2nd Seminar of the UsinoVerT Chair
"Planning Green Infrastructures for Industrial Cities"
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The Research on Green Infrastructures in Industrial Cities

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Outline

1. Introduction

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    - 2.1 Methodological approach
    - 2.2 Sources of studies
    - 2.3 Selection criteria

3.Results
    - 3.1 A descriptive overview of researches
    - 3.2 Knowledge map:
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        - *2/ GI and planning*

4. Discussion
    - 4-1 Planning GI in industrial cities: towards sustainability ?
    - 4-2 Research gaps

5.Conclusion

1. Introduction

Objective: a scoping review of researches over the past 25 years combining three keywords
-Green infrastructure
-Planning
-Industrial (and post-industrial) cities

With two main focuses
-Descriptive panorama in terms on characteristics such as countries of origin, number, types of researches etc.
-Transversal:

1. What are the main topics of these researches ?
2. How is the concept of sustainability transition (if any) addressed is these works ?

⇨ **Main theoretical and empirical gaps of researches when considering green infrastructures as possible "pillars" of industrial city sustainable transformation ?**

1. Introduction

Warning: what is a green infrastructure ?

“Green Infrastructure: the physical environment within and between cities, towns and villages. The network of open spaces, waterways, gardens, woodlands, green corridors, street trees and open countryside that brings many social, economic and environmental benefits to local people and communities.”

“Green Infrastructure is a sub-regional network of protected sites, nature reserves, green spaces and greenway linkages. Green Infrastructure should provide for multi-functional use…it should operate at all spatial scales from urban centers through to open countryside.”

“Green Infrastructure is an interconnected network of green spaces that conserves natural ecosystems values and functions and provides associated benefits to human populations. Green Infrastructure is the ecological framework needed for environmental, social and economic sustainability.”

