

A Work Project, presented as part of the requirements for the Award of a Master's degree in
Management from the Nova School of Business and Economics.

**SENSO – REVOLUTIONISING PATIENT JOURNEY IN INFLAMMATORY
DISEASE MONITORING: FINANCIAL PLANNING AND CAPITAL STRATEGY**

ALESSANDRO LURAGHI – 57467

Work project carried out under the supervision of:

Nuno Arantes-Oliveira

17/05/2024

Abstract

The current challenges in the healthcare sector demand innovative solutions. Point-of-care devices are emerging as simplified, efficient, and patient-centric alternatives, often using biosensor technology. SENSO, a miniaturised biosensor, measures inflammation in Polymyalgia Rheumatica (PMR) patients by detecting the H₂O₂ concentration in a blood drop. Its integration into disease monitoring protocols, both on-site and remotely, promises to enhance patient quality of life while offering an efficient and reliable solution to healthcare professionals. The SENSO company will use PMR monitoring as a proof-of-concept, starting with the Iberian market, while assessing the biosensor's potential for broader applications in the future.

Individual Abstract

The financial planning chapter provides a detailed overview of a startup's financial projections from Q3 2024 to 2028. It includes an income statement, balance sheet, and cash flow statement, focusing on pricing strategies, revenue forecasts, cash flow analysis, and financing plans. The pricing model includes a 60% markup on production costs, with projected revenues from sales in Portugal and Spain starting in 2026 and 2027, respectively. The cash flow projections highlight the importance of operating, investment, and financing cash flows, with positive cash flow expected from 2027. The financing plans involve grants and investment rounds to cover initial costs, with a contingency plan for potential operational and financial challenges.

Keywords

Biosensor, Hydrogen Peroxide, Inflammation, Polymyalgia Rheumatica, Disease Biomarkers, Health Monitoring, Point-of-Care, Home Care, Scientific Innovation, Science-based Entrepreneurship, Financial Planning, Key Expenses, Financing, Funding, Capitalization Table, Contingency Plan, Exit Strategy, Valuation.

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

Table of Contents

1. Executive Summary	1
2. Introduction.....	3
2.1. Current Challenges and Trends in Healthcare	3
2.2. Biosensors as a Promising Healthcare Solution.....	5
3. Business Case.....	7
3.1. The Problem.....	9
3.2. The Need	10
3.3. The Solution	11
4. The Company	12
4.1. Our Story.....	12

4.2.	Our Vision.....	14
4.3.	Our Mission	15
4.4.	Our Values	15
4.5.	The People Behind SENSO	16
4.5.1.	Executive Board.....	16
4.5.2.	Advisory Board.....	19
4.5.3.	Team	22
5.	<i>Who Is Shaping the Market?</i>.....	23
5.1.	<i>What Do They Offer?</i>.....	26
6.	<i>Market Analysis</i>.....	27
6.1.	Market Segmentation	27
6.2.	Market Size and Growth Potential	30
6.3.	Detailed Market Expansion Considerations.....	30
7.	<i>The Buyer and the User</i>.....	32
7.1.	Users' Needs and Preferences.....	32
7.2.	Buyers' Needs and Preferences	33
7.3.	Buying Behaviours.....	34
8.	<i>External Competitive Landscape</i>.....	35
8.1.	Emerging Competitors Dynamics.....	35
8.2.	Reinforce Supplier Relationship	36
8.3.	Negotiate Value with Healthcare System	36

8.4.	The Alternatives Dynamics.....	36
8.5.	Industry Competition	37
9.	<i>Current Patient Journey and Solution for PMR</i>	37
9.1.	Current PMR Monitoring Process	38
10.	<i>SENSO's Value Proposition</i>	41
10.1.	Application of SENSO in Hospital Setting.....	42
10.2.	Application of SENSO in Homecare Setting	43
11.	<i>Financial Planning</i>	45
11.1.	Financial Projections.....	45
11.2.	Pricing	46
11.3.	Revenue Forecast	46
11.4.	Cashflow and Breakeven	47
11.5.	Financing Cashflow	48
12.	<i>Key Expenses</i>	48
12.1.	Operational Expenses.....	49
12.1.1.	R&D Team.....	49
12.1.2.	Sales and Marketing Team.....	49
12.1.3.	Operations Team	49
12.2.	PPE.....	50
12.3.	Patent.....	50
12.4.	Medical Device Validation	50

12.5.	Marketing Expenses	50
13.	<i>Financing</i>	51
13.1.	Funding	51
13.1.1.	Grant	52
13.1.2.	Pre-Seed Round	53
13.1.3.	Seed Round Investment	53
13.1.4.	Series-A Round Investment	54
14.	<i>Capitalization Table</i>	55
15.	<i>Contingency Plan</i>	56
16.	<i>Exit Strategy</i>	58
16.1.	Valuation	58
16.2.	Exit Opportunity	59
17.	<i>References</i>	62
18.	<i>Appendix III – Financial Data</i>	67

Abbreviations

CRP C-reactive Protein

ESR Erythrocyte Sedimentation Rate

H₂O₂ Hydrogen Peroxide

IP Intellectual Property

ITQB Nova Institute of Chemical and Biological Technology

NWC Net Working Capital

PCT Patent Cooperation Treaty

PMR Polymyalgia Rheumatica

POC Point-of-Care

PPE Property, Plant, and Equipment

ROS Reactive Oxygen Species

TRL Technology Readiness Level

WIPO World Intellectual Property Organization

1. Executive Summary

The healthcare sector continually evolves to meet the complex needs of chronic diseases, exacerbated by ageing populations and lifestyle factors. SENSO introduces a transformative approach to managing inflammatory diseases such as Polymyalgia Rheumatica (PMR) through a miniaturised biosensor technology. This innovation promises a shift from traditional, often cumbersome monitoring practices to a streamlined, patient-centric model.

SENSO utilises cutting-edge biosensor technology to detect hydrogen peroxide (H_2O_2) levels in a single drop of blood, offering a swift and reliable indicator of inflammation within minutes. This technology has its origin in the work developed at NOVA Institute of Chemical and Biological Technology (ITQB) by Dr Célia Silveira and enables on-site and remote patient monitoring, thus significantly enhancing the quality of life for patients and operational efficiency for healthcare providers.

SENSO will apply this technology to offer a more efficient and less invasive solution for PMR monitoring. The proposed solution leads to a win-win-win approach in which the three parties involved, the patients, the hospital, and our venture, increase the quality of the patient journey in terms of time and resources spent, benefiting from SENSO's solution. The Business Model is based on kits directly sold to hospitals and clinics, ensuring predictable revenue through one-time reader purchases and recurring sensor replacements. To realise this model, SENSO will adopt an Operating Model that revolves around retaining control over both research and development (R&D) and sales. Key stakeholders play critical roles in supporting SENSO's operations and market success while internally, departments such as R&D, Operations and Logistics, Sales and Marketing, and Finance collaborate seamlessly to streamline operations and deliver a high-quality product to clients.

SENSO will be introduced in the Iberian market, starting with PMR monitoring as a proof-of-concept. The business strategy includes comprehensive market analysis, competitive landscape evaluation, and detailed financial planning, aiming to establish SENSO as a leader in innovative healthcare solutions. The product's development from concept through to market readiness involves rigorous testing, regulatory approvals, and strategic industry partnerships, positioning SENSO for successful commercialisation.

By leveraging local and international market dynamics, SENSO plans to expand beyond the Iberian Peninsula, addressing global healthcare challenges and opportunities. Our expansion strategy incorporates a nuanced approach tailored to each market. We start by conducting in-depth analyses to grasp the healthcare needs, regulatory landscapes, and competition in each region. For each target region, SENSO will implement customised marketing strategies. These will include forming partnerships with local healthcare entities, launching tailored promotional activities, and participating in prominent medical tradeshow to enhance brand recognition.

Building relationships with local medical institutions and influential healthcare professionals is essential. These partnerships will support pilot projects and case studies that showcase SENSO's clinical value, boosting our market credibility. We will provide training opportunities to ensure healthcare providers are proficient in using SENSO. These programs will cover operational use, integration into medical protocols, and patient care workflows.

Our objective is to establish SENSO as a fundamental tool in global chronic disease management, transforming patient care with our innovative technology. By adapting our strategy to each market, we aim to position SENSO as a global leader in delivering efficient and effective healthcare solutions.

The company's financial plan from Q3 2024 to 2028 includes income, balance, and cash flow statements, pricing strategies, revenue forecasts, and operational efficiency indicators. The

company anticipates steady growth, particularly in Portugal and Spain, with a balanced pricing strategy and a promising revenue trajectory. We expect to reach a positive EBIT in the third quarter of 2027. The company's funding strategy includes grants and strategic investments to secure €2,6 million for critical developmental phases. A contingency plan is in place to mitigate operational and financing challenges. The company's exit strategy includes potential acquisitions by companies established in the healthcare sector, such as Philips, mergers, or organic expansion strategies.

2. Introduction

2.1. Current Challenges and Trends in Healthcare

Over the last decades, the world has witnessed extraordinary population growth, accompanied by a significant increase in life expectancy, with the most recent data pointing towards a global average life expectancy at birth of 73,3 years (UN 2022; WHO 2020). While chronic inflammatory diseases are already considered the most significant cause of death in the world, the referred extended life span, along with unhealthy diets, risk behaviours, new social pressures and environmental risk factors are expected to increase their prevalence by 17% over the next decade (Hanson and Gluckman 2011; WHO 2023; Pahwa et al. 2023). Ageing and the rise of chronic diseases are the two main factors that are putting increasing pressure on healthcare systems to provide fast, cost-effective and innovative solutions.

In response to the current challenges, and anchored on technological innovation, there has been an increasing demand for alternative models of care, including digital health, remote patient monitoring, and home care solutions (Castelyn et al. 2021). These have the potential to make healthcare more accessible and to offer high-quality solutions at the point of need, creating value for the diverse stakeholders involved in the healthcare process (Wang et al. 2023;

Bestsenny et al. 2022).

One of these tendencies is reflected in the growth of Point-of-Care (POC) testing, defined as clinical laboratory testing carried out on the site where the patient is located rather than a centralised laboratory (Larkins and Thombare 2023). This type of solution has been used in the past decades but was limited to certain clinical settings, such as emergencies (Howard-Wilson et al. 2024). However, the COVID-19 pandemic changed the landscape of POC and fuelled the use of this kind of solution, most significantly for home-based use. The advantages for both patients and healthcare systems became clear, comprising time efficiency, simplicity, lower costs, convenience, and the possibility to protect the patients from eventual complications emerging from unnecessary visits to the hospital (Howard-Wilson et al. 2024; Clemente et al. 2023). Health professionals are starting to recognise the potential of this trend in more diverse and challenging clinical settings, as is the case of chronic disease management, both as in-house and home care solutions. As a consequence, the POC market is expected to reach USD 72 billion by 2027 at a CAGR of 10,8% (Clemente et al. 2023).

From the patient's standpoint, particularly in a chronic disease setting, managing such health condition presents a significant burden, including self-management of disease evolution, keeping track of therapeutics and frequent medical appointments and exams. Home care solutions offer a promising alternative to reduce the treatment burden experienced by these patients (Tahsin et al. 2024). By providing them with tools to monitor their health status and access virtual consultations, travelling and waiting time in hospital is eliminated, reducing the impact of disease monitoring on patients' daily lives. This is particularly relevant for individuals with mobility issues, who may struggle to arrange accessible transportation and cope with long waiting times in potentially unconformable settings (Tahsin et al. 2024). In addition, these solutions have the potential to lower medical costs by reducing the costs of on-

site care and minimising the probability of preventable adverse health events. Physicians, may increase their capacity to follow other urgent or more complex situations that require in-person care (Bestsennyy et al. 2022).

