THE USE OF CO-OCCURRENCE NETWORKS FOR MAPPING NEW TOPICS IN SCIENTIFIC FIELDS

GIUSEPPE GIORDANO
Dept. of Political and Social Studies,
University of Salerno (Italy)

The use of co-occurrence networks for mapping new topics in scientific fields
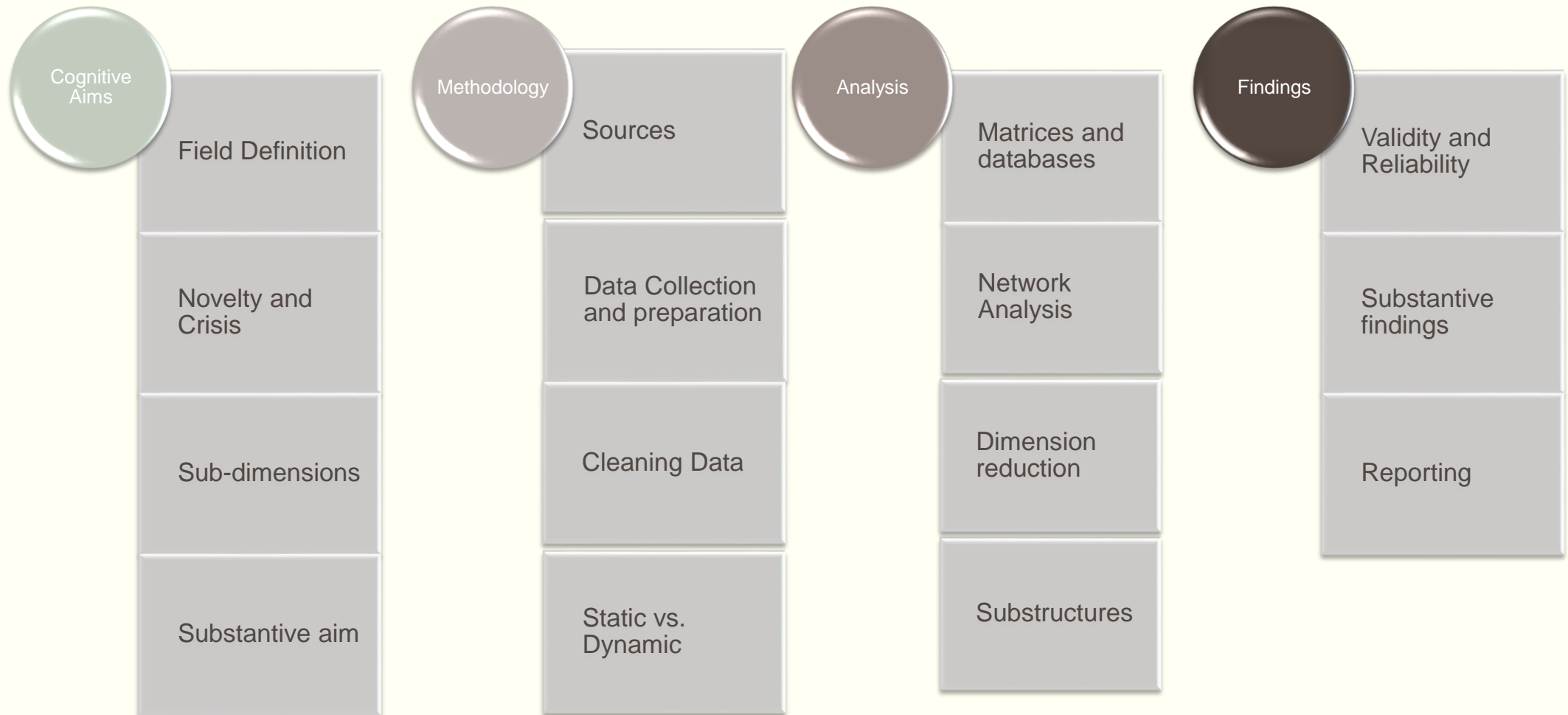
- Aim of this talk is to give an overview of the general framework and the several steps involved in conducting a Bibliometrics research

- After discussing a general scheme reporting all phases of the study, we take a look at the specific steps along with a real case study conducted by:

Maria Carmela Catone, Paolo Diana and Giuseppe Giordano
Dept. of Political and Social Studies, University of Salerno, Italy

