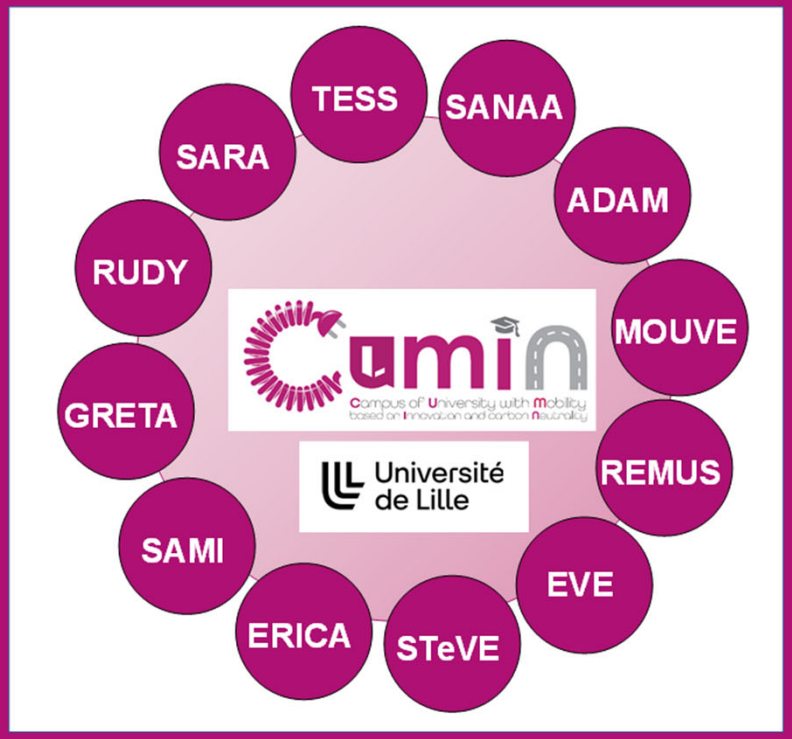
CUMIN - TEM Project 2022-2023

(J. Frotey & E. Masclef, dir.)

https://cumin.univ-lille.fr/



Energy transition for mobilities on University Campuses

« Best mobility practices on University campuses worlwide : a literature review »

Philippe Verville, UQTR

Debbie Imhof, UQTR

Université du Québec à Trois-Rivières

CUMIN Seminar - 22th of March 2023

Presentation of TEM

Energy transition for mobilities on University Campus

Project funded by the « Green fund » of Trois-Rivières University, 2022-2023 (5 000$)

Coordinated by J. Frotey (post-doc, UQTR) and E. Masclef (phD student, ULILLE)

Objectives

Collection of best university practices in terms of sustainable mobility around the world

=> Creation of a guide for students and users of the campus (awareness tool)

Research Methods

Both Quantitative and qualitative state of the art / literature review on sustainable mobility initiatives around the world

Main problem and questions

Are campuses good places to experiment with sustainable mobility ? Where are the best practices ? Which research teams are also working on these questions ?

Plan of the presentation

1. A quantitative literature review on sustainable mobility
2. A qualitative literature review on sustainable mobility

Main conclusion

Campus of **U**niversity with **M**obility based on **I**nnovation and carbon **N**eutrality

Part 1 - A quantitative literature review

https://cumin.univ-lille.fr/

Part 1 – A quantitative literature review

Context

High increase of scientific publications : « Publish or perish » / « open science »

The rise of « bibliometric analysis » (bibliometric softwares and databases)

It requires more and more skills to find the most relevant references in a database

To make our articles discoverable : we have to choose the best keywords

=> Development of “Prompt ingeneering” : methods to communicate with IA and databases

Part 1 – A quantitative literature review

Objectives of the quantitative review

Identify the most influential journals/researchers in a field,

Uncover new trends or gaps in the research field,

Mapping interactions and connections between the research fields constituents,

Follow the scientific production over time…
….

***Who publish* on the subject and where ?**

***Who sponsors* the researches on the subject ?**

***Which journal* publishes on the subject ?**

Part 1 – A quantitative literature review

Methodology

1. Bibliometric databases comparison

Databases	Advantages	Drawbacks
Cairn Dimensions Érudit EBSCO Google Scholar IEEE Scopus Springer Link	Database in French (Cairn, Érudit); Access to an interesting number of results; A large list of metadata; Straightforward and user-friendly search interface; Access to an interesting number of results; Access to Scival Possibility to export in multiple files.	The research findings related to the project appear to be inadequate or lacking in depth; Database not connected to Scival; The boolean search system was limited; Exporting results from database was hard; Mostly in engineering _ _

Part 1 – A quantitative literature review

Methodology

1. Bibliometric databases comparison

The database that has been chosen is Scopus. Here are the reasons for this choice

- Access to many results;
- Possible to export results in Endnote, BibTex, Plain Note, ExCilibris, Mendeley CSV format;
- Database connected to Scival;
- Presence of DOI column to merge several list of references;
- Wide range of metadata;
- Free access (UQTR subscription)

Part 1 – A quantitative literature review

Methodology

2. Selection of best keywords and a definitive database

Locations/actors	Green adjectives	Transport modes
alumni campus college post secondary professor student teacher university	eco energy gas emission green low carbon smart sustainable low carbon environment zero carbon	bicycle bike / e-bike bus / e-bus car / car park electric bike electric car electric vehicle charging station / microgrid e-scooter / scooter electric scooter sustainable mobility commute / daily travel decarbonization walkability / pedestrian Transport / modal choices

Part 1 – A quantitative literature review

Methodology

2. Selection of best keywords and a definitive database

Searches were performed with multiple operators (OR, AND, AND NOT) and a wildcard (*):

1. OR
2. AND
3. AND NOT (boolean operators that exclude some undesired keywords)
4. The asterisk (*) By using "campus*", all words that begin with "campus" will be captured in the search results (ex. campuses)

References titles / Abstract or Keywords must contains :

(“campus*” **OR** “universit*”) **AND** (“sustainable mobility” **OR** “sustainable transport*”)

Part 1 – A quantitative literature review

Methodology

2. Selection of best keywords and a definitive database

Suggested query in three parts (626 results):

Location	(“sustainable campus" OR "green campus*" OR "eco campus*" OR "green universit*" OR "sustainable universit*" OR "university campus" OR "college campus")
Main subject : mobility	**AND** ("sustainable mobilit*" OR "mobilit*" OR "green mobilit*" OR "transport" OR "transportation" OR "sustainable transport*" OR "travel pattern*" OR "travel behavior" OR "daily travel" OR "modal choice*" OR "commut*" OR "campus commut*")
Transport modes	**AND** ("bicycle*" OR "cycl*" OR "bike*" OR "bike sharing" OR "bus*" OR "car*" OR "charg* station*" OR "decarboniz*" OR "e-bike*" OR "electric* bike*" OR "electric* scooter*" OR "electric* vehicle*" OR "electric* car*" OR "e-scooter*" OR "car park*" OR "scooter*" OR "walk*" OR "pedestrian")

Part 1 – A quantitative literature review

Methodology

2. Selection of best keywords and a definitive database

In order to reduce the noise, we had to read the research articles individually. During this process, certain keywords were identified as "negative" and were taken into consideration.