2.2. Biosensors as a Promising Healthcare Solution

In the pursuit of innovation in healthcare, biosensors have emerged as game-changers, not only in research settings, but also posing as a promising solution for real-life applications, given their potential to improve the efficiency, accuracy, and accessibility of diagnostic processes (Bhatia et al. 2024).

A biosensor is a device that uses biological components, such as enzymes or antibodies, to detect target compounds, converting a biological reaction into a measurable signal, which may be electrical, or optical, among others. By reading this signal, it is possible to determine the concentration of the referred target compound in the sample, which can be obtained, for instance, from blood or urine (Bhalla et al. 2016).

A paramount example of the potential impact of biosensors is the glucose monitoring biosensor. By offering the possibility to obtain real-time data on glucose levels in a simple, fast and accurate way, it has revolutionized diabetes monitoring and improved the quality of life of millions of patients worldwide (Bhatia et al. 2024). Another widely known example of a biosensor application is pregnancy tests (Bhalla et al. 2016). Beyond monitoring settings, biosensors entail a wide range of applications as diagnosis tools. Their accuracy in the detection of biomolecules or other compounds associated with inflammatory diseases or tumours makes them a promising tool to track disease indicators and contribute to the early diagnosis and treatment of complex diseases (Bhalla et al. 2016; Bhatia et al. 2024).

Biosensors provide a competitive advantage given their selectivity, sensitivity and

reproducibility, fast response and user-friendly nature, efficient manufacturing, and scalability (Bhalla et al. 2016; Zhang et al. 2023; Bhatia et al. 2024), as opposed to the complexity of more traditional laboratory-based methods, requiring sample processing, trained operators and limited to laboratory facilities (Khan et al. 2023).

The field of biosensors is multidisciplinary, requiring seamless interaction between different disciplines, such as life sciences, biochemistry, materials science, engineering, and computer science (Bhalla et al. 2016; Zhang et al. 2023). There has been significant growth in recent years, based both on technological developments in key areas, such as the evolution of microfabrication techniques and the use of novel bio-recognition molecules and nanomaterials, and on strengthened collaboration between academia and industry (Bhalla et al. 2016; Zhang et al. 2023).

Nevertheless, the absence of a standard in this field implies that some key aspects cannot yet be considered as a given. When developing a new biosensor, it is crucial to ensure reproducibility, standardisation, and accuracy, ensuring that the device is robust and regulatory compliant (Zhang et al. 2023; Bhalla et al. 2016). In addition, the long-term stability and shelf life of biological components must be assessed, and potential challenges associated with packaging and large-scale production must be addressed (Zhang et al. 2023; Bhatia et al. 2024).

Unlike other research topics more typically associated with the fundamental sciences, biosensors have very tangible applications in real-life scenarios, as exploited above, which, alongside the significant attention and investment being devoted to areas of translational research, particularly innovative healthcare solutions, reinforces the relevance of the joint efforts currently observed in this field (Bhalla et al. 2016). The great commercial success of other biosensors supports the belief that, if conducted correctly, the development of a new biosensor can be sustainable and become equally profitable. Therefore, the current trend is to

develop portable and user-friendly devices, connected to simplified interfaces, that offer a cost-effective POC solution (Bhatia et al. 2024; Zhang et al. 2023).

If all their potential is addressed, biosensors may have the capacity to revolutionize healthcare. By offering a simplified, efficient, reproducible, rapid and cost-effective tool for healthcare monitoring, they will be pivotal in expediting treatment decisions, enhancing patient outcomes, and reducing the strain on health systems (Bhatia et al. 2024).

3. Business Case

Chronic inflammatory diseases occur when the immune system mounts a prolonged response to a non-existent threat, damaging healthy tissues and organs. (Kampftrath 2022; Santos-Longhurst 2024). The causes of chronic inflammation have not been clearly established, which hinders the implementation of preventive measures, although, in some cases, it has been related to genetic susceptibility, environmental factors and unhealthy lifestyles (Santos-Longhurst 2024; Martins and Ponte 2019). Chronic inflammation can target a diversity of organs, such as skin, joints and muscles, but also lungs and the digestive system, among others, resulting in diseases such as rheumatic, gastrointestinal and cardiovascular diseases, but also certain types of cancer and other metabolic pathologies.

Rheumatic diseases include a wide range of disorders that affect joints, muscles, tendons, and bones, causing severe pain, stiffness and swelling, and potentially impacting other internal organs (Leitão Afonso 2020). These conditions affect individuals of all ages and genders and can significantly impact a person's quality of life (Leitão Afonso 2020). The European League Against Rheumatism (EULAR) reports that these disorders affect around 25% of the European population, representing one of the main causes of physical disability (Leitão Afonso 2020). In addition to the costs to the healthcare system, these diseases also impose a considerable social

burden due to economic losses from absenteeism and early retirement caused by uncontrolled disease states, usually linked to the delay between the first symptoms and a medical appointment, the severity of symptoms and after-effects (News Farma 2019).

Most rheumatic disorders have no cure, requiring long-term care and commitment from patients, healthcare practitioners and health systems to monitor disease evolution, adjust therapeutics and manage symptoms, paving the way for an active and comfortable life. Following the diagnosis, clinical examination and regular measurement of inflammation levels are key to monitoring disease progression and assessing the need for adjustments in therapeutics.

Currently, inflammation monitoring is conducted by collecting blood samples to measure established inflammatory markers such as C-reactive protein (CRP) and Erythrocyte Sedimentation Rate (ESR) which, in some cases, may be complemented by additional and/or disease-specific markers (Kampfrath 2022). Initially, patients must undergo frequent monitoring, which requires visiting the hospital or clinic at least once a month for blood sampling, followed by a waiting time for laboratory results and subsequent consultation with the physician. During these consultations, the doctor assesses the patient's inflammation status using CRP and ESR levels, among other relevant indicators derived from blood tests. At the same time, the physician examines a patient and assesses symptoms to gather information on disease progression and to determine whether the current treatment plan should be continued or modified. This rigorous monitoring programme is usually maintained monthly throughout the first year following diagnosis, and until the disease is effectively managed. After stabilisation, the frequency of monitoring may decrease, from every six months to every year.

3.1. The Problem

Polymyalgia Rheumatica (PMR) is an inflammatory rheumatic disease characterised by severe pain and stiffness in the shoulders, hip, and neck, with particular emphasis on the pelvic and scapular girdles. The symptoms evolve quickly and have the potential to limit the patient's daily activities (Martins and Ponte 2019; Manzo 2019). The vast majority of PMR cases are observed above 50 years old, with the highest prevalence occurring around the age of 75 years old and above, and a higher frequency registered in women (Martins and Ponte 2019; Manzo 2019). Unlike other rheumatic inflammatory diseases, no disease-specific analyses are available for PMR, being diagnosis and monitoring based on clinical aspects (symptoms) and the general inflammatory markers CRP and ESR (Manzo 2019).

In Portugal, the prevalence of PMR is above 4000 cases, with more than 640 new cases diagnosed every year (Manzo 2019). The need for patient management and regular monitoring presents a significant load to the healthcare system, anchored on the costs of multiple blood analyses and frequent in-house consultations. Moreover, the necessity of monthly visits to the hospital, building on blood collections and significant waiting times, presents a major challenge to PMR patients, which is exacerbated by the fact that most of these individuals are above 75 years old and often suffer from severe pain associated with disease manifestations. According to Dr Maria Costa and Dr Vanessa Lapierre, both rheumatologists working in Portugal and Luxemburg, respectively, from a logistical perspective, these patients typically have three options to deal with regular disease monitoring:

- i. The patient arrives at the hospital in the morning to collect blood samples, which are directed to the laboratory for analysis. If the hospital has an internal laboratory, it will require at least 2 hours to make the results available, a lag time that may be extended if the analysis is outsourced. To avoid double commuting, the patient stays at the hospital

waiting for the results, which will be followed by a consultation with the medical doctor.

- ii. Other patients prioritise a reduction in waiting times, even though it requires them to travel to the hospital twice for a single monitoring point. In these cases, they typically go to the hospital before the medical appointment to collect the blood samples for analysis and return one or two days later for the consultation.
- iii. In other cases, there might be the possibility to perform the blood tests outside the hospital, in external laboratories or at home (by home care providers), the latest particularly suited for elderly people. Although this solution is typically more convenient for patients, it results in more significant delays in obtaining the results.

None of the scenarios is particularly convenient for the patient for a diversity of reasons. While, in the first case, the significant waiting time can be tedious and quite uncomfortable for elderly patients suffering from muscle and joint pain, which reflects the majority of the PMR cases, the second situation presents an increased logistical and, eventually, financial burden by requiring doubled visits to the hospital, and the third introduces increased delays in result acquisition. In all cases, the time needed from the patients is significant, increasing the impact of the disease on their day-to-day lives.

3.2. The Need

In the current scenario, PMR patients would greatly benefit from an alternative solution to respond to their need for regular disease monitoring that would simultaneously offer reliable inflammation tracking, while being fast and convenient, reducing disease burden and increasing quality of life.

On the other hand, healthcare systems would likewise be positively impacted by a faster,

cheaper, and leaner approach to PMR disease monitoring that provides accurate and consistent inflammation measurement. While for physicians a competitive solution would ensure efficiency and quality in patient management, for healthcare facilities it would mean a smoother and less costly service.

3.3. The Solution

After understanding the potential impact of meaningful collaboration between research labs and industry and how it can give rise to the innovative solutions actively sought by the healthcare sector, we decided to partner with Dr Célia Silveira and her team at Nova Institute of Chemical and Biological Technology (ITQB), who were working on the concept of a miniaturised biosensor to monitor the presence of Hydrogen Peroxide (H_2O_2) in the organism.

H_2O_2 is one of the main Reactive Oxygen Species (ROS), a set of molecules associated with the organism's normal immune response to external threats (Srivastava et al. 2017). However, uncontrolled and prolonged generation of these molecules may promote oxidative stress and result in tissue damage and chronic inflammation, associated with a multitude of pathologies, such as chronic inflammatory diseases (Smallwood et al. 2018; Chatterjee 2016). As a consequence of the substantial evidence supporting the relationship between H_2O_2 and inflammation, this compound has been gathering attention from the scientific and medical community regarding its potential as a marker to monitor inflammation in the organism (Srivastava et al. 2017; Barbosa et al. 2020).

In this context, and recognising the potential of Dr Célia's idea, we developed SENSO, a H_2O_2 biosensor capable of determining the concentration of this compound in less than 5 minutes through a single drop of blood obtained by finger picking. This solution is composed by a sensor unit that can be connected to a portable reader, where the result will be displayed,

offering a fast and simplified device that may be used even by untrained individuals. The referred features, along with its portability, offer a promising solution to monitor inflammation both in-house and remotely. A detailed characterisation of this biosensor solution will be provided in *Chapter 5 – Product Design and Development*. In a clinical consultation setting, by offering an almost immediate result, SENSO reduces drastically the time spent by each patient in the hospital or the need for multiple visits. As a home care solution, using SENSO to track inflammation is very simple and convenient for the patient, once it avoids the need for hospital visits. Nevertheless, as stressed by Dr Maria Costa, and in line with the current remote medicine trends, it is key to complement the home use of SENSO with a video or teleconsultation, so that the results are reported to the physician and symptoms are analysed.

PMR is one of the few chronic inflammatory disorders in which regular analytical monitoring is done almost exclusively through generic inflammation markers, in association with symptoms, without the need to track additional indicators in the blood analysis. Therefore, and according to Dr Maria Costa's experience, it presents itself as a promising target to extract the full potential of the H₂O₂ biosensor, given the possibility of replacing blood testing for the instant inflammation measurement offered by the sensor. Moreover, the potential of the H₂O₂ biosensor applied to PMR is significantly extended when considering that the end users directly impacted by this solution are elderly people most likely facing mobility challenges, due to disease manifestations.

