Integrating Artificial Intelligence (AI) into Scientific Research on SME Management

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About you

- Name and nationality

- Research or topics of Interest.

- What are your expectations for this seminar?

- How do you plan to apply the knowledge from this seminar to your current or future research projects or thesis?"

About me

- Doctor of Economics (Guadalajara University)
- Assistant Professor at the Department of Marketing and analysis at Tecnologico de Monterrey, MEXICO.
- Business Intelligence, Data Analytics, Demand Management, Artificial Intelligence in Business

International Week timetable:

	DAY 1	DAY 2	DAY 3
8:15-8:30			Farewell Breakfast
8:30-9:00	Welcome Breakfast		
9:00-10:30	Courses	Courses	Courses (until 13 :00)
10:30-11:00	Coffee break	Coffee break	
11:00-12:30	Courses	Courses	
12:30-14:00	LUNCH	LUNCH	13:00-14:00: LUNCH
14:00-15:30	Courses	Courses	
15:30-16:00	Coffee break	Coffee break	
16:00-17:30	Courses	Courses	

Seminar structure
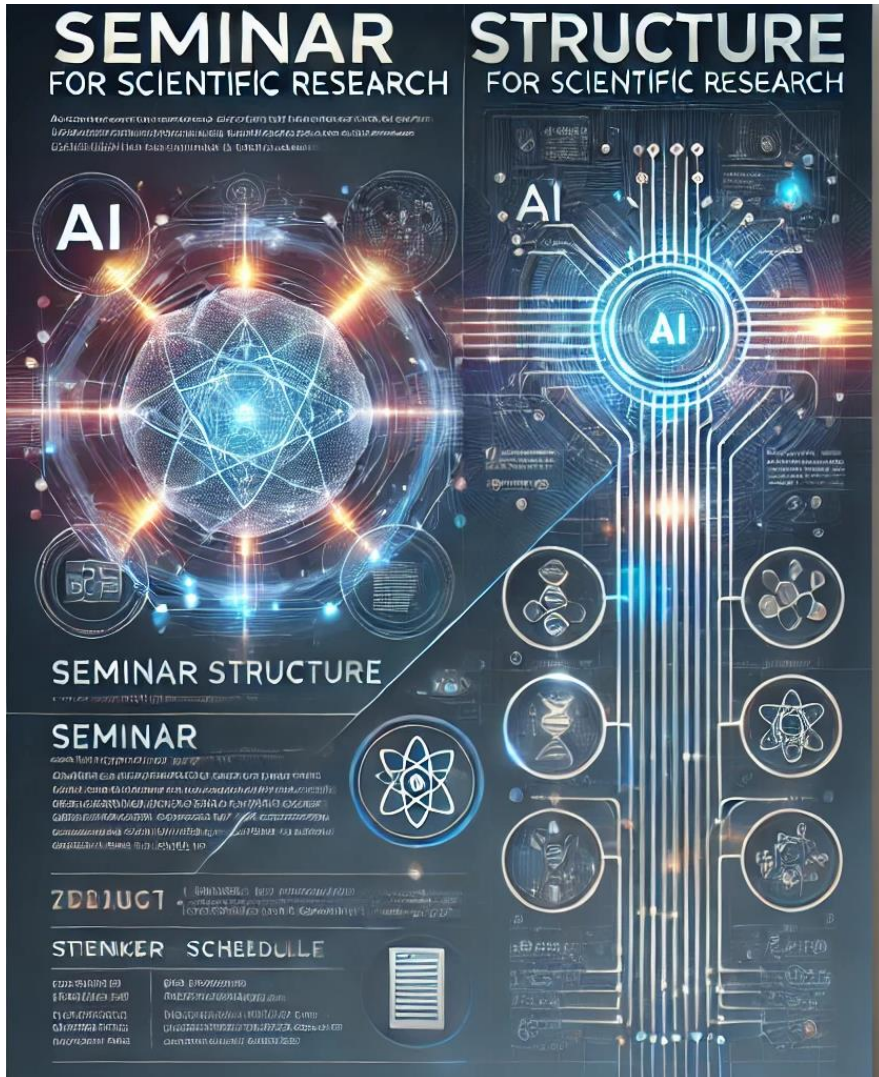
Day 1: Introduction to AI in the Scientific Research Process for SMEs

Day 2: Data Extraction, Synthesis, and Research Report Preparation

Day 3: Research Presentation and Visual Communication

Articles on SMES and Literature Review

- Rodriguez-Marin, M., Saiz-Alvarez, J. M., & Huezo-Ponce, L. (2022). A bibliometric analysis on pay-per-click as an instrument for digital entrepreneurship management using VOSviewer and SCOPUS data analysis tools. *Sustainability*, *14*(24), 16956. https://doi.org/10.3390/su142416956

- Ramírez-Solis, E. R., & Rodriguez-Marin, M. (2022). Diffusion model for Mexican SMEs to support the success of innovation. *Sustainability*, *14*(16), 10305. https://doi.org/10.3390/su141610305

- Gil, M., Rodriguez-Marin, M., & Montoya, M. A. (2020). Demand planning on small and medium-sized enterprises in Mexico: A case study of a confectionery firm. *Adv. Bus.-Relat. Sci. Res. J*, *11*, 56-73.

Teachig method:

The course will be conducted interactively, combining the instructor's expertise with the active participation of attendees through practical workshops, videos and more. Real scientific research that has employed this methodology will be explored, and various AI tools will be utilized. Additionally, participants will have access to online resources and will receive continuous feedback to ensure their progress.
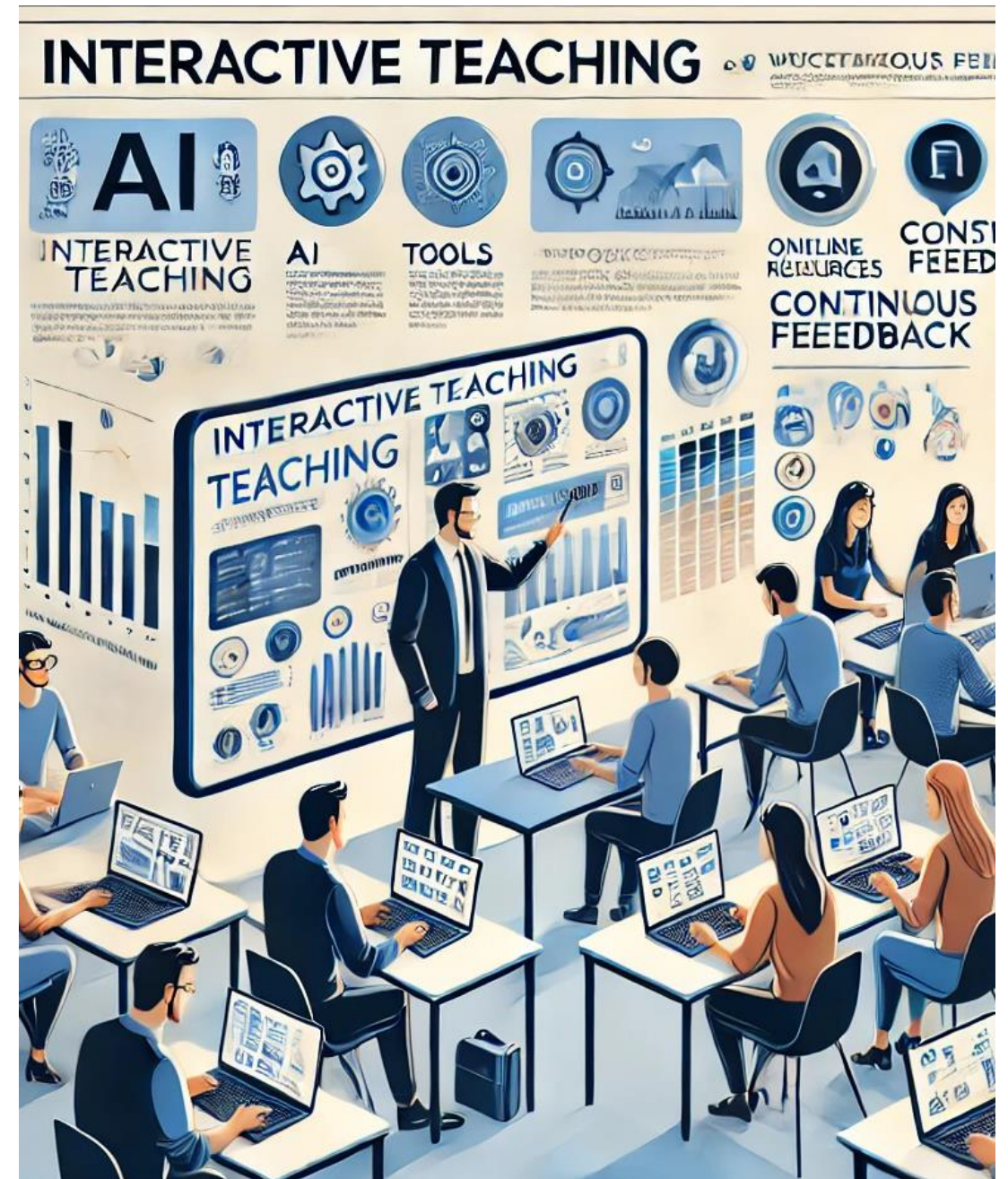
Final Assignment: Scientific Article Draft

