The Role of Logistics in a Damaged World: Mitigation and Adaptation approaches to Climate Change

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Why Climate Change? Why Logistics?

Climate change refers to a variety of events that contributes to changes in temperature, precipitation and wind patterns on a global scale, mainly due to the burning of fossil fuels and the increase in greenhouse gas emissions into the atmosphere (Havenga, Witthöft, de Bod & Simpson, 2020).

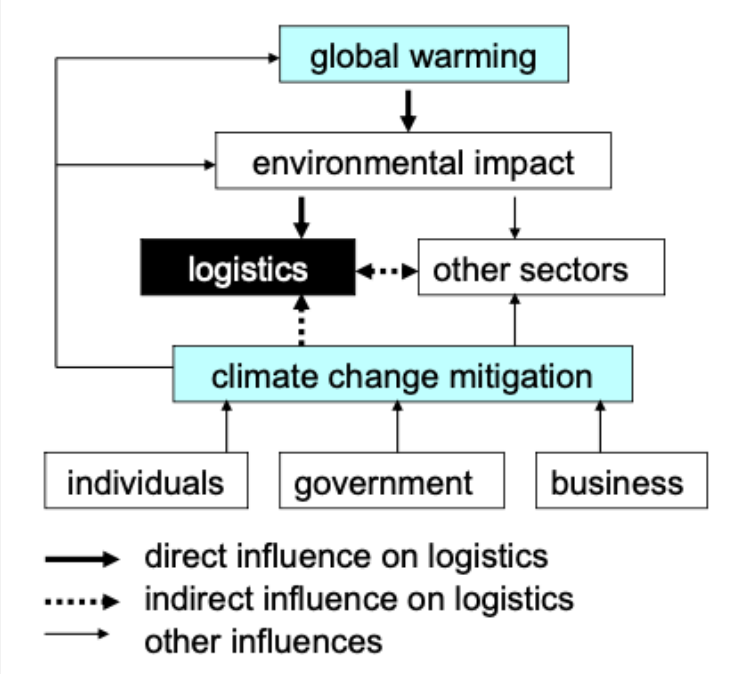


Figure 1: Direct and Indirect Pressures on Logistics to Adapt to Climate Change (McKinnon & Kreie, 2010)

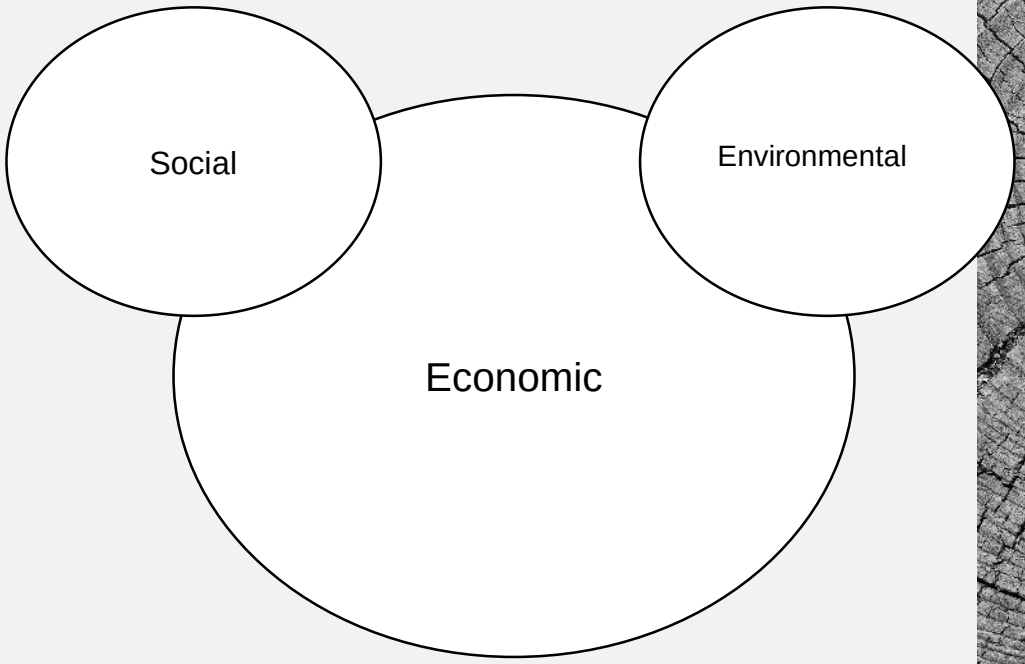


Figure 2: 'Mickey Mouse' Triple Bottom Line Model (Havenga et al., 2020)

Research Focus

Status of current research on mitigation and adaptation in the logistics industry.

