

Mākslīgais intelekts kā
partneris
zinātnes komunikācijā un
sabiedrības iesaistīšanā

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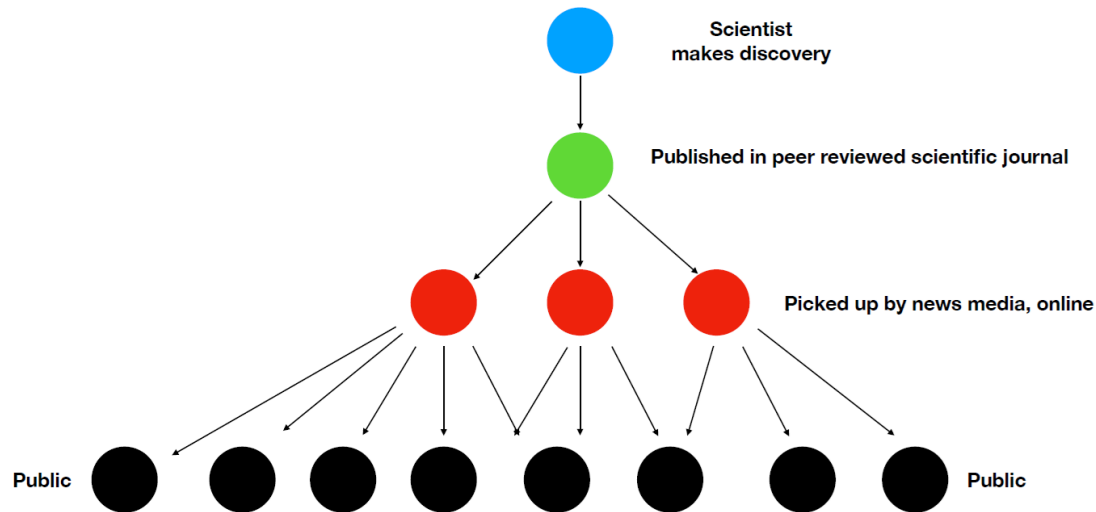
Latvijas Universitātes

● Ekonomikas un sociālo zinātņu
fakultātes doktorante

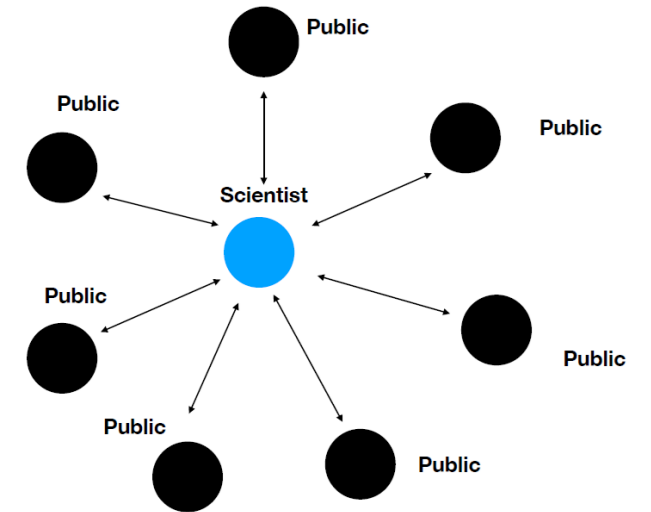


Kas ir Zinātnes komunikācija?

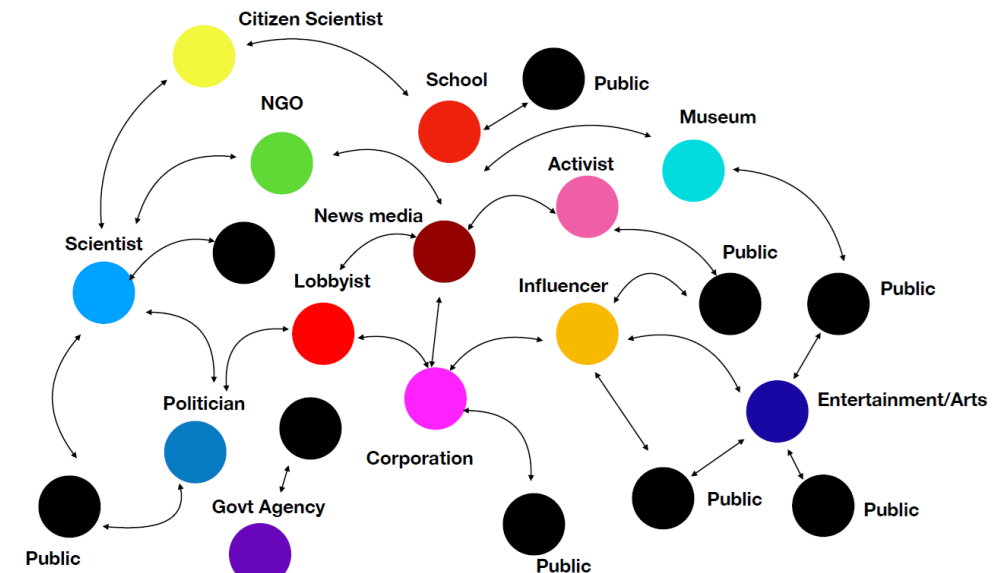
Dissemination model of science communication