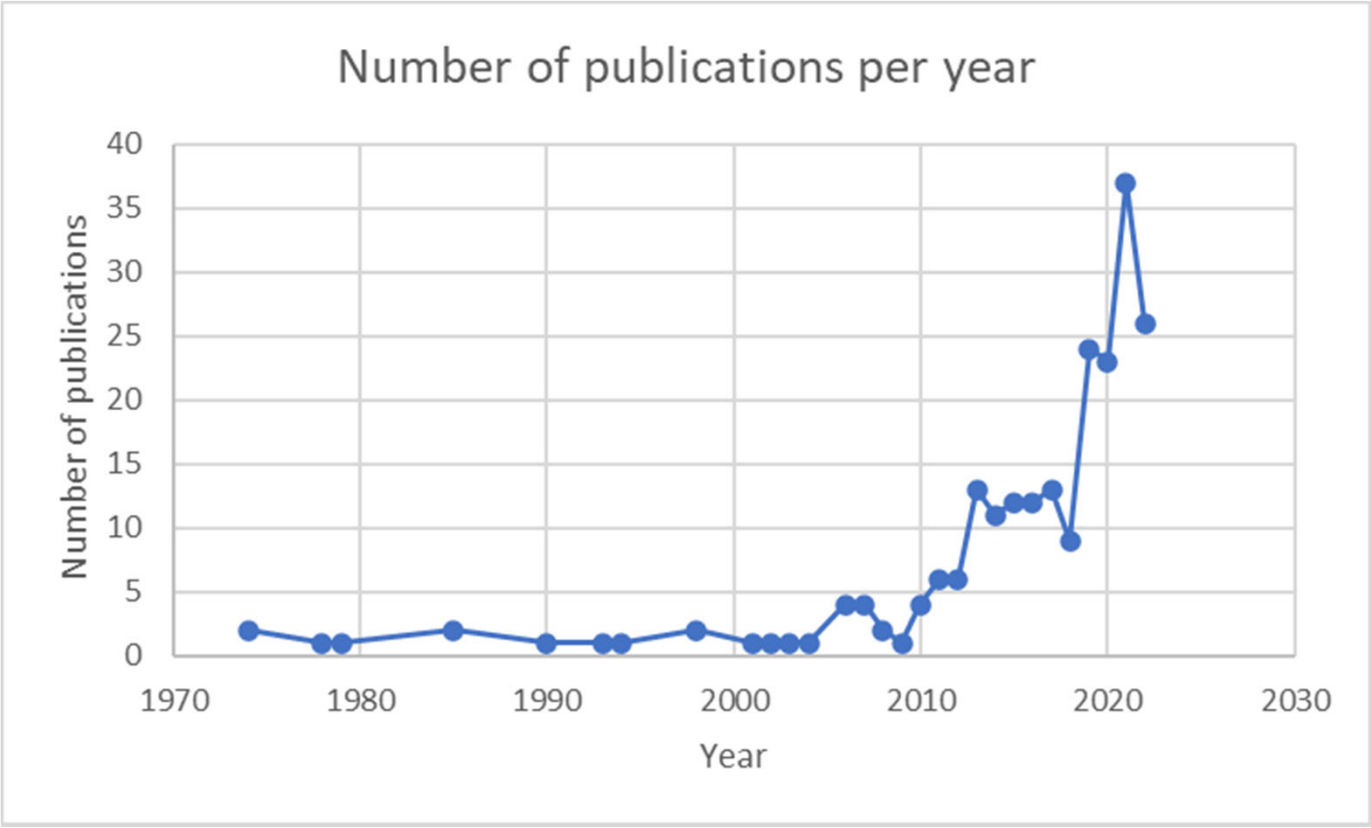
AND NOT ("waste"; "water"; "paper"; "recycl*"; "food"; "video surveillance"; "medical"; "medicinal"; "fertilizer"; "soil"; "genetic"; "neurology"; "ecosyst*"; "learning"; "e-learning"; "teaching"; "deep learning"; "comput*"; "software*"; "data mining"; "internet"; "natural sciences"; "digitalization"; "nursing";"health")

223 references obtained

Part 1 – A quantitative literature review

Results

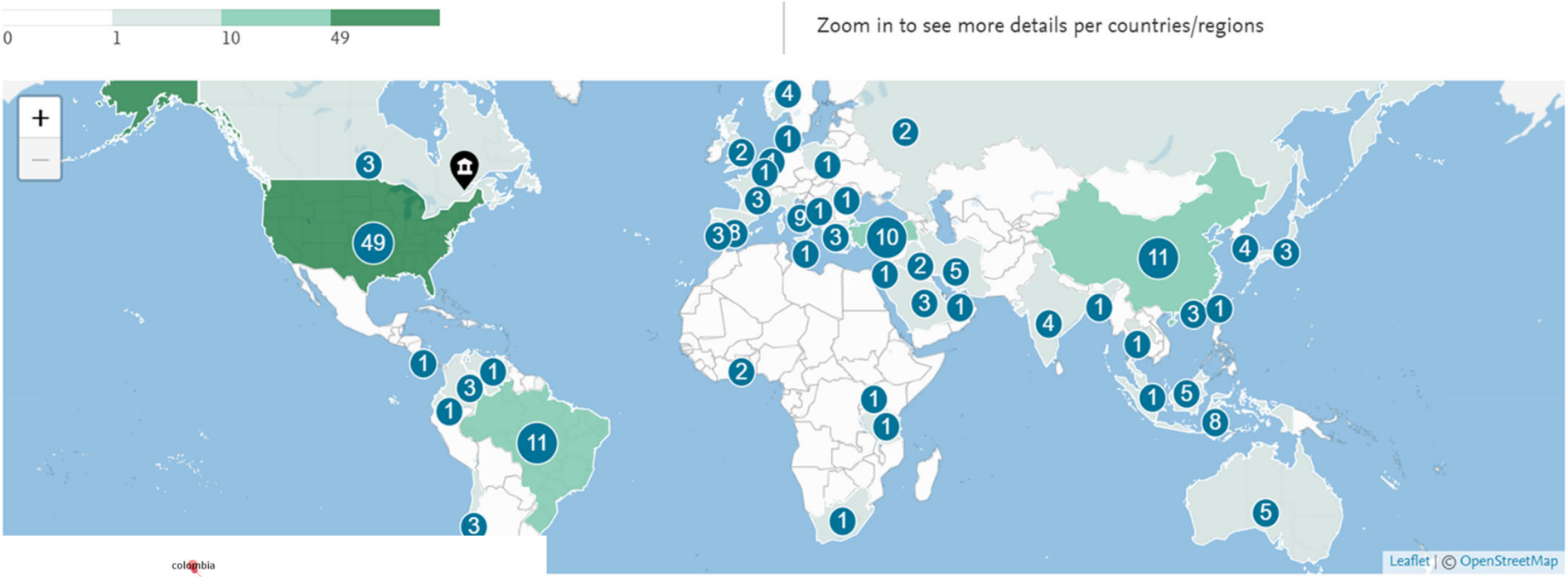
1. The 223 references database : visualization of data with Excel