Mapping new topics and recent trends in Social Research Methodology

Conceptual Framework

Cognitive Aims
- Field Definition
- Novelty and Crisis
- Sub-dimensions
- Substantive aim

Methodology
- Sources
- Data Collection and preparation
- Cleaning Data
- Static vs. Dynamic

Analysis
- Matrices and databases
- Network Analysis
- Dimension reduction
- Substructures

Findings
- Validity and Reliability
- Substantive findings
- Reporting

Field Definition: Social Research Methodology

Explore the ongoing and emerging issues, the recurring themes and new directions on the topic of Social Research Methodology taking account of:

Novelty & Crisis

➡The growing complexity of global society (Castells & Cardoso 2006; Capra 2002)

➡The new opportunities to investigate social phenomena due to the development of digital technologies and the increasingly source of information, traces, data (Edwards et al., 2013; Rogers, 2013)

➡The «crisis of the empirical Sociology» (Savage & Burrows, 2007)

Sub-dimensions

Substantive dimension: Digital Sociology

Digitization as a fundamental societal phenomenon: it affects every sphere of our life and determines societal, cultural, political and economical transformations.

New digital technologies are embedded in multiple aspects of everyday life (Marres, 2017).

Methodological dimension:

Procedures and instruments to analyse and interpret contemporary society.

- The social researcher has to tackle a complex mix of different elements: human being, technological devices, infrastructures and data.

- Digitization of already existing methods (e.g. web surveys, netnography)

- Natively digital methods which are the 'new' methods specifically designed according the distinctive features of digital devices (Rogers, 2013)

Digital sociology - methodological dimension

▪Reflection on the new *apparatus* of social research:

E.g. Issues of validity, reliability, representativeness

▪Identification of a different methodological *vocabulary*:

E.g. the concept of 'data' VS trace (Bruno Latour et al. 2012): data implies a specific architecture, the trace maintains a reference to the device from which it was detected (Marres & Weltevrede, 2013). E.g: Web scraping VS data collection

▪E.g. 'designed' data VS 'naturally occurring' data (Rogers, 2013)

BUT they are formatted with reference to the technical characteristics of the device

Substantive Aim

Is it possible to find the relevant topics emerged in the field of the Social Research Methodology, highlighting:

- *Dominant topics*
- *Peripheral or Marginal Topics*

and finally,

- *To plan a journey in the Middle-Earth ?*

Methodology

Selecting the Database

- Data base Scopus (SciVerse Scopus).
  http://www.scopus.com

- Web of Science – WoS
  Data base ScienceDirect.
  https://clarivate.com/products/web-of-science/

Delimiting Sources and Time

- Journals not Specialized on peculiar sub-topics

- High Citation Index

- Journal Citation Reports

- Distribution of issues along years

Methodology: the choices

Selecting the Database

- Data base Scopus (SciVerse Scopus).
  http://www.scopus.com

Delimiting Sources and Time

- Three Generalist Journals
  - *International Journal of Social Research Methodology (Taylor & Francis)*
  - *Sociological Methodology (Sage)*
  - *Sociological Methods & Research (Sage)*

Distribution of issues along years

- 30 years from 1989 to 2018

Bibliometrix is developed by [Massimo Aria](#) and [Corrado Cuccurullo](#).

It is an open-source tool for quantitative research in scientometrics and bibliometrics that includes all the main bibliometric methods of   analysis.

With **biblioshiny**, the shiny app introduced from version 2.0, bibliometrix has become very easy to use even for those who have no coding skills.

Bibliometrix package provides various routines for importing bibliographic data from [SCOPUS](#), [Clarivate Analytics' Web of Science](#), [PubMed](#) and [Cochrane databases](#), performing bibliometric analysis and building data matrices for co-citation, coupling, scientific collaboration analysis and co-word analysis.

