The global scientific brain: indicators of research mobility using bibliometric data

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Outline

- The challenge of measuring mobility

- Bibliometric possibilities

- The global brain

- Results on global mobility patterns

- Conclusions

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The challenge of measuring mobility

- Policy need: internationally comparable mobility indicators for the scientific workforce

- Current approaches: insufficient
  - Issues of data sparsity, idiosyncratic data collection practices, and time delays in integrating datasets, etc.

- To address this policy gap: global scientific mobility patterns based on bibliometrics

- Explore the potential (and challenges) of bibliometric approaches to capture scientific mobility

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Bibliometric possibilities

2008 onwards: author-affiliation linkage in WoS publications

Is g-index better than h-index? An exploratory study at the individual level

By: Costas, R (Costas, Rodrigo)[1] ; Bordons, M (Bordons, Maria)[1]

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Is Scientific Literature Subject to a 'Sell-By-Date'? A General Methodology to Analyze the 'Durability' of Scientific Documents

By: Costas, R (Costas, Rodrigo)[1] ; van Leeuwen, TN (van Leeuwen, Thed N.)[1] ; van Raan, AFJ (van Raan, Anthony F. J.)[1]

JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE AND TECHNOLOGY
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The 'global brain'

- Mobility of scholars captured by their affiliation with multiple countries in scientific publications

- *Co-affiliation*: two countries that share(d) a given scholar

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Operationalization of mobility

- *Mobile scholar*: author affiliated with more than one country during the period of analysis

- *Country of origin*: country with which the author was affiliated at the date of their first publication (t0).

- Any other country of affiliation after t0 is designated as a *receiving country*.

- *Dynamic approach*: instances of 'sending'/'receiving' scholars across countries over time by comparing the country/countries with which a scholar is affiliated at a given point in time (tx) with the country/countries associated at the next point in time (tx+1).

Methodology: data

- Web of Science database

- Author-name disambiguation algorithm (Caron & van Eck, 2014)

- Period of time: 2008-2015

- Selection of scholars:
  - Year of first publication $\geq$ 2008
  - At least 2 publications

- 8,168,640 publications associated with 3,521,797 disambiguated individuals worldwide

- 6.5% of the 3.5 million individuals in our sample were associated with mobility

