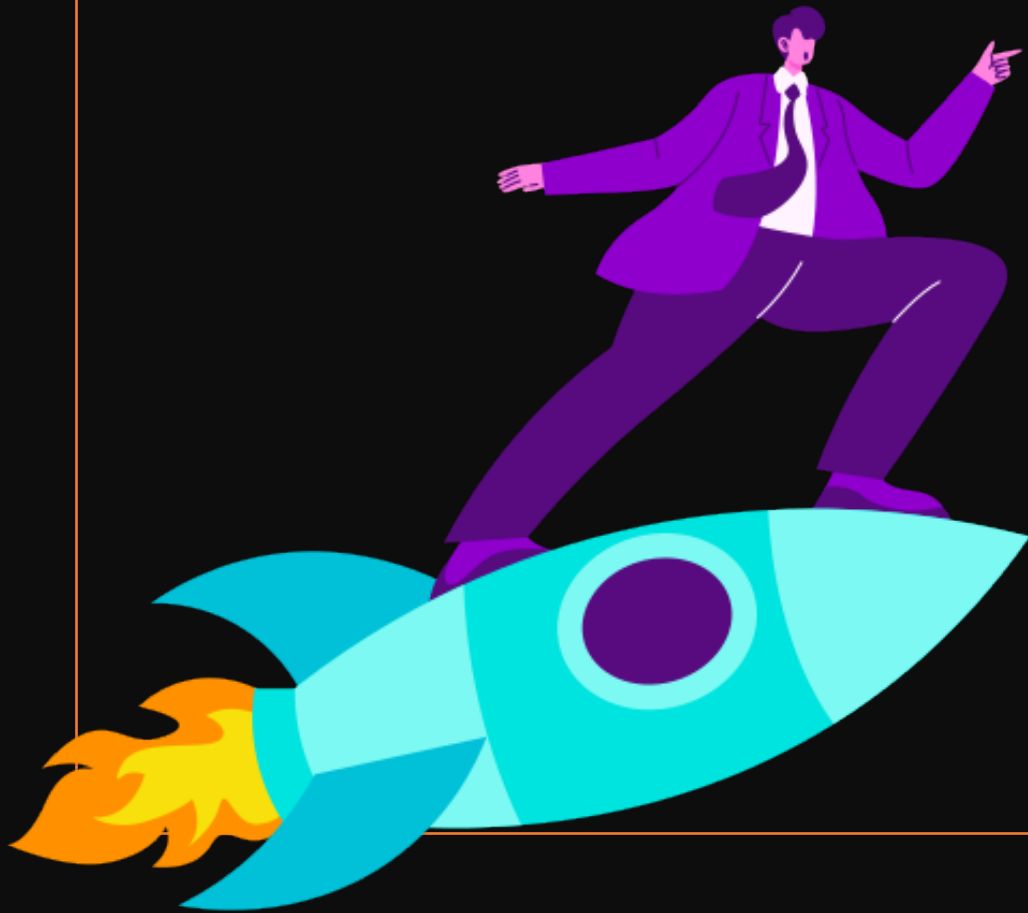


An Introduction to Literature Review and Scientometrics Analysis

By Arghavan Akbarieh





Agenda

1. Introduction
2. Types of Literature Review
3. How to organise your literature review
4. Keywords Selection
5. Bibliometric and Scientometric Analysis
6. Introduction to Bibliometrix package
7. Tips and tricks
8. Conclusions

Background:

B.Sc. Civil Engineering
M.Sc. Environmental Engineering
Master in Business Administration
PhD.c. Civil Engineering

Research Interests:

Building Information Modelling (BIM)
OpenBIM
Circular Construction
Sustainable Construction
Urban Mining
Blockchain
Linked Data
Gamification

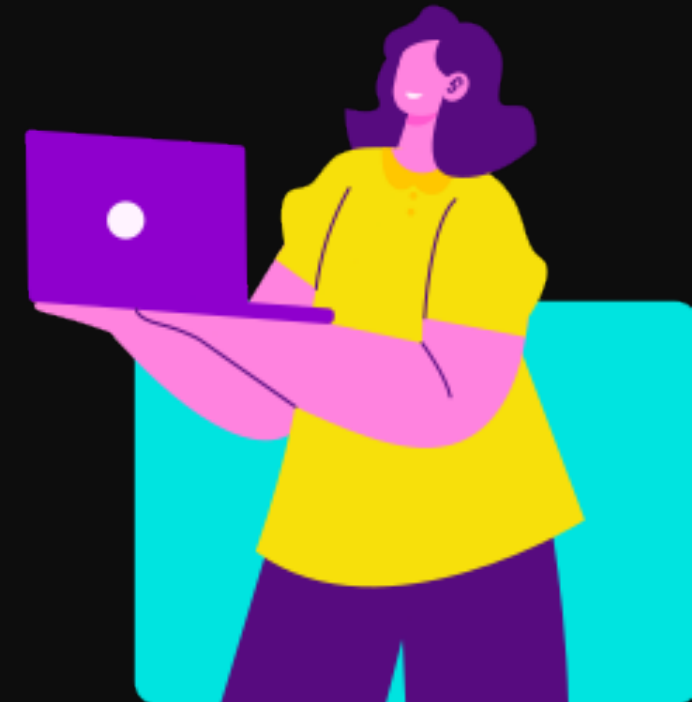
Arghavan Akbarieh

Post-doc Researcher,
Information Systems in the Built Environment,
Built Environment,
Eindhoven University of Technology



Please introduce yourself

1. Name
2. Discipline
3. PhD year
4. Your Research Question
5. Have you done a literature review before?



Label	Description	Methods used (SALSA)			
		Search	Appraisal	Synthesis	Analysis
Critical review	Aims to demonstrate writer has extensively researched literature and critically evaluated its quality. Goes beyond mere description to include degree of analysis and conceptual innovation. Typically results in hypothesis or model	Seeks to identify most significant items in the field	No formal quality assessment. Attempts to evaluate according to contribution	Typically narrative, perhaps conceptual or chronological	Significant component: seeks to identify conceptual contribution to embody existing or derive new theory
Literature review	Generic term: published materials that provide examination of recent or current literature. Can cover wide range of subjects at various levels of completeness and comprehensiveness. May include research findings	May or may not include comprehensive searching	May or may not include quality assessment	Typically narrative	Analysis may be chronological, conceptual, thematic, etc.
Mapping review/ systematic map	Map out and categorize existing literature from which to commission further reviews and/or primary research by identifying gaps in research literature	Completeness of searching determined by time/scope constraints	No formal quality assessment	May be graphical and tabular	Characterizes quantity and quality of literature, perhaps by study design and other key features. May identify need for primary or secondary research
Meta-analysis	Technique that statistically combines the results of quantitative studies to provide a more precise effect of the results	Aims for exhaustive, comprehensive searching. May use funnel plot to assess completeness	Quality assessment may determine inclusion/exclusion and/or sensitivity analyses	Graphical and tabular with narrative commentary	Numerical analysis of measures of effect assuming absence of heterogeneity
Mixed studies review/mixed methods review	Refers to any combination of methods where one significant component is a literature review (usually systematic). Within a review context it refers to a combination of review approaches for example combining quantitative with qualitative research or outcome with process studies	Requires either very sensitive search to retrieve all studies or separately conceived quantitative and qualitative strategies	Requires either a generic appraisal instrument or separate appraisal processes with corresponding checklists	Typically both components will be presented as narrative and in tables. May also employ graphical means of integrating quantitative and qualitative studies	Analysis may characterise both literatures and look for correlations between characteristics or use gap analysis to identify aspects absent in one literature but missing in the other
Overview	Generic term: summary of the [medical] literature that attempts to survey the literature and describe its characteristics	May or may not include comprehensive searching (depends whether systematic overview or not)	May or may not include quality assessment (depends whether systematic overview or not)	Synthesis depends on whether systematic or not. Typically narrative but may include tabular features	Analysis may be chronological, conceptual, thematic, etc.
Qualitative systematic review/qualitative evidence synthesis	Method for integrating or comparing the findings from qualitative studies. It looks for 'themes' or 'constructs' that lie in or across individual qualitative studies	May employ selective or purposive sampling	Quality assessment typically used to mediate messages not for inclusion/exclusion	Qualitative, narrative synthesis	Thematic analysis, may include conceptual models

Types of Review Articles (1)

Source: Grant & Booth (2009)

Types of Review Articles (2)

