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Sustainability as a topic at a technical university: A bibliometric analysis

Work in progress – Preliminary results

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Presentation outline

- Background: sustainability policy
 - Research themes
 - Methods and data
 - Results: sustainability research and research areas
 - Discussion: conclusions and implications
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Background: sustainability policy

Brundtland report (UN 1987) solving the conflict between socioeconomic development and protection of the natural resource base by defining sustainable development as:

'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.

Now: sustainable development as an **essentially contested concept**? Agree on 'first level' political meanings; under this apparent unity there is deeper disagreement. Makes it easy to modify to fit changing circumstances and vulnerable to hijacking and re-definition.

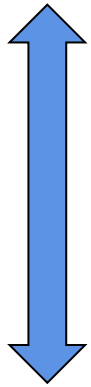


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Research themes

UNIVERSITY POLICY

- specialization in areas of environmental engineering
- cross-disciplinary involvement in natural sciences
- show current examples of domains of sustainability research in areas of social sciences and humanities



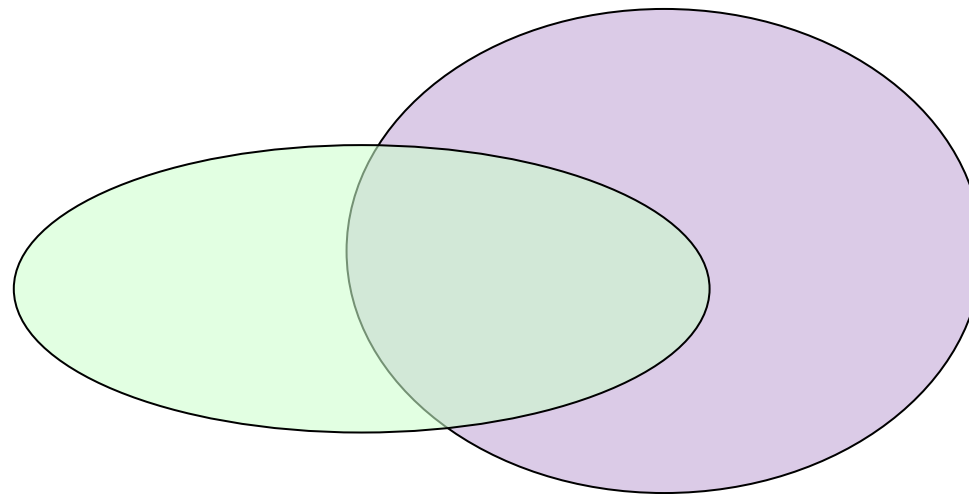
NATIONAL AND EU POLICY

- Policy on research investments in Sweden and EU: Grand Challenges and Horizon 2020
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Methods and data

- Local publication database (DiVA). (Web of Science to be used in further work)
- Two-step method: sustainability and wider search of terms to expand analysis of research publications not explicit mention sustainability/hållbar