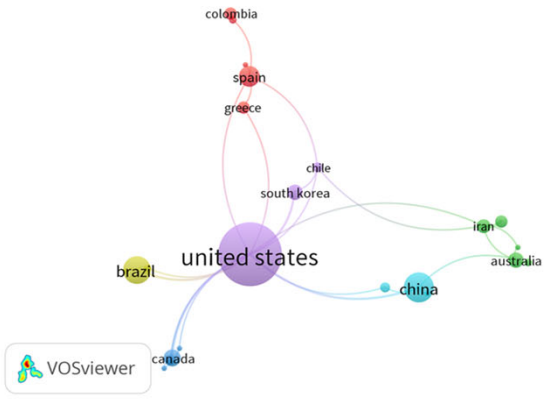


Part 1 – A quantitative literature review

Results

1. The 223 references database : Mapping the countries of publication (Scival)

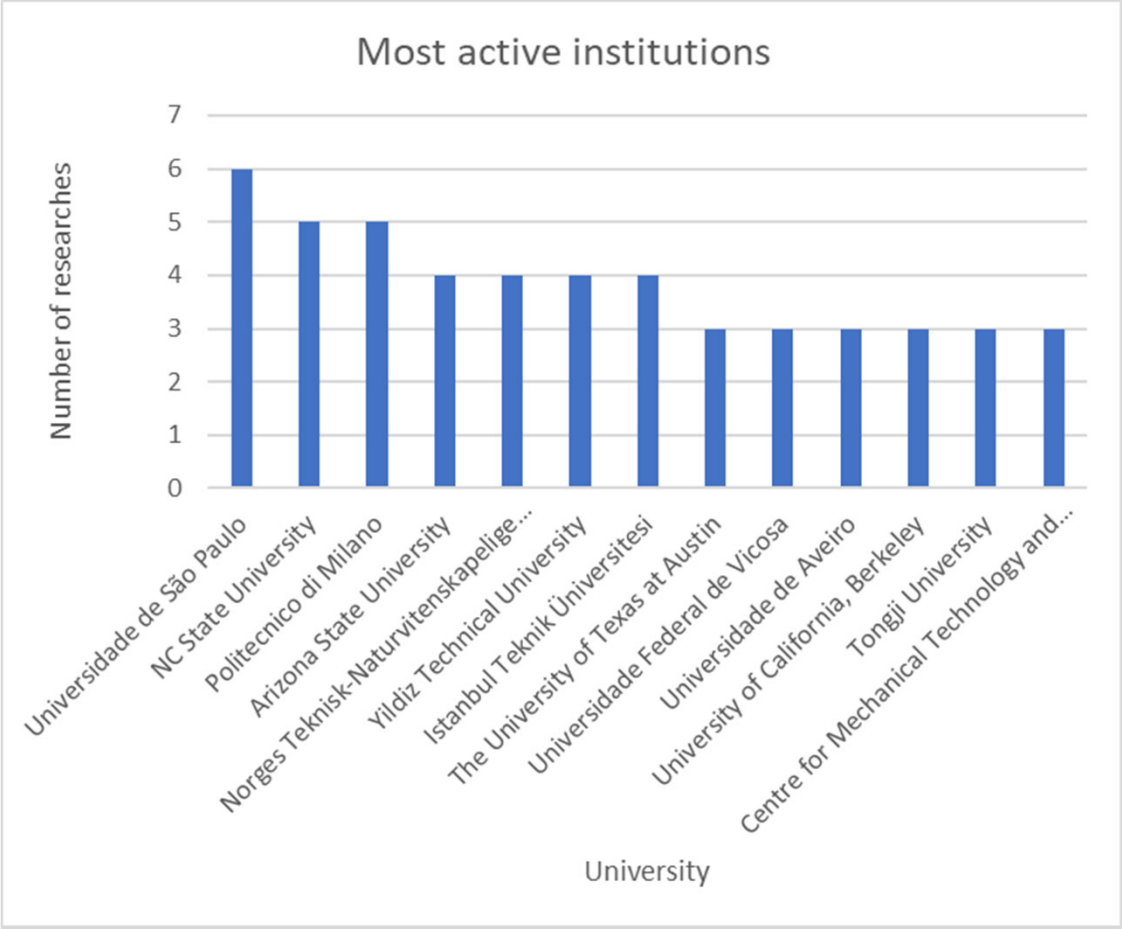




Part 1 – A quantitative literature review

Results

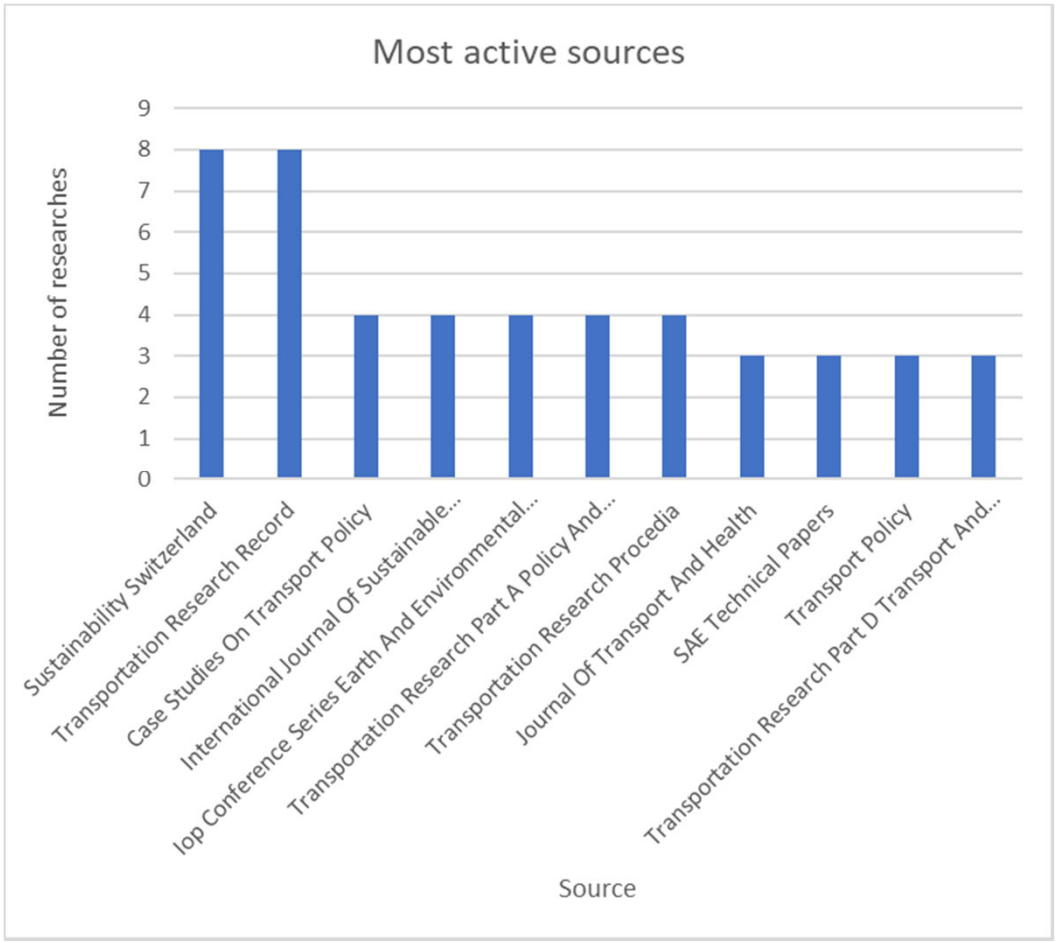
1. The 223 references database : Who publish on the subject ? (Excel)