4. The Company

4.1. Our Story

The team poised to bring SENSO into reality was formed in early February 2024, with a common enthusiasm for healthcare innovation and a desire to advance medical technology.

The potential of the H₂O₂ biosensor under development at ITQB by Dr Célia Silveira's team piqued our attention. This cutting-edge biosensor, known for its accuracy and reliability may steer a substantial advancement in medical diagnosis and disease monitoring. We were convinced early on that this technology can profoundly improve patient care, particularly for those suffering from chronic inflammatory diseases. As visionary entrepreneurs, our goal is to be at the forefront of transformative healthcare solutions. By combining our flair for business with the technical expertise and achievements of the ITQB research team, we are committed to creating a company that will bring SENSO to the market.

The biosensor industry is saturated with rivals concentrating on numerous diagnostic technologies, but SENSO stands out for its innovative approach to exploit hydrogen peroxide as a sign of inflammation. This distinct emphasis, along with the biosensor's user-friendly design and speedy feedback mechanism, offers significant advantages over conventional disease monitoring approaches. These will be further discussed in *Chapter 9 – External Strategic Analysis of Competitive Landscape*. Despite our initial focus on PMR as a proof-of-concept, the biosensor's potential uses go beyond this condition and may be extended to other inflammatory and chronic illnesses, as discussed in *Chapter 26.2 – SENSO's Potential Over Time*.

The initiative began as a collaboration between the ITQB institution and master's students at NOVA School of Business and Economics, with the goal of leveraging breakthrough technology for medical purposes. This collaboration was critical in determining the direction and execution of our enterprise. SENSO has received praise and financial support from reputable sources, including the national research agency and ITQB, demonstrating its viability and inventive potential. These endorsements not only corroborate the biosensor's innovative nature, but also reinforce our startup's basic approach. *Chapter 20 - Financial Planning* will

go into greater depth on this financial backing, as well as our objectives for acquiring additional investments and increasing market penetration, discussed in *Chapter 22 – Financing*.

Throughout this business plan, we will outline our strategic plan to transform the SENSO biosensor from a promising prototype into a commercially successful product. Leveraging technology and our entrepreneurial drive, we aim to redefine how chronic inflammation is monitored and managed, paving the way for more personalized and effective healthcare solutions.

4.2. Our Vision

We are committed to driving transformative change in healthcare with our pioneering biosensor technology. Our vision is to lead the way in healthcare innovation, specifically in the management of chronic diseases worldwide. We aim to set new standards in patient care by integrating our cutting-edge biosensor technology into daily clinical practices, enabling advanced, non-invasive health monitoring accessible to all healthcare facilities. Our goal is to advance beyond simple monitoring, envisioning our technology at the forefront of developing comprehensive health management systems, and setting unparalleled standards in the industry. Through continuous innovation and strategic partnerships, we aspire to broaden our impact, influencing healthcare systems globally and contributing to a healthier, better-informed society.

Dedicated to precision and efficiency, we see a future where our technology revolutionizes the way individuals manage chronic conditions, significantly enhancing their quality of life through accessible and effective health solutions. This commitment positions SENSO as a leader in the development of innovative tools that support continuous health management for patients and healthcare providers alike.

4.3. Our Mission

SENSO's objective is to transform healthcare monitoring via ground-breaking improvements in biosensor technology. We aim to improve the journey of chronic inflammatory illnesses patients by providing healthcare practitioners with powerful, real-time tools for precise, non-invasive monitoring. Our primary objective is to enhance patient outcomes and simplify the everyday management of health issues while lowering the overall costs of chronic illness care. Apart from the assessment of this innovative technology for PMR monitoring in Portugal and Spain, we expect to expand its scope throughout Europe and possibly beyond. We are dedicated to enabling healthcare professionals and patients by bridging the divide between conventional diagnostic methods and current technologies. Our biosensor is intended to deliver accurate and dependable health monitoring solutions that fit effortlessly into regular clinical procedures and patients' lifestyles.

4.4. Our Values

Innovation and Excellence: We commit to continuous improvement and state-of-the-art healthcare solutions. Our approach to innovation extends beyond product development; it includes challenging and refining our processes to achieve excellence. We invest heavily in research and development to ensure that our biosensor technology sets a benchmark for excellence in the healthcare industry.

Accuracy and Reliability: Central to our mission is the commitment to provide an exceptionally accurate and reliable health monitoring tool. Each product we develop undergoes rigorous testing and validation to meet the highest standards of medical accuracy. This commitment is crucial, as the data provided by our sensors are pivotal in critical decision-making processes in patient care.

Patient-Centricity: We prioritise the needs and well-being of patients in every phase of our product design and development. Our devices are engineered to be user-friendly, minimally invasive, and supportive of patients' quality of life. We understand that technology in healthcare is ultimately about better patient outcomes, which drives us to innovate in ways that directly benefit patient care and experience.

Integrity and Trust: Integrity is the foundation of all our business relationships and practices. We adhere to the highest ethical standards, ensuring transparency and accountability in our interactions with all stakeholders. Building trust with our users, partners, and the communities we serve is paramount, as it underpins our reputation and the acceptance of our technologies.

Collaboration and Partnership: We believe in the power of collective expertise and shared goals. SENSO actively seeks out and fosters collaborative relationships with healthcare professionals, research institutions, industry leaders, and patient advocacy groups. These partnerships enhance our understanding of the needs and challenges within healthcare, driving innovation that is both relevant and impactful.

Education and Advocacy: SENSO is dedicated to educating both the medical community and the public about the benefits and advancements in biosensor technology. Through seminars, workshops, publications, and community engagements, we advocate for informed healthcare choices and promote understanding of the critical role technology plays in modern medicine.

4.5. The People Behind SENSO

4.5.1. Executive Board

As typically observed in most startup companies, SENSO's executive board will consist of its founders - Margarida Rodrigues, Alessandro Luraghi, Matteo Vocale, and Francesco Mancuso - alongside Dr Célia Silveira. This composition will combine and maximise the potential of the

diverse backgrounds, expertise, and entrepreneurial spirit of the founders with Dr Célia Silveira's specialised knowledge, while offering a flexible and adaptable structure, and ensuring that strategic decisions closely reflect the company's vision, mission and values.

Margarida Rodrigues will assume the role of Chief Executive Officer (CEO). She holds a Master's in Biological Engineering from Instituto Superior Técnico and is currently pursuing a Master's in Management at NOVA SBE. This diverse academic background provides her with a broad vision of the diversity and complexity of a science-based company, which will be key to facilitating the coordination between the different teams. During her time at Instituto Superior Técnico, she was part of the Executive Committee of the Pedagogical Council, taking part in major decisions impacting the future of the school, namely the recent teaching model revision, gaining experience in negotiation processes and strategic thinking. At Técnico's Pedagogical Council, she also led a team responsible for implementing a continuous training program for the school's Student Representatives, which strengthened her leadership and management skills. At a professional level, she has managed EU-funded international cooperation projects in the education sector, demonstrating her international experience and her ability to collaborate with diverse stakeholders.

Our Chief Financial Officer (CFO), **Alessandro Luraghi**, combines academic excellence with practical experience. Alessandro has a Bachelor's Degree in Economics from the University of Milan Bicocca and is now pursuing a Master's Degree in Management at NOVA SBE, giving him a solid educational basis for his work. His career in finance began as a founding partner of a real estate investment business, where he refined his accounting and corporate finance abilities. Later, he worked for a real estate firm in England, where he specialized in real estate transaction evaluation and learned numerous company valuation procedures. Alessandro's combination of practical expertise and academic rigour makes him essential to our financial

strategy. His analytical prowess, strategic insight, and collaborative attitude are perfectly aligned with our company goals. As CFO, Alessandro's commitment to continual learning ensures that our financial plans are both realistic and forward-looking, allowing us to confidently pursue our goals.

Matteo Vocale steps into the role of Chief Operating Officer (COO) with a blend of entrepreneurial spirit and profound academic path in various topics. Armed with a Bachelor's degree in Business Administration from UNIFG and a Master's in Impact Entrepreneurship and Innovation from NOVA SBE, Matteo's academic journey underscores his commitment to innovation, business strategies and practical entrepreneurial solutions. His exchange semester at Copenhagen Business School (CBS) in Bio-Entrepreneurship further enriched his understanding of healthcare industry, particularly in biotech field, equipping him with a deep understanding of the industry dynamics and the technical skill set to succeed in startup management. Matteo's hands-on experience in the chemicals supply chain for agriculture amplifies his credentials. As founder, he demonstrated strategic skills, optimizing operations and navigating the complexities of the industry with finesse. His adeptness in strategic planning and business modeling resulted in streamlined processes and heightened efficiency. Matteo's track record speaks for his problem-solving abilities, ensuring operational challenges are met with agility and resolve. With Matteo as COO, we can leverage his entrepreneurial spirit to propel our business forward.

Francesco Mancuso has joined SENSO as the new Chief Marketing Officer (CMO), bringing with him a robust background in business management and a passion for innovation. With a degree in Management for Company and Economics from the University of Pisa and a master's in Impact Entrepreneurship and Innovation from NOVA SBE, Francesco has developed a solid understanding of business strategy and sustainable processes. His self-taught knowledge in

marketing, sales, and corporate structure complements his formal education. He has practical experience from founding and leading a startup, managing marketing strategies and market penetration effectively. Francesco's interest in digital healthcare innovation was sparked during an Erasmus exchange at Copenhagen Business School. As CMO at SENSO, he aims to integrate innovative healthcare solutions with market needs, enhancing the visibility and adoption of the company's technologies. His academic credentials, coupled with his hands-on business experience, position him well to lead SENSO's marketing efforts in the healthcare innovation sector.

Dr Célia Silveira assumes the role of Chief Scientific Officer (CSO) for our company. With a PhD in Sustainable Chemistry from NOVA School of Science and Technology and currently serving as a post-doctoral researcher at ITQB, Dr Silveira brings a valuable expertise in protein bioelectrochemistry and the development of enzyme-based electrochemical biosensors. Her background positions her as a valuable leader for our research and development efforts, ensuring alignment with the company's objectives. Her extensive involvement in various R&D projects, including her coordination of the "ORBioelectronics" project, which focused on advancing electrochemical platforms for enzyme immobilization in biosensors, underlines her capability to effectively lead and support our team of researchers.

4.5.2. Advisory Board

The management team will be supported by an Advisory Board, composed of researchers with relevant backgrounds, healthcare professionals with distinct profiles and experienced entrepreneurs, aiming to complement our expertise with industry-specific knowledge, boosting the company's success at all levels. In the initial stages, we plan to invite Dr Smilja Todorovic and Catarina Barbosa, Dr Maria Costa and Dr Vanessa Lapierre, and Professor Nuno Arantes-Oliveira to establish the Advisory Board.

Dr Smilja Todorovic earned her PhD in Physical Chemistry from Mayo Clinic (USA) in 2000 and pursued postdoctoral studies at NOVA School of Science and Technology and TU Berlin. In 2007, she founded the Laboratory for Raman BioSpectroscopy at ITQB, where she continues to lead research efforts. Her strong global experience includes extended periods as a visiting scientist across Europe, Latin America, and Asia, fostering a wide network and numerous national and international collaborations. Over the course of her career, she has coordinated and participated in several research projects, alongside her current role as an editorial board member for two international journals. Dr Todorovic's diverse experience, coupled with her robust network and international perspective, will offer valuable strategic insights for the growth and advancement of SENSO.

