KOTISCAN

Cancer Home Detection Solution

Kotiscan is a white label service that aims to improve the post-treatment process for lung cancer patients. Kotiscan encompasses a scanning device and application extension. With Kotiscan, the patients can monitor their lungs and consult doctors conveniently at home, reducing their anxiety and emotional stress. The service helps early diagnosis of lung cancer recurrence. Kotiscan has the potential to expand treatment to other cancer types and stages. By collaborating with public and private healthcare providers, Kotiscan can shift parts of cancer treatment from hospitals to homes.

TEAM ATTRACT

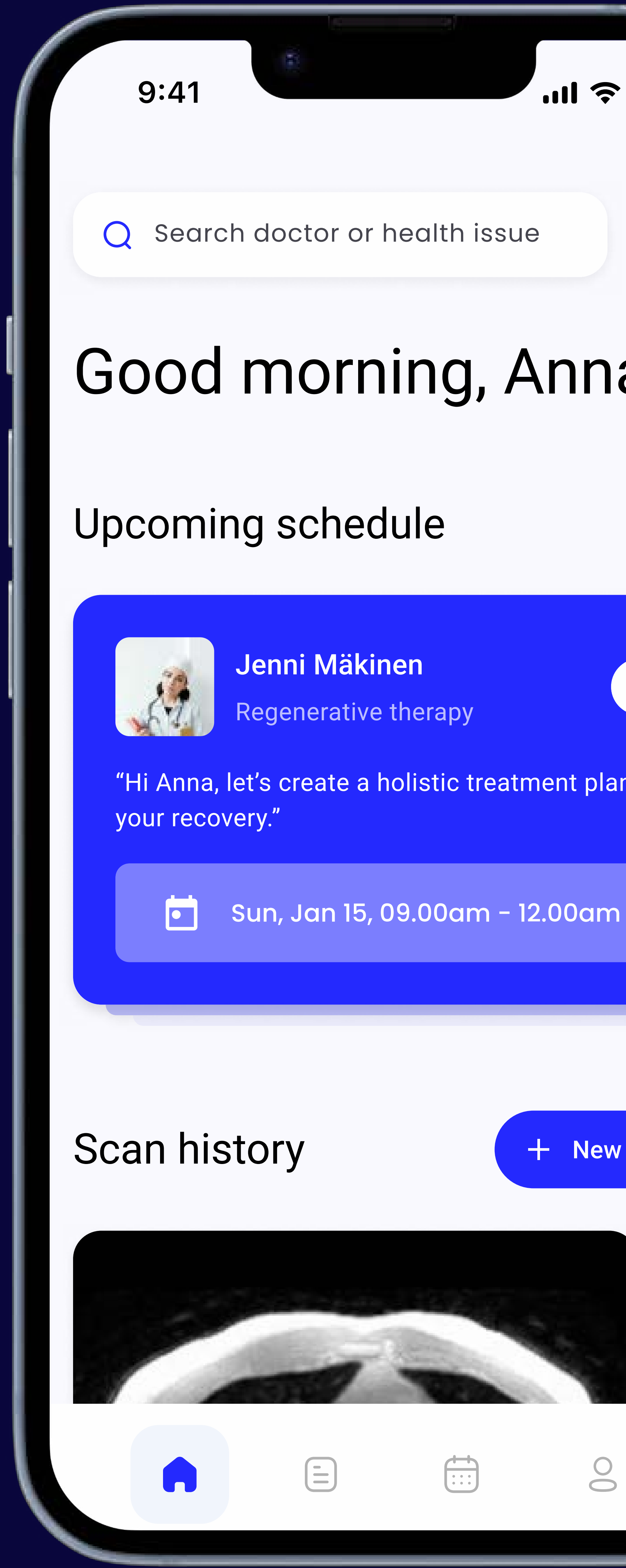
Giang Nguyen · Leevi Mäkikalli · Nina Balashova · Maria Simon · Jordi Rocha

DATE

9.6.2024

USE OF AI DECLARATION

We acknowledge the use of GPT-4o by OpenAI (for image creation) and MS Copilot (for text editing). The prompt and GPT for each image creation may be found in its respective entry in the figure list (p. 29).



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1. Introduction

1.1 Our mission, goal, and design framework.

Our client organization, ATTRACT Academy, provided a seemingly simple mission: get inspiration from the two cutting-edge technologies and ideate use cases to solve real-world problems. The use of the technologies needed to make a social impact and materialize into prototypes. We were encouraged to use design thinking principles and address the United Nations Sustainable Development Goals (SDG) in molding the concept.

Our project comes under Student Program 2 (SP2) track of ATTRACT Academy. The project also goes under the project acronym SGI. The technologies given to us are MicroQuaD and POSICS-2. We utilized the Double Diamond Framework to guide our design process, which helped us stay user-centric and focused on developing viable solutions.

In this report, we outline our design journey, from the initial inspiration and ideation phases to defining and developing the concept of our outcome: Kotiscan.

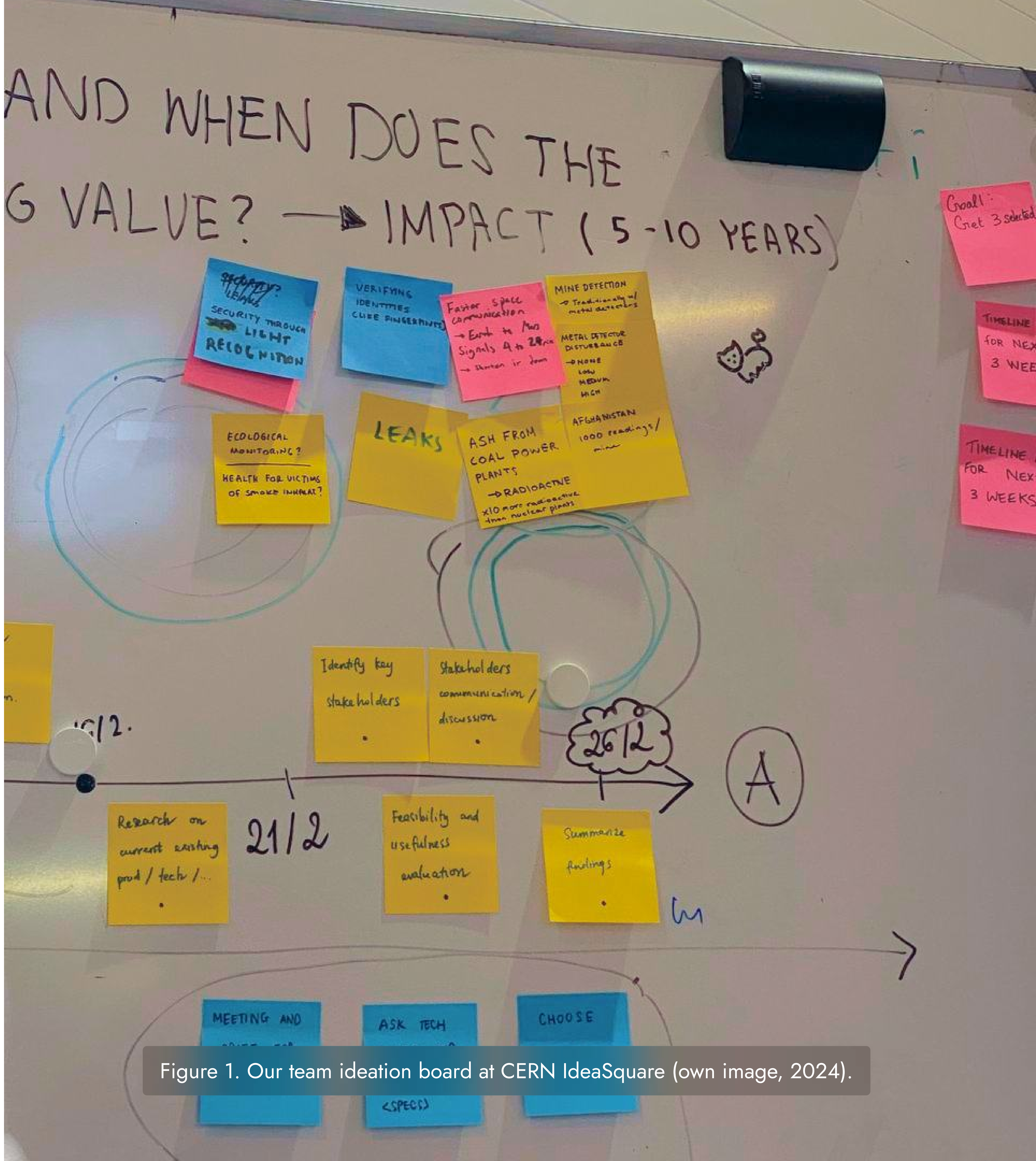


Figure 1. Our team ideation board at CERN IdeaSquare (own image, 2024).

