

**Student Sustainable Entrepreneurship in Action:**

AI analytical approach on Koster island, Sweden

*INTERREG FREIIA Project – Koster AI Analyze*

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**Abstract**

*FREIIA, Facilitating Resilience Embracing Islands Innovation, is a INTERREG project financed by the European Union running from 1. October 2022 until 31. December 2025. The project consists of 14 partners from 6 countries, Netherlands, Denmark, Sweden, Germany, France and Norway.*

*The aim of this project is to help 6 island communities in the European Union to create competences, capabilities & structures that support the public sector in becoming successful in the green transition, through the involvement of community, young entrepreneurs and students.*

*This paper describes the process of using AI as a tool for identifying the innovation gaps on the Koster Islands in Sweden. AI is used as a prototype to explore possibilities for to process huge amount of data in a short period of time. The next step is to arrange workshops based on the problem statements produced/found by AI.*



*Figure 1 Students interviewing on Koster Island*

## Introduction:

During an experiment in analytic work after the interviews in V1 Hvaler in 2023, we found that we could save time by using AI to identify the innovation gaps identified after the interviews.

In this experiment, a picture of the whiteboard was taken using Google Lens, which can copy text from the whiteboard and transfer it into ChatGPT. When prompted to identify the innovation gaps, ChatGPT provided 10 suggestions. After our initial work by the students was completed, ChatGPT had correctly identified 9 out of the 10 problem statements. As part of the independent subject "Applied Project Development," an independent project was issued to explore the use of AI to assist in performing a time-consuming task more efficiently.

We have documented our approach to our prototype on how we used AI, and how it found our results.

## Word definitions

A **large language model (LLM)** is a type of computational model designed for natural language processing tasks such as language generation. As language models, LLMs acquire these abilities by learning statistical relationships from vast amounts of text during a self-supervised and semi-supervised training process.

Wikipedia contributors.com (2024). *Large language model*. In *Wikipedia*. Retrieved November 20, 2024, from [https://en.wikipedia.org/wiki/Large\\_language\\_model](https://en.wikipedia.org/wiki/Large_language_model)

**Prompt engineering** is the process of structuring an instruction that can be interpreted and understood by a generative artificial intelligence (AI) model. A *prompt* is natural language text describing the task that an AI should perform. [https://en.wikipedia.org/wiki/Prompt\\_engineering](https://en.wikipedia.org/wiki/Prompt_engineering)  
A prompt for a text-to-text language model can be a query such as "what is Fermat's little theorem?", a command such as "write a poem in the style of Edgar Allan Poe about leaves falling", or a longer statement including context, instructions, and conversation history.

Wikipedia contributors.com (2024). *Prompt engineering*. In *Wikipedia*. Retrieved November 20, 2024, from [https://en.wikipedia.org/wiki/Prompt\\_engineering](https://en.wikipedia.org/wiki/Prompt_engineering)

**AI analytics** refers to a subset of business intelligence that uses machine learning techniques to discover insights, find new patterns and discover relationships in the data. In practice, AI analytics is the process of automating much of the work that a data analyst would normally perform.

Anodot.com (2024). *AI analytics: What it is and how it works*. Retrieved November 20, 2024, from <https://www.anodot.com/learning-center/ai-analytics/>

## Chat GPT-4o

GPT-4o ("o" for "omni") is a multilingual, multimodal generative pre-trained transformer developed by OpenAI and released in May 2024. GPT-4o is free, but with a usage limit that is five times higher for ChatGPT Plus subscribers. It can process and generate text, images and audio. Its application programming interface (API) is twice as fast and half the price of its predecessor, GPT-4 Turbo.

Wikipedia contributors. (2024). *GPT-4*. In *Wikipedia*. Retrieved November 20, 2024, from <https://en.wikipedia.org/wiki/GPT-4>

**Custom GPTs** are a new way for anyone to create a tailored version of ChatGPT to be more helpful in their daily life, at specific tasks, at work, or at home—and then share that creation with others. For example, GPTs can help you learn the rules to any board game, help teach your kids math, or design stickers.

OpenAI. (2024.). *Introducing GPTs*. Retrieved November 20, 2024, from <https://openai.com/index/introducing-gpts/>

### **Hallucination (AI Context)**

AI hallucinations are incorrect or misleading results that AI models generate. These errors can be caused by a variety of factors, including insufficient training data, incorrect assumptions made by the model, or biases in the data used to train the model.

Google Cloud. (2024). *What are AI hallucinations?* Retrieved November 20, 2024, from <https://cloud.google.com/discover/what-are-ai-hallucinations>

### **Democratization of AI**

AI democratization puts AI into the hands of users without specialized AI or even technical knowledge, thereby empowering these individuals with the benefits and opportunities of the technology. Increasingly, IT leaders seek ways to extend the benefits of AI capabilities across the enterprise.

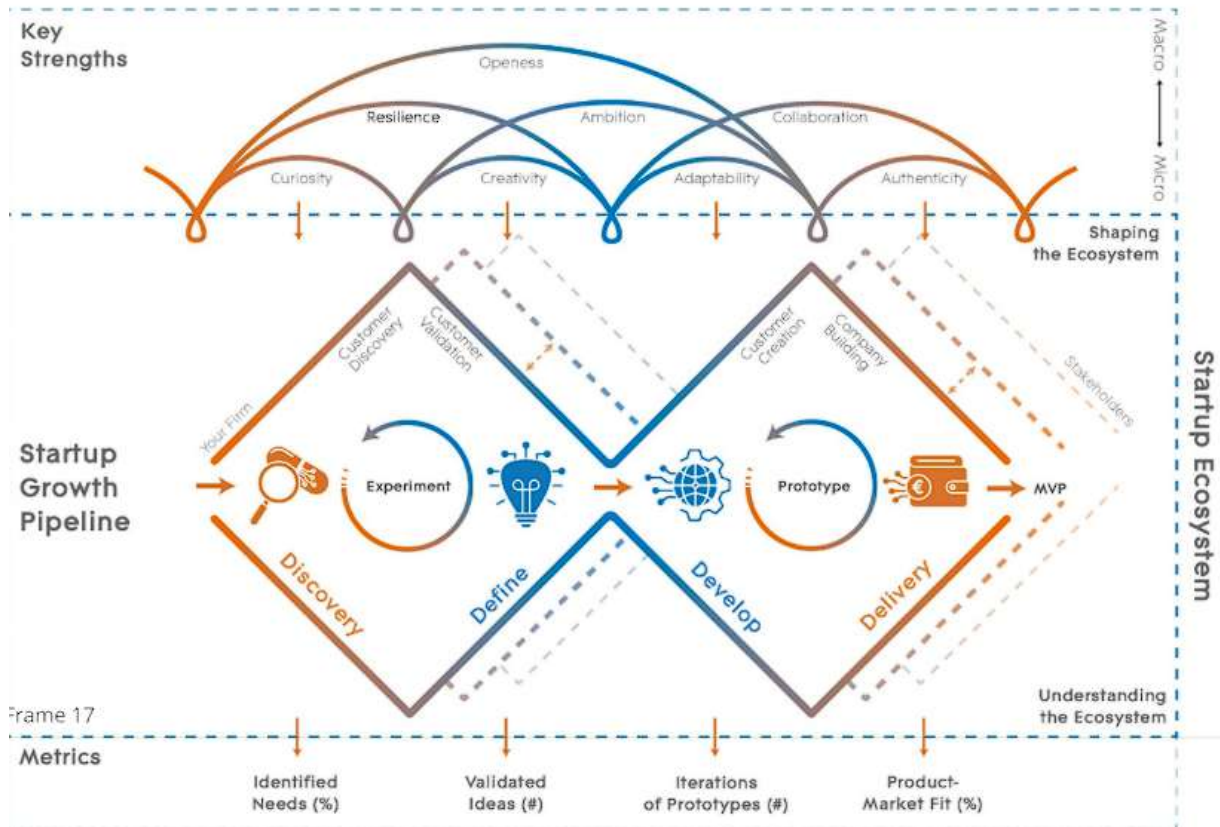
Moorhead, P. (2023). *Democratization of AI creates benefits and challenges*. TechTarget. Retrieved November 20, 2024, from <https://www.techtarget.com/searchenterpriseai/feature/Democratization-of-AI-creates-benefitsand-challenges>



