Global Entrepreneurship Monitor

1999 25TH ANNIVERSARY 2024

Using AI in Entrepreneurship Research

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Let us know in the Q and A:

1. In what areas of your research work are you currently using AI?

2. What is the question you would most like answered or at least partially answered today?

Speakers

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GEM SWITZERLAND Experience

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Freiburg

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2021 Nov. 2022 2025 …

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GEM 1999 25TH ANNIVERSARY 2024

Ranks | Scores

	Overall	Talent	Infrastructure	Operating Environment	Research	Development	Government Strategy	Commercial	Scale	Intensity
United States	1	1	1	2	1	1	2	1	1	3
China	2	9	2	21	2	2	5	2	2	21
Singapore	3	6	3	48	3	5	10	4	11	1
United Kingdom	4	4	17	4	4	16	7	5	3	9
France	5	10	14	19	6	4	9	8	6	10
South Korea	6	13	6	35	13	3	4	12	7	11
Germany	7	3	13	8	8	11	8	9	5	15
Canada	8	8	18	16	9	10	3	6	8	8
Israel	9	7	26	65	7	6	32	3	14	2
India	10	2	68	3	14	13	11	13	4	36
Japan	11	23	5	53	20	14	12	14	9	31
Switzerland	12	5	11	58	5	19	64	20	29	4

https://www.tortoisemedia.com/data/global-ai

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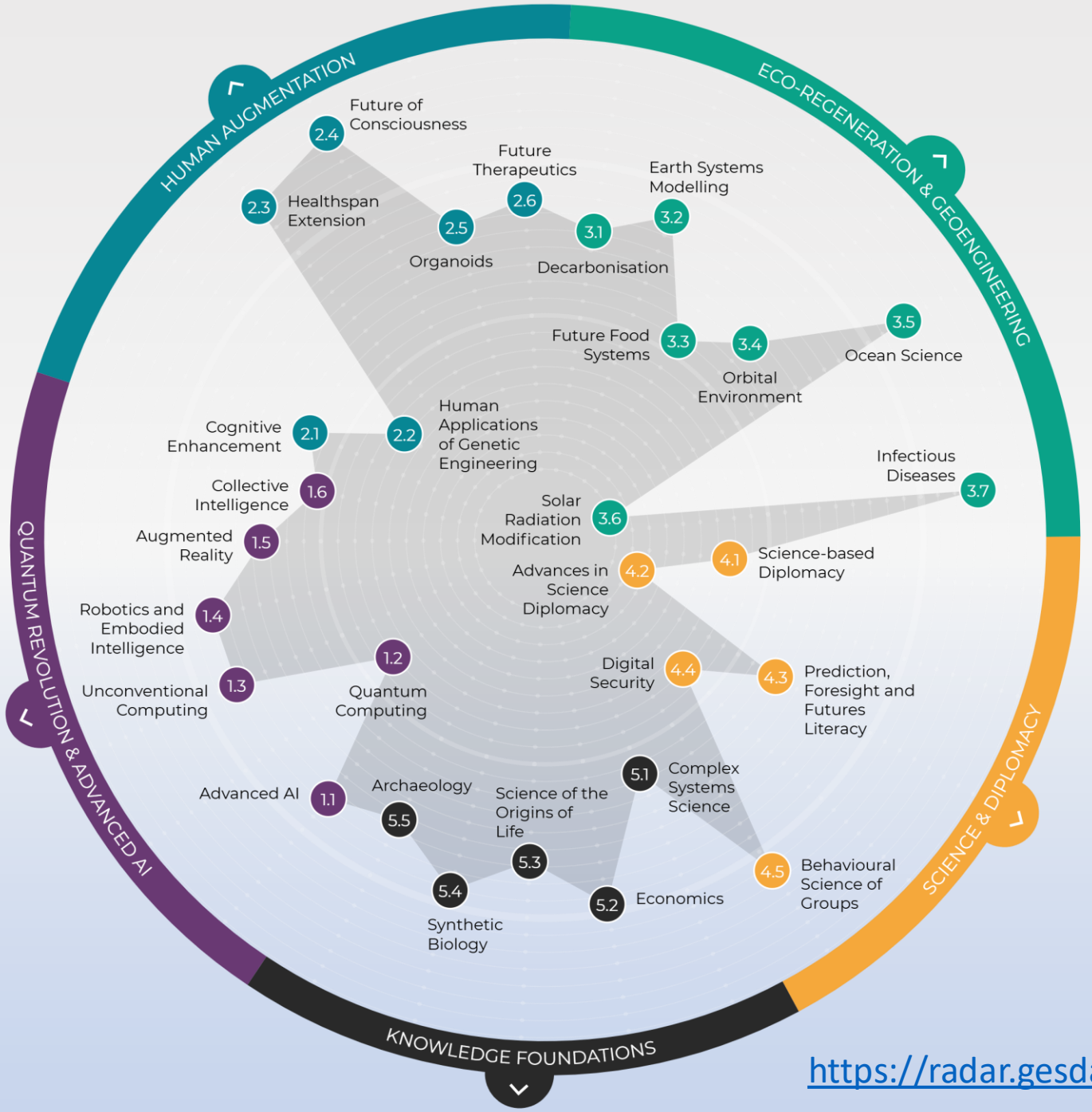