1.2 Our team

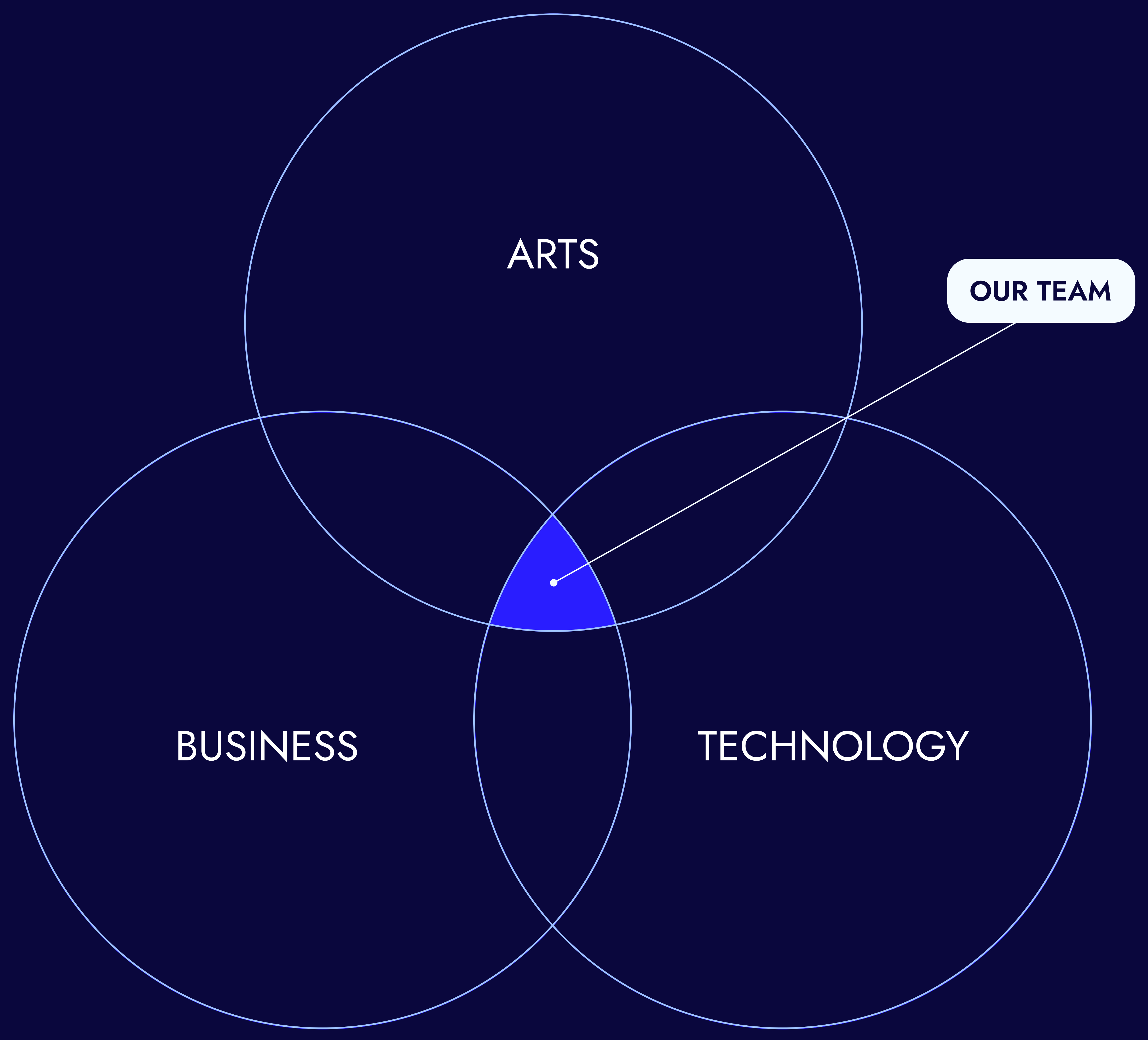
We are a dynamic and interdisciplinary team of five, combining expertise from the fields of arts, business, and technology with the mission to create an innovative and impactful solution. Our diverse backgrounds and skillsets have allowed us to multilaterally approach the design and development of the Kotiscan concept.

Nina Balashova and **Jordi Rocha**, our designers and representatives of the arts field, were pivotal in shaping the visual components and design elements in our project. Nina conducted extensive desk research, ensuring our designs were well-informed and grounded in relevant data. In addition to visuals, Jordi ensured the coherence and clarity of our project documentation and presentations with his exceptional academic writing skills.

Maria Simon, the AI developer of our group oversaw the scientific integrity and management of technological aspects of our project. Her understanding of the science behind the technologies helped us to make sure that our technological solutions were feasible during the ideation process and in the outcome.

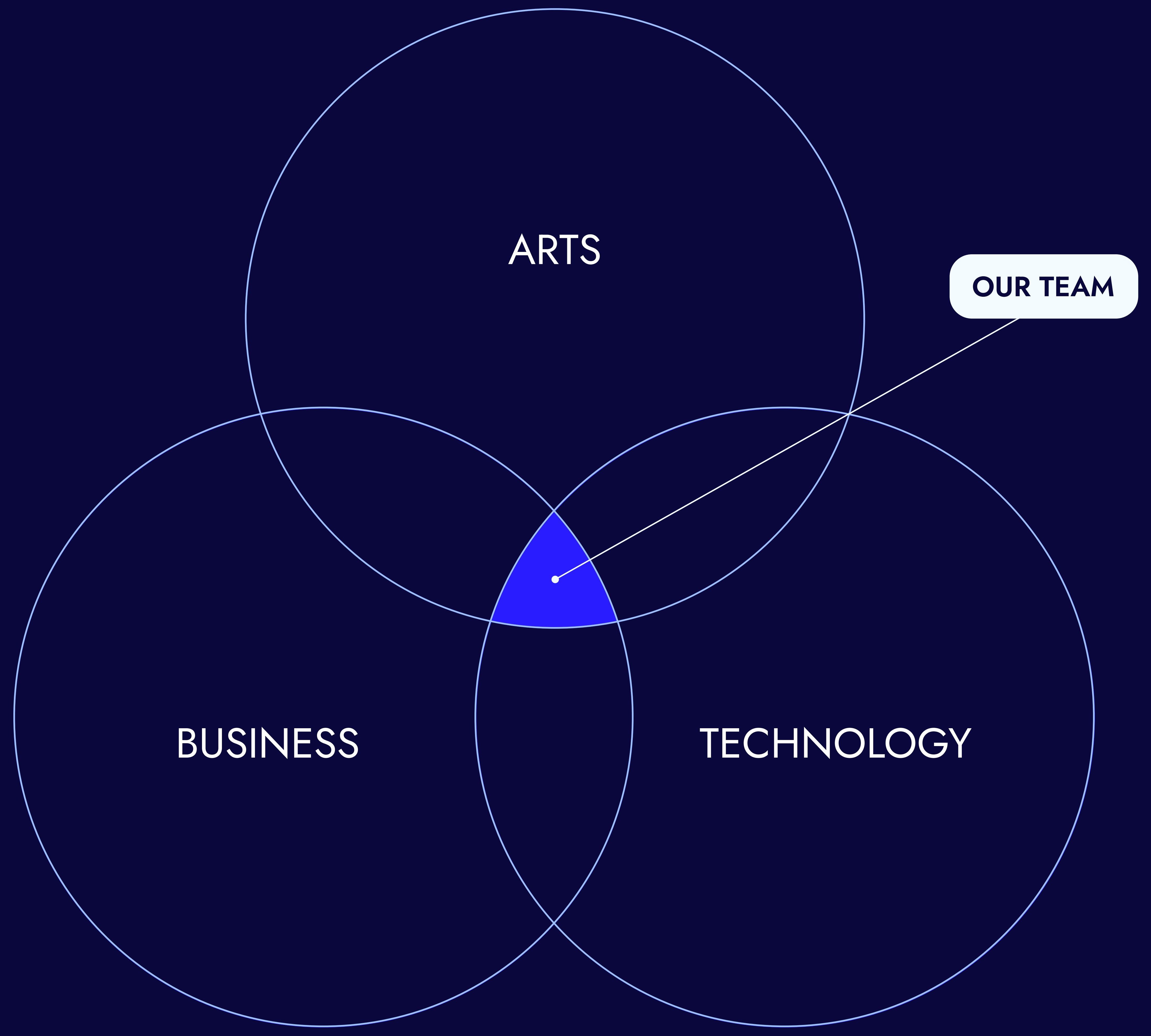
Giang Nguyen, with her background in project management and business studies took the role of leading our team's communications and stakeholder engagement. In addition, she managed our timelines and deadlines while providing a lot of effort to the research phase of the project.

