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Use of co-word analysis and bibliometric maps for detecting mega trends in the green transition of the urban areas?

The 19th Nordic Workshop on Bibliometrics and Research Policy

Project background and objectives

- Denmark 2050 – future scenarios
 - The aim of the project was to form scenarios for the future development of Danish cities towards a green transition
 - Two approaches were adopted: a) identification of events, reforms and social changes b) a major review of the themes in the international scientific literature
- Four scenarios were developed: i) State of Green, ii) Green Grid, iii) Guerilla Green and iv) State of Stuck
- But how good are the predictions that we can build using scientific literature?

Co-word analysis

- Using co-word analysis for this is no way a new idea, quite a few studies discuss the pro and cons of co-word analysis and even the methodology are up for debate
- The forecast of future research themes is dependent on the time-span and the quality of data determine the value of predictions based on previous research. (Glänzel, 2012)

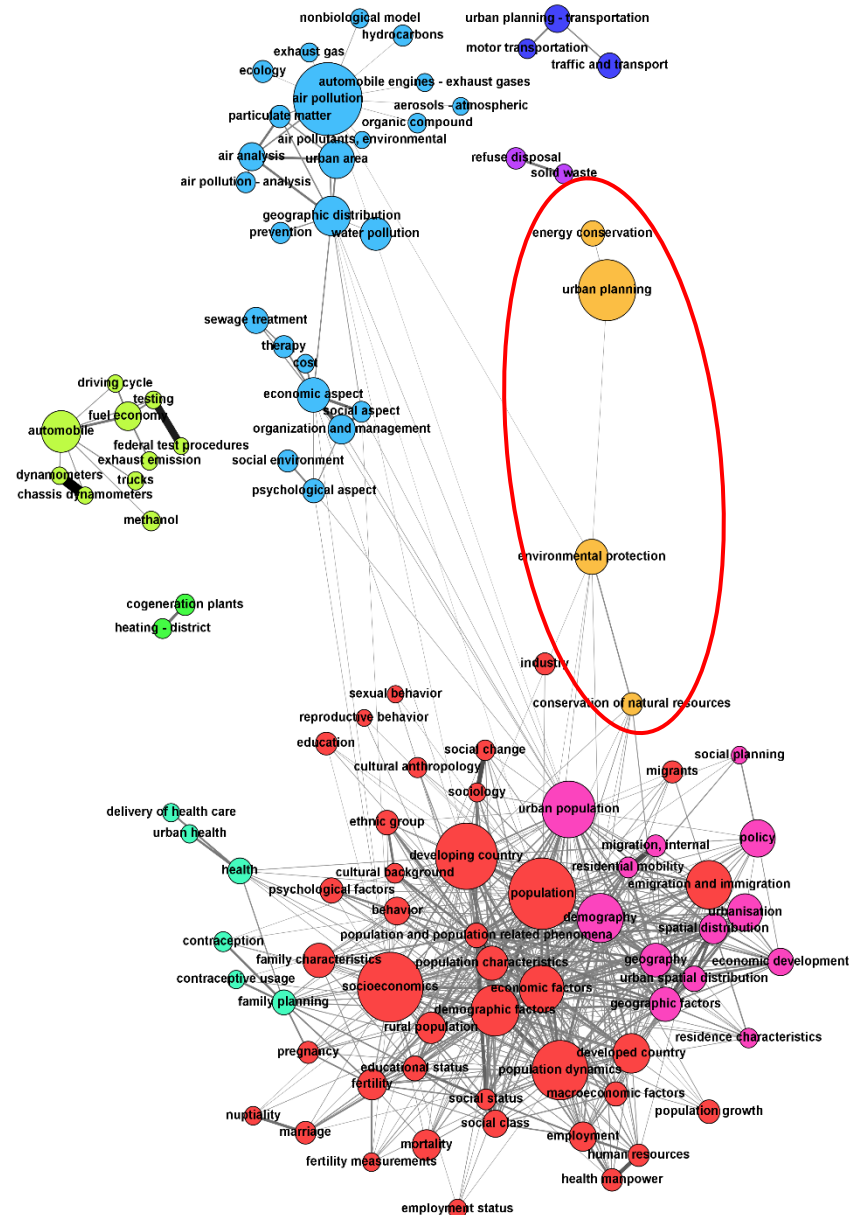
Zhang et al 2012 PLOS one, Neff et al Scientometrics vol 8 No 3, Leydesdorff 1997 Journal of the American Society for Information Science, Whittaker 1992 *Scientometrics*, Jan van Eck 2009, JASIST