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Results – global mobility patterns
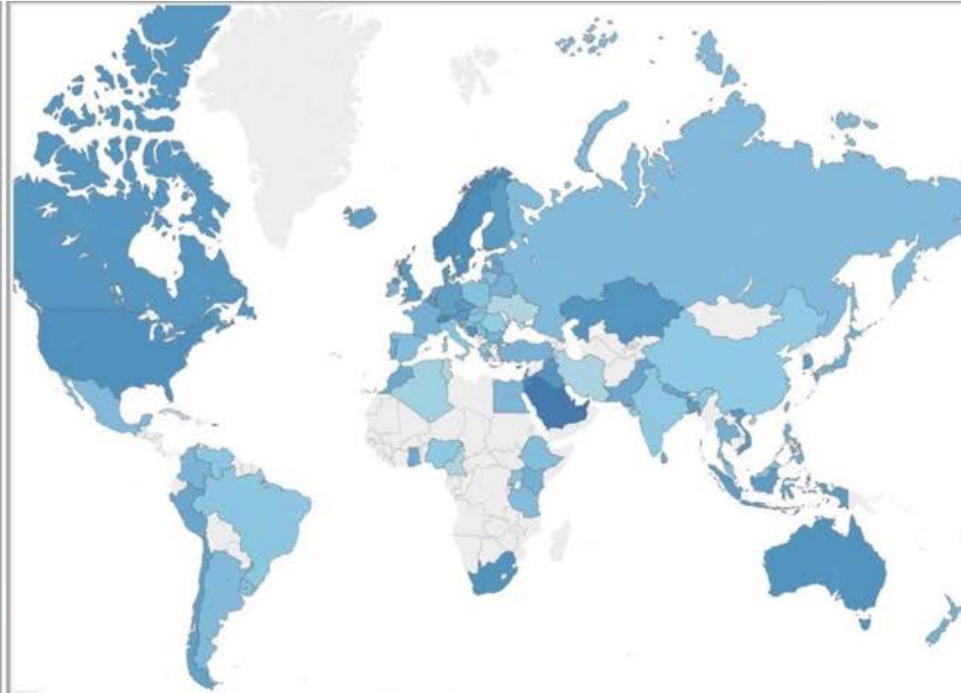# - % of scholars with mobility