Catarina Barbosa Dr Catarina Barbosa's journey showcase a profound dedication to advancing biosensor technology. Her progression from a Bachelor's degree in Biochemistry to specialized research fellowships and now pursuing a PhD in Molecular Biosciences demonstrates a commitment to continuous learning and expertise refinement. Her focus on enzyme-based electrochemical biosensors, supported by a multidisciplinary approach incorporating bioelectrochemistry and vibrational spectroscopy, reflects her innovative mindset. By integrating diverse methodologies like molecular biology and protein purification, Dr Barbosa exemplifies a holistic approach to biosensor development, emphasizing both theoretical understanding and practical application. Her inclusion in SENSO's advisory board undoubtedly brings valuable insights that align with the company's core technology and aspirations.

Dr Maria Costa is a young medical doctor specialised in rheumatology, working at one of the biggest hospitals in Portugal. She is interested in leveraging innovative technologies to enhance patient care and recognises the great potential of innovation in daily clinical practice. Her

enthusiasm aligns with our vision to transform the landscape of disease monitoring technology and her contributions during the early development stages of SENSO have been of great importance, making her a valuable asset to our Advisory Board.

Dr Vanessa Lapierre is a rheumatologist at the Luxembourg Hospital Centre (CHL), specialising in joint ultrasonography, inflammatory rheumatic diseases, and paediatric rheumatic diseases. She began her training in Lyon (France) and completed an internship in Saint-Etienne (France), gaining experience in paediatric rheumatology at the CEREMAIA reference centre (Kremlin-Bicêtre, Paris). After professional experiences in Canada and Guadeloupe, she settled in Luxembourg. Graduating with a master's in health engineering, she maintains an interest in medical research with the aim of continually improving patients' quality of life. Her diverse expertise, international perspective and drive towards innovation will bring important knowledge to our venture.

Professor Nuno Arantes-Oliveira has a vast background as a scientist, entrepreneur, and investor, alongside his role as a professor of science-based entrepreneurship at NOVA SBE. With an interest in innovation, particularly within Life Sciences and Healthcare, he stands as one of the four partners at Clinical Research Ventures, a Boston-based investment fund focused on clinical-stage biotech and MedTech companies. His career path includes founding and leading various companies across Europe and the USA, in fields like technology transfer, drug development, genomics, healthcare services, and aquaculture, demonstrating his expertise in building science-driven companies. Nuno's experience in board, advisory, and expert positions, along with his vast industry knowledge, reinforce our intent to approach him to integrate SENSO's Advisory Board.

4.5.3.Team

In the early stages of our venture, SENSO's team will be exclusively formed by the founders, composing the Executive Board as described above, and the Advisory Board. To support a sustained growth of the company, this team will be expanded to include talented individuals with multidisciplinary backgrounds.

The **R&D Team** will be initially composed of two researchers, reflecting the team currently working on the development of the biosensor at ITQB. Over time, this team will grow gradually to eight members in 2028, who will continuously work towards the application of the biosensor in different disease settings, improvement of the enzyme production process and exploitation of innovative enzymes that may give rise to new biosensors.

As part of the **Operations and Quality Control Team**, SENSO will need a blend of supply chain expertise and a strong understanding of the medical device industry. Experience in managing temperature-controlled logistics for biological materials will be a plus, given the importance of enzyme transport. Additionally, a focus on quality control and adherence to regulatory requirements is essential. The ideal members of the team will be analytical and data-driven, with the ability to optimize processes and identify cost-saving opportunities. At the earliest, during 2025-2026 the workforce will be composed of 8-9 members in both Operations and Quality Control Team, but it will be structured to be flexible and growth according to the market share and workload.

Our **Sales and Marketing Team's** development is important as we prepare for our market launch in 2026. Beginning in 2025, we will engage a key team member in Portugal, preferably fluent in Portuguese and Spanish, to make first contacts and tailor our strategy to the local market. This position is critical for knowing the regional healthcare scene and forming early relationships. We intend to raise the team size to six individuals by 2026 in order to broaden

our reach and accelerate market penetration across the Iberian Peninsula. By 2027, we hope to have nine sales and marketing specialists, increasing our footprint in Iberia and planning for further expansion throughout Europe. This strategic expansion will position SENSO as a pioneer in healthcare technology, notably in the management of chronic diseases.

Our **Finance and Accounting Team** will start to grow from the second year onwards; we expect to hire one employee in 2025 to support the CFO with day-to-day tasks. By 2026, as our company expands and our activities grow, we plan to add two more team members. In 2027 and 2028, our goal is to hire another employee, maintaining a team of four until our exit.

Although initially the recruitment process will be managed by the founders, a **Human Resources Manager** will be hired in 2026 to recruit and manage our evolving team.

5. Who Is Shaping the Market?

The competitive landscape for inflammation monitoring is diverse and populated by various stakeholders, ranging from well-established companies to dynamic research institutions all engaged in the development of sensors and biosensors. The market includes numerous entities dedicated to refining the technology, which underpins inflammation measuring through a diversity of biomarkers, aiming to enhance its accuracy, usability, and integration into healthcare systems.

As of now, we have identified three companies that offer products similar to ours, each targeting the same objective of improving health outcomes through innovative biosensing technology. These competitors are notable for their market presence and consumer reach.

MedicinesOnline (UK): Offers a CRP Reactive Sensitivity Blood Home Test Kit, which is a direct-to-consumer product designed for at-home monitoring of standardised inflammation

markers such as CRP. Expanding on its foundational strategy, MedicinesOnline effectively caters to consumers looking to monitor inflammation markers directly from their homes. This service aligns with the growing trend of home health monitoring, offering a practical solution where feedback on inflammatory status is provided within three days—a rapid turnaround that is particularly appealing to patients' intent on managing their health proactively. The process employed by MedicinesOnline enhances user convenience and access. Initially, the CRP test kit is shipped directly to the patient's home, allowing them to conduct the test in their own space and at their convenience. After collecting the sample, the patient is required to send it back to MedicinesOnline. The analysis is completed swiftly, and results are delivered within three days. This streamlined method not only simplifies the testing process but also supports timely health management by quickly providing critical health data to the user. This model is perfectly suited to meet the demands of today's healthcare consumers who prioritize personalized, efficient, and straightforward medical solutions. Moreover, the ability of the CRP test kit to accurately measure CRP levels offers critical insights into inflammatory disorders, infections, and even cardiovascular health. This diagnostic feature significantly enhances the utility of the kit, enabling users to track their health effectively and identify potential health issues at an early stage.

LetsGetChecked (US): LetsGetChecked distinguishes itself in the healthcare market by offering a wide range of home testing kits that address various health concerns. These kits, designed for use at home, meet the growing demand for personalized and accessible healthcare solutions, allowing users to manage their health conditions conveniently. They also empower patients to actively participate in their healthcare, aligning with the trend towards greater personal control and involvement. The focus on diverse biomarker monitoring is especially valuable, helping users track crucial health dimensions for informed decisions about their

wellness and chronic condition management. The simplicity and user-friendliness of LetsGetChecked's kits reduce the need for frequent medical visits, making health management direct and straightforward. Enhancing access further, LetsGetChecked offers key services like virtual consultations, medication delivery, and health testing. Virtual consultations connect patients with healthcare providers digitally, enabling professional advice without in-person visits and delivering all necessary documents online for added convenience. The medication delivery service brings prescriptions directly to patients' doors and includes virtual follow-ups with healthcare teams, supporting continuous treatment management. Health testing kits provide actionable health insights within 2 to 5 days, encouraging proactive health management from home.

Proactive-Diagnostics (CA): Pro-Dx is gearing up to enter the market with a suite of specialized biosensors aimed at enhancing patient care through swift and precise diagnostics. The company's strength lies in its ability to deliver rapid and reliable diagnostic results, which are crucial for effective healthcare delivery. At the core of Pro-Dx's product line are biosensors designed to quickly identify a range of medical conditions, proving especially critical in urgent care scenarios where speed is of the essence. These devices are tailored to detect critical health conditions such as infectious diseases, which remain a high priority in medical research and healthcare provision. Pro-Dx is committed to transforming diagnostics by focusing on specific medical needs, ensuring that healthcare professionals can make informed decisions swiftly, thereby improving patient management and outcomes. This targeted approach highlights Pro-Dx's potential as a key player in the healthcare sector, driven by its dedication to fast and dependable diagnostic solutions. Unlike previous systems that required sending kits back to the laboratory for analysis, Pro-Dx's biosensors, equipped with cytokine detection and reader technology, deliver quick results directly to patients, they offer optical biosensors, utilizing

surface plasmon resonance (SPR) technology, beneficial in oncology and bacterial detection. This capability is enhanced by the integration of AI and big data analytics, allowing for immediate feedback and a comprehensive health overview, positioning Pro-Dx as an innovator in real-time medical diagnostics.

5.1. What Do They Offer?

In examining the competitive landscape for our SENSO project, we identified and observed in the three major competitors several common characteristics that define their approach to the market. These characteristics highlight significant trends in the way companies adapt to changing consumer demand for healthcare products. By examining their strategies, we aim to identify the patterns prevalent among these competitors to improve our understanding of market dynamics and refine our strategic direction. The following are the main patterns we have detected.

Direct-to-Consumer Focus: All three companies emphasise offering products directly to consumers, particularly for home health monitoring. This reflects a significant trend towards empowering patients to manage their health independently outside traditional medical settings.

Rapid and Convenient Testing: Each competitor highlights the speed and convenience of their testing solutions. MedicinesOnline and LetsGetChecked provide quick turnaround times for results, while Pro-Dx focuses on the rapid detection capabilities of their biosensors. This focus on speed is crucial in appealing to consumers who value immediate feedback and ease of use.

Integration of Advanced Technologies: Pro-Dx and LetsGetChecked incorporate advanced technologies like AI and big data analytics to enhance diagnostic accuracy and patient monitoring. This integration signifies a push towards more sophisticated, data-driven

approaches in health diagnostics, which can offer more personalised and predictive insights into patient health.

Expansion of Service Offerings: Besides just providing testing kits, LetsGetChecked and MedicinesOnline offer additional services like virtual consultations and medication delivery. This holistic approach to healthcare services caters to the growing demand for comprehensive health management solutions that extend beyond simple diagnostic testing.

Focus on Specific Health Markers: While each company targets general health monitoring, there's a clear emphasis on specific biomarkers or health conditions, such as inflammation and infectious diseases. This specificity allows them to cater to niche markets and address particular health concerns more effectively.

6. Market Analysis

The SENSO biosensor has the potential to revolutionize the monitoring of PMR, which necessitates a comprehensive understanding of the target market. Our initial strategy involves launching within the Portuguese market, leveraging local infrastructure and knowledge to optimize logistics and distribution and to create a scalable model for subsequent expansion into international markets.

6.1. Market Segmentation

Polymyalgia rheumatica predominantly affects individuals over 50 years of age, with the highest incidence observed among individuals aged 75 years and older. It is more prevalent among women. Our initial target market is Portugal, where current data indicate that more than 4.000 people are affected, with more than 640 new cases diagnosed each year. The strategic location of our research laboratory in Lisbon, together with the support of national health

institutions, allows for rapid market entry and facilitates direct product testing.

To enhance the understanding of our market segmentation, we will analyse three personas that exemplify the varied needs and experiences of potential SENSO users. These examples, which we will explore further in *Chapter 17 - Marketing Plan*, serve as conceptual models rooted in a blend of industry expertise, extensive market research, and established healthcare practices. By depicting common scenarios in chronic disease management, such as PMR, these personas enable us to conceptualize practical yet hypothetical interactions with SENSO.

Maria, 76, Living with Established PMR

Maria, a spirited 76-year-old with a keen love for gardening, has been living with PMR for several years. She has become well-versed in the rhythms of her condition, but still, her days are punctuated by the need for regular check-ups and the side effects of her ongoing treatment. Maria has developed a strong, trusting relationship with her specialist, Dr Anderson, who has been her compass in the often tumultuous sea of chronic disease management.