Co-word analysis

- Data:
 - Scopus publication data is collected for the intersection of the urban environment and the five themes; Environment, Transport, Economy, Energy and Quality of life
 - The data contains in total 160.000+ publications covering 35 years (1980 – 2013)
- Methodology:
 - The analysis is based on standardized author and indexed keywords
 - The keywords are connected by the use of the Jaccard index
 - Based on which four maps were generated

Mapping 1980 to 1989

- In the 80's urban planning is not a major research theme
- The focus of this decade is on social aspects of living in the city

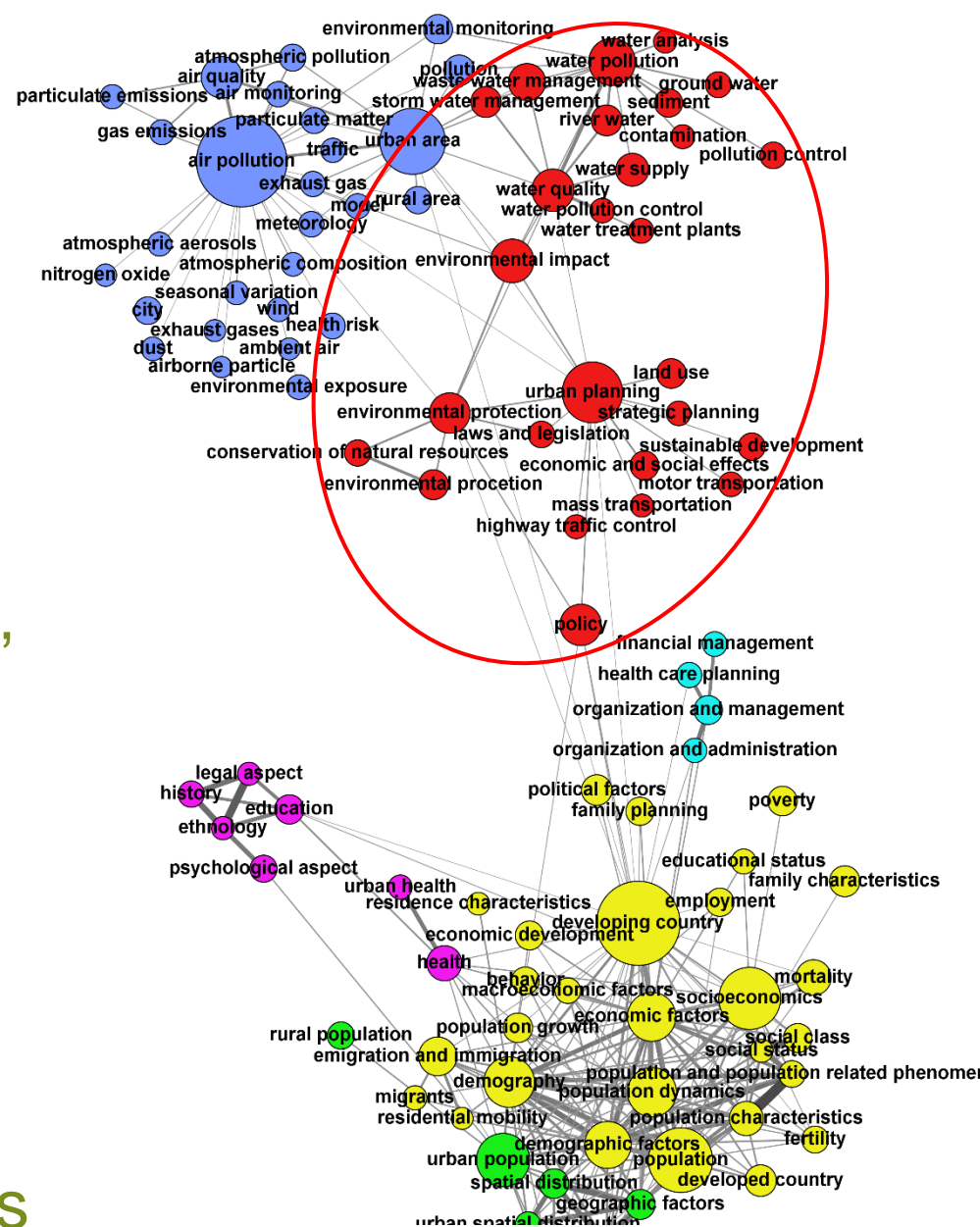


Source: DAMVAD 2014, based on Scopus

Node colors: Coloring is random, but nodes with equal coloring belongs to clusters of keywords most frequently used together. **Node size:** Number of publications and **tie size:** Strength of the Jaccard index