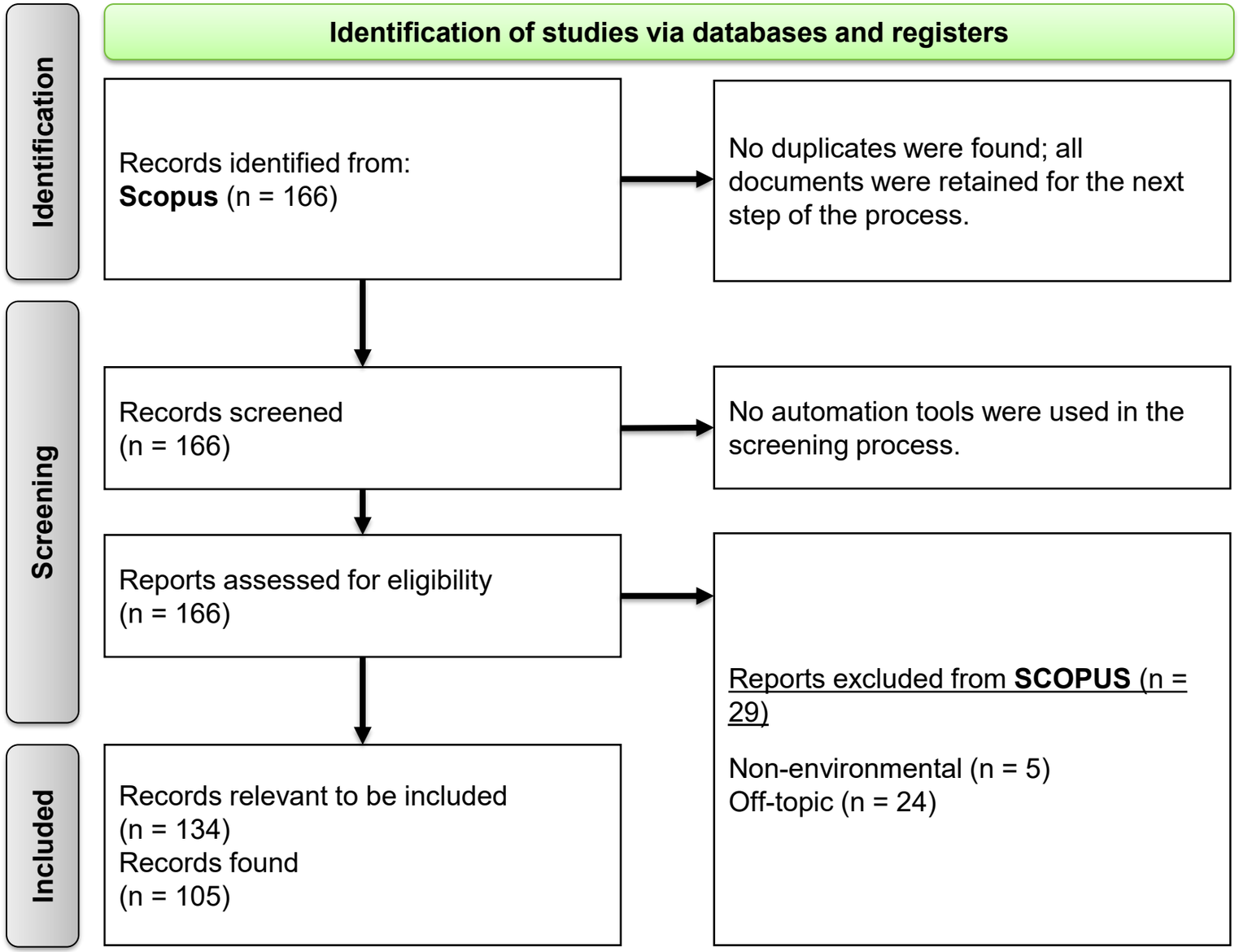
2. Methodology and materials

2-1 Methodological approach
-Scoping review vs bibliometric study
-Software tools

2-2 Sources of studies
-Scopus database
-PRISMA-ScR process

2-3 Selection of studies