Her routine is a structured one, with visits to the specialty clinic for monitoring every other week. The SENSO biosensor could be a turning point for Maria. With it, Dr Anderson proposes a simplified care routine that could reduce Maria's clinic visits to once every few months. The device would be provided to Maria during her next visit to the clinic, integrated into her treatment plan seamlessly. With SENSO, Maria could monitor her inflammation levels from the comfort of her home, with results she could trust as much as those from the clinic's lab and communicate them to her doctor. This means more time for her flowers, her family, and her peace of mind.

Miguel, 68, Navigating a New Diagnosis

Miguel, a recently retired teacher and an active individual at 68, has recently been diagnosed with PMR. This new chapter comes with unfamiliar morning stiffness and pain, marking his entry into the world of chronic illness management. His family doctor, Dr Sousa, plays a crucial role in guiding him through this new terrain.

While Miguel's diagnosis is still recent, requiring consistent monitoring to optimise his treatment plan, the SENSO biosensor used at his clinic offers a practical solution. Although the clinic possesses only one SENSO device, it significantly speeds up each visit compared to traditional blood tests. Miguel visits the clinic regularly, but each session is brief, as the biosensor quickly assesses his condition on-site. This allows Miguel to manage his health effectively without the extended disruption of more frequent hospital trips.

For Miguel, the availability of SENSO at his clinic means reduced wait times and quicker feedback on his treatment progress, enhancing his autonomy and enabling him to maintain an active role in his healthcare management. This setup not only empowers him but also optimizes the clinic's efficiency in handling patient care.

Dr Lopes, Rheumatologist Championing Patient Care

Dr Sofia Lopes is a rheumatologist with a deep commitment to her patients. She juggles a busy practice, where each patient's care is a delicate balance of medication, monitoring, and motivation. Dr Lopes has long sought to reduce the frequency of her patients' visits without compromising the quality of care—aiming to streamline their treatment and minimize their discomfort.

With the introduction of SENSO into her practice, Dr Lopes has found a way to do just that. Sourced through the hospital with which she's affiliated, the biosensor enables her to get accurate inflammation readings quickly, which is critical for adjusting treatment regimens in a

timely manner. The device allows for fewer and shorter visits, which her patients appreciate, and provides her with real-time data that is indispensable for managing a condition as variable as PMR. SENSO has become a trusted ally for Dr Lopes, enhancing her ability to provide personalized care that adapts to the needs of her patients, with the added benefit of freeing up her clinic's resources for those who need more intensive support.

6.2. Market Size and Growth Potential

While the Portuguese market is relatively small in population size, it serves as a robust base for product validation and refining marketing and sales strategies. The aging population indicates an increasing prevalence of PMR, thereby expanding the potential demand for innovative and non-invasive monitoring solutions like SENSO.

After establishing our presence in Portugal, we plan to expand into Spain, a market with similar demographic characteristics and minimal language barriers. This approach not only facilitates logistical and operational synergies but also allows us to benefit from economies of scale and to strengthen brand recognition across both countries.

6.3. Detailed Market Expansion Considerations

Expanding regionally allows us to manage logistical and regulatory challenges in a more controlled manner, thereby building a robust presence in familiar markets before tackling larger and more diverse markets. A thorough understanding of the local social and healthcare contexts, combined with support from government institutions and the medical community, positions SENSO as a potential leader in the biosensor sector for PMR monitoring. Spain, as our next target market, offers strategic advantages due to its larger population and well-established healthcare infrastructure, which is comparable to that of Portugal.

This similarity allows for a smoother transition and quicker adaptation of our operations and

marketing strategies. Additionally, both Portugal and Spain have shown an increasing trend towards adopting home healthcare technologies, which aligns perfectly with our product's capabilities. This careful, step-by-step approach to market expansion ensures that each new market entry is grounded in a deep understanding of local needs and conditions, maximizing the chances of success and sustainable growth. By first consolidating our position in the Iberian Peninsula, we lay a strong foundation for further expansion into other European markets.

Looking beyond the Iberian Peninsula, our strategic roadmap includes targeting the Nordic countries—Sweden, Denmark, Finland, and Norway. These regions are renowned for their high receptivity to technological innovation, especially in healthcare, and exhibit some of the highest rates of healthcare expenditure in Europe. Their robust digital infrastructure and progressive healthcare policies make them ideal candidates for the introduction of advanced technologies like ours.

The introduction of SENSO's biosensors into Nordic healthcare systems could revolutionize PMR monitoring, offering new levels of convenience and efficiency. We plan to leverage local partnerships and innovative marketing strategies that resonate with the tech-savvy populations in these countries. Furthermore, the environmental conditions and societal focus on quality of life and health in the Nordics provide unique research and development opportunities that could influence future product iterations and expansions.

This expanded vision not only reinforces SENSO's commitment to becoming a market leader but also enhances its potential for widespread adoption and recognition as a preeminent solution in global PMR management. By meticulously planning our entry into these innovative markets after establishing a strong base in the Iberian Peninsula, SENSO is strategically positioning itself for significant global impact and success.

7. The Buyer and the User

A deep understanding of customer insights is crucial for the successful market penetration of the SENSO biosensor. This section elaborates on the specific needs and preferences of our target demographic, mainly elderly patients with PMR, and the healthcare providers who manage their treatment. It also examines how these insights shape our value proposition, sales tactics, and influence our distribution and promotional strategies.

7.1. Users' Needs and Preferences

Patients suffering from PMR typically encounter severe discomfort due to the frequent diagnostic procedures required to monitor their condition. This demographic has a pronounced need for a diagnostic solution that minimizes physical discomfort and the logistical inconvenience of regular hospital visits. SENSO meets these needs by providing a rapid, non-invasive, and highly accurate monitoring tool that can be used in the comfort of the patient's home. The key preferences of our end users include:

Non-invasiveness: Unlike traditional blood draws, SENSO requires only a single drop of blood from a finger prick, which is less intimidating and painful.

Speed and Reliability: Results are available in less than five minutes, allowing for immediate health status updates and peace of mind.

Ease of Use: Designed to be user-friendly, especially for the elderly who may not be technologically savvy. The device features straightforward operating procedures and large, easily interpretable display screens.

Portability: Enables monitoring at home or on the go, which is especially valuable for patients with mobility issues.

Understanding these preferences helps tailor our value proposition, emphasizing not only the clinical benefits of accurate inflammation monitoring but also the enhanced quality of life our product offers through its design and functionality.

7.2. Buyers' Needs and Preferences

In evaluating the needs of healthcare institutions likely to purchase SENSO, it's evident that hospitals seek innovative diagnostic solutions that enhance patient care and streamline operations. These institutions prioritize tools that simplify procedures and improve outcomes for conditions like PMR, which necessitate regular monitoring. SENSO meets these requirements by providing a rapid, non-invasive, and accurate monitoring tool, designed for use in both clinical settings and directly through affiliated doctors to patients. The key preferences of our healthcare institution buyers include:

Non-invasiveness: SENSO's minimal invasive requirement, needing just a single drop of blood, aligns with the trend towards reducing patient discomfort and the risks associated with more invasive procedures.

Speed and Accuracy: Delivering results in less than five minutes, SENSO enables healthcare providers to make quicker, more informed decisions without the wait associated with traditional lab tests.

Ease of Integration: SENSO is designed to integrate seamlessly into existing healthcare workflows, with minimal training required and compatibility with standard medical record systems.

Cost-Effectiveness: By reducing the frequency of in-person consultations and traditional diagnostic tests, SENSO offers a cost-effective solution for ongoing patient management.

7.3. Buying Behaviours

The buying behaviours of our target audiences include several key tendencies:

Healthcare Provider Influence: Elderly patients frequently depend on the guidance and recommendations of their healthcare providers when adopting medical products. Therefore, securing the endorsement of rheumatologists and other healthcare professionals is essential for patient adherence to this monitoring system.

Simplicity in the Sales Process: Our sales strategy is tailored to the complex healthcare ecosystem where direct-to-consumer sales are not our focus. Instead, SENSO biosensors are made available through collaborations with healthcare institutions.

Value Sensitivity: While cost is a consideration, the value derived from ease of use, reduced need for hospital visits, and the comfort of monitoring from home justify the investment in SENSO. Communicating this value effectively is essential for aligning with the financial sensitivities of our market.

The purchasing decisions for SENSO biosensors are made by hospitals, which then determine how they are utilized. These healthcare institutions can choose to employ the sensors during medical consultations or provide them to patients for home use. Recognizing the influence that healthcare providers, such as rheumatologists and clinics, have over treatment protocols, it is crucial to secure their support and endorsement. These professionals play a pivotal role in integrating our biosensors into the standard care regimen, thereby facilitating access for patients who rely on their guidance.

Our sales approach is crafted to align with the intricacies of the healthcare sector, where the patient's journey often begins in the hands of a trusted family physician or within the hospital's care. The SENSO is made available to patients through these establishments, ensuring a

seamless integration into their current treatment regimens. This strategy underscores our commitment to a simplified sales process that avoids direct-to-consumer complexity and places our cutting-edge biosensors in the hands of those who need them most, through the professionals who know them best.

Our distribution strategy employs a dual-channel approach, ensuring that SENSO is accessible both in hospital settings and through clinic management. This flexible and personalized approach is crucial for addressing the unique healthcare needs of the elderly demographic we serve, providing them with reliable access to our technology regardless of their treatment location.

8. External Competitive Landscape

Navigating the competitive landscape within the healthcare industry presents a complex set of challenges and opportunities for SENSO and its innovative biosensor technology. While SENSO's biosensor holds immense promise, our ability to establish a successful niche in the market will depend on various strategic factors that involve the whole market dynamics. With this in mind, we can analyze the industry from an external perspective through these particular trajectories: the barriers to be crossed in order to enter the market, the suppliers and buyers' power over SENSO, the strategies to face current alternative solutions to the problem, and the density of players within the industry. By analyzing those external aspects with a holistic approach, we can outline the best internal configuration and strategy to let SENSO succeed.

8.1. Emerging Competitors Dynamics

Firstly, in assessing the landscape of potential new entrants in this niche, it's evident that while the development of biosensors demands a multidisciplinary expertise, spanning material

science, engineering, and biology, several companies are already exploring similar ventures. Although this may present a moderate threat, SENSO can counter this by fostering a culture of innovation, securing intellectual property rights through patents, and maintaining an agile research and development pipeline to continuously evolve its technology ahead of competitors.

8.2. Reinforce Supplier Relationship

On the supplier front, while there exists a diverse pool of suppliers for the components essential to SENSO's biosensor, early strategic partnerships with key suppliers will be crucial during the initial stages. However, as the project progresses, we can develop relationships with multiple suppliers for key components and if SENSO's solutions gain commercial relevance we may explore strategies for vertical integration.

8.3. Negotiate Value with Healthcare System

The bargaining power of healthcare providers emerges as a significant factor in the adoption of new medical technologies. SENSO must navigate a landscape where healthcare providers are not only cost-conscious but also demand demonstrable value in terms of patient outcomes and system efficiency. Therefore, effectively communicating the cost-effectiveness and clinical benefits of SENSO's biosensor will be paramount in influencing adoption rates among healthcare providers.

8.4. The Alternatives Dynamics

Moreover, the threat posed by substitutes, particularly traditional blood tests, cannot be overlooked. Despite being considered as the standard method for PMR monitoring, these tests suffer from drawbacks such as invasiveness, time consumption, and lack of real-time data collection capabilities. SENSO can leverage these limitations to position its biosensor as a

superior alternative, emphasizing its accuracy, ease of use, and ability to provide real-time insights into patient health.

8.5. Industry Competition

Competitive rivalry in the industry comes from both established players and industry giants, all fighting for a share of the market. SENSO must differentiate itself through continuous innovation, building strategic partnerships with key stakeholders in the healthcare ecosystem, and effectively communicating the unique value proposition of its biosensor technology.