Part 1 – A quantitative literature review

Results

1. The 223 references database : Where to publish on the subject ? (Excel)

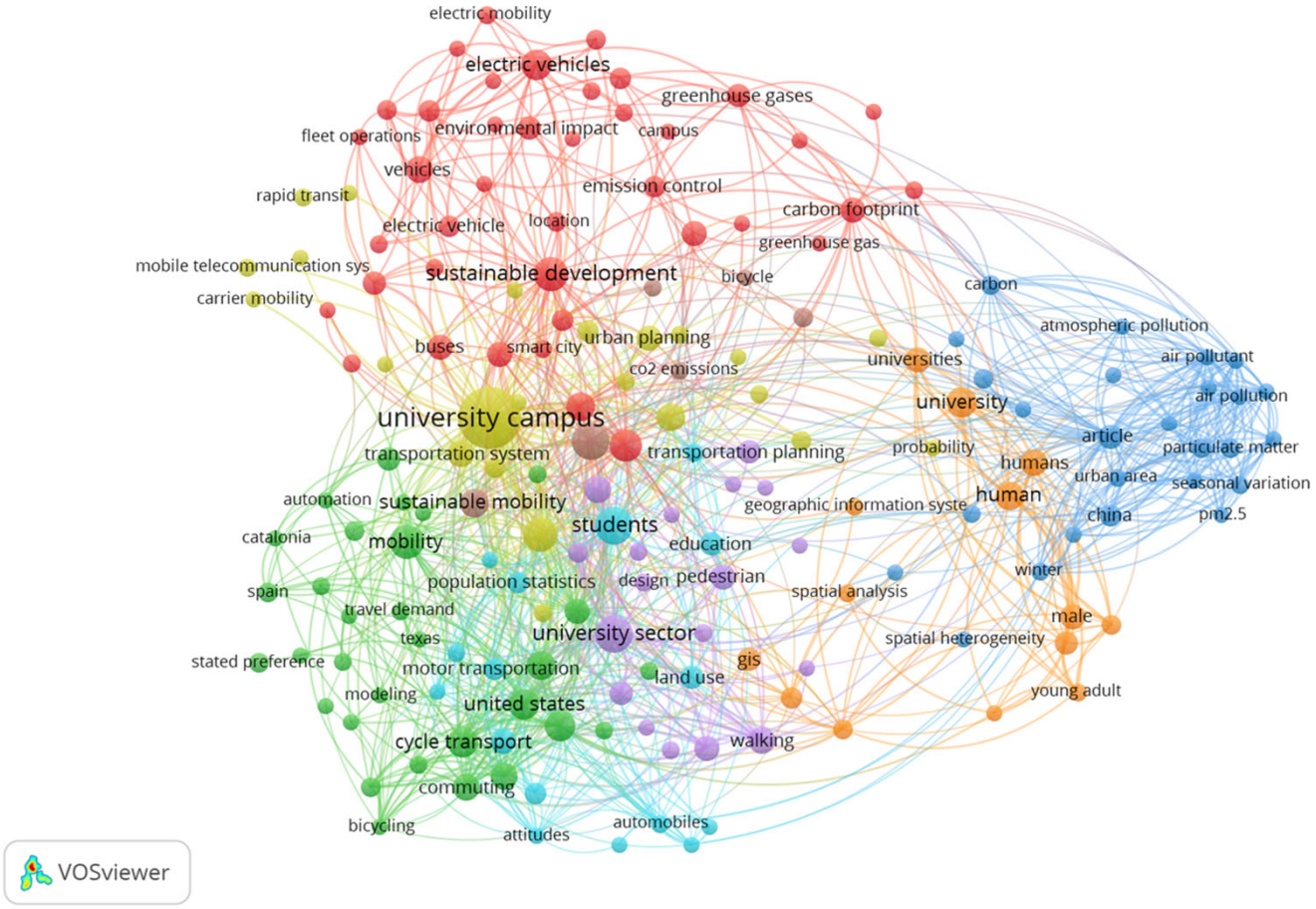


Part 1 – A quantitative literature review

Results

2. The 223 references database vizualized on Vosviewer (All keywords)

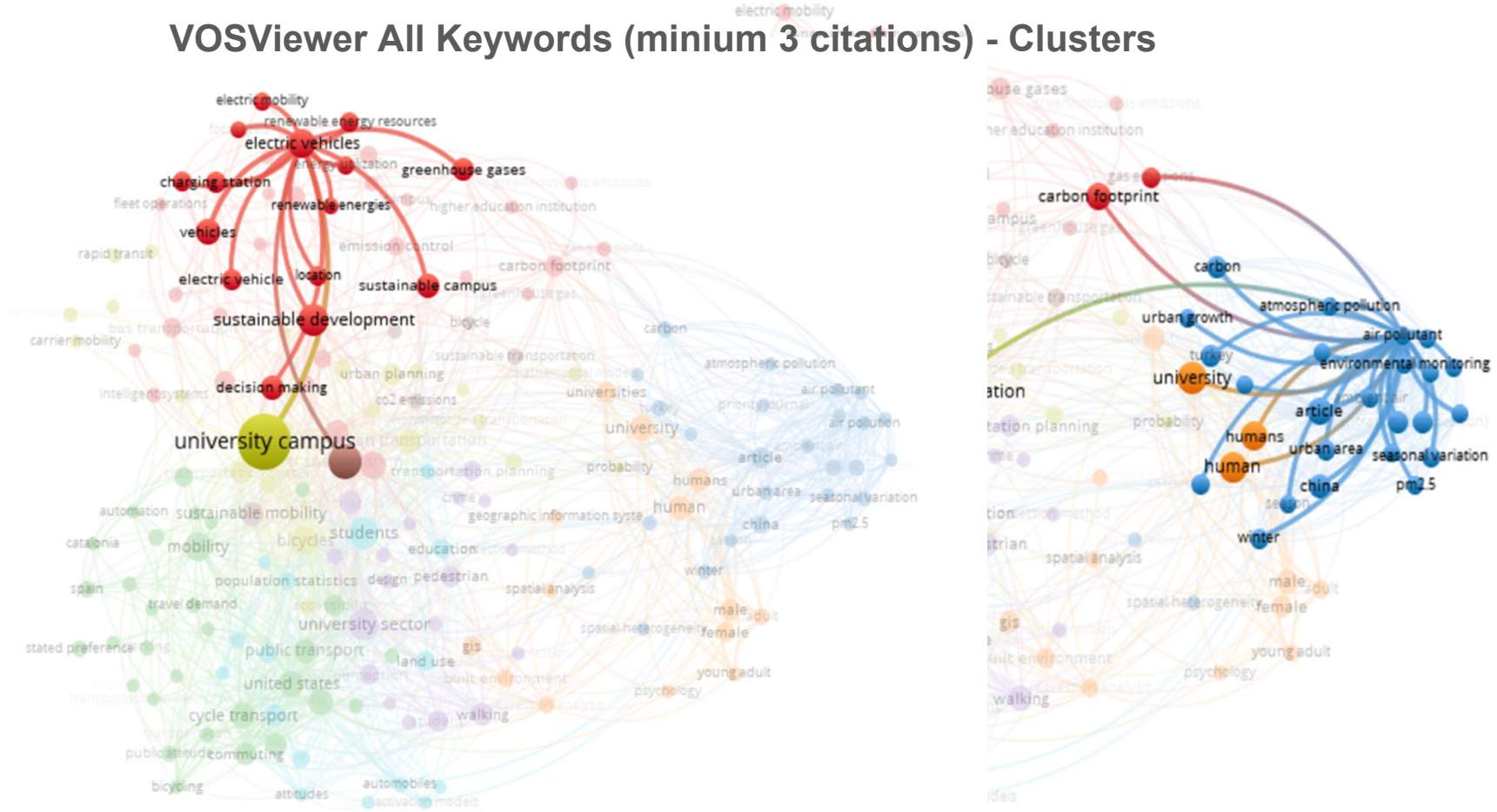