-Eligibility criteria
-Coding process
-Sample characteristics
-Time span

2. Methodology and materials



3. Results: A descriptive overview of researches

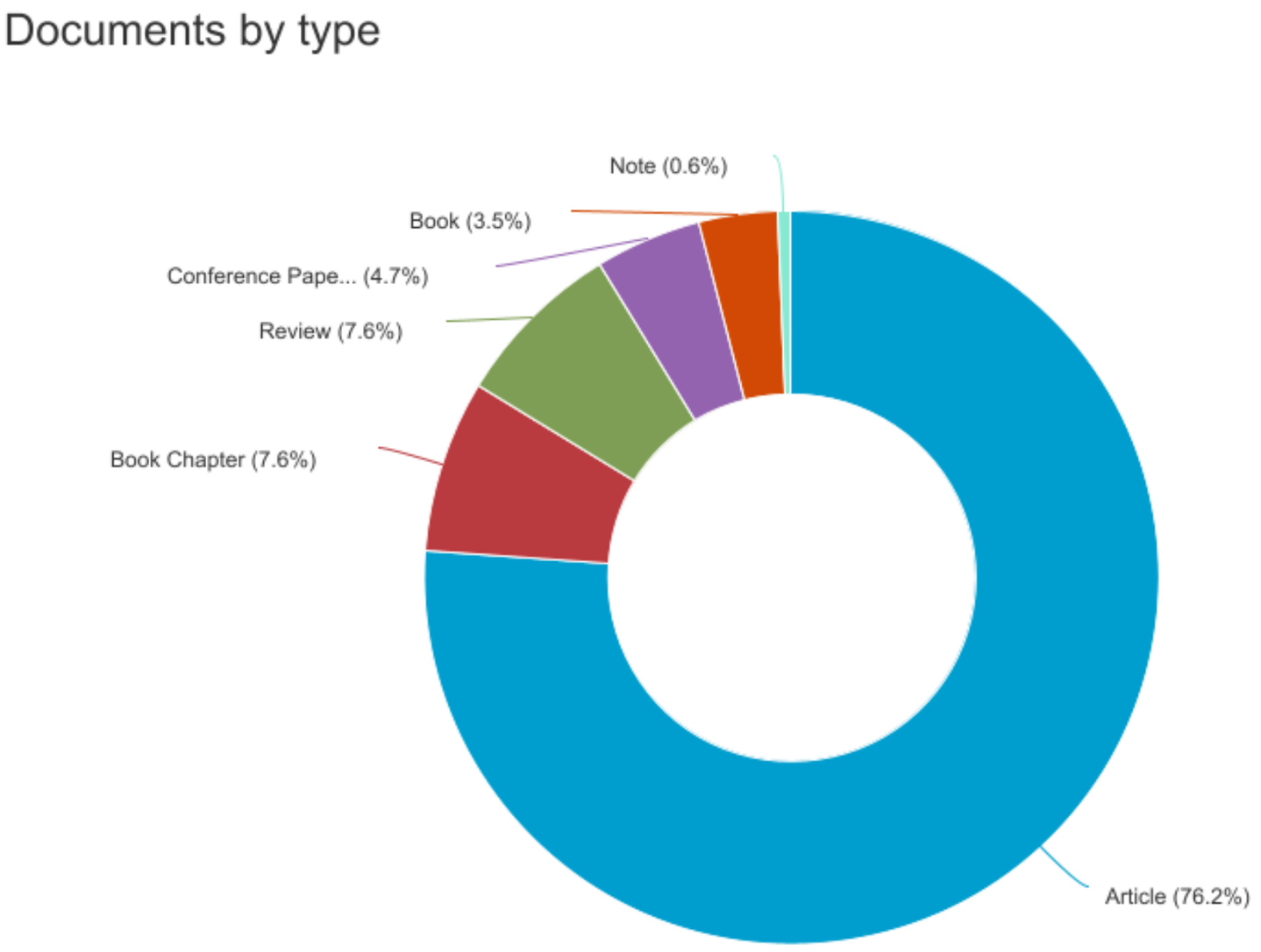
-Types and number of studies overtime (25 years)