Label	Description	Methods used (SALSA)			
		Search	Appraisal	Synthesis	Analysis
Rapid review	Assessment of what is already known about a policy or practice issue, by using systematic review methods to search and critically appraise existing research	Completeness of searching determined by time constraints	Time-limited formal quality assessment	Typically narrative and tabular	Quantities of literature and overall quality/direction of effect of literature
Scoping review	Preliminary assessment of potential size and scope of available research literature. Aims to identify nature and extent of research evidence (usually including ongoing research)	Completeness of searching determined by time/scope constraints. May include research in progress	No formal quality assessment	Typically tabular with some narrative commentary	Characterizes quantity and quality of literature, perhaps by study design and other key features. Attempts to specify a viable review
State-of-the-art review	Tend to address more current matters in contrast to other combined retrospective and current approaches. May offer new perspectives on issue or point out area for further research	Aims for comprehensive searching of current literature	No formal quality assessment	Typically narrative, may have tabular accompaniment	Current state of knowledge and priorities for future investigation and research
Systematic review	Seeks to systematically search for, appraise and synthesis research evidence, often adhering to guidelines on the conduct of a review	Aims for exhaustive, comprehensive searching	Quality assessment may determine inclusion/exclusion	Typically narrative with tabular accompaniment	What is known; recommendations for practice. What remains unknown; uncertainty around findings, recommendations for future research
Systematic search and review	Combines strengths of critical review with a comprehensive search process. Typically addresses broad questions to produce 'best evidence synthesis'	Aims for exhaustive, comprehensive searching	May or may not include quality assessment	Minimal narrative, tabular summary of studies	What is known; recommendations for practice. Limitations
Systematized review	Attempt to include elements of systematic review process while stopping short of systematic review. Typically conducted as postgraduate student assignment	May or may not include comprehensive searching	May or may not include quality assessment	Typically narrative with tabular accompaniment	What is known; uncertainty around findings; limitations of methodology
Umbrella review	Specifically refers to review compiling evidence from multiple reviews into one accessible and usable document. Focuses on broad condition or problem for which there are competing interventions and highlights reviews that address these interventions and their results	Identification of component reviews, but no search for primary studies	Quality assessment of studies within component reviews and/or of reviews themselves	Graphical and tabular with narrative commentary	What is known; recommendations for practice. What remains unknown; recommendations for future research

Source: Grant & Booth (2009)

Organise your Literature Review



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graph TD; A[IDENTIFICATION] --> B[SCREENING]; B --> C[ELIGIBILITY]; C --> D[FINDINGS];
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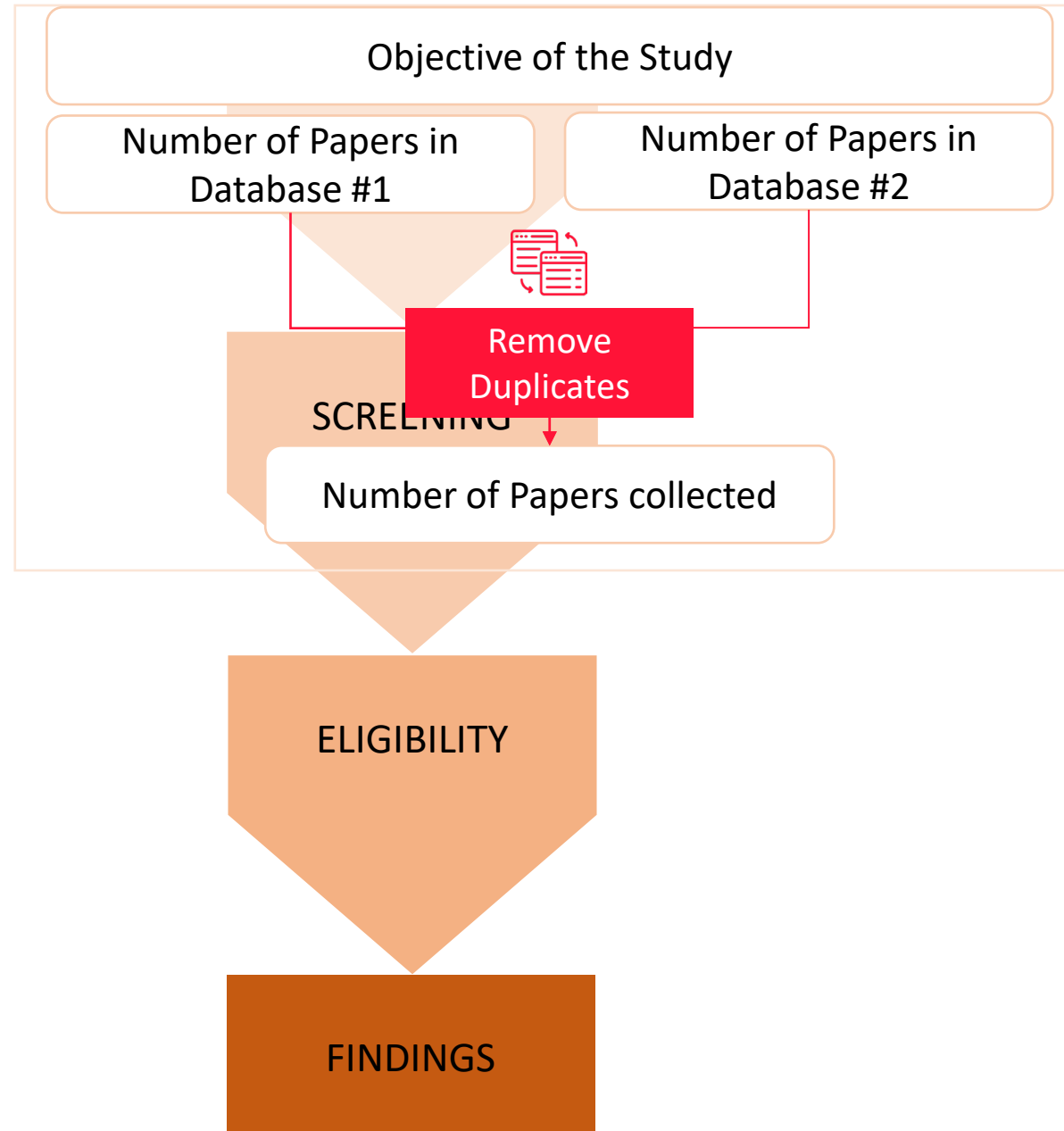
IDENTIFICATION

SCREENING

ELIGIBILITY

FINDINGS

Step 1: Identification



Two-way cooperation of architectural 3D CAD and game engine

Unified Urban Governance Models; [城市治理一网统管]

Usability of visualization platform-based safety training and assessment modules for engineering students and

Use of gaming technology to bring bridge inspection to the office

Using game technologies to improve the safety of construction plant operations

Virtual Australia and New Zealand (VANZ): Creating a piece of Digital Earth

Virtual Heritage Learning Environments

Virtual Nature as a Digital Twin Botanically Correct 3D AR and VR Optimized Low-polygon and Photogramme

Virtual nature makes knowledge beautiful

Virtual Reality as a Training Tool in Environments of Electrical Risk

VIRTUAL REALITY STORIES for CONSTRUCTION TRAINING SCENARIOS: The CASE of SOCIAL DISTAN

Virtual reality-based cloud BIM platform for integrated AEC projects

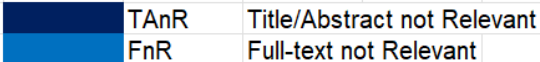
Virtual Scene Construction of Wetlands: A Case Study of Poyang Lake, China

Virtually (re)constructed reality: The representation of physical space in commercial location-based games

