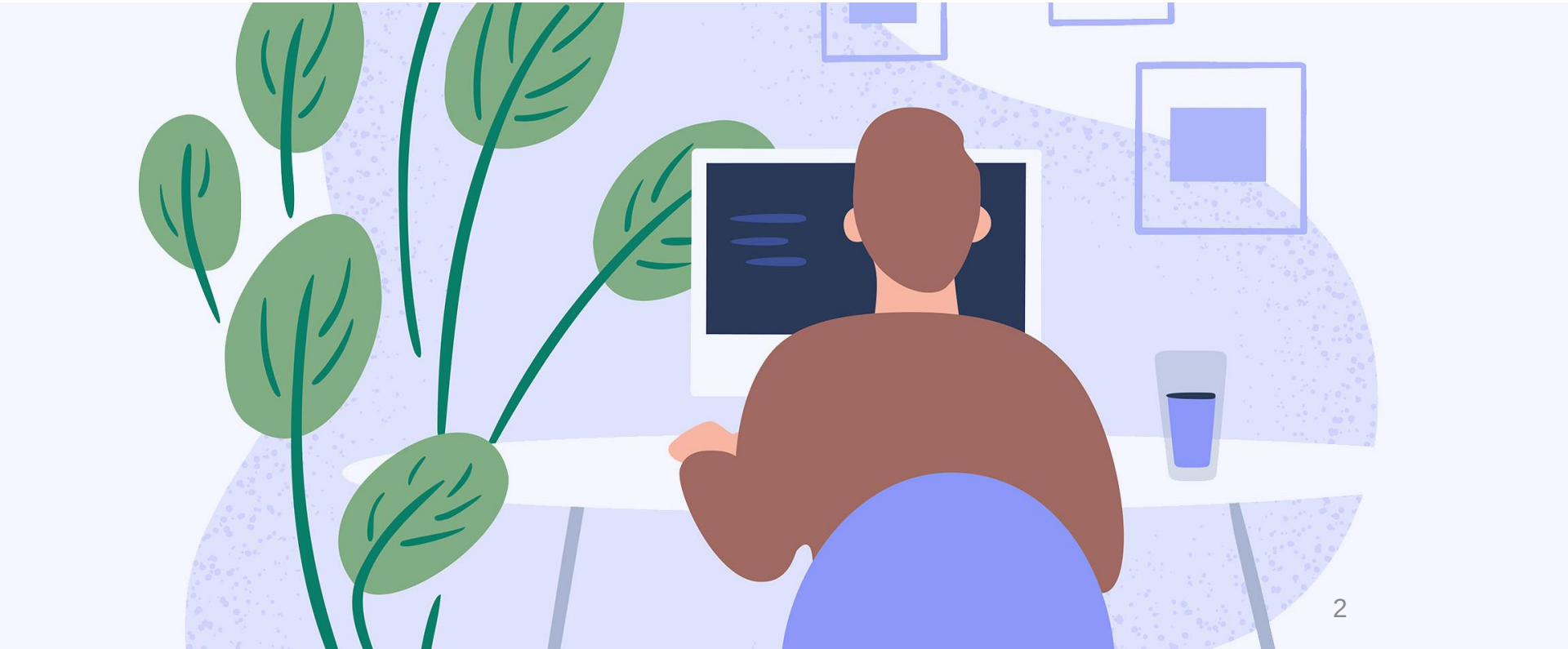
Systematic Review

Shady Attia PhD, USGBC Faculty and LEED Accredited Professional
Head of Sustainable Building Design Lab (SBD)

shady.attia@uliege.be

Objective

In this module you will learn: 1) how to **write a systematic literature review** for a scientific paper, 2) The key steps or **stages for how to write a literature review** that will prove a successful part of a research paper submitted for publication.