-Distribution of countries

-Distribution of subject areas

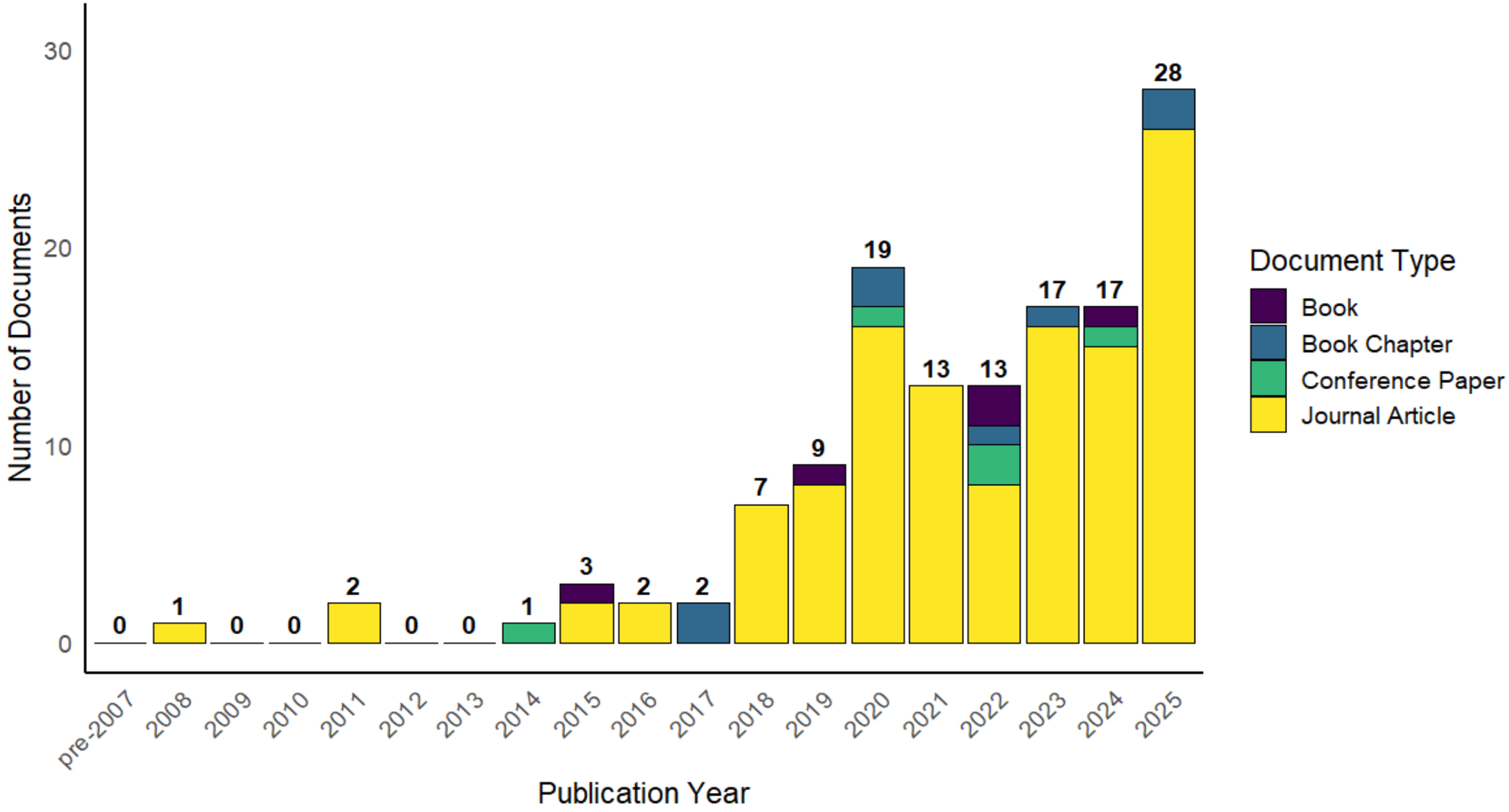
-Distribution of journals

3. Results: : A descriptive overview of researches

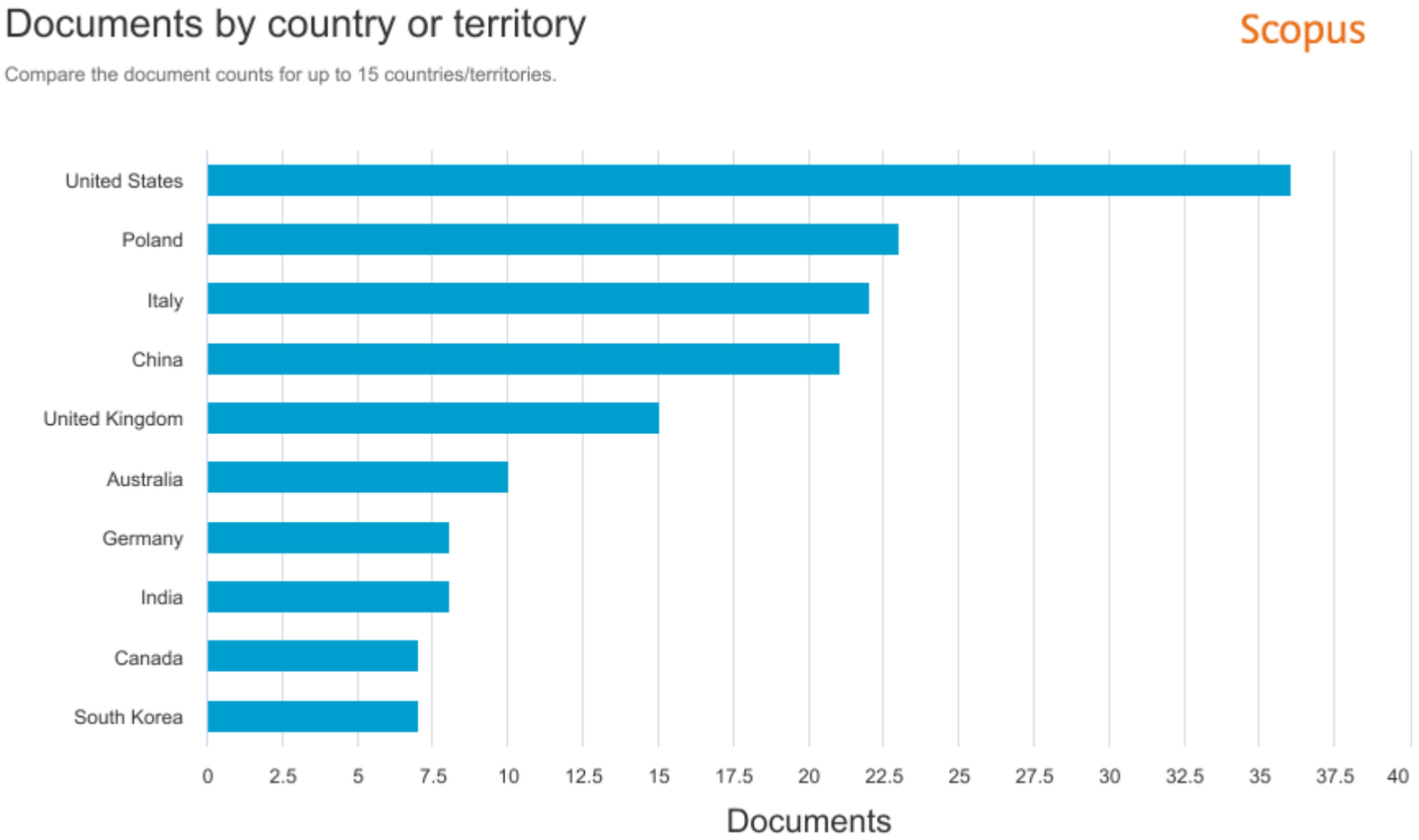


3. Results: : A descriptive overview of researches