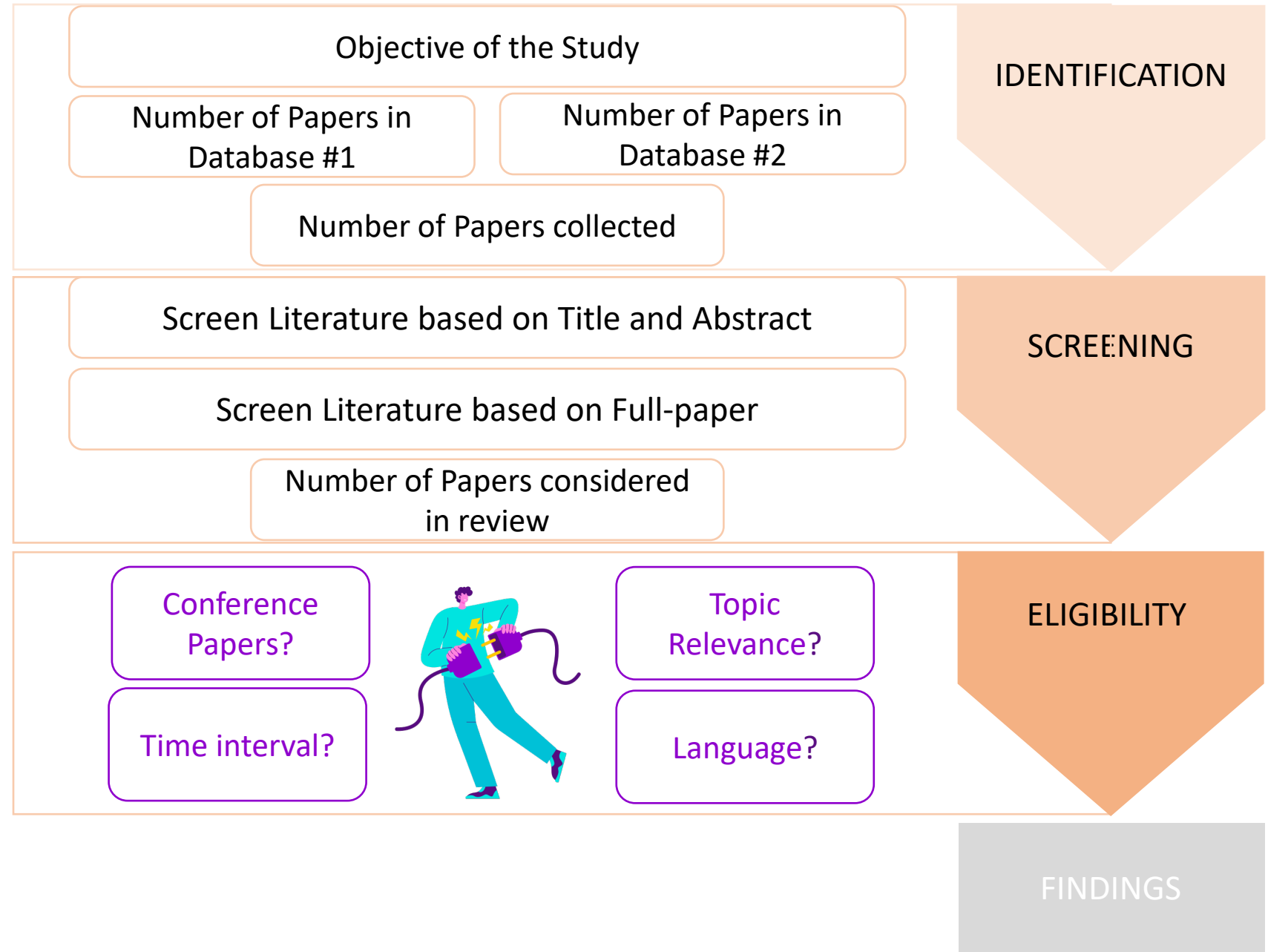
VR Based Visualization of Robotic Workcells using Cryengine

VRDR: An attempt to evaluate bim-based design studio outcome through virtual reality

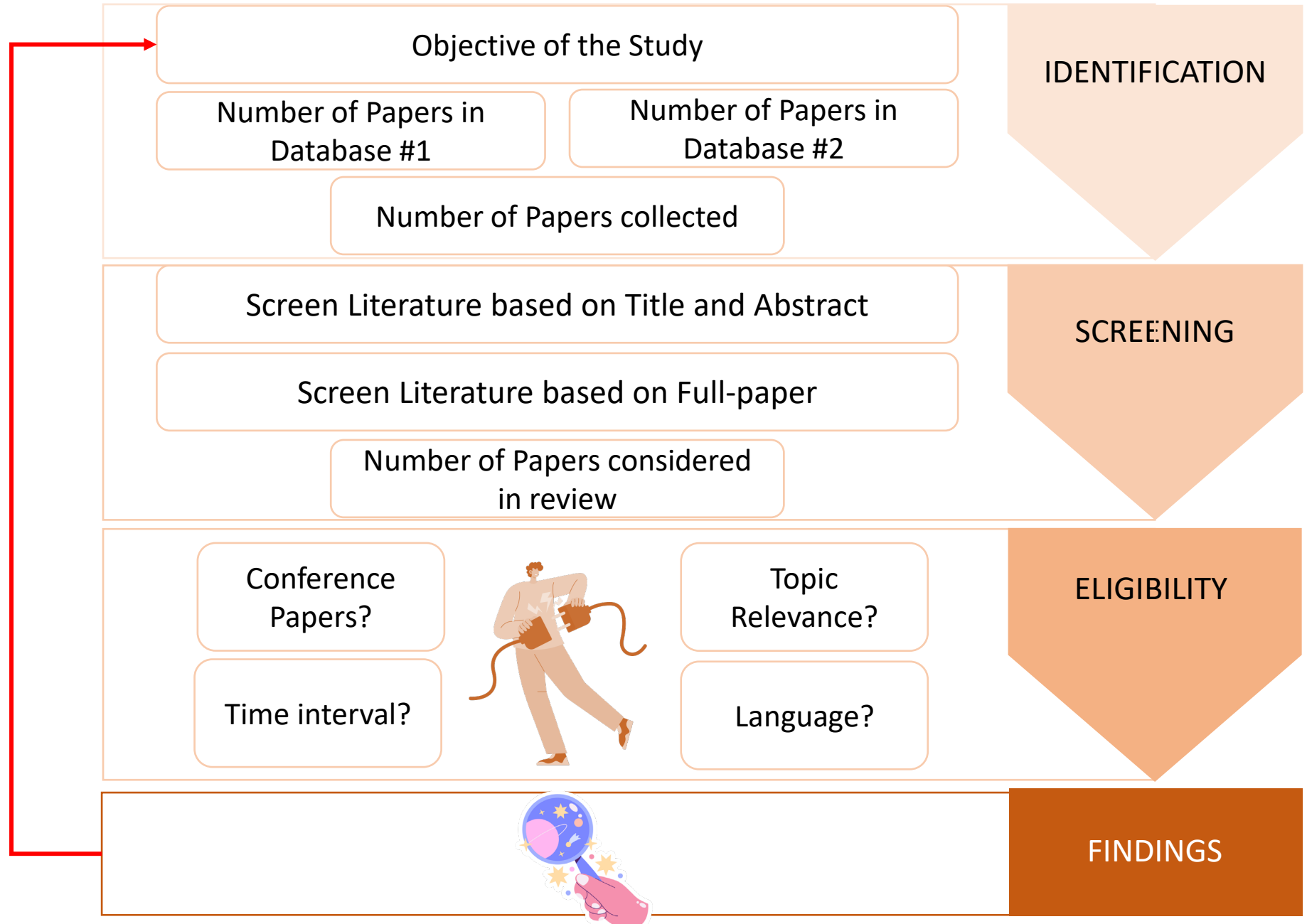
Vrea project-a digital curator for architecture and digital perspectives for heritage management and enhancer



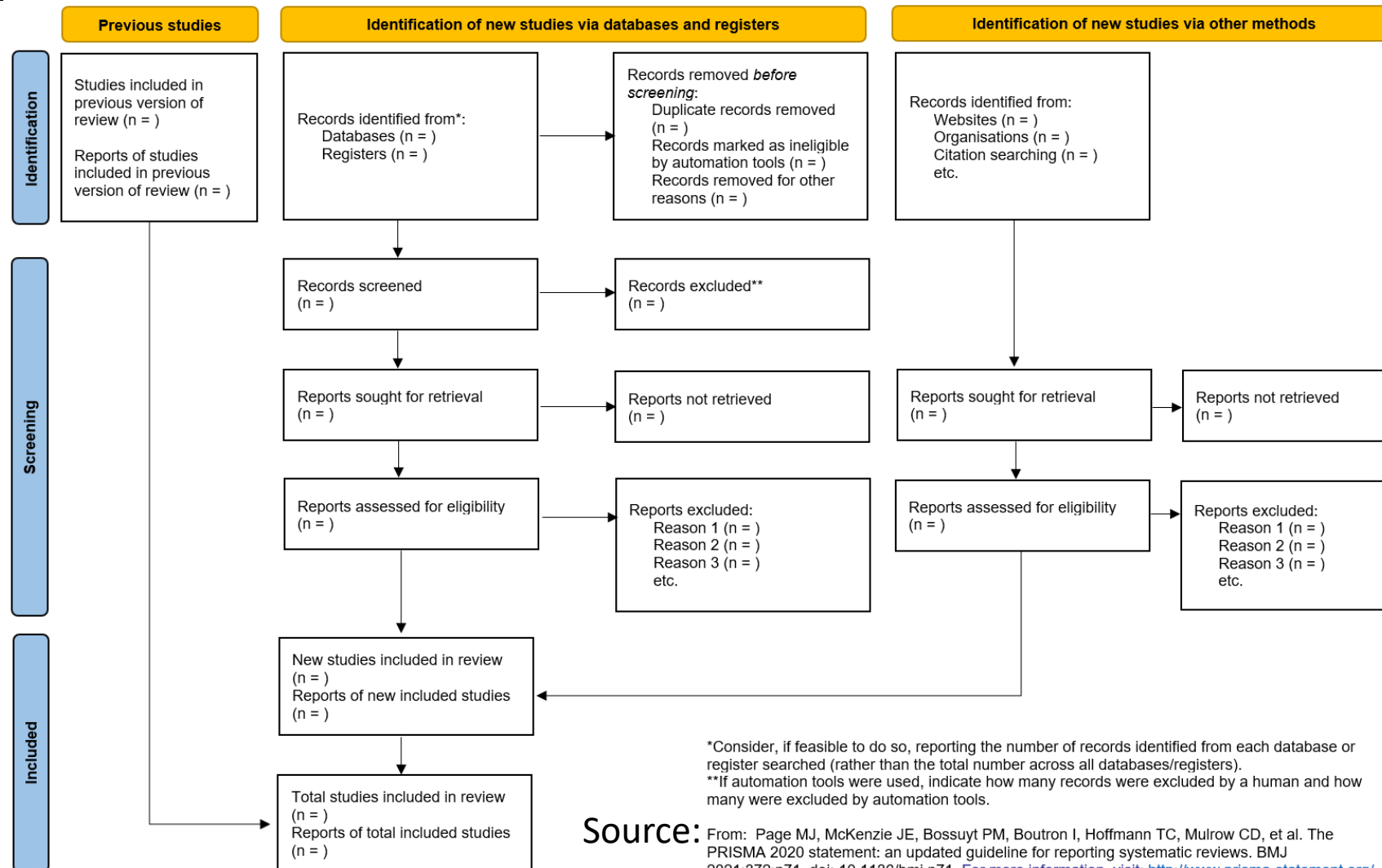
Step 3: Eligibility



Step 4: Findings



PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses



Keywords Selection 101

("Circular Economy")