BIBLIOMETRIX

An R-tool for comprehensive science mapping analysis

Now it includes
BiblioShiny App: *Bibliometrix for non-coders*

LEARN MORE

http://www.bibliometrix.org/

Sources' Statistics

Description	Results
Documents	1383
Sources (Journals, Books, etc.)	5
Keywords Plus (ID)	88
Author's Keywords (DE)	2581
Period	1989 - 2018
Average citations per documents	38.99
Authors	2231
Author Appearances	2861
Authors of single-authored documents	484
Authors of multi-authored documents	1747
Single-authored documents	577
Documents per Author	0.62
Authors per Document	1.61
Co-Authors per Documents	2.07
Collaboration Index	2.17

Looking for prominent Scholars

Most Relevant Authors
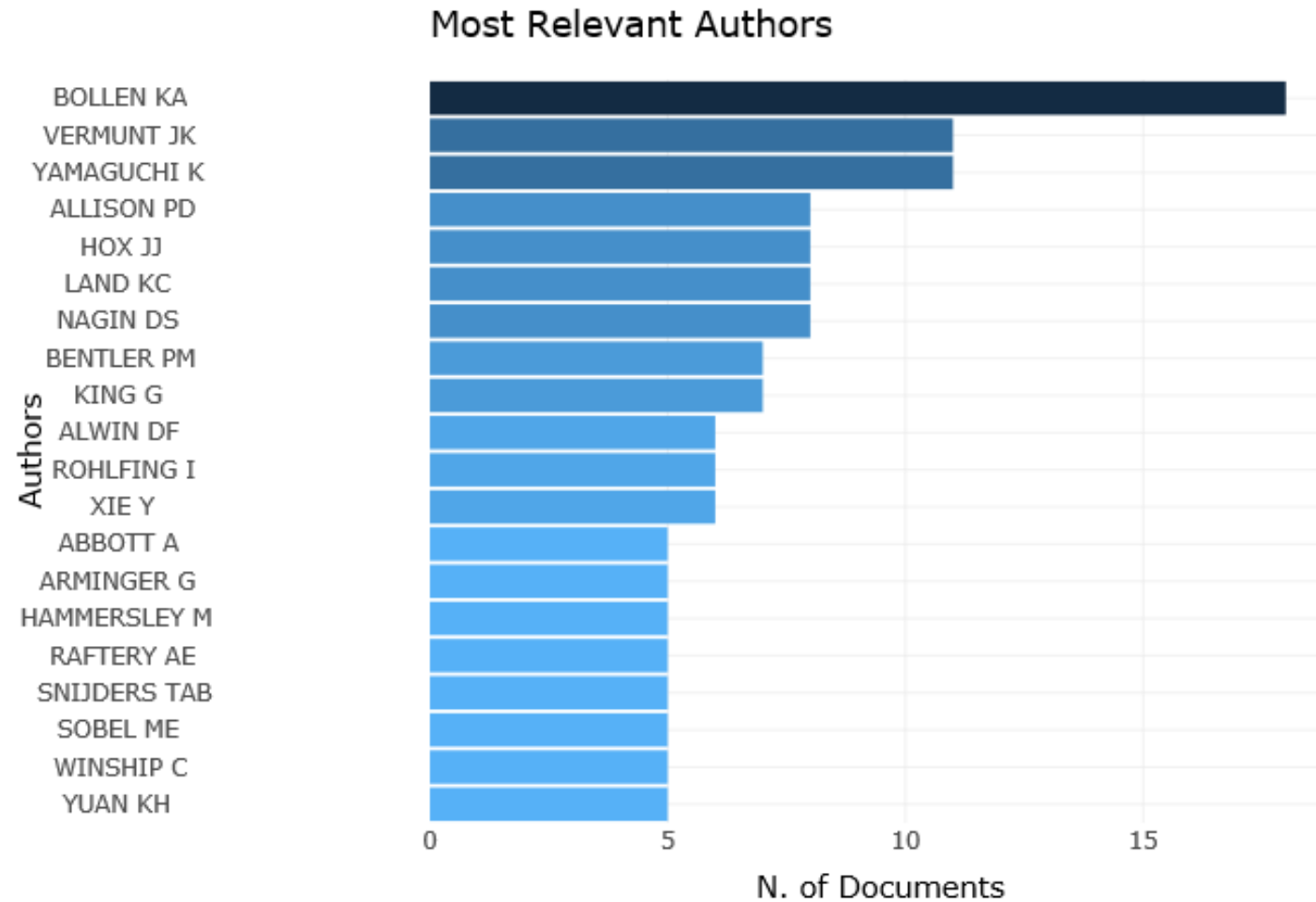
Descriptive Bibliometrics