Evolution and types of studies overtime



3. Results: : A descriptive overview of researches



3. Results: : A descriptive overview of researches

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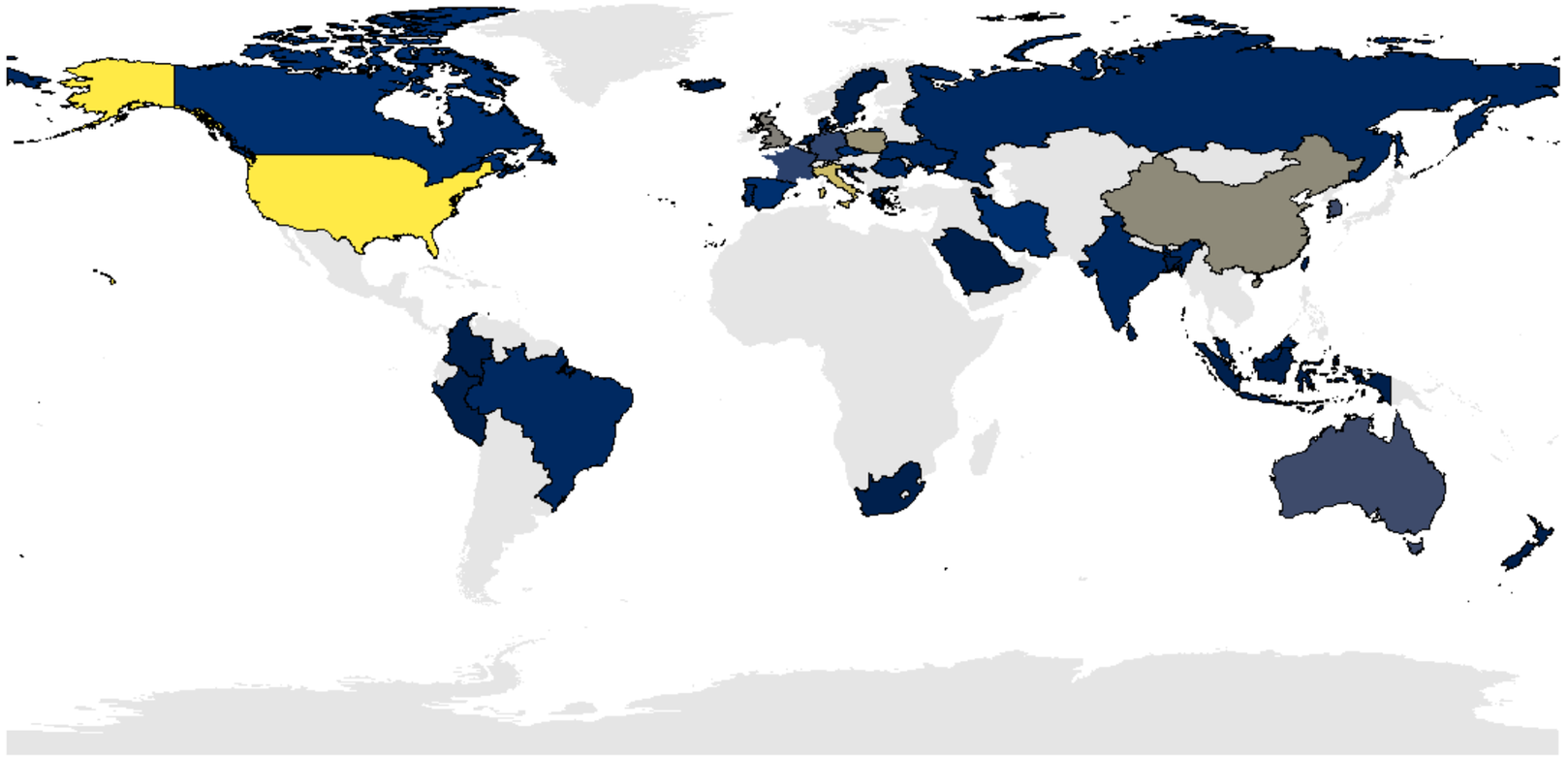
Country distribution of research



