Collaborations & Research Fronts in SEA

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A bibliometric model for capturing the state of scientific development

PRE-DEVELOPMENT
Low research activity without clear policy or structural funding of research.

BUILDING- UP
Collaborations with developed countries are established. National researchers enter international scientific networks.

CONSOLIDATION AND EXPANSION
The country develops its own scientific infrastructure. The amount of funds available for research increases.

INTERNATIONALISATION
Research institutions in the country start functioning as fully fledged partners, and increasingly take the lead in international collaborations.

Table 27. Schematic overview of trends in bibliometric indicators per development phase

Phase	Trend in number of publications	Trend in share of internationally co-authored papers
Pre-development	.	.
Building up	+	++
Consolidation and expansion	++	-
Internationalization	+	+

Notes: "." denotes low or limited; "+" denotes an increase; "++" denotes a large increase; "-" denotes a decline.
Source: Authors

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General Methodology

- The analysis is based on scientific publications extracted from Scopus (Elsevier Database)
- Data on all publications indexed in the Scopus were sorted into three adjacent time periods: i) 1997-2001; ii) 2002- 2007; and iii) 2008-2012.
- This yielded approximately 6.5 million records for the region as a whole over these three time periods.
- The publication records were sorted into 26 research disciplines implemented in Scopus.
- Within that, publications were coded to denote the number of co-authorships among authors from countries in the study set and with authors in other countries outside the target countries.
- Publications were further categorized by authors' type of institutional affiliations (i.e. academia, gov., private)

RESULTS HIGHLIGHTS

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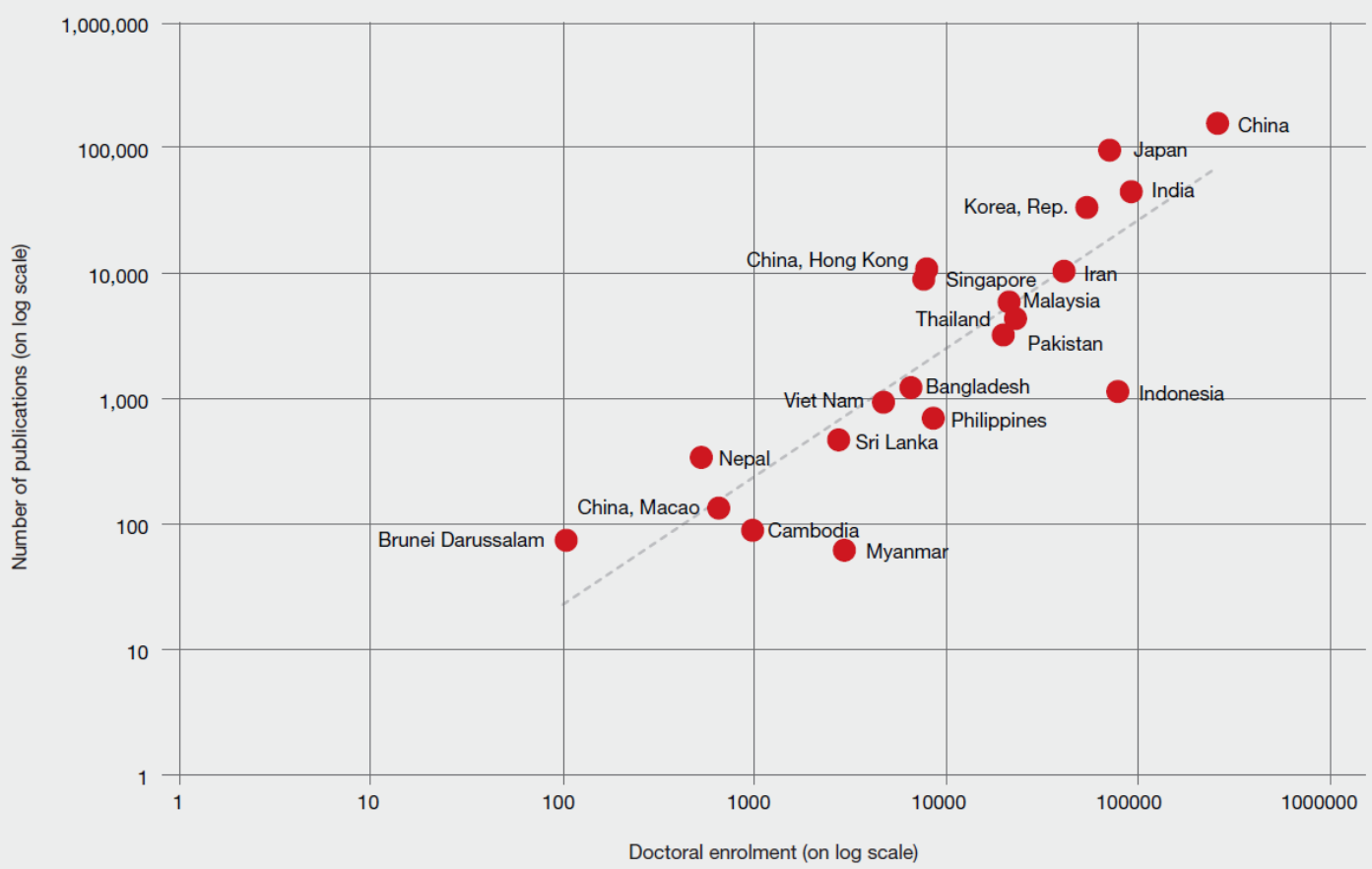
Input & Resources