https://radar.gesda.global/science-anticipation

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Competence & institutions

Practical guidance for institutions:

1. Technical Understanding

1. AI terminology
2. Machine learning algorithms
3. Neural networks
4. Natural language processing

2. Practical Skills

1. Designing and deploying AI tech
2. Using tools
3. Data management

3. Critical Evaluation

1. Assessing AI-generated content
2. Identifying biases and inaccuracies
3. Understanding algorithmic intent

4. Ethical Considerations

1. Core ethical principles of AI
2. Ethical dilemmas
3. Societal implications

Baskara FR. Conceptualizing Digital Literacy for the AI Era: A Framework for Preparing Students in an AI-Driven World. Data and Metadata [Internet]. 2025 Jan. 1 [cited 2025 Jun. 10];4:530. Available from: https://dm.ageditor.ar/index.php/dm/article/view/530

Competence & students

Table 1. AI competency framework for students

Competency aspects	Progression levels		
	Understand	Apply	Create
• Human-centred mindset	• Human agency	• Human accountability	• Citizenship in the era of AI
• Ethics of AI	• Embodied ethics	• Safe and responsible use	• Ethics by design
• AI techniques and applications	• AI foundations	• Application skills	• Creating AI tools
• AI system design	• Problem scoping	• Architecture design	• Iteration and feedback loops

unesdoc.unesco.org/in/rest/annotationSVC/DownloadWatermarkedAttachment/attach_import_be395de4-719f-49fa-94f9-b0381426f8c5?_=391105eng.pdf&to=80&from=1

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Competence & SME

satw technology for society

Applications and examples of AI for SMEs

The following applications show how and where AI technologies are already being used today. The assessment refers to how complex their implementation is, from simple and moderate to difficult.

Content creation with AI
Tools such as Microsoft Copilot support text creation, translations and style optimization.

Example: In marketing or customer support, the processing time can be reduced by up to 50 %.

Simple

Education with AI
AI combined with VR/AR enables individual and practical learning.

Example: Employees are trained in realistic scenarios, e.g. for service tasks.

Simple

Image and video analysis
AI optimises quality controls or automates document processing.

Example: A catering company automated the processing of 30,000 invoices per month and increased accuracy.

Simple to medium

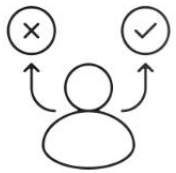
AI in software development
AI-based assistants like Gemini facilitate code analysis, troubleshooting and documentation.

Example: JetBrains IntelliJ offers AI-supported functions for more efficient and higher-quality code development.

Simple to medium

Decision-making with data science and machine learning
Algorithms analyse patterns in data to support decision-making.

Example: A company used machine learning (ML) to optimise personnel planning in logistics and increased efficiency by 15 %.



Simple to difficult

SAIROP

Optimisation in production and logistics
AI-supported algorithms improve delivery networks, forecasts and pricing.

Example: A beverage retailer automates orders for 600 stores and reduces overstocks and out-of-stock situations.