Objective: Develop a draft scientific article on a topic related to SMEs or another field of interest, integrating AI tools and following the guidelines of systematic research methods covered in the seminar.

Requirements:

- Must include a clear research question, comprehensive literature review, data analysis, and discussion of results.

- Use at least 3 AI tools (from the course) to assist with different parts of the research and writing process.

- Submission includes a reflection on how AI improved their research process.

Guideline for grading:

Appreciation	Excellent	Very satisfactory	Satisfactory	Average	Insufficient	Very insufficient
Equivalent	« Beyond expectations»	« Very good work »	« good work»	« Adequate but I expected more »	« I am disappointed »	« Not good enough »
Equivalence mark out of 20	18	16	13	10	7	4

Relevant articles on the topic Systematic Literature Review (SLR)

Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical analysis of Big Data challenges and analytical methods. *Journal of business research*, *70*, 263-286. https://doi.org/10.1016/j.jbusres.2016.08.001

Garousi, V., Felderer, M., & Mäntylä, M. V. (2019). Guidelines for including grey literature and conducting multivocal literature reviews in software engineering. *Information and software technology*, *106*, 101-121. https://doi.org/10.1016/j.infsof.2018.09.006

Majid, M., Habib, S., Javed, A. R., Rizwan, M., Srivastava, G., Gadekallu, T. R., & Lin, J. C. W. (2022). Applications of wireless sensor networks and internet of things frameworks in the industry revolution 4.0: A systematic literature review. *Sensors*, *22*(6), 2087. https://doi.org/10.3390/s22062087

Tandon, A., Dhir, A., Islam, A. N., & Mäntymäki, M. (2020). Blockchain in healthcare: A systematic literature review, synthesizing framework and future research agenda. *Computers in Industry*, *122*, 103290. https://doi.org/10.1016/j.compind.2020.103290

Badi, S., & Murtagh, N. (2019). Green supply chain management in construction: A systematic literature review and future research agenda. *Journal of cleaner production*, *223*, 312-322. https://doi.org/10.1016/j.jclepro.2019.03.132

Rules of our sessions

- Take what you want
- Keep it simple
- Less but deeper
- We will use some open access applications
- Most of the AI apps are paid. I will show you them.
- Interactive
- Active participation

MENTIMETER

Join at menti.com   use code 7578 6576

https://www.menti.com/alawe6jnzaqt

Please provided an indication about your familiarity with the following tools:

IA in general
ChatGPT
Consensus
Jenni.AI
Gamma
VOSviewer.

https://www.mentimeter.com/app/presentation/al74czikzpaxqqujooyirvydcac7fg81/edit?question=bhrhmsnp5o1h

MENTIMETER
Join at menti.com   use code 7578 6576

Please provide an indication for the following
statemens:

I once struggled to develop research.

I usually use some AI resources to conduct scientifi
research.