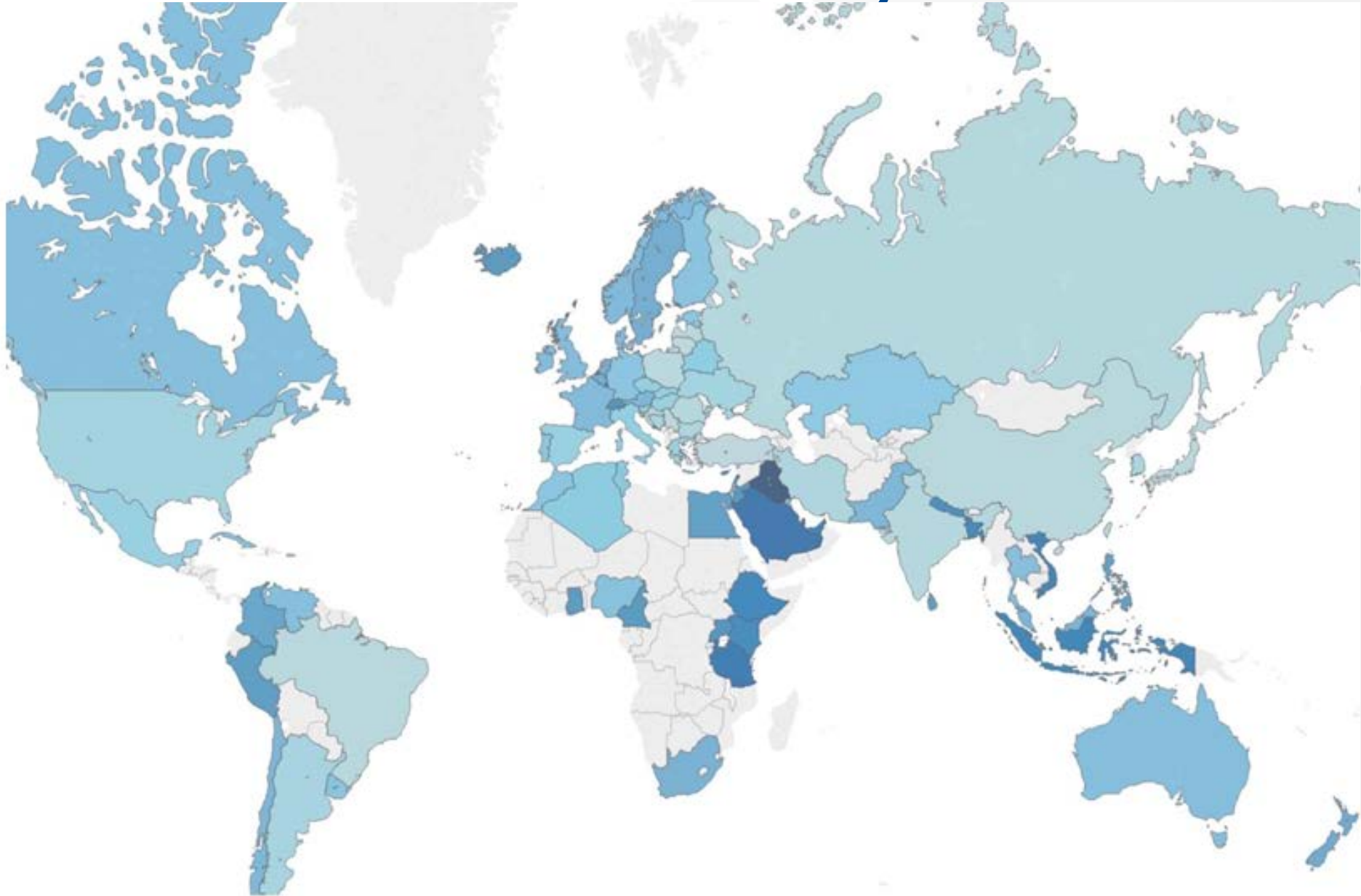
Originating vs. receiving countries
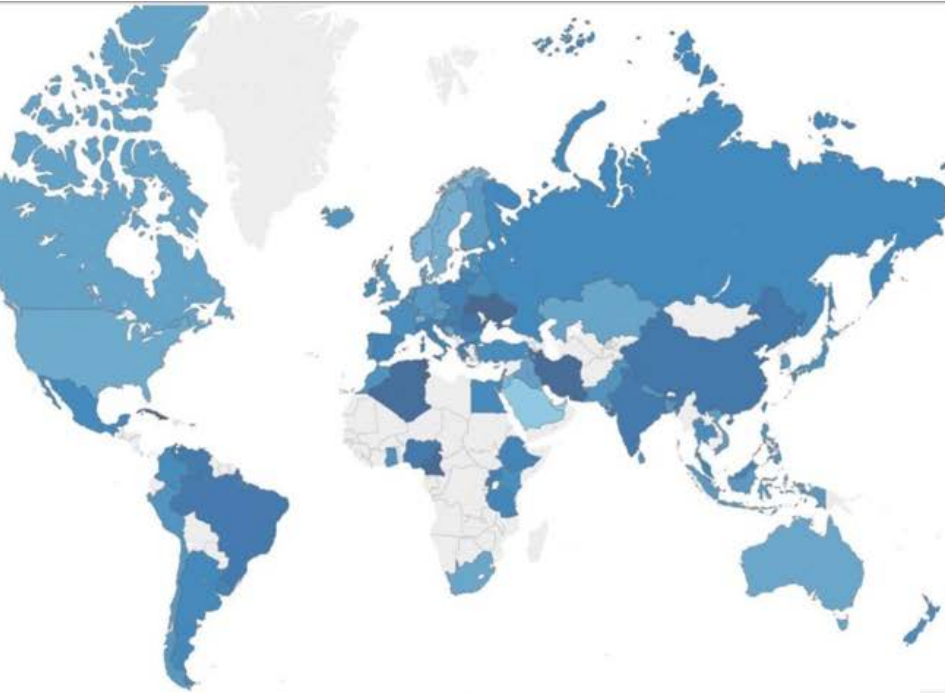
B. Originating

