

RISIS



RESEARCH INFRASTRUCTURE FOR SCIENCE
AND INNOVATION POLICY STUDIES

Revealing dynamics, structure and societal connections
How advanced bibliometrics support science policy
analysis

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Outline

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- Introduction
- Applications beyond the usual:
 - Priority setting: disease burden vs R&D output and monitoring
 - CWTS publication dataset (basic set, additions, classification, link to RISIS)
 - Connectedness between R&D and society
- Discussion
- Wrap up

Introduction:

Why should we shift analyses to mission-orientation research?

Three innovation frames (Schot and Steinmueller, 2016)

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- Linear model (postwar until 1980s)
 - Science → Technology → Innovation → Well-being
 - Input (\$, people) and output (pubs, pats) indicators of STI.
 - OECD Frascati Manual (1963)
- Innovation Systems (early 1990s until late 2000s)
 - Interactions between stakeholders are key to produce innovation.
 - STI interactions → Innovation → Economic Growth → Wellbeing
 - OECD Oslo Manual (1992) -- focus on interactions
- **“Inclusive” or “transformative” innovation (2010s...)**
 - Innovation not necessarily positive – directions matter.
 - Emphasis in cross-sectoral policy, public participation, decentralisation
 - Indicators?? **Adjust research to social goals of innovation**

Shift to mission-orientation in science policy

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“Mission-oriented innovation policy responds to these ‘grand challenges’ by identifying and articulating concrete problems that can galvanise production, distribution, and consumption patterns across various sectors.”

Mazzucato (2017)

- R&D related to societal goals
- Co-creation between diverse stakeholders
- Direction of research and innovation matters

New analytical challenge for:

- Strategy, Monitoring, Evaluation

How can bibliometrics help?

- Strategy & Portfolios → which priorities?
- Co-creation → which societal connections?

Horizon Europe – Mission areas



Representations of research for strategy, monitoring & assessment

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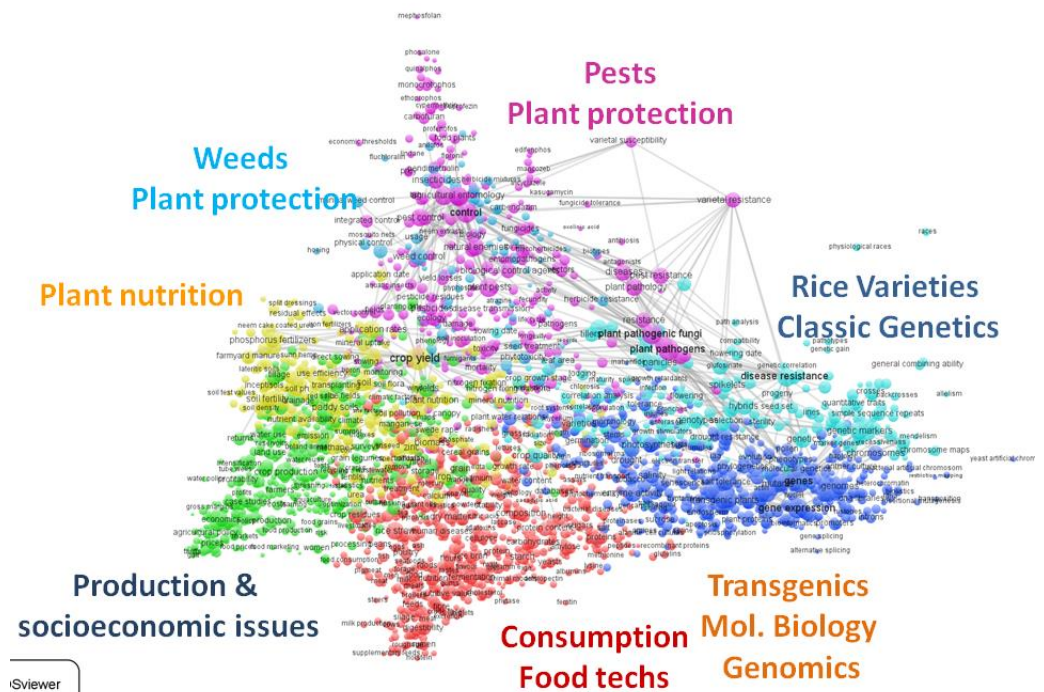
Old model: Focus on performance
 Rankings -- ordinal list of preferences

How is best? How much?
 How fast?

Mission model: Focus on directions & connections
 Facilitating options/choices in research landscapes
 Advice becomes plural & conditional

Which way? What alternatives? Why?
 What interactions? Whose interests?