Strongly disagree   Strongly agree

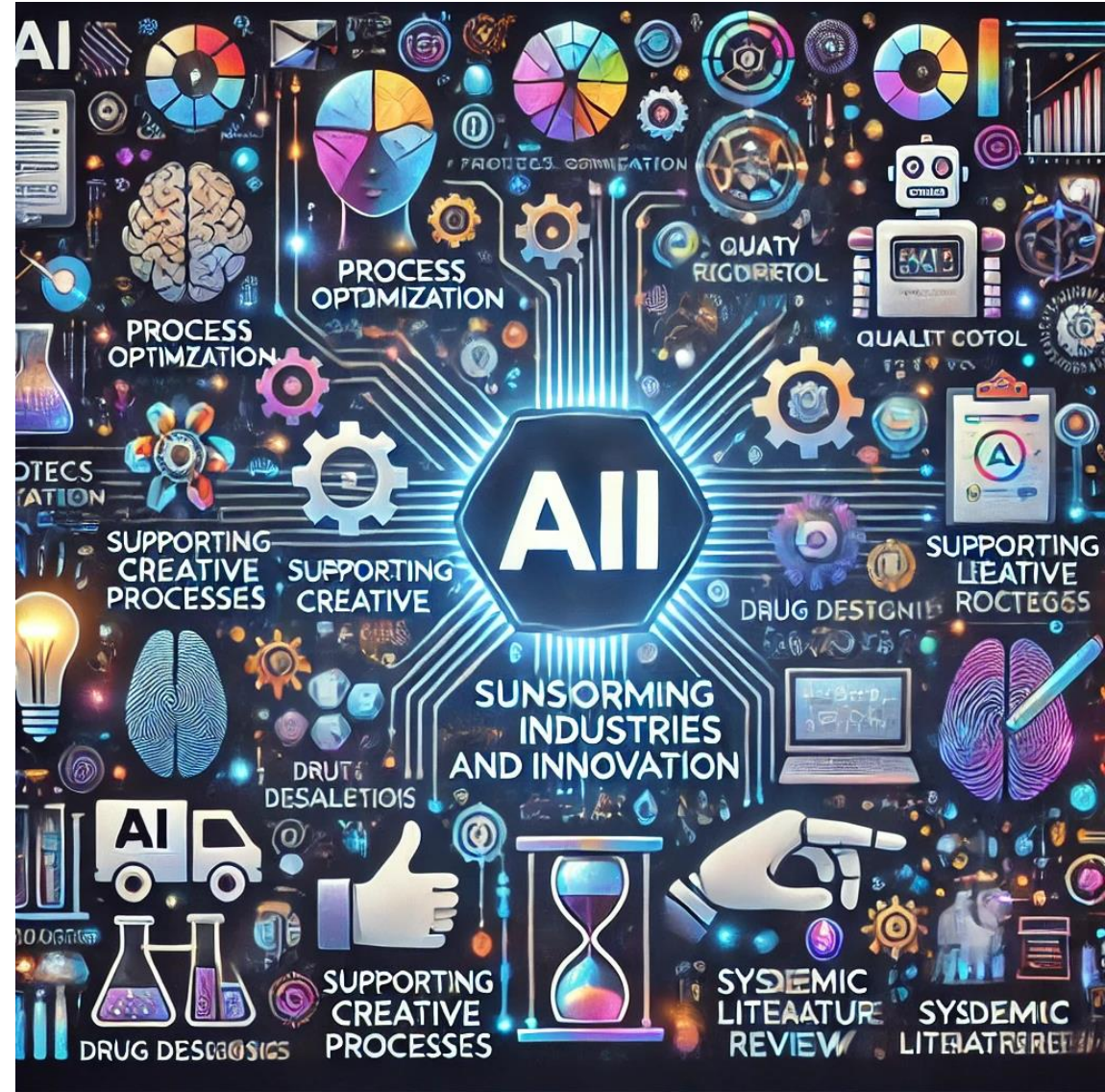After participating in this seminar, I know...
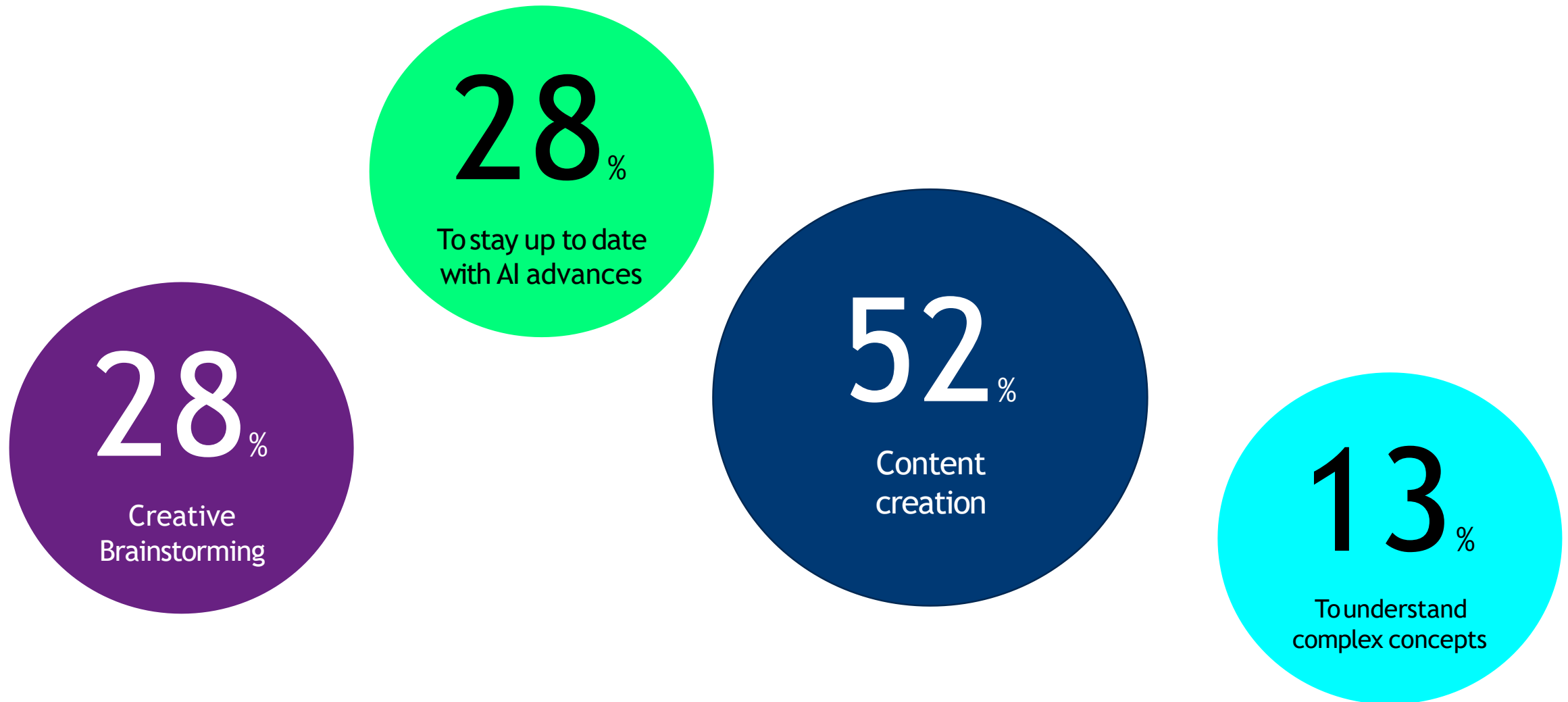I would like to know...

Seminar aim

This seminar synthesizes the role of artificial intelligence (AI) and automation in systematic literature reviews (SLRs)
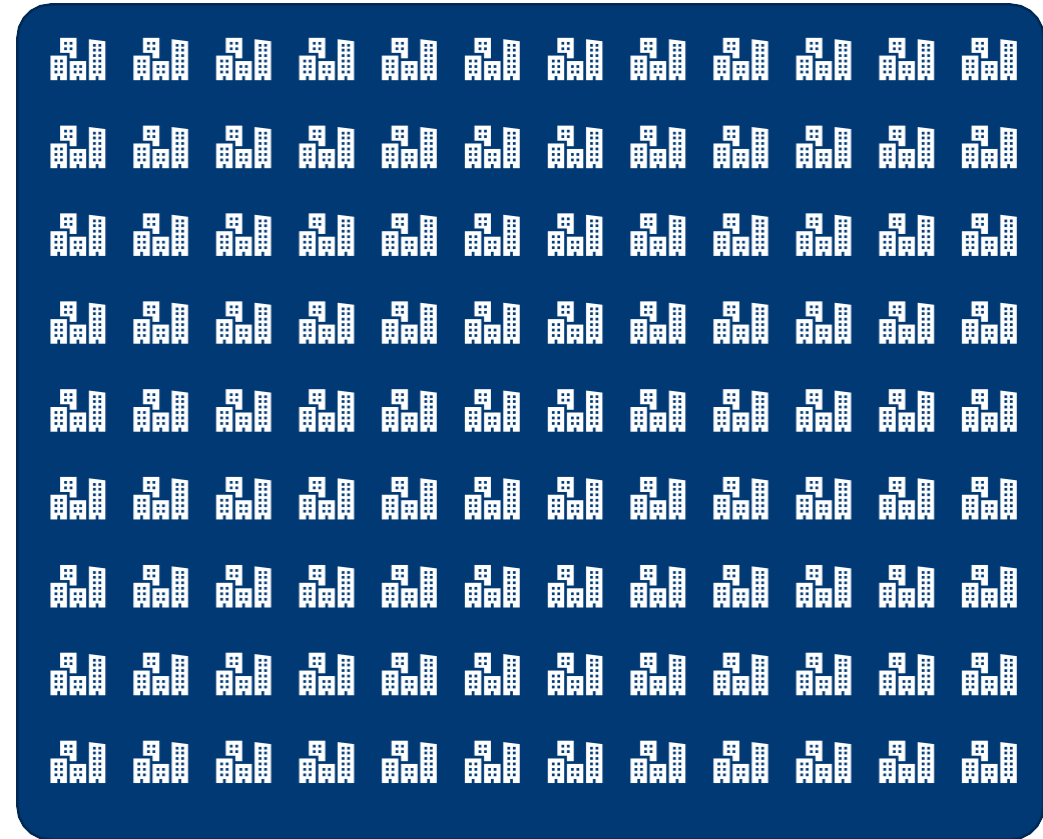
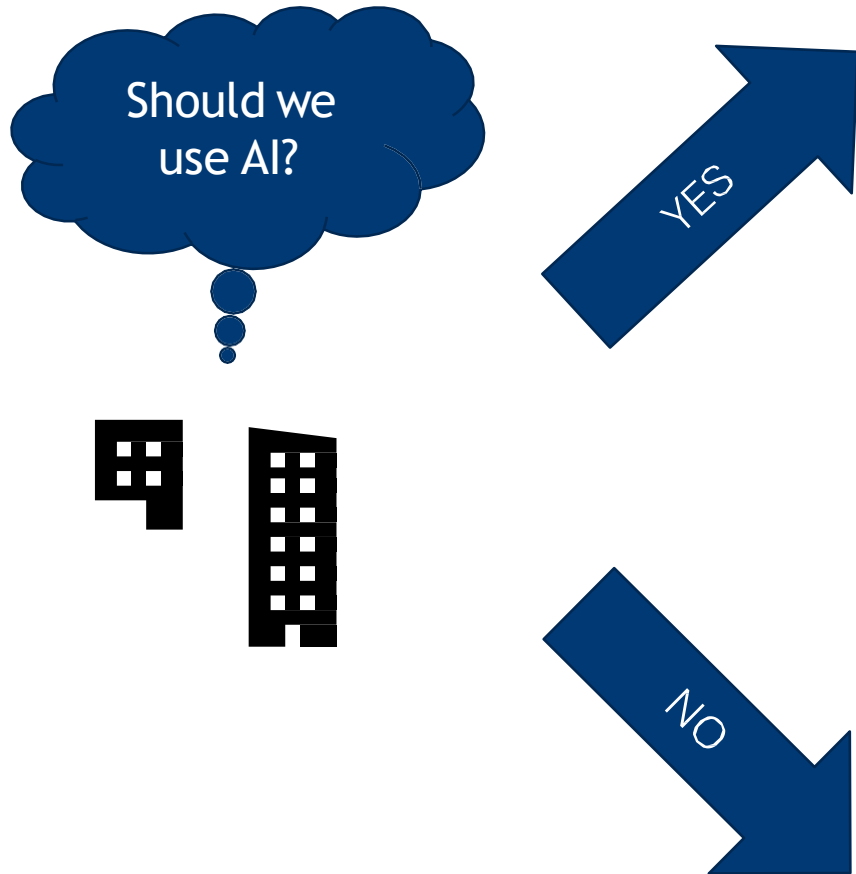# AI is used for different purposes

