Past, present, and future low carbon supply chain management : A content review using social network analysis

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Contents

1. Introduction

Problem discussion

✓ global environmental problems have become challenging operation issues
✓ manufacturing firms and their SC are most significant contributors to carbon emissions

→ **Enabled the adoption of Low Carbon Supply Chain practice**

Low Carbon Supply Chain

✓ startegic environmentally-aligned initiative that aims to achieve operational excellence and cost reductions by focusing on energy efficiency and reducing carbon emissions

Perspective about LCSC paradigm

✓ Management-approach scholars : how carbon emissions data can be interpreted to articulate business strategies to reduce carbon emissions

✓ Technical-approach scholars : how reduce carbon emissions using mathematical perspectives

1. Introduction

Using a proven content review technique,
Address the issues and Contribute to conceptualizing a new theoretical understanding of LCSC

↓

Bibliographic information and The co-occurrence of keywords

↓

Current trends, gaps in the literature, and a visual picture of the evolution of this field of research

1. Introduction

To help understand the burgeoning field of LCSC and
To provide new insights from a bibliometric synthesis of publication

Q1. What are the main themes regarding LCSC?

Q2. What is LCSC management and which journal provide the most significant conceptualization of this paradigm?

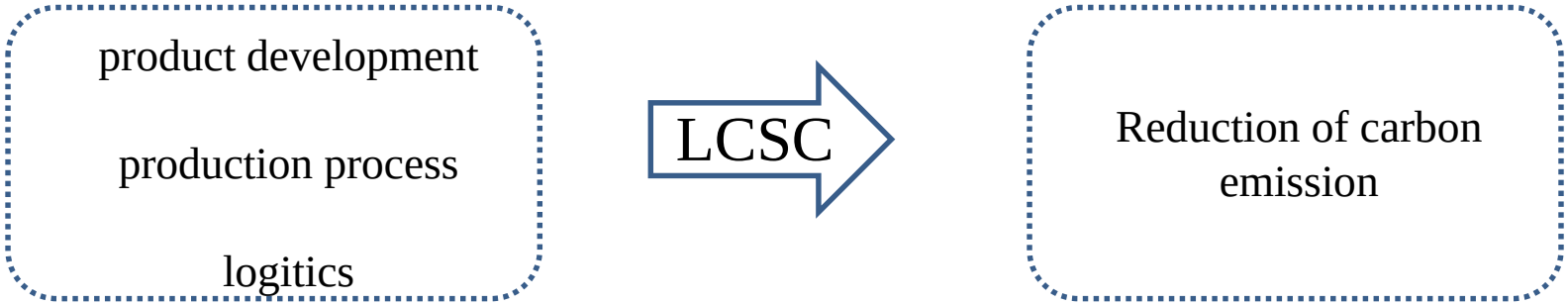
Q3. What is the country of orgin for scholars who have published on LCSC?

Q4. What are the highest LCSC co-occurrence word used in the business and management fields, as well as across fields of study?

Q5. What is the past, current and future trajectory of LCSC studies?

→ **New contributions to the field of supply chain management**

2. Low Carbon Supply Chain (LCSC)



LCSC practices

Domains	Practices	Authors
Low carbon **procurement**	Reducing carbon emissions through purchasing of low carbon energy supply, consumption and purchasing of goods and services that reduced overall life cycle carbon emissions.	Correia et al. (2013)
Low carbon **product design**	Consideration of life cycle assessment during product development, using renewable and recycled materials, reducing carbon intensive materials and overall emissions	Böttcher & Müller (2015)
Low carbon **production process**	A carbon emissions reduction practice through integration of energy related concerns, technology and machinery adoption, materials and parts choices and managing life cycle and process in production	Jin et al. (2017)
Low carbon **distribution**	The warehousing and movement of goods using less energy, low carbon emissions and environmental packaging.	Chen et al. (2016)
Low carbon **logistics**	A carbon emissions reduction in regards to transportation efficiency, technology emission and productivity.	He et al. (2017)

2. Low Carbon Supply Chain (LCSC)

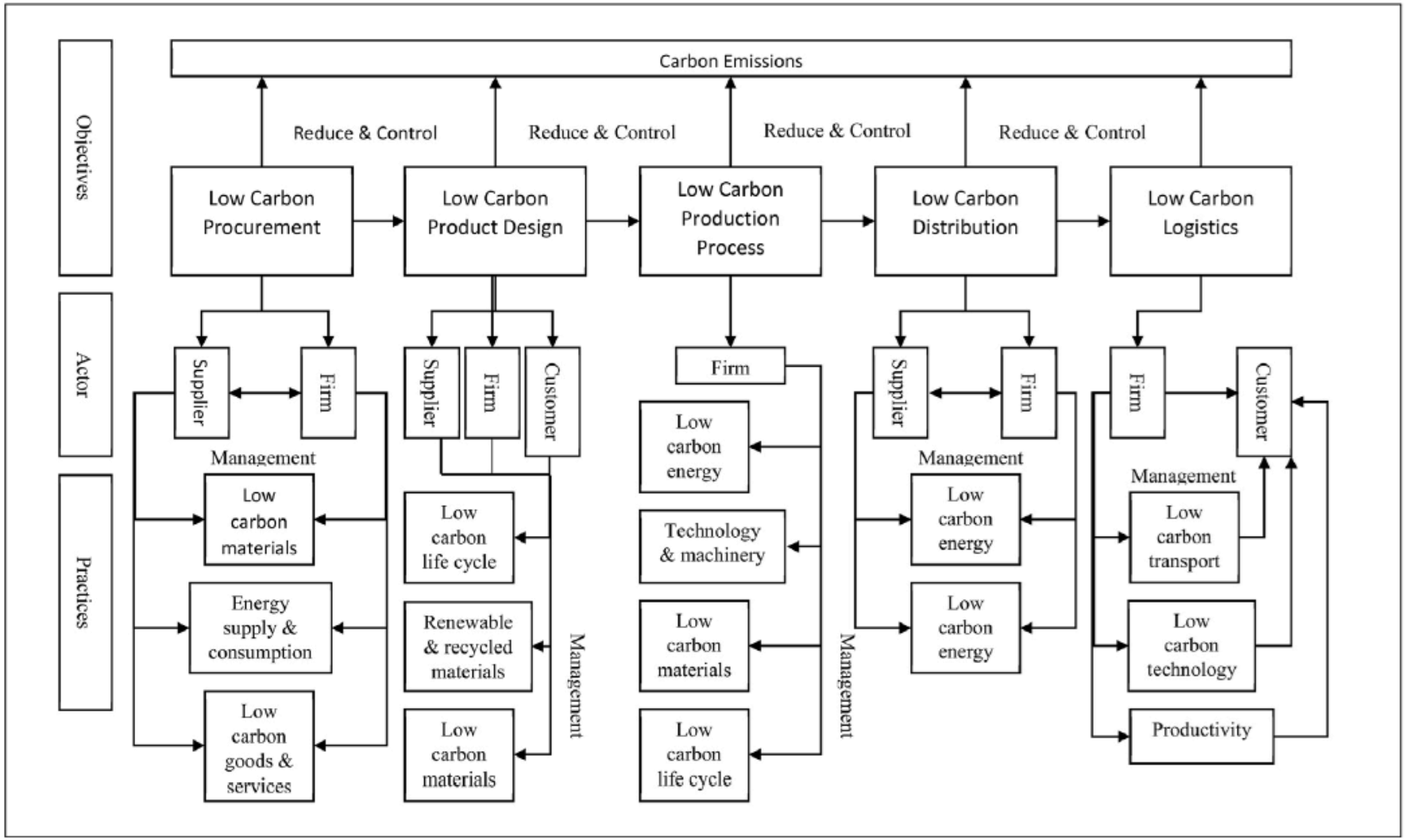
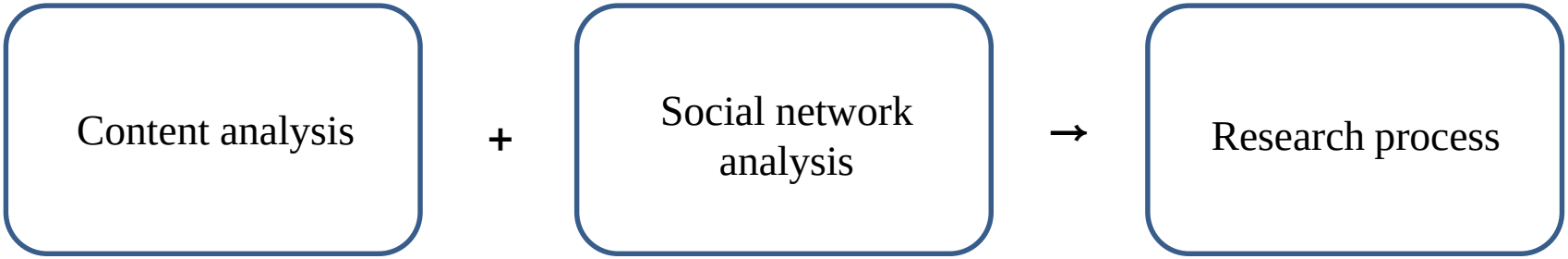