- Key logistics areas impacting climate change
- Mitigation and adaptation approaches
- Knowledge gap identification

Literature Review

Human activity is the main contributor to rapid advancements of climate change.

2 strategies have been identified:

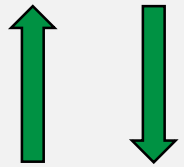
- Mitigation
- Adaptation

There is a relationship and a trade-off between mitigation and adaptation.

Logistics plays a major role.

Mitigation

"Reducing climate change"



Adaptation

"Adapting to life in a changing climate"

Research Design & Methodology

Systematic Literature Review

"Replicable, transparent & scientific process"

Research Protocol	Protocol Details* (Academic Literature)
Databases	Scopus, Emerald, Business Source Premier, Academic Search Premier, Web of Science.
Time Period	2010 – 2020
Search Fields	Full-Text
Data Type	Journal Articles, Open Access
Language	English
Search Terms	Climate change, global warming, carbon footprint, climate proofing, climate resilience, mitigation, emission reduction, decarbonisation, adaptation, logistics.

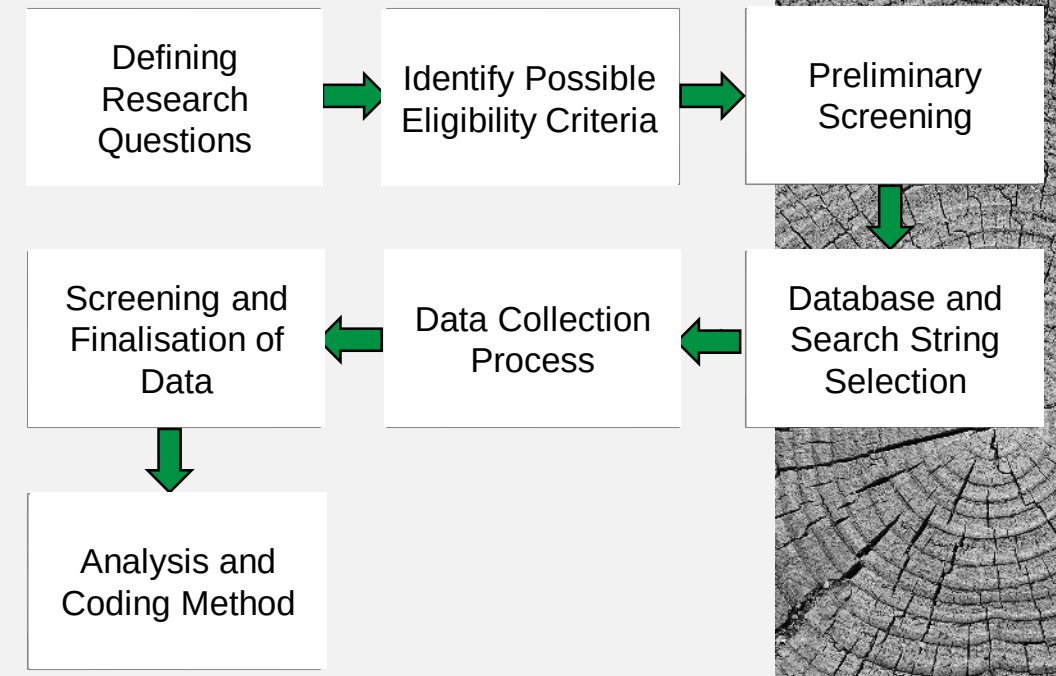


Figure 4: Adapted research methodology framework (Moher et al., 2009)

Screening Results

Articles Before Title Screening	
Selected Database	**Number of Articles**
Scopus	122
Emerald	10
Business Source Premier	4
Academic Search Premier	8
Web of Science	24

Articles After Title Screening 'Selected' Articles	
Selected Database	**Number of Articles**
Scopus	54
Emerald	6
Business Source Premier	1
Academic Search Premier	3
Web of Science	3

Reasons for Exclusions	Number of Articles
"Logistics" only in references	20
Logistics Regression Analysis (LRA)	11
No logistics focus/relevance	7
"Logistics" not in article	1

Coded Articles	
Selected Database	**Number of Articles**
Scopus	23
Emerald	4
Business Source Premier	1