Trend Analysis
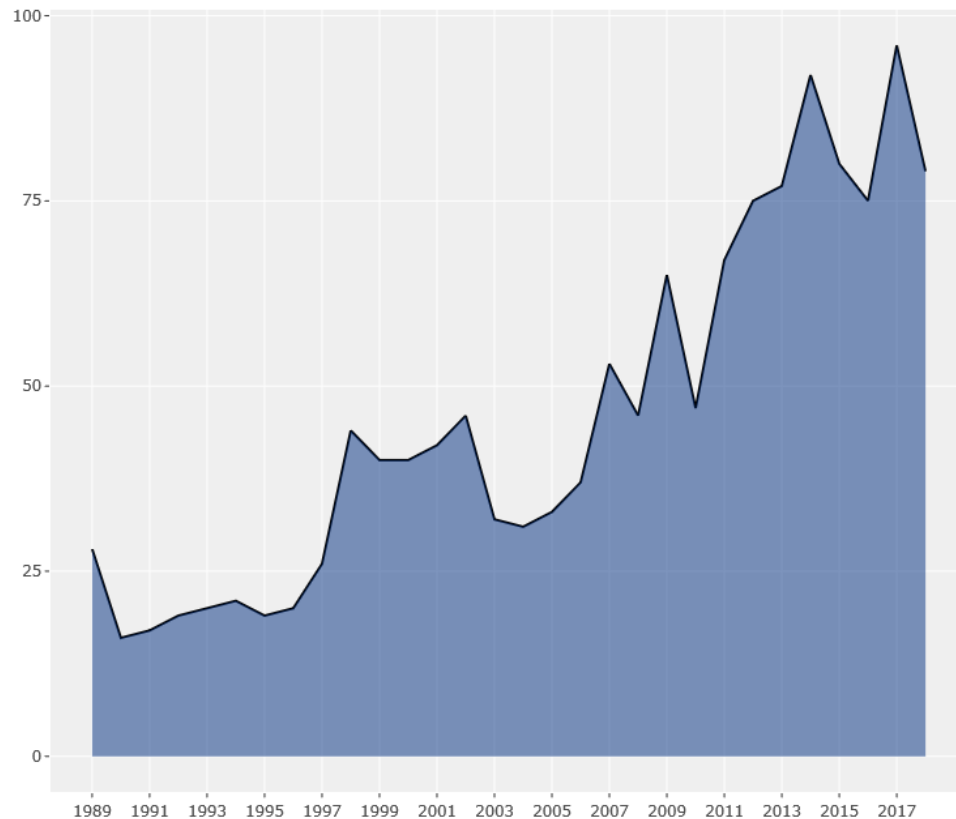
How the SRM field behave during time?

- The trend of publications appears to be constant until 2007. Since 2008, the number of publications has increased rapidly.

- What happens in those years?