Academic Ranking of World Universities - 2011				
World Rank	Institution	Country	National Rank	Total Score
1	Harvard University	USA	1	100.0
2	Stanford University	USA	2	72.6
3	Massachusetts Institute of Technology (MIT)	USA	3	72.0
4	University of California, Berkeley	USA	4	71.9
5	University of Cambridge	UK	1	70.0
6	California Institute of Technology	USA	5	64.7
7	Princeton University	USA	6	61.2
8	Columbia University	USA	7	60.4
9	University of Chicago	USA	8	57.5
10	University of Oxford	UK	2	56.4



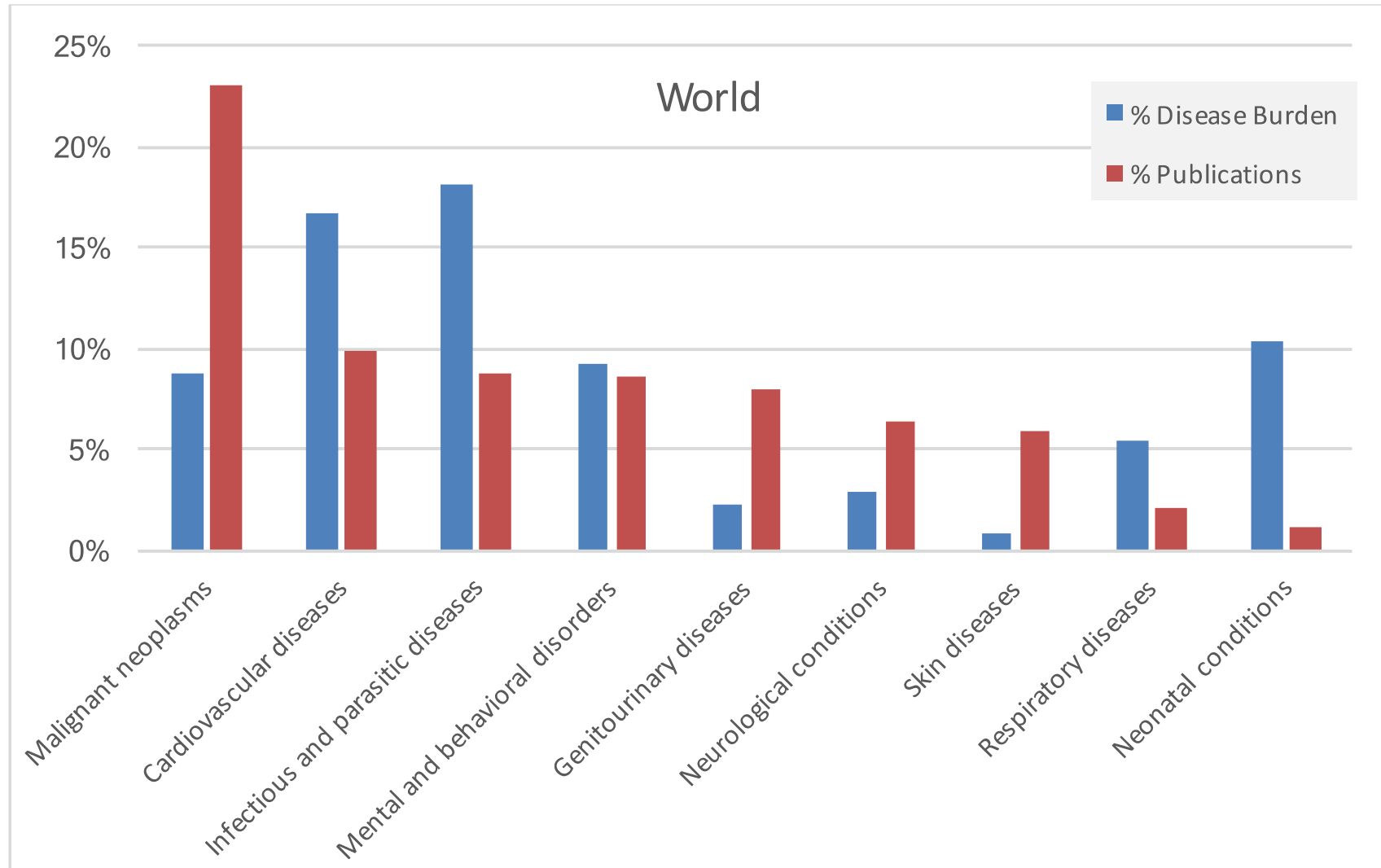
Viewer

Ciarli & Rafols (2019)

Priority Setting Type I: Choosing between different “problems”



