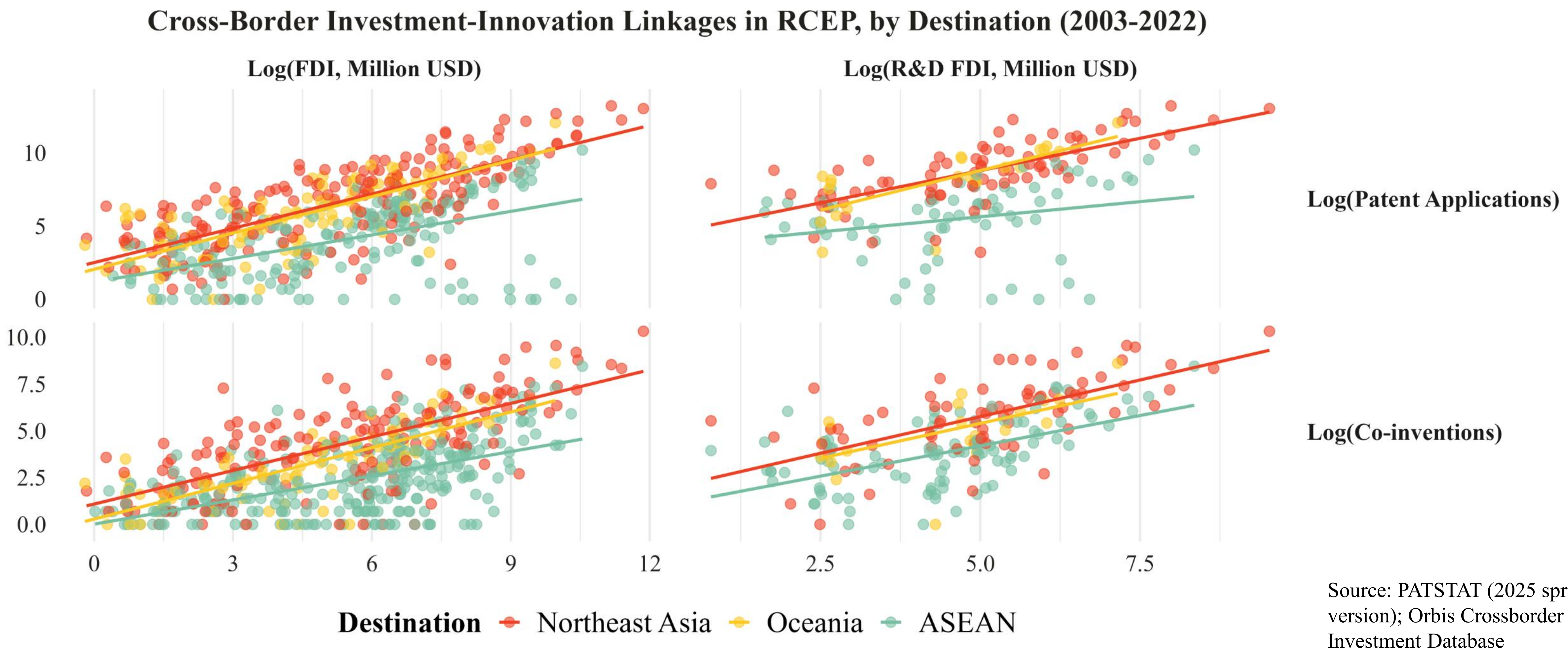
- Foreign firms utilised patents to safeguard their technological assets within RCEP destination markets
- Investors also engaged in collaborative work, facilitating the transfer of technology