Looking for time events

Average Article Citations per Year
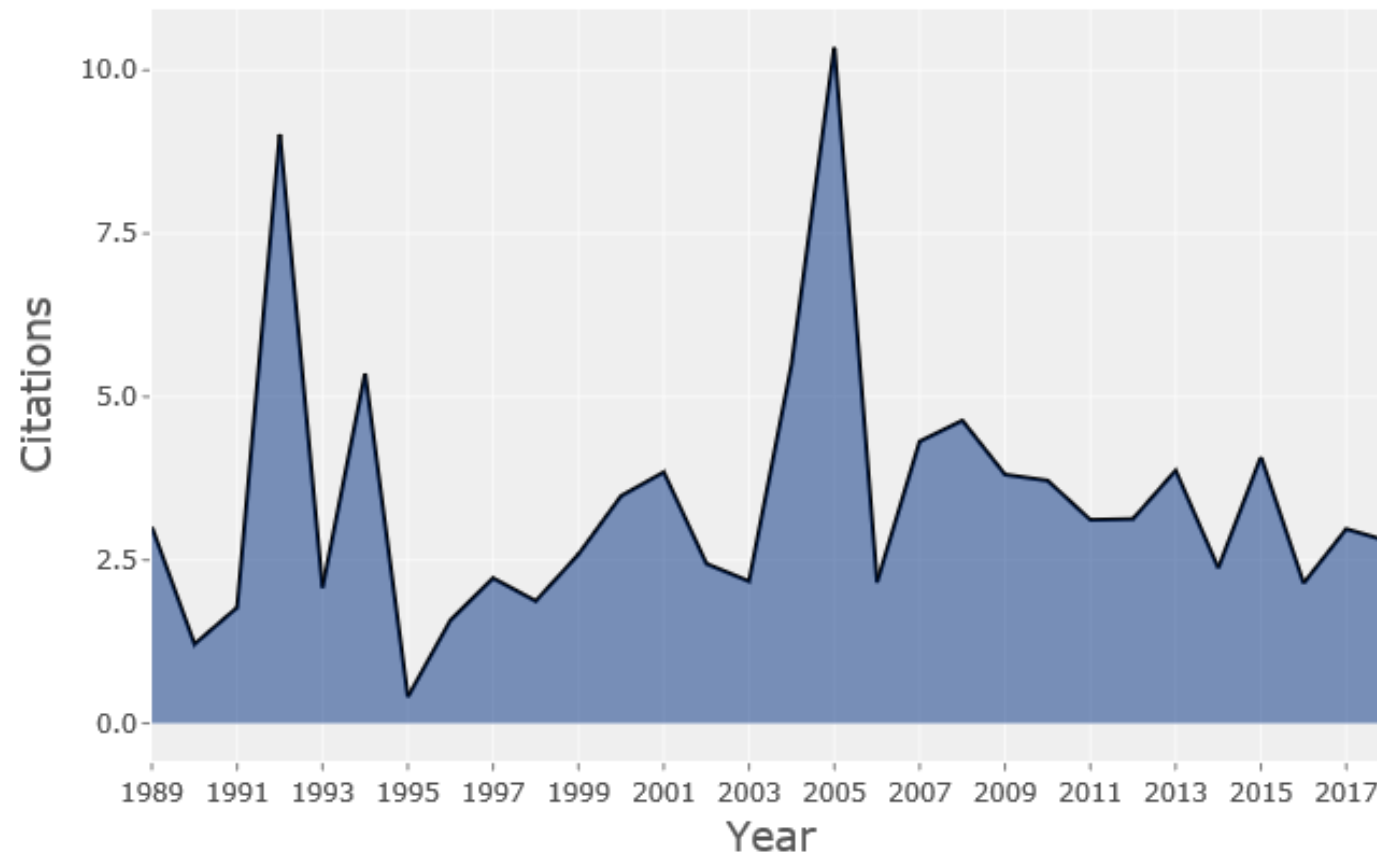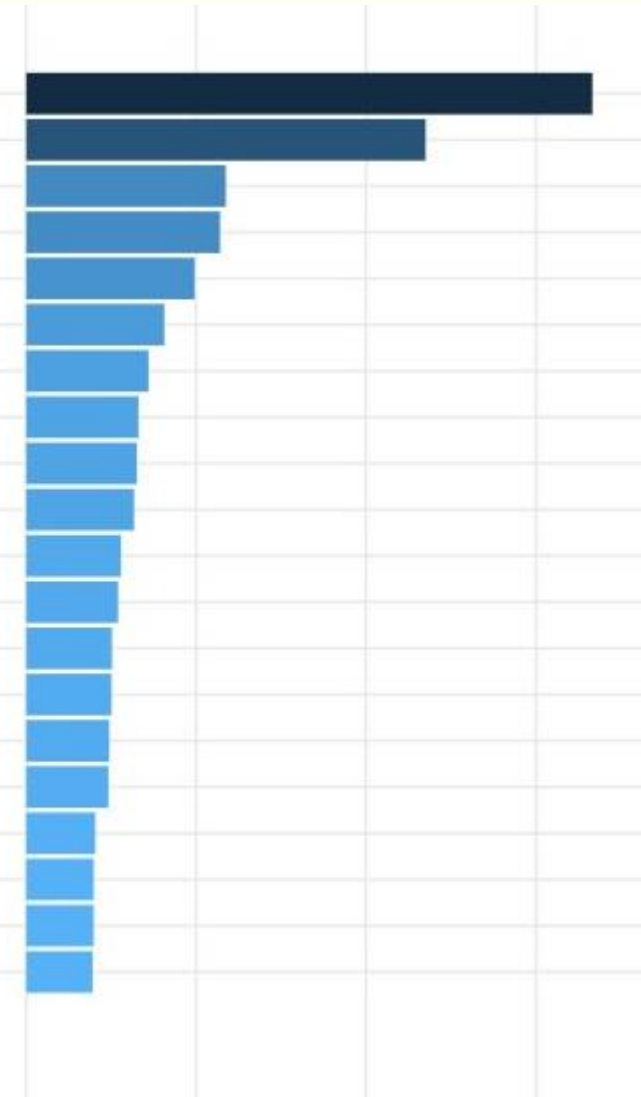

Two peaks clearly emerge:
1992
2005

Milestones Papers or multiple documents?