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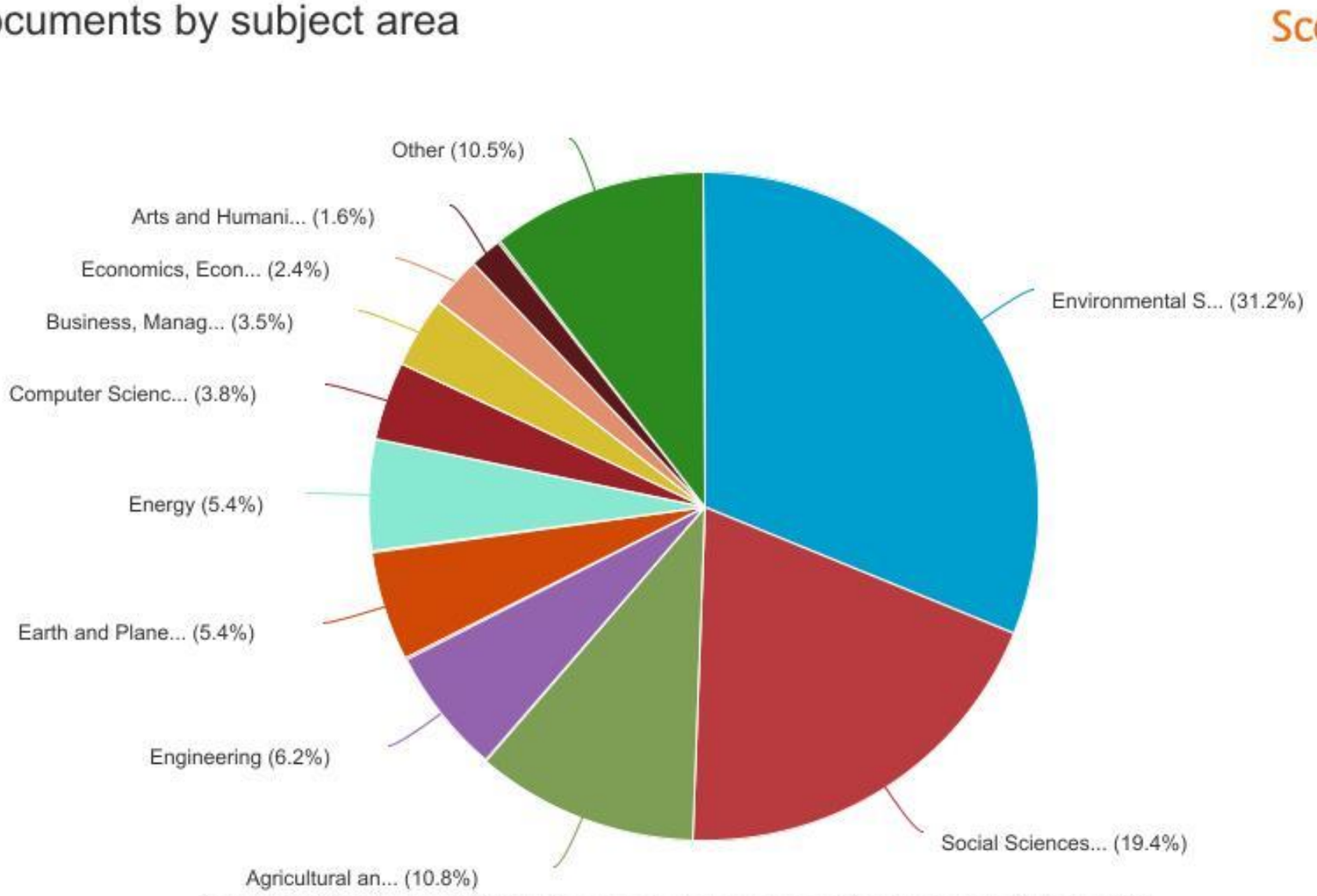