Publications & Doctoral Enrollment

The number of publications generated within a country increases in almost linear fashion with doctoral enrolment. This suggests that doctoral students play a key role in the production of a country's publication output.

Figure 28. Number of publications indexed in Scopus in relation to doctoral enrolment by country



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Annual Growth Rate

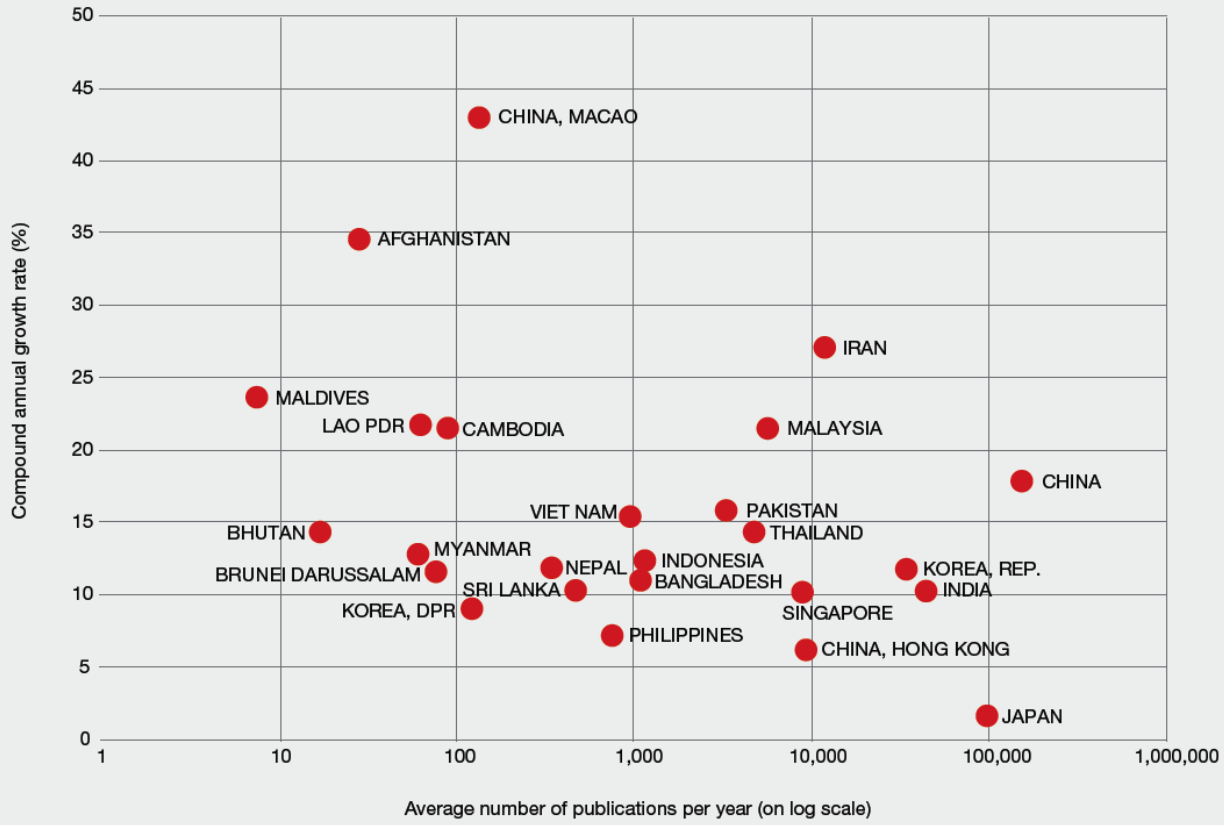
There are differences among countries in their average number