Final Coding Template

Logistics Focus Area

General
Transportation
Warehousing/Facility
Production/ Manufacturing
Ports

Challenge

Reducing Carbon Emissions
Necessity for renewable energy sources
Necessity for better infrastructure/Lack of appropriate infrastructure
Necessity for better systems/techniques
Economic constraints
Acknowledgement without action
Reducing demand
Lack of knowledge/Difficulty in understanding
Adverse effects of M&A strategies
Non-economic constraints
Reluctancy to implement change
Ambitious expectations/goals
Conflicting agendas in stakeholders
Lack of policy/regulation
Knock-on effects of CC

Strategy

Mitigation
Adaptation

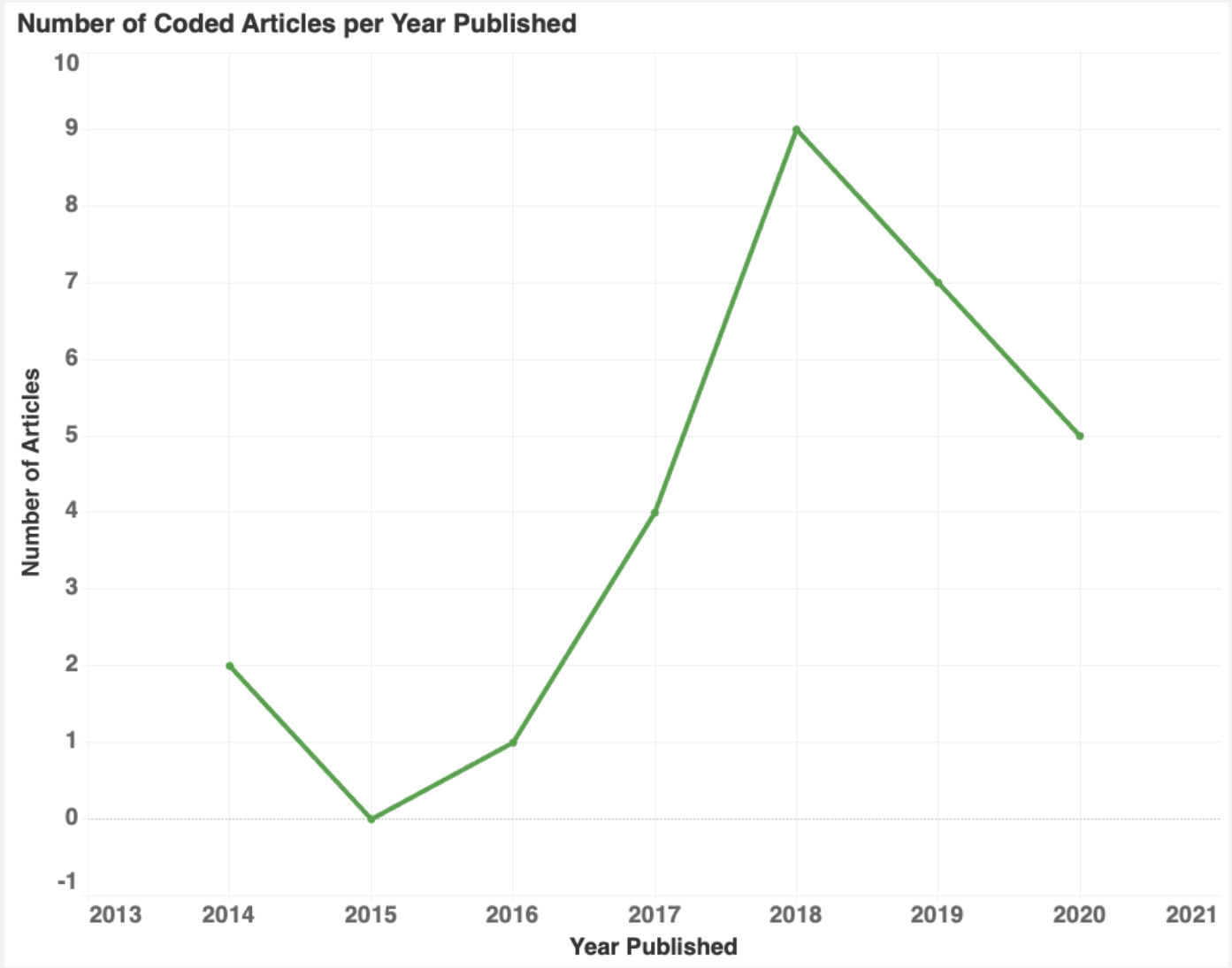
Mitigation

Using renewable energy sources
Reducing demand
Investment in new strategies/technologies
Using infrastructure with lower carbon emissions
Raising awareness and understanding
Total value costing
Multimodal Transportation
Re-aligning SCs and re-allocating resources
Policy Implementation
Zero-Deforestation Commitment (ZDC)
Combination of measures