Mapping 1990 - 1999

- Urban planning in the 90's is rather connected to other research areas related to environmental impact and a the sub-themes of “water quality” and “air pollution”
- In general the research makes a shift in this period towards environment and pollution oriented themes

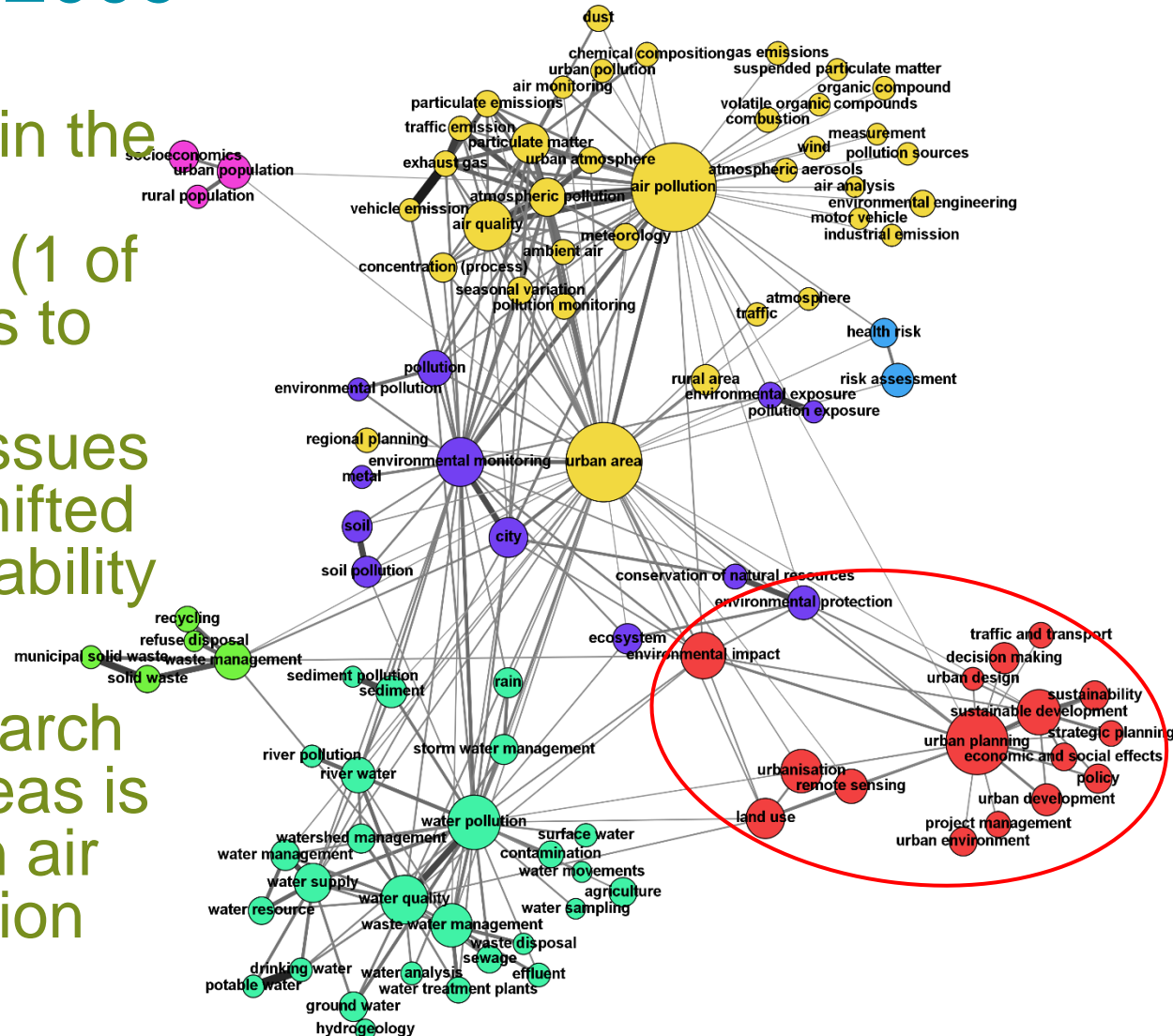


Source: DAMVAD 2014, based on Scopus

Node colors: Coloring is random, but nodes with equal coloring belongs to clusters of keywords most frequently used together. **Node size:** Number of publications and **tie size:** Strength of the Jaccard index

