Improving Stakeholder Processes in Estonian Georesources Through Generative AI

Summary

Georesource production is part of the foundation of our modern society, yet obtaining the social licence to operate (SLO) is particularly complex. Such projects often attract strong public opposition (also known as NIMBY or BANANA attitudes). At the same time, the reasoning and, moreover, solution ideas of opposing individuals are little researched. This is partially due to the high complexity of quantifying reasoning during classic surveys. The rise of Generative AI (GenAI) provides the technological leap that allows us to survey the reasoning of individuals and quantify it in an economic way. The aim of this project is to explore the possibilities of GenAI-supported surveys to understand the reasoning and solution ideas of stakeholders and to obtain an outlook for improved stakeholder inclusion processes.

Research field:	Earth sciences
Supervisors:	Prof. Dr. Wolfgang Dieter Gerstlberger Bruno Grafe
Availability:	This position is available.
Offered by:	School of Science Department of Geology
Application deadline:	Applications are accepted between June 01, 2025 00:00 and June 30, 2025 23:59 (Europe/Zurich)

Description

Supervisors

- Dr. Bruno Grafe, Department of Geology, School of Science, TalTech
- Prof. Wolfang Dieter Gerstlberger, Head of Unit - Sustainable Value Chain Management Unit: Department of Business Administration
- Industry co-supervisor: Dr. Stefanie Walter, Lots* GmbH, Germany

Duration of the project: 4 years (2025–2029)

Problem statement

Sentiment against resource extraction, be it primary or secondary, is at an all-time low in Estonia and the EU in general – although environmental standards are among the highest worldwide. Previous studies in Germany have further shown that sentiment against resource projects is dependent on the location of people surveyed: most negative in urban areas, most positive near mining areas; the less people know about mining, the more negative the sentiment is; knowledge about resources, how they are extracted, and their role in daily life is extremely limited. These problems are also known as Not-in-my-backyard (NIMBY), or more extreme, “Build absolutely nothing anywhere near anyone” (BANANA). However, resource projects require a “Social Licence to Operate” (SLO), which means that, irrespective of legal licences, the public does not oppose a project to the extent that operations are made impossible.

Surveys conducted in the field of mining and construction of large projects normally quantify the general sentiment on numerical scales but cannot capture the reasoning behind negative attitudes, the ideas of negatively opinionated individuals, let alone quantify these opinions and reasoning.

Solution and research approach

Semi-structured interviews allow for an assessment of reasoning behind pure opinion, but normally they have to be conducted by interviewers in person -– limiting the application. However, the rise of GenAI has paved the way for analysing large amounts of free text and classifying responses in near-real time. This allows semi-interactive surveys that react to user responses and ask for reasoning and proposed solutions. Another aspect is the possibility to classify and bin free-text replies and the ability to quantify responses based on their similarity (similar to sentiment analysis). This allows for the quantification of large amounts of unstructured answers.

The project aims to investigate the possibilities and boundaries in the use of GenAI for these tasks, with a focus on the specific domain of the georesource industry, as this is one of the most negatively viewed industries.

Aims

The objectives of this PhD project are to:

- gain insights into whether the willingness to cooperate with the survey increases or decreases through free-text surveys and/or interactive surveys;
- by using free text input, allow for unbiased answers of possible solution ideas to complex public problems;
- further develop the field of stakeholder involvement and the knowledge of its influencing factors;
- to increase the knowledge and competency in the deeper use of GenAI in Estonia;
- to gain insight on the cost and benefit of such an approach.

Responsibilities

The project will include:

- Design of next-generation surveys that utilise the potential of GenAI. Different design strategies are possible and should be explored. Ranging from free-text surveys over semi-structured interviews to complete chatbot interactions;
- Executing the implementation of the chosen survey concepts;
- Evaluation of the survey results, using GenAI and statistical methods;
- Evaluating the spatial distribution of sentiment and reasoning towards resource projects with regard to proximity to the projects;
- Presentation of the results in seminars, workshops, and conferences;
- writing scientific publications (three articles in international peer-reviewed journals are required) together with other team members;
- Participating in PhD courses and being involved in teaching undergraduates according to the regulations of the doctoral study programme at TalTech.

Requirements and beneficial experiences

- An M.Sc. degree in a related field
  - Social sciences with a focus on public relations / communication management and a strong dedication to learning about the resource industry,
  - Mining, civil or industrial engineering with experience or strong dedication to extend knowledge in the fields of communication management,
  - Economics, with a willingness to develop knowledge in stakeholder management and the resource industry;
- A clear interest in the topic of the position;
- Good statistical understanding;
- Knowledge/experience in GenAI API usage;
- Programming knowledge (such as Phyton, R);
- Proficiency in English;
- Strong and demonstrable writing and analytical skills;
- Capacity to work both as an independent researcher and as part of an international team.

We offer

- Friendly community and modern working environment within the TalTech campus in Tallinn, the capital of Estonia;
- Possibility to work on a currently very pressing topic with a great outlook for further use of the gained knowledge in the industry;
- Advisory by an industry partner;
- Becoming a member of an Estonian national research project and multi-institutional team. Tight international collaboration and regular visits to other European research centres, participation in conferences and workshops annually for presenting the results and building a network of research contacts.
- Gross income starting from EUR 2300 per month (increase depending on performance).

TalTech Department of Geology

The Department of Geology is the centre of expertise in geology, mineral resources, and mining at TalTech. Our researchers focus on bedrock geology, paleoenvironments, mineral resources, mining engineering and circular economy. We are responsible for study programmes on Earth systems and resources and host various labs and the largest geoscience collections in Estonia.

TalTech Department of Business Administration - Sustainable Value Chain Management Research Group

Sustainable value chain management focuses on preparing and supporting innovation and growth within a firm's strategic framework. The research group explores these opportunities using interdisciplinary methods from business, sustainability (e.g., Circular Economy), environmental economics, engineering, IT, design, and social sciences. Emphasis is placed on digitalization, smart production, Industry 4.0, Big Data, and strategic networks, aligned with Europe's smart, sustainable, and inclusive growth agenda. Projects are typically conducted in cooperation with businesses and supported by European or national initiatives.

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