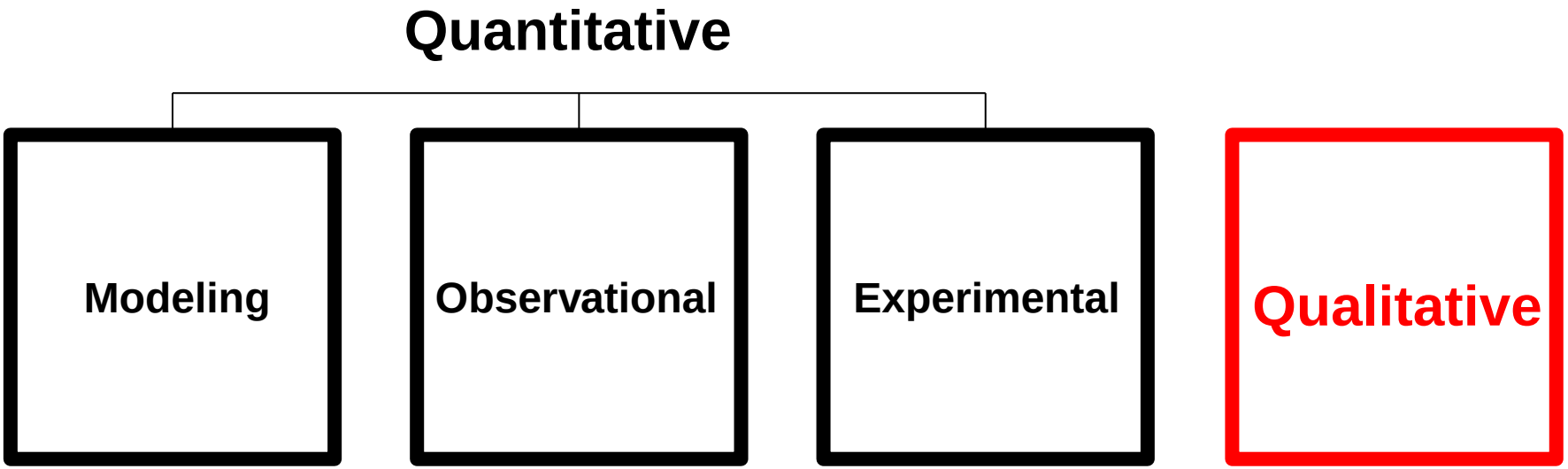
Content

1. Introduction
2. Positioning
3. Novelty
4. Review Protocol
5. Data Extraction
6. Quality and Validation
7. Synthesis & Writing
8. Take Away

1 Introduction

Methodological Families

SLR belongs to which family?



What is Systematic review ?

Cover long period trend, with a large geographical scope, is time and cost effective, looks at high quality open-access data.

Desk Research

Systematic Reviews

Content Analysis

Terminology

Characteristics of SLR

When to do a SLR?

- **When?**
  - Many evidence-based studies have been published
- **Why?**
  - Answer a specific question
- **How?**
  - Define a search strategy for articles (criteria of inclusion/exclusion)
  - Submit a clear protocol/methodology so that it can be easily reproduce
  - Conduct a quality assessment of studies
  - Synthesis of findings

Systematic L. Review vs. Literature Review?

Literature review	Methodological stages	Systematic review
Introduces context and current thinking, often without a specific questions, is general and covers several aspects of topic.	Focus of review	Uses a precise question to produce evidence to underpin a piece of research. A stand-alone piece of research, it should be conducted prior to undertaking further research, particularly in PhD theses.
Finds papers through a fairly random process, usually searching only a few databases. Use of grey literature common, but not usually systematic.	Methods for data collection	Searches of several specified databases using precise search terms; a similar systematic search of grey literature sometimes included, depending on the question.
Papers are read, 'take home' message used in the review.	Methods for data extraction	Data extraction tool used to identify precise pieces of information; two or more researchers undertake extraction.
Anything up to 80 papers or more.	Number of papers included in review	Usually less than 50 papers; often fewer than 10.
Writer interprets the meaning of the results.	Methods for data analysis	Recognised, referenced, methods for data analysis; includes analysis methods, rigour of conduct of research, strength of evidence and so on.
Prose paper, occasionally supported with diagrams.	Methods for data presentation	PRISMA/CONSORT or similar/table of included papers.
Not suitable for short journal publication.	Publication	Can be suitable for specialised journal publications
Actions/directions informed by evidence of various drawn form included papers.	Outcome	Actions/directions are based on evidence from reviewed papers.