Mapping 2000-2009

- Urban planning in the 00's is separate research theme (1 of 3) and continues to be related to environmental issues but focus has shifted towards sustainability
- Overall the research on the urban areas is divided between air and water pollution

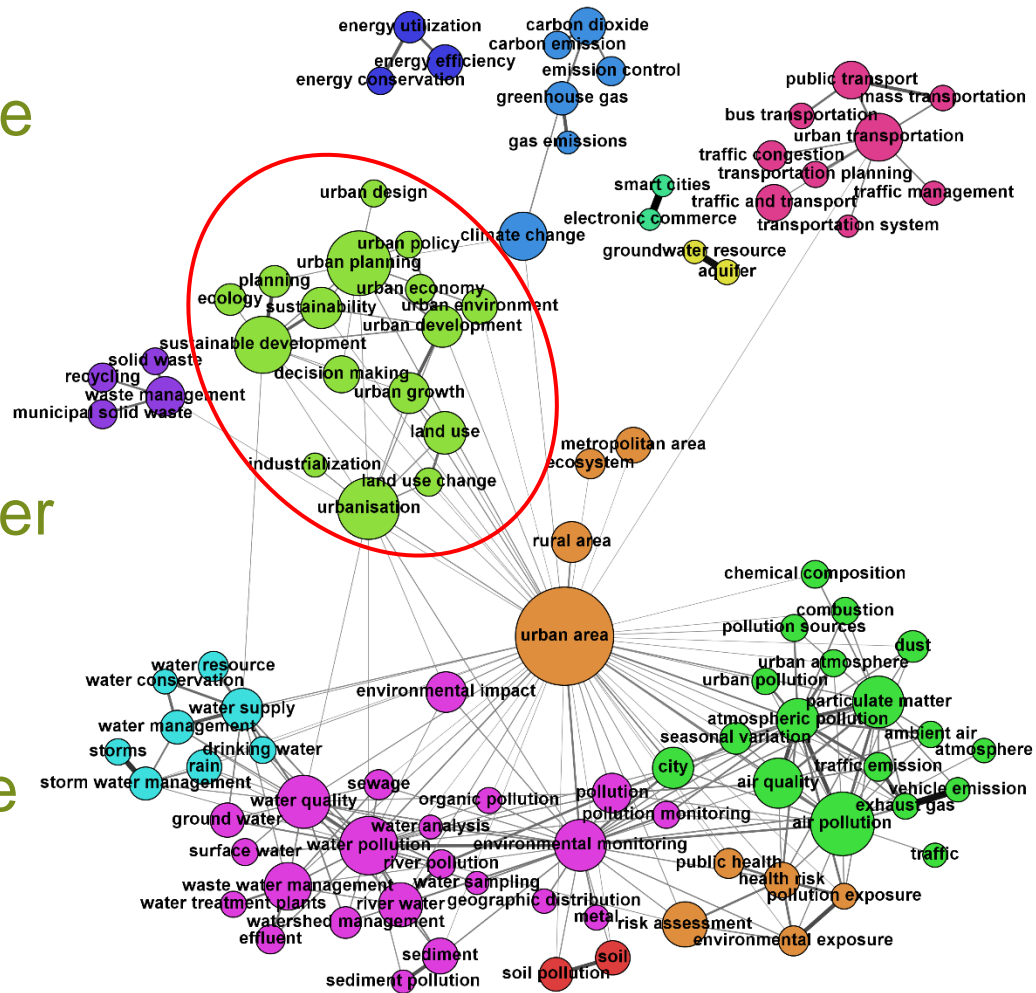


Source: DAMVAD 2014, based on Scopus

Node colors: Coloring is random, but nodes with equal coloring belongs to clusters of keywords most frequently used together. **Node size:** Number of publications and **tie size:** Strength of the Jaccard index

Mapping 2010-2013

- Urban planning has in the latest year been even more focused on sustainability related to urban development
- Research on air and water pollution is prominent in this decade too.
- The transportation theme has in the latest year re-emerged