Leevi Mäkikalli, founder of a software company, concentrated on a human-centric approach to business design and brought his expertise in building solutions from scratch to help the team finding the problem-solution fit. His understanding of storytelling contributed to the presentations and pitching of the outcome.



We had the privilege of being guided by two mentors, **Markku Koskela** and **Pouria Kay**, providing us with insights and advice whenever we needed them. Markku, an experienced Design Thinking practitioner and educator, is the Global Innovation Program Manager & Lecturer at Aalto University. Pouria, the program director of Nordic Startup Ventures and is an expert in understanding customer perspectives and market trends. Their roles were to guide and support our team during the project, giving feedback and suggestions based on our development, yet leaving a total autonomy for the team to make our own decisions.

In addition, **Ville Eloranta**, Director of the IDBM in Aalto University, together with the **teaching team** of Industry Project course, gave us valuable feedback and set a positive environment for the group during the project.



Nina Balashova

ROLES

Designer

Creativity expert

User experience and service design expert

RESPONSIBILITIES

Visual components for the files

Presentations and files design

Giang Nguyen

ROLES

Coordinator

Communication expert

Business expert

RESPONSIBILITIES

Liaison between stakeholders and the team

Collaborating with others on business related aspects

Leevi Mäkikalli

ROLES

Start-up expert

Business expert

Storytelling expert

RESPONSIBILITIES

Leveraging startup experience in market research and business analysis

Enhancing storytelling and presentation techniques

Jordi Rocha

ROLES

Designer

Design approaches expert

UX/UI expert

Branding

RESPONSIBILITIES

Writing and editing

Visual components for the files

Presentations and files design

Maria Simon

ROLES

AI and start-up expert

Tech and science expert

RESPONSIBILITIES

Technology analysis

Collection and preparation of material for analysis

Figure 2. Our team at CERN IdeaSquare (own image, 2024).

2. Technology overview

2.1 MicroQuaD

Technology Owner: Benedetta Valerio, Marketing and Application Engineer - Marketing and Business Development Team, Single Quantum

Description: MicroQuaD consists of advanced Superconducting Single photon detectors and TCSPC modules. Single photon detectors are the most sensitive light detectors that exist. They are so sensitive that they can detect a single particle of light: an individual photon. The subject-matter experts involved in the project plan to develop multipixel detectors and adapt them for coupling them to microscopes enabling new research opportunities (ATTRACT-EU, 2022)

According to ATTRACT-EU (2022), the potential societal issues MicroQuaD can address include:

- Advances in material technology
- Novel microscopy techniques

Figure 3. MicroTime 100 Confocal Microscope with SNSPDs coupling (PicoQuant GmbH, n.d.).

2.2 POSICS-2

Technology Owner: Domenico della Volpe, Professor, Université de Genève

Description: POSICS-2 is a cheap, handleable, wireless, compact, and lightweight camera. When moved around in-vivo on a patient's body for tumor surgery or diagnosis, the camera uses radio-tracer radiation and reconstructs the tumor position and its borders with a sub-millimetric precision. This reduces the invasiveness of the surgery, ensuring the complete removal of cancer at the same time. The technology can spot tumors up to a few centimeters under the skin, making it extremely useful for lymph node identification or mammal cancer outpatient treatment. Further, the system is dual-use, capable of working with gamma and beta-emitting radiotracers, opening a wide field of possible medical applications (ATTRACT-EU, 2021).

According to ATTRACT-EU (2021), potential societal issues POSICS 2 can address include:

- Improving the definition of the resection area in
- Cancer diagnosis

Figure 4. POSICS-2 Prototype (ATTRACT stories: Behind the POSICS-2 project, 2024)

3. Design framework

3.1 Double diamond framework

Realizing the great potential of MicroQuaD and POSICS-2, we explored the global problems and scenarios where these innovative technologies can be used to create a social impact. We used the double diamond method as our design framework.

This framework was a valuable tool to overcome blockades and technological constraints. The framework kept us more focused, and user-centric to reach our final concept, Kotiscan.

However, soon we discovered that the double diamond is more suitable for an ordinary design process. Our brief differs from that, given that we were tasked to leverage these technologies as tools to solve a complex problem.

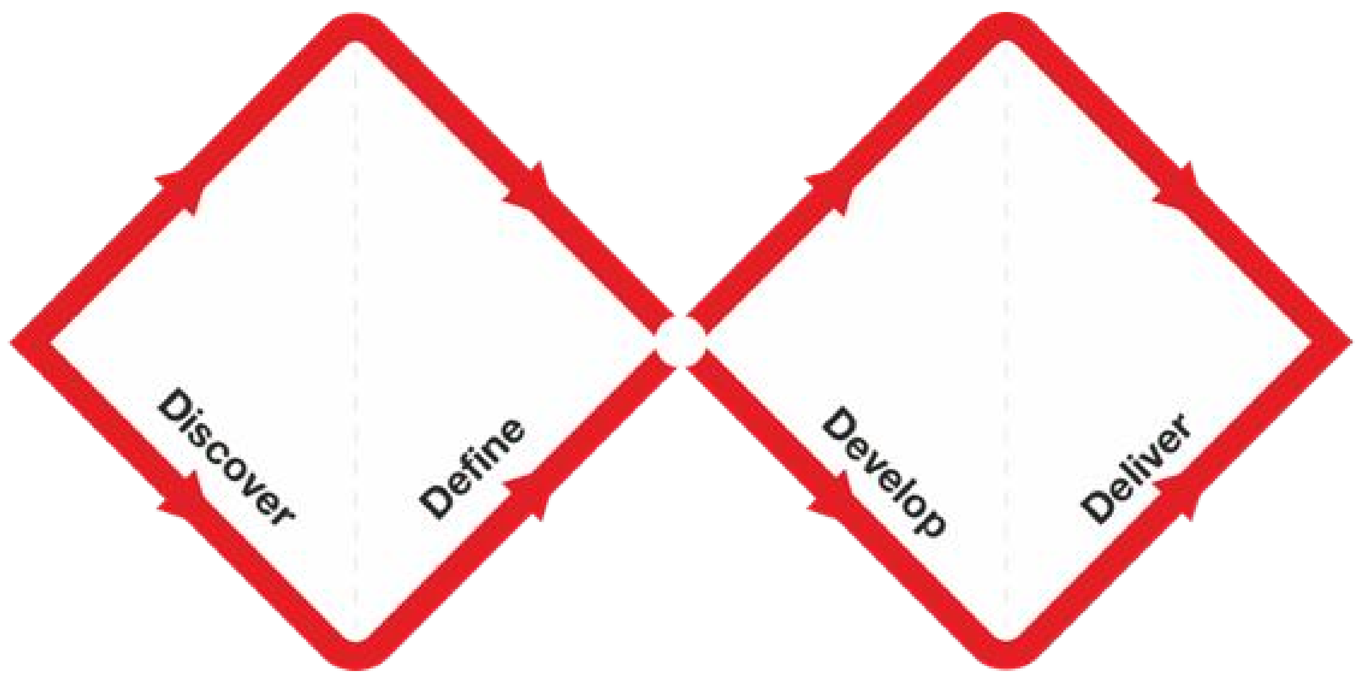


Figure 5. The Double Diamond Framework by the British Design Council (Design Council, 2024).

Reflecting on the project framework we followed, we were organically adjusting and adapting the double diamond framework. We devoted more time on the discovery phase. We ended up going in loops among these stages of discovery phase.