Adaptation

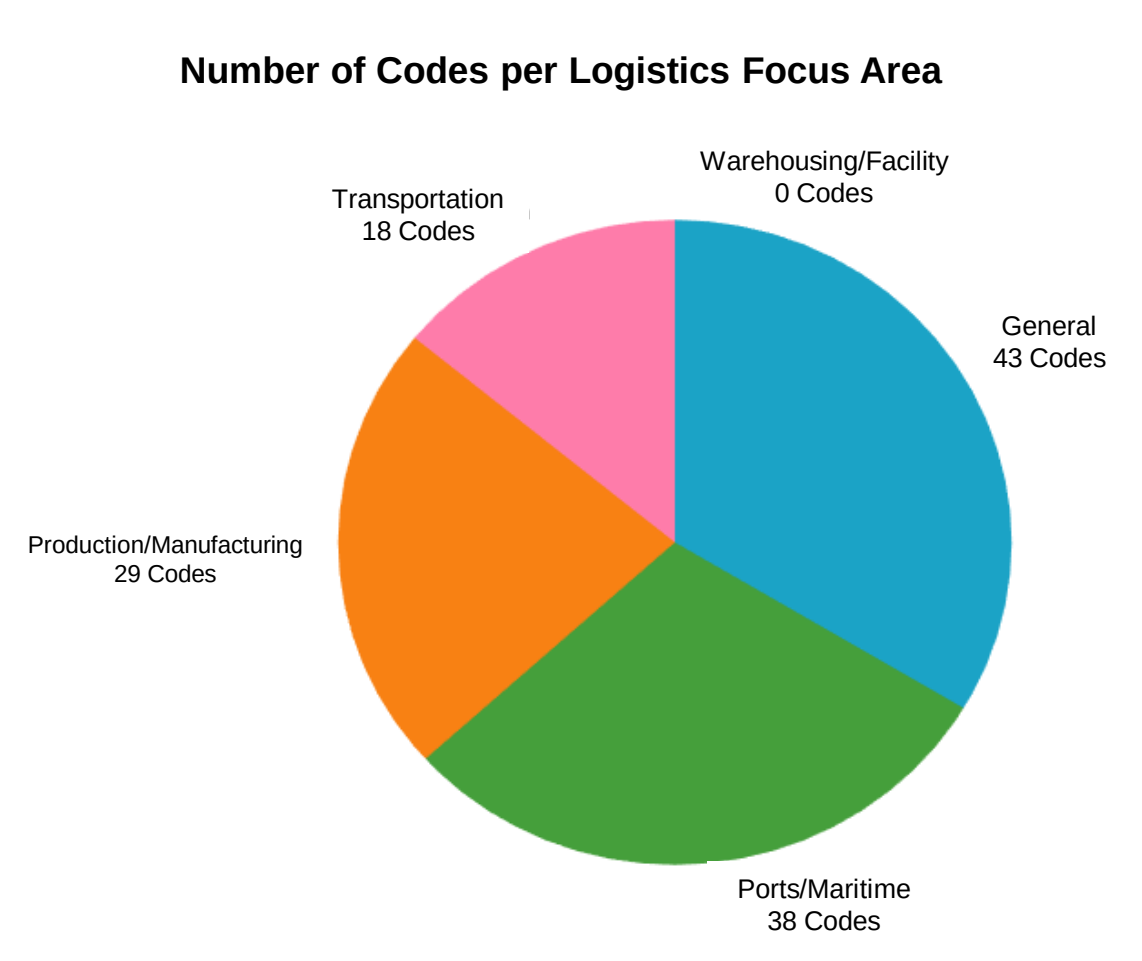
Geo-engineering Methods
Climate Proofing
Multi-stakeholder cooperation
Infrastructure development/restructuring
Carbon capture & storage (CCS)