Fig. 1. Low carbon supply chain conceptual mode.

3. Methods


Content analysis
+
Social network analysis
→
Research process

3. Methods

Content analysis

- ✓ Occurrence of keywords that appear in a text
- ✓ Analysing the frequency of keywords used in the text
- ✓ Use the acronym of LCSC as a keyword to distinguish parameters in databases

→ most accurate and desirable results

3. Methods

Social network analysis

- ✓ Allows for clustering of publications without advanced computer skills or profound knowledge of clustering technique
- ✓ Mendeley : filter the data for this research for preventing data duplication
- ✓ VOSviewer : perform bibliographic analysis and provide word frequency analysis using the method of co-occurrence-based keywords

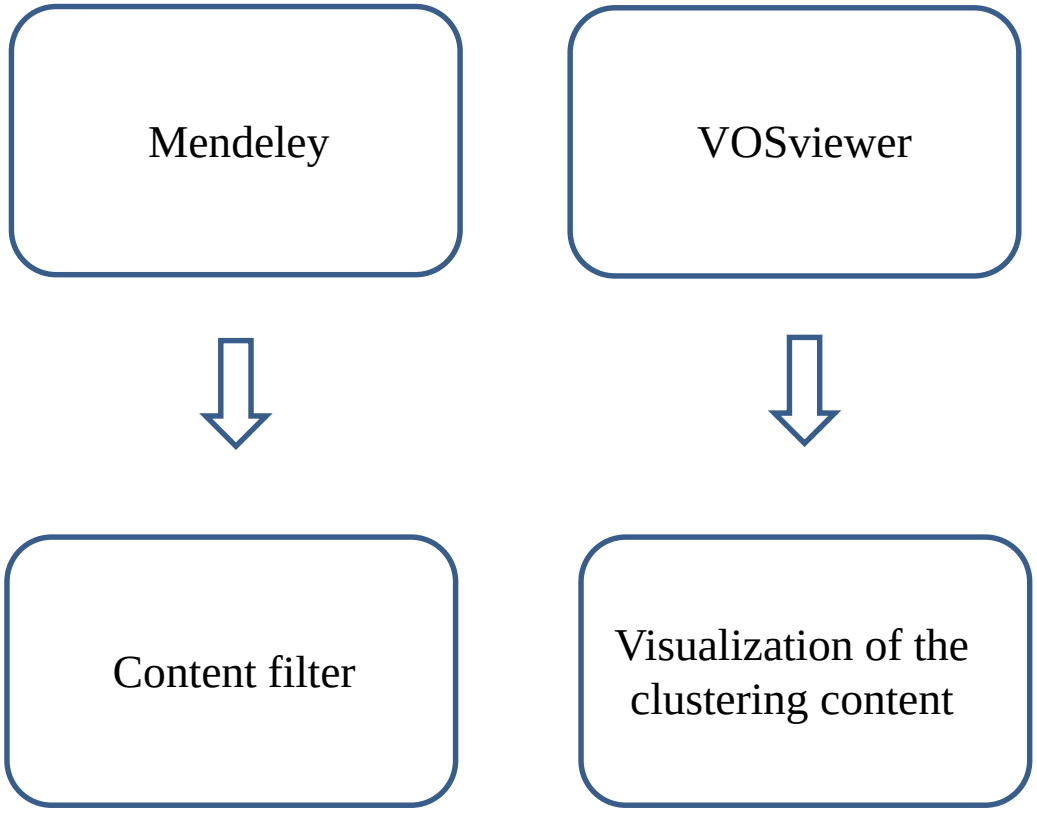
3. Methods

Research process

Table 2
Research process

Stage#	All LCSC Field	Business & Management Field
Stage 1 Publications from Databases	*Step 1: Select Database* i. ScienceDirect 122,718 ii. Emerald 2075 iv. Web of Science 727 *Step 2: Filter* i. LCSC keyword only ii. No book publications TOTAL 124,793 Publications	*Step 1: Select Database* i. ScienceDirect 1418 iii. Emerald 1519 iv. Web of Science 306 *Step 2: Filter* i. LCSC keyword only ii. No book publications TOTAL 2199 Publications
Stage 2 Check for Duplicates	*Step 1: Filter in Mendeley*	*Step 1: Filter in Database* *Step 2: Filter in Mendeley*
Stage 3 Content Analysis	*Step 1: Co-occurrence analysis* *Step 2: Bibliographic Coupling Analysis*	*Step 1: Co-occurrence Analysis*
Stage 4 Discussion	*Step 1: Identify key findings* *Step 2: Answer all research questions* *Step 3: Identify literature gap & future research*	