of publications per year, by up to 400%.

Among countries with more than 1,000 papers per year, the largest output originates from China. However, the

Islamic Republic of Iran, Malaysia and Pakistan have a compound annual growth rate above 15%.

Figure 31. Number and annual growth rate of publications indexed in Scopus by country, 1997-2012



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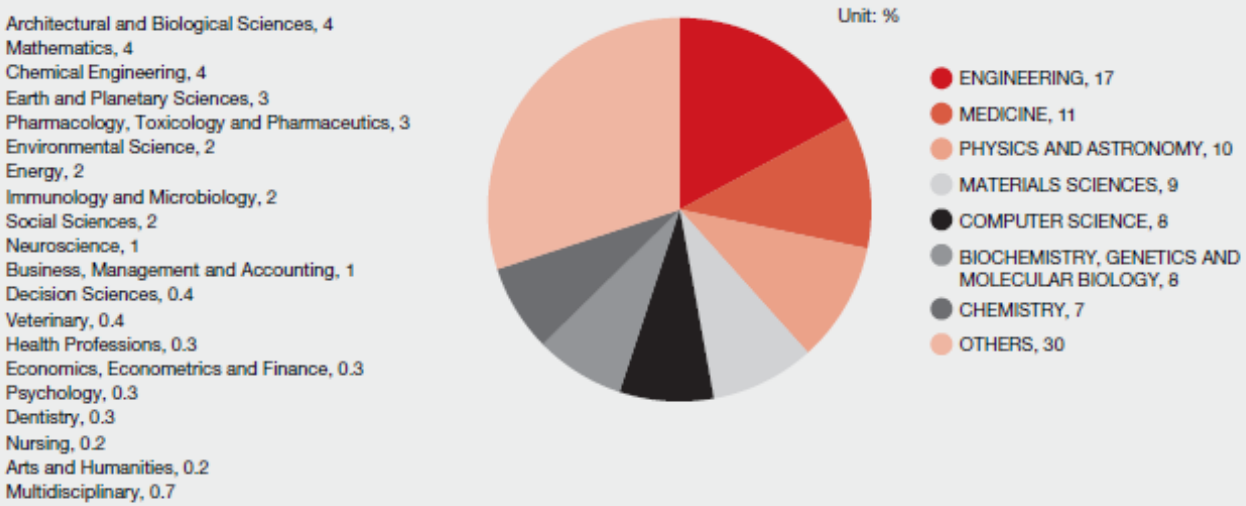
Disciplinary Growth

Disciplinary specialization

The major disciplinary foci of the region are concentrated around Engineering, Medicine, Physics and Astronomy, Material Sciences, Computer Science, Biotechnology and Chemistry

The area showing the greatest growth between 2007 and 2012 has been Arts and Humanities, Computer Science, and Nursing, while the least growth has been in neuroscience, Health Professions and Veterinary

Figure 32. Distribution of publications by discipline in the Asian countries analysed in the study, 1997-2012



Source: Scopus

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Collaborations & Co- Authorships