## 2) Methods & Process

With the rise of AI and the democratization of this technology, we now have the unique ability to use this powerful tool without deep knowledge of computer science and coding. Our approach to this is rooted in design thinking and grounded theory.

Business Ecosystems Game, Innovative Dutch (<https://innovativedutch.com>)  
2024 - Jan Spru



### Phase 1.

**Discover AI tools and exploring tools to match use case**

### Phase 2. Getting ChatGPT to work in best possible way

### Phase 3. Develop and test the ChatGPT Prototype

**Phase 4. Delivery of the prototype with a step-by-step guide to recreation.**

Figur 3 Design Thinking Model

### Research – Double diamond applied to explore the use of AI.

#### Phase 1. Discover AI tools and exploring tools to match use case.

During our research, we explored tools like GPT-UIO, Microsoft Copilot, Google Gemini, Meta LLaMA 3, and various other software and web applications that claim to be effective for document analytics. However, due to its simplicity and ease of use, the choice was made to use ChatGPT from OpenAI. The decision was also made to focus on available software within the space of Large Language Models, also known as LLMs. What has not been explored are machine learning technologies or other AI solutions, including other software and applications from other companies other than OpenAI.

## Phase 2 Explore and define.

This phase has been limited to the use of ChatGPT.

With the introduction of Custom GPTs from OpenAI on November 6, 2023, we have been experimenting with using it to analyse documents, and it is a tool that performs this task very well. We looked for current research on Google Scholar to see if anything was relevant to my project, but little was found. But how does ChatGPT work, and how can we make it deliver results for our analytic work?

In the final prototype, we drew inspiration from the Automatic Framework to achieve precise results. See the attachment for the full list.

*Act as...a persona.* Define the bot persona of the AI assistant in a few words: **Act as a professor!**

*User persona, Audience:* Describe the audience, their background, the expected level of knowledge of the recipients : Students involved in the project : **Students involved in the project; they are familiar with the basics of the topic but rely on structured and clarified insights to understand the innovation and development gaps for the Koster community.**

*Target Action:* Use a meaningful verb and objects describing the transformation from input to output or the way the model should produce or create output: **Summarize the innovation gap within Koster, with specific references to sustainability, community infrastructure, and growth challenges.**

*Output Definition;* The output can be described in a separate section in the great detail.: **Provide a table with three columns: Source (Interview Reference), Quotes (Directly from Interviews), and Gap/Issue Identified. The table will capture key points about issues with housing, young resident retention, infrastructure, and municipality support.**

*Mode/Tonality/Style:* Define the way the model should convey the message: **Academic and insightful, focusing on clear analysis with detailed references and structured presentation to aid comprehension.**

*Atypical Cases:* not used in this.

*Topic Whitelisting:* When building a Conversational system, you may not want the model to talk about anything and everything, because it may hallucinate, touch critical topics: Use only data has been uploaded.: **Responses are strictly based on uploaded data to avoid extraneous topics.**

## Design Phase 3 Develop and test

Prototype 1. Can we use of Custom GPT's, to check if this was possible the interviews from V1 Hvaler

The screenshot displays the configuration interface for a Custom GPT named 'Hvaler - 1'. The interface is organized into several sections:

- Navn:** A text input field containing 'Hvaler - 1'.
- Beskrivelse:** A text input field containing 'Analyse av interjuver - Hvaler'.
- Instruksjoner:** A text area containing the following instructions: 'Analyser av intervjuer. Det som er viktig er innovasjonsprosses, gap, designthinking, dobbel dimond, bærekraftig utvikling og områder som kan forbedres. Svar skal være ground based. De må inne holde quotes fra intervjuene hvor påstanden er hetet ifra.' (Note: 'dobbelt dimond' and 'hetet ifra' appear to be typos for 'double diamond' and 'quoted from' respectively).
- Samtalestartere:** A list of conversation starters, currently containing 'Hvilke Gap finnes på hvaler?' with a close button (X).
- Kunnskap:** A section for knowledge files. It includes a note: 'Hvis du laster opp filer under Kunnskap, kan samtaler med GPT inkludere filinnhold. Filer kan lastes ned når Kodetolker er aktivert.' Below this, there are six document icons, each labeled with a filename and 'Dokument'.

was used for this purpose.

*Figur 4 Interface of Custom GPT*

**First section: Name.**

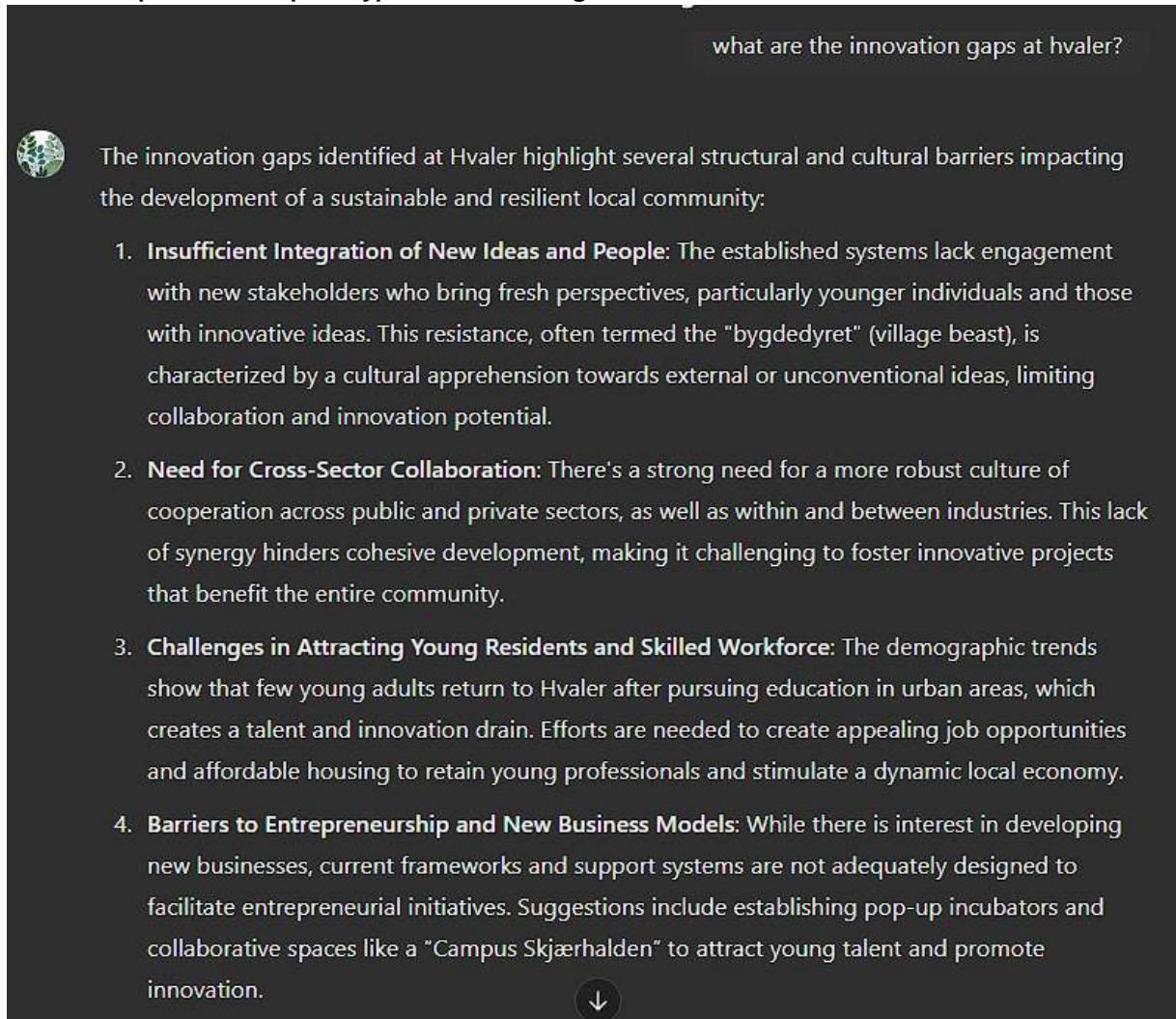
**Description: what the GPT will perform.**