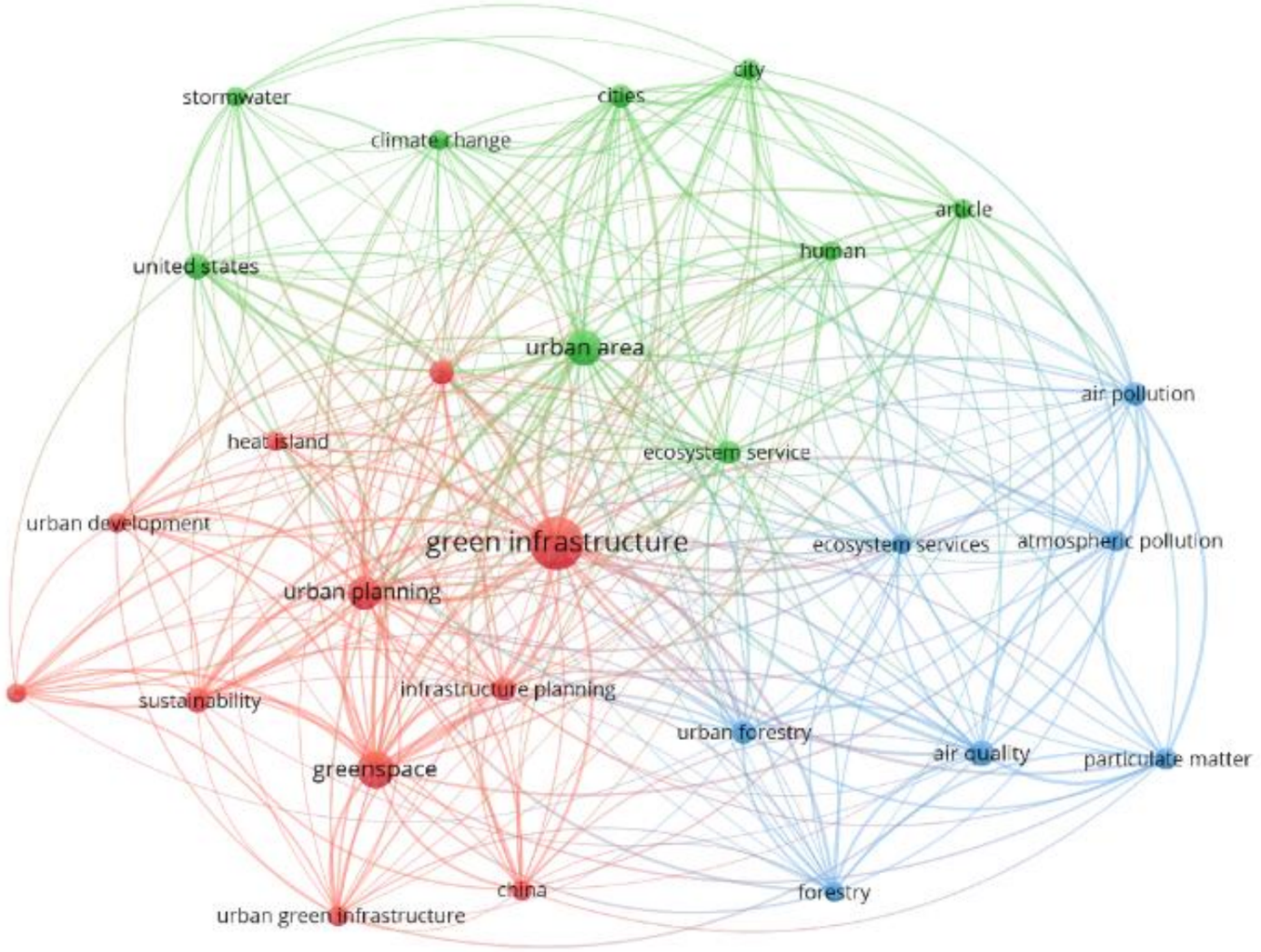
3. Results: : A descriptive overview of researches