AACY = (Total number of citations for the documents in a year / #Documents) /
# Citable Years

Looking for Milestones
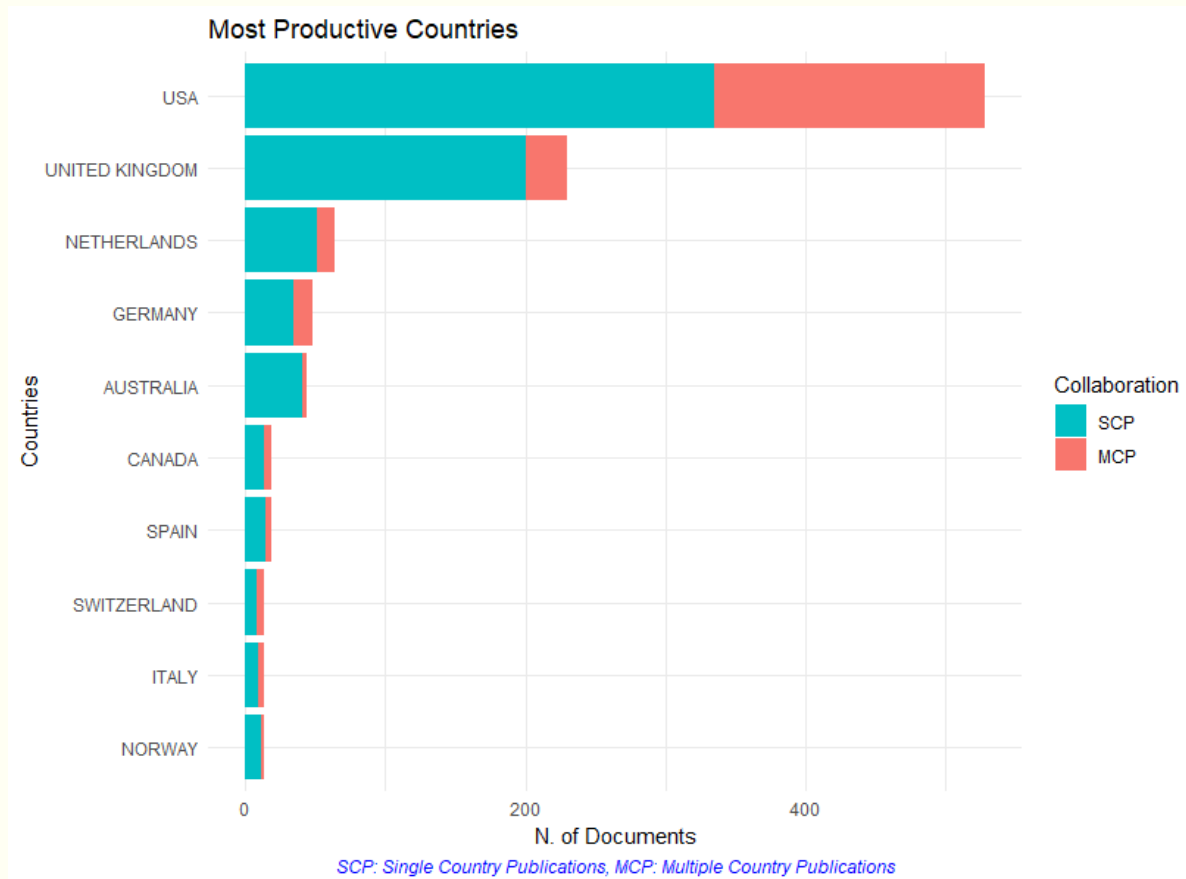
Scholars and Time

Darker colors are related to more cited documents.

Bigger circle means larger number of publications in that year

More Productive Countries

Countries

Most Productive Countries

SCP: Single Country Publications, MCP: Multiple Country Publications

Which are the Countries more involved in the Field?

- Is there a Country effect?

- Is there a Language effect?

- Why USA, UK, Netherlands are so influent?

Towards co-occurrence analysis

To be continue….

Contact: ggiordano@unisa.it