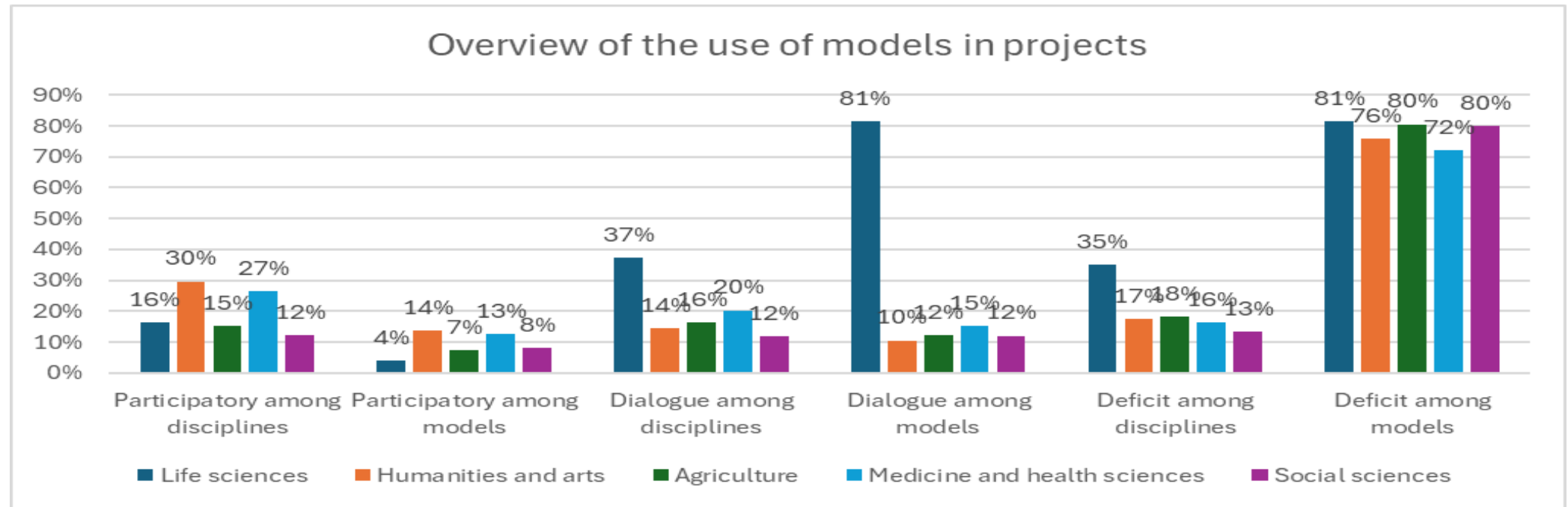
Mode 2: Dialogue (Science in Society)



Mode 3: Participation: Society in Science



Zinātnes komunikācijas prakse Latvijas Zinātnes padomes fundamentālo un lietišķo pētījumu programmā 2023. gadā



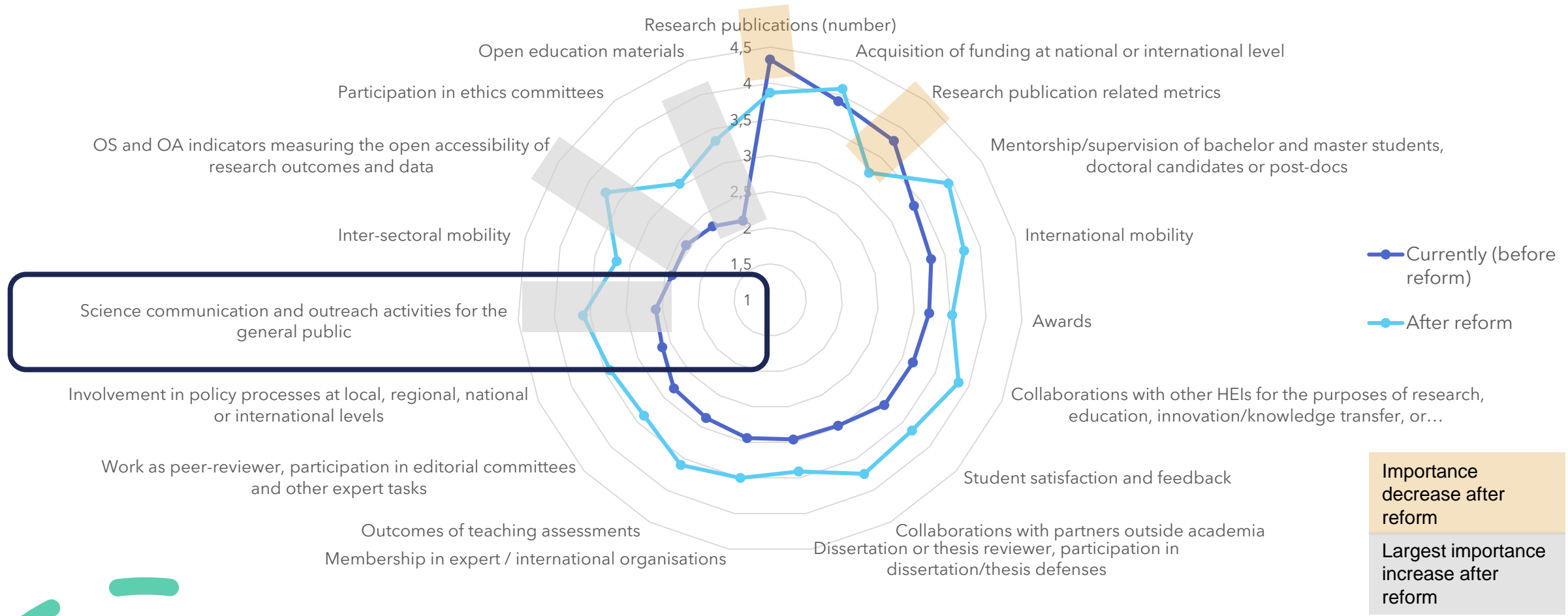
- Tā kā visa šī informācija ir attiecināma uz projekta *ietekmes* sadaļu, var apgalvot, ka komunikācijas prakse lielākajā daļā projektu nav labi noformulēta, tāpēc rezultāti ir neskaidri, ja tie bija iecerēti. Nepieciešams skaidri nodalīt komunikāciju, izplatīšanu un izmantošanu, kur komunikācija varētu būt vērsta uz jebkāda veida aktivitātēm, un kategorijām, tas palīdzētu izvēlēties iespējamo aktivitāti un to efektīvi izmantot, veicot komunikācijas aktivitātes.

by JAMES STEVENSON
New Yorker Cartoons



“One thing I’ll say for us, Meyer—we never stooped to popularizing science.”

Indicators for assessing academic careers



ERA PRIORITIES

2. Taking up together the challenges posed by the twin green and digital transition, and increasing society's participation in the ERA

ERA ACTIONS

10. Make EU research and innovation missions and partnerships key contributors to the ERA
11. An ERA for green transformation
12. Accelerate the green/digital transition of Europe's key industrial ecosystems
13. Empower higher education institutions
14. Bring Science closer to citizens

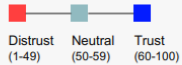


2024 Edelman Trust Barometer

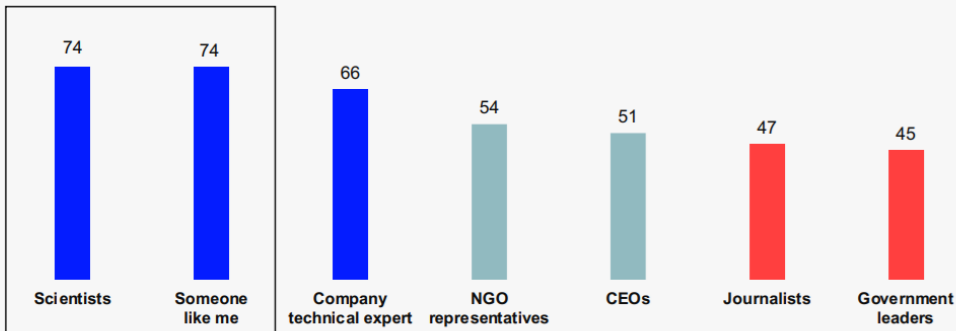
Dispersion of Authority: Peers on Par With Scientists

Percent trust

GLOBAL 26 Excl China, Saudi Arabia



I trust each to tell me the truth about new innovations and technologies



2024 Edelman Trust Barometer. TRU_PEP_TCNG. Below is a list of categories of people. For each one, please indicate how much you trust that person or group of people to tell you the truth about new innovations and technologies. 9-point scale; top 4 box, trust. Question asked of half the sample. General population, 26-mkt avg. *Government leaders* not asked in China or Saudi Arabia.

Pietuvināt zinātni sabiedrībai

2024 Edelman Trust Barometer

P. 28

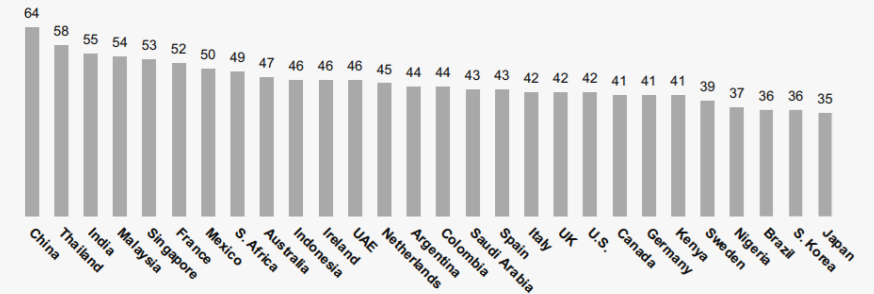
Make the Science Transparent and Accessible to the Public

Percent who agree

GLOBAL 28

Scientists do not know how to communicate with people like me

45%



2024 Edelman Trust Barometer. CHG_AGR. Please indicate how much you agree or disagree with the following statements. 9-point scale; top 4 box, agree. Question asked of half the sample. General population, 28-mkt avg.

Trust in scientists and their role in society across 68 countries

83% aptaujāto uzskata, ka zinātniekiem ir jākomunicē ar sabiedrību par zinātni.

- Zurnālā Nature Human Behaviour publicētajā rakstā “Trust in scientists and their role in society across 68 countries” (Uzticība zinātniekiem un viņu loma sabiedrībā **68 valstīs**) pētīta pasaules sabiedrības uzticēšanās zinātniekiem un viņu uztveramā loma sabiedrībā. Pētījums, kas veikts 68 valstīs, atklāj, ka uzticēšanās zinātniekiem būtiski atšķiras atkarībā no reģiona un to ietekmē tādi faktori kā **politiskā ideoloģija, izglītība** un **ar zinātni saistītas informācijas pieejamība**. Kopumā zinātniekiem uzticas vairāk nekā daudzām citām institūcijām, taču šī uzticēšanās nav viendabīga, un to var ietekmēt dezinformācija, politiskā polarizācija un kultūras atšķirības. Pētījuma rezultāti uzsver, cik svarīga ir zinātnieku pārredzama komunikācija un sabiedrības iesaiste, lai saglabātu un vairotu uzticēšanos, jo īpaši pieaugoša skepticisma un dezinformācijas laikmetā. Pētījumā uzsvēta zinātnieku izšķirošā loma globālo problēmu risināšanā un nepieciešamība veicināt uzticēšanos, lai nodrošinātu, ka viņu darbs tiek efektīvi integrēts sabiedrības lēmumu pieņemšanā.

Kādiem nolūkiem parasti izmanto

- Rakstot komunikācijas ziņojumus
- Izvelkot pārskatu par pētījumu
- Adaptācija dažādam mērķauditorijam
- Izvelkot faktus, statistiku, datus interpretācijas
- Izmanto, ka palīgrīku apmācības, vai izglītības procesā
- Datu analīzei

Vērtētāji arī izmanto ChatGPT projektu pieteikumu vērtēšanai un MI vairāk patīk projektu pieteikumi kas bija uzrakstīti ar MI.



Specific tasks in which AI is most used: **Communications**
The Rapid Adoption of Generative AI, August 2024.

<https://www.nber.org/papers/w32966>

MI rīki un ChatGPT izmantošana

- Veidot saturu;
- Vienkāršot un apkopot informāciju no pētījumā dažādam auditorijam, piem. žurnālistiem;
- 'Runāt' ar rakstiem, lai ātrāk un vienkāršāk citēt tos.
- *NB! Ja kaut kas ko jūs prasāt ir ļoti specifisks, vai tam nevar vienkārši piekļūt gatavojaties halucinācijām.*



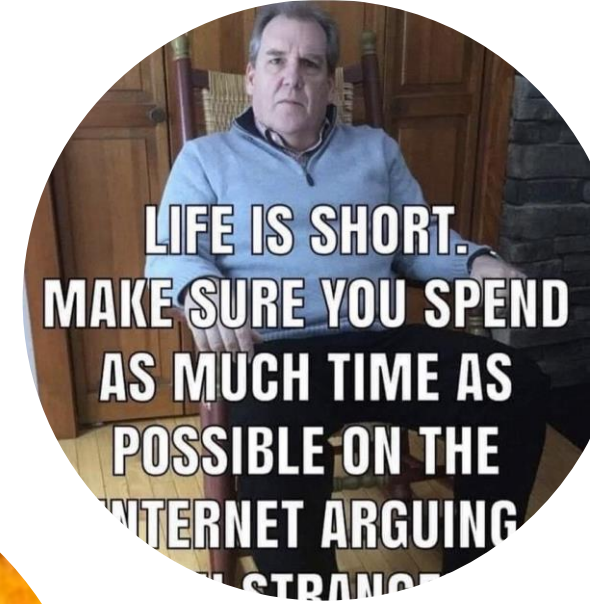
Reasoning models (argumentācijas modeļi)

- DeepResearch (OpenAI)

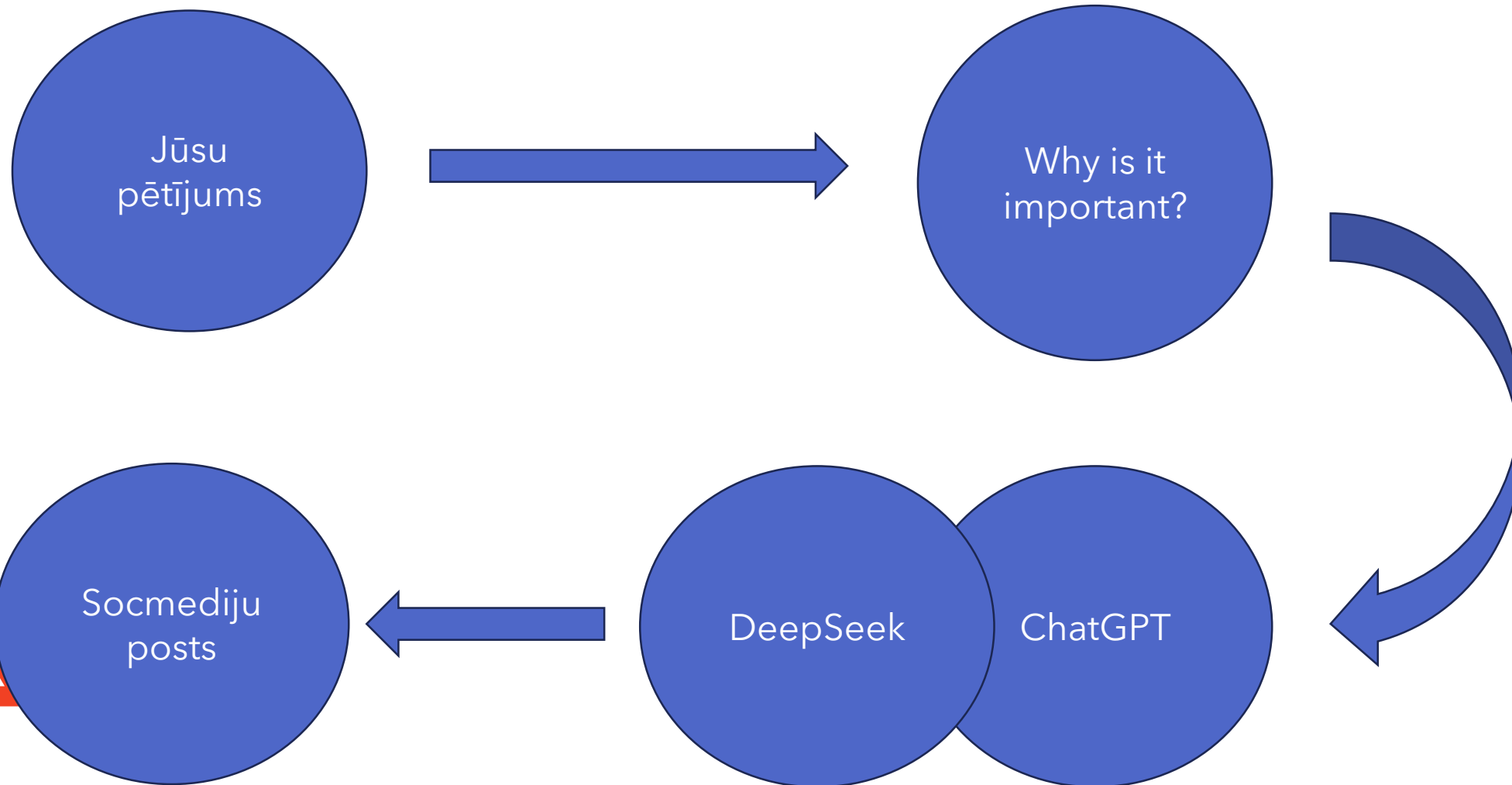
- DeepSeek (DeepThink)

Service	Best Model	Live Mode	"Reasoning"	Web Access	Generates Images	Executes Code	Data Analysis	Sees images	Sees video	Reads Docs	Personality	Superpower
OpenAI ChatGPT	GPT-4o	✓ Full multimodal	✗	✓	✓ DALL-E3	✓	✓	✓	In Live Mode	✓	Polished and efficient in text. In live mode, expressive and adaptive.	Live mode, most versatile set of features and capabilities
	o1/o3 family	✗	✓	✗	✗	✓	✗	✓	✗	✗	Methodical and analytical	Very powerful model for complex reasoning tasks, particularly in science, coding, and mathematics
Microsoft Copilot	"Copilot"	Voice only	✓	✓	✓ DALL-E3	Limited	✗	✓	✗	✓	Since it uses different models behind the scenes, a little inconsistent	Works well with Microsoft products and services
Anthropic Claude	Claude 3.5	✗	✗	✗	✗	✓	Limited	✓	✗	✓	Clever and friendly	Often the most creative and socially engaging model
Google Gemini	Gemini family	Voice only	✓	✓	✓ Imogen-3	Limited	Limited	✓	✓	✓	Helpful and a bit bland	Wide variety of features, good connections with search
X.ai Grok	Grok-2	✗	✗	✓ Mostly X	✓ Aurora	✗	✗	✓	✗	✓	Sarcastic and "fun" (though you can tone that)	Powerful model integrated tightly with X
DeepSeek	DeepSeek v3	✗	✓	✓	✗	✗	✗	✓	✗	Limited	Neurotically helpful, warm	Remarkably cheap and powerful model out of China

ViA ziņojums 2021.g.
uzsvera
Zinātnes
komercializāciju
Starptautisko sadarbību



Lai sasniegt tos mērķus ceļš varētu izskatīties šādi



Harry Potter and

Nitric Oxide as a miracle compound for anammox bacteria recovery in high-nitrite containing nitrogen removal MBBR

**Ivar Zekker^{1*}, Faisal- Al Mamun¹, Ruta Ozola-Davidane², Juris Burlakovs³,
Andrey E. Krauklis³, Zane Vincecica-Gaile³, Inga Grinfelde³**

¹ Institute of Chemistry, University of Tartu, 14a Ravila St., 50411 Tartu, Estonia.

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Bet kāpēc tas ir svarīgi?



The paper titled "Nitric Oxide as a Miracle Compound for Anammox Bacteria Recovery in High-Nitrite Containing Nitrogen Removal MBBR" explores the role of nitric oxide (NO) in enhancing the performance of anammox bacteria within moving bed biofilm reactors (MBBRs) used for wastewater treatment.

Significance of the Study:

Anammox (anaerobic ammonium oxidation) bacteria are crucial for nitrogen removal in wastewater treatment, offering an energy-efficient alternative to traditional nitrification-denitrification processes. However, high concentrations of nitrite (NO_2^-) can inhibit anammox activity, posing operational challenges. This study demonstrates that introducing trace amounts of nitric oxide can mitigate nitrite inhibition, thereby enhancing the resilience and efficiency of the anammox process.

Key Findings:

- **Nitric Oxide as a Recovery Agent:** The research indicates that adding small quantities of NO can accelerate the recovery of anammox bacteria from nitrite-induced inhibition. This finding suggests a potential strategy for maintaining stable nitrogen removal rates even under high-nitrite conditions.
- **Enhanced Biofilm Resilience:** The study highlights that thicker biofilms in MBBRs provide a protective environment for anammox bacteria, making them more resistant to inhibitory substances like nitrite. The addition of NO further supports biofilm resilience, promoting sustained bacterial activity.

Communicating to the Broader Public:

To convey the importance of this research to a general audience, consider the following approach:

- **Simplify Technical Terms:** Explain that the study focuses on improving methods to clean wastewater by enhancing the performance of specific bacteria responsible for removing harmful nitrogen compounds.
- **Highlight Environmental Impact:** Emphasize that this advancement can lead to more efficient and cost-effective wastewater treatment processes, contributing to cleaner water bodies and a healthier environment.
- **Use Analogies:** Compare the role of nitric oxide in aiding bacterial recovery to a "booster" that helps the bacteria overcome stress, similar to how a vitamin supplement might help humans recover from fatigue.

By focusing on these aspects, you can effectively communicate the study's significance and potential impact on environmental sustainability to the broader public.

DeepSeek posts

https://chat.deepseek.com/a/chat/s/c39d7d2e-6b24-4028-b264-a492d147a5bb



Nitric Oxide Advances Wastewater Treatment



Breakthrough in Wastewater Treatment!

Did you know nitric oxide (NO) could be a game-changer for cleaning up wastewater? A recent study reveals that NO acts like a *miracle compound* for reviving anammox bacteria—a key player in nitrogen removal—even in high-nitrite environments! 🌱 ✨

This discovery could revolutionize how we treat wastewater, making the process more efficient and sustainable. 🌍 💧

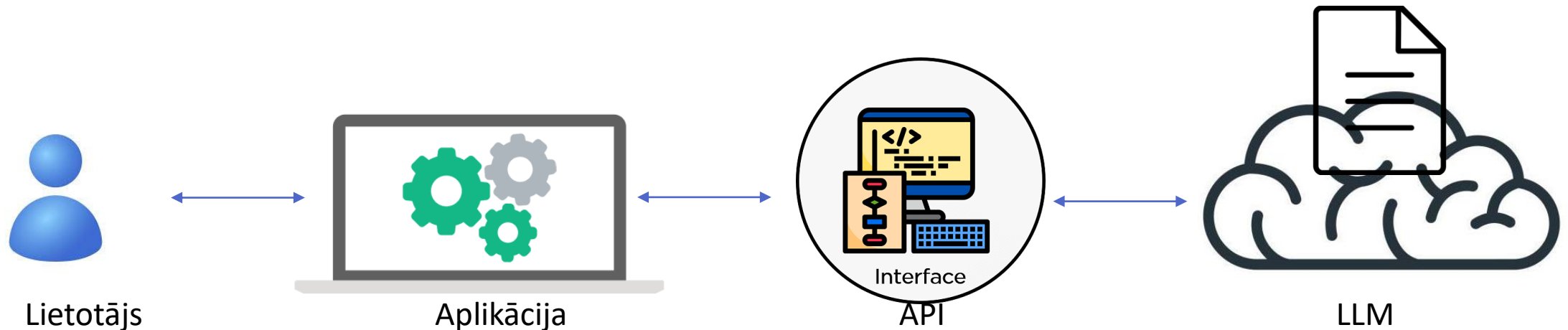
Check out the full article to learn how this tiny molecule is making a BIG impact: [Read more here](#)

#Science #Sustainability #WastewaterTreatment #Innovation #NitricOxide #Anammox
#EnvironmentalScience

Cita lieta ir ar projektiem un to komunikāciju



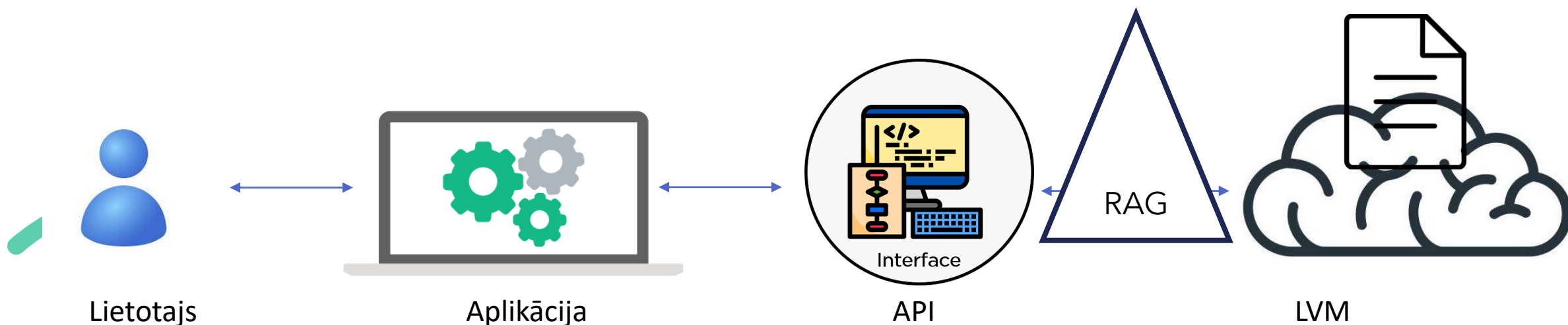
- ChatGPT:
- Semantiskais modelis
- Lai saņemtu vēlamu atbildi, jums ir jāsniedz konteksts un jāuztur komunikācija
- Lietojumprogrammēšanas saskarne, kas ļauj pieņemt pieprasījumus un sūtīt atbildes.



SciComBot dati:



- Nacionālas ZK stratēģijas un sabiedrības iesaistes prakses;
- Īpaši koncentrēti zinātnes komunikācijas projektu rezultāti no pamatprogrammas "Apvārsnis 2020" un pamatprogrammas "Apvārsnis Eiropa" projektiem;
- Ieteikumi par zinātnes komunikācijas un sabiedrības iesaistīšanas prakses uzlabošanu. Labas prakses piemēri un apraksts
- Pētniecības dokumenti
- Monitoringa ziņojumi par zinātnisko saturu un sabiedrības intereses līmeni
- Pēc pieprasījuma varētu atjaunināt un sniegt papildus saites, īpaši koncentrējoties uz Eiropas dokumentiem un stratēģijām.



Kādi ir sabiedriskas zinātnes iniciatīvu labie piemēri?(ChatGPT 4o)

- **Environmental Monitoring**
- **iNaturalist:**
 - Participants document and share observations of biodiversity using a mobile app. Data contributes to species distribution research and conservation efforts.
- **eBird:**
 - Bird enthusiasts report sightings to help track bird populations, migration patterns, and conservation status globally.
- **AirVisual Earth (Citizen Air Quality Monitoring):**
 - Volunteers use low-cost air quality sensors to monitor pollution levels and contribute to global air quality datasets.
- **Public Health and Medicine**
- **Flu Near You:**
 - Citizens self-report flu symptoms to help track and predict flu outbreaks.
- **Zika Mozzie Seeker:**
 - Participants set traps for mosquitoes, which are then analyzed for Zika virus presence to aid public health monitoring.
- **Climate Science**
- **Globe Observer:**
 - Participants report cloud cover, land cover, and mosquito habitats, contributing to NASA's climate studies.
- **Community Snow Observations (CSO):**
 - Skiers and hikers measure snow depth to improve water resource predictions and avalanche forecasting.
- **Old Weather:**
 - Volunteers transcribe historical weather logs from ships to help reconstruct past climates and improve climate models.
- **Ecology and Conservation**
- **Great Backyard Bird Count:**
 - A global event where people count birds in their backyards over a specific period to track populations.
- **Monarch Watch:**
 - Citizens tag and track monarch butterflies to study their migration patterns and population dynamics.
- **Ocean Conservancy's International Coastal Cleanup:**
 - Volunteers collect and document trash from beaches to inform strategies to combat marine pollution

Kādi ir sabiedriskas zinātnes iniciatīvu labie piemēri? (SciComBot)

- **Assistant:** Good examples of citizen science initiatives include:
- 1. **CitieS-Health:** Engages citizens in designing experiments to study the impact of environmental pollution on health in various cities [【20:0†source】](#) .
- 2. **WeCount:** Empowers locals to gather data regarding transport and mobility, enhancing community knowledge and involvement [【20:2†source】](#) .
- 3. **D-NOSES:** Aims to address odor pollution through local case studies, using citizen participation to influence global policy [【20:7†source】](#) .
- 4. **SPARKS:** Created participatory activities and exhibitions across Europe, promoting citizen engagement in health and science [【20:7†source】](#) .
- 5. **ACTION Project:** Supports hands-on citizen science initiatives targeting pollution, providing tools and methodologies to democratize research [【20:0†source】](#) .
- 6. **InNat:** Uses a mobile app to monitor biodiversity through citizen reports on various species, fostering citizen engagement in ecological data collection [【20:8†source】](#)

Labi piemēri par valstu stratēģijām zinātnes komunikācijā (**SciComBot**)

1. **Danish Board of Technology's Consensus Conferences:** Engaging citizen panels to inform policy decisions based on scientific knowledge 【24:1†source】 .
2. **UK's 'Line of Argument' Process:** Inviting a diverse group of stakeholders to collaboratively explore complex sustainability issues 【24:1†source】 .
3. **Austrian Science Communication Initiatives:** Utilizing networks like the Austrian Platform for Research and Technology Policy Evaluation to enhance science-policy interactions 【24:10†source】 .
4. **European Commission's Scientific Advice Mechanism:** Integrates scientific expertise into policymaking for informed decision-making 【24:18†source】 .

Labi piemēri par valstu stratēģijām zinātnes komunikācijā (ChatGPT 4o)

United Kingdom – Science and Society Strategy:

- Objective: Improve public trust in science and enhance engagement.
- Key Features: Science festivals and exhibitions (e.g., Cheltenham Science Festival); Support for science journalism and fact-checking organizations; Public consultations on controversial topics like genetic modification.
- Impact: Greater dialogue between scientists and the public on ethical and societal implications of research.

Australia – Inspiring Australia Initiative:

- **Objective:** Promote STEM engagement nationwide and enhance understanding of science's role in society; Key Features: Regional programs to engage rural and indigenous communities; National Science Week to celebrate achievements in science; Partnerships with media for positive portrayals of science in popular culture.
- **Impact:** Increased participation in STEM-related activities and better regional representation.

- **Finland** – Science Communication through Education: Objective: Integrate science communication into education at all levels.

- Key Features: Emphasis on critical thinking and media literacy in schools; Collaboration with universities to train scientists in public communication; Annual Tieteen Päivät (Science Days) festival to showcase research to the public.

- Impact: High public trust in scientists and widespread scientific literacy.

- **Germany** – Wissenschaft im Dialog (Science in Dialogue):

- Objective: Foster dialogue between science and society.

Key Features: Science slams and interactive science fairs to make research accessible; Public debates on controversial topics like nuclear energy or artificial intelligence; Media partnerships to ensure accurate reporting.

Latvijas piemēri:

- Atmodas stāsti – informācija <https://garamantas.lv> ([Autobiogrāfiju krājums](#) sadarbībā ar [Lifestory - Latvian Oral History Researchers Association](#) un [LU Latvijas vēstures institūts](#))
- Balsu talka (<https://balsutalka.lv>) – teikumu ierunāšana latviešu un latgaliešu valodā runas tehnoloģiju attīstībai, [AiLab.lv](#), [Latvijas atvērto tehnoloģiju asociācija - LATA](#))
- Savvaļas stāsti (<https://www.rsu.lv/savvalas-stasti>) – [RSU Sociālo zinātņu fakultātes](#) īstenota iniciatīva, kuras mērķis ir labāk saprast un dokumentēt Latvijā unikālu tradīciju – sēņošanu, ogošanu un citu savvaļas veļšu vākšanu.
- Folkloratoria: [Latvijas pirmatskaņojumu piedzīvos Valda Muktupāvela folkloratorija "Mūsu esmes upes"](#) - Latvijas Kultūras Akadēmija
- "LFK simtgades talka" (<https://lfk100.garamantas.lv>) – folkloras manuskriptu atšifrēšanas iniciatīva, kas norisēs vēl visu 2025. gadu ([LFK digitālais arhīvs / garamantas.lv](#), [LU Literatūras, folkloras un mākslas institūts](#)).
- [Dabasdati](#) (<https://dabasdati.lv>) aizvien piedāvā plašas un daudzveidīgas iespējas dabas dokumentēšanā.

Paldies par uzmanību!

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