C. Receiving

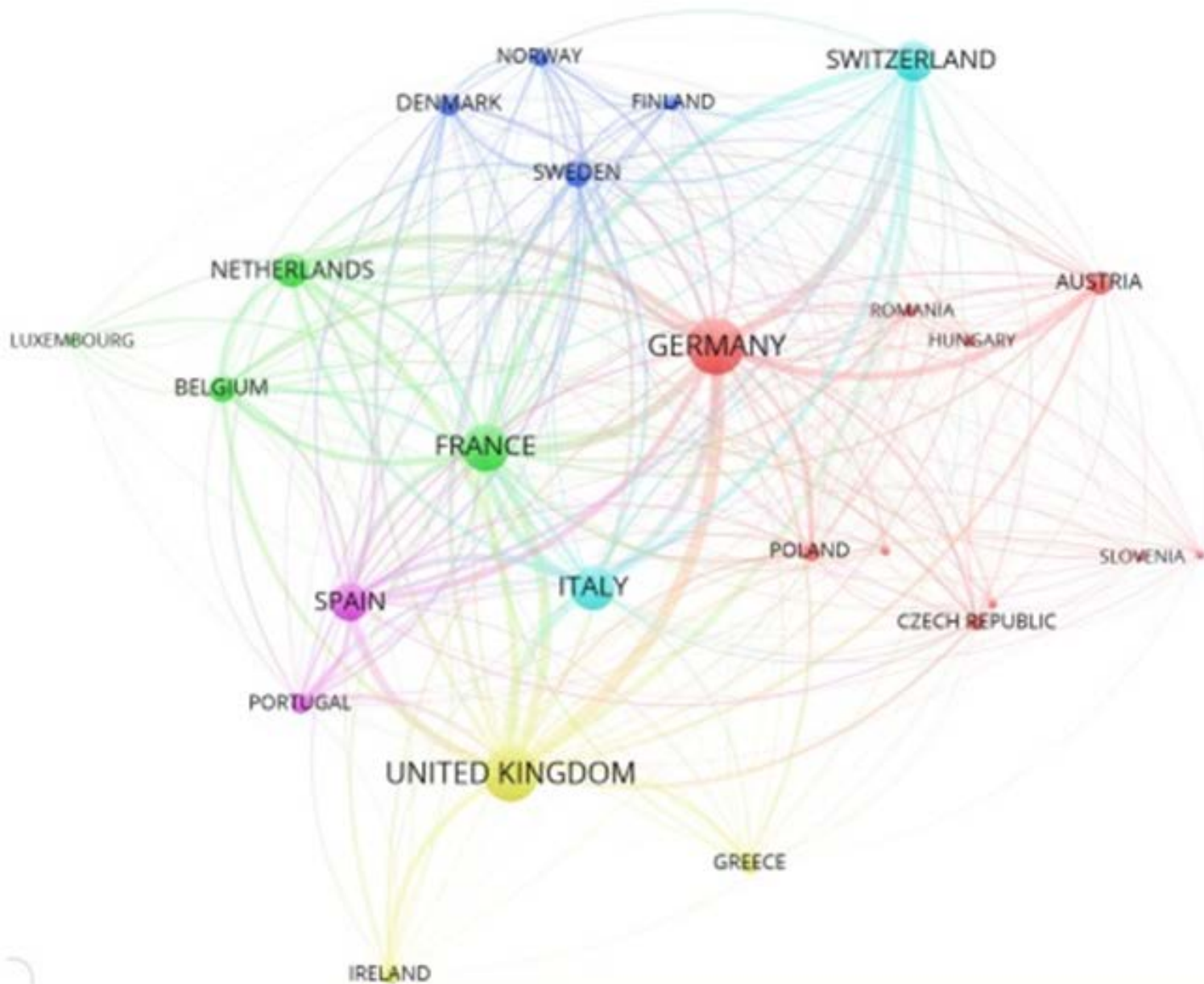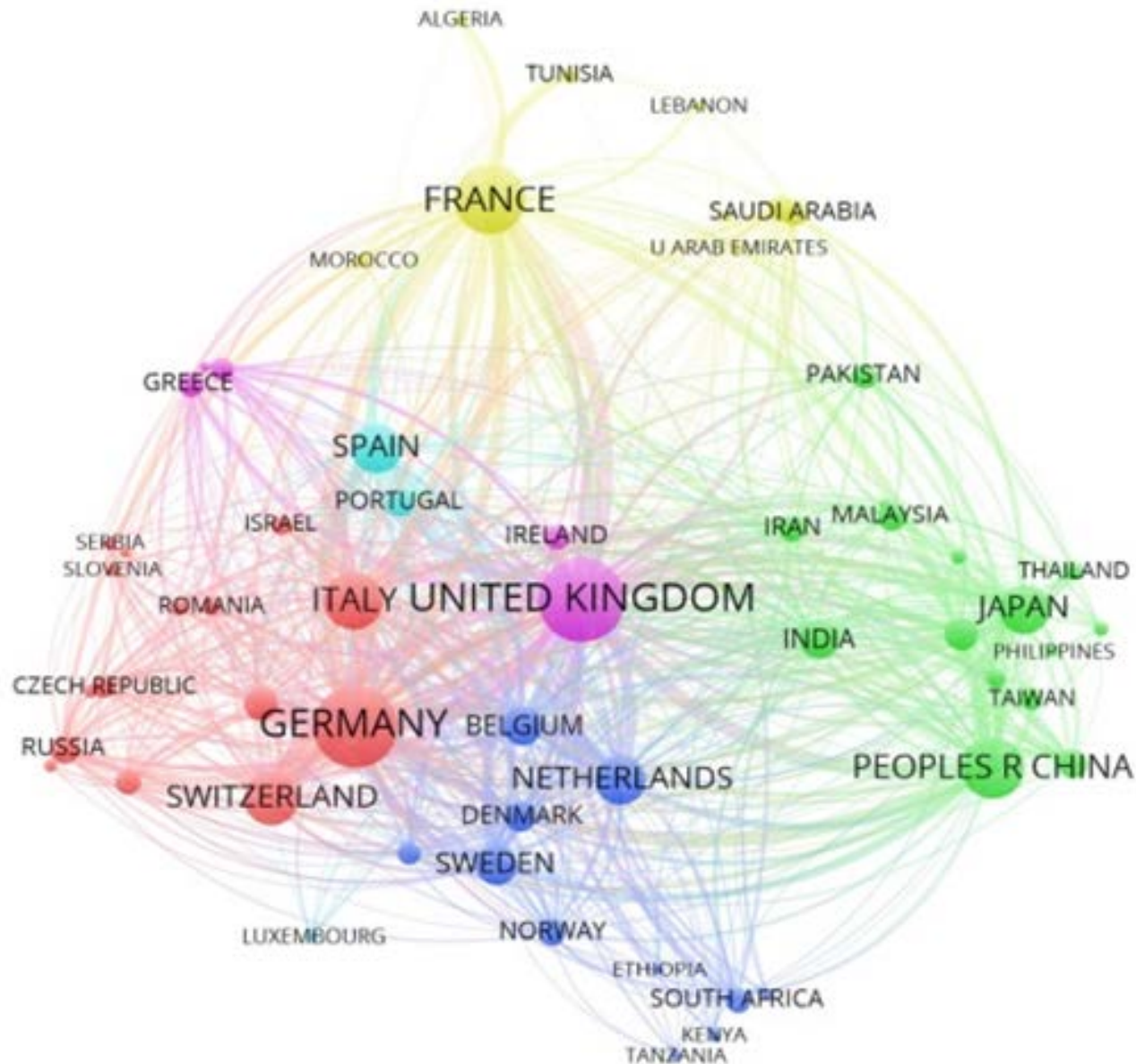Dark colors: countries with higher % of 'mobile' individuals originating from that country