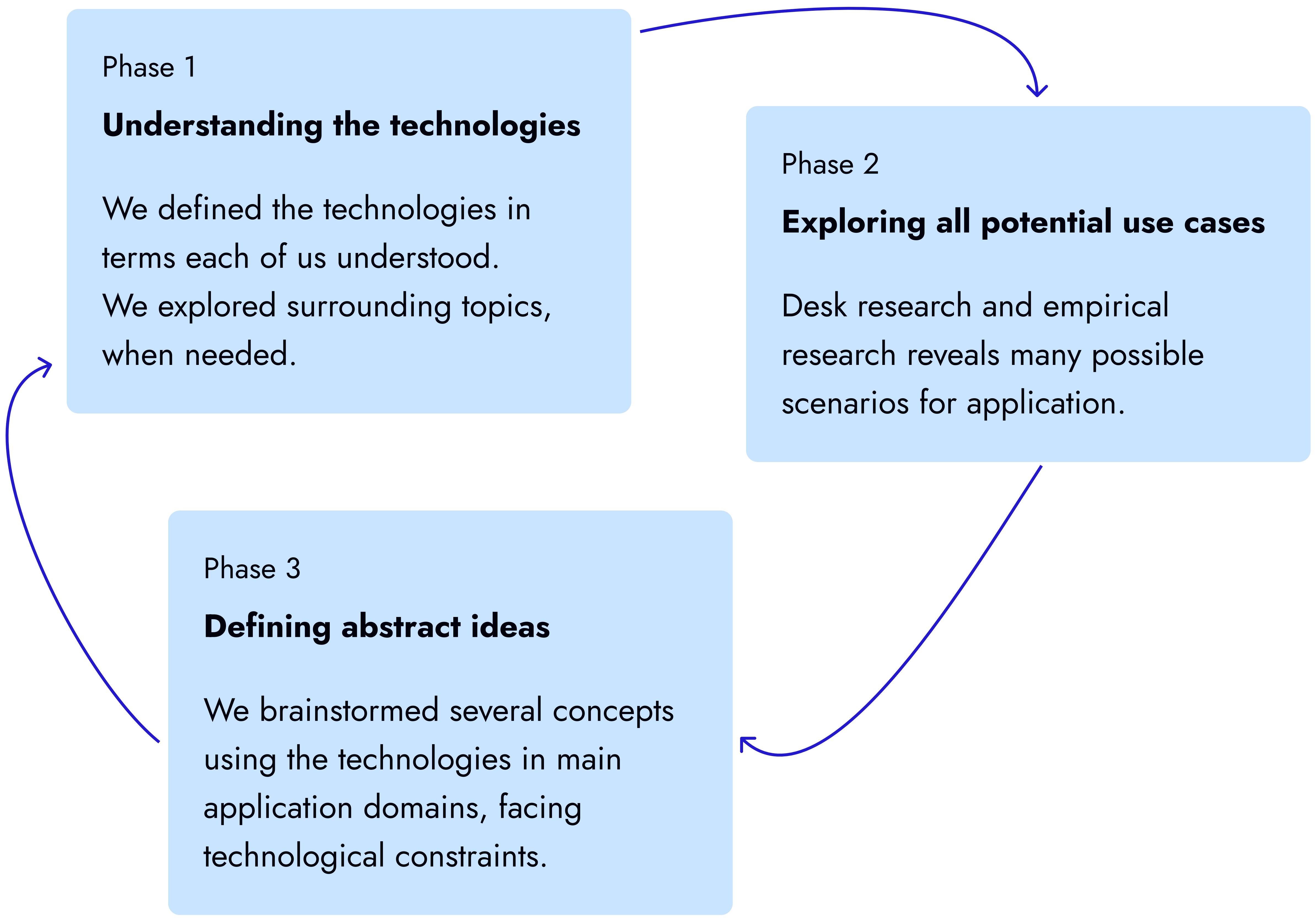


Figure 6. Three phases in the discovery phase where we iterated extensively (own diagram).

3.2 Identifying major application domains

We conducted extensive desk research which gave us a comprehensive understanding of the technologies. We also had exploratory interviews with experts and understood the current constraints of our ideas. Our focus moved to synthesizing our insights into thematic domains of our ideas. These are the main application domains we identified

- In vivo non-invasive imaging
- In vivo invasive imaging
- Use of imaging in Experience Reality (XR)/ Virtual Reality (VR) for training surgeons
- Space Optical Communication
- Quantum Cryptography
- Material Science

Many ideas in each application domain were analyzed. Throughout our ideation process, we encountered numerous technical constraints. As we brainstormed concepts, these obstacles hindered our ability to innovate.

Figure 7. Team workshop session at CERN IdeaSquare (own image, 2024).

4. Project milestones

4.1 Speculation: CERN and initial design visions

In February 5th to 9th, we visited CERN in Geneva, Switzerland, and later that month in 28th, we participated in a workshop at the Design Factory in Otaniemi, Finland.

During our week at CERN, we engaged in several workshops focused on design thinking, problem-solving, and innovation. These workshops enhanced our ability to create solutions for complex issues. We had numerous discussions with specialists, mentors, CERN employees, and other students to gather insights and feedback on our ideas. This led us to identify space communication and quantum cryptography as two potential applications for the MicroQuaD technology. We then composed a background report on these two areas.

Following this, we attended another workshop session organized in Design Factory, Otaniemi for student groups involved with ATTRACT Academy projects. This workshop addressed the challenges student groups face when tackling complex problems with advanced technologies. We discussed our challenges with other teams and mentors to gather information, insights, and advice. These exercises and discussions prompted us to reconsider our chosen directions of space communication and quantum cryptography. We realized these paths were too constrained by current technological and social limitations, making the solutions abstract and not easily relatable to ordinary users. Thus, we reopened our project to further exploration.

Subsequently, a coaching session with Ville Eloranta and Annika Bengts helped us connect our work to speculative design and visualize our design approach. After this mentoring session, three design visions including IVF, cancer home detection and innovation station were crafted. With feedback from mentors and teaching team, we narrowed down to IVF and cancer home detection service.

4.2 Refinement: Milan Design Week and course home stretch

In April, we attended Milan Design Week and spent considerable time advancing our project. Following extensive discussions, we chose to pursue the idea of at-home cancer detection, speculating that the risks associated with radioactive materials could be mitigated for home use. Further feedback from our mentors and teachers guided us in conducting more in-depth research on cancer. This process helped us narrow down our user segment and refine our concept.

During the final six weeks of the course, we established a foundation for our concept. Our research highlighted the significant impact of lung cancer on citizens globally, including non-smokers, leading us to choose lung cancer patients as our target user segment. As the scope of the service design is still broad, we identified the stages of cancer where our service could be most impactful and decided to concentrate specifically on the post-treatment process for patients. This decision marked a major milestone, defining the core framework of our project outcome.

With the support and guidance of our teaching team and mentors, our team presented our concept and received critical feedback. These suggestions and insights both on our presentation and the service idea enabled us to refine our concept further, leading to a successful pitch at the course's final event, the IDBM Impact Gala.

5. Kotiscan concept design

5.1 Discovering the need of a service

Our team, after spending much time on understanding the technology and its limitations for each idea, decided to 'step back' and revisit the original purpose of the technology.

Here, we embraced the paradigm-breaking strategies described in the study by Sternberg and Lubart (1998, p.7), particularly, re-embracing craftsmanship and artisanal methods. Together, we realized that POSICS-2 was developed to help doctors and patients battle cancer. From this point, we began our ideation towards creating a project with the same goal.

Thus, we examined the problems that patients face at all stages of cancer treatment, from initial diagnosis to the post-treatment period. We identified four most pressing challenges (see right).

Understanding the significant challenges faced by patients, especially in the post-treatment phase, we were driven to develop a solution that would alleviate their emotional burden and reduce the financial stress. Our aim was to foster a stronger connection between patients and the clinic, optimizing resource utilization and enhancing efficiency. This led us to the concept of a dedicated service for post-treatment patients.

Most pressing challenges in cancer patient journey

Difficulty detecting cancer in the primary stages

"The delays in cancer diagnosis may occur throughout the diagnostic pathway: patient, primary care, and secondary care" (Al-Azri, p. 325).

High cost of treatment

"The delays in cancer diagnosis may occur throughout the diagnostic pathway: patient, primary care, and secondary care" (Al-Azri, p. 325).

Long active monitoring and diagnosis periods

There is a need for active monitoring and diagnosis of patients even after completing the main stage of treatment (Follow-up care after cancer treatment. (n.d.). American Cancer Society).

Emotional exhaustion of patients

"Depression and anxiety are also associated with CRF (Cancer-related fatigue)" (Weber and O'Brien, p. 502).

5.2 Speculative design case

Our service theoretically ideally combined the service itself, which would meet users' needs, and the original technology for diagnostics. Thus, with the help of POSICS-2, a patient at home could conduct independent diagnostics by scanning his body. The results are uploaded to application, where a doctor assesses them, statistics are tracked, and post-treatment is continued. This approach helps reduce the patient's need to visit clinics and reduces diagnostic costs.

However, this project is called a speculative design case for a reason: just like in our initial ideas, here we are faced with the problem of the exposure to radioactive materials, especially at home by patients themselves. Firstly, given the technology's degree of development and the limitation on details disclosure from the technology owner, we could not fully assess the real threat of using radioactive material necessary for diagnostics at home. Secondly, within society, there are many prejudices and fears associated with the use of any radioactive material, regardless of the context.

According to Barendregt and Vaage (2021, p. 375): "Speculative design is an approach to design in which designers create a product or object connected to an imagined scenario." Our goal as a team was to overcome the abovementioned limits and prejudices by creating an alternative "new" future scenario in which cancer treatment is possible at home. For this reason, we decided to disregard the technical constraints related to radioactive material exposure, trying to find possible future solutions through a detailed speculative case study.