AND

("Building Information Modelling" OR "BIM")

e.g.: Building Information Model*



Keywords Selection 102



Keywords should reflect your research question



Check if your desires acronyms are domain-specific or not



Use full phrase instead of an acronym



Include synonyms



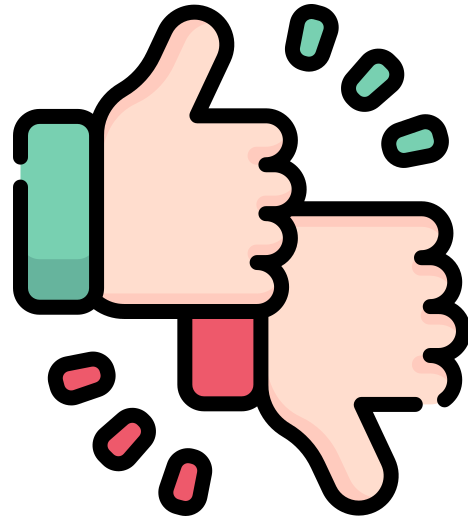
Do not use umbrella terms

What are your keywords?



Bibliometric and Scientometrics Analysis

Common Question:
Is Scientometrics Analysis different from
Bibliometric Analysis?



Bibliometric Analysis



Aim:

1. to evaluate the productivity of research actors, i.e., individuals, institutions, or countries,
2. to identify trends and patterns in research output.



Established bibliometric measures:

1. Citation counts: the number of times a publication has been cited by other works,
2. H-index: a measure of an author's productivity and impact based on their publications count and respective citations.

Scientometric Analysis

➡️  Aim: to measure various aspects of scientific output (based on metadata) :

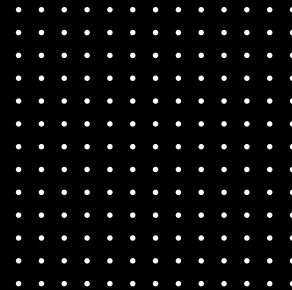
1. Map the Landscape of a research domain or topic,
2. Reveal the evolution of a scientific field,
3. Discover relationships between different topics or keywords,
4. Find the emerging topics,
5. Outline the conceptual structure of the topic of interest.

 Tools: Bibliometrix (in Rstudio), VOSviewer and CiteSpace...



How to download the metadata

- Choose your bibliographic database:
 - Scopus
 - Web of Science
 - PubMed
 - Google Scholar
 - ...
 - (Do you use other ones that you would like to share with us?)



Download Metadata – Example: Scopus

Export document settings ⓘ



You have chosen to export 1270868 documents

Select your method of export

- ☐ MENDELEY ☐ ExLibris RefWorks ☐ RIS Format
EndNote,
Reference Manager ☐ CSV
Excel ☒ BibTeX ☐ Plain Text
ASCII in HTML

What information do you want to export?

<input checked="" type="checkbox"/> Citation information	<input checked="" type="checkbox"/> Bibliographical information	<input checked="" type="checkbox"/> Abstract & keywords	<input type="checkbox"/> Funding details	<input type="checkbox"/> Other information
<input checked="" type="checkbox"/> Author(s)	<input checked="" type="checkbox"/> Affiliations	<input checked="" type="checkbox"/> Abstract	<input type="checkbox"/> Number	<input type="checkbox"/> Tradenames & manufacturers
<input checked="" type="checkbox"/> Author(s) ID	<input checked="" type="checkbox"/> Serial identifiers (e.g. ISSN)	<input checked="" type="checkbox"/> Author keywords	<input type="checkbox"/> Acronym	<input type="checkbox"/> Accession numbers & chemicals
<input checked="" type="checkbox"/> Document title	<input checked="" type="checkbox"/> PubMed ID	<input checked="" type="checkbox"/> Index keywords	<input type="checkbox"/> Sponsor	<input checked="" type="checkbox"/> Conference information
<input checked="" type="checkbox"/> Year	<input checked="" type="checkbox"/> Publisher		<input type="checkbox"/> Funding text	<input checked="" type="checkbox"/> Include references
<input checked="" type="checkbox"/> EID	<input checked="" type="checkbox"/> Editor(s)			
<input checked="" type="checkbox"/> Source title	<input checked="" type="checkbox"/> Language of original document			
<input checked="" type="checkbox"/> volume, issue, pages	<input checked="" type="checkbox"/> Correspondence address			
<input checked="" type="checkbox"/> Citation count	<input checked="" type="checkbox"/> Abbreviated source title			
<input checked="" type="checkbox"/> Source & document type				
<input checked="" type="checkbox"/> Publication Stage				
<input checked="" type="checkbox"/> DOI				
<input checked="" type="checkbox"/> Open Access				

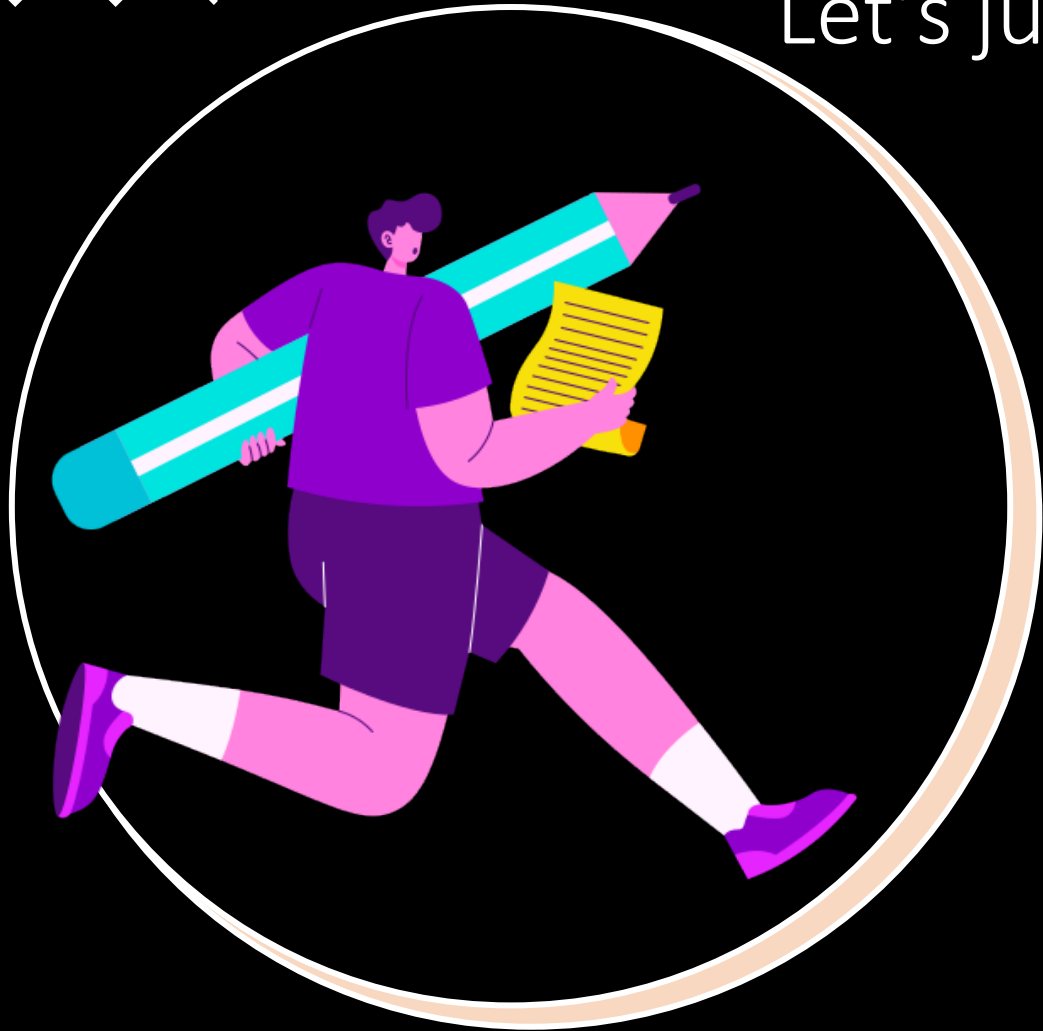
Cancel

Export

Let's jump into the Bibliometrix Package!