Keywords - Minimum number of occurrence ≥ 3



Part 1 – A quantitative literature review

Methodology

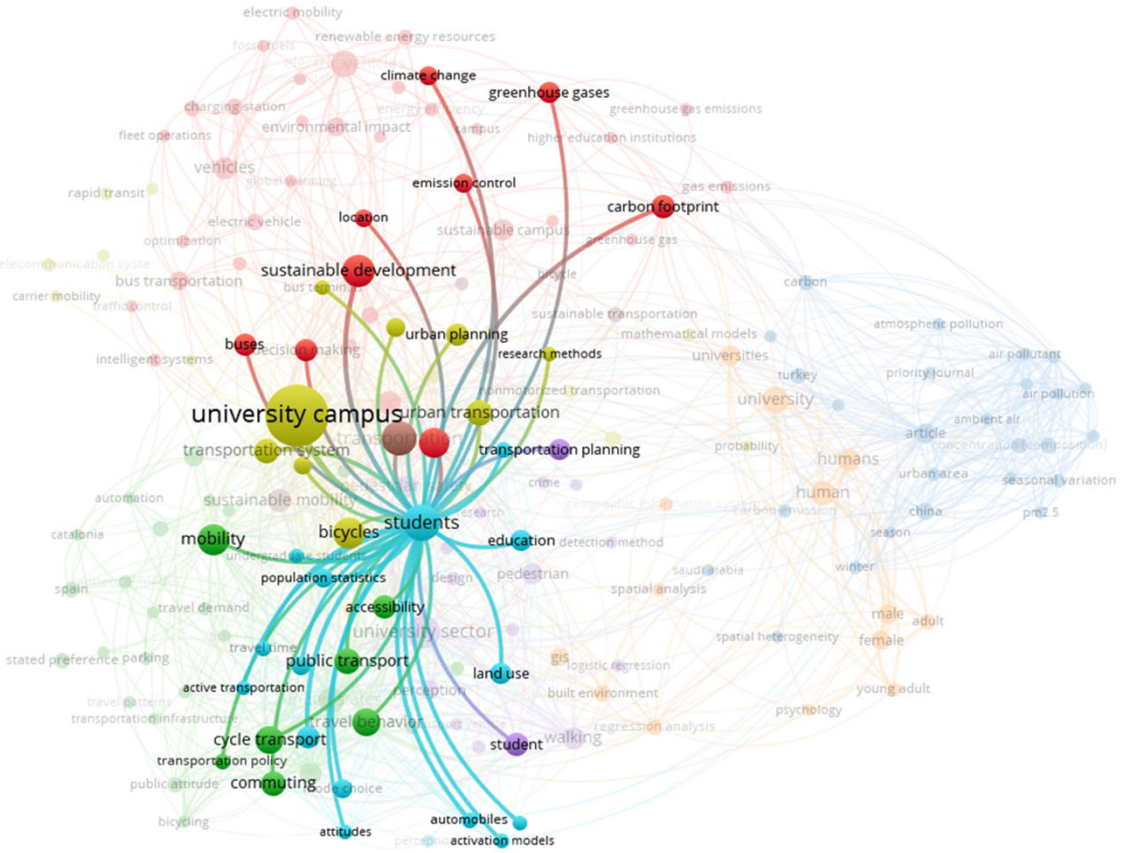
VOSViewer All Keywords (minium 3 citations) - Clusters



Part 1 – A quantitative literature review

Methodology

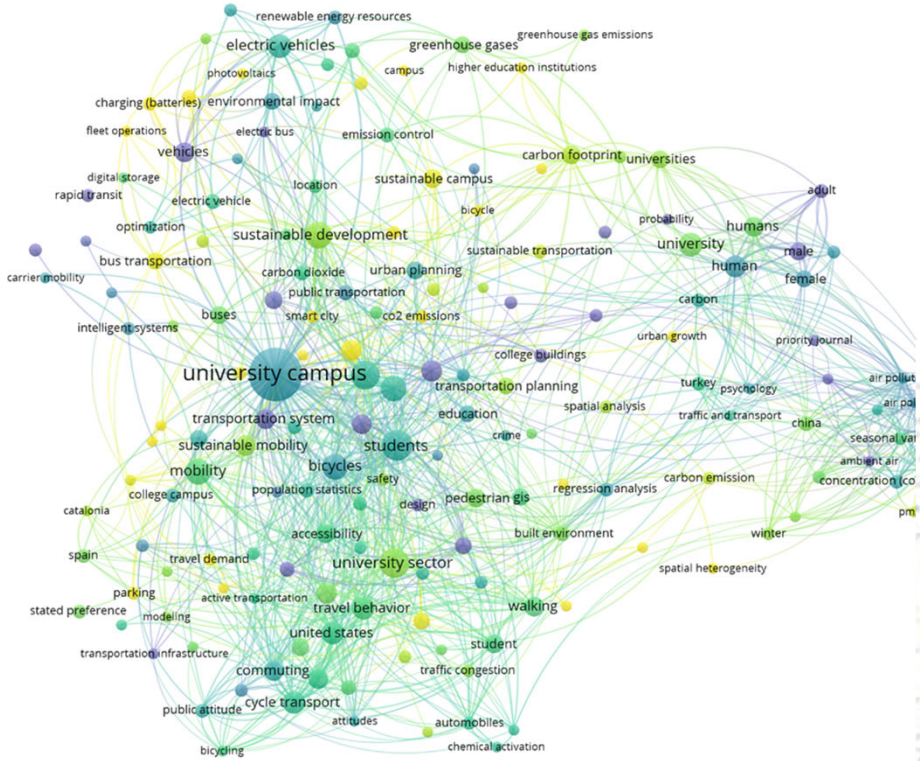
VOSViewer All Keywords (minium 3 citations) - Clusters