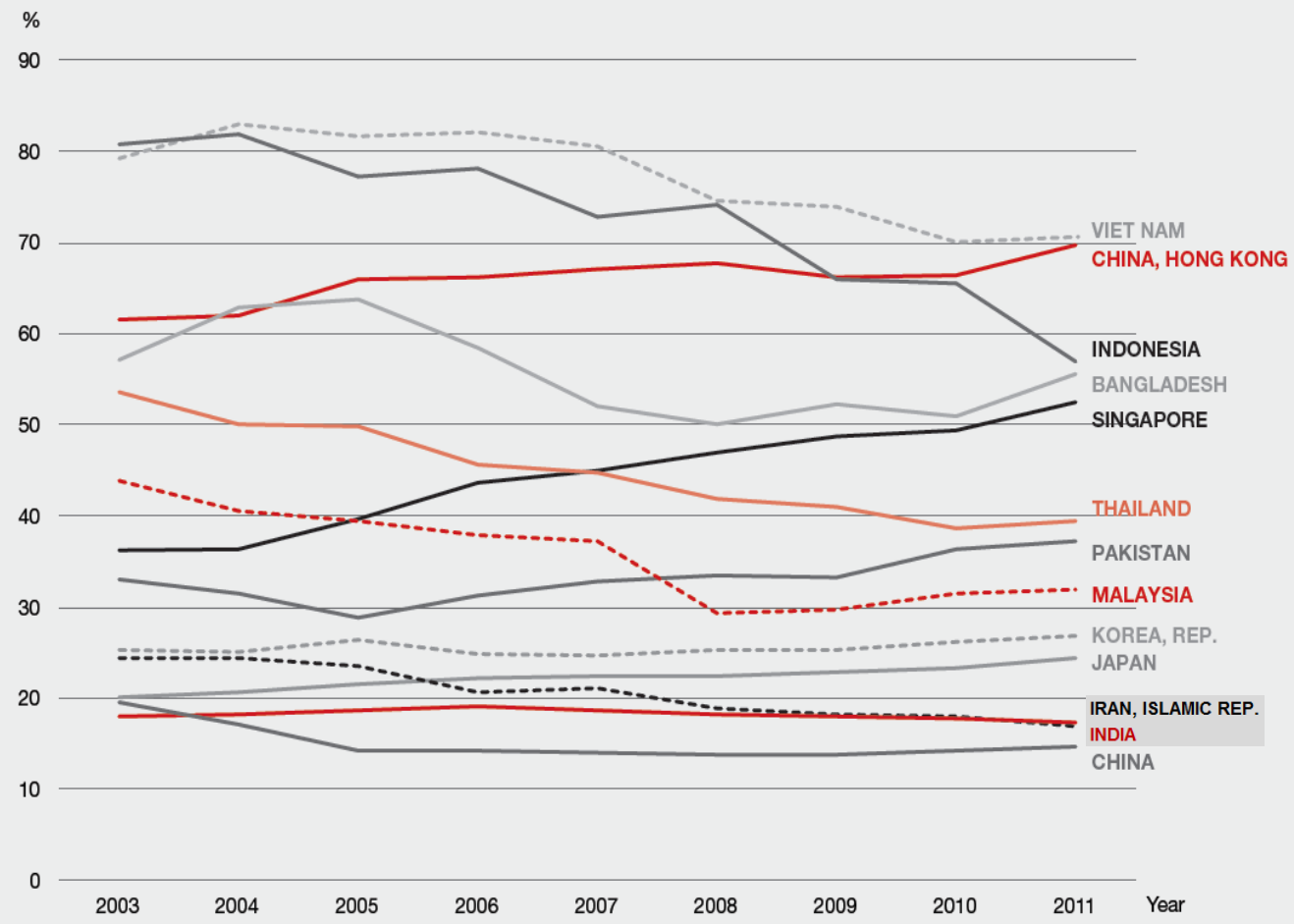
International co-authorship

Three out of five high-income countries or territories show a positive trend in international co-authorship.

Seven out of nine upper middle-income countries or territories show a significant decline in the percentage of internationally co-authored articles

None shows a significant positive trend.

Figure 30. Trends in the percentage of internationally co-authored articles in selected countries or territories, 2003-2011



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Internal Regional Collaborations