All terminologies and concepts are explained in this page:

https://www.bibliometrix.org/vignettes/Introduction_to_bibliometrix.html

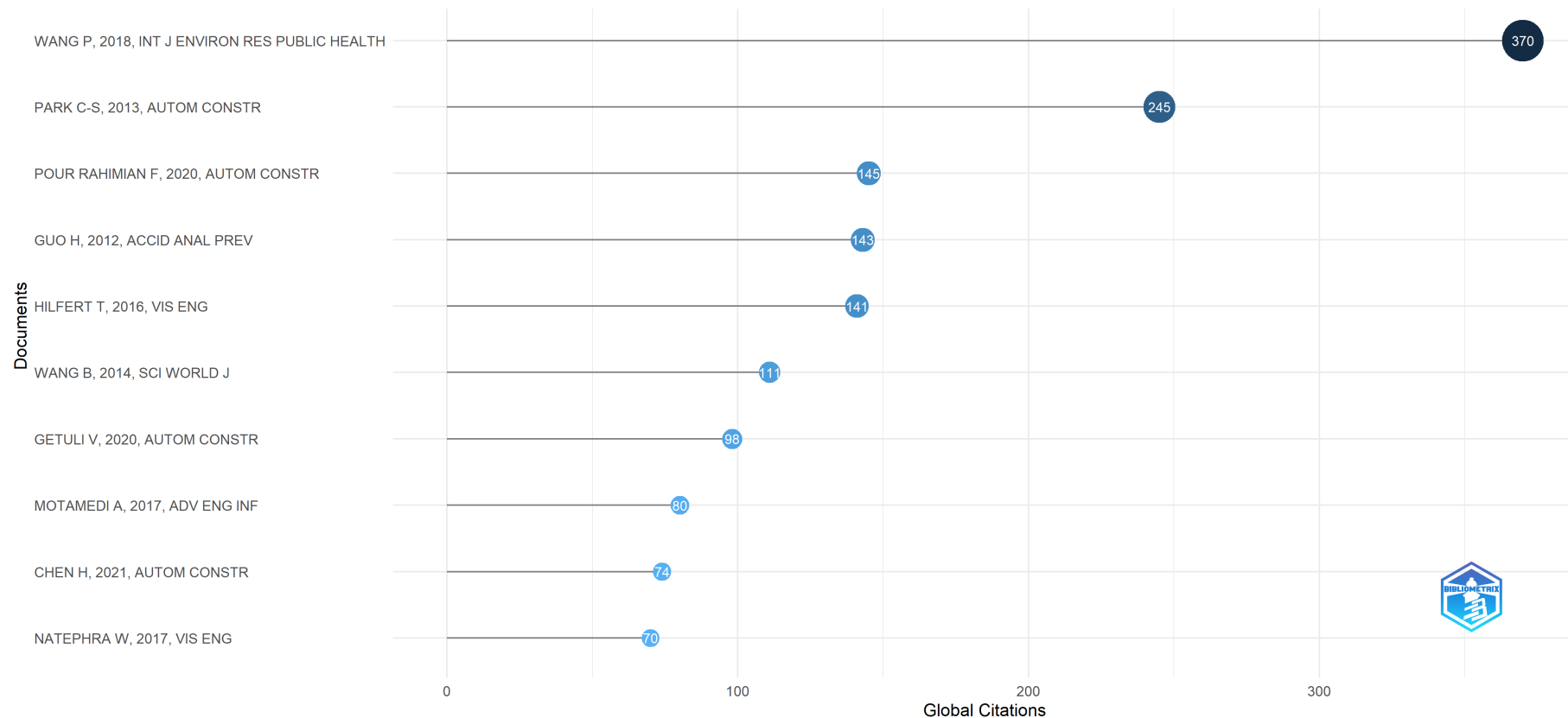




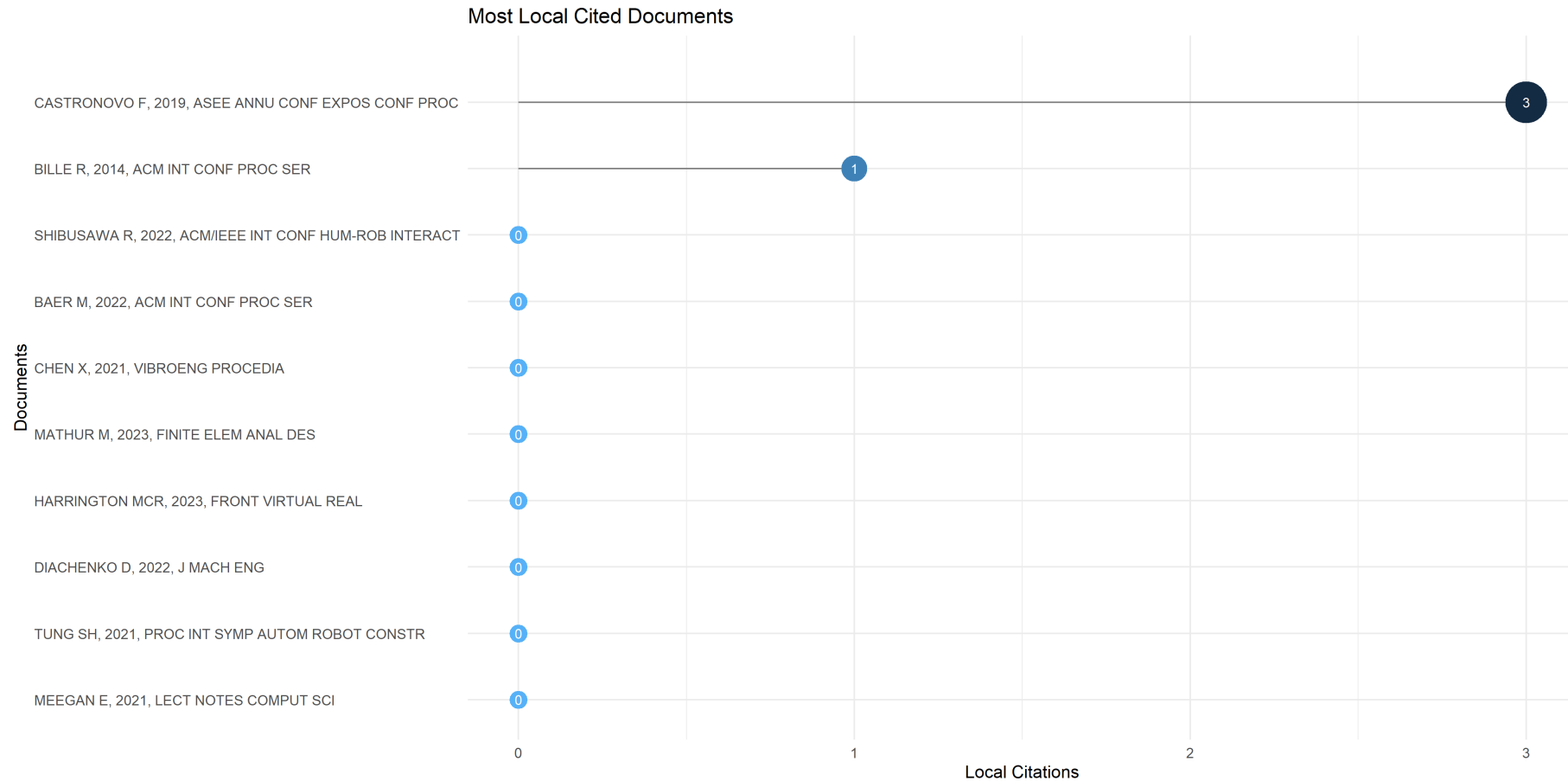
To get going with Bibliometrix:

```
1 #STEP1 Install Bibliometrix from CRAN
2 install.packages("bibliometrix")
3
4 #STEP2 Load Bibliometrix package
5 library(bibliometrix)
6
7 #STEP3 To start Biblioshiny
8 biblioshiny()
9
```