Demographics of Results



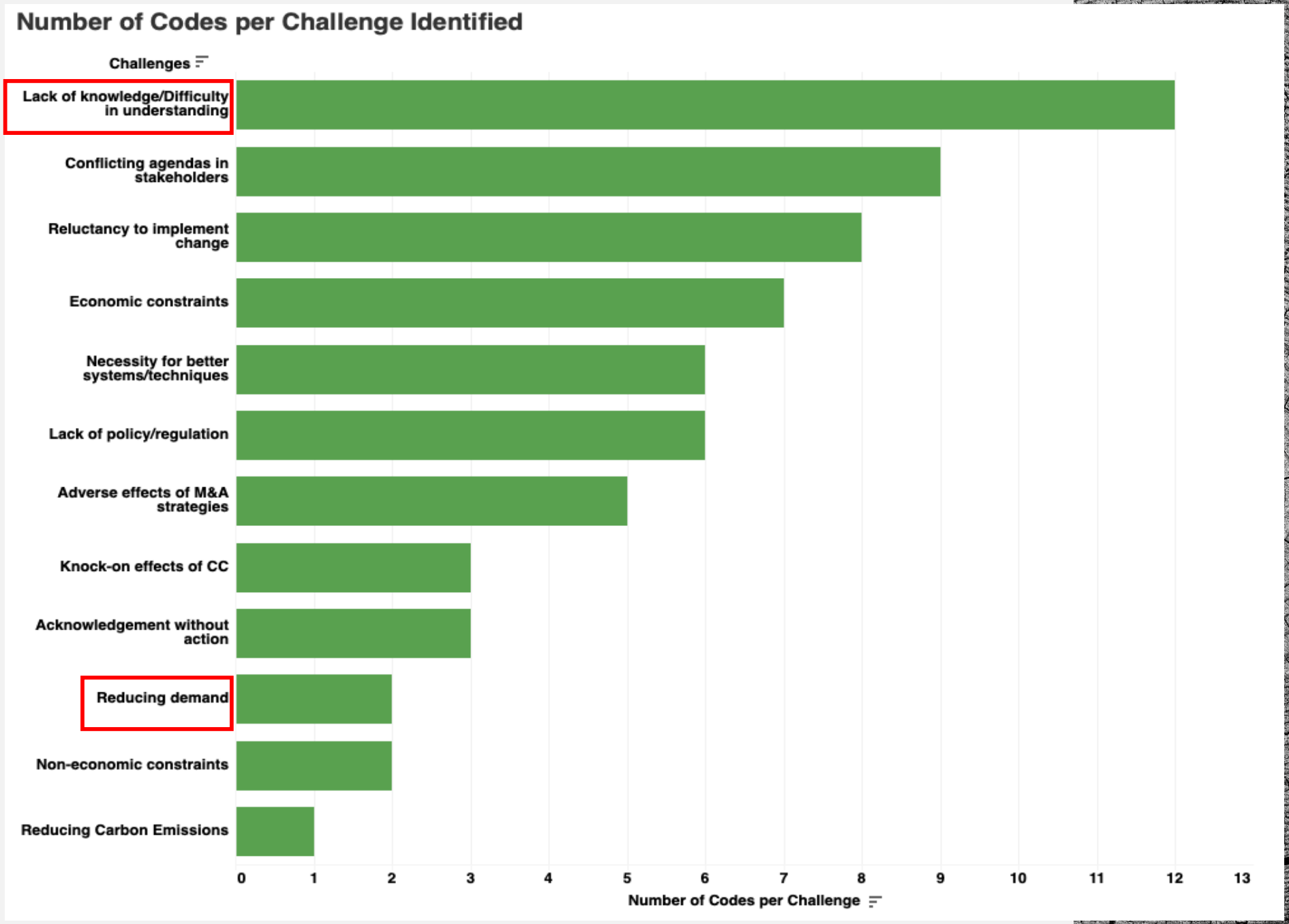
- Steady increase in open access articles
- Follow-up research into ‘closed’ articles necessary
- Relationship with grey literature should be established

Demographics of Results



- Warehousing does not receive enough research attention
- Number of general codes points to a lack of detailed process analysis
- Ports are highly vulnerable to climate change
- Global trade is a significant contributor to climate change
- Transportation is surprisingly small
- Large-scale transportation system strategies mostly absent