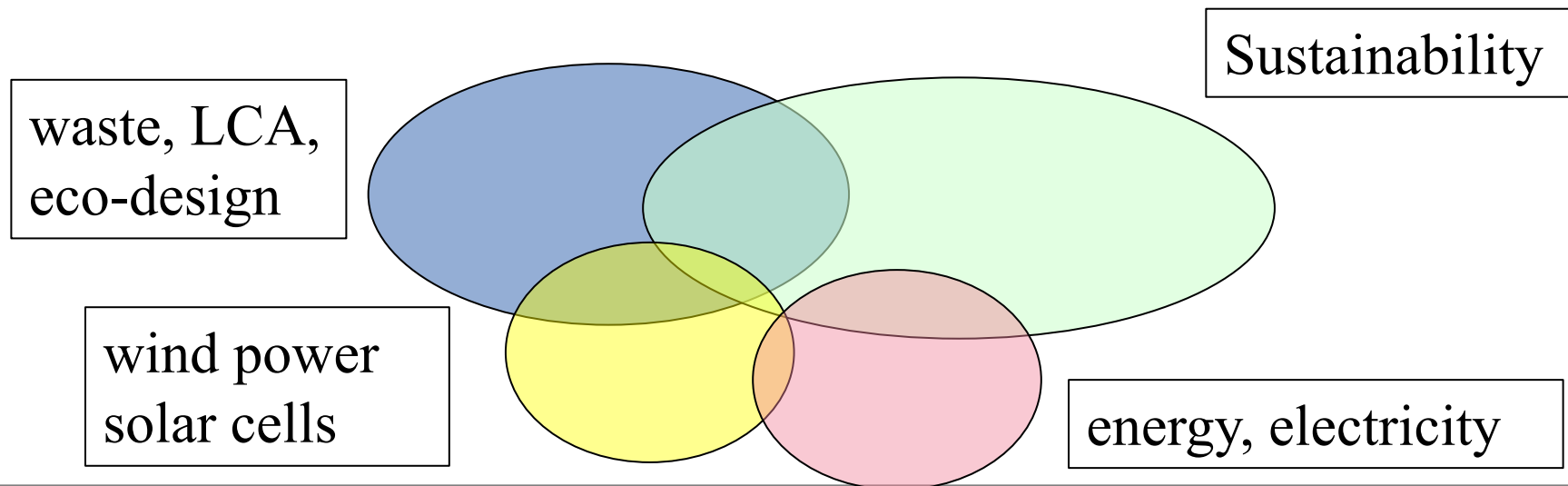
Step 1 search:
Sustainability
Hållbar



Step 2 search:
expansion of
terms (beyond
sustainability)

Methodological concerns

- Step 1 – High precision, low recall
- Step 2 – Balance between recall and precision
- Example – Environmental (Environmental humanities, environmental management, environmental assessment...)





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Data and type of publications

- **Data:** Local publication database (DiVA) and Web of Science
- **Time period:** 2004-2013
- **Fields searched in:** Title, abstract, keywords

- **Step 1** – search for "sustainab*" and "hållbar*"
- 772 records

- **Step 2** – Extended search from retrieved keywords (119 words)
- 2171 records

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Step 2 – Publication types

Publication type	Count	Share
Article in journal	856	39.4%
Article, review	22	1.0%
Book	18	0.8%
Book chapter	78	3.6%
Collection/Anthology (editor)	12	0.6%
Conference paper	607	28.0%
Doctoral thesis	256	11.8%
Licentiate thesis	174	8.0%
Proceedings (editor)	10	0.5%
Report	138	6.4%
Total	2171	100.00%

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Step 2 – Publications per year

Year	Count
2004	110
2005	182
2006	153
2007	141
2008	168
2009	231
2010	274
2011	371
2012	364
2013	177
Total	2171

Work in progress – Preliminary results

Step 2 - Languages

Language	Count	Share
eng	2095	96.5%
ger	1	0.0%
por	4	0.2%
spa	1	0.0%
swe	69	3.2%
und	1	0.0%
Total	2171	100.0%

Work in progress – Preliminary results

Visualizations of word clusters

- VOSviewer
- Clusters from co-occurring words
- Words in title, abstract and keywords
- Stop lists
- Delimitation
 - Most frequent words (occurring at least 7 times)
 - Most relevant words in clusters

Step 1 Themes

- Step 1:
 - Red: Urban planning, sustainability assessment
 - Yellow: material research, properties of environmentally friendly
 - Green: energy systems, solar
 - Blue: GHG green house gas, transport, biofuel
 - Pink: water (Arsenic, Bangladesh/India) and participation, gender
 - Turquoise: technical production systems, mobility
-

Step 2

- Turquoise: fuel cells, solar cell systems (dsc, electrolyte)
 - Blue: material sciences, polymer, cellulose, renewable resource
 - Pink: Agriculture, arsenic, Baltic sea
 - Green: hydropower, electricity production, wind power, solar-thermal
 - Red: Strategic environmental, environmental history
 - Yellow: wireless networks, traffic, communication
 - Light blue: production system, university
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Discussion: conclusions and implications

- Two-step method to capture 'sustainability turn'
 - Engineering sciences: areas of waste management, materials (solar cells), energy use and electricity networks (production, distribution and use)
 - Social sciences: planning, environment and sustainability
 - Not much interdisciplinarity (social-natural sciences)
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Contributions and Further work

- Analysis of research in the 'sustainability turn'
NOT defining sustainability research
 - DiVA: expanded analysis including both Web of Science of KTHs own publication database
 - Methodological analysis of a topic in two steps to examine areas of specialization in environmental research including natural as well as social sciences and humanities
 - Further analysis of citation data in research areas, journal areas where research is published, doctoral thesis – step 2 over 400!
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