Clusters focusing on different disciplines

China cluster focusing Engineering,

Physics and Astronomy, and Computer Science

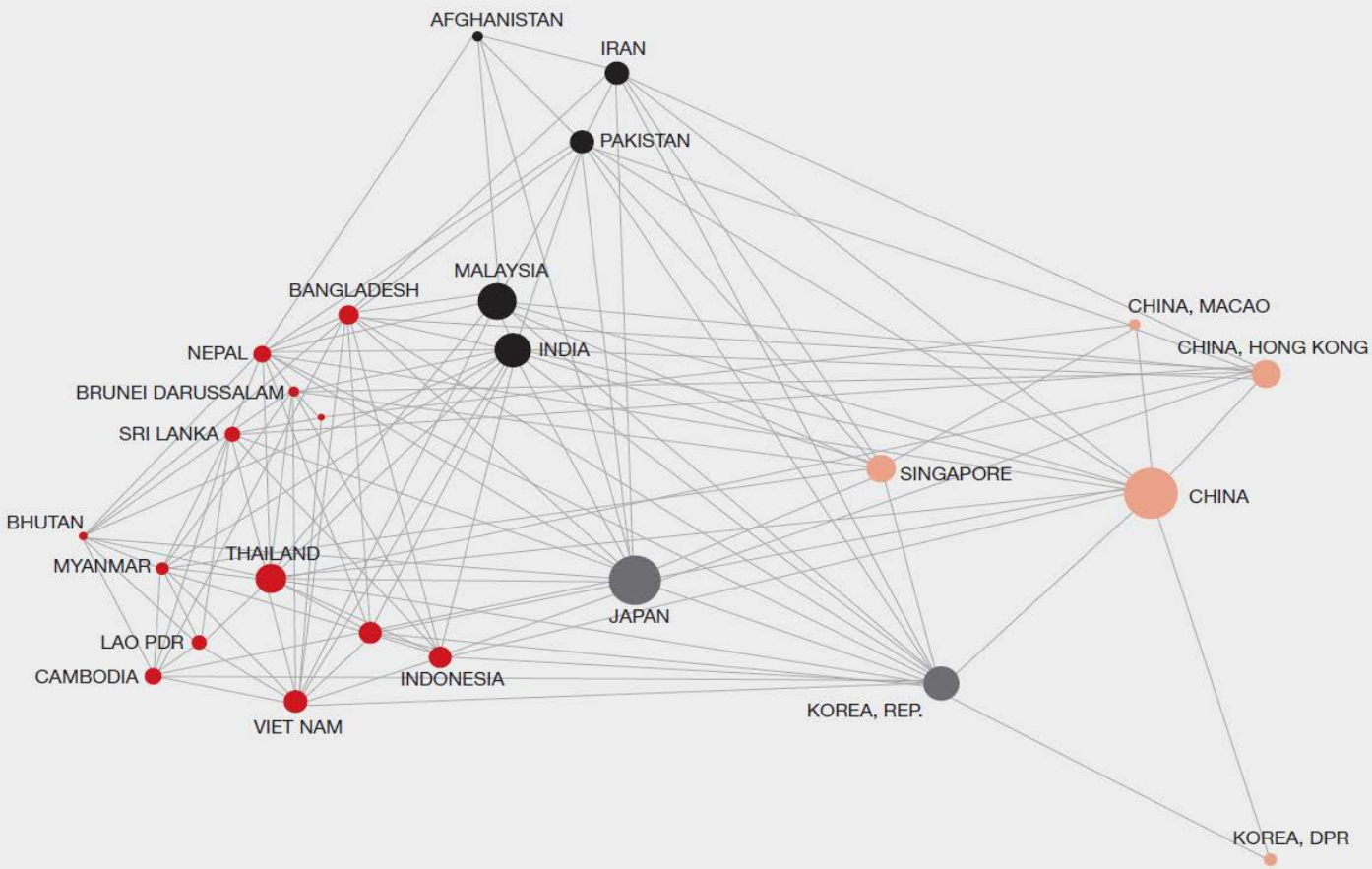
India cluster focuses on Medicine, Agriculture, Chemistry

and Engineering

Thailand cluster focuses mostly

on Agriculture, Medicine and Earth Sciences.