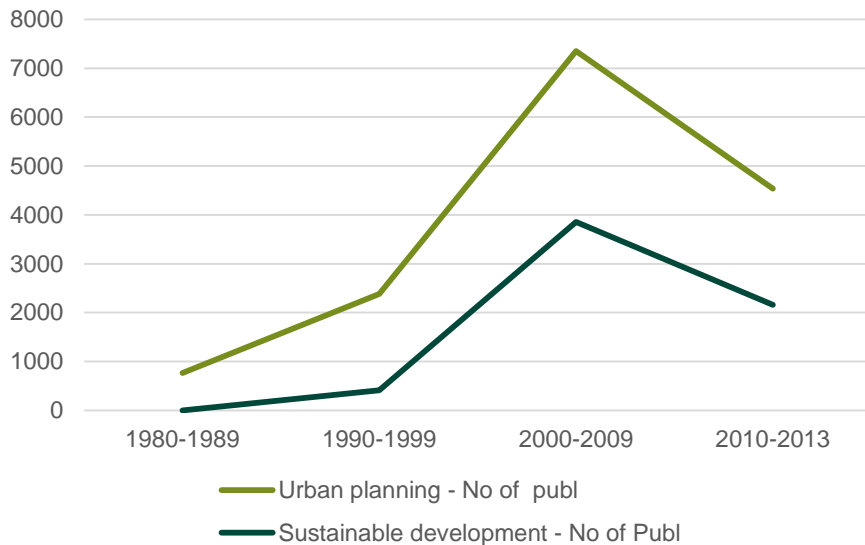


Source: DAMVAD 2014, based on Scopus

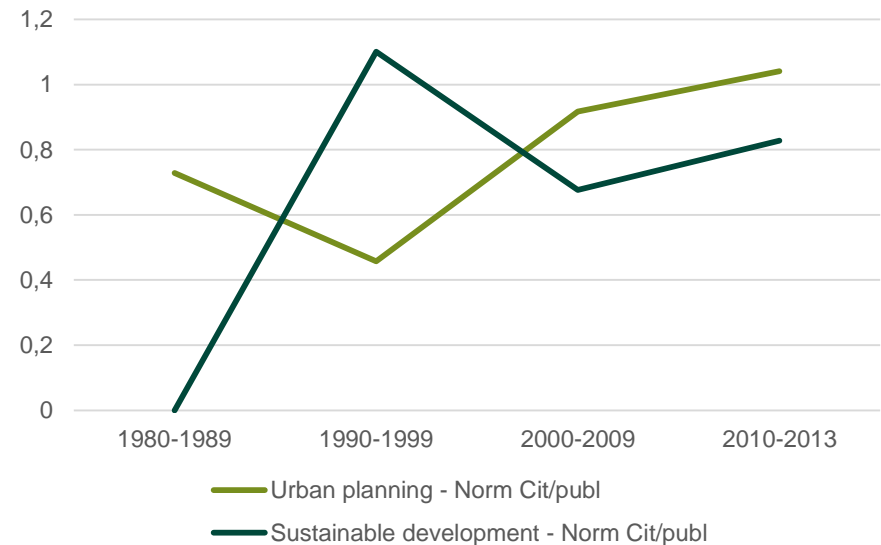
Node colors: Coloring is random, but nodes with equal coloring belongs to clusters of keywords most frequently used together. **Node size:** Number of publications and **tie size:** Strength of the Jaccard index

Theme volume and quality

Publication volume



Citation rates



Source: DAMVAD 2014, based on Scopus

Preliminary results and conclusions

- Evolution of research in different subject areas and the patterns of their interaction is modest in the 80's and 90's later an increasing number of new sub-directions of research emerge
- Development of volume and citation rates in the identified research themes seems to be aligned with the size and distribution of the themes, but the methodology needs refinements
- In line with the previous research, we propose that it is possible to use co-words analysis in combination with publication activity and citation impact to identify themes within a research area, but
- Further analysis is required to fully understand the nature of the emerging research themes e.g. collaboration patterns, co-citation analysis and the like to establish the connection back to the events, reforms and social changes seen in the society in order to be able to loop forward in to the scenarios

Contact



DAMVAD Denmark
Badstuestræde 20, DK-1209
Copenhagen K

DAMVAD Norway
Grensen 13, 0159 Oslo

DAMVAD Sweden
Riddargatan 17D, 3TR, SE-
114 57 Stockholm

Rasmus Lund Jensen
Principal Consultant

Science & Technology studies,
Research policy and Scientometrics

+45 4082 4356
rlj@damvad.com