3. Results: : A descriptive overview of researches

Journal Title	Number of occurences
Urban Forestry & Urban Greening	11
Land	9
Sustainability	8
Ecological Indicators	5
Forests	4
Environmental Pollution	3
Science of the Total Environment	3
Ecological Engineering	2
Cities	2
Environmental Sciences	2
Landscape and Urban Planning	2
Applied Sciences	2
Urban Ecosystems	2
Socio-Ecological Practice Research	2

3. Results: A knowledge map of researches on GI in industrial cities



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3. Results: Green infrastructures and industrial context (1/2)

1. Environmental studies

-Remediation and pollution control, with focus of nature-based solutions (NBS) especially for cooling and run-off controls,
-Capture and filter airborne pollutants like heavy metals.
-Improve water and soil quality of contaminated soils, improve drainage of soils

➔ *Subtheme of climate change adaptation*

-Green versus grey infrastructures to better manage risks of flooding, storm water, heat stress, water scarcity, restoring water cycles,
-In the recent years: roles of technological solutions based upon the integration of remote sensing and biophysical indicators

2. Post industrial land regeneration

-Brownfield regeneration catalyst for land reuse and urban regeneration.
-Abandoned factories and derelict zones are being transformed into multifunctional landscapes
-Land degradation by industries, multifunctionality of brownfields

3.Economic revitalization and social equity

-Improvements of social-spatial integration between industrial zones and populations
-Aesthetics and cultural dimensions of industries to revitalize: industrial past as a legacy
-GI and industrial renewal: eco parks, industrial parks…

3. Results: Green infrastructures and industrial context (2/2)

-The characteristics of **the industrial context *:***

1. Industrial phase: still industrial cities *vs* post industrial cities

✓ Still-industrial cities: trend of research, where the objectives are to create a “green industrial urbanism”, and sometimes an “innovative industrial urbanism” (incremental vs disruptive perspective)

✓ Post-industrial cities: trend of industrial regeneration or restructuring

2. Roles of GI **in *industrial transformation, and not only adaptation***

-This transformation could be obtained through eco-parks,

-Recent trend: development of industrial metabolism: GI are not only “green spaces” but encompass recycling activities, carbon-free industries,

-In some researches focus on the roles of GI for a social equity and environmental justice

-A specific topic, **governance aspects** of GI

-Participatory process: integration of citizens, experts, institutions and roles of engagement and citizen awareness

-Policy instruments for institutional coordination between spaces (metropolis level)

-Guiding principles of governance: climate change, ecological stewardship

3. Results: GI and planning scale

-**Wide variety of scales** across the literature

✓ National/regional scale – Policy frameworks and nationwide greening strategies (e.g., Singapore's national ecological infrastructure).

✓ City scale – Urban systems and networks of green infrastructure (e.g., Vacant to Vibrant, Cleveland case).

✓ Neighborhood scale – Community engagement and localized planning (e.g., Buffalo and Gary case studies).

✓ Site scale – Parcel-level interventions such as stormwater parks, vertical greenery systems, or park design.

-GI's objectives in relation with scales: **some regularities**

✓Regional/metropolis/city scale: controlling urban and industry sprawl, maintain rural or nature – urban linkages

✓City scale: similar, but with emphasizing the role of **community participation**

✓Neighborhood scale: importance of **integration between economic, social and ecological goals**, accessibility, local resilience

✓Site or corridor scale**: localized adaptation** (green roofs, site greening…), environmental services and engagement provided by GI to the community

4. Discussion

Planning GI in industrial cities: towards sustainability ?

✓Relatively few studies explicitly situate themselves within the **sustainability transition perspective**

✓Nevertheless, by addressing the topics of ecological remediation, climate resilience, social and economic regeneration, these works operationalize the core dimensions of sustainability

✓GI = Urban green actions can serve as ***"bricks or catalysts for broader societal transitions"***

✓ Sustainability transitions are developed through two main dimensions (not always explicit)

1.**Bridge** between economic, ecological and social systems: GI as *mediating systems* connecting social, ecological and technical networks (a way to develop a real interdisciplinary perspective)

2. **GI defines an application of multi scalar governance integration**: opportunities to go further one single stage, to encompass a territory as a whole (i. e. ecosystem services or recreational activities)

4. Discussion: Research gaps

Empirical gaps

-In terms of **country distribution**: few studies in developing countries, and almost none in Africa, and over-representation of some countries, USA, China, and in Europe, Poland

-In terms of characteristics of **industries and industry transformation**

-In terms of **impacts, indicators, assessments**

-Roles and importance of **innovative technologies** (robotics, data management, AI etc.) : "*smart city approach*"

Theoretical gaps

-Lack of **common definitions of GI**, especially from the point of view of planning scales

-Relatively **few interdisciplinary approaches** in the perspectives of sustainability transitions (MLP approach)

5. Conclusion

- ✓ Growing field of researches, with some empirical voids

- ✓ Interesting stream of research which fuels interdisciplinary perspectives:
  - ✓ Enriches planning studies on the topic of multi scalar governance
  - ✓ Brings together social, economic and ecological systems
  - ✓ Enables a dialogue between industrial policy and societal issues

- ✓ Conceptual foundations to consolidate
  - ✓ Extended holistic approach: blue-grey-green infrastructures
  - ✓ Planning perspective: works on optimal implementation, not on the finality
  - ✓ Little reference is made to the sustainability transition school

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"The Research on Green Infrastructures in Industrial Cities: a Scoping Review"
Fabiana Fabri, Mohammad Naim, Loïc Sauvée