Moderate to difficult

AI-supported language models with external knowledge
Large language models (LLM) can be supplemented by external data sources, such as company data. This combination improves the quality of the answers and reduces errors.

Example: A company's product information is searched when processing an inquiry and relevant details are used to provide more precise answers. Sources can be specified and false statements reduced.

Moderate to difficult

Safety through ML
ML detects and prevents fraud, e.g. in online banking.

Example: Splunk uses ML for anomaly detection and failure prevention in IT systems.

Moderate to difficult

Quality control with computer vision
Neural networks identify errors in real time, ideal for small batches and precision parts.

Example: A Swiss manufacturer uses AI to optimise tool production and achieve the highest quality standards.

Moderate to difficult

Process optimisation
AI minimises downtimes through automated adjustment of production parameters.

Example: In the machining industry, start-up times for new products are significantly reduced by AI technology.

Difficult

Predictive maintenance
AI recognises potential machine problems at an early stage and extends operating times.

Example: In the railroad industry, maintenance is carried out proactively to avoid breakdowns.

Difficult

https://online.fliphtml5.com/qdiuc/tctv/

Visual storytelling

Data storytelling through interactive dashboards enables users to:

- ***Explore trends*** dynamically by filtering for country, year, gender, and age.
- ***Identify relationships*** between ecosystem conditions and entrepreneurial activity.
- ***Translate complex indicators*** into accessible visuals for policymakers and the public.
- ***Provide tailored views*** for different stakeholder needs—whether researchers, educators, or government agencies.

METHODOLOGY FOR PROCESSING GEM FILES (APS AND NES) AT THE SWISS AND GLOBAL LEVELS TO CREATE POWER BI REPORTS, Viktoriia Apalkova, Maya Dougoud (to come)

Tricky

- Transparency (black box -> information (yes/no - part./full))
- Discrimination (private/public)
- Data Protection (transparency, purpose limitation, data minimization, storage limitation)
- Manipulation (dominance/autonomy - ethics)
- Liability

Tricky

Constant evolution of tools (choosing the right one)
Multiple potential (knowing how to use)
Promising Collaboration (experience)

Risks
Processing errors
Exposure of personal or sensitive data
Risk of standardization
Loss of critical thinking

AI doesn’t …

- use facial expressions
- use irony
- assume context

Synthetic entrepreneur?

8 **virtual** people

- Quick & inexpensive
- Harmonious & idealized
- Reproduces patterns
- Responds well

42 **real** people

- Elaborate and nuanced
- Contradictions
- Surprises
- Tells complex stories

https://swiss-insights.ch/wp-content/uploads/2024/11/GIM-Suisse_Synthetic-User_VortragSwissInsights_V20241113_kurz.pdf

HOW?

- An AI Accountability Framework requires the exercise of **due diligence** in the **development** and **deployment** of a company's AI products to ensure that the end-result is not discrimination or the further marginalization of vulnerable groups
- **Transparent** assessment of partnerships that will guide HOW a product will be utilized within the **context of a given culture or society**
- **Due Diligence on Human Rights Impacts** must be exercised at **every cycle of development**
- **Collaboration** with **stakeholders**
- Hiring of **management** to ensure that ALL of the assembled data and information base is culturally relevant but NOT culturally biased, accounting for all social, cultural and historic contexts
- A stocktaking of if and how inequality is perpetuated through automation, such as through discriminatory algorithms or through the **'weaponization'** of AI

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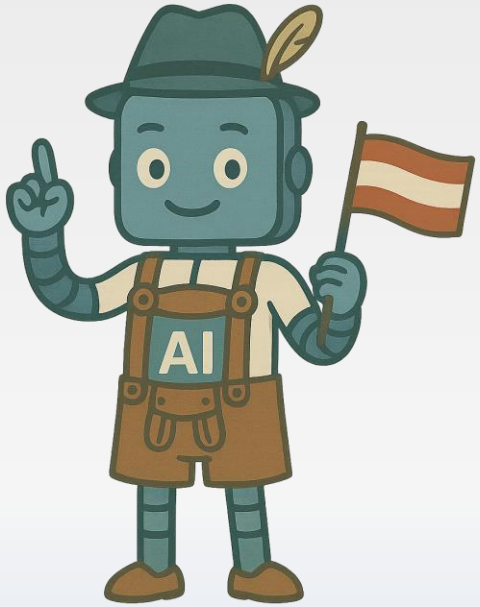