The same strategy was advised to be followed by scientists considering speculative design in the context of a "possible" future enabled by the evolution of technologies" (Kawahara, 2019, p. 40). Thus, this speculative design case was not just a theoretical exercise. It has the potential to inspire real-world technological developments. As scientists can consider the new versions of the future enabled by actively developing technologies, our project could serve as a fresh sight. By demonstrating the feasibility of home diagnostics and treatment, we hope to encourage technological development in this direction.

As we imagined various possible scenarios, we realized that one group of potential users—post-treatment patients—had already encountered radiation as part of their treatment journey. This fact, which seemed to lie on the surface but was opened only through work on speculative design, opened our eyes to the fact that our case becomes much more realistic if, within the framework of the project, we focus on a group of post-treatment users. The second limit on social distrust of radiation was automatically reduced in the group of people who had already experienced it firsthand throughout chemo. So, thanks to the speculative design case, we took a project development trajectory that is more realistic.

5.3 Defining the concept: Kotiscan

Through numerous searches for ideas and speculative scenarios, we came to the idea of creating a cancer home detection solution— a service for communicating with patients who have undergone the main stage of chemotherapy and are at the post-treatment stage, which requires constant diagnostics.

Building on this foundation, we propose a service named **Kotiscan**.

KOTISCAN

home • scan

Who?

The term "koti" means "home" in Finnish, reflecting our aim to support patients' health in the comfort and familiarity of their own homes.

How?

Kotiscan is a white-label medical service designed to partner with existing medical service providers. The service comprises two main components: a handheld device (a scanner powered by POSICS-2 technology) and a smart device application. This application can be integrated as an extension of the current applications used by partnered medical service providers. For instance, in Finland, Kotiscan could be added as an extension to the Maisa application for public medical services. Similarly, private providers like Mehiläinen and Terveystalo could incorporate Kotiscan into their smart device applications.

What?

With the scanning device and app connected to it, patients can do post-treatment checkups and connect to their doctors from home. This approach will reduce the time, money, and emotional resources required by both patients and healthcare providers.

5.4 Kotiscan user journey

The device is issued by the hospital where a patient was admitted during the primary treatment period.

The device connects to the hospital application and the main doctor of the patient before being handed over to the patient

The application reminds the patient to do monthly checkups with the scanning device (powered by POSICS-2 technology).

Data after screening is stored in the application for statistics and access is given to the primary care physician.

The doctor remotely analyzes the results and adjusts the treatment plan according to the diagnostic results.

If necessary, the patient can make a video call with the doctor in the application or book an in-person visit.

After complete remission, the device is returned to the hospital, ready to continue its journey with the next patient.

HOSPITAL DISCHARGE

REMISSION

One of the main aspects of the entire service is transferring the central part of the post-treatment period to the home.

The primary purpose of this, in addition to the monetary costs on both sides, is the desire to improve the emotional state of patients and allow them to be close to their loved ones during treatment. It has been scientifically proven that emotional state and mental health have an impact on cancer recovery: "Supporting individuals...around their cancer diagnosis is an essential component of holistic care that can affect an individual's long-term prognosis and outcomes" (The National Behavioral Health Network for Tobacco & Cancer Control, 2020, p.1). Indeed, supporting loved ones, being close to them and being in a familiar context (for example, at home) can help improve the mental comfort of patients and positively impact treatment outcomes.

To conclude, even though POSICS-2 was created for use in hospitals by doctors to improve the diagnosis of cancer during surgery, our team was able to see an alternative idea to use the technology. The emphasis of our service is to take care of the patient and improve his life first. Although this design project is still partially speculative, we hope our idea can encourage scientists to see new possibilities in the technology.

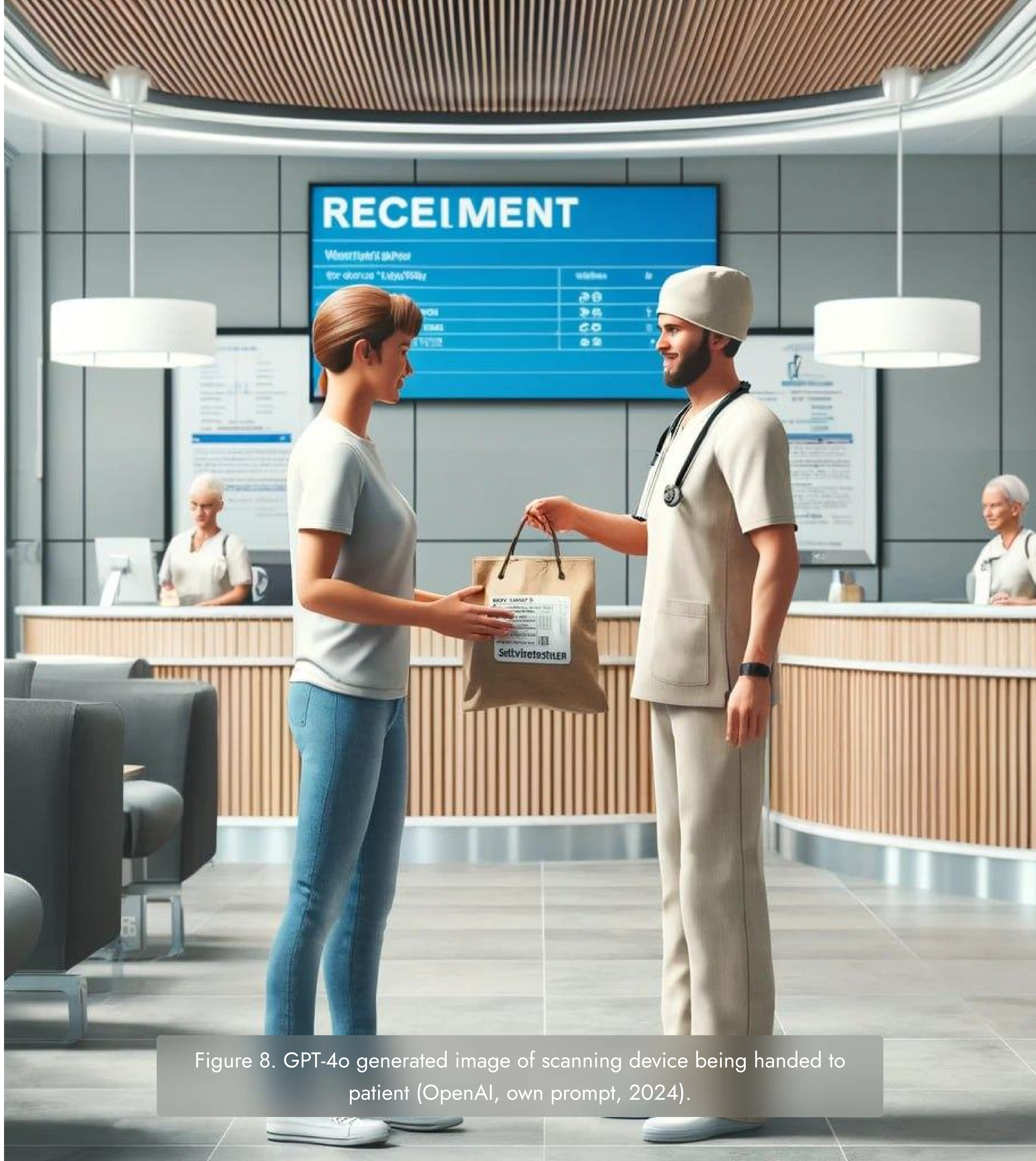


Figure 8. GPT-4o generated image of scanning device being handed to patient (OpenAI, own prompt, 2024).

5.5 Kotiscan core values

Social impact

Kotiscan has the potential to create significant social value for customers (medical service providers), end users (lung cancer patients), and providers (device manufacturers and distributors). By enabling patients to conduct their checkups at home, Kotiscan enhances comfort and reduces the time and emotional stress associated with frequent hospital visits. This decrease in visits can reduce the workload and stress for doctors and medical staff, allowing them to focus more on patients undergoing treatment or those with recurring cancer. Additionally, Kotiscan contributes to global health and well-being by improving post-treatment monitoring and supporting the fight against cancer. This can also positively affect the health and well-being of medical professionals, whose excessive working hours and stress have long been a problematic phenomenon globally (Trinkoff et al., 2006; Kumar, 2016).

Economic and environmental impact

Kotiscan reduces the number of hospital visits required by patients, thereby decreasing travel and its associated environmental impact, such as air pollution from transportation. The service adopts the "rent instead of buy" and "self-service" business models (Gassmann et al., 2013). Patients can rent the device from the hospital for home use, reducing the cost of post-treatment care. Given the current cost of each handheld device at $10,000 (according to Domenico), this model presents significant savings for patients and offers substantial economic benefits.