In conclusion, navigating the competitive landscape demands a multifaceted approach. Our success will lie in the ability to not only develop cutting-edge technology but also in our capacity to build strategic alliances, communicate value effectively, and adapt to the evolving needs of the healthcare industry. By addressing these challenges proactively, SENSO can solidify its position in the market and achieve sustainable growth in the long term.

9. Current Patient Journey and Solution for PMR

The patient journey in PMR involves several stages, including onset of symptoms, seeking medical help, diagnosis, treatment, and management.

Onset of Symptoms: The journey begins with the sudden onset of severe pain and stiffness, primarily affecting areas like the shoulders, upper arms, neck, and pelvic region. These symptoms can significantly impact daily activities, making tasks like dressing, driving, and even basic movements challenging and painful.

Seeking Medical Help: Patients may initially consult their primary care provider for symptoms that can be mistaken for other conditions or side effects of medications. Due to the debilitating nature of PMR symptoms, patients may advocate for themselves to seek urgent

medical attention and avoid delays in diagnosis and treatment.

Diagnosis: Diagnosis of PMR is typically confirmed by a rheumatologist after a series of tests and assessments. Patients may feel a mix of relief and anxiety upon receiving a diagnosis, as it provides clarity about their symptoms but also introduces concerns about treatment options and potential side effects.

Treatment: The primary treatment for PMR involves corticosteroids like prednisone to manage inflammation and relieve symptoms. Patients may initially have concerns about the side effects of steroid treatment but often experience significant improvement in symptoms shortly after starting medication.

Management and Monitoring: Regular follow-up visits are scheduled at specific intervals, such as weeks 0, 1-3, 6, and then at Months 3, 6, 9, and 12 in the first year, with additional visits for relapses or adverse events. At each visit, patients should be assessed for response to treatment, proximal pain, fatigue, and morning stiffness, and complications of disease, including symptoms of Giant Cell Arteritis (GCA), and steroid-related adverse events. The duration of treatment and follow-up usually lasts 1-3 years, although some patients may require low doses of steroids beyond this period.

9.1. Current PMR Monitoring Process

The management and monitoring phase plays a crucial role in the Patient Journey due to its recurring nature and its significance in determining the success of therapy in managing inflammation. Patients must therefore periodically visit a laboratory or the hospital where they are being treated for a blood draw.

The analysis of the sample and the communication of the results require a period of time, generally at least 2 hours depending on the type of clinic. During this time, the patient is forced

to wait for the results as they are crucial for the doctor's decisions regarding therapy. Once the sample has been analysed, processed, and the results communicated to the patient, the patient must visit the doctor they are being treated by to have the results of the blood analysis evaluated and the therapy adjusted if necessary. This process is repeated periodically during the first year, causing many inefficiencies in the healthcare system and significantly worsening the Patient Journey, considering that the target patient suffers from many physical pains and generally has an age over 50, most frequently above 75, which makes it difficult to combine work, mobility, and condition with the disease monitoring activity. A scheme to visualize the current Monitoring Process for PMR is presented in Figure 3.

As we can see from the scheme, the patient is forced to step back in the process and wait whenever the results are not yet ready (red line in the scheme), or the doctor's appointment is scheduled on a different day. Thus, there is room for improvement in terms of time efficiency for the patient.

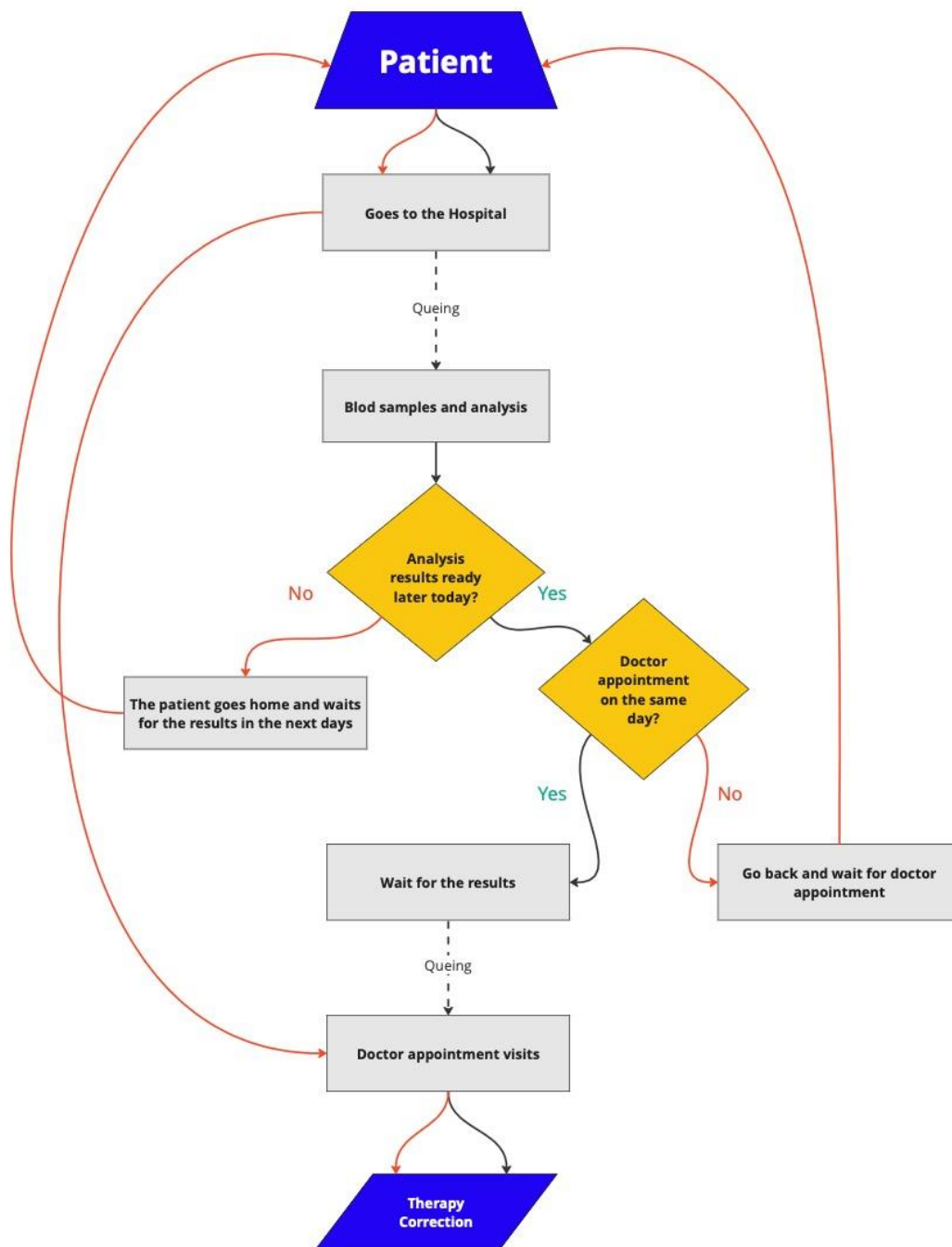


Figure 1 – Flow Chart of PMR monitoring process with blood test.

It is also important to consider the economic impact of the process for both the healthcare system and the patient.

Healthcare System: By talking with Hospitals and doctors, the average cost of performing the

blood tests is €4-5 per analysis. It is difficult to quantify the cost for inefficiencies in terms of people stationed in the hospital queue and hidden resources needed to process blood tests.

Patient: The analysis is generally exempt from charges, but a portion of patients who do not benefit from it pay approximately €4-5 for an analysis. To this must be added the cost of waiting time and the cost of transportation to the hospital. If the analysis results are released on the same day as the doctor's visit, we can calculate the transportation cost as a round-trip. While if the analysis results are released on a different day, we can simply double the transportation costs. The average cost of Portuguese public transportation per kilometer is included in a range between 0,20 € - 1,50 € depending on the type of means of transport used.

This analysis points out several inefficiencies in the current PMR monitoring process that negatively impact both the healthcare system and the patient, highlighting key aspects to be addressed by new solutions.

10. SENSIO's Value Proposition

SENSIO can revolutionize the management of inflammatory diseases, specifically PMR, by offering a highly efficient solution. The SENSIO solution aims to monitor the level of inflammation through hydrogen peroxide. Compared to traditional blood tests, the biosensor offers real-time monitoring of inflammation, eliminating the need for frequent blood tests, avoiding long wait times for results and reducing very significantly the amount of blood required for the analyse. This translates into a significant improvement in patient experience and reduces the burden on healthcare systems. Furthermore, SENSIO is committed to ongoing research, development, and clinical validation. By leveraging its expertise with this technology, SENSIO can explore new applications for other inflammatory diseases. This robust R&D pipeline ensures SENSIO remains at the forefront of innovation in chronic inflammatory disease

management and expands the potential market for biosensor technology.

10.1. Application of SENSO in Hospital Setting

To have cognizance of the Value Proposition, it is appropriate to compare the process of PMR monitoring through blood analysis analysed in Figure 3, with the process proposed by SENSO through our biosensor in Figure 4.



Figure 2 - Flow Chart of PMR monitoring process in hospital setting with SENSO.

1. **Patient Goes to the Hospital:** At this stage, the patient initiates the process by going to a hospital or clinic to monitor their condition.
2. **Doctor Appointment and Visit:** During this visit, the doctor discusses the patient's condition, including symptoms and medical history.
3. **Monitoring with SENSO during the visits:** During the visit the doctor monitors inflammation level through SENSO. This involves pricking the patient's finger and collecting a drop of blood, like a blood sugar test.
4. **Therapy:** Based on the evaluation of the inflammation level retrieved by the biosensor, and in line with the symptoms observed, the doctor determines the appropriate treatment plan. This might involve adjusting the current therapeutic or prescribing new medication, like corticosteroids, to manage inflammation and relieve symptoms.
5. **Repeat:** The cycle must be repeated as scheduled in the treatment plan.

The SENSO technology is a significant innovation in inflammation monitoring, offering a user-

friendly system that necessitates just a single drop of blood. This feature eliminates the requirement for invasive procedures and specialized staff. A standout aspect of SENSO is its capability to provide instantaneous results, which accelerates the decision-making process for treatments and eliminates inefficiency and time wasting for patients. The device delivers precise readings of inflammation levels in minutes, a considerable improvement over the extended waiting periods associated with conventional blood tests. Such prompt monitoring during patient consultations allows healthcare professionals to make well-informed decisions promptly. As we look into the future, SENSO is poised to become a pivotal tool in PMR management. It stands to revolutionise the monitoring process, granting autonomy to patients and healthcare providers alike. The potential of SENSO to reshape PMR management and enhance patient experiences is substantial. Its effortless integration into current healthcare protocols signifies a notable advancement in medical practice. Within 2 years, following the validation and certification of our medical device, SENSO aims to achieve the model outlined above.

Group Part **10.2. Application of SENSO in Homecare Setting**

Considering the intrinsic characteristics of our technology, an additional advancement for hospitals and clinics could involve the provision of a homecare service utilizing SENSO. This service would consist in hospital renting the complete kit to patients for a specified duration, according to the flow chart seen in Figure 5.