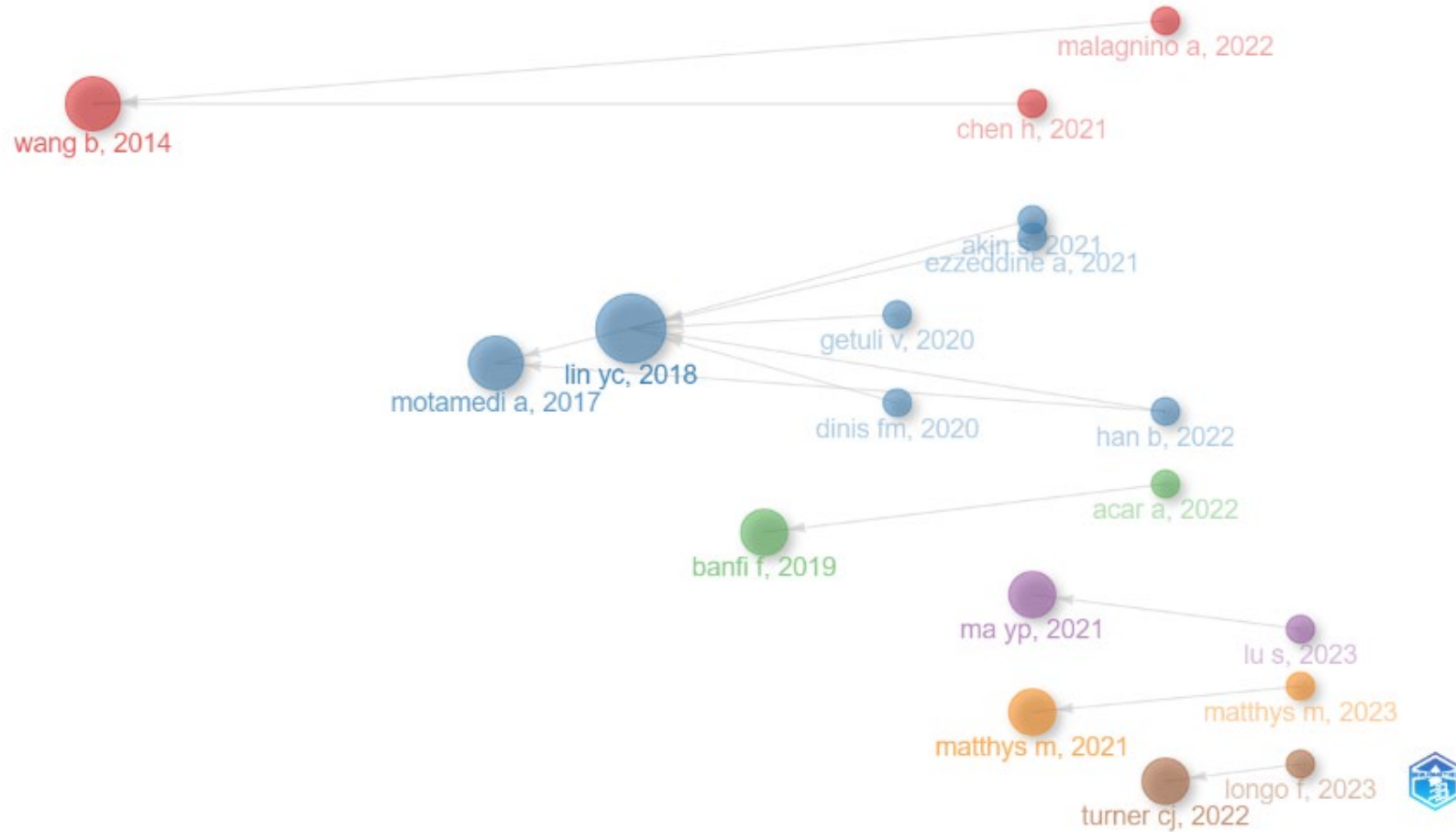
1. Most Global Cited Documents



2. Most Local Cited Documents

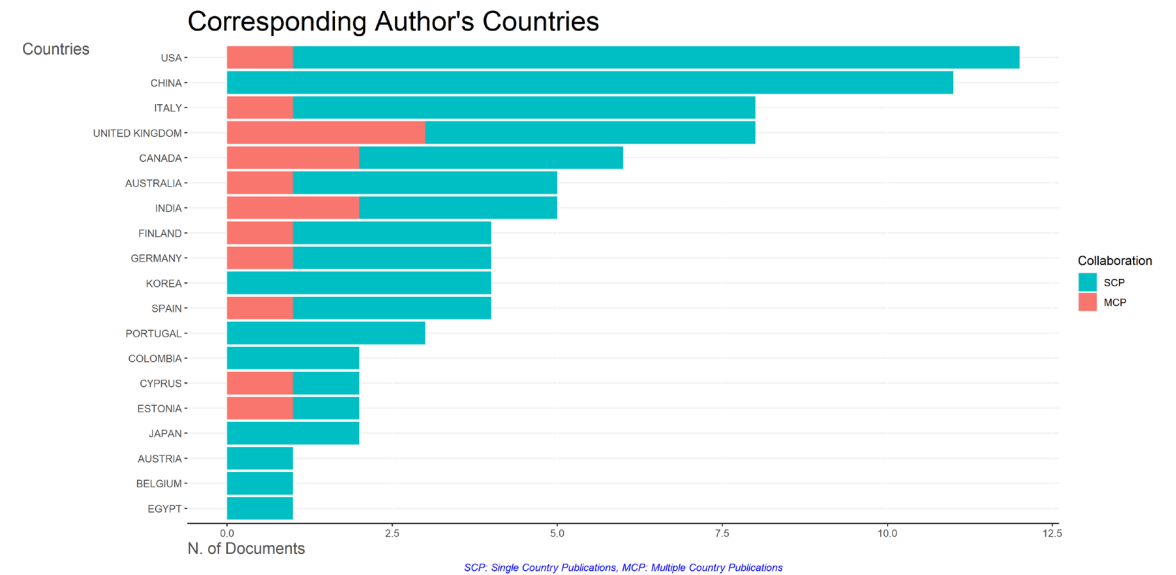
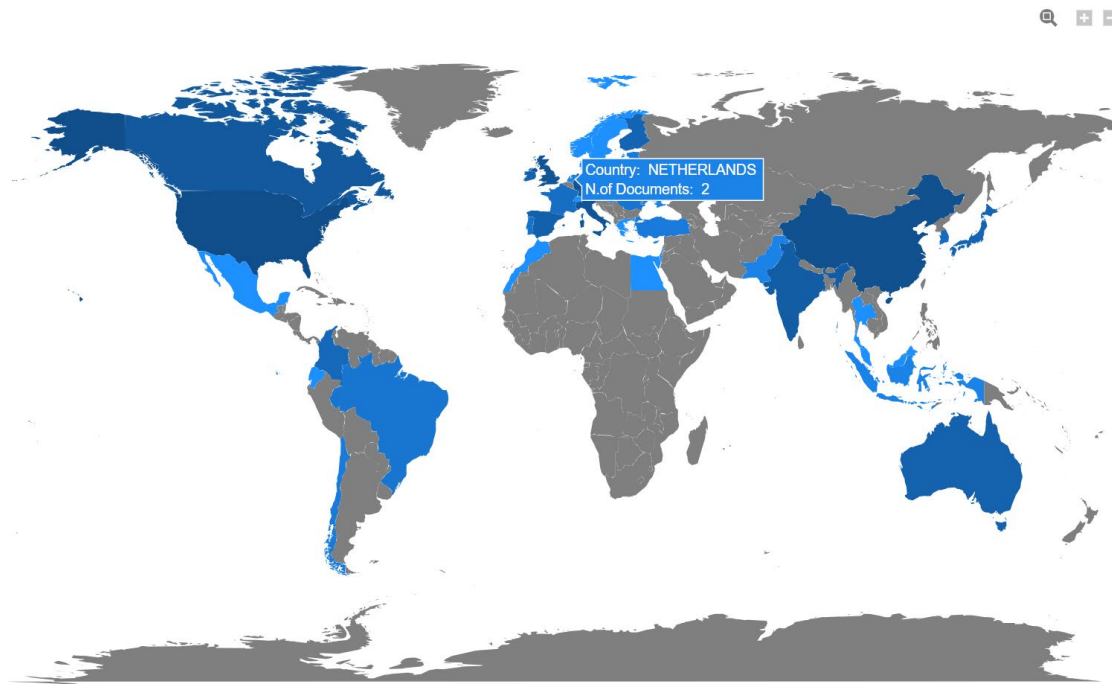