Moreover, the rental model diminishes the demand for device production, conserving materials and resources, and enhancing the sustainability of the service. By minimizing production requirements, Kotiscan promotes a more sustainable approach to healthcare technology.

Figure 9. CERN campus, where we first ideated our core values (own image, 2024).

5.6 User experience mockup

To communicate the idea and value of Kotiscan, we designed a clickable prototype.

The user flow captures the main value Kotiscan provides. The Kotiscan mission is to improve the post-treatment experience of cancer patients. The solution rests on an underlying assumption that post-treatment at home instead of hospitals results in a more comfortable patient experience. Thus, our clickable prototype needed to communicate the comfort resultant from an at-home experience. This distinction matters because, although the direct interaction between the patient and ATTRACT technology occurs in the scanning phase, the comfort delivery occurs later. Automatic scan interpretations, at-home medical appointment booking, one-on-one expert advice, accessible medical history, and other features deliver this comfort. For this reason, we chose to illustrate via prototype not the scanning interaction but rather what happens after; the prototype shows how the user views her scan history, books an appointment, talks to her oncologist, and receives an updated treatment plan — all from the comfort of home. This user flow captures the comfort a patient feels using Kotiscan and, in this way, exemplifies the real value our solution introduces.

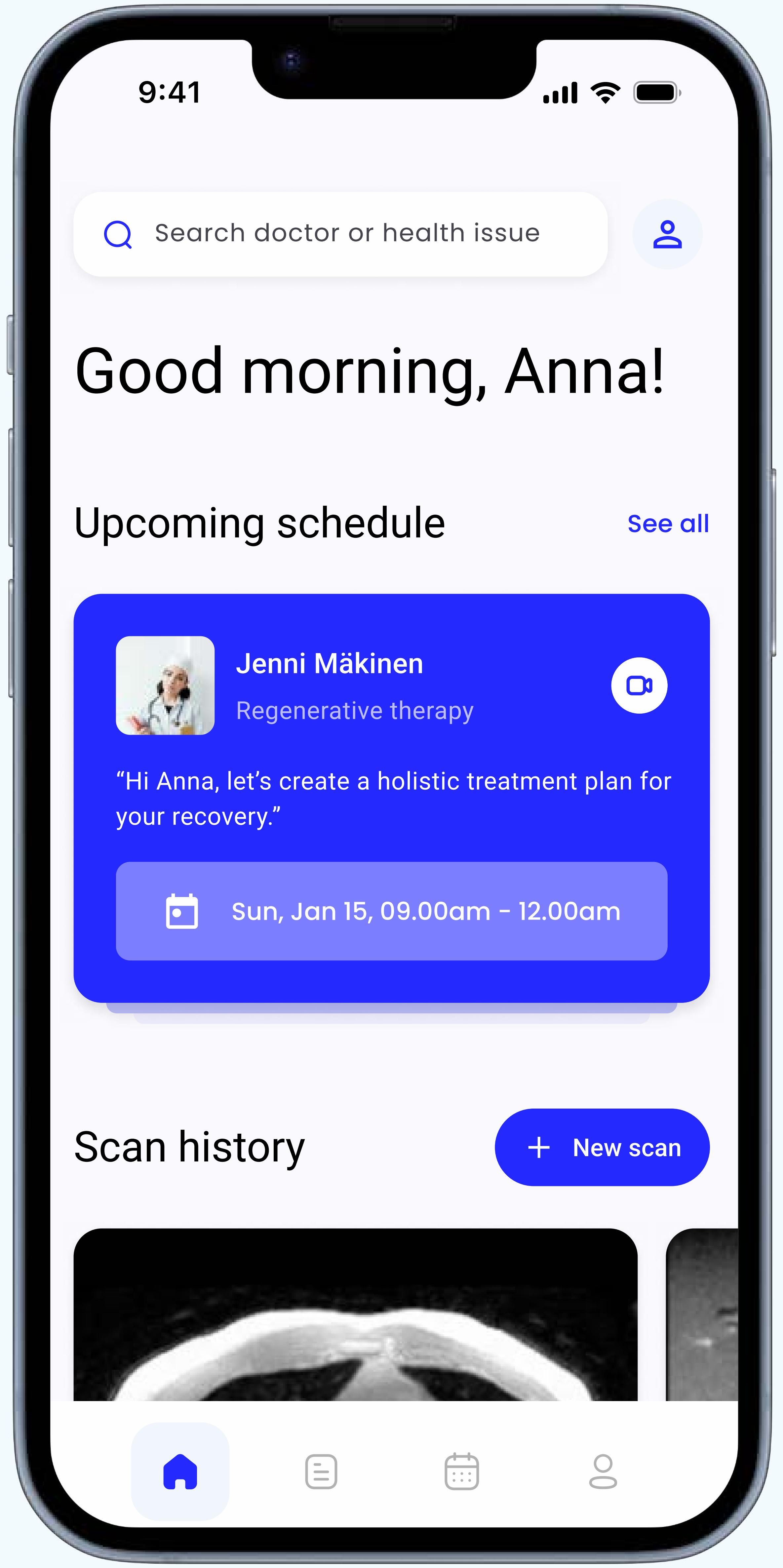


Figure 10. Mockup of Kotiscan homepage.


r or health issue
rning, Anna!
hedule
See all
äkinen
ative therapy
te a holistic treatment plan for
n 15, 09.00am - 12.00am
New scan
9:41
Scan record
13 January 2024
Intelligent assesment
All good!
Your scan shows no new metastatic lesions. The recovery plan proceeds as normal.
9:41
Schedule consultation
Maria Koskinen
Oncologist
Languages: Finnish, English, Russian
Available in next 5 days
Location
Annankatu 8, 00120, Helsinki
HELSINKI
Kaartinkaupunki
Punavuori
Schedule a new appointment
View other doctors
9:41
Oncologist
Maria Koskinen
10.02
9:41
Scan record
13 January 2024
Doctor notes
10 January 2024
Subjective
Patient sent in recent home scan
feeling generally well with signific
symptoms. No new complaints. P
energy levels, reduced cough, and

6. Potential implementation framework

6.1 Business model

Developing a complete business model with financial calculations for our concept proves challenging, as POSICS-2 technology is currently in prototyping phase according to our discussion with Domenico, the technology owner. However, we constructed a business model canvas to better showcase our concept envisioning. The business model canvas targets Finland as the market.