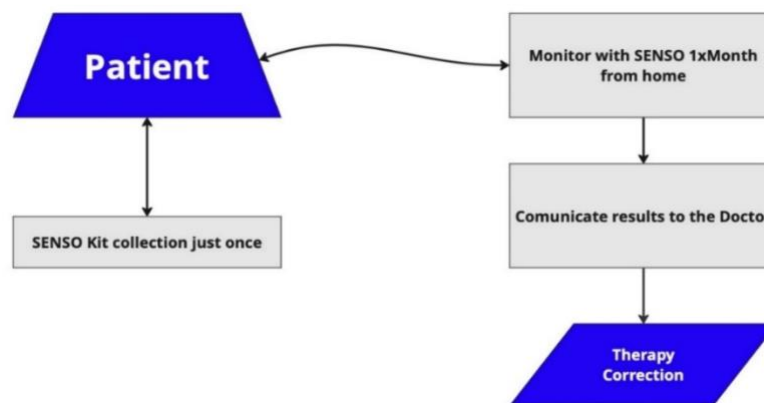


Figure 3 - Flow Chart of PMR Monitoring Procedures from home with SENSO.

1. **SENSO Kit Collection:** The patient collects the kits from the hospital after ticket payment and doctor prescription.
2. **Patient Monitor with SENSO 1x Month from Home:** The patient performs one measurement per month at home (or more if necessary), using SENSO. This involves pricking their finger and collecting a drop of blood, like a blood sugar test.
3. **Communicate Results to the Doctor:** The patient transmits the data shown by the SENSO display to their doctor during a telephone or virtual consultation, during which symptoms will also be assessed.
4. **Therapy Correction (if required):** The doctor reviews the results and determines if the patient's treatment needs to be adjusted.

By extending the use of SENSO beyond traditional clinical settings, we can offer patients enhanced flexibility and convenience in managing their health. This proposed homecare service aligns with the evolving healthcare landscape, emphasizing personalized and patient-centric approaches. Furthermore, it presents opportunities for improving patient engagement and treatment adherence, ultimately leading to better outcomes.

Further, the SENSO technology enhances monitoring efficiency and encourages patients to become more involved in managing their own health. It facilitates self-testing and offers real-

time feedback, fostering greater patient involvement and compliance with prescribed treatment regimens. This approach, centred around the patient's needs, has the potential to lead to better health outcomes and a more satisfactory healthcare experience overall (Hibbard & Greene 2013). Nonetheless, it is essential to recognize that despite the simplification provided by SENSO, the expertise of medical professionals remains indispensable. Physicians interpret the data from the sensor alongside their medical acumen to arrive at well-founded treatment choices. This synergistic method ensures that patient care is customized and optimized for their specific health requirements.

Overall, SENSO offers a compelling value proposition for both patients and healthcare providers, fostering a more efficient, patient-centred approach to PMR management.

Alessandro Luraghi

11. Financial Planning

11.1. Financial Projections

In terms of financial planning, we looked at the period from the third quarter of 2024, when the company will start, to 2028, when we plan to exit. To acquire a comprehensive grasp of the important financial milestones, we prepared an income statement, a balance sheet, and a cash flow statement. This chapter will cover the pricing, revenue estimate, cash flow and break-even point, financing cash flow, and key financial efficiency indicators. Furthermore, Figure 8

provides a succinct visual depiction of the income statement for five years from 2024 to 2028, accounting for sales, EBITDA and Net Profit or Loss.

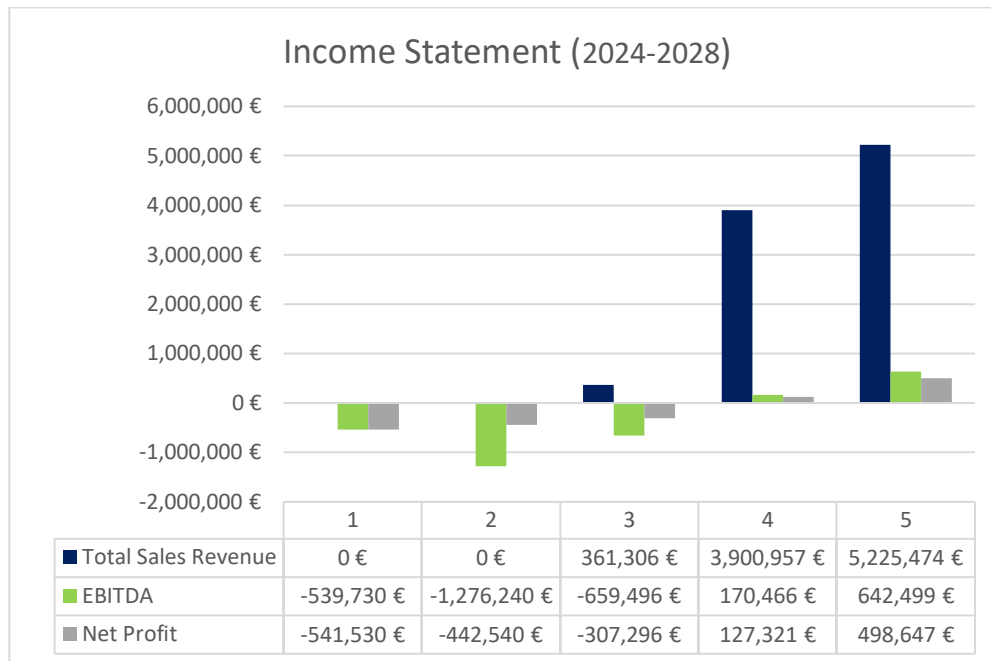


Figure 8 - Income Statement (2024-2028).

Alessandro Luraghi

11.2. Pricing

Metrohm DropSens is the chosen principal provider, in charge of manufacturing both sensor units and readers. The sensors are acquired for €2,50 per unit, while the readers cost €1.120,00. To obtain a reasonable pricing with an adequate profit margin, a 60% markup was given to the variable cost of the two components, including the enzyme's production costs. As a result, the ultimate price for a single sensor is €4,00, whereas for a reader it is €1.792,00.

11.3. Revenue Forecast

During the first five years, we will concentrate on the Portuguese and Spanish markets. Sales in Portugal are projected to start in the third quarter of 2026, based on the timing of the medical device validation process. We anticipate reaching 5 hospitals and around 80 patients in the first quarter, with an increase to 60 hospitals and 1340 patients predicted over the next few years.

As a result, revenue predictions for Portugal are €361.306 in 2026 and €683.694 in 2028.

The increase in revenue in Portugal, from €361.306 in 2026 to €1.198.360 in 2027, followed by a decline to €683.694 in 2028, is due to the fact that the majority of new hospitals in Portugal will be addressed in 2027. While sensors represent a frequent purchase, readers are generally a one-time acquisition but represent simultaneously a significant source of income. Therefore, higher revenues are generated when a new hospital becomes a customer, resulting in increased profits when numerous new healthcare facilities are acquired.

In the Spanish market, we intend to begin sales in the first quarter of 2027, reaching roughly 10 hospitals and 600 patients in the first quarter, with an expected increase to around 200 hospitals and 10.000 patients by 2028. These numbers are expected to generate €2.702.597 in income for Spain in 2027 and € 4.541.780 in 2028.

Alessandro Luraghi

11.4. Cashflow and Breakeven

In the cash flow statement, we looked at operating, investment, and financing cash flows. Operating cash flow will only be positive from the first quarter of 2027, with a large portion coming from Net Working Capital (NWC). Part of our financial strategy is based on the usage of negative NWC, which allows us to pay suppliers within 90 days and receive payments from consumers within 60 days, reflecting the longer liquidity times associated with hospital payments compared to private clients.

The cash flow from investments is generally modest once investments in Property, Plant, and Equipment (PPE) do not include buildings or laboratories, but instead focus solely on the acquisition of equipment, with the option of renting the facilities.

Table 1 - Cashflow Statement.

Cashflow Statement	2024	2025	2026	2027	2028
EBIT	-541.530 €	-1.282.540 €	-667.296 €	161.166 €	631.199 €
Depreciation	1.000 €	2.500 €	4.000 €	5.500 €	7.500 €
Amortization	800 €	3.800 €	3.800 €	3.800 €	3.800 €
Change in NWC	0 €	-552 €	45.176 €	470.273 €	119.243 €
Income taxes paid	0 €	0 €	0 €	33.845 €	132.552 €
Cashflow from operations	-539.730 €	-1.276.792 €	-614.319 €	674.584 €	894.294 €
Capex	-9.000 €	-12.500 €	-11.000 €	-9.500 €	-12.500 €
Cashflow from investments	-9.000 €	-12.500 €	-11.000 €	-9.500 €	-12.500 €
Grants and Contributions	0 €	840.000 €	360.000 €	0 €	0 €
Equity issuance	550.000 €	500.000 €	400.000 €	0 €	0 €
Cashflow from financig	550.000 €	1.340.000 €	760.000 €	0 €	0 €
Free Cashflow	1.270 €	50.709 €	134.681 €	665.084 €	881.794 €
Cumulative Cashflow	1.270 €	51.979 €	186.659 €	851.743 €	1.733.537 €
Cash Burn Rate	1.270 €	50.709 €	134.681 €	665.084 €	881.794 €

Alessandro Luraghi

11.5. Financing Cashflow

Given our multi-stage startup funding strategy, fundraising activities for equity issue are included in the financing cash flow. Grants of €840.000 at the beginning of 2025 and €360.000 at the end of 2026 help to cover the necessary costs. The balance will be made up of a €50.000 share capital contribution from investors and three additional investment rounds: the Pre-Seed round of €500.000 in June 2024, the Seed round of €500.000 in March 2025, and an investment of €400.000 in January 2026. These investments will provide the necessary liquidity, particularly in the early years, due to the costs involved with the numerous patents and clinical trial phases.

12. Key Expenses

During the creation of financial forecasts, we identified the following important costs.

12.1.Operational Expenses

12.1.1. R&D Team

Salaries for research and development make up a considerable portion of our costs, as we strive to construct a research team that meets our goals. In the first year, we intend to begin with two researchers in addition to Dr Célia Silveira and a supervisor, reflecting the team currently operating. The number of researchers will steadily grow over time, reaching eight in 2027 and 2028, omitting Dr Célia Silveira and the supervisor. This growth is critical to our objective of entering the Spanish market and diversifying the enzyme's applications. Salaries will increase from €1.500 gross in the first year to €3.000 gross by 2028. The expenses of this item will range from €18.000 in 2024 to €288.000 in 2028.

12.1.2. Sales and Marketing Team

We do not intend to hire marketing professionals in the first and second years once sales will not begin in Portugal until the third quarter of 2026. However, we believe it is critical to recruit a marketing person by the end of the second year to expedite client acquisition. To acquire a major share of the market, we intend to hire 6 personnel beginning in 2026 and increasing to 9 by 2028. Salaries will increase from €1.500 gross in the first year to €2.500 gross by 2028. The expenses of this item will range from €4.500 in 2025 to €270.000 in 2028.

12.1.3. Operations Team

In the operations department, we do not expect to hire in the first year but will begin the second year with a team of two people. Most of the hiring will take place in 2026 to streamline product management procedures. We intend to hire six people in 2026, increasing to nine in 2028. Salaries will develop in a similar manner to the marketing department. The expenses of this item will range from €36.000 in 2025 to €270.000 in 2028.

12.2. PPE

Property, Plant, and Equipment costs are relatively modest because we intend to rent offices and warehouses rather than buy them. In 2026, these expenditures will account for approximately 19% of revenues, or approximately €70.000, and in 2028, they will be decreased to 2% of revenues, which is approximately €103.000.

12.3. Patent

Patent expenses amount €8.000 in the first year and €30.000 in 2025, as previously detailed in *Chapter 13 - Intellectual Property Management and Strategic Cooperation*.

12.4. Medical Device Validation

These are the most significant expenses in the first two years, and they serve as the primary destination for our investments and grant. To implement the performance assessment and validation procedures previously discussed in *Chapter 5.2 – Development Process*, we anticipate spending €500.000 in 2024 and €1.000.000 in 2025.