- Process Optimization

- Pattern Recognition

- Supporting Creative Processes

- Quality Control

- Chatbots / Virtual Agents

- Recommendation Systems

- Market Analysis

- Content analysis

- Drug discovery

- Product Design

- **Systematic Literature Review**

- ....

For what are you using AI?

28%
To stay up to date with AI advances

28%
Creative Brainstorming

52%
Content creation

13%
To understand complex concepts

AI is (pretty much) everywhere

Should we use AI?

YES

NO

Because AI is everywhere...

New capabilities required!

AI meets academia: transforming systematic literature reviews

Przemyslaw Tomczyk
Kozminski University, Warszawa, Poland
Philipp Brüggemann
FernUniversitat in Hagen, Hagen, Germany, and
Demetris Vrontis
Department of Management, School of Business, University of Nicosia, Nicosia, Cyprus;
S P Jain School of Global Management – Dubai Campus, Dubai, United Arab Emirates and
Department of Management Studies, Adnan Kassar School of Business, Lebanese American University, Beirut, Lebanon

Abstract

Purpose – This study synthesizes the role of artificial intelligence (AI) and automation in systematic literature reviews (SLRs), focusing in particular on efficiency, methodological quality and human–machine collaboration.

Design/methodology/approach – A systematic review methodology was applied, analyzing studies from Scopus and Web of Science databases to explore the use of AI and automation in SLRs. A final sample of 28 articles was selected through a rigorous and interdisciplinary screening process.

Findings – Our analysis leads to seven themes: human and machine collaboration; efficiency and time savings with AI; methodological quality; analytical methods used in SLRs; analytical tools used in SLRs; SLR stages AI is utilized for and living systematic reviews. These themes highlight AI's role in enhancing SLR efficiency and quality while emphasizing the critical role of human oversight.

Research limitations/implications – The rapid advancement of AI technologies presents a challenge in capturing the current state of research, suggesting the need for ongoing evaluation and theory development on human–machine collaboration.

Practical implications – The findings suggest the importance of continuously updating AI applications for SLRs and advocating for living systematic reviews to ensure relevance and utility in fast-evolving fields.

○ **Activity:** Group discussion on potential applications of AI in SME research, scientific studies, or other industries, focusing on improving efficiency, decision-making, and innovation.

What is Systematic Literature Review (SLR)?

A **Systematic Literature Review (SLR)** is a methodical and structured approach to identifying, evaluating, and synthesizing all available research relevant to a specific research question or topic. Unlike traditional reviews, an SLR follows a predefined protocol and is designed to minimize bias and ensure that the review is comprehensive and reproducible.
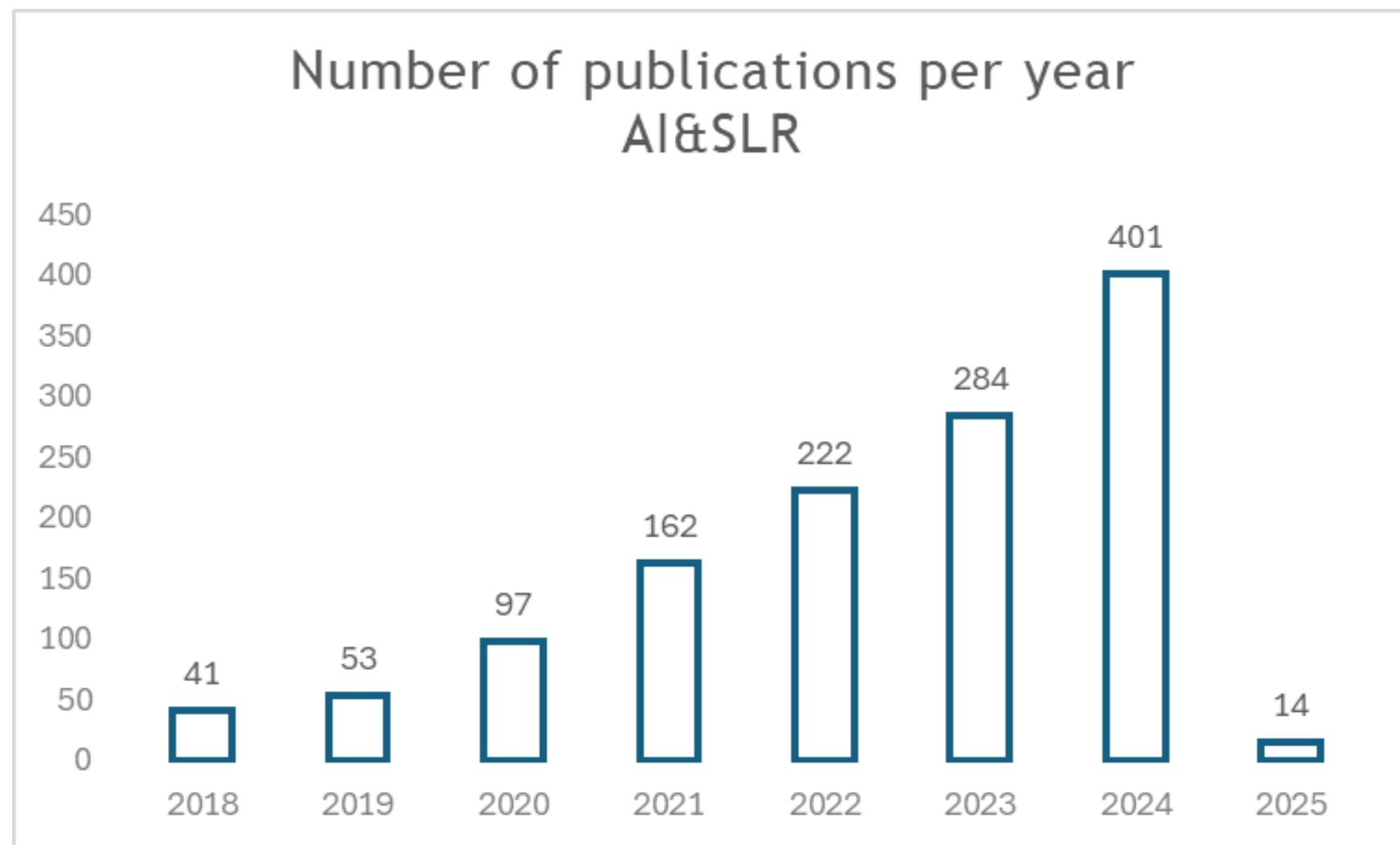
Introduction

Technological Evolution: AI and ML are transforming scientific methodologies across fields like health, data science, and management (Thrassou et al., 2022, 2024; Shneiderman, 2002; Fleischer et al., 2018).