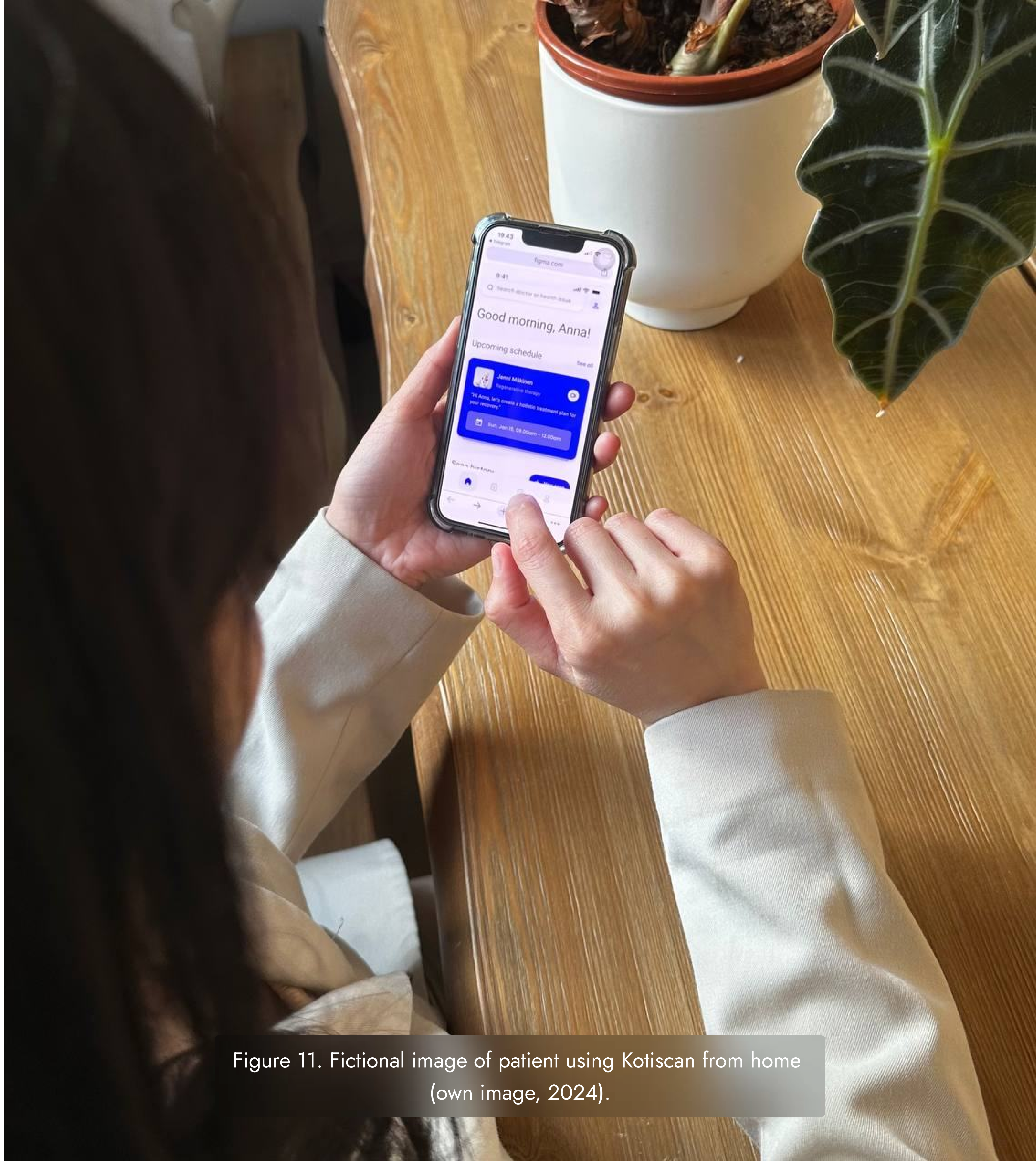


Figure 11. Fictional image of patient using Kotiscan from home (own image, 2024).

Business model canvas

KEY PARTNERSHIPS

Medical Service Providers

Device Manufacturers: Companies producing the handheld scanners powered by POSICS-2 technology.

Product team responsible for integrating Kotiscan into existing medical service applications.

Hospitals: Issuing the devices and integrating them into patient care.

KEY RESOURCES

POSICS-2 Technology

Medical Expertise: Knowledge from healthcare providers to ensure the service meets medical standards.

Development Team: Skilled professionals to build and maintain the smart device application.

Partnerships: Strong relationships with medical service providers.

KEY ACTIVITIES

Research and Development: Continuously improving POSICS-2 technology and the smart device application.

Integration: Working with medical service providers to integrate Kotiscan into their existing applications.

Training: Educating healthcare providers on how to use Kotiscan effectively.

Support and Maintenance: Providing ongoing technical support and updates for both the handheld device and the application.

VALUE PROPOSITIONS

For Patients: Convenient at-home monitoring, reduced need for travel, less emotional stress, and continuous post-treatment care.

For Healthcare Providers: Reduced workload, better allocation of resources, and improved patient outcomes.

For Medical Service Providers: Enhanced service offerings, patient satisfaction, and loyalty.

CUSTOMER RELATIONSHIPS

Personal Assistance: Direct support through hospitals and clinics issuing the devices.

Automated Services: Application reminders and notifications for monthly checkups.

Remote Monitoring: Doctors can remotely analyze data and adjust treatment plans.

CHANNELS

Hospitals and Clinics: Primary channel for distributing the handheld devices.

Medical Service Provider Applications: Integration into existing apps like Maisa, Mehiläinen, and Terveystalo.

Online Platforms: Website and mobile app for information and support.

CUSTOMER SEGMENTS

Primary: Lung cancer patients requiring post-treatment monitoring.

Secondary: Healthcare providers looking to improve patient care and resource management.

Tertiary: Medical service providers aiming to enhance their service offerings.

COST STRUCTURE

R&D cost: Continual development of POSICS-2 technology and the application.

Integration Costs: Working with medical service providers to integrate Kotiscan into existing systems.

Manufacturing Costs: Production of the handheld scanners.

Training and Support: Educating healthcare providers and maintaining the service.

REVENUE STREAMS

Subscription Fees: Charges for medical service providers to integrate Kotiscan into their applications.

Rental Fees: Patients rent the handheld device from the hospital.

Service Fees: Fees for ongoing support and maintenance services.

6.2 Potential features for future development

Kotiscan has significant potential for customization to meet different user group preferences. Despite this concept being a speculative design case, we hope that the technological constraints faced in this project will be resolved by scientific breakthrough, opening up opportunities for new features development.

AI prediction of treatment responses and accuracy of radiotherapy

"AI has been recognized as a potent ally in lung cancer treatment"(Gandhi et al, 2023, p. 9). Many imaging equipment manufacturers like GE have already identified AI and machine learning opportunities in early cancer detection (GE HealthCare, 2024).

In the coming years, we expect AI models to predict treatment responses and select optimal therapies. According to Gandhi et al. (2023), AI models can predict the response and recurrence following therapies and optimizing radiation therapy for lung cancer patients (p. 1).

For example, Philips and Silo AI, a Nordic AI lab together developed computer vision models to enhance the accuracy of radiotherapy (Alanen, 2020).

Better visualization of scanned images

By combining Kotiscan images with CT scans or X-ray images, it is possible to enhance the image visualization for the patient in a more understandable way.

Kotiscan images will be closest to PET scan images since both PET and POSICS 2 work on radioactive radiation imaging. As said in Batchelor, 2006, the combination of 3D imaging technology with PET/CT has more potential for lesion characterization and preprocedural planning. We anticipate that Kotiscan images can also be rendered into 3D images. As highlighted in 3D and Quantitative Imaging Laboratory (n.d.), complex medical data can be unlocked with 3D imaging to make it more personalized and effective.

Expansion to other cancer types

To ensure clear concept definition and clarity, our team has chosen lung cancer as the initial target group. However, the technology has significant potential to be expanded to other cancer types that pose major global health challenges. We believe that, beyond lung cancer, Kotiscan can be developed to benefit patients with various forms of cancer, thereby enhancing the overall health and wellbeing of all cancer patients and contributing to the broader fight against cancer.

6.3 Sustainable development goals (SDGs)

Our main aim in the project was to make a sustainable social impact with the technologies. Hence integrating UN Sustainable Development Goals was at the core of choosing the final concept. The main SDG achieved by Kotiscan is Goal 3: Good health and well-being (United Nations,n.d.).

SDG 3 aims to achieve universal health coverage and equitable access of healthcare services to all men and women. It proposes to end the preventable death of newborns, infants and children under five (child mortality) and end epidemics (United Nations,n.d.).

TARGET 3.4	HOW KOTISCAN HELPS
Reduce mortality from non-communicable diseases and promote mental health (United Nations, n.d.).	By enabling continuous post-treatment monitoring and reducing anxiety, Kotiscan directly contributes to the goal of reducing mortality from non-communicable diseases and promoting mental health. We believe that Kotiscan's collaboration with healthcare providers may help achieve this goal on a global level.

TARGET 3.8	HOW KOTISCAN HELPS
Achieve universal health coverage (United Nations, n.d.).	Kotiscan achieves this target by making healthcare more accessible, affordable, and effective for lung cancer patients. Its capability to monitor and detect lung cancer from home and its potential to expand to other cancer types, represents a significant advancement towards universal health coverage.

7. Concept delivery

This section first discusses our main delivery of the concept – a pitch at the IMPACT Gala. Then, we provide the ATTRACT-specific project deliverables.

7.1 IMPACT Gala

The IMPACT Gala is the final event for IDBM's Industry Project where project outcomes are presented to clients, faculty, and students. At this event, our team pitched our concept through a 4-minute presentation, showcasing the important aspects of Kotiscan. At the booth, the application mockup was displayed on a large screen together with our posters to give the booth visitors a visualization of how the concept works.

Kotiscan was well received by the event's audience. Besides the novelty of the concept, attendees were impressed at the importance of our solution in cancer treatment, and this positive reaction has strengthened our belief in Kotiscan's impact. Many questions were raised on the design methodologies used in the project, together with questions on how and why we chose this concept instead of other ideas.

As we discussed with the faculty members and other booth visitors, we acknowledged even more the importance of developing medical services to improve the health and wellbeing of citizens globally. We believe that technology breakthrough can lay the foundation for innovative services that can significantly contribute to this goal, with Kotiscan concept being one of them.