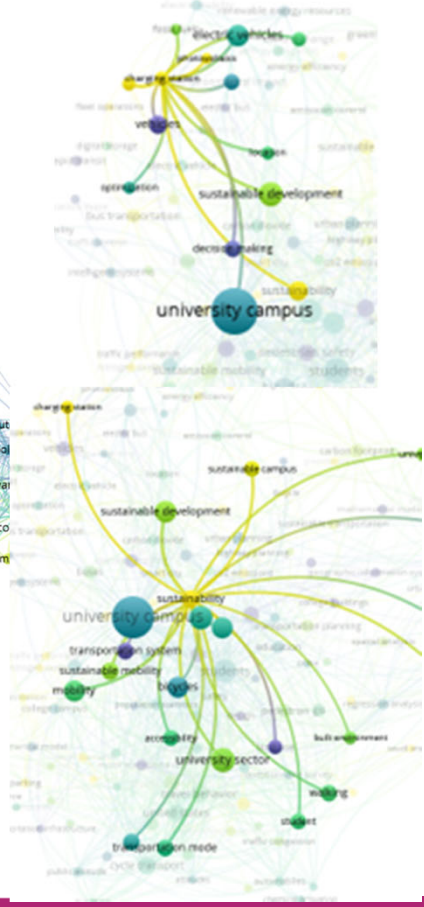


Part 1 – A quantitative literature review

Methodology

VOSViewer Overlay - All Keywords Minimum number of occurrence ≥ 3





VOSviewer

Part 1 – A quantitative literature review

Conclusion

On the bibliometric research on Scopus :

+

-Scopus is a very large database with a multitude of available metadata;

-Boolean searching is very intuitive;

-Scopus comes with Scival,

-Scopus allows the export in several formats (i.e CSV)

-We can see which keywords work and which don't (eco campus VS sustainable campus)

-

-Yet, Reading the results carefully is always necessary in order to eliminate noise;

-It took a long time to handle Scopus database and obtain a reliable database

Campus of **U**niversity with **M**obility based on **I**nnovation and carbon **N**eutrality

Part 2 – A qualitative review

https://cumin.univ-lille.fr/

Part 2 – A qualitative literature review

Methodology of the quali. literature review

Database used

IEEE Xplore - greenFILE - Scopus

Mostly in English, for a total of **42 articles (summarized in word file)**

Key words

Sustainability - Campus - Mobility - University - Transport

From **2003 to 2022**, except for the Talloires Declaration (1990)

No recurring authors

Recurring journals

Case Studies on Transport Policy (2)
International Journal of Sustainability in Higher Education (2)
Transport Research (3)

Part 2 – A qualitative literature review

Results & salient elements of the review :

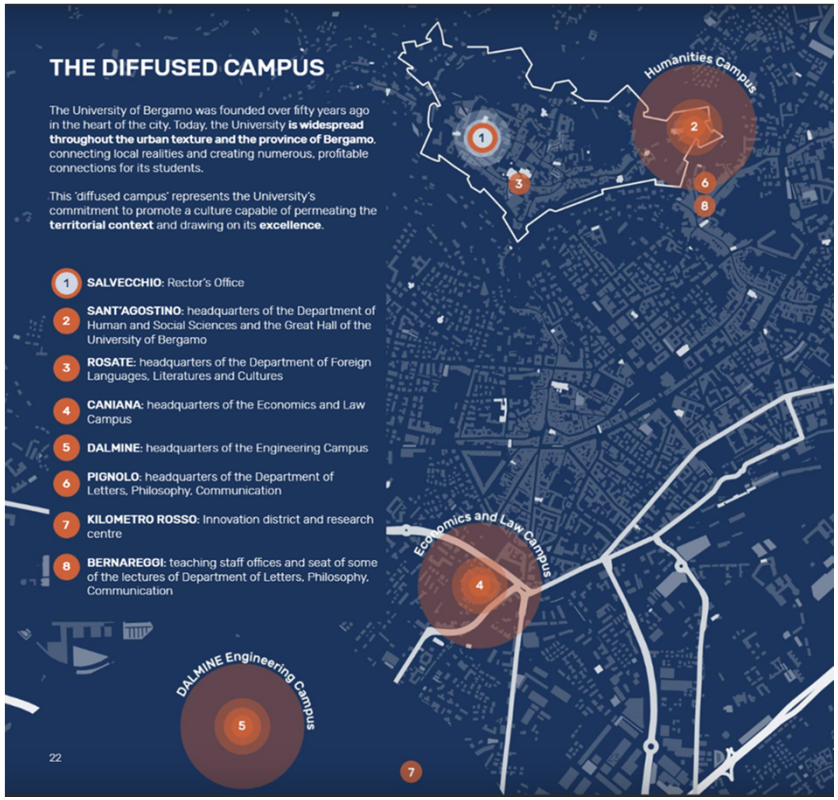
1. Campuses are a good field of experiment

Diverse population (age, socio-economic status, occupations, travel patterns)
(Villegas-Ch, W. 2019 - Huang, Z. 2012 - Rérat, P. 2021 - Bumbiere, K. 2022 - Finlay, J. 2012 - Kaplan, D.H. 2007)

Traffic generator through the large number of users / campus are often spread out
(Villegas-Ch, W. 2019 - Rybarczyk, G. 2014 - Rérat, P. 2021)

Geographically accessible for researchers
(Villegas-Ch, W. 2019 - Rérat, P. 2021)

Forging future leaders, engine for social change
(Masclef, E., 2020 - Rybarczyk, G. 2014)



Bergamo University Campus,
from https://en.unibg.it/about-us/university/unibg-facts-figures