Source: PATSTAT (2025 spring version); Orbis Crossborder Investment Database

The Heterogeneity Among Destination Markets

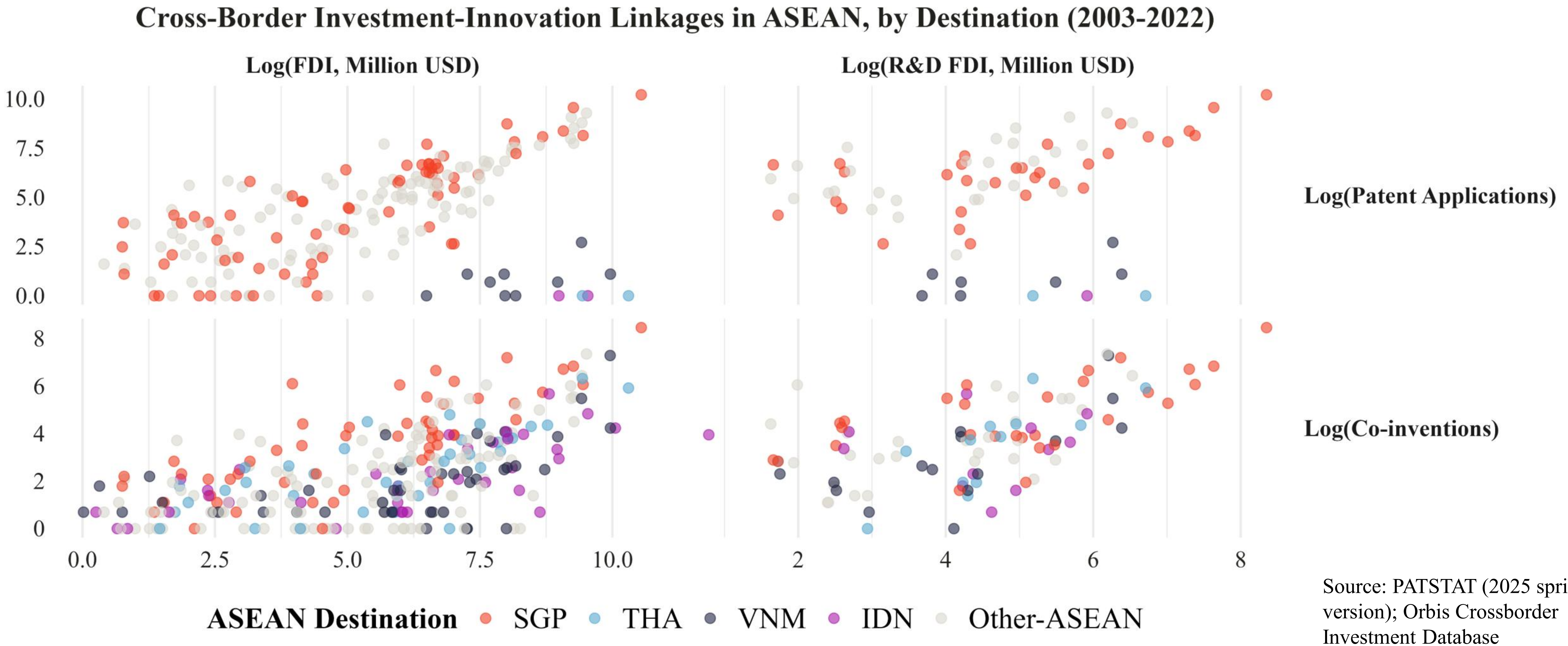
- Compared with Northeast Asia and Oceania, ASEAN showed lower levels of innovation output, given the same levels of investment inflows



Source: PATSTAT (2025 spring version); Orbis Crossborder Investment Database

Intra-ASEAN Performance Gap: Quality of IPR System Matters

- Singapore: primary destination for foreign firms to engage in R&D FDI and secure IP rights
- Vietnam, Thailand, Indonesia: significant FDI, but lag in technology diffusion and transfer



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RCEP’s IP Chapter: Promoting Cooperation in IP Harmonisation

- The IP chapter effectively sets a minimum standard for IP laws and practices among RCEP countries

Comprehensiveness

- Compared with existing ASEAN+1 FTAs, RCEP’s IP Chapter has **the most number of Articles** (83), more comprehensive than the AANZFTA’s (12) or the AHKFTA’s (2)
- RCEP’s IP Articles **cover various areas** such as patent protection/ IPRs enforcement/ unfair competition, which are missing in AANZFTA

Inclusiveness

- **Technical Assistance** requested by Cambodia, Laos, Myanmar, and Vietnam
  - **Digitalisation**: electronic application systems, online database
  - **Capacity building**: law and IT experts, trademark examiners
  - IPRs **enforcement**: checking pirated or counterfeited goods at customs authorities

Key Takeaways

- The RCEP region is a **key player** in technology commercialisation and development
- **FDI inflows** serve as a significant channel for **disseminating foreign technology** and facilitating **international technological cooperation**

- Northeast Asia:
    - Technological **leader** with a **“self-reliant”** innovation ecosystem
- ASEAN:
    - Its technological output remained **negligible, but improving**
    - Singapore and Malaysia remained the regional innovation leaders
    - **International collaboration** is a solution for members with weaker innovation capabilities

- Untapped potential of the RCEP region:
    - Enhance **intra-bloc integration** in technology commercialisation and development
    - Amplify the **impact of FDI** through supporting local patenting activities or collaborative work
    - Deliver **technical assistance programmes** to improve the quality of the IPR systems

Q&A

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