2 Positioning

Positioning

- **Positioning means comparing the literature that was done by others and pointing out the things that your study does which was never done before.** Justify and frame a novel contribution

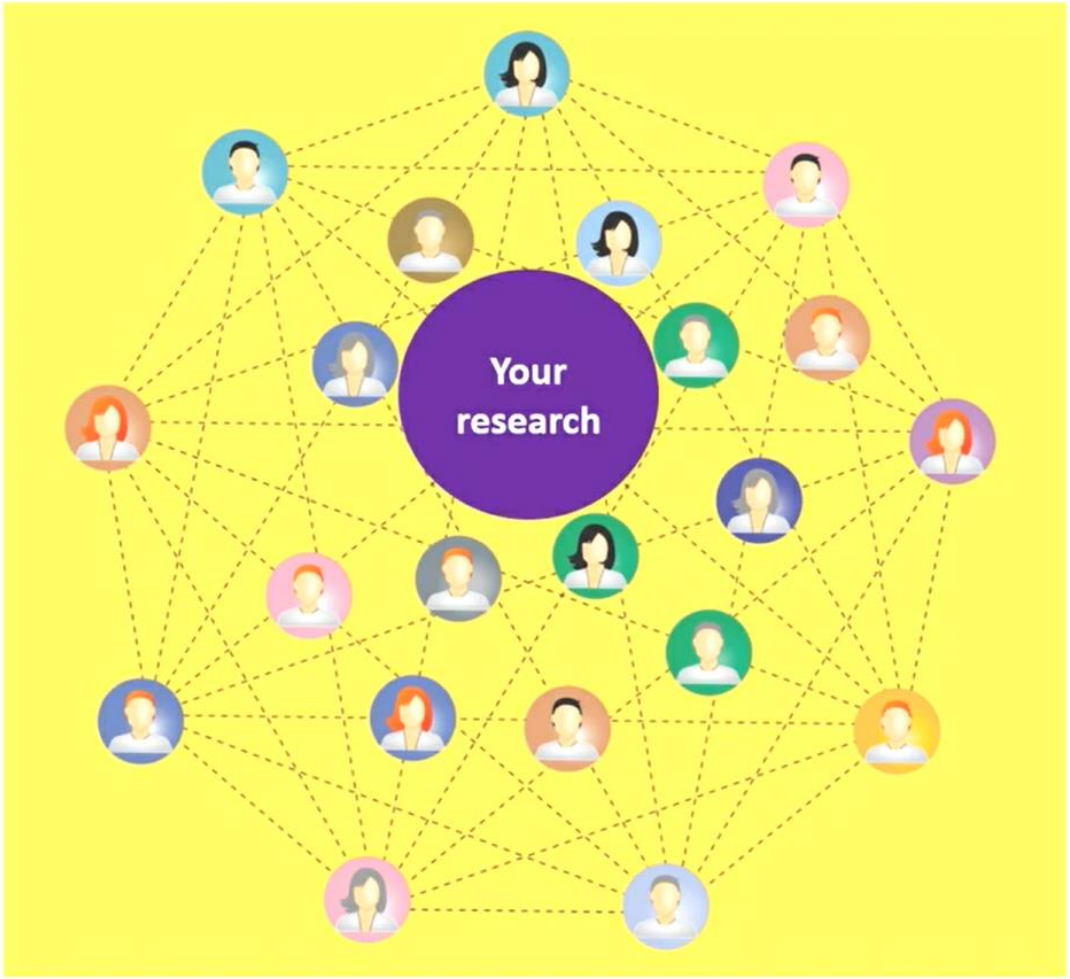
Positioning

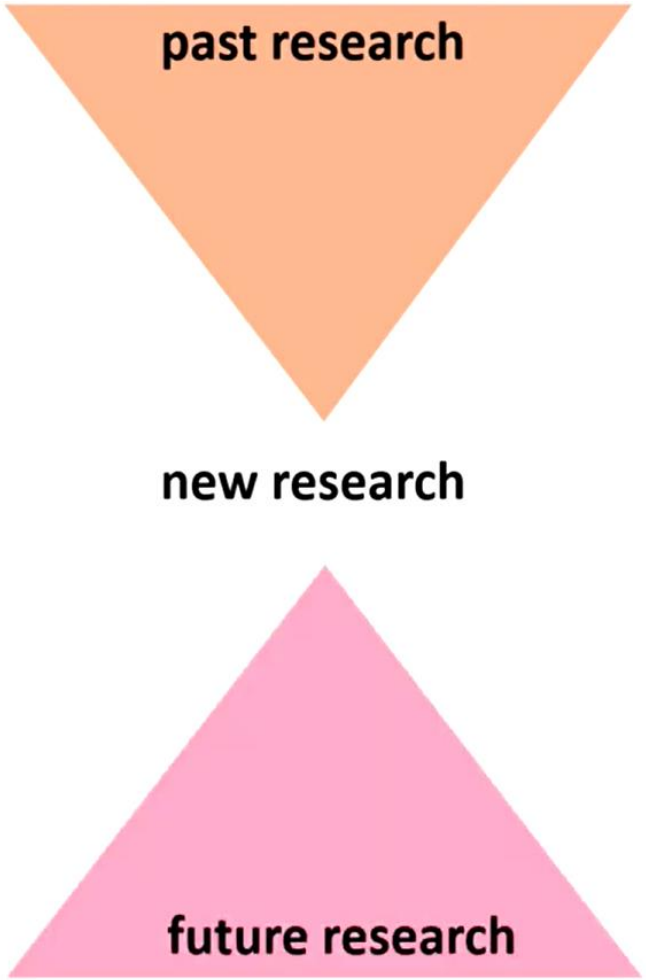
- **The ultimate aim of a SLR is to provide background information about a phenomenon/technology/problem using existing relevant and reliable or credible literature.**