4. Results


Mendeley
VOSviewer
Content filter
Visualization of the clustering content

4. Results

CLUSTERING

Density of interest

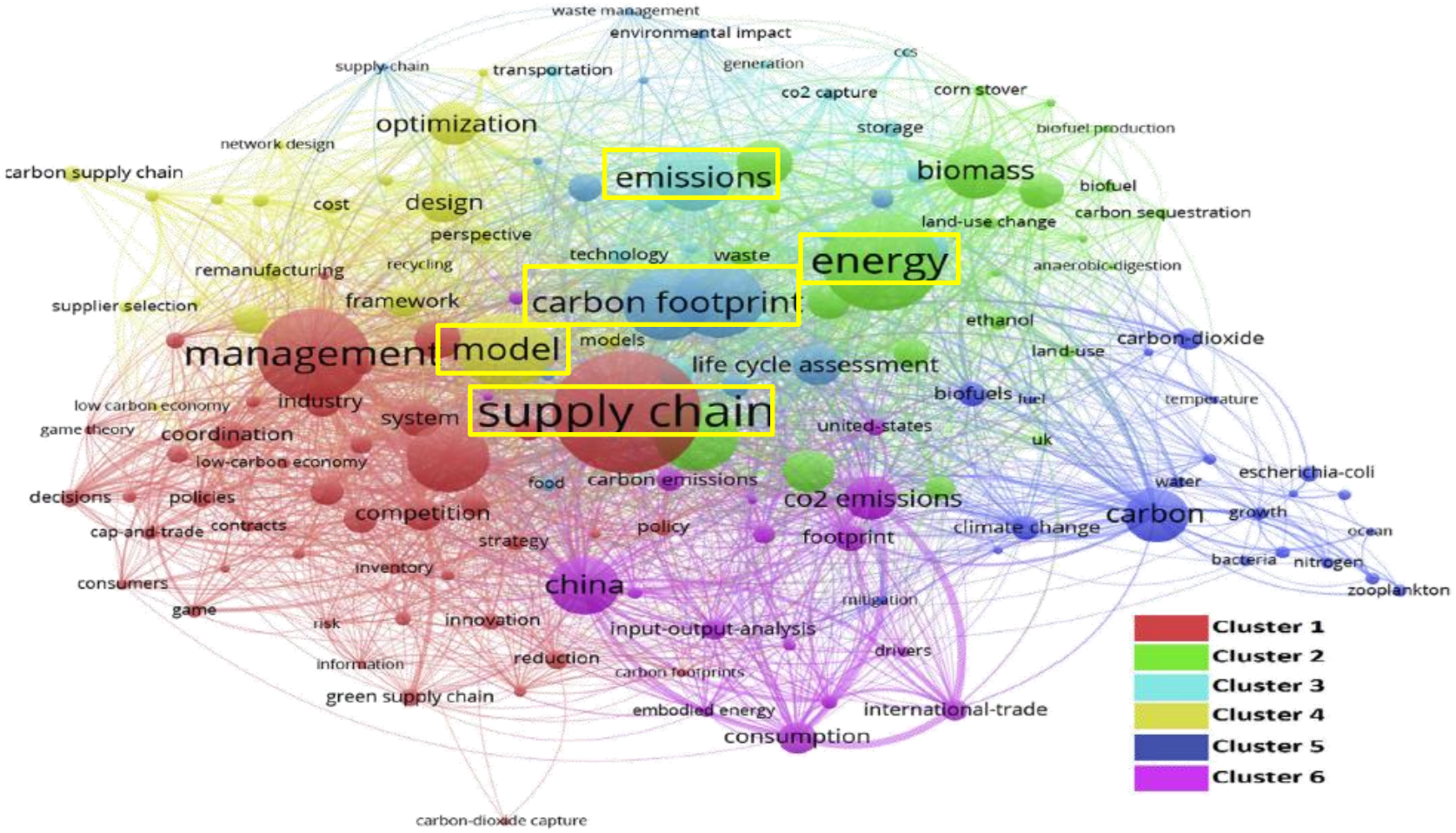
Identify research gaps

Display trends change

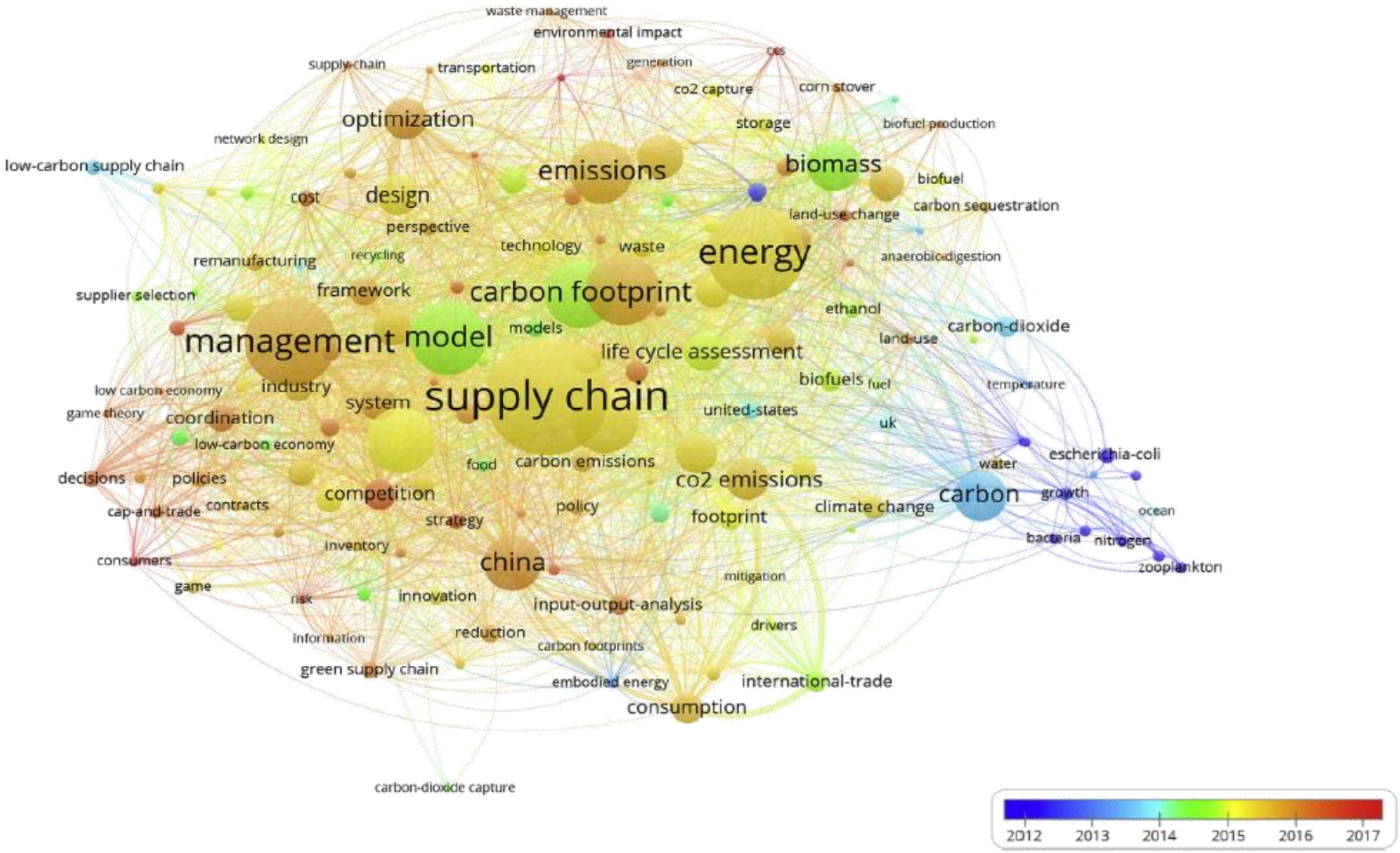
Visualizing gaps in analysis
finding emerging topic and patterns of research

4. Results

Q1. What are the main themes regarding LCSC?