Part 2 – A qualitative literature review

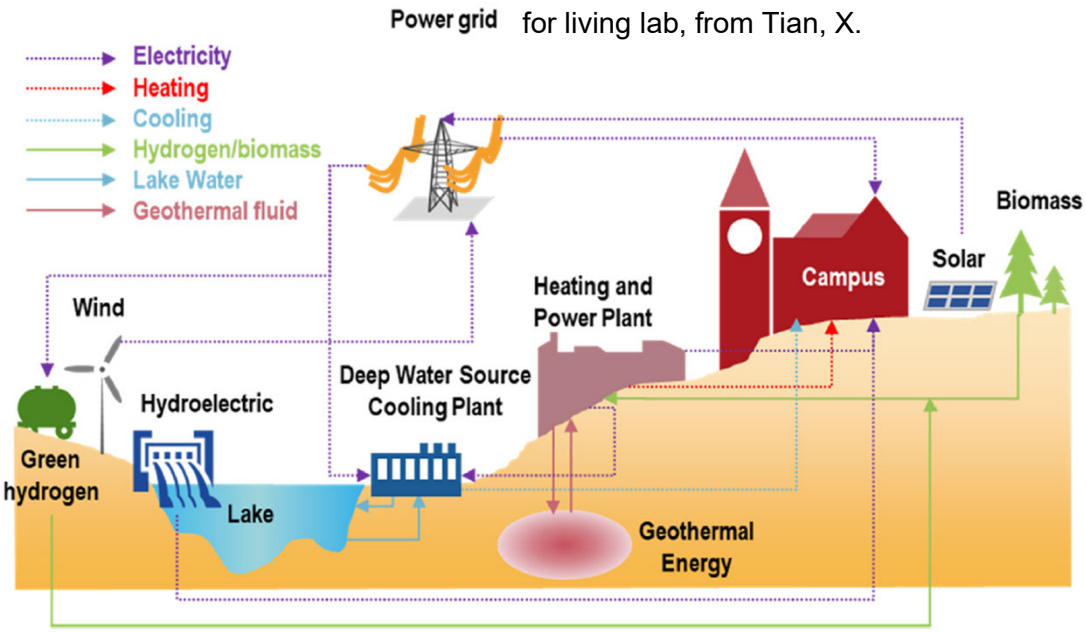
Results & salient elements of the review :
2. Examples of methods used in the projects reviewed

Survey (quantitative/qualitative online/offline questionnaire)
(Fürst, E. 2014 - Rérat, P. 2021 - Bumbiere, K. 2022 - Mateo-Babiano, I. 2020 - Yan, J. 2020 - Taha, M.Y. 2021 - Cappelletti, G.M. 2021)

Living labs
(Rérat, P., 2021 - Tian, X. 2022)

Travel journal (self reporting)
(Sukor, N.S.A. 2014)

Free (spontaneous) word association exercise
(Kalin, A. 2019)



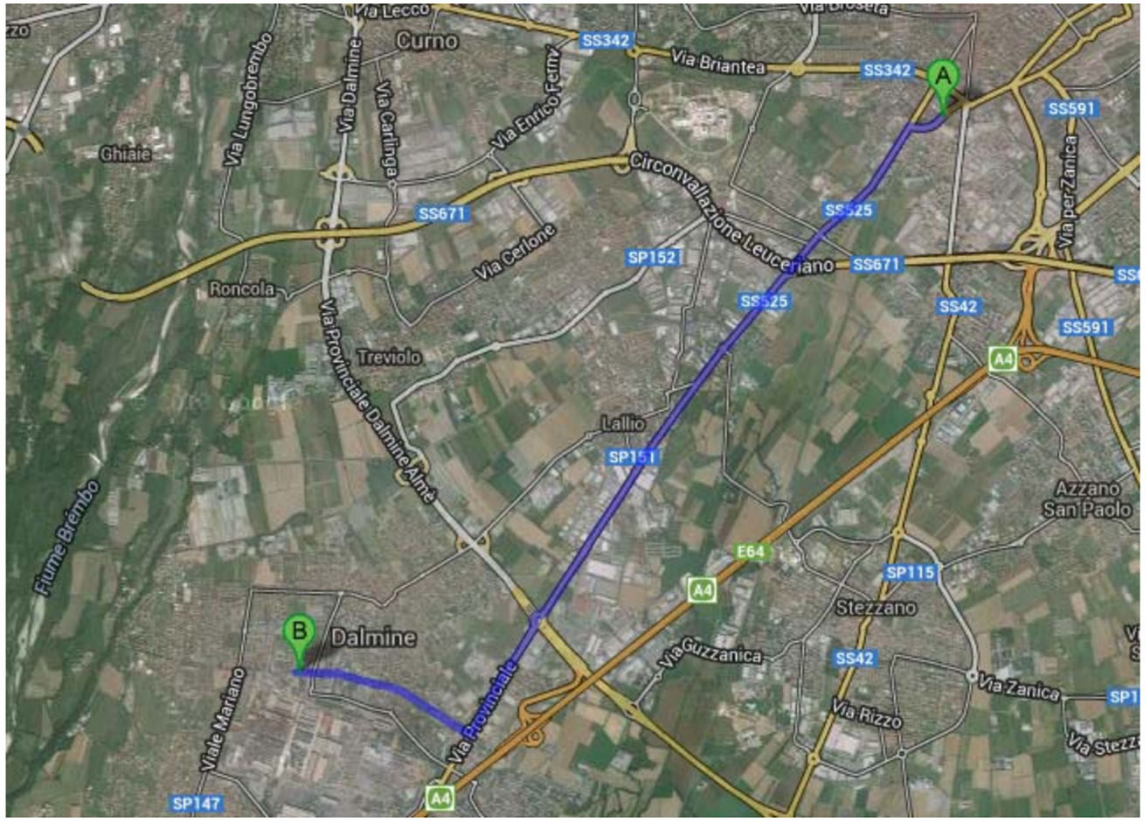
for living lab, from Tian, X.

Part 2 – A qualitative literature review

Results & salient elements of the review :
3. Examples of sustainability actions / practices worldwide

Apps (encouraging/incentives)
(Guerrieri, M. 2019 - Yi, H.B. 2017)

Autonomous/electric vehicles
(Feng, X. 2018 - Longo, M. 2013 - AlNuaimi, A. 2021, Bouscayrol, A. 2019)



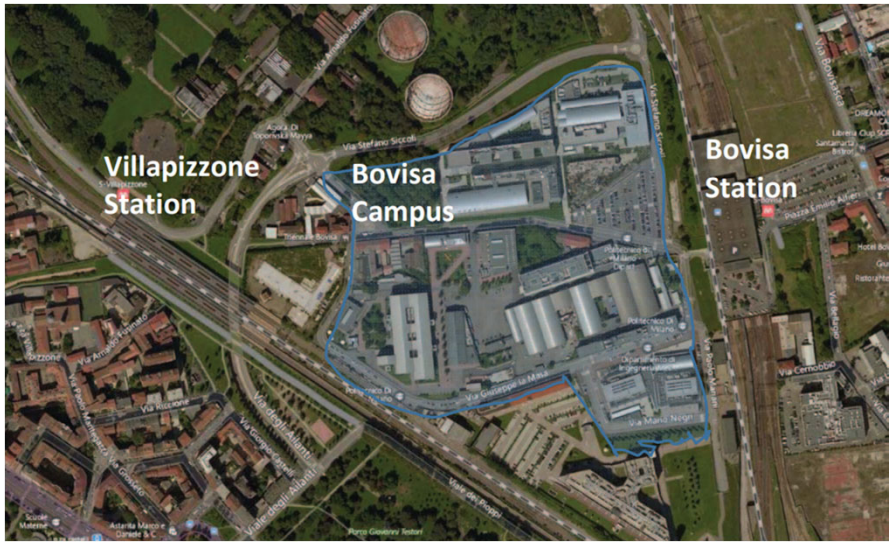
Bergamo University, from Longo, M.