- **There will always be questions in your mind, which you try to resolve by reading. In the end, you will still look for answers to your set of questions, but find nothing that addresses your curiosity.**

- **Have you read enough? There's a possibility that you might have not read everything, that there may be some literature that you have missed somewhere, somehow.**

Connecting & Funnelling





Positioning: New Pizza

Positioning: Chronologically

Chicken

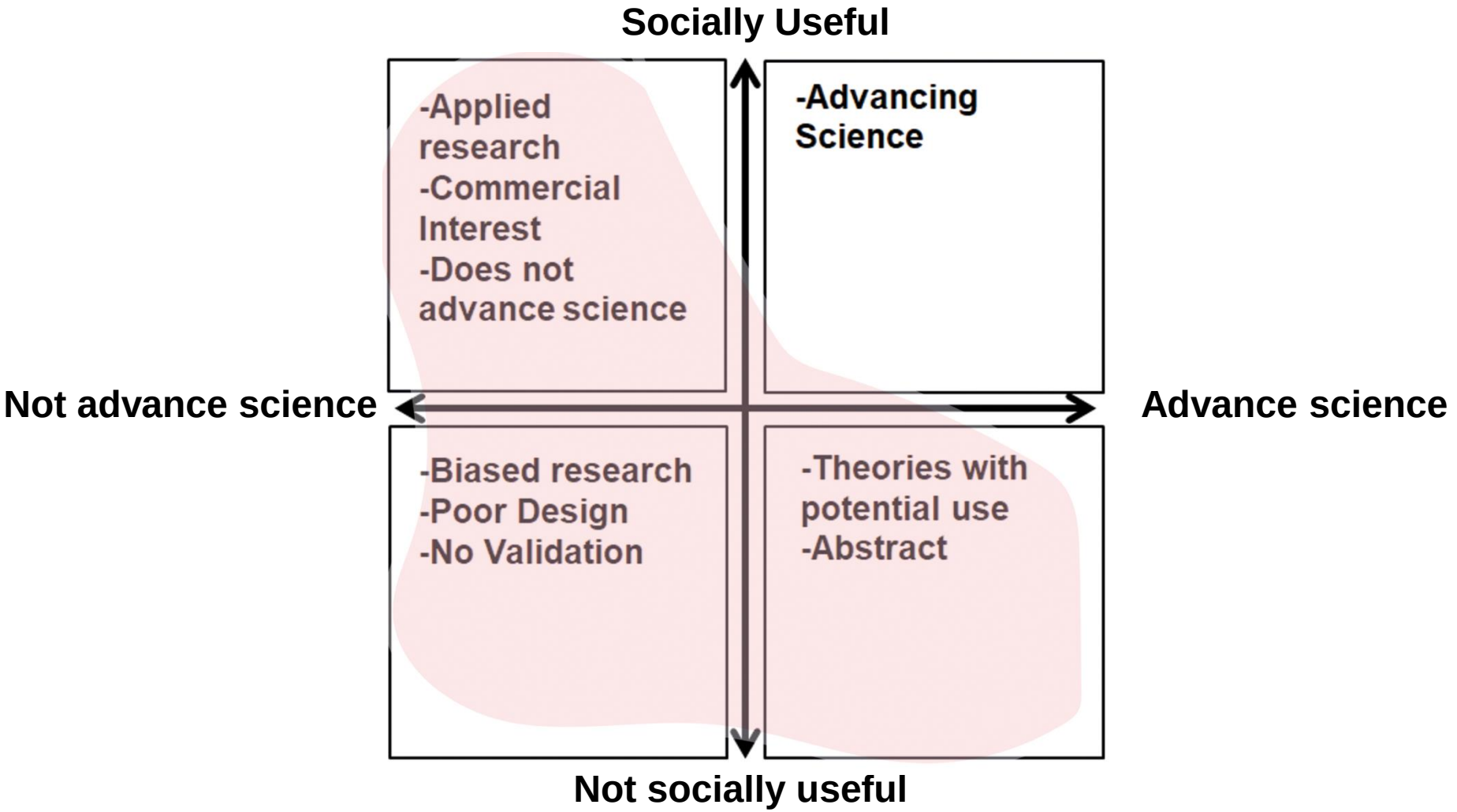
BBQ Chicken

Pulled Chicken

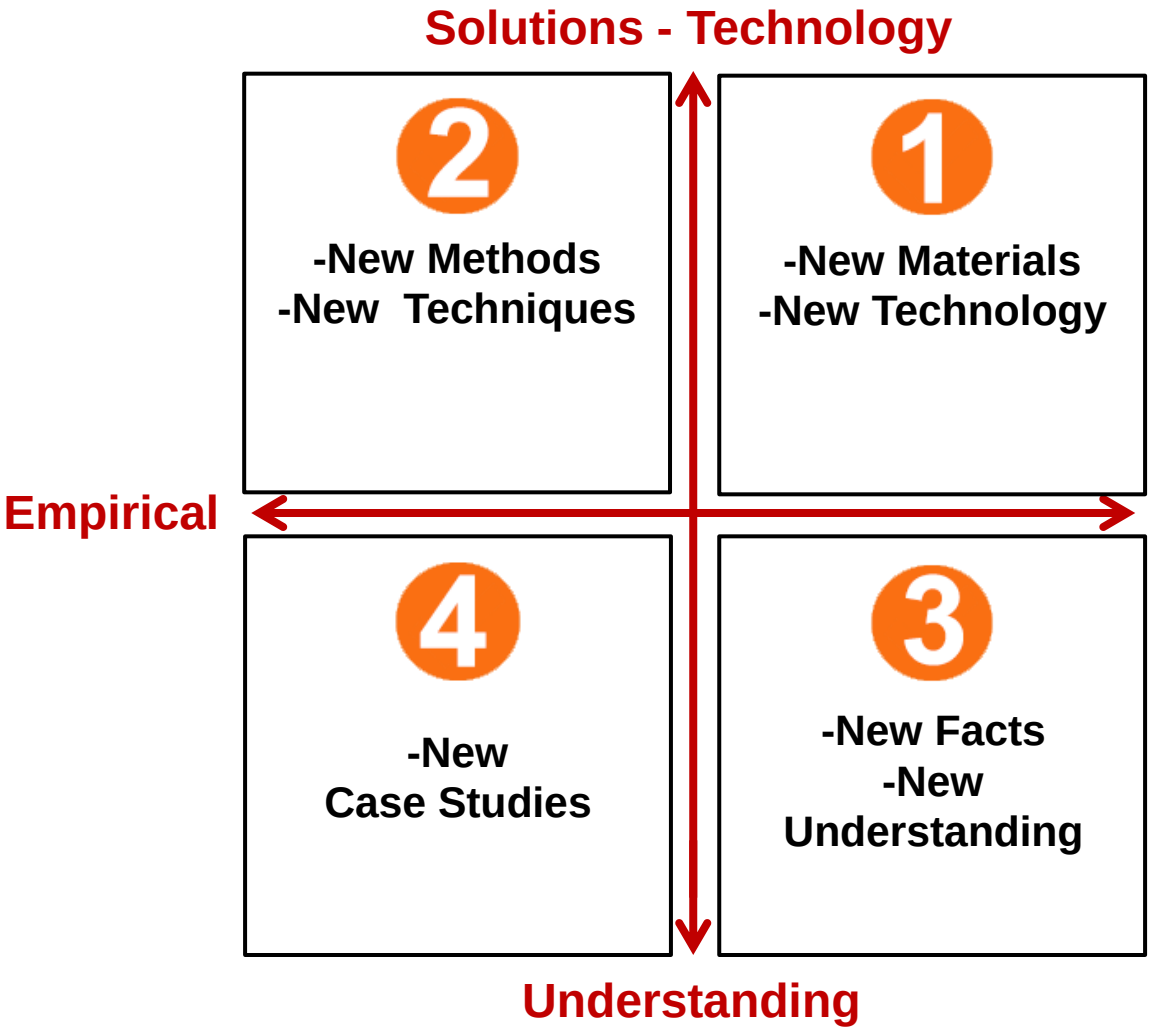
Positioning: Geographically

3 Novelty

Added Value Quad Chart



Innovation Quad Chart



Types of Contribution:

1. **Thematic/Conceptual**
2. **Methodological**
3. **Empirical/Practice**

4 Review Protocol

Before starting…

How to proceed?

- ❑ Formulate the problem
- ❑ Review the literature to make sure it has not been done before **(unless…)**
- ❑ Form hypothesis and give the review a title

Develop a Protocol

What is a SLR protocol?

- ❑ **Describe the steps that the reviewer will follow**
  - ➢ **How and where are studies going to be found?**
  - ➢ **What will be the criteria for selection of studies?**
  - ➢ **Methods used for data analysis and validity assessment**
  - ➢ **Time available to conduct it**
- ❑ **Why**
  - ➢ **Readership (Journal Audience)**
  - ➢ **Guide reviewer**
  - ➢ **Ensure the reproducibility**

Example of a protocol

1 Purpose:

To identify the specificities of NZEB design process management that make it different from that applied to ordinary buildings, in order to synthesise these differentials and contribute to Architecture, Engineering and Construction (AEC) industry and researchers in this field, to enable understanding of the process and disseminate the culture of energy efficiency in Architecture.

2 Research questions

- What characteristics make NZEB design process management different from ordinary ones?
- How the different characteristics of NZEB design process affected the requirements for qualification of the teams?
- How they influenced on design and construction costs?
- Which kinds of buildings (residential, commercial, public, private, etc.) were reported in the primary studies reviewed?
- What countries the studies were carried out in?
- What were the measured benefits reported?

3 Keywords

Design, management, management, net zero-energy building(s), process

4 Synonyms

nearly zero-energy building(s), NZEB

5 Sources/digital libraries

American Society of Civil Engineers	http://ascelibrary.org/journals
Ei Compendex	http://www.engineeringvillage.com
Emerald Publishing	http://www.emeraldinsight.com
IEEE Digital Library	http://ieeexplore.ieee.org
Infohab	http://www.infohab.org.br
ISI Web of Science	http://www.isiknowledge.com
ScienceDirect	ttp://www.sciencedirect.com
Scopus	http://www.scopus.com
Springer	http://link.springer.com
Taylor & Francis	http://www.tandfonline.com

6 Search strings

"NZEB" AND "design" AND ("process" OR "management")
(("nearly" OR "net") AND "zero" AND "energy" AND ("building" OR "buildings")) AND "design" AND ("process" OR "management")

7 Inclusion criteria

- Research field: AEC
- Language: English
- Publication date: 2009 to 2018
- Type of work: scientific studies
- Availability: full text
- Subject: NZEB design process management

8 Exclusion criteria

- Not belong to AEC Field
- Not in English
- **Publication before 2010**
- Not a scientific work
- Not related to the subject of interest
- Full text unavailable

Tips for searching

How to find sources?

- Search **terms** used for literature search should be clearly described with information on their relevance to the research question.
- Make a **references list** of reviews captured during your search
- Mention **searches with and without language restrictions** to estimate the number of papers excluded.

Select Review Studies

How to select the references?

- ❑ **By screening titles and/or abstracts, you will be able to reject those who don't fulfill your inclusion criteria**
- ❑ **Inclusion criteria can also be about the type of publications preferred**
- ❑ **Make a table of papers you will read in detail and those that will be rejected**
- ❑ **Keep a record of why it was included or rejected**

Example:

N°	Publication	Citations	Observations (reasons of inclusion or rejection)

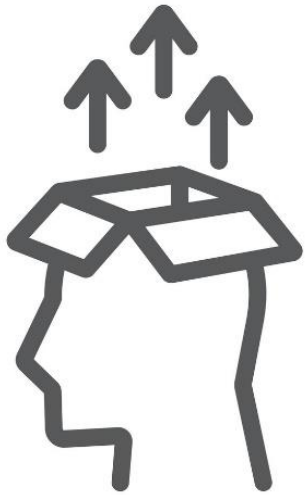
5 Data Extraction

Data extraction

Subjective

❑ **Necessary to summarize the findings of the studies reviewed in the form of a table (matrix) with:**