**Instructions: how do you want the Custom GPT to behave.**

**“Interview Analysis. Key focus areas include the innovation process, identifying gaps, design thinking, the double diamond model, sustainable development, and areas for improvement. The responses should be grounded and must include quotes from the interviews where they originate from.**

“One example from this prototype is the following:

what are the innovation gaps at hvaler?



- 1. Insufficient Integration of New Ideas and People:** The established systems lack engagement with new stakeholders who bring fresh perspectives, particularly younger individuals and those with innovative ideas. This resistance, often termed the "byggedyret" (village beast), is characterized by a cultural apprehension towards external or unconventional ideas, limiting collaboration and innovation potential.
- 2. Need for Cross-Sector Collaboration:** There's a strong need for a more robust culture of cooperation across public and private sectors, as well as within and between industries. This lack of synergy hinders cohesive development, making it challenging to foster innovative projects that benefit the entire community.
- 3. Challenges in Attracting Young Residents and Skilled Workforce:** The demographic trends show that few young adults return to Hvaler after pursuing education in urban areas, which creates a talent and innovation drain. Efforts are needed to create appealing job opportunities and affordable housing to retain young professionals and stimulate a dynamic local economy.
- 4. Barriers to Entrepreneurship and New Business Models:** While there is interest in developing new businesses, current frameworks and support systems are not adequately designed to facilitate entrepreneurial initiatives. Suggestions include establishing pop-up incubators and collaborative spaces like a "Campus Skjærhalden" to attract young talent and promote innovation.

Figure 5 answer from first prototype, Hvaler interviews

**The Prompting works and we can relate to the results from the workshop at Hvaler.**

This was then further developed on each island in the FREIIA project.

In total, five prototypes have been created.

One prototype contains interviews from all islands to make comparisons between them, to see what they can learn from each other, and to identify any common gaps across the islands.

There is one prototype for each island, containing only the interviews from that specific island: one prototype from Schiermonnikoog, one from Bornholm, one from Hvaler, and one from Koster.

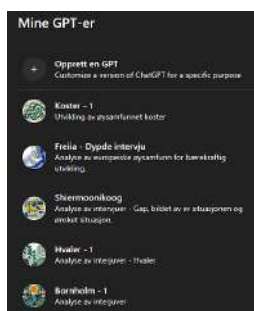


Figure 6 interface of Custom GPT all prototypes

1. Tests on its accuracy.

As a part of the test to check accuracy we prompted to see what questions were asked in the interviews and measured the results vs the questionnaire given to the students. On this it hits 9/9. Not only that, but it also even added a 10<sup>th</sup> question that the students asked that at the very end, that was not written down “Har du en siste kommentar på samfunnet her på øya?” “Any last questions regarding the community on the island?”

See attachment Treffsikkerhet på spørsmåleneCHATGPT and Intervjuguide-NOR-ENG

Phase 4 Deilvery

Step by step how it all works.

Step 1.0

Anonymize the interview data, using OpenAI.

Step 1.1

Make sure the files size is within the limit of ChatGPT.

Custom GPT has a max file sample of 20 documents and 2million tokens per document per Custom GPT. Since we had 45 interviews in individual documents, then structure around 12 interviews into 1 document. This lets us work within the frame of GPT rules.

Step 1.2

Within each document start each interview by “Start interview 1, end of interview 1”

This is to help the AI and let it know where each interview starts and ends. This is also done to make sure the quotes are from the correct interview to avoid hallucinations.

Step 2.1

Create OpenAI account for ChatGPT. And pay for the upgraded version. Cost 20\$/month.

Step 2.2 Create Custom GPT



Figure 6 Custom GPT

Step 2.3 This is what a custom GPT looks backend without any information filled out.

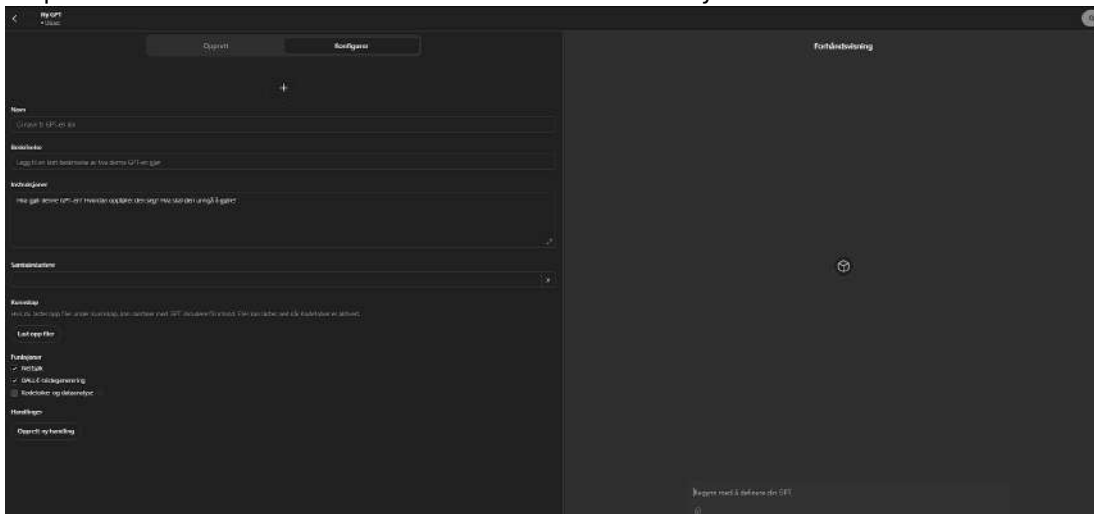


Figure 7 Inside of a Custom GPT

Step 2.4 upload all relevant files.

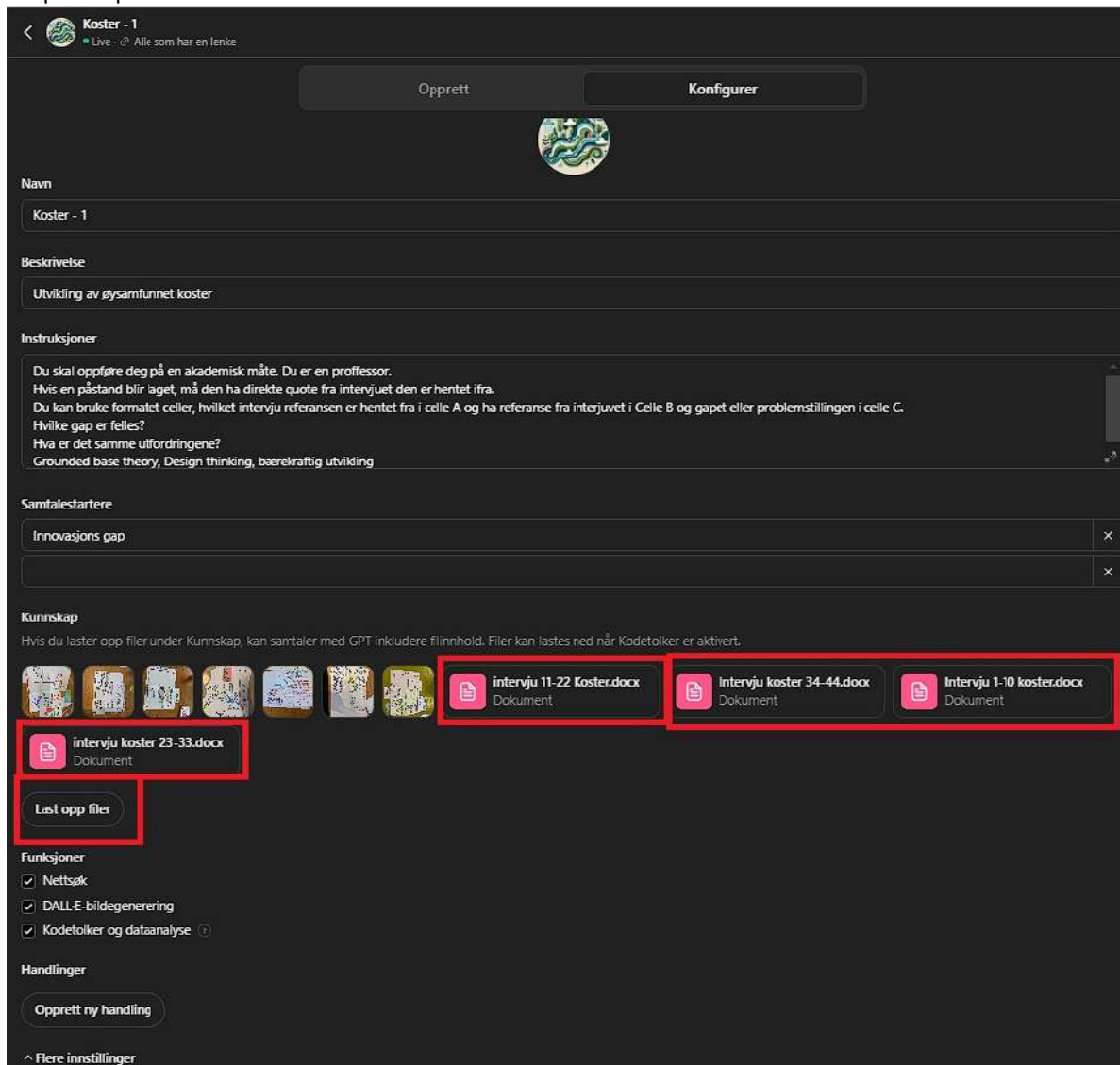


Figure 8 Prototype of Koster GPT with filled out instructions

Step 2.5 make sure to disable Open AI's ability to use the information for future training.

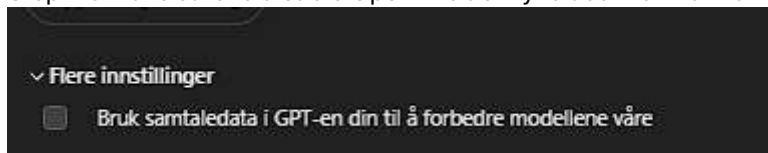


Figure 9 Opting out of allowing Open AI to use data for training

Step 2.6 Make sure that the GPT is only available for me, or those within the project group that wants the link. (This is done since we don't want it publicly)



Figure 10 – Sharing option – keeping it offline and not shareable

Step 2.7 add name

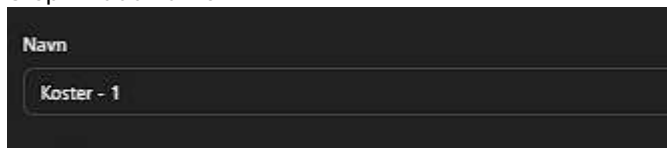


Figure 11 Name of the GPT

Step 2.8 add description

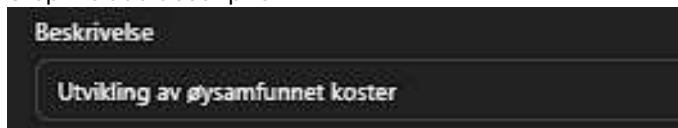


Figure 12 Description of the GPT what it will be used for

## Step 2.9 add instructions (based on the Automatic Framework)

### 1. Audience

Define the primary users of this GPT and their specific needs. For instance:

Users: Academic researchers, local community leaders, and policymakers.

Needs: Analyze interviews, identify gaps, challenges, and potential improvements in island communities, particularly focusing on Koster.

### 2. Understanding

Determine what knowledge or tools the GPT needs to understand:

Grounded base theory, design thinking, sustainable development.

Local context from interviews and community dynamics.

Analyzing qualitative data and summarizing findings with citations.

### 3. Task

Specify the tasks the GPT should accomplish:

Extract direct quotes and organize them into a structured format.

Identify recurring gaps, challenges, and themes in interviews.

Suggest actionable solutions using frameworks like design thinking or grounded base theory.

Provide insights to improve sustainable practices and community engagement.

### 4. Output

Define how outputs should be presented:

Use tables with columns for interview numbers, direct quotes, and identified gaps or challenges.

Summarize findings across interviews.

Deliver recommendations or solutions in structured formats (e.g., bullet points or frameworks).

### 5. Measurement

Define success criteria:

Accuracy of extracted quotes and gaps identified.

Relevance of insights and recommendations.

Clarity in organizing and presenting data.

### 6. Availability

State constraints or limitations:

Ensure responses are based on uploaded interviews and cited correctly.

Avoid assumptions beyond the provided data.

### 7. Technology

Tools or techniques the GPT should employ:

Use structured analysis methods for qualitative data.

Implement grounded base theory and design thinking to generate insights.

Cross-reference across multiple interviews for common themes.

### 9. Challenges

Address potential challenges:

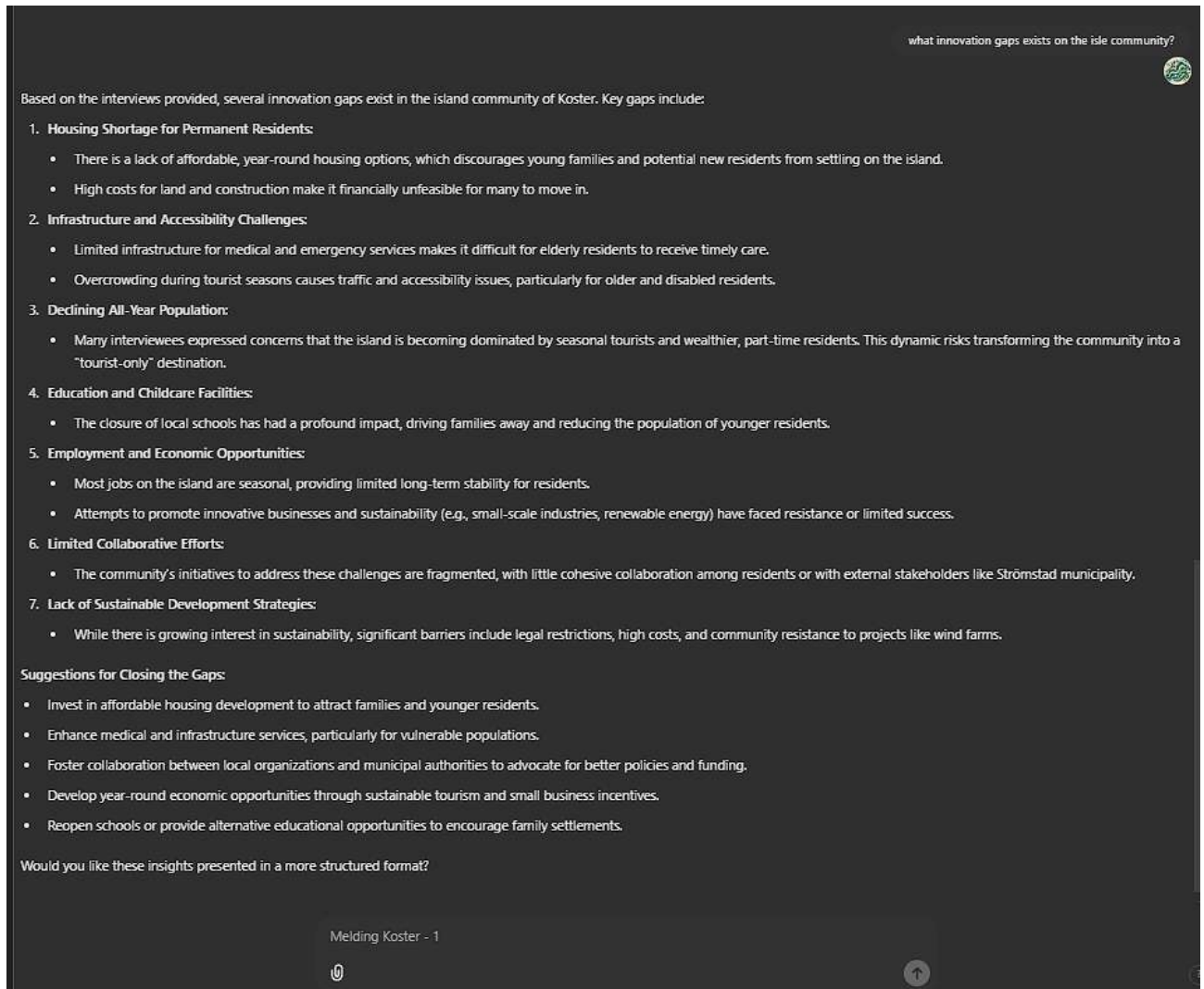
Ensure nuanced understanding of the local language and context.

Balance between high-level theory and practical recommendations.

Figure 13 Instructions to the GPT

### Step 3. Start Prompting (example of a prompt)

*“What innovations gaps exists on the island community?”*



The screenshot shows a chat window with a dark background. At the top right, the prompt is displayed: "what innovation gaps exists on the isle community?". Below the prompt, the response is generated, starting with "Based on the interviews provided, several innovation gaps exist in the island community of Koster. Key gaps include:". The response is organized into seven numbered sections, each with a title and a list of bullet points. The sections are: 1. Housing Shortage for Permanent Residents, 2. Infrastructure and Accessibility Challenges, 3. Declining All-Year Population, 4. Education and Childcare Facilities, 5. Employment and Economic Opportunities, 6. Limited Collaborative Efforts, and 7. Lack of Sustainable Development Strategies. Following these sections is a heading "Suggestions for Closing the Gaps:" followed by a list of five bullet points. At the bottom of the chat window, the text "Melding Koster - 1" is visible, along with a small circular icon containing a 'u' and a circular arrow icon.

what innovation gaps exists on the isle community?

Based on the interviews provided, several innovation gaps exist in the island community of Koster. Key gaps include:

- Housing Shortage for Permanent Residents**
  - There is a lack of affordable, year-round housing options, which discourages young families and potential new residents from settling on the island.
  - High costs for land and construction make it financially unfeasible for many to move in.
- Infrastructure and Accessibility Challenges**
  - Limited infrastructure for medical and emergency services makes it difficult for elderly residents to receive timely care.
  - Overcrowding during tourist seasons causes traffic and accessibility issues, particularly for older and disabled residents.
- Declining All-Year Population**
  - Many interviewees expressed concerns that the island is becoming dominated by seasonal tourists and wealthier, part-time residents. This dynamic risks transforming the community into a "tourist-only" destination.
- Education and Childcare Facilities**
  - The closure of local schools has had a profound impact, driving families away and reducing the population of younger residents.
- Employment and Economic Opportunities**
  - Most jobs on the island are seasonal, providing limited long-term stability for residents.
  - Attempts to promote innovative businesses and sustainability (e.g., small-scale industries, renewable energy) have faced resistance or limited success.
- Limited Collaborative Efforts**
  - The community's initiatives to address these challenges are fragmented, with little cohesive collaboration among residents or with external stakeholders like Strömstad municipality.
- Lack of Sustainable Development Strategies**
  - While there is growing interest in sustainability, significant barriers include legal restrictions, high costs, and community resistance to projects like wind farms.

**Suggestions for Closing the Gaps:**

- Invest in affordable housing development to attract families and younger residents.
- Enhance medical and infrastructure services, particularly for vulnerable populations.
- Foster collaboration between local organizations and municipal authorities to advocate for better policies and funding.
- Develop year-round economic opportunities through sustainable tourism and small business incentives.
- Reopen schools or provide alternative educational opportunities to encourage family settlements.

Would you like these insights presented in a more structured format?

Melding Koster - 1

Figure 14 – Example of a prompt using the prototype

### 3) Results

In total, 45 interviews were conducted, resulting in 813 pages and 134,257 words of transcribed content. The new tool that is provided with the democratization of Gen AI provides a wonderful opportunity for digitalization and cost reduction and time saving. It is estimated that the cost reduction is x1100 and work hours will be reduced by x120.

The anonymized interviews were processed, and within two hours, the preliminary results were delivered.

Some double-checking was required to ensure that the statements and quotes accurately reflected the original interviews. This was achieved by prompting GPT to indicate the source interview for each quote. The process involved copying the quote, opening the relevant interview document, and using the "Ctrl+F" function to search for a match.

If no match was found within the document, the statement was invalidated. If a match was confirmed, the quote was deemed reliable and incorporated into the problem statement. This verification process revealed some inconsistencies, requiring additional time to align the quotes with the corresponding statements as accurately as possible.

Ultimately, this approach provided a comprehensive understanding of the current innovation gaps on the Isle of Koster. The verified data was then utilized to formulate final problem statements, ensuring they were grounded with 100% certainty in the interview data.



*Figure 15 – Student enjoying breakfast at Koster assisting with the conduction of the interviews.*

Here is an example of what that looks like.

g ønsker at du skal liste opp de gapene som eksisterer på koster. Jeg vil ha gapene med quoterung fra intervjuet i colonne B og med nummer på hvilket intervju det er i Colonne A. I colonne C ønsker jeg beskrivelse på gapet.



| Colonne A   | Colonne B  | Colonne C  |
|-------------|--|--|
| Intervju 11 | "Det er på vei ned når det gjelder befolkningen tyvæ. Og framfor alt ungdommer. Vi blir snart bare pensjonære her."  | Befolkningsnedgang, særlig blant unge, truer samfunnets bærekraft. Økende antall pensjonister og færre unge gjør det vanskelig å opprettholde et dynamisk samfunn.                             |
| Intervju 11 | "Problemet er jo at det ikke finnes bosteder til de som vil flytte hit. For det første er det svært å få et bygglov... så koster det veldig mye penger med å bygge et hus her ute også." | Boligmangel og byggeproblemer. Vanskelighetene med å få byggelov og de høye kostnadene ved å bygge på Koster gjør det utfordrende for nye innbyggere å etablere seg.                           |
| Intervju 34 | "Det er dårlig at man ikke kommer frem på vegene... De sykler litt tokig."   | Overbelastning av veier og trafikkproblemer, spesielt om sommeren med turister. Dette skaper utfordringer for mobilitet, spesielt for eldre og handikappede.                                   |
| Intervju 34 | "Ja, det blir jo at man vil at det skal bygges mer hus og det kan flytte helt mer unge mennesker. For vi er bare pensjonære kvar."   | Manglende boligtilbud for unge familier. Samfunnet består hovedsakelig av pensjonister, og det bygges ikke nok rimelige boliger for unge familier som ønsker å bosette seg på øya.             |
| Intervju 23 | "Nei og det er vel en dårlig sak med Koster at du ikke kommer kunne bo her for at du kan ikke få vård her ute."  | Manglende helsetjenester og omsorg for eldre beboere. Mange eldre må flytte fra Koster fordi de ikke får den nødvendige helsehjelpen på øya.   |
| Intervju 34 | "De sier det ikke finnes vann så det går ikke å bygge her. Det finnes ingen barnefamilier så det blir ingen skole."  | Manglende infrastruktur, som vannforsyning, hindrer bygging og tilflytting. Kommunen investerer ikke i å utvide grunnleggende infrastruktur for å tiltrekke flere beboere og støtte utvikling. |

Her er en oversikt over noen av de sentrale gapene på Koster, hentet fra ulike intervjuer.

Figure 16 example of prompt with interview number in Column A, the direct quote in Column B, and the gap in Column C

List of gaps, with corresponding interviews and quotes.

kan du gi meg intervju 31,32,33,34,35,36,37,38,39,40,41,42,43,44



Here is the list of gaps identified from interviews 31 to 44:

| Colonne A   | Colonne B  | Colonne C   |
|-------------|--|---|
| Intervju 31 | "Det er jo lett å se problem. og det er det vi ser. Vi har en aldrende befolkning...unge flytter ut og kommer ikke tilbake." | Aldrende befolkning og fraflytting av unge forårsaker befolkningsnedgang og utfordrer samfunnets bærekraft.                       |
| Intervju 32 | "Det er mange som sier det er veldig dyrt å bo her... Vanlige folk har ikke råd til å kjøpe hus."                            | Boligmarkedet på Koster er svært dyrt. noe som gjør det vanskelig for lokale å bo der permanent.                                  |
| Intervju 33 | "Det er veldig dyrt å kjøpe hus her. det er mange som vil bo her, men det er ikke mulig for vanlige folk."                   | Boligprisene er høye. og det hindrer tilflytting fra nye potensielle innbyggere.  |
| Intervju 34 | "Det er for mye folk på øya om sommeren. spesielt turister, noe som gjør det vanskelig å bevege seg."                        | Overbefolkning og trafikkbelastning under turistsesongen skaper utfordringer for mobilitet og dagliglivet.                        |
| Intervju 35 | "Så lenge det ikke finnes skole. vil ikke flere unge kunne bo her. Det er vanskelig for familier."                           | Mangel på skoler og infrastruktur gjør det utfordrende for familier å bosette seg på øya.   |
| Intervju 36 | "Jeg vet ikke hva man skal tro om utviklingen. men kanskje får de i gang skolen igjen."                                      | Usikkerhet om fremtiden og mangel på klare utviklingsplaner.  |
| Intervju 37 | "Mye av infrastrukturen er dyrere. og skaper utfordringer for dagliglivet på øya."   | Økte kostnader knyttet til infrastruktur som transport og forsyninger skaper vanskeligheter for beboere.                          |
| Intervju 38 | "Vi må fokusere på spesifikke nicher som kan gjøre øya unik, som en skole for vannbruk."                                     | Manglende strategisk fokus på unike utviklingsområder som kunne tiltrukket nye ressurser og kompetanse.                           |
| Intervju 39 | "Takk vare honom så kommer jeg inn i samfunnet på Koster, det gamle og det nye."   | Utfordringer med integrering av nye innflyttere i øysamfunnet, både sosialt og kulturelt.   |
| Intervju 40 | "Det er veldig stor forskjell mellom folk som bor her permanent og turistene som besøker."                                   | Stor kontrast mellom fastboende og turister fører til sesongbasert befolkningsfluktasjon som utfordrer kontinuiteten i samfunnet. |

Dette er identifiserte gap med sitater fra intervjuer 31 til 44.

🔍 📄 🗑️ 🗑️



Figure 17 example of prompt with interview number in Column A, the direct quote in Column B, and the gap in Column C

## Problem statements from the GPT

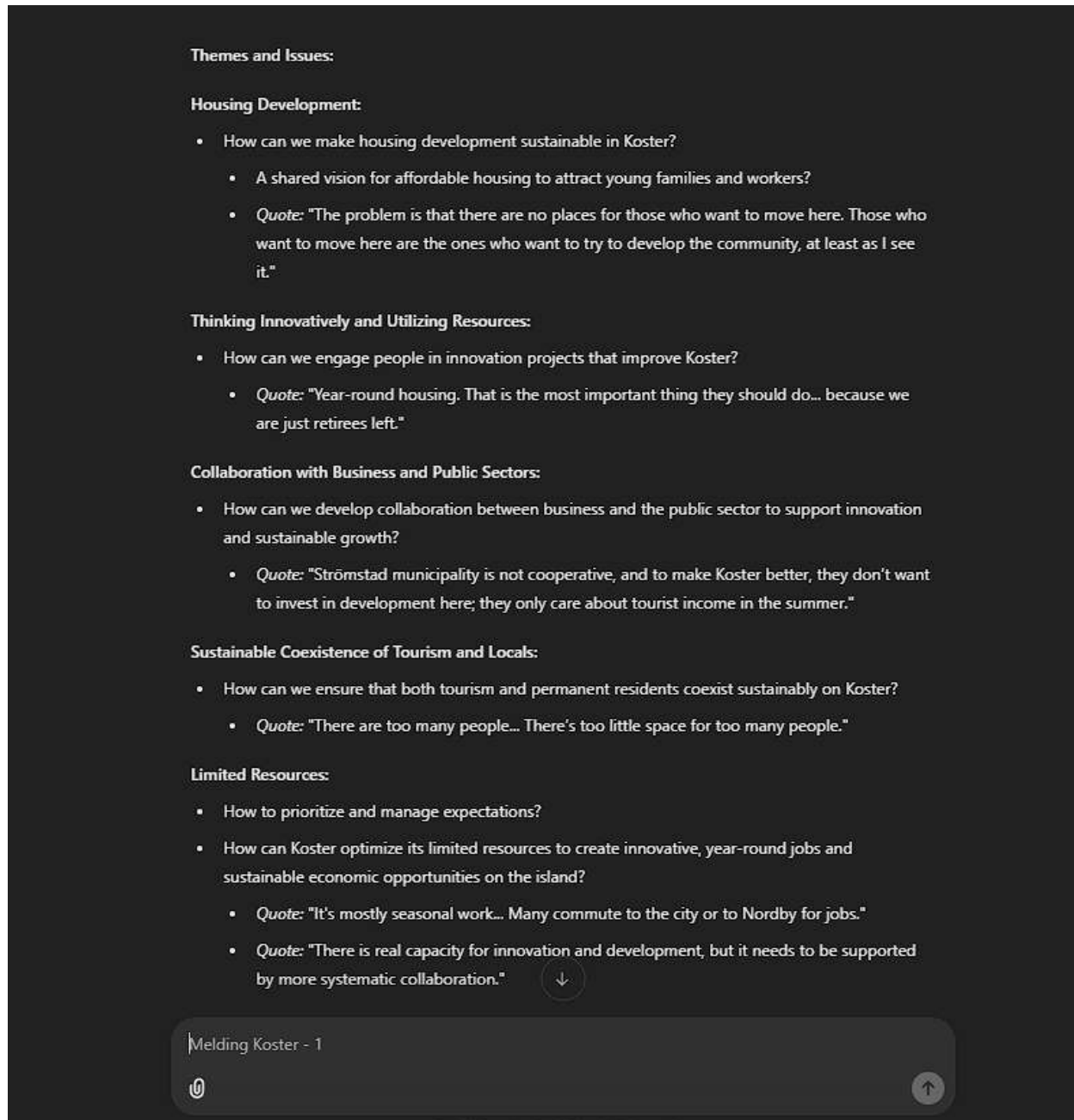


Figure 18 example of problem statements produced by ChatGPT

How did we discover the 5 problem statements that were chosen?

A huge part of being successful with closing innovation gaps is to include the voices of the locals, to make sure that most opinions were covered, we simply prompted for the most common problem statements and asked how often they appear in interviews.

The results are shown here.

Kjempe fin tabell, den var perfekt.  
Men jeg trenger det på engelsk



Here is the table translated into English, with the main findings, the number of interviews in which these issues are mentioned, and examples from the interviews:

| Main Findings                              | Number of Mentions in Interviews | Examples from Interviews   |
|--|----------------------------------|--|
| Sustainable Development and Housing Issues | 8                                | "The problem is that there is no housing for those who want to move here... mostly retirees here." (Interview 11)      |
|  |                                  | "The houses are too expensive. No one can afford to buy and move here." (Interview 34)                                 |
| Limited Municipal Support and Cooperation  | 7                                | "Strømstad municipality is not willing to cooperate... to make Koster better." (Interview 34)                          |
|  |                                  | "The municipality does not want to invest in building here because they think it costs too much money." (Interview 11) |
| Tourism's Double Effect                    | 5                                | "It's hard to get around on the roads... too many people." (Interview 34)  |
|  |                                  | "It gets very crowded here, a lot of traffic, especially in summer." (Interview 35)                                    |
| Lack of Services and Facilities            | 6                                | "One issue with Koster is that you cannot live here... you can't get healthcare out here." (Interview 23)              |
|  |                                  | "It is difficult with the school closed down... the store remains, for now." (Interview 1)                             |

Figure 19 example of how often the problem statements occur in the interviews

The Final problem statements for the workshop.

# Problem statements

1. How might we make housing development sustainable on Koster?
2. How might we engage people in innovation projects that improve Koster?
3. How might we develop collaboration between the business sector and the public sector to support innovation and sustainable growth?
4. How might we facilitate sustainable coexistence between tourism and permanent residents on Koster?
5. How might we optimize the use of Koster's limited resources to create innovative, year-round jobs and sustainable economic opportunities?

*Figure 20 Final Problem Statements*

## 4.) Discussion

It is a well-known that CHATGPT is known for its hallucinations and according to the rapport from Hal Open Science, ChatGPT “Tend to produce “hallucinations, meaning inaccurate or imaginary information”. (Charpentier et al., 2024). And we also encounter this during this experiment.

Suggestions can be wrong and sometimes it may not hold any grounding in reality, one example of this was a suggestion to reduce the cost of the ferries by simply building a 4-lane highway bridge from Strömstad to Koster. This idea would never be realized considering the budget of Strömstad municipality and the distance from mainland to the isle of Koster.

In figure 15 and 16 there is also inaccuracies not all the quotes come from the correct interview. It is therefore extremely important to use critical thinking and ground the results in the actual interviews, to make sure that the statements are true and not simply made up. By using the method described in the 3.) results section this was avoided to provide accurate problem statements.

“AI systems obey the golden rule: garbage in, garbage out, want good results, feed it good data” (Stack Overflow, 2023). With this in mind it is a clear advantage to have experience with finding innovation gaps, including models and methods before conducting such an experiment like this.

Knowing what to look for and the ability to prompt correctly will vastly affect the results being produced by the Custom GPT. Besides the resources saved, there might also be new useful areas to use this technique that has yet been explored in this paper.

In contrast, the AI-based approach drastically reduced this timeframe. By employing ChatGPT's document analysis capabilities, preliminary results were generated within two hours. This included categorizing statements, highlighting key innovation gaps, and cross-referencing quotes with interview sources. Such efficiency translates into an estimated x120 reduction in work hours, freeing us to focus on interpreting and implementing findings rather than spending time on data processing.

AI-driven analysis brought a significant cost-saving advantage, with an estimated x1100 reduction in associated costs compared to traditional methods. These savings are particularly impactful for the project because the time from the data collection to the workshop was within a very short period of time. While traditional methods excel in their depth and contextual sensitivity, the AI approach compensates with speed and scalability. It not only streamlined the analysis but also uncovered insights. An example of this is how we can compare the innovation gaps on different islands and use that knowledge to help everyone and not one island isolated.

However, this shift from manual to AI-based methods is not without its challenges. Ensuring the accuracy of the AI's results required critical human oversight to validate quotes and contextual relevance. Despite these limitations, the hybrid use of AI and traditional verification methods offers a promising model for future research, balancing the strengths of both approaches.

## 5.) Conclusions

The new tool that is provided with the democratization of Gen AI provides a wonderful opportunity for digitalization and cost reduction and time saving. It is estimated that the cost reduction is x1100 and work hours will be reduced by x120.

We can use this tool and interviews to extract other useful information that otherwise would be unobtainable.

In addition to that, we have discovered multiple other new use cases, and they are as follows:

*Example 1.* Mapping of all the participants that took part in the interviews.

*Example 2.* Holding a digital workshop using the GPT as a participant. And exploring new innovative ideas that is in accordance with the isle inhabitants.

*Example 3.* Checking statements from the interviews made against the overall municipalities of Strömstad's strategic goal and plans for the future, budgets and priorities.

*Example 4.* Making comparisons between all the islands, find common innovation gaps, common solutions that can be applied to all islands. Using Ideas from one island as a solution for problems to other islands.

*Example 5.* Conducting analysis and information of interviews that are in a foreign language.

*Example 6.* Sharing information with the other stakeholders in the FREIIA project for them to discover new possibilities within the data to make real life changes in their local communities.

## 6.) Acknowledgements

We extend our heartfelt gratitude to Bjørn Gittle for his unwavering support and for trusting us to independently explore the potential of AI in this project. His encouragement has been instrumental in driving this work forward.

We are deeply thankful to Dr. Gunnar Anderson for his invaluable guidance in the research process and for ensuring that the academic rigor of this project was upheld.

We are equally grateful to Eivind and Tobias for organizing the workshop that enabled the creation of insightful solutions to the problem statements stemming from this project.

This project would not have been possible without the invaluable contributions of Høgskolen I Østfold and the class of IPL 2023, whose interviews provided the foundational data and information necessary for its success.

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Attachment: precision test

### **Precision on hits to the questionnaires on files: spørsmåleneCHATGPT and Intervjuguide-NOR-ENG**

The questions given to the students to ask for interviews:

#### **Interview guide.**

1. What is your role in the island community?
2. How would you describe the island community and its current state?
3. What do you think are the best aspects of Bornholm?
4. What are the major challenges the island community faces in terms of innovative development and sustainable growth?
5. What initiatives has the island community undertaken in the past to address these challenges?
6. How does the island community collaborate to promote innovative development and sustainable growth?
7. How do you think the island community can improve its capacity for development?

8. How can you and your organization contribute to enhancing the island community's capacity for sustainable growth?
9. How can the island community better collaborate with surrounding communities and regions to achieve common goals?

**CHATGPT RESPONSE:**

Based on the review of the interviews, here are the 10 most common questions asked in the various interviews:

2. **What is your role in the island community?**
  - Example: "What is your role in the island community?"
3. **How would you describe the island community and its current state?**
  - Example: "How would you describe the island community and its current state?"
4. **What do you think are the best aspects of Koster?**
  - Example: "What do you think are the best aspects of Koster?"
5. **What are the main challenges facing the island community in terms of innovative development and sustainable growth?**
  - Example: "What are the main challenges facing the island community in terms of innovative development and sustainable growth?"
6. **What measures has the island community previously implemented to address these challenges?**
  - Example: "What measures has the island community previously implemented to address these challenges?"
7. **How does the island community collaborate for improvement, innovative development, and sustainable growth?**
  - Example: "How does the island community collaborate for improvement, innovative development, and sustainable growth?"
8. **How do you think the island community can enhance its capacity for development?**
  - Example: "How do you think the island community can enhance its capacity for development?"
9. **How can the island community better collaborate with surrounding communities and regions?**
  - Example: "How can the island community better collaborate with surrounding communities and regions?"
10. **What do you think you can personally do to help strengthen the community's capacity?**
  - Example: "What do you think you can personally do to help strengthen the community's capacity?"
11. **Do you have any final comments on the community here on the island?**
  - Example: "Do you have any final comments on the community here on the island?"

**Examples of what Custom GPT's can be used with, generated by CHATGPT.**

This custom GPT could be utilized in various ways, especially tailored around analyzing, understanding, and addressing the unique challenges and opportunities highlighted in the interviews about islands like Schiermonnikoog, Hvaler, and Bornholm. Here are some specific ideas and solutions, grounded in the interview texts:

1. Facilitating Community Development Projects
  - Use Case: Identify and prioritize community challenges such as affordable housing, workforce retention, or tourism balance.
  - Example: Schiermonnikoog discusses the aging population and the impact of wealthy, non-resident property buyers diminishing community involvement. GPT could help stakeholders analyze these patterns, propose housing policies, and simulate the effects of potential solutions.
2. Tourism Sustainability Strategies

- Use Case: Generate sustainable tourism models that balance seasonal tourist influx with long-term economic stability.
  - Example: Bornholm emphasizes efforts to attract tourists year-round, with the community working on marketing campaigns and improving logistics. GPT could analyze successful models from similar islands and suggest tailored marketing strategies.
3. Collaborative Innovation and Sustainability Networks
- Use Case: Propose frameworks for collaboration between islands or similar regions facing parallel challenges.
  - Example: Islands like Bornholm already collaborate with neighboring regions for sustainable growth. GPT could help identify potential partnerships or grant opportunities, leveraging programs like Interreg North Sea mentioned in Schiermonnikoog's case.
4. Education and Retention Programs
- Use Case: Enhance local education and training initiatives to retain young talent and attract a skilled workforce.
  - Example: Schiermonnikoog started the Schier Academy, inspired by similar academies on other Wadden Islands. GPT could expand on this by curating curricula aligned with local needs, attracting students, and connecting them with job opportunities.
5. Enhancing Accessibility and Infrastructure
- Use Case: Propose improvements in transportation and logistics to support both residents and tourists.
  - Example: Bornholm and Hvaler mention transportation challenges during off-seasons. GPT could evaluate existing infrastructure and suggest cost-effective solutions like flexible bus schedules or ferry optimizations.
6. Cultural and Historical Preservation
- Use Case: Develop initiatives to preserve and promote local culture and heritage as a part of the tourism experience.
  - Example: Schiermonnikoog's community pride and unique local traditions, such as kite-surfing or bar activities, could be formalized into tourist experiences. GPT could design engaging cultural programs or digital storytelling campaigns.
7. Climate Change and Environmental Strategies
- Use Case: Support sustainability efforts by generating practical solutions for energy use, waste management, or conservation.
  - Example: Bornholm emphasizes its natural beauty and the need for environmentally friendly policies to address challenges like agricultural emissions. GPT could suggest island-specific renewable energy models or conservation practices.
8. Data-Driven Policy Making
- Use Case: Analyze data from similar regions to inform local governance and policy creation.
  - Example: Use insights from interviews to compare island challenges globally and recommend policy adaptations (e.g., incentivizing year-round business operations or managing housing markets).
9. Digital Transformation
- Use Case: Encourage e-commerce and remote work opportunities to diversify local economies.
  - Example: Bornholm's mention of online business transition suggests that GPT could guide local entrepreneurs in digitizing their operations and accessing wider markets.
10. Event and Festival Planning
- Use Case: Design seasonal or year-round events that attract tourists while celebrating local culture.
  - Example: Developing events like off-season music festivals or eco-tourism weeks based on existing activities like hiking or kite-surfing.

By leveraging these applications, the custom GPT can act as a vital tool for planning, innovation, and community-driven decision-making in island settings and similar communities worldwide.