AI in SLRs: AI enhances efficiency, accuracy, and accessibility in systematic literature reviews by automating tasks like screening and data extraction (Beller et al., 2018; O'Connor et al., 2019).

Historical Context: Automation in SLRs began in the 1990s, with continuous advancements improving the review process (Stanfill and Marc, 2019; Schmidt et al., 2021). It hasn't started with ChatGPT.

Bibliometrics

Number of publications per year
AI&SLR

Year	Publications
2018	41
2019	53
2020	97
2021	162
2022	222
2023	284
2024	401
2025	14

Source: Scopus, December 2024

Motivation to conduct an empirical study

1. Scoping review

2. Research Question

3. Literature identification
& selection

4. Data extraction
& Synthesis

What makes the Literature Review time intensive?

- Conceptualization/Scoping Review

- Research questions

- Literature identification and selección

- Data preparation

- Robustness checks

- Reporting and recomendation

- ...

Sometimes, this is the consequence...

Let´s start ...

- Conceptualization/Scoping Review

The conceptualization stage of scientific research is the foundation of the study, where the researcher defines the problem, establishes objectives.

- Research questions

The formulation of research questions is a critical step in scientific investigation, where the researcher translates the identified problem into specific, clear, and answerable inquiries. These questions guide the research process, focusing on key aspects of the study while ensuring relevance and feasibility.

Activity (Individual)

What are your main research questions?

In case you don't have them yet, ask them.

For example:

Does Corporate Social Responsibility (CSR) have an impact on SMEs?

How does Corporate Social Responsibility (CSR) influence the performance of SMEs?

How do SMEs integrate Corporate Social Responsibility (CSR) into their business strategies?
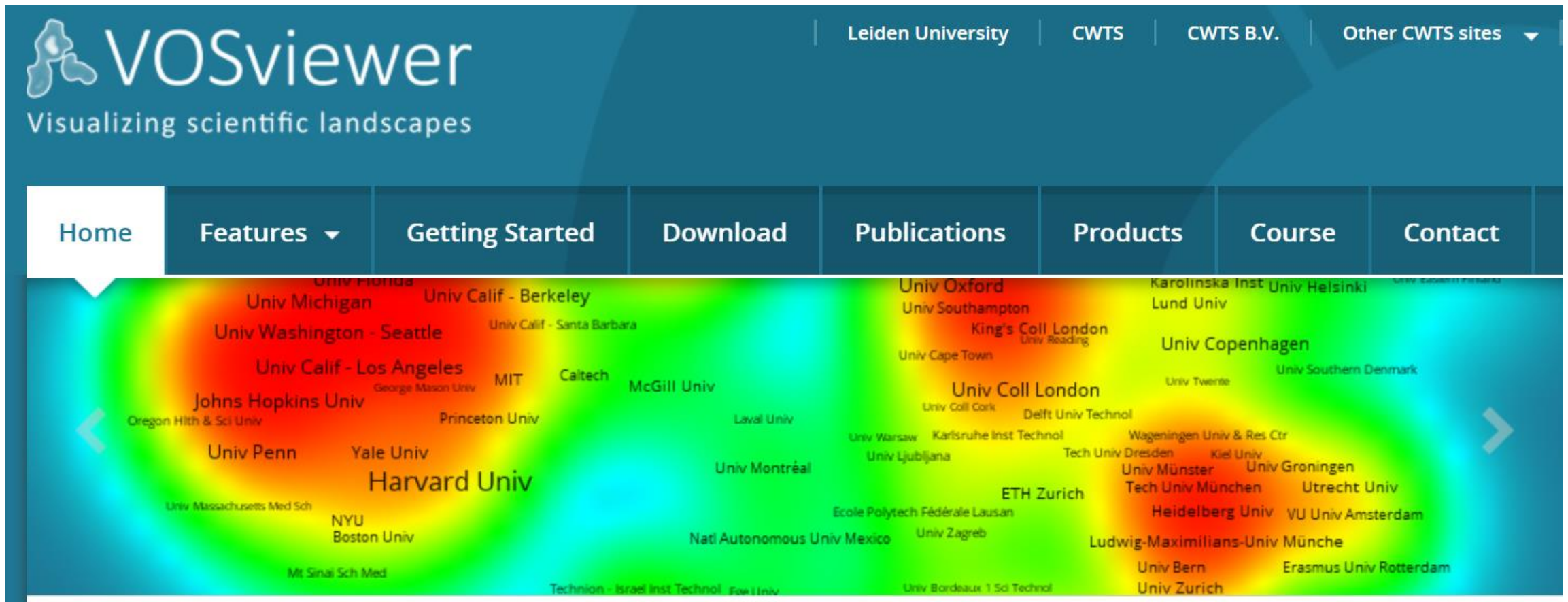
Literature identification and selection

The stage of literature identification and selection in scientific research involves locating, evaluating, and choosing relevant academic sources to build a strong foundation for the study. This step ensures the researcher understands the current state of knowledge, identifies gaps, and contextualizes their work within existing research. It includes using databases, journals, and other reliable sources to gather information and then critically assessing the quality and relevance of each source.

Activity (Individual)

Installation of VOSviewer software (https://www.vosviewer.com/)
and SCOPUS database (https://www.scopus.com/)

Installation of VOSviewer software

- # Activity (Individual)

  Installation of VOSviewer software (https://www.vosviewer.com/)
  and SCOPUS database (https://www.scopus.com/)