Challenges


Number of Codes per Challenge Identified
Challenges
Lack of knowledge/Difficulty in understanding
Conflicting agendas in stakeholders
Reluctancy to implement change
Economic constraints
Necessity for better systems/techniques
Lack of policy/regulation
Adverse effects of M&A strategies
Knock-on effects of CC
Acknowledgement without action
Reducing demand
Non-economic constraints
Reducing Carbon Emissions
0
1
2
3
4
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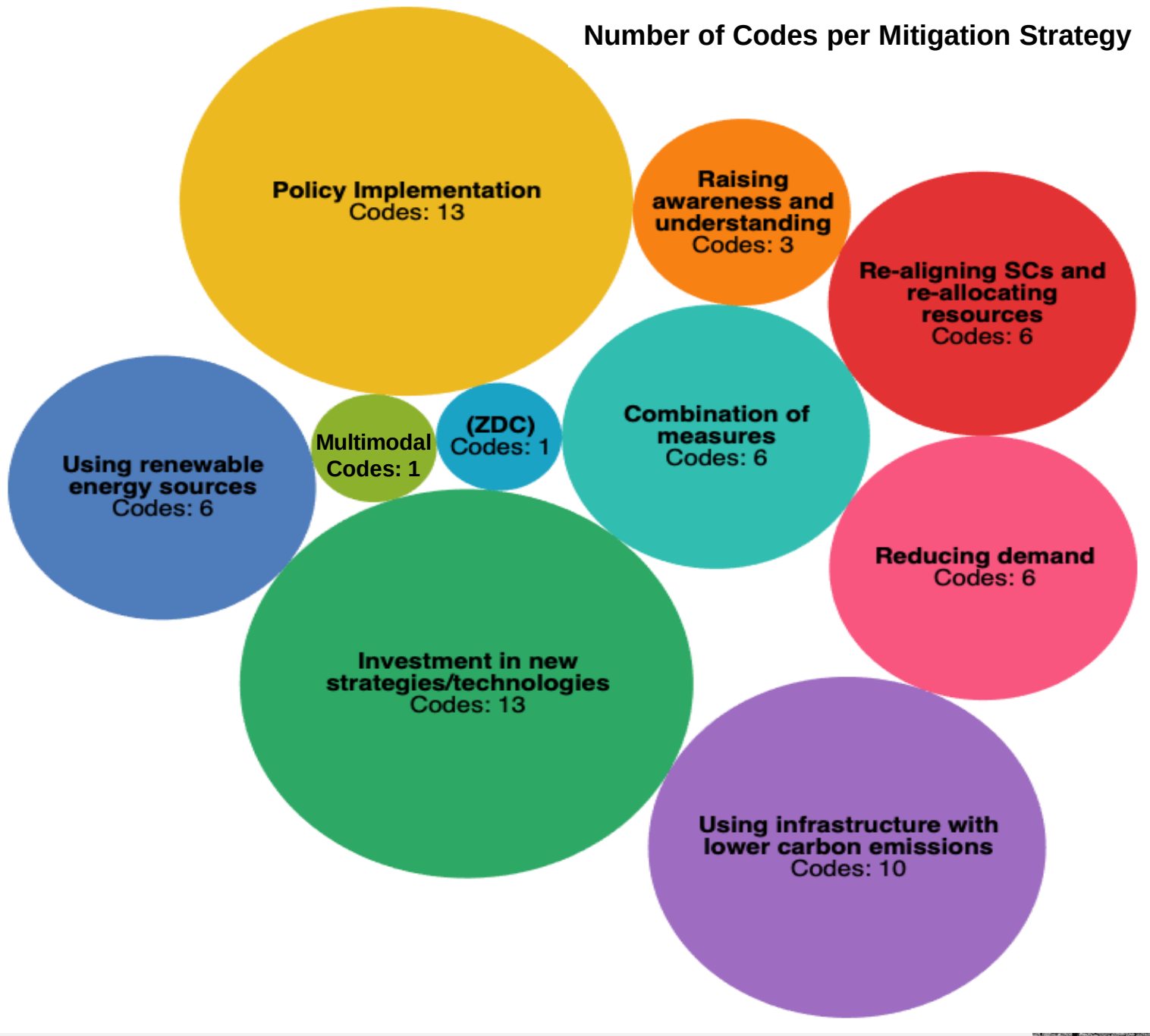
6
7
8
9
10
11
12
13
Number of Codes per Challenge