GEM Austria Experience

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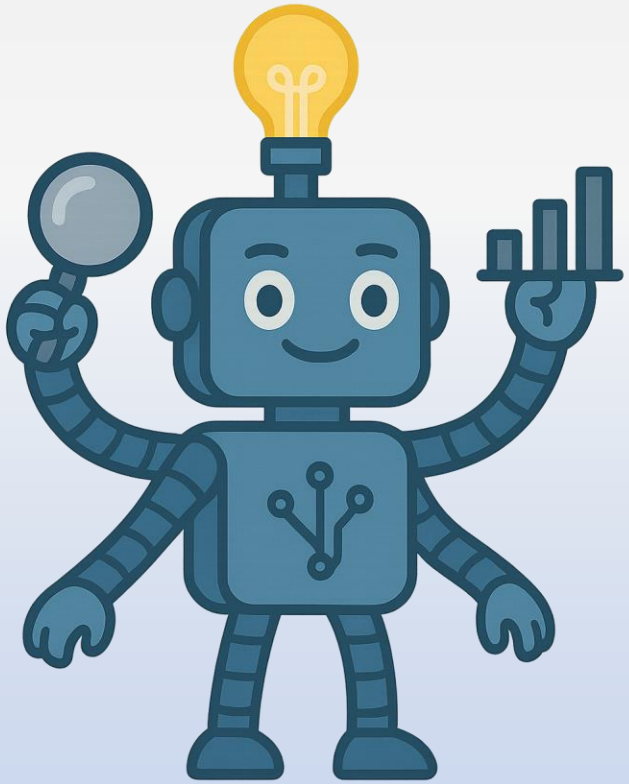
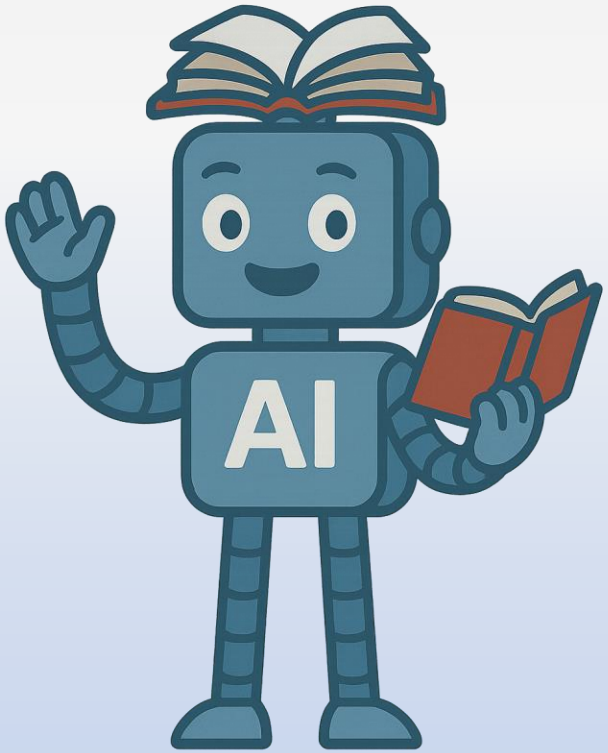
GEM Austria – AI as our jack-of-all-trades team member (different team roles & use cases)



#1 AI Co-Author

Customized GPT for automated report writing (but be transparent and always double-check!), drafting country spotlights, contextualisation, benchmarking etc.