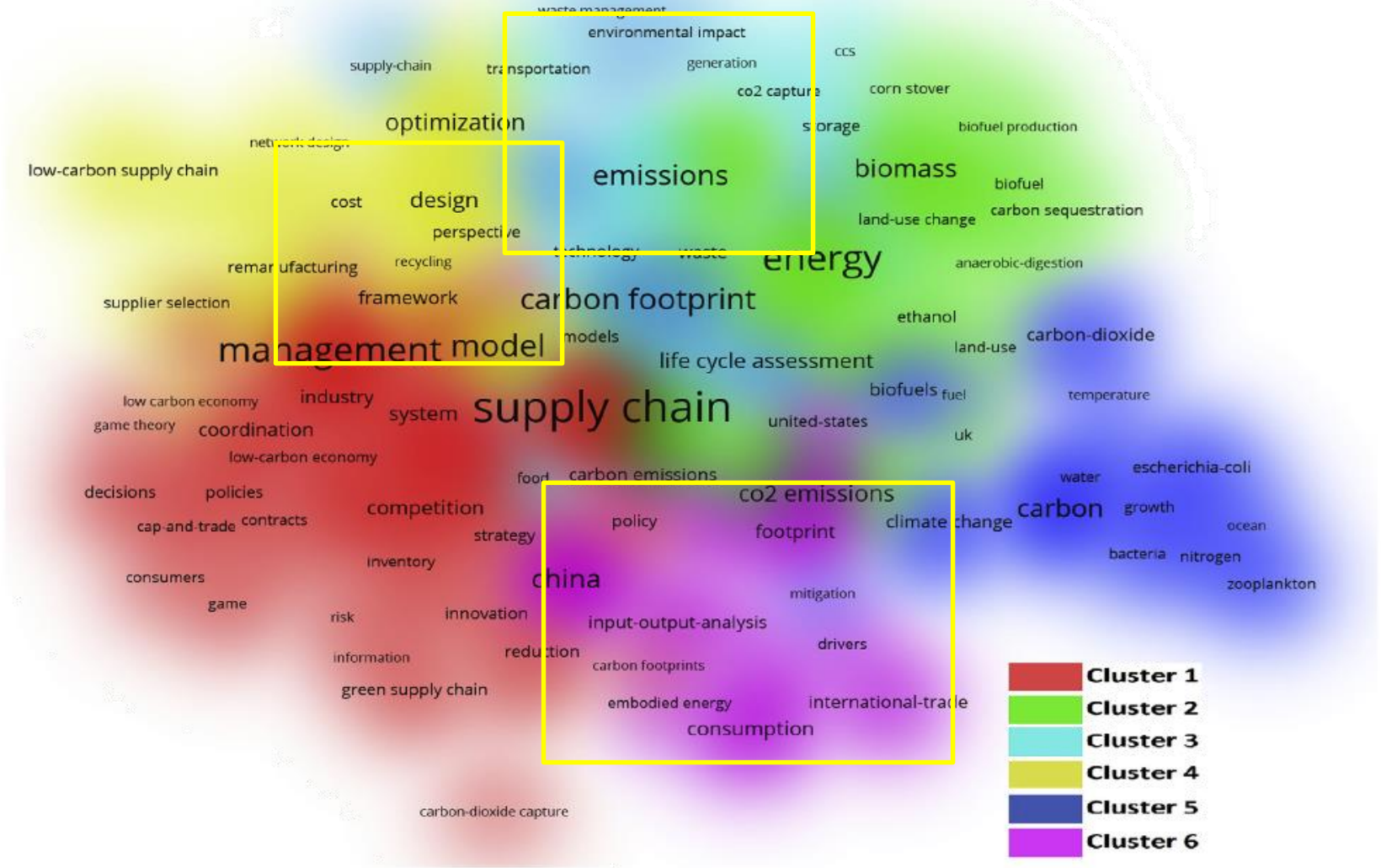


4. Results

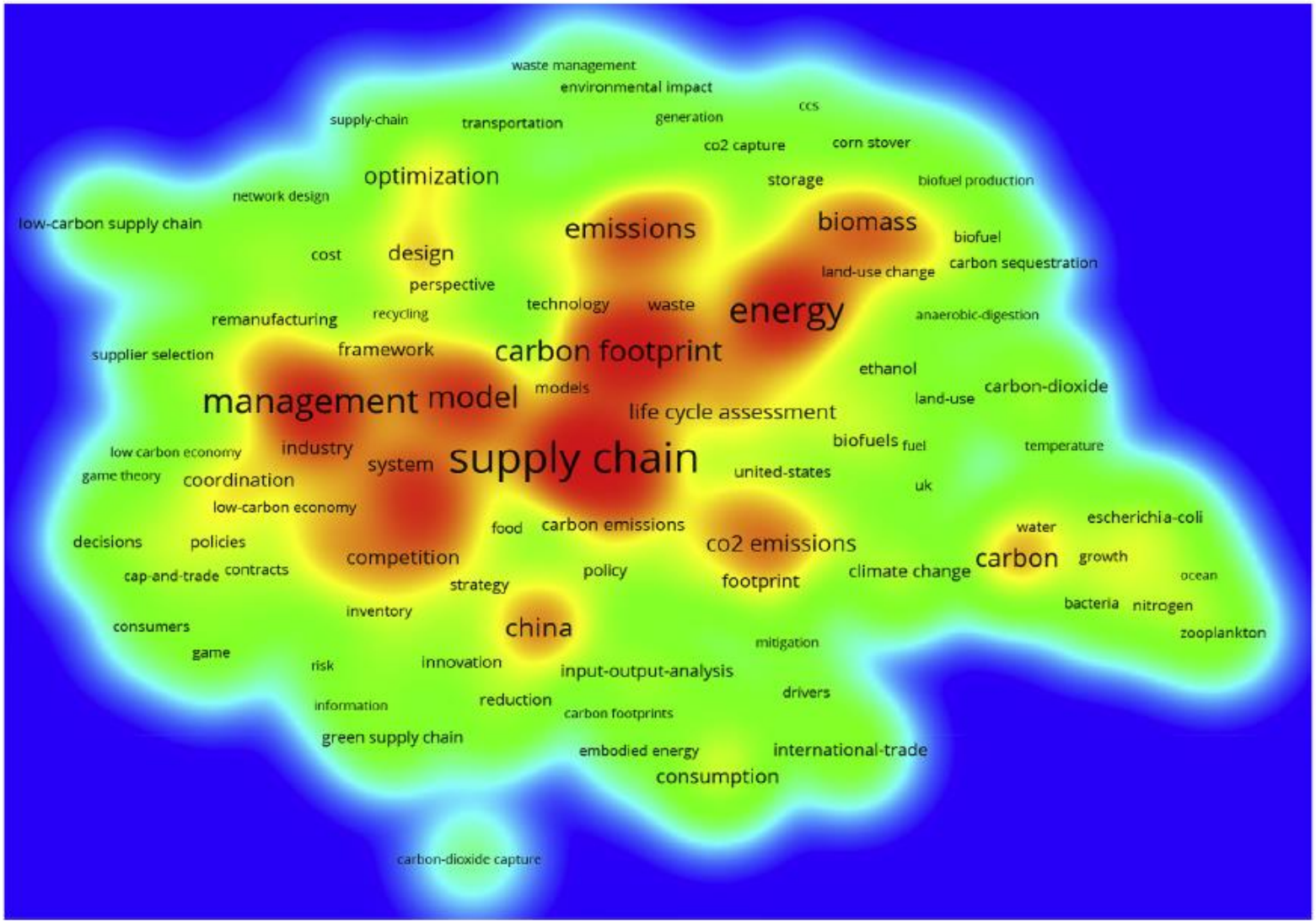

waste management
environmental impact
ces
supply-chain
transportation
generation
co2 capture
corn stover
optimization
storage
biofuel production
network design
low-carbon supply chain
emissions
biomass
biofuel
cost
design
carbon sequestration
perspective
land-use change
technology
waste
energy
anaerobic-digestion
remanufacturing
recycling
supplier selection
framework
carbon footprint
ethanol
carbon-dioxide
management
model
models
land-use
life cycle assessment
biofuels
fuel
temperature
low carbon economy
industry
system
supply chain
united-states
game theory
coordination
uk
low-carbon economy
escherichia-coli
water
food
carbon emissions
decisions
policies
co2 emissions
carbon
growth
competition
climate change
cap-and-trade
contracts
policy
footprint
ocean
strategy
bacteria
nitrogen
inventory
consumers
china
zooplankton
mitigation
game
risk
innovation
input-output-analysis
drivers
information
reduction
carbon footprints
green supply chain
embodied energy
international-trade
consumption
carbon-dioxide capture
2012
2013
2014
2015
2016
2017

4. Results

Q4. What are the highest LCSC co-occurrence word used in across fields of study?



4. Results


waste management