Profesor-guided examples
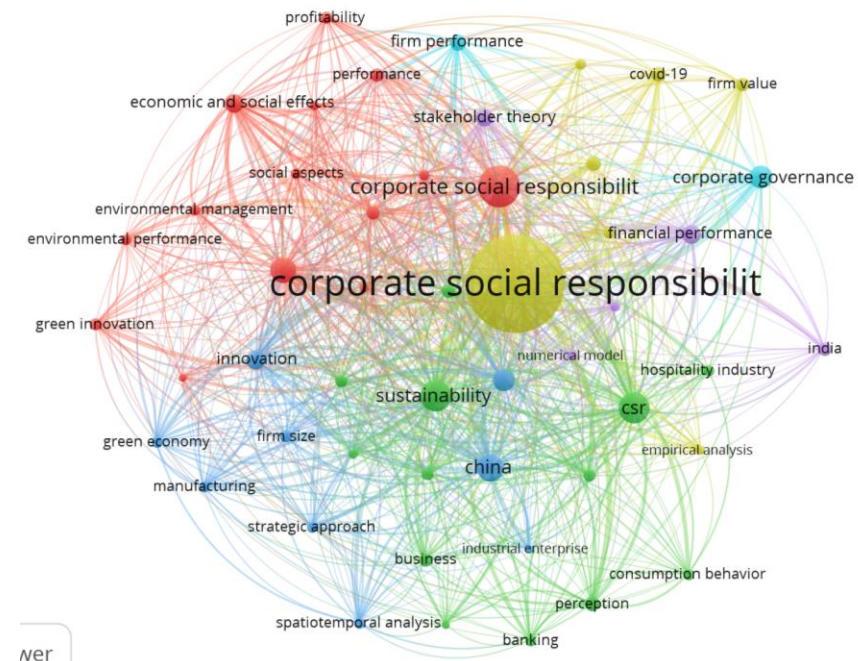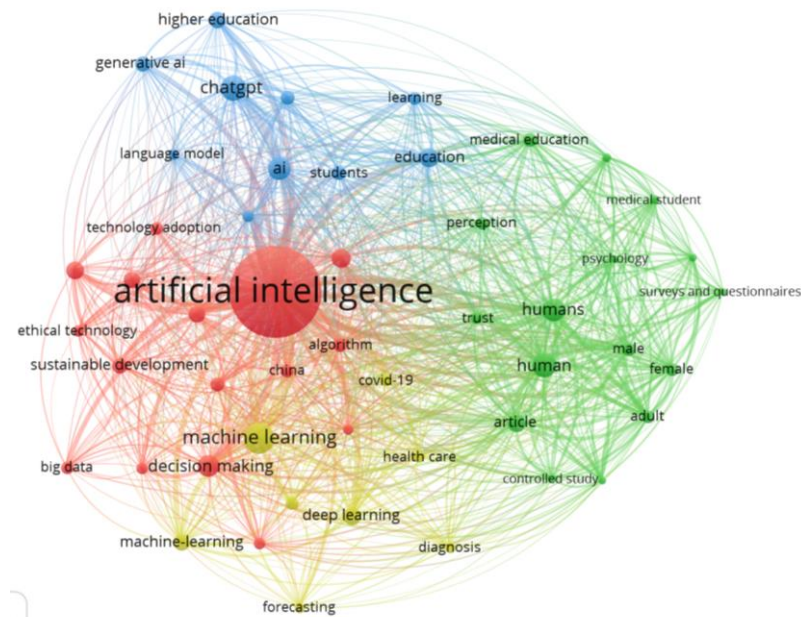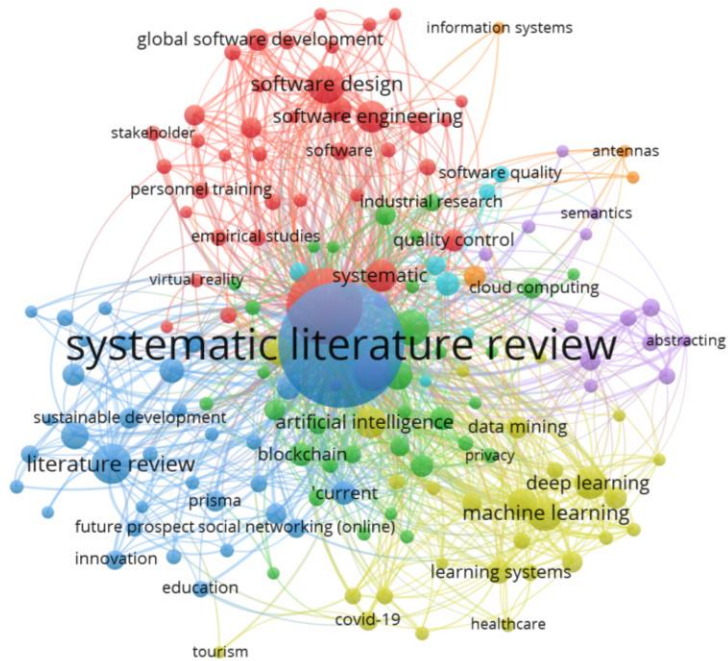
Activity (Individual)

- Download the scopus database SME´s.csv from the DRIVE folder that the professor will share.
- Use VOSviewer software to load Scopus database
- On the topic of SMES identify: the main 25 authors
- Top 25 countries that have researched the topic (Citations)
- Where is your country in the ranking with respect to this research topic?
- Identifies topics related to SMES research

25 minutes

Deliver the activity in a Word or Power Point file. mauro.rodriguez@tec.mx

SLR procedure (Vrontis, Christofi, 2021*)

Stage	Description	References
Scoping Review	Defines the boundaries and focus of the study, systematically determining inclusion criteria and timeframe.	Vrontis & Christofi, 2021
Research Purpose and Research Question	Defines the scope and focus of the study, followed by the formulation of research questions based on identified gaps.	Billore et al., 2023; Vrontis & Christofi, 2021
Research Context	Refers to the setting, background, and elements that may affect the research, helping in interpreting findings.	Vrontis et al., 2020; Christofi et al., 2017; Baima et al., 2020; Vrontis et al., 2022
Literature Identification	Systematic search and assessment of relevant publications to map the current state of knowledge on a topic.	Jain et al., 2022
Literature Selection	Selecting relevant sources based on research questions, objectives, and quality to ensure a rigorous literature base.	Christofi et al., 2017; Battisti et al., 2023
Data Extraction and Synthesis	Collecting and analyzing data from selected literature to identify patterns and synthesize key insights.	Christofi et al., 2021; Battisti et al., 2023
Reporting and Recommendation	Summarizing and synthesizing results, identifying gaps, and providing recommendations for future research.	Christofi et al., 2017; Pereira et al., 2023b

*Vrontis, D., & Christofi, M. (2021). R&D internationalization and innovation: A systematic review, integrative framework and future research directions. *Journal of Business Research*, *128*, 812-823.

Sistematic Literature Review (SLR) References.

- Vrontis, D., & Christofi, M. (2021). R&D internationalization and innovation: A systematic review, integrative framework and future research directions. *Journal of Business Research*, *128*, 812-823. https://doi.org/10.1016/j.jbusres.2019.03.031

- Vrontis, D., Makrides, A., Christofi, M., & Thrassou, A. (2021). Social media influencer marketing: A systematic review, integrative framework and future research agenda. *International Journal of Consumer Studies*, *45*(4), 617-644. https://doi.org/10.1111/ijcs.12647

- Billore, S., Anisimova, T., & Vrontis, D. (2023). Self-regulation and goal-directed behavior: A systematic literature review, public policy recommendations, and research agenda. *Journal of Business Research*, *156*, 113435. https://doi.org/10.1016/j.jbusres.2022.113435

Sistematic Literature Review (SLR) Structure.

- Abstract
- Introduction
- Research design
- Bibliometrics (optional)
- Thematic análisis-The Method
- Conclusions
- Discussion
- Further Research
- References

What AI gives to SLR

- **Conversation** (we ask in natural language– AI answers in different forms)

- **Consequently** – the mindset. Researcher as a manager of SLR writing proces

- **Fast searching and writing** – pre-writing of the manuscript

- **Time:** savings in time

What AI doesn't give

- Full control
- The <u>correct</u> answer to all questions.
- Better results in literature identification and selection than Scopus or WoS

SLR with AI. Table of software

Tool	web	Scoping analysis	Purpose and research questions	Context analysis	Literature identification	Literature selection	Data extraction and synthesis	Report preparation and recommendations	SUM	Price
Consensus.app	https://consensus.app/	1	1	1	1	1	1		6	Freemium
SciSpace	https://typeset.io/	1		1	1	1	1	1	6	Freemium
Elicit	https://elicit.org/	1		1	1	1	1		5	Freemium
Paperpal	https://edit.paperpal.com									
Epsilon	https://www.epsilon-ai.com/	1		1	1			1	4	Freemium
Julius	https://julius.ai/	1	1	1				1	4	Freemium
Open Read	https://www.openread.academy/	1		1	1			1	4	Freemium
Paper Digest	https://www.paperdigest.org/	1		1	1			1	4	Freemium
Research Kick	start.researchkick.com		1	1	1		1		4	Paid
SciSummary	https://scisummary.com/	1			1	1	1		4	Freemium
Scite	https://scite.ai/	1		1	1			1	4	Freemium
Blainly	https://blainy.com/	1		1				1	3	Freemium
Genei	https://app.genei.io/	1		1				1	3	Paid
Jenni	https://jenni.ai/	1		1				1	3	Freemium
MirrorThink	https://mirrorthink.ai/	1		1				1	3	Paid
Perplexity	https://www.perplexity.ai/	1		1				1	3	Freemium
PowerDrill	https://powerdrill.ai/	1		1				1	3	Freemium
Research Buddy	https://researchbuddy.app/	1		1				1	3	Freemium
Textero	https://app.textero.ai/	1		1				1	3	Freemium
Petal	https://www.petal.org/						1	1	2	Freemium
Cambiran	https://www.cambrianml.org/				1				1	Free
ChatDoc	https://chatdoc.com/							1	1	Paid
SUM		17	3	17	10	4	6	15	72	