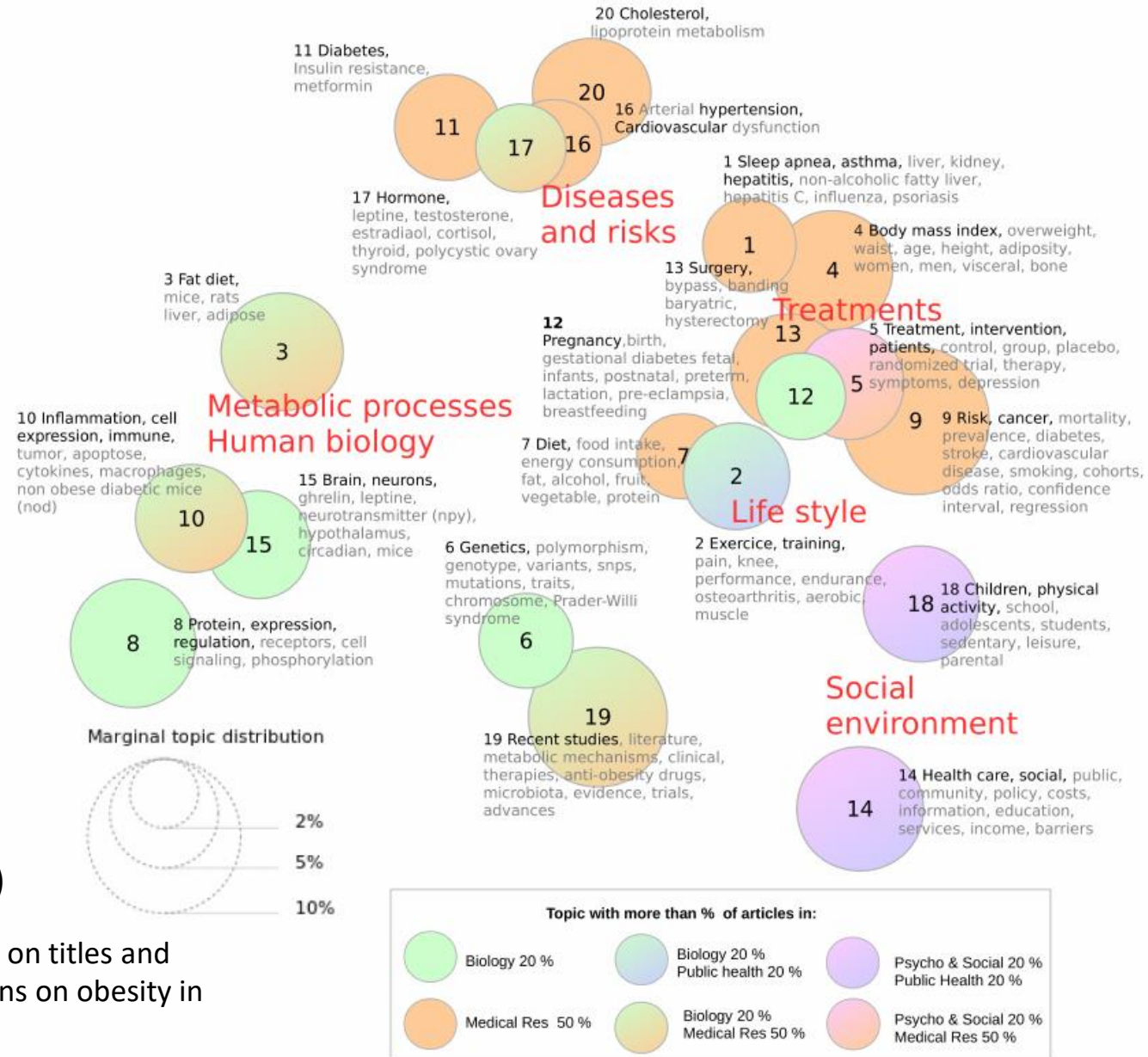
Comparing health needs and research efforts



Priority Setting Type II: Choosing between different research approaches

Choosing between potential “solutions” in obesity research

Comparing health needs and research efforts



Cassi et al. (2017)

Topic modelling based on titles and abstracts of publications on obesity in WoS (2002-2013)

Analysis of co-creation and impact: Capturing connections

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Methodologies of Research Impact Assessment

put emphasis on process and interaction, i.e. co-creation

‘Productive interactions’ (Spaapen & van Drooge, 2011) SIAMPI project

Most societal contribution -- mediated by two-way interactions between researchers and stakeholders

Given diversity of exchange channels:

There **can be NO general indicators of societal contribution**

But useful indicators for supporting impact assessment in certain contexts

(Cf. Molas-Gallart et al., 2003)

... but **we can trace a large variety of interactions:**

Mentions in policy documents

Mentions in news

Co-authorships with stakeholders many more

From individual to community attribution of contributions

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‘Ortega’ hypothesis (Cole and Cole, 1972; Bornmann et al. 2011 -- who challenge it):

- Scientific advance through accumulation of many mediocre contributions that eventually lead to breakthrough by a ‘great’ scientist.

Adaptation to societal contribution:

- Social contributions of research build on knowledge made a research community that eventually may be communicated to societal actors by some eminent(or well-connected) researcher or knowledge ‘broker’
- The knowledge transferred via a knowledge ‘broker’ has to be thought as being produced by a research community.
- The value lies in participating in a community that has some form of connectedness.