Dark colors: countries with higher % of 'mobile' individuals not originating from that country (i.e. scholars received by the country)

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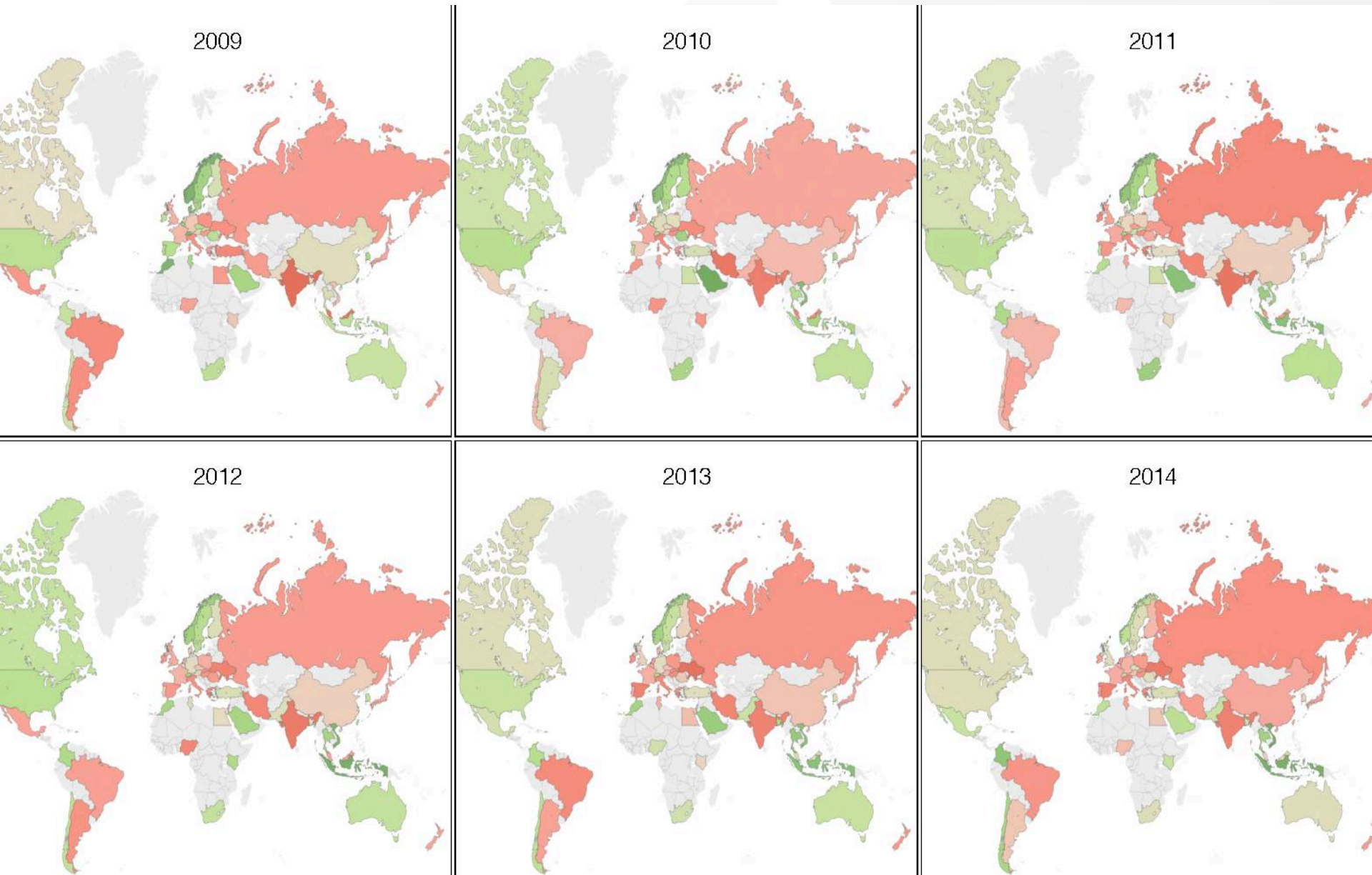# Co-affiliation networks - World

Europe

Asia, Europe, Middle East and Africa

Time dynamics:
Green: receivers / Red: senders

Main conclusions

- Previous approaches relied on:
  - Complex integration of data from several/heterogeneous sources;
  - Indicator development cumbersome

- Utility of bibliometric data for depicting:
  - the connectivity of countries through shared human capital,
  - the circulation of scholars at the global level, and
  - the capacity of countries to produce and attract scholars.

- Advantages:
  - timely and standard collection of the data (for all countries)
  - ability to overlay with several variables (e.g., gender, discipline, institution, etc.)
  - Inclusiveness

- Challenges:
  - Coverage
  - Publication delays & year of first publication
  - Author-name disambiguation approach - conservative

Main conclusions

- Bibliometric data allow for the analyses of various correlative variables with mobility including: economic, scientific, and social capital.

- Bibliometric indicators provide an opportunity to test several policy-relevant questions systematically, globally, and diachronically.

- Bibliometric approaches, combined with other sources on mobility, provide a *unique perspective on the global mobility of scholars and its effects on the scientific system*.

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Thank you very much for your attention!

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