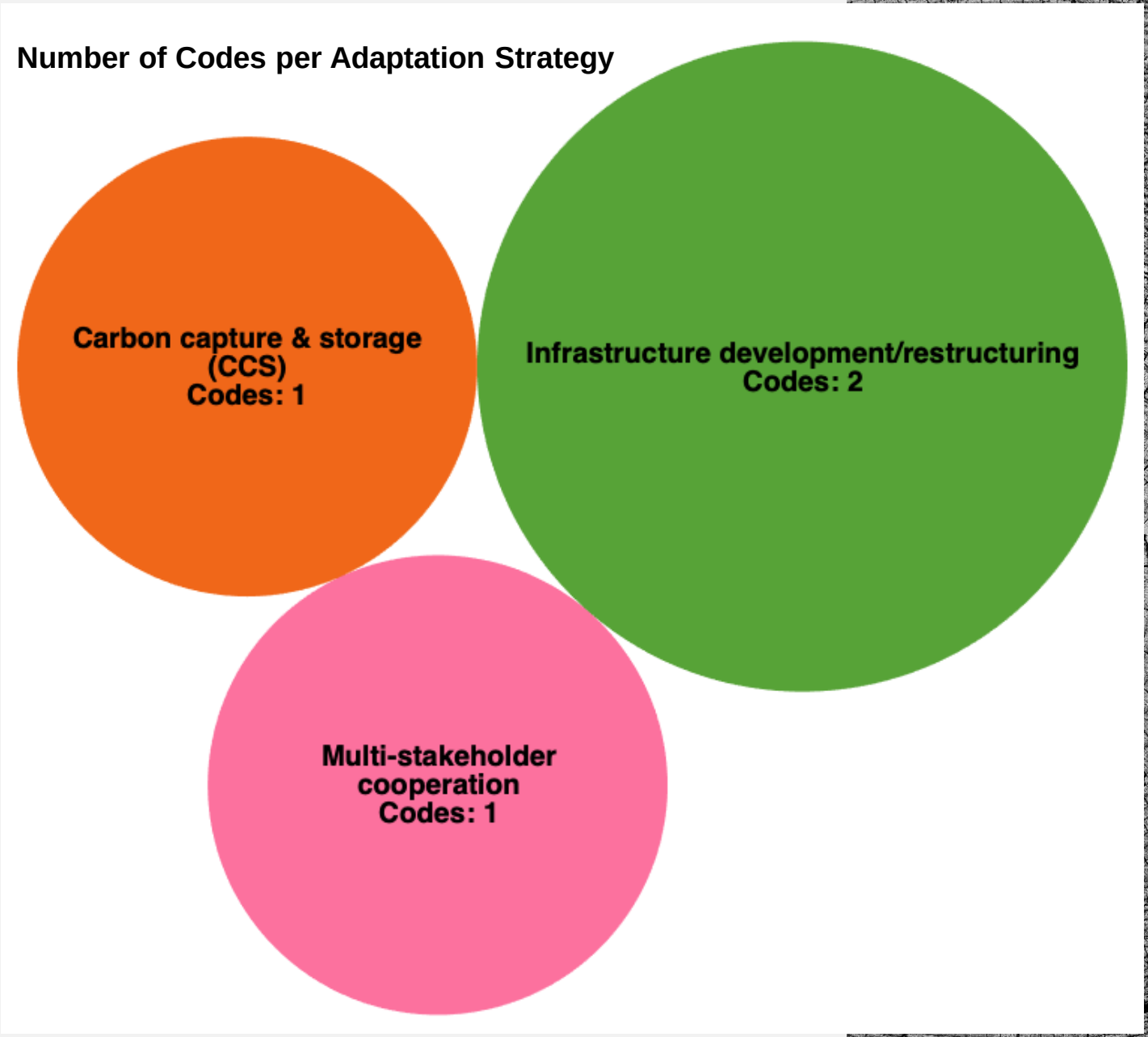
Mitigation Strategies



Adaptation Strategies/Solutions

Lack of representation in adaptation.

- Geo-Engineering methods
- Climate Proofing



Conclusion & Recommendations

Highest representation of the General Logistics industry, with specific focus on the Port/Maritime industry.

Biggest challenges:

- Lack of knowledge/Difficulty in understanding
- Conflicting agendas in stakeholders
- Reducing demand is not acknowledged

Key Strategies/Solutions:

- Investment in new strategies/technologies
- Policy implementation

Key areas for future research:

- To extend research to grey literature and closed journals
- Interplay with other disciplines
- Relationship between logistics and engineering solutions

(Business Takes Lead against Climate Change, 2020)