Alessandro Luraghi

12.5. Marketing Expenses

Marketing costs will begin in 2025 with an initial expenditure of €30.000. In 2026, the marketing budget will increase to €74.400, followed by €96.000 in 2027. By the end of 2028, the annual marketing expenditure will reach €116.000. This reflects a steady annual increase in marketing investment. Table 3 shows the initial marketing activities that will be conducted between 2025 and 2026. These activities will focus on establishing our brand, engaging our target audience and laying the foundation for sustained marketing efforts in the following years.

Table 2 – Cost allocation for the marketing activities carried out between 2025 and 2026.

Marketing Activity	Cost
Event Participation	€28.000

Website Development/Maintenance	€12.000
Advertising to Doctors and Hospitals	€30.000
Digital Marketing	€7.000
Market Research	€10.000
Analytics and Tools	€3.000
Contingency Fund	€10.000
Conservative Margin	€4.400

13. Financing

13.1. Funding

To structure our financial request, we have selected a list of potential investors as shown in the investor mapping (see *Appendix III* – Table 16), as well as a planned timeline of fundraising cycles to assist our startup. Our funding strategy is based on multi-stage funding, which offers multiple benefits such as adaptation (offering the right support - money, mentorship, resources - at each level), risk reduction, validation, access to various expertise and corporate control.

The ITQB and the Fundação para a Ciência e Tecnologia (FCT) provided funding for the early stages of research and development of the biosensor. To further proceed with the technological development and establishment of the SENSO company, we expect to obtain an additional grant first, followed by the funding rounds described below.

The amount of financing needed is approximately €2.500.000, as shown by the cumulative cashflow in Figure 8. However, to maintain a safety margin, investments for a total of €2.600.000 divided as follows would be necessary.

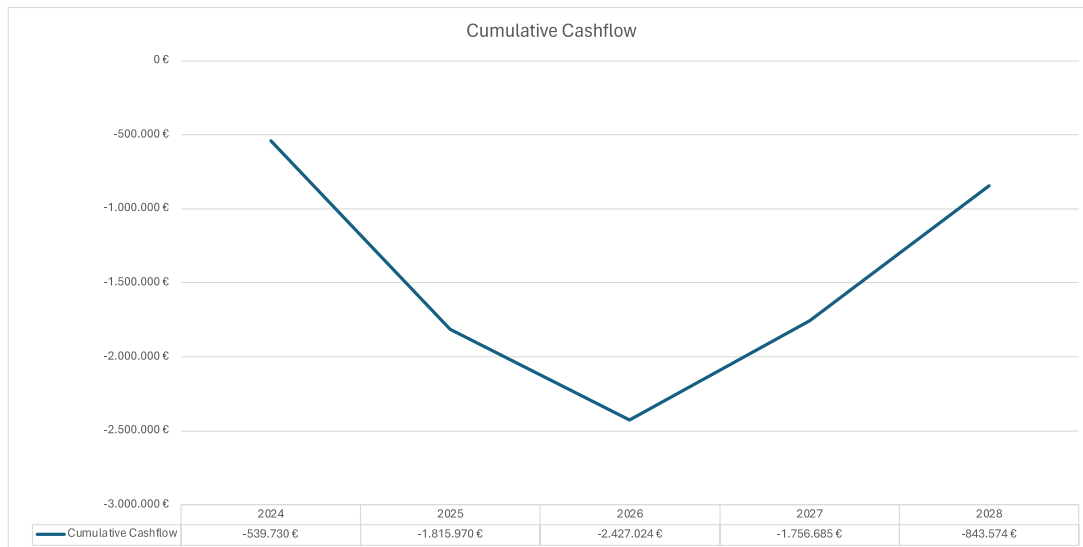


Figure 4 - Cumulative Cashflow.

13.1.1. Grant

Grants from the European Innovation Council (EIC) are an important part of the European Commission's Horizon Europe project, which aims to help startups develop new products with high economic potential (European Innovation Council 2024). The EIC Transition financing line focuses on technology validation and the creation of business plans for innovations in development at TRLs 3 to 6.

We want to apply for €1.200.000 in financing to support our SENSO project, beginning in January 2025. This funding intends to move our product from TRL Level 4 to market readiness by Q2 2026. According to the EIC grant funding rules, we anticipate obtaining 70% of the total amount, €840.000, at the project's start in January 2025. The remaining 30%, or €360.000, will be disbursed in December 2026, providing that we satisfy the objectives and standards outlined in the work plan agreed upon with the European Commission.

We utilized the Venture Capital Method to calculate the pre-money valuation, aligning with the most common approach used by venture capitalists. This method provided us with reasonable valuations for each investment round and equipped us to anticipate potential

counteroffers from VCs. By adopting this methodology, we are well-prepared for negotiations with VCs, ensuring we enter discussions with confidence and clarity.

13.1.2. Pre-Seed Round

Our financing request amounts to €500.000, offering the investor a diluted share of 25%. These contributions will be used to support numerous critical aspects of our early development, including medical device validation costs, team salaries, and patent protection expenses. We intend to use a large percentage of the funds obtained in this round to cover the high costs of medical device validation, which is a critical step in ensuring regulatory compliance and safety of our products. This financing will allow us to overcome some of our initial financial hurdles and focus on the growth and development of our company.

This financing round is expected in June 2024, with our pre-money valuation of €1.500.000 and a price per share of €2,50. After carefully evaluating numerous possible Venture Capitals, we have determined that Portugal Ventures is the best partner for this first round of financing. Their experience in the health technology sector, as well as their network of contacts in our region, will offer us not only the financial support we need, but also valuable strategic advice and networking opportunities to help us develop and thrive in the market.

Alessandro Luraghi

13.1.3. Seed Round Investment

Our finance request totals €500.000, offering a diluted share of 12,5%. These funds will be required to cover expenses linked to medical device validation and hiring new employees. As previously discussed, we intend to increase our staff in critical areas such as R&D, marketing, operations, and accounting to better prepare for the commencement of sales in the third quarter of 2026. Salary costs for these two quarters will be around €40.000 per quarter.

We will use a large portion of the funds collected during this funding round to cover the

remaining costs of medical device validation, which are still estimated to be over €750.000, bringing this critical phase of our project to a close. This finance will be critical in overcoming significant initial financial problems and focusing on our company's growth and development. The funding round is scheduled for March 2025, with our pre-money valuation of €3.500.000 and a price per share of €4,38. After thorough consideration of numerous possible Venture Capitals, we have determined that ENISA, a Spanish VC, is the best partner for this initial round of financing. This decision will allow us to satisfy our economic needs while also finding a reliable partner in Spain who will help us build an effective network of connections. This would make it easier to interact with hospitals in the country and speed up the process of acquiring new consumers.

13.1.4. Series-A Round Investment

The medical device validation process is expected to be complete between the end of 2025 and the first half of 2026, indicating that our product is ready for commercialization. Given that we will only join the market in the third quarter of 2026 and will thus not generate revenues for another two quarters, we understand the need for another basic investment cycle to cover these two months of expenditures without revenues, while we prepare the launch of our product.

To that aim, we plan to launch a Series A round in Q1 2026, raising €400.000 for 6,8 % diluted capital. Specifically, we expect to reach the deal with our pre-money valuation of €5.500.000 and a price per share of €6,02. The funds that will be received will be mostly used for wages. Salaries will rise from around €40.000 to €150.000 per quarter as new figures are hired in various departments, preparing us as best as possible for market entry. Furthermore, we will be responsible for the price of renting offices and warehouses, which will rise as the number of employees grows, from around €6.000 per quarter to approximately €14.000.

For this crucial step, we have decided to start a strategic partnership with Think Health, a prestigious German venture capital firm renowned for its specialization in our sector and its extensive experience in Europe and the United States. This strategic collaboration not only meets our immediate economic needs, but also provides us with a formidable ally to advance our global expansion efforts. Finally, our capital raising strategy extends beyond financial infusion to the formation of strategic alliances.

14. Capitalization Table

Here is our projection for Senso LDA's capitalization table at the moment of establishment in Portugal, with an initial capital of 600.000 shares, as shown in Table 4. Initially, 83,33% of the capital is shared among the five founders, with each owning 16,67%. As a result, 16,67% has been allocated to NOVA ITQB.

We anticipate three rounds of external investment, each resulting in dilution of equity capital. The first round, Pre-Seed, is predicted to produce a dilution of about 25%. In the second Seed round, dilution is reduced slightly to around 9,4%, and in the Series A round, it is reduced even further to around 4,4%. As a result, the founders' ownership percentage falls from 100% to 61,2%.

Investors' share values vary as follows: for Portugal Ventures, the percentage shares change from 25 % to 20,4 %; for ENISA, the percentage shares change from 12,5 % to 11,7%; and for Alessandro Luraghi Think Health, there is no share dilution because no further rounds of investments are planned.

It is important to note that, while the percentage shares are diluted from round to round, the price per share rises significantly, as does the value of the shares held by both founders and shareholders.

Table 3 - Capitalization Table.

Cumulative	Shares	Ownership	Investment	Shares	Ownership	Investment	Shares	Ownership	Investment
Common	600.000	75,0%		600.000	65,6%		600.000	61,2%	
Portugal Ventures	200.000	25,0%	500.000 €	200.000	21,9%	500.000 €	200.000	20,4%	500.000 €
ENISA				114.286	12,5%	500.000 €	114.286	11,7%	500.000 €
Think Health							66.494	6,8%	400.000 €
Total	800.000	100,0%	500.000 €	914.286	100,0%	1.000.000 €	980.779	100,0%	1.400.000 €

15. Contingency Plan

Things may not always go according to plan in the fast-paced and unpredictable world of startups. SENSO, like any other startup or firm, faces a variety of risks because of the many elements at play. Being prepared and adaptive is essential, and having contingency plans allows us to anticipate unforeseen events and shift our strategy accordingly.

We identify two major areas where deviations can occur: operational challenges, such as potential delays in the medical device validation phase or delays in entering targeted markets; and financing challenges, where we may be unable to raise the necessary financing through pre-designated investors or a greater need for cash, resulting in different investment rounds. Given these factors, we are building a contingency plan to deal with unexpected deviations from our intended strategy.

Given the operational challenges, such as probable delays in the medical device validation process or delays in entering the targeted markets, we evaluated the following actions:

- Evaluate and improve our operational planning to anticipate and reduce any delays.

Identifying potential pain areas in the medical device certification process and market entrance plans would enable us to build backup solutions and respond quickly if problems arose.

Alessandro Luraghi

- Seek for strategic alliances with partners or suppliers who can assist us speed up the medical device certification process or handle any delays in entering target markets.

Collaboration with firms or organizations that have experience in the industry may offer us with additional resources and specialized skills.

In terms of finances, however, if investors are unable to invest or the required €2.600.000 is insufficient, we have chosen to proceed in the following manner:

- We would broaden our quest for finance beyond pre-selected investors. We may investigate options such as accelerators, startup competitions, crowdfunding, and bank loans. Diversifying our finance sources can increase our chances of receiving funds to support our expansion.
- We intend to modify the terms of our existing financing agreements to acquire better terms or to prolong our payment periods. Renegotiation could help us better manage our liquidity and relieve short-term financial pressure.
- We will consider non-dilutive financing sources such as grants, government support, and strategic partnerships. These types of financing may enable us to secure the necessary funds without materially diluting our ownership in the company or increasing our financial burden.
- We would optimize our internal operations and cut non-essential costs in order to increase efficiency and conserve capital. We may carefully analyze our spending to discover areas where we may cut costs without sacrificing quality or performance, such as compensation based partially on stock options.

This proactive plan displays our commitment to resilience and adaptation, ensuring that the organization can weather unanticipated setbacks and stay on track to success.

16. Exit Strategy

16.1. Valuation

To evaluate our startup, we used comparables; in particular, we considered an average of the valuations acquired by companies in the sector in past situations of market exit (Bits DIGITS 2024). We pursued this strategy because the true value of our company lies in its accumulated know-how and intangible assets, which are difficult to estