The GreenGuide Report
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Introduction

In a world grappling with the impacts of climate change, collaboration towards achieving the 17 Sustainable Development Goals (SDGs) is more crucial than ever. The private sector, responsible for 70-85% of global investments, plays a pivotal role in this endeavor. Among these players, startups stand out for their potential to innovate and challenge established norms. Germany, with its thriving startup ecosystem ranked 7th globally, exemplifies the significance of this sector. However, startups often lack sufficient time and resources to learn and comply with sustainability regulations and implementations within their businesses. Recognizing this challenge, the TUM Venture Lab, an accelerator supporting over 280 startups, identified the need for a solution. Lucia Lara Vargas and Bastian Burger, TUM Venture Lab members, reached out as our challengers. The task assigned was broad: create something that would make sustainability knowledge accessible to early-stage startups using an AI tool.

This report unfolds the narrative of The GreenGuide, an AI chatbot crafted to simplify the intricate landscape of sustainability for startups. Serving as a reliable compass, it offers nuanced and customized responses to the pressing queries that regularly arise in early-stage startups in their pursuit of sustainability. Within these pages, you will delve into the design thinking process day by day, witnessing how we navigated through initial ideas to create a feasible AI tool that saves startup founders both time and money.

Join us as we dissect the inner workings of The GreenGuide, exploring the genesis of this idea and how it came to life.

Day 0: Unveiling Startup Perspectives

The journey started a week earlier with the main goal of understanding how startup founders view sustainability and how an AI tool might help them in their businesses. To initiate this exploration, we conducted two short interviews with startup founders based in Latin America—one of them the owner of an AI tool focused on transcribing large audios, and the other the founder of a digital car service. Facilitated by one of our team members with convenient access to this region, these interviews unfolded seamlessly via Zoom. Despite their brevity, these conversations offered an initial glimpse into the perspectives of startups concerning sustainability. The key takeaways were unmistakable: a conspicuous lack of knowledge about sustainability, coupled with a shortage of time and resources to invest in sustainability initiatives, especially in the early stages of a business. Additionally, both founders were quite concerned about

the challenges of measuring their impact and were unsure about the available tools or methodologies suitable for conducting a proper assessment. They believed that such an assessment could potentially attract investors who were looking to fund businesses that care about environmental and societal concerns. Equipped with these invaluable insights, we eagerly delved into the project week, conducted from November 29th to December 3rd.

Day 1: Understanding the Challenge

As mentioned earlier, the TUM Venture Labs presented our team with the challenge. Initially, we had numerous questions and lacked a clear idea of what could be achievable within this project week. With only five days to create the first draft of an AI tool prototype, we faced the challenge of developing something that could later be refined and fully developed.

The project journey officially commenced with guidance from our mentors, Helene and Charlotte, who played a crucial role in helping us comprehend our challenge. At this stage, our initial focus was on defining our mission, identifying our beneficiaries or clients, and understanding their characteristics. This process was essential for recognizing their needs and devising solutions to address the challenges they were encountering.

One of our initial discoveries (Fig. 1) emphasized the importance of showcasing startups' impact to potential investors. In response, we first shifted the project in that direction. As a team, we opted to use the board to outline our initial ideas, and we conceived something we deemed groundbreaking. Our idea was to make startups more "attractive" by introducing an app that leverages AI for impact assessment. Consequently, the app would create tailored recommendations to startups, allowing them to improve performance in areas that were underperforming. Additionally, the app would cater to investors seeking startups aligning with their impact criteria. This way, the app could facilitate the matching of startups and investors, fostering the growth of these early-stage businesses.
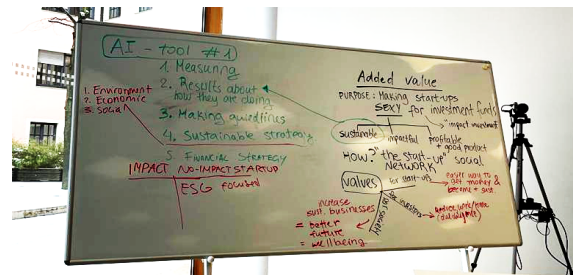

Figure 1. Discovery Mind Map

With this idea in mind, we created a stakeholder map to identify all the different actors involved. Although the initial idea was innovative and creative, we recognized the importance of aligning our work with the expectations of our challengers. To ensure this alignment, we held our initial meeting with Lucia Lara Vargas, a seasoned professional in sustainable development, during which we presented our first idea and received invaluable feedback in return. Lucia pointed out that, given the time and resources available for this project, our initial concept was overly ambitious. She suggested that we should primarily focus on one aspect, such as impact assessment or another type of tool. We also explored the possibility of developing a sustainability chatbot, acknowledging the need to introduce a unique aspect since ChatGPT already exists. This meeting played a crucial role in solidifying our understanding of the vast field we were entering and set the tone for the days ahead.

Day 2: Sustaining Momentum

Our second day commenced with a brief but insightful meeting with one of Airgae's startup co-founders, which significantly broadened our perspective. Insights from the startup's standpoint, particularly regarding the intricate details of a product's carbon footprint, underscored the necessity for a tool capable of swiftly assessing and calculating such sustainability metrics. This tool would serve a dual purpose for startups: firstly, assisting them in identifying areas for improvement in their sustainability practices, and secondly, presenting investors with a clear understanding of how and to what extent they contribute to SDG targets. This revelation echoed the sentiments gathered from the previous week's interviews, further emphasizing the need for an impact assessment tool. Such a tool would not only enhance startups' comprehension of impact assessment but also present the results in an understandable manner, facilitating a broader comprehension of their contributions.

Following this meeting, we embarked on the creation of our initial AI tool mind map. Adopting a user-centric approach, our first task was to identify how we could gather information from each startup, serving as input for the AI tool. This step is crucial for obtaining specific details about each business, enabling the tool to conduct a tailored assessment.

In the figure 2, one can follow the subsequent steps: firstly, if the startup lacks any data concerning its performance on sustainability issues, it can respond to questions posed by the AI model to gain a better understanding of its business activities. On the other hand, if the startup

already possesses a deck and other calculation sheets, it can upload these documents to serve as input. The subsequent step involves the assessment, where the tool considers assessment guidelines and SDG metrics previously input into the model to organize unstructured data (input) and generate structured data as output.

Upon examining the output, we contemplated the possibility of classifying it in two ways: first, into the direct and indirect impacts of the business, and second, as a forecast of that impact if the business continues without any changes. The final output also includes a set of guidelines, providing recommendations on how the company could achieve the SDG targets aligned with its business in the short, medium, and long term.
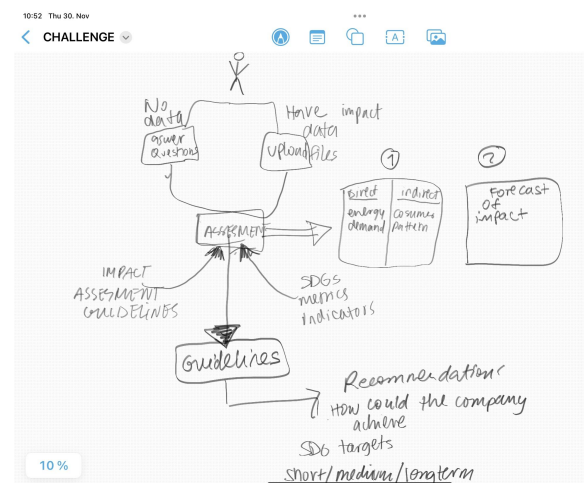

Figure 2. Initial Framework draft

Later that day, we had a meeting with Maximilian, our tech advisor. Given that our team lacked significant expertise or knowledge about AI models and tools, we decided to maximize this meeting by asking as many questions as possible.

Our primary focus was on

streamlining the input process for our AI tool. We inquired about the types of documents—ranging from photos to PDFs—that the AI could effectively analyze. Maximilian suggested leveraging a large language model and introduced tools like Lama Index to extract data from the different types of sources. We also delved into the intricacies of prompting, exploring ways to structure questions for specific outputs.

A key question revolved around training the AI to generate pertinent queries that could facilitate the creation of a comprehensive impact assessment for startups. Additionally, we sought insights on how the AI could autonomously differentiate between indirect and direct impacts and forecast both positive and negative impacts over time based on existing patterns.

Incorporating the insights from the paper "Business and the Sustainable Development Goals: Measuring and Managing Corporate Impacts," we have enriched our approach to measuring Sustainable Development Goals (SDGs). Schönherr and Martinuzzi (2019) provide a comprehensive methodology for assessing and managing corporate impacts on sustainability (Fig. 3), which aligns perfectly with our project's objectives. By adopting this framework, we aim to create a robust mechanism for startups to not only measure their SDG alignment but also manage their impacts more effectively.
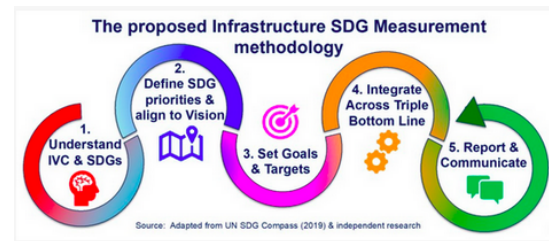

Figure 3. Infrastructure SDG measurement (Schönherr and Martinuzzi, 2019)

Finally, our discussions extended to the formulation of guidelines, where we probed into training the AI with standard sustainability documents to generate recommendations aligned with SDG targets. These questions were pivotal in shaping the technological framework of our AI tool, ensuring it could effectively gather, process, and analyze data for impactful outcomes

Day 3: A Pivotal Turn in the Project's Trajectory

On Day 3, our project underwent a transformative moment, marking a pivotal turn in its trajectory. We eagerly presented the first draft (Figure 4).
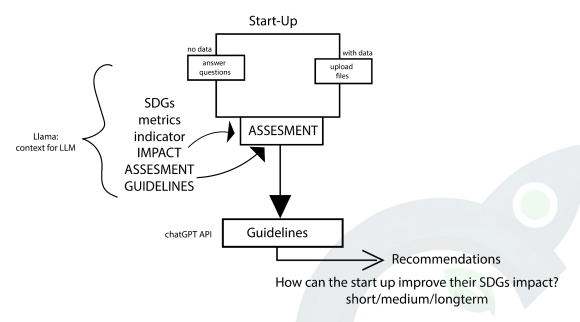

Figure 4. Initial Framework

of our ambitious assessment tool to our professors, elucidating the integration of Lama index and a large language model in formulating responses. However, the response we received was clear and somewhat sobering. Our professors highlighted the ambitious nature of our

approach and expressed concerns about the appropriateness of the chosen technologies on the tech side. In light of this feedback, they advised us to simplify our strategy, recommending the use of a model more suitable for prototyping. The dream of a sophisticated assessment tool was quickly tempered by a stark reality check, forcing us to reassess the project's feasibility. In response, we made a significant pivot, opting for a simpler approach—focusing solely on a chatbot. This decision was grounded in practical considerations, aligning our efforts with the available knowledge and resources at that juncture.

Day 4: The Great Challenge

The fourth day marked the onset of our great challenge, as we redirected our focus towards crafting a chatbot within a constrained time frame. We revisited the fundamental question: What Do Early-Stage Startups Truly Need? The resounding answer was efficient learning about sustainability. Time, being a critical resource for early-stage startups, posed a challenge for comprehensive research on sustainability topics and regulations. Yet, compliance with sustainability standards, particularly from the EU, is imperative for attracting impact investors and funds. Thus, the GreenGuide emerged as our solution—a tool designed to simplify the path towards sustainability for startups. This AI tool, powered by a large language model, provides filtered and tailor-made answers about sustainability topics. It taps into scientific-backed information from reputable sources like EU and United Nations SDGs reports.

To illustrate its functionality, let's envision you as the founder of AIRGAE, a startup creating microalgae for Aquaculture's

Tomorrow. The GreenGuide begins by processing your presentation deck to gain accurate context about your business. Utilizing Llamindex, a data framework connecting custom data sources to large language models (LLMs), the tool reads different input sources, making them comprehensible to the LLM, which then generates personalized answers. When you pose a question, the GreenGuide responds with references to sources from the database and your uploaded pitch. The answers are not only personalized but also classified according to the SDGs, thanks to the fine-tuned prompting developed.
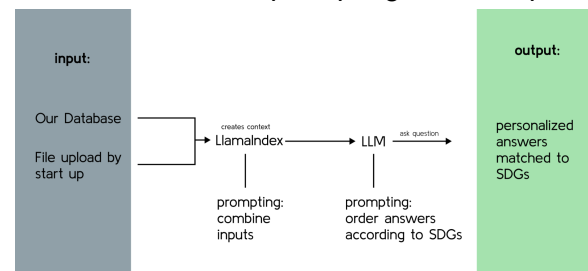

Figure 5. AI Programming Framework Scheme

What sets us apart from ChatGPT? The differentiator lies in our specific, tailor-made sustainability expertise that surpasses ChatGPT (Fig. 6). Our reliable and well researched database comprises verified sources, and our model generates tailor-made answers through specific prompting. While ChatGPT engages in general conversation, the GreenGuide stands out by truly simplifying sustainability and helping every start-up with their specific challenges.

Figure 6. Example Output

Project Reflections: Challenges, Achievements and Future Horizons

On the fifth and final day, we presented the pitch and showcased the tool to the challengers. Successfully achieving our goal, we unveiled the first unfinished prototype of "The GreenGuide." Throughout our journey, we encountered various obstacles, navigated the constraints of limited time and resources, and diligently incorporated feedback from both professors and our challenger. Our iterative process was marked by strategic decision-making, ultimately culminating in the development of the final product design. Looking ahead, the prototype should undergo further development and testing, a phase that remains pending due to the absence of an interface for trial purposes. The next steps in the project involve refining the tool, creating a user-friendly interface, and conducting comprehensive testing to ensure its effectiveness and usability.

We envision the GreenGuide as more than just a digital assistant – it has the potential to become a dynamic sustainability resource due to its user-friendly design. The strategic integration of GPT and Lama Index models makes it accessible even for those without extensive programming experience. This simplicity underscores technology's power to demystify complex concepts, especially beneficial for resource-constrained startups. The GreenGuide shows how technology can drive sustainable change in the business sector. This initiative reflects our commitment to fostering a greener, responsible entrepreneurial landscape. Our journey reinforces the belief that, with the right tools, startups of any size can contribute significantly to a sustainable future.

References:

Schönherr, N., & Martinuzzi, A. (2019). *Business and the Sustainable Development Goals: Measuring and Managing Corporate Impacts*. https://doi.org/10.1007/978-3-030-16810-0)