Focus on

- ChatGPT https://www.openai.com/

- Consensus https://consensus.app/search/

- Jenni https://app.jenni.ai

- Paperpal https://edit.paperpal.com/

- SCISPACE https://typeset.io

- Elicit https://elicit.com/

ChatGPT installation

1. Installation and Use of ChatGPT 3.5
Step 1: Create an OpenAI Account
Visit the OpenAI website:
Open your browser and go to
https://www.openai.com/.
2. Register:
1. Click "Sign Up" or "Register."
2. Fill out the form with your email and
   create a password.
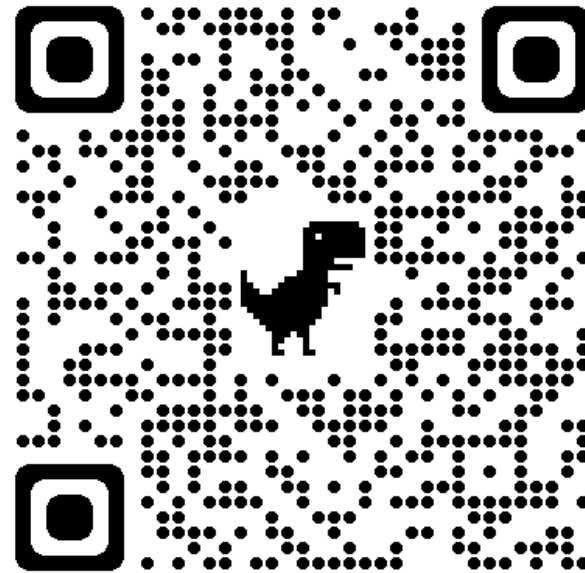
Note: If you have another version of ChatGPT installed it is fine.

Hands on

Individual activity with ChatGPT

Write the following prompt in ChatGPT

Prompt 1 : Write a scientific article on the topic [Systematic Literature Review on Small and Medium Enterprises]. Includes the main bibliographical references, citing them appropriately.

What were the results and your experience in this activity?

Hands on

Write the following prompt in ChatGPT

Prompt 2 : I want to write a literature review about [Small and Medium Enterprises (SMES)]. Can you help me come up with a structure for this review?

What were the results and your experience in this activity?

Hands on

Now write the Promp with the research topic of your interest, section in yellow with brackets

Prompt 3 : I want to write a literature review about [Topic]. Can you help me come up with a structure for this review?

What was the result, does the review of literature and structure that ChatGPT produced make sense?

Hands on

Individual activity with Google Scholar

Search and explore bibliographical references in pdf of your topic of interest in Google Scholar, use keywords or author

Generate a folder on your laptop with a clear name related to your topic of interest. Keep all the papers you found on the topic in it, making sure to organize them in an orderly manner.

https://scholar.google.com/

Jenni AI vs. Paperpal

- has outline builder feature
- versatility in outlining
- Can search academic databases and insert references
- Accurate AI assistant (Ask Jenni)

- Works with Microsoft word
- guide to start writing a scientific article
- Text improvements suggestions

@Marek Kiczkowiak

Procedure proposition

HOW TO WRITE A LITERATURE REVIEW WITH AI?
AI into Scientific Research seminar IAE Lyon 2025

Read a lot! — Scopus, Elicit, SciSpace, Consensus App — 1 — SCOPING ANALYSIS

PURPOSE AND RESEARCH QUESTIONS — 2 — What to study? Consensus App, ChatGPT

To check the context — Scopus, Epsilon, Elicit, SciSpace, Consensus App — 3 — CONTEXT ANALYSIS

LITERATURE IDENTIFICATION — 4 — To find the base data — ChatGPT, Scopus, WoS, Elicit, SciSpace, Consensus App

To find the best data — Scopus, WoS, Elicit, SciSpace, Consensus App — 5 — LITERATURE SELECTION

REPORT PREPARATION WITH AI (PRE-WRITING)
AI into Scientific Research seminar IAE Lyon 2025

Narrowing the scope — Elicit, SciSpace, Consensus, ChatGPT, Gemini, Claude — 1 — EXTRACTION OF ABSTRACTS/MAIN FINDINGS

THEREADS IDENTYFICATION — 2 — What's in the literature? ChatGPT, Gemini, Claude

The structure creation — MS WORD :) — 3 — EXPANDING THREADS WITH POINTS

FILLING THE POINTS WITH THE CONTENT — 4 — The content creation — ChatDOC, Jenni, Blainly, Elicit, SciSpace, Scite

How many %of AI? — Quilbot, SciSpace, other.... — 5 — AI DETECTION

PARAPHRASING — 6 — Write it differently — Quilbot, SciSpace, other....

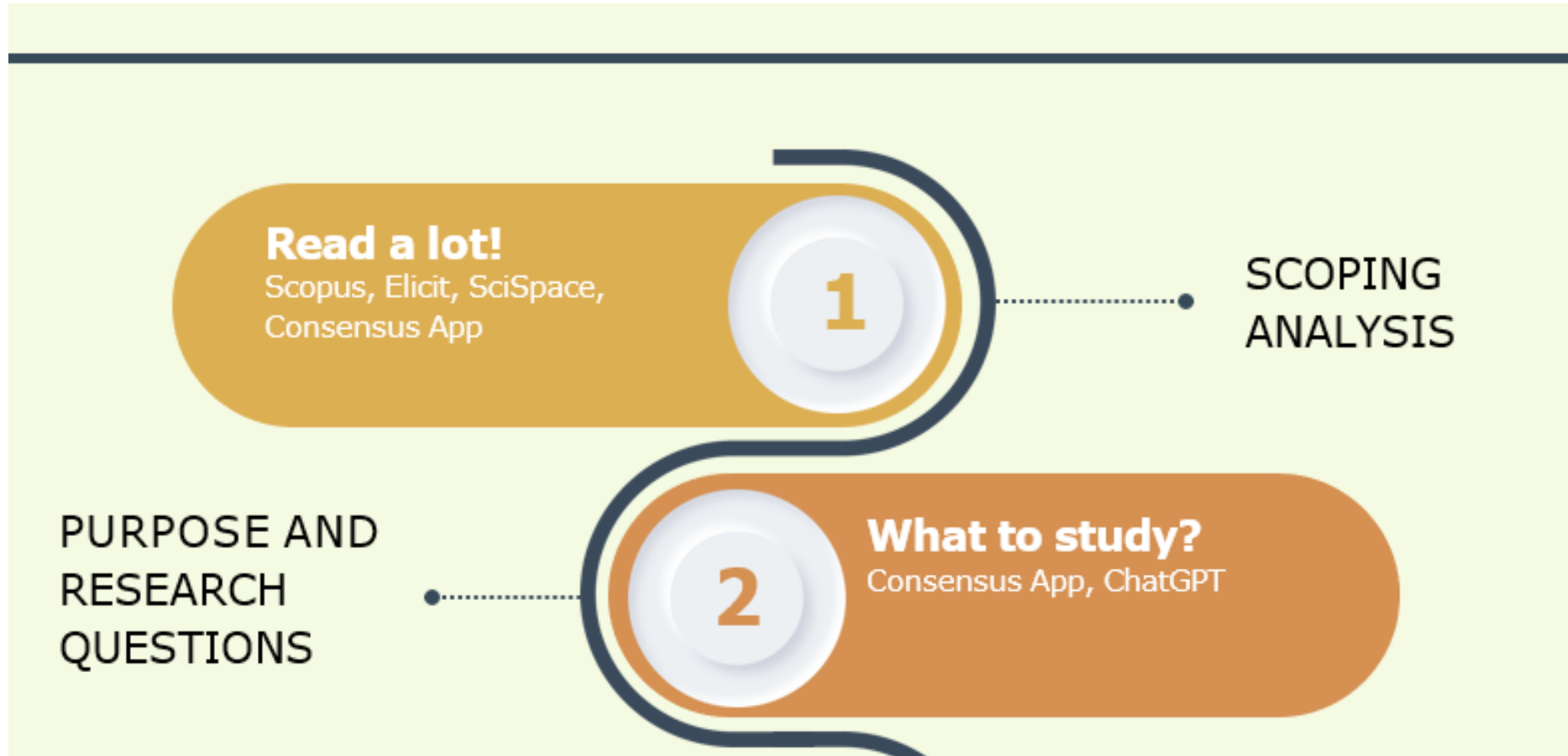References! — Mendeley, Zotero — 7 — REFERENCES