- **References**
- **Study parameters**
- **Focus**
- **Gap**
- **Findings**

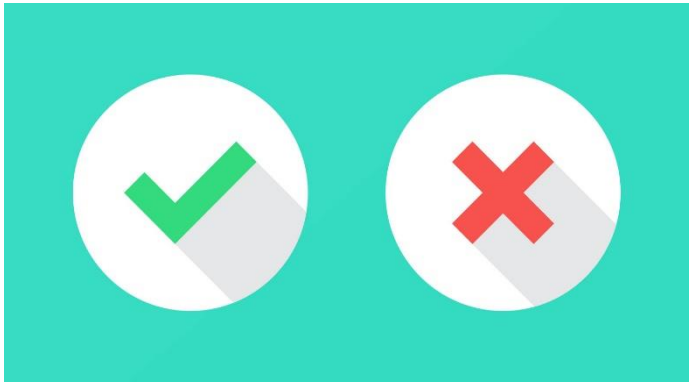


❑ Data extraction by at least two reviewers is important for establishing **inter-rater reliability.**

Example: Literature Review Matrix

No.	Reference	Study parameters	Focus	Gap	Findings
1	I. Nolte, N. Griffiths, O. Rapf, and A. Potcoava, Eds., "Implementing Nearly Zero-Energy Buildings (nZEB) in Romania – Towards a definition and roadmap." The Building Performance Institute Europe (BPIE), Aug-2012.	- State of the art - Implementing the concept of Nearly Zero Energy Buildings in Romania for the existing and new buildings - Graps in the romanian design Codes - Financial Analysis of nZEB solutions	- The building stock of romania - The roadmap of implementing the nZEB concept for Romanian buildings. - Current regulations and practice for new buildings - Current support schemes for buidlings	- The report about Romanian building stock concentrates only on the urban areas and not on rural areas too. - There isn't a detail report about the areas with renewable energy. The cities are only mentioned - The cities: Beius, Huedin, Giurgiu are mentioned as having renewable energy, but don't have certain facts or data to prove its implementation.	- The Cost-Optimal Methodology was applied for 3 different reference buildings from Romania: a single family house, a multi family house and an office building. - In the application of the Cost-Optimal Methodology, for each reference building were chosen at least 10 variants.

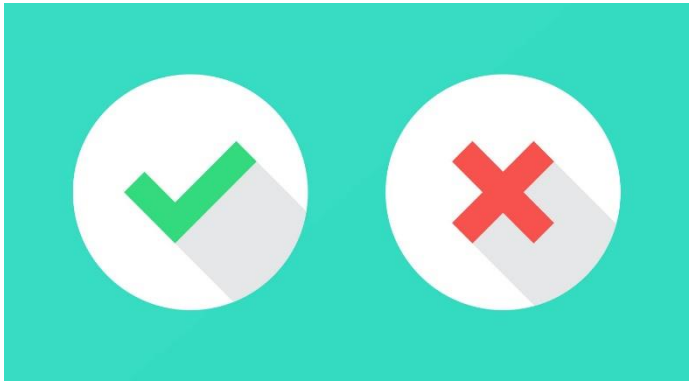
6 Quality and Validation



Validation of SLR

How to validate my review?

- The original manuscripts/data were created for a different purpose
- Might be influenced by the data
- Access to data be restricted
- Data can be quickly outdated (5 years max.)
- Reliability: Data can be influenced during collection or coding, or processing.



Methods for Quality Evaluation

Qualtiative research is subjective !

- **The Quality Evaluation of the review studies has an impact on the conclusion, so it is necessary to avoid any bias**

- **Types of bias include:**
  - Publication bias (content)
  - Location bias
  - Citation bias
  - Language bias
  - Outcome reporting bias