3. Histogram

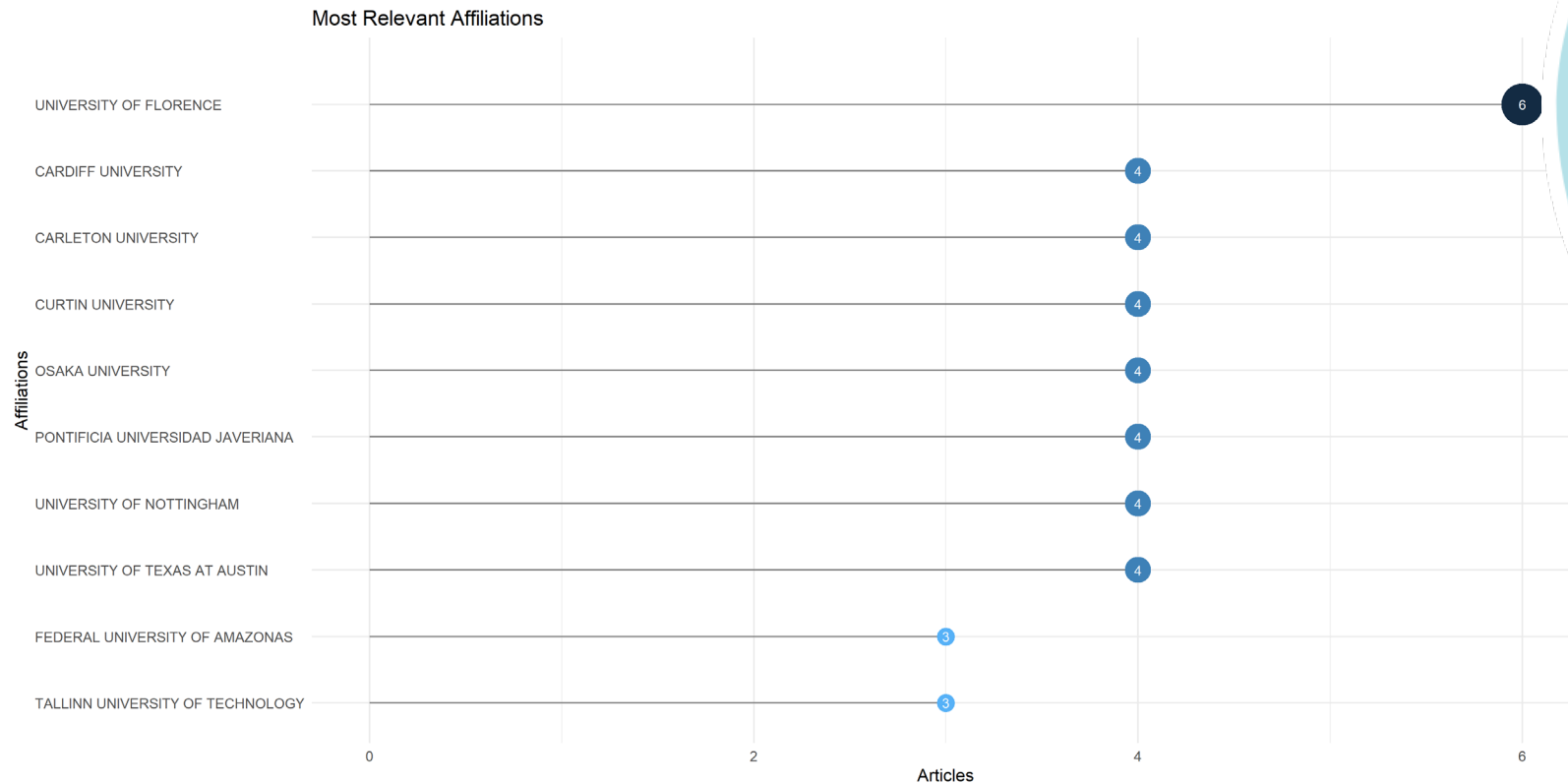


4. Country's Production Over Time

This is good for justifying location-specific research topics, where locality is the point of novelty.



5. Which other universities are active in this field?



Keyword Analysis

Author Keyword



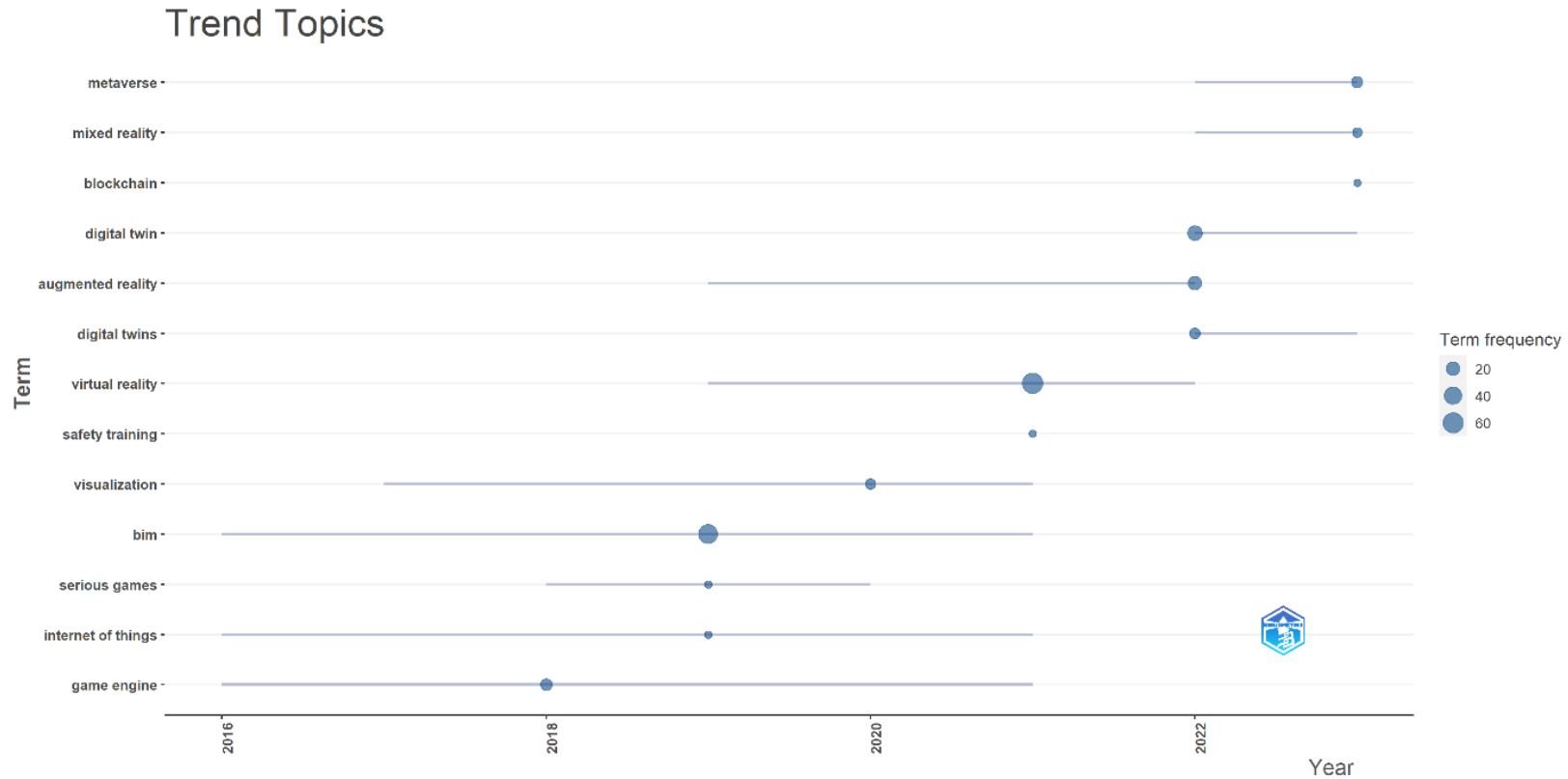
Keywords Plus

“KeyWords Plus”[®] are index terms automatically generated from the titles of cited articles.”



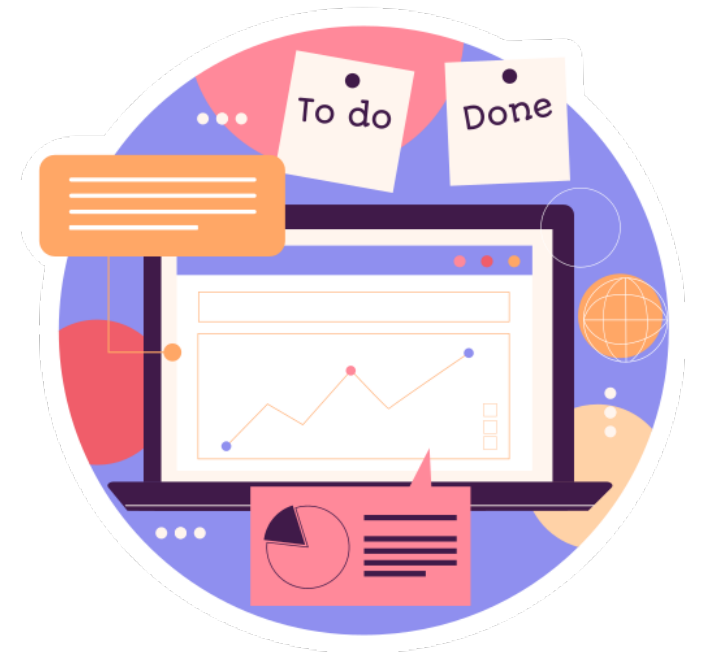
Source: Padhan & Bhat (2023)