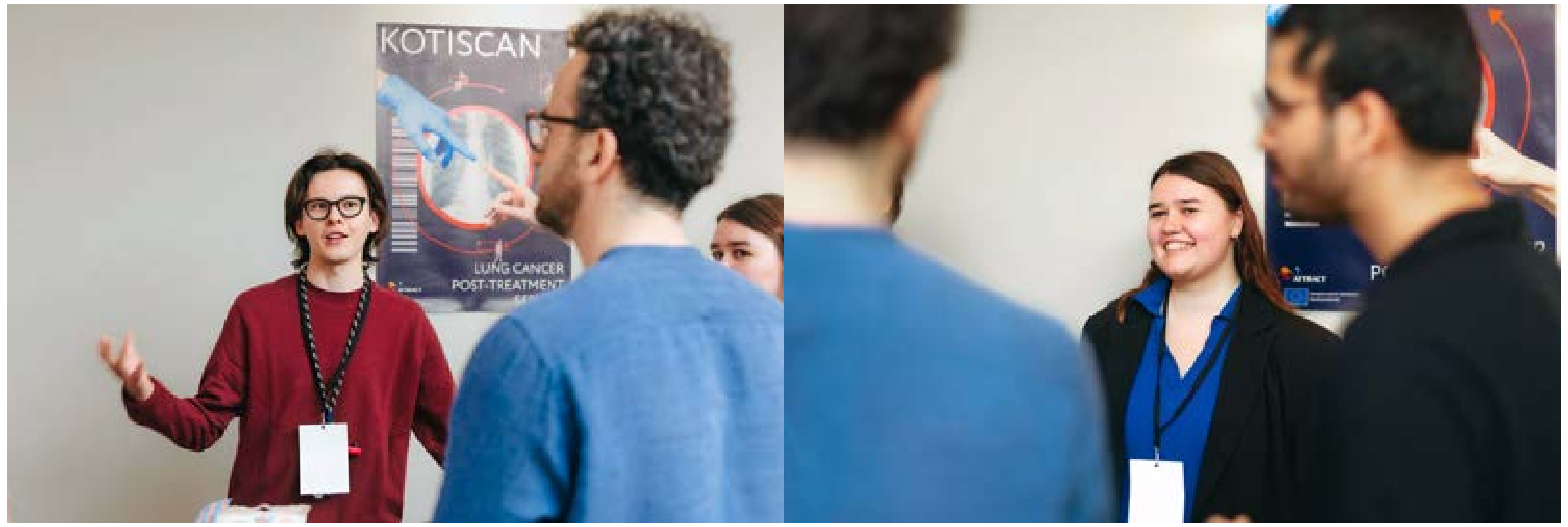


Figure 12. Team members engaging with booth visitors.

7.2 Video

The video shows the culmination of our work: the pitch at the IDBM Impact Gala 2024. In it, we tell a compelling story with Kotiscan as its protagonist. You can find the video through the following link.

7.3 Prototype

The clickable prototype (link) shows how a user can view her scan history and request a one-on-one remote doctor appointment.

7.4 Posters

Two posters were produced with different target audience. We aim to use the first poster at medical environment such as hospitals, clinics, and the second poster for regular events such as innovative conference or design exhibition.

Figure 13. Kotiscan official poster 1

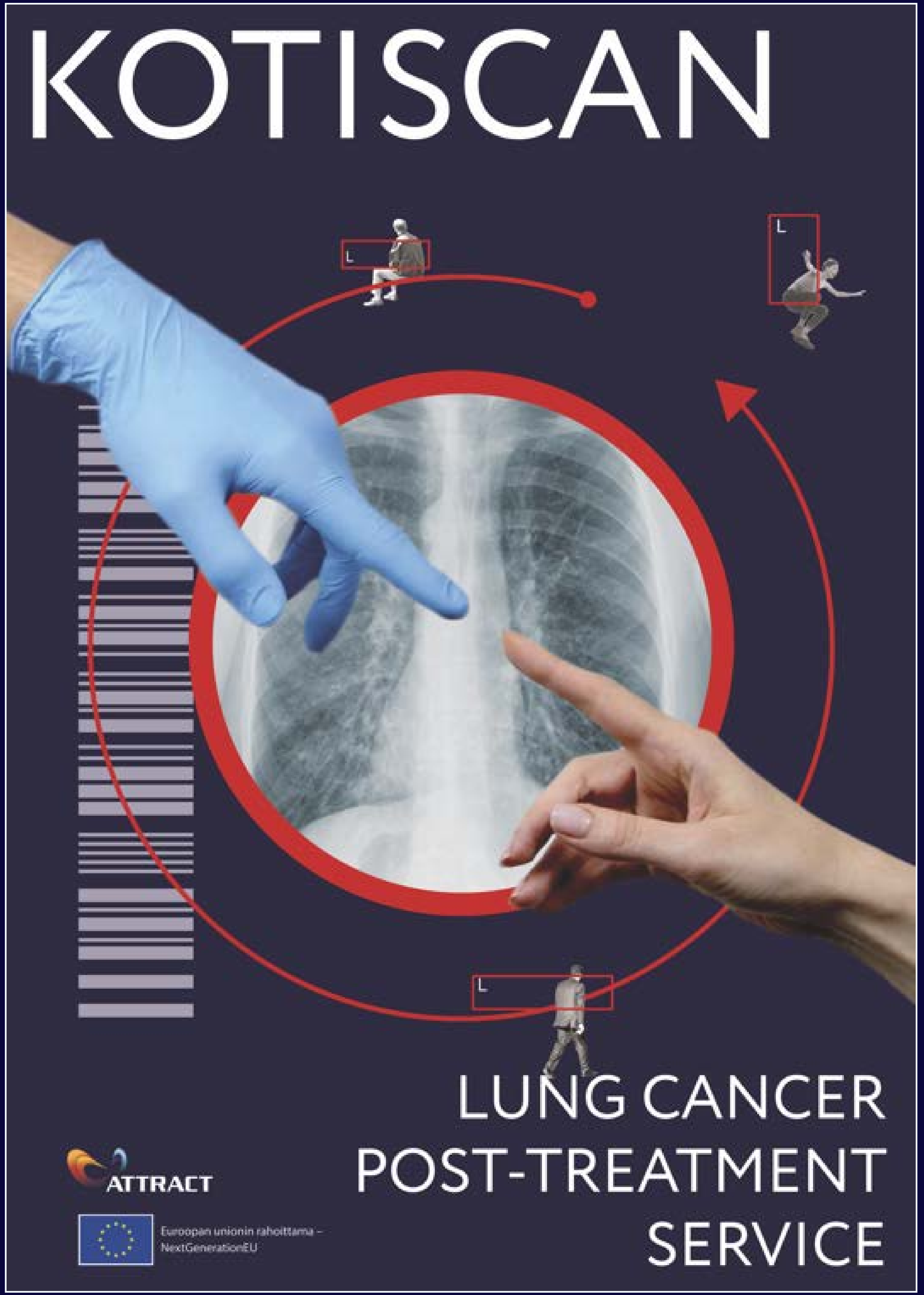


Figure 14. Kotiscan official poster 2

7.5 Team poster

Figure 15. Official team poster

8. Reflections

8.1 Tackling given technologies with “How might we” questions

We felt quite intimidated by the cutting-edge technologies in the beginning. It took us time to understand the basic principles of technology. However, we used our intuition and imagination and came up with broad and diverse ideas.

Molding a useful and final solution meant understanding the technologies better and finding the constraints related to each of our ideas. Once we pinpointed the constraints, we used ‘How might we solve/replace this constraint?’ to address them. This process made us dive deeper into solving these constraints and ultimately refine our solution more effectively.

8.1 Interdisciplinarity is a boon, not a bane

We were an interdisciplinary group based on our field of specialization. We were also different in our styles of working and personal temperaments. We were also a very multinational group with cultural differences.

Interdisciplinarity led to some conflicts in our group, as we had different approaches to understanding technology and speculating for the future. Everyone tried to bring their own practices and framework to approach the problem. As emphasized in Dorst (2018, p. 64), each of us was forced away from our normal (knee-jerk) action orientation and ended up reframing our thinking for the complex problem.

We saw this as an opportunity for creativity and innovation, as we could merge our trans disciplinarity to create more novel and impactful solutions. We chose to apply the framework of leveraging tensions in interdisciplinary teams that we learned in the course, such as finding, explaining, and addressing the tensions that came up in our teamwork.

9. Conclusion

This project was a profound learning experience that demonstrated the power of interdisciplinary collaboration and radical creativity.

This project was a profound learning experience that demonstrated the power of interdisciplinary collaboration and radical creativity. Over the past seven months, we have acquired extensive knowledge across various domains, ranging from advanced technologies to design thinking. Throughout this period, we have improved numerous soft skills and embraced our journey with the invaluable support and guidance of our mentors and teaching team. We are proud of our achievements and are committed to applying our lessons to make a positive change in our respective work and communities.

Through our collective efforts, we developed Kotiscan, an innovative service designed to enhance post-treatment care for lung cancer patients by integrating advanced technology (POSICS-2) with digital services. We believe that our concept can make a substantial impact and contribute to the Sustainable Development Goals, helping individuals globally achieve better and healthier lives. We hope that in the future, Kotiscan will be implemented in practice and that more innovative services will emerge to further enhance the quality of life for humanity.

Figure 16. Helmets hung on wall when scientists go home at CERN (own image, 2024).

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Figure list