7 Synthesis & Writing

Data Synthesis

Summarize results

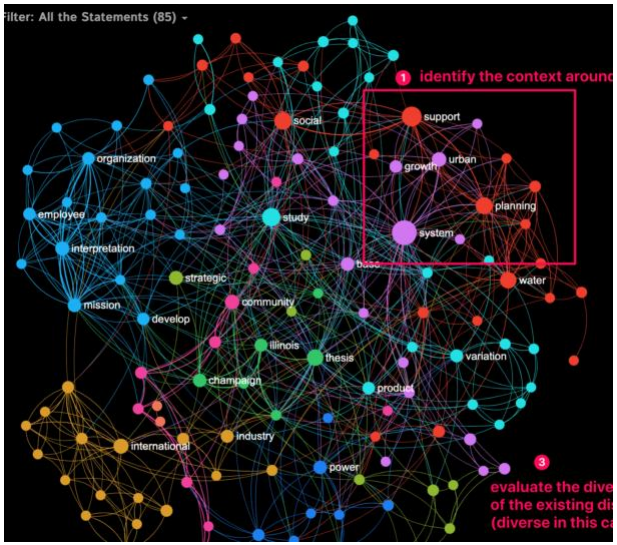
❑ **There are four approaches depending on the question and type of study:**

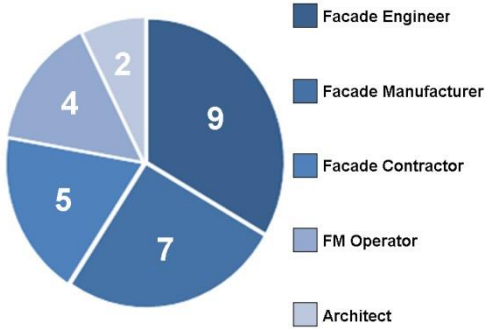
- **Theme:** A narrative synthesis
- **Category:** A Clustering synthesis
- **Code:** A statistical synthesis with a meta-analysis based on content analysis (exp. atlas.si)
- **Meaning Unit:** Data Mining

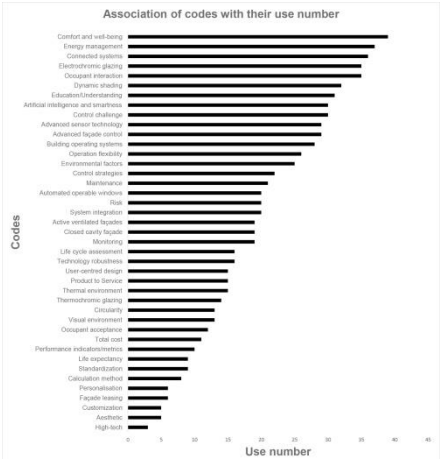
Data Visualization

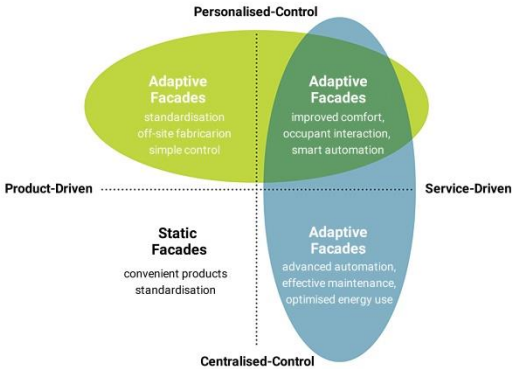
Get inspired

- ❑ Network Visualization
- ❑ Word clouds
- ❑ Frequency
- ❑ …









Writing Report Structure

Example

Title
Contents list
Abbreviations/glossary

Executive summary or structured abstract
Background
Objectives
Methods (data sources, study selection, data extraction, quality assessment, data synthesis)
Results
Conclusions

Main text
Background/introduction
Review question(s)
Review methods
- *Identification of studies*
- *Study selection (inclusion and exclusion criteria; methods)*
- *Data extraction*
- *Quality assessment*
- *Data synthesis*

Results of the review
- *Details of included and excluded studies*
- *Findings of the review*
- *Secondary analyses (sensitivity analyses etc.)*

Discussion (interpretation of the results)
Conclusions
- *Recommendations/implications for practice/policy*
- *Recommendations/implications for further research*

Acknowledgements or list of contributors and contributions
Funding
Conflicts of interest
References
Appendices

8 Take Away

What is Systematic Review

Literature

1. A systematic review is a detailed review of existing literature on a precise topic to address a specific question.
2. Positioning requires years of experience to understand your field's history and structural trends.
3. A protocol is necessary to define the study design, goals, and outcomes.
4. A systematic review can't be validated without using quality assurance techniques to avoid bias.
5. Systematic reviews can be reported through a narrative analysis or meta-analysis
6. Learn from other journal papers

Systematic Review

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