4. Trendy Topics



Literature Review to-do list

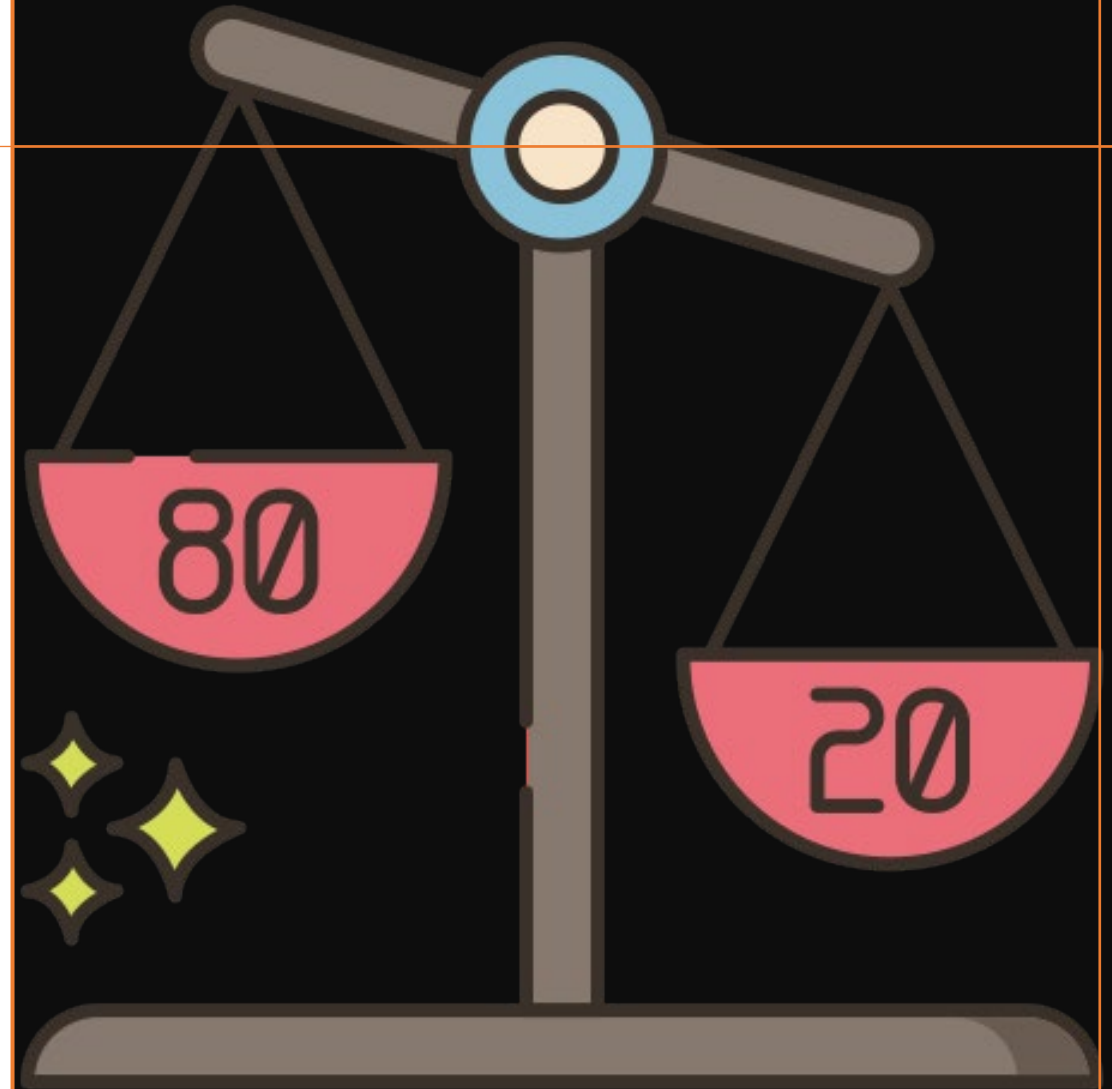
- Download CSV of all records.
- Record the date that you finalised the search query.
- Explain how you have collected information, when, from where.



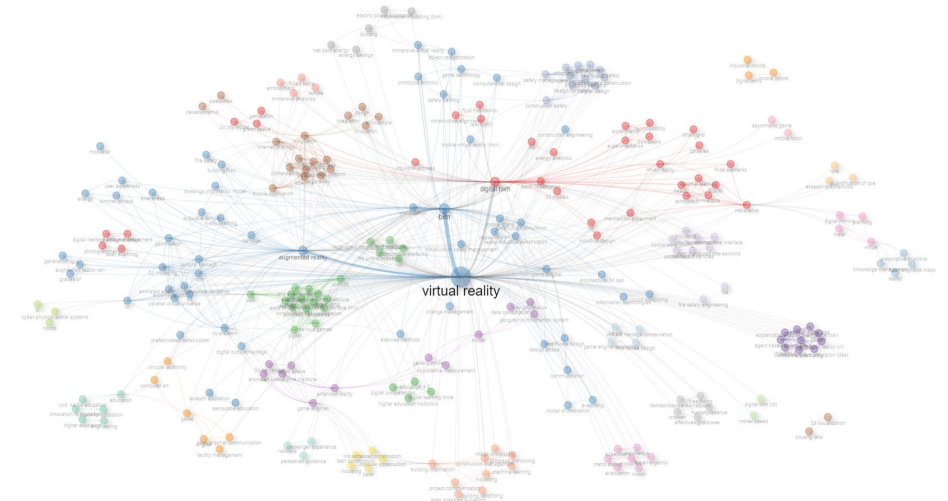
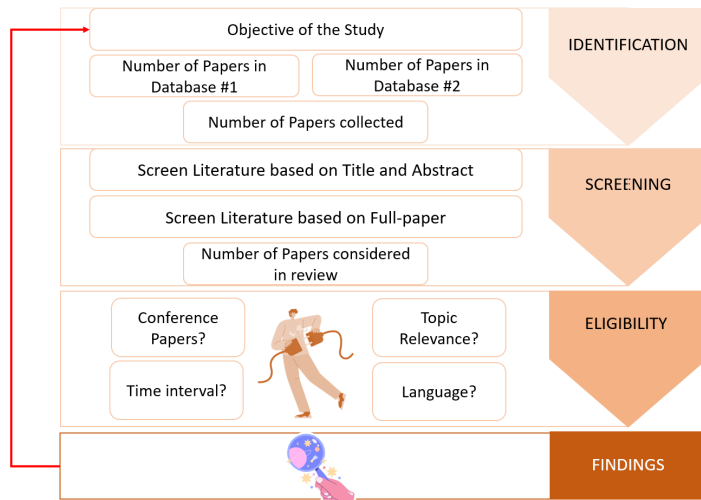
Tips and Tricks: 20/80 Rule

- Also known as the Pareto principle or the law of the vital few,
- The principle is named after Italian economist Vilfredo Pareto, who observed the wealth distribution in Italy.
- It states that roughly 80% of the effects come from 20% of the causes.
- The rule suggests that a small proportion of causes can have a disproportionate impact on the overall outcome.
- The 20/80 rule has been applied in many fields:
 - In business: 80% of profits come from 20% of customers or products.
 - In personal productivity: 20% of effort leads to 80% of results.

Note: The 20/80 rule is a generalization and may not hold true in all situations. The specific ratios may vary, but the principle behind it remains the same.



Thanks for your attention.



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More videos on this topic:

https://youtube.com/playlist?list=PLm8p4Z96J1LMVIBV_PljUSASiUWSakkmH&feature=shared

References

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3. Aria, M. and Cuccurullo, C. (2017) 'bibliometrix: An R-tool for comprehensive science mapping analysis', Journal of Informetrics, 11(4), pp. 959–975. Available at: <https://doi.org/10.1016/j.joi.2017.08.007>.
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5. Akbarieh, A., Jayasinghe, L. B., Waldmann, D., & Teferle, F. N. (2020). BIM-Based End-of-Lifecycle Decision Making and Digital Deconstruction: Literature Review. Sustainability, 12(7), Article 7. <https://doi.org/10.3390/su12072670>
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7. <https://www.bibliometrix.org/home/>
8. <https://posit.co/download/rstudio-desktop/>
9. <http://www.prisma-statement.org/?AspxAutoDetectCookieSupport=1>
10. https://images.webofknowledge.com/images/help/WOS/hp_full_record.html#:~:text=KeyWords%20Plus%C2%AE%20are%20index,traditional%20keyword%20or%20title%20retrieval.

Extra Slide: Co-occurrence and Co-citation

Aspect	Co-occurrence	Co-citation
Definition	Appearance of items together in context	Relationships between two articles cited together
Application	Keywords/terms in the same publication	Citation patterns of scholarly articles
Analytical Technique	Identifying patterns and relationships	Identifying key articles and connections
Insights	Understanding the structure and content of a field of research	Finding the impactful articles/authors, research relationships
Uses	Emerging research areas, collaborations	Emerging trends, impact assessment
Application in Research	Identifying important themes/topics	Evaluating article/author influence