PRZEMYSŁAW TOMCZYK, PHD
with adaptations by MAURO RODRÍGUEZ-MARIN

HOW TO WRITE A LITERATURE REVIEW WITH AI?
AI into Scientific Research seminar IAE Lyon 2025

Read a lot!
Scopus, Elicit, SciSpace,
Consensus App

1

SCOPING
ANALYSIS

PURPOSE AND
RESEARCH
QUESTIONS

2

What to study?
Consensus App, ChatGPT

Note: Poster 1 is available in the DRIVE folder shared by the professor.

HOW TO WRITE A LITERATURE REVIEW WITH AI?
AI into Scientific Research seminar IAE Lyon 2025

To check the context
Scopus, Epsilon, Elicit, SciSpace, Consensus App

3

CONTEXT ANALYSIS

LITERATURE IDENTIFICATION

4

To find the base data
ChatGPT, Scopus, WoS, Elicit, SciSpace, Consensus App

To find the best data
Scopus, WoS, Elicit, SciSpace, Consensus App

5

LITERATURE SELECTION

HOW TO WRITE A LITERATURE REVIEW WITH AI?
AI into Scientific Research seminar IAE Lyon 2025

DATA EXTRACTION, SYNTHESIS AND PRESENTATION

6

What the data is about?
Consensus App, Elicit, SciSpace, Gamma and Fliki

Write!
ChatGPT, ChatDOC, Jenni.ai, Elicit, SciSpace, Scite.

7

REPORT PREPARATION

Mind the ethics.
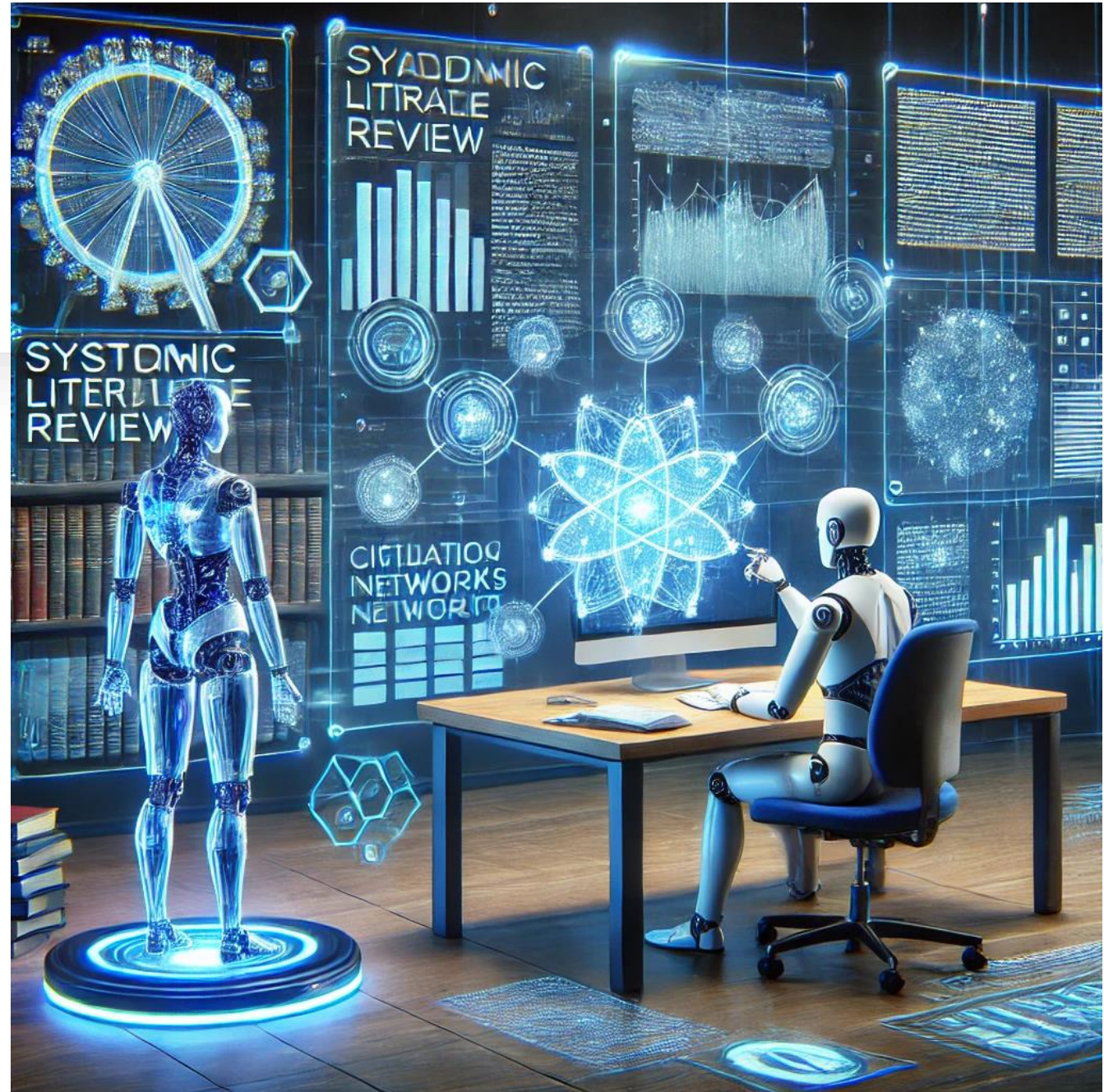How to use AI tools to meet publishers requirements

What publishers say? Claims, if needed

Additionally, Furthermore, Secondly, Crucial, Realm...

How to recognize AI?

Human – AI collaboration in the future

AI as a tool or as a research partner?

Learnings

- **AI in Research**: AI tools significantly enhance the efficiency of SLR
- **Applications of AI**: AI is versatile, supporting tasks like process optimization, content creation, and SLR
- **Tool Utilization**: Freemium and paid AI tools such as Consensus, SciSpace, Paperpal and Elicit provide comprehensive support for research, including scoping reviews, data synthesis, and report preparation.
- **AI Limitations**: While AI accelerates research processes, it doesn't guarantee accuracy or replace manual quality checks, especially in literature identification and selection.
- **Human-AI Collaboration**: Effective integration involves treating AI as a complementary partner, balancing automation with human oversight for optimal research outcomes.

Introduction to Ethical considerations: Leveraging AI for Scientific Research

This seminar explores the transformative role of AI in scientific research, emphasizing its ethical and responsible integration into academic practices. Researchers must navigate not only the technical capabilities of AI but also its broader implications on research integrity, data privacy, and societal impact. The seminar equips researchers with the vocabulary and analytical tools necessary to critically evaluate AI applications. Topics include their potential to advance research, challenges surrounding fairness and bias, and the ethical considerations involved in decision-making processes related to AI usage.

Key Questions for Consideration

- What constitutes ethical and responsible use of generative AI in scientific research, particularly regarding academic integrity, data protection, and reproducibility?
- How can researchers maximize the benefits of generative AI while addressing challenges like algorithmic bias, data security, and over-reliance on automation?
- What critical factors should researchers consider to ensure the transparent and equitable deployment of generative AI in their work?
- How can the use of generative AI in research align with data privacy regulations and respect participants' rights in studies involving information?