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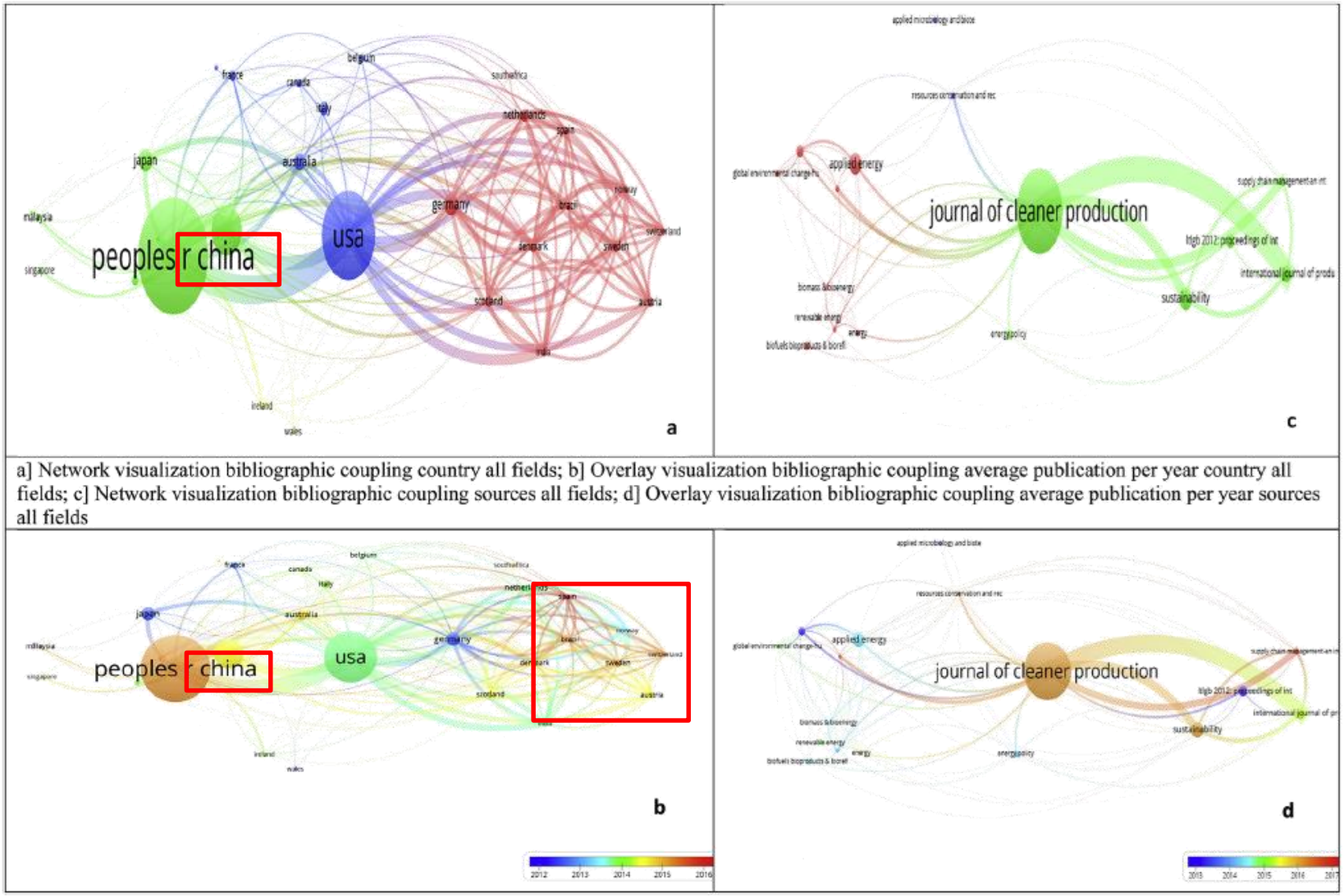
supplier selection
framework
carbon footprint
ethanol
models
carbon-dioxide
management model
land-use
life cycle assessment
biofuels
fuel
temperature
low carbon economy
industry
system
supply chain
united-states
game theory
coordination
uk
low-carbon economy
escherichia-coli
water
food
carbon emissions
decisions
policies
co2 emissions
carbon
growth
competition
cap-and-trade
contracts
policy
footprint
climate change
ocean
strategy
bacteria
nitrogen
inventory
china
consumers
zooplankton
mitigation
game
risk
innovation
input-output-analysis
drivers
information
reduction
carbon footprints
green supply chain
embodied energy
international-trade
consumption
carbon-dioxide capture

4. Results



a] Network visualization bibliographic coupling country all fields; b] Overlay visualization bibliographic coupling average publication per year country all fields; c] Network visualization bibliographic coupling sources all fields; d] Overlay visualization bibliographic coupling average publication per year sources all fields

Fig. 6. Network and overlay visualization of bibliographic.

4. Results

Q2. What is LCSC management and which journal provide the most significant conceptualization of this paradigm?

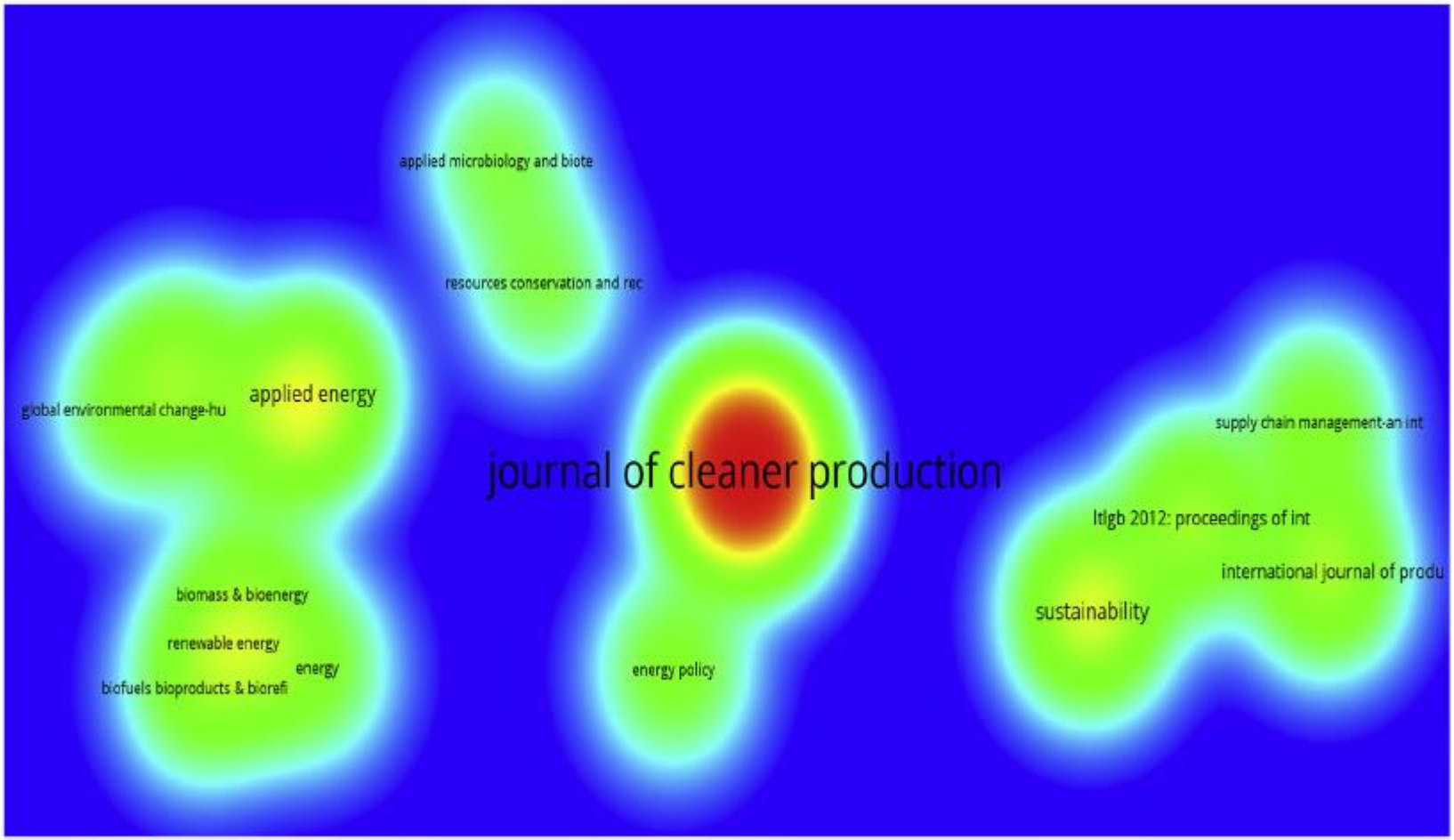


Fig. 7. Density visualization bibliographic coupling item density sources all fields.

4. Results

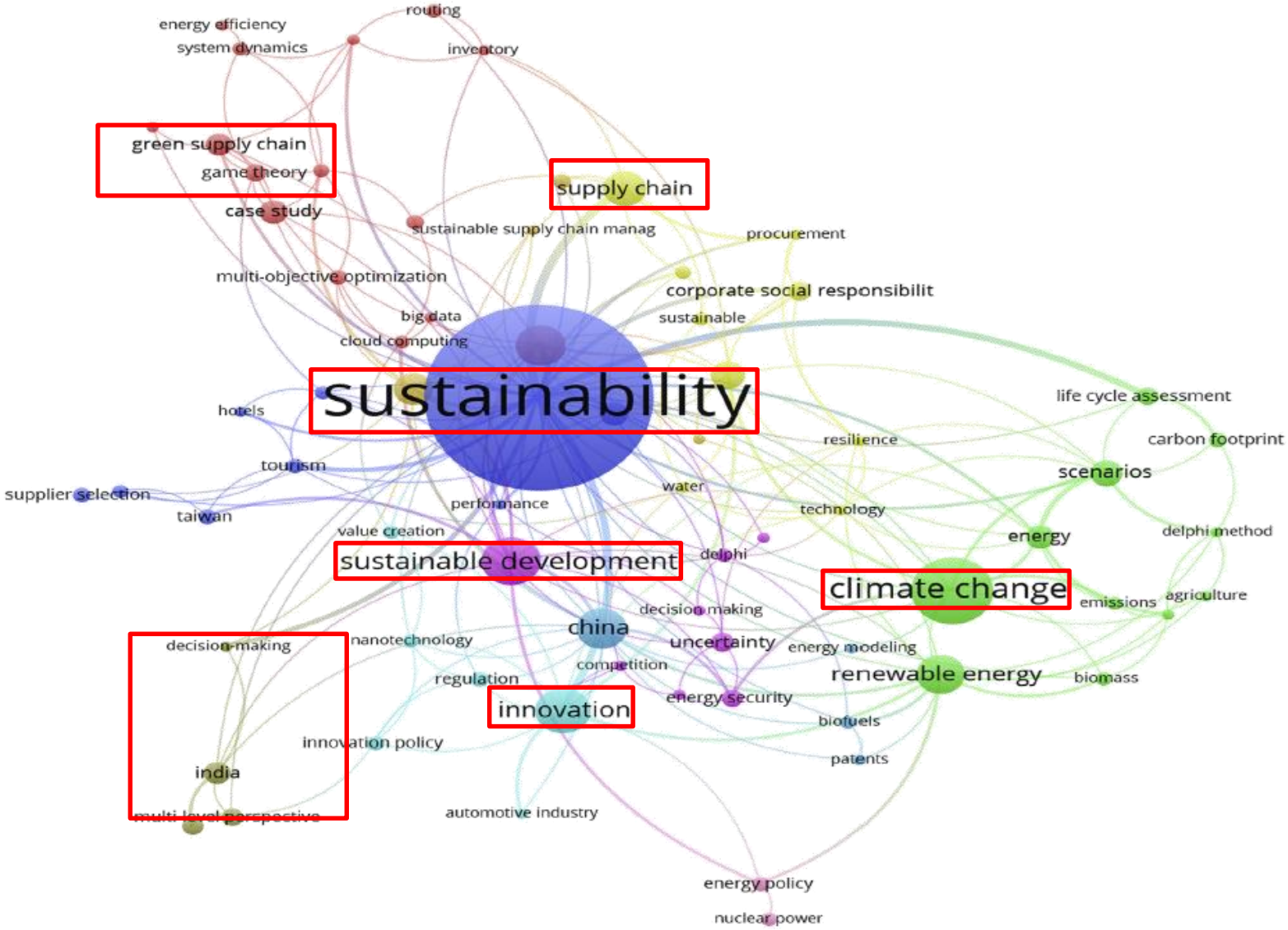


Fig. 8. Network visualization co-occurrences keywords business and management field.

4. Results

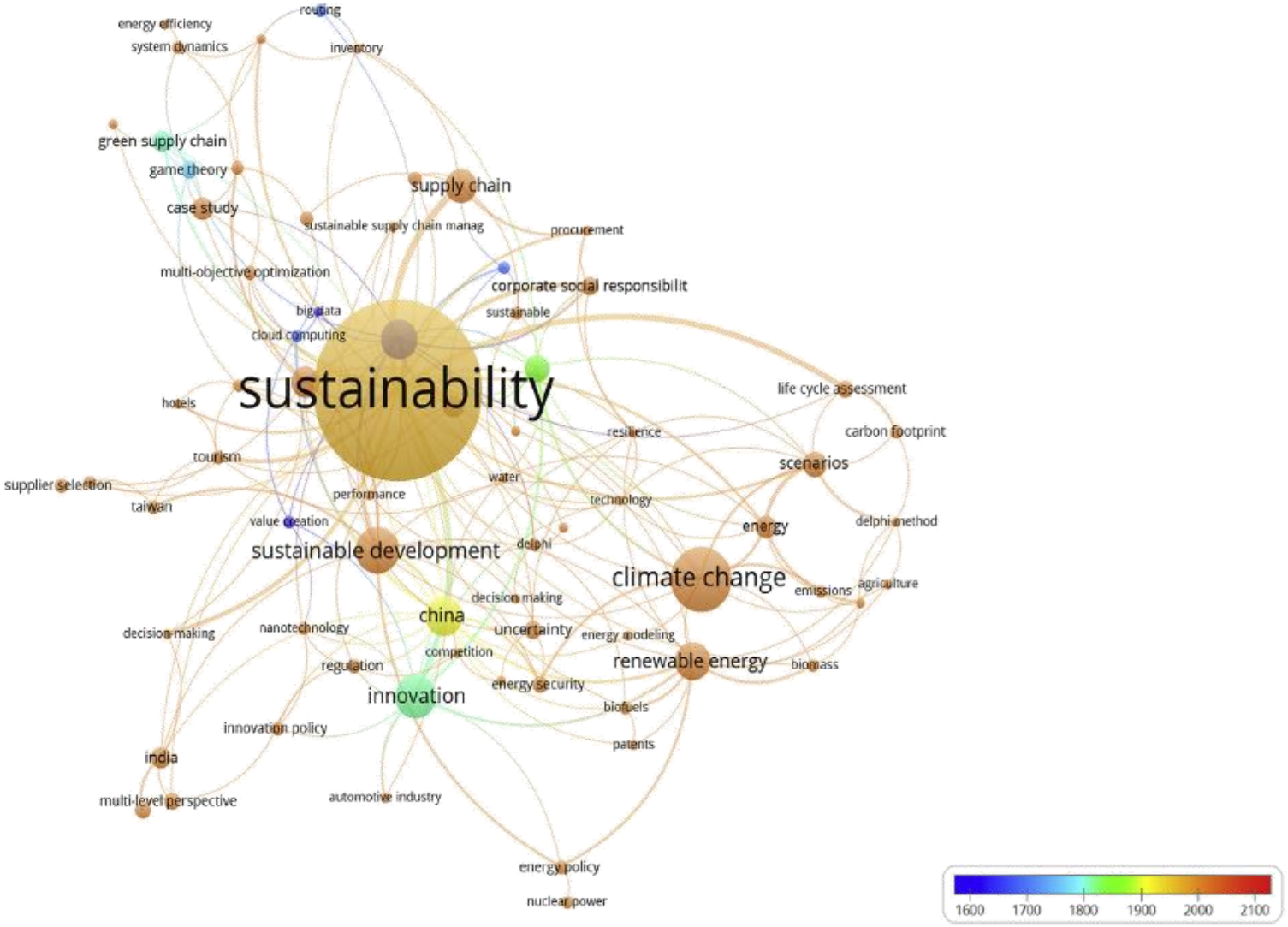


Fig. 9. Overlay visualization occurrences average publication per year business and management field.

4. Results

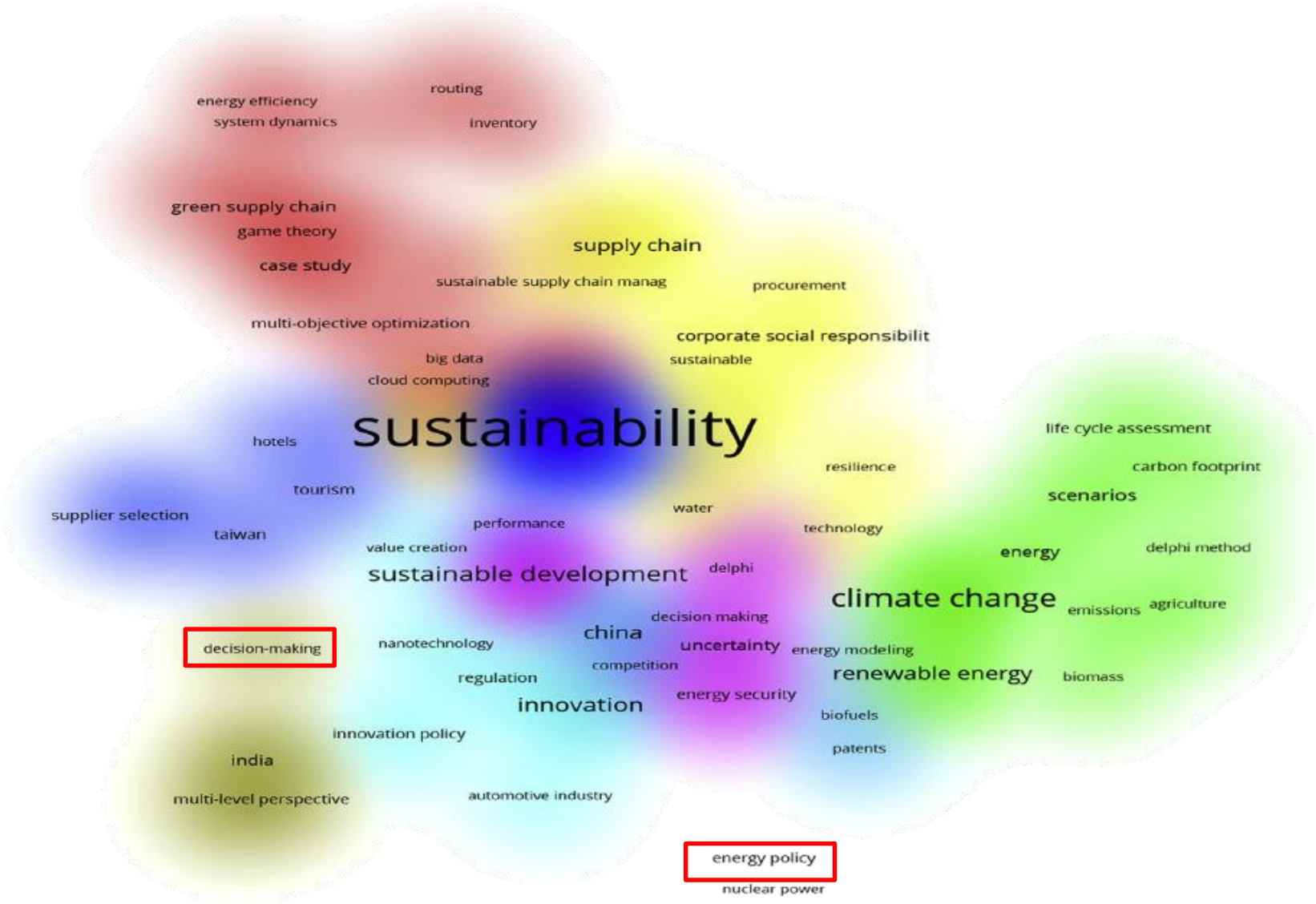


Fig. 10. Density visualization occurrences cluster density co-occurrences keywords business and management field.

4. Results

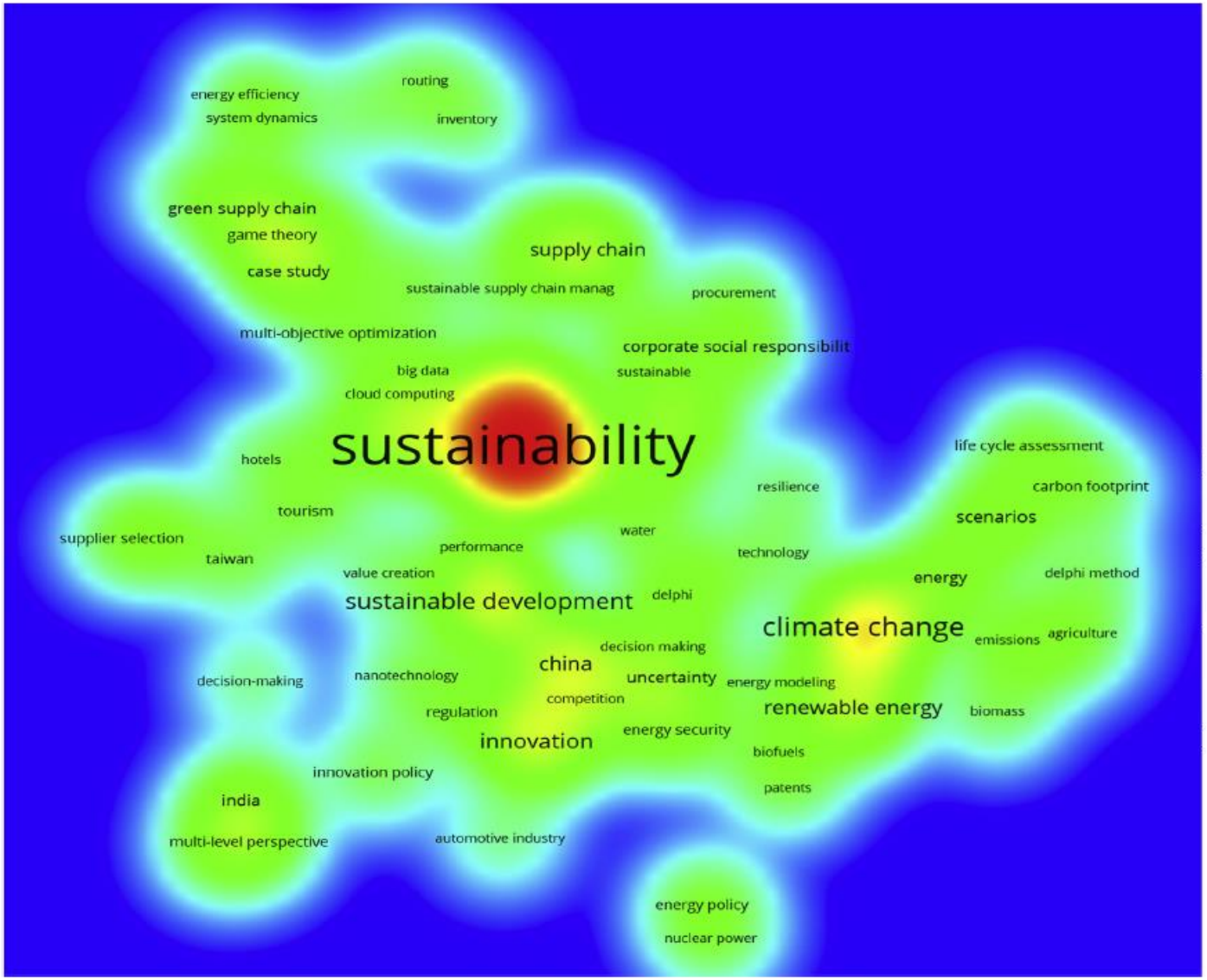


Fig. 11. Density visualization occurrences item density co-occurrences keywords business and management.

5. Discussion of the research finding, trends, and future research implication

Sustainability papers related to LCSC ⇨ **ScienceDirect database**

Increasing number of LCSC studies ⇨ **Environmental regulation & government involvement**

Environmental research in China and USA ⇨ **Better understanding in growth-leading economies**

5. Discussion of the research finding, trends, and future research implication

Papers related to LCSC → ScienceDirect databases

- ✓ high impact ranking of the journals
- ✓ wide exposure to the targeted
- ✓ frequent citation

Increasing number of LCSC studies → Government involvement

- ✓ since 2016, increasing number of LCSC studies
- ✓ strengthening the environmental regulations imposed on firms

Environmental research in china, usa and growth-leading country

- ✓ higher number of publications in China
- ✓ large population, rapid industrial development and scarcity of natural resource
- ✓ validate the existing findings
- ✓ improve on the trend of environmental research
- ✓ better understanding of the environmental issues

6. Conclusion

✓ **Aim to intergrate energy policy into the research model**

→ understand how policy maker encourage industry to comply with low carbon emissions and energy management practices

✓ **Demonstrates the capabilities of Mendeley and VOSviewer for clustering publications**

→ powerful mapping and clustering technique with functional and practical infographics

✓ **Proposing a conceptual model of LCSC**

→ LCSC focuses more on supply chain and energy management
→ LCSC aim to reduce carbon emissions and improve low carbon performance
→ more consensus is needed in the literature
→ carbon accounting can assist manufacturing firms to record low carbon assessment and performance

Thank you