GEM Austria – AI as our jack-of-all-trades team member (different team roles & use cases)

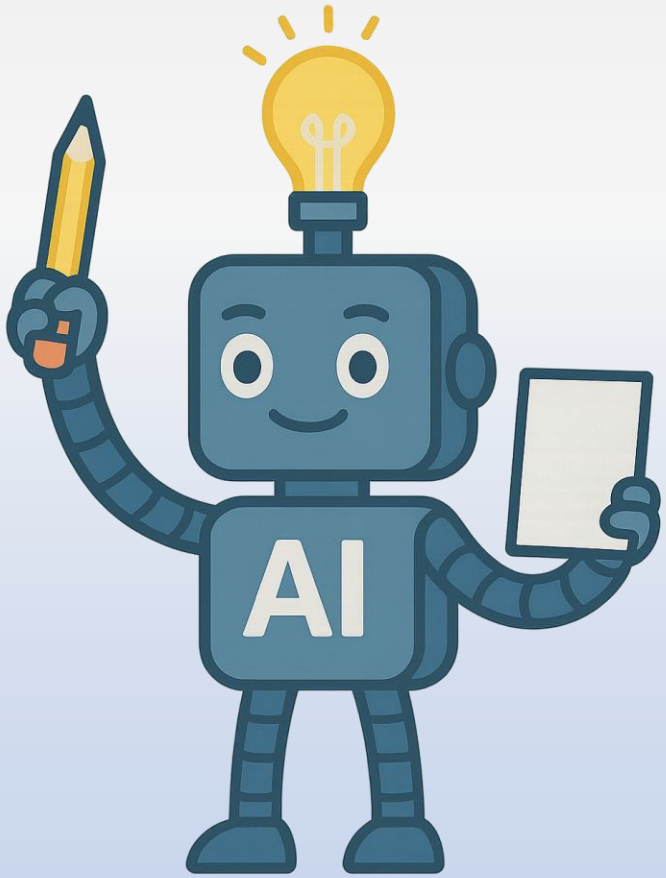


#2 AI Storyteller: automated adaptation of content for different audiences

- AI Podast creator: with e.g. NotebookLM
- Social media posts (for e.g., LinkedIn)
- Website news & press releases
- Policy advisor
- Audience "Translator"
- Designer of infographics, slideshows, presentations, reels, snapshots etc. (with e.g. Gamma)
- GEM light versions (all results concise in 12 pages)
- Short animated videos (e.g. powtoon.ai > under prep.)

…

GEM Austria – AI as our jack-of-all-trades team member



Under development

#3 AI Data Analyst (APS: automated data analysis; NES content analysis with AI; data mining)

Research project with eXplore!, University of Economics Vienna & EY Austria

The future/disruption of GEM? AI Data Creator >>> (real-time?) APS and NES AI-Augmented GEM Data

Based on e.g. past GEM data (APS & NES), global datasets (World Bank, OECD, WEF, GII etc.), country-level economic, social, institutional, and demographic indicators, social media signals, search trends, and digital footprint data (for proxy behavior signals) etc.

Data Augmentation

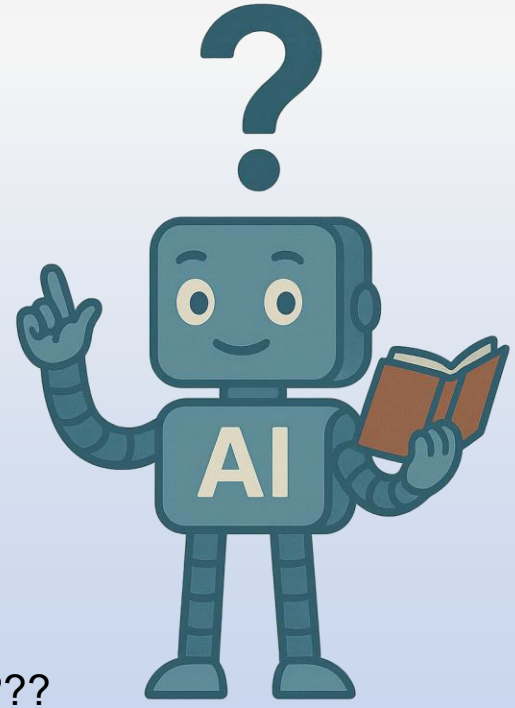
- Fill in missing data for countries or years with incomplete GEM coverage
- Improve robustness in panel data models

Synthetic Forecasting

- Predict future APS/NES values for policy scenario planning
- Estimate impact of policy changes or economic shocks (e.g., COVID, inflation)

Cost Reduction / Data Triaging

- Identify low-variance or low-risk data areas where real surveys can be skipped or reduced
- Use AI-generated insights to pre-fill data and then validate with experts or targeted surveys
- Run in parallel to “real” data collection as a control group (enlarge or split sample) > or replace???