Figure 34. Co-authorship networks within Asia, 2008-2012



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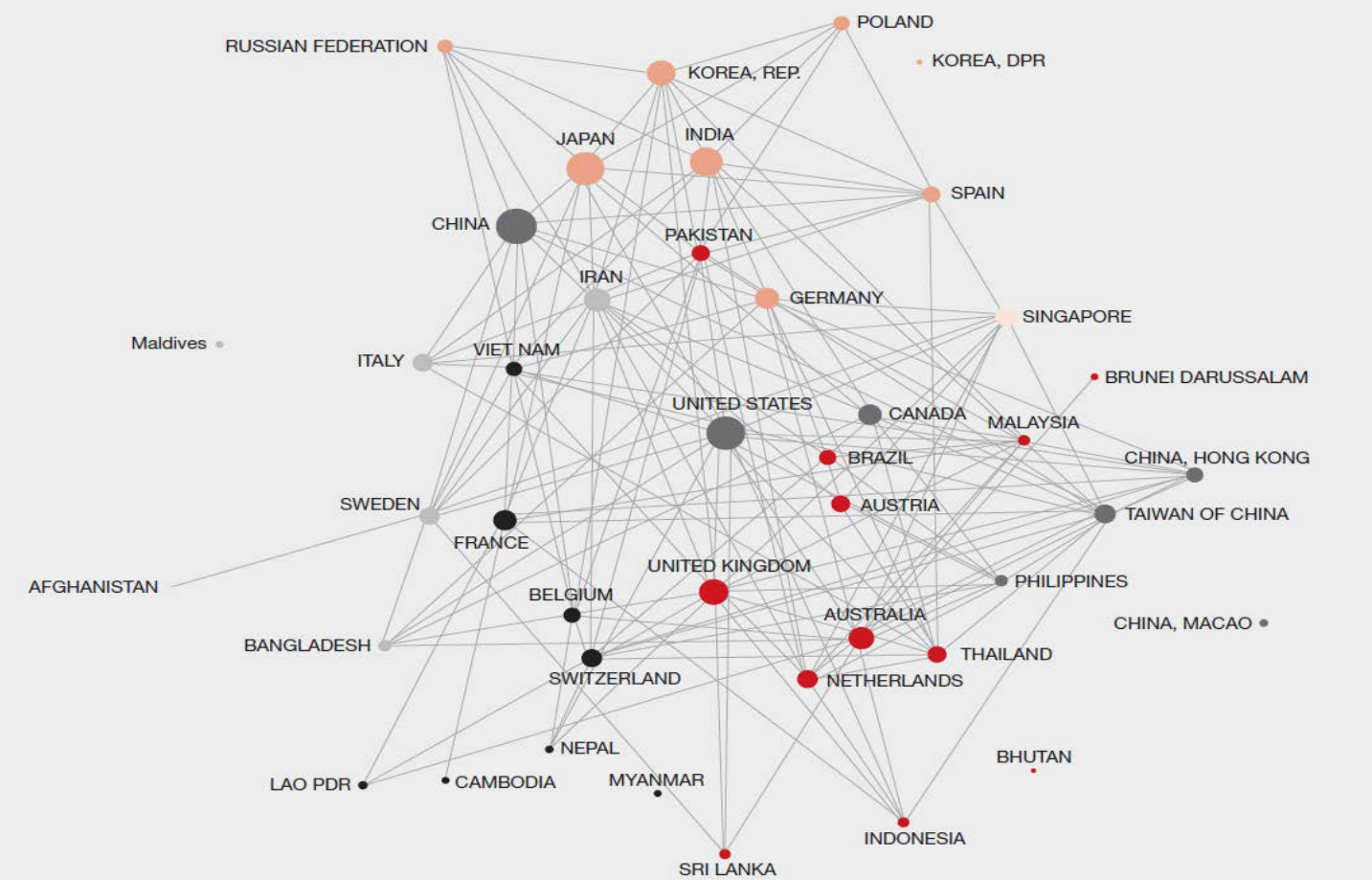
Western International Collaboration

Leading western countries collaborating with SEA countries include the USA, Canada, UK, Germany, Netherlands and Austria

Brazil is the leading South American country collaborating with the region. ,

Figure 36. International co-authorships between selected Asian and Western countries, 2008-2012



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Main take away points

- The bibliometric model of four phases of scientific development is largely in agreement with economic development phases.
- Be cautious when interpreting bibliometric indicators. A declining trend is not always a bad sign
- There are differences among countries in their average number of publications per year, by up to 400%.
- The major disciplinary foci of the region are concentrated around Engineering, Medicine, Physics and Astronomy, Material Sciences, Computer Science, Biotechnology and Chemistry
- Collaborations within the regions are around "clusters" of countries with similar research agenda
- Leading western countries collaborating with SEA countries include the USA, Canada, UK, Germany, Netherlands and Austria while Brazil is the leading SA country collaborating in the region

Thank you!
Questions?

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