Part 2 – A qualitative literature review

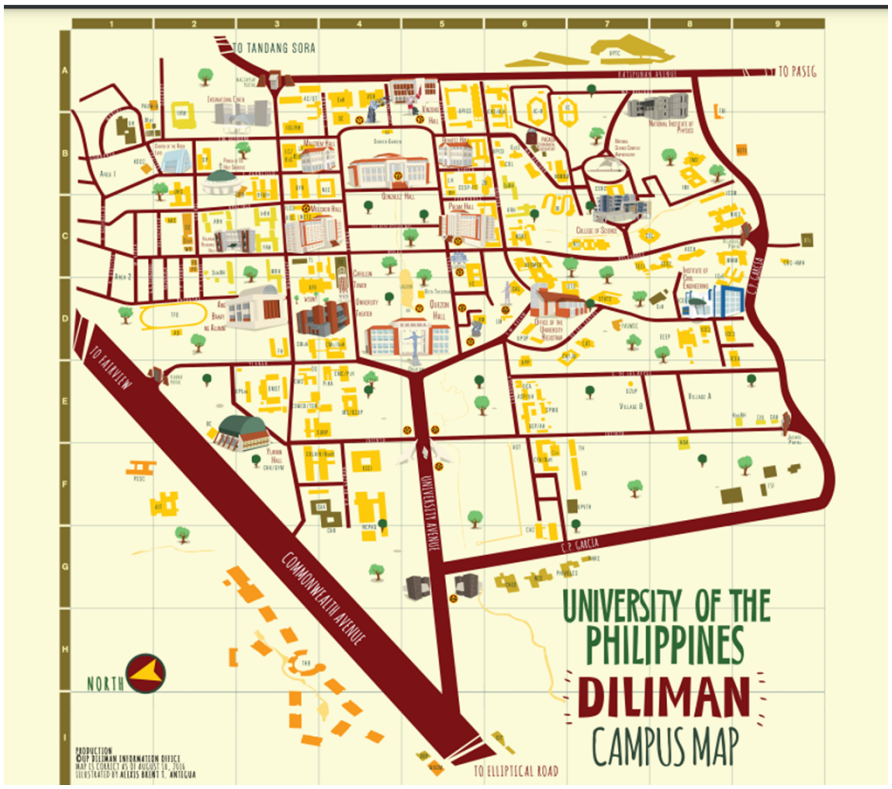
Results & salient elements of the review :
3. Examples of sustainability actions / practices worldwide

Bike sharing
(Mateo-Babiano, I. 2020 - Yan, J. 2020)

Partnerships with local public transport authorities
(Brenna, M. 2016)



Bovisa Campus, Milan University, from https://www.polimi.it/en/technical-and-administrative-staff/life-and-work/sustainable-mobility-services



Diliman Campus, University of the Philippines, from https://upd.edu.ph/wp-content/uploads/2018/06/UPD-Map-2018.pdf

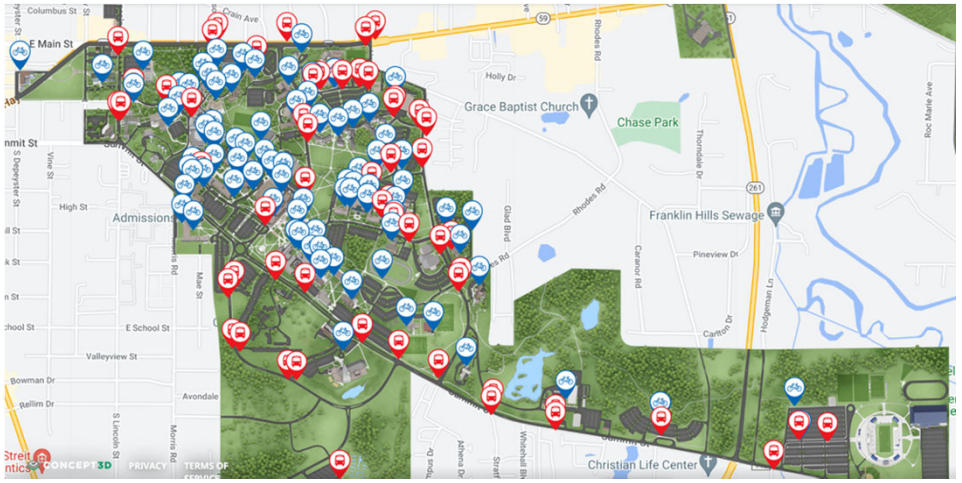
Part 2 – A qualitative literature review

Results & salient elements of the review :
3. Examples of sustainability actions / practices worldwide

Pedestrian and cycling (only) infrastructures

(Kalin, A. 2019 - Kaplan, D.H. 2007 - Puig-Ribera, A. 2022 - Crotti, D. 2022 - Kim, J. 2016)

Bike path, Karadeniz Technical University (KTU), from Kalin, A.



Kent State University (transportation), from https://map.concept3d.com/?id=568#!ct/44418?s/

Part 2 – A qualitative literature review

Results & salient elements of the review :
4. Challenges to overcome for universities

Absence of universal framework and lack of evaluation tools
(Gavanas, N. 2017 - Faezah, J.N. 2022)

Lack of participation and access to information (knowledge, awareness, decision making)
(Kim, J. 2016 - Bumbiere, K. 2022 - Tretyakova, E. 2020)

Safety issues for cycling and pedestrians (theft, accidents) as well as weather factors (partage de la route)
(Huang, Z. 2012 - Rybarczyk, G. 2014)

Main conclusion

We combined both quantitative and qualitative reviews on sustainable mobility practices on campus

The quantitative review helped strengthen the qualitative review with missing international references

The qualitative review helped integrating articles in french, misreferenced in Scopus database

Work to be done :

Complete the qualitative literature review by producing a “guide / report” on best mobility practices for UQTR university services

Publish on the bibliometric review : its methodology, database bias and opportunity for future researches

Campus of **U**niversity with **M**obility based on **I**nnovation and carbon **N**eutrality

Thank you for your attention !

https://cumin.univ-lille.fr/