Further examples: GEM Spain – interactive dashboard on website

PowerBI: [Datos Interactivos - GEM España]

Further GEM teams using PowerBI:

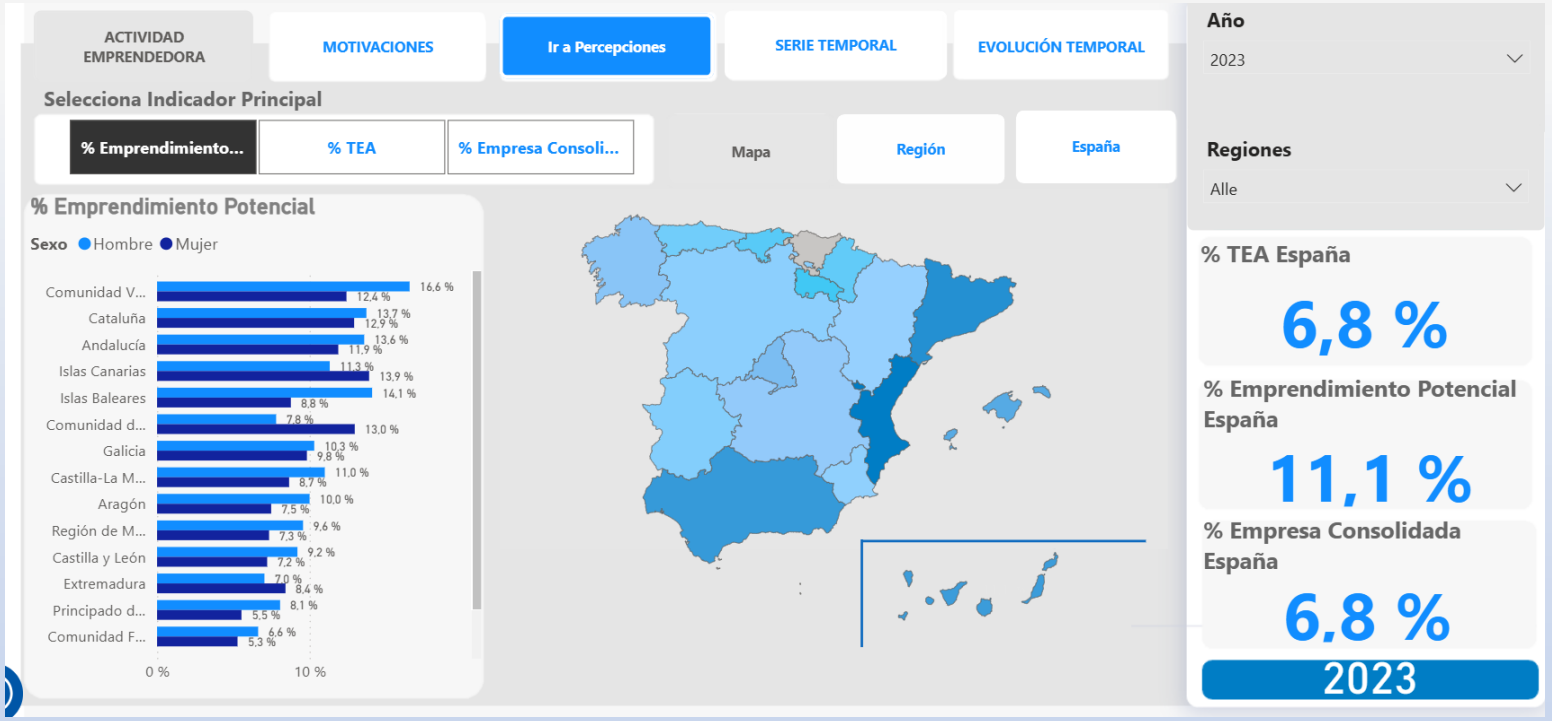
GEM Jordan

GEM South Africa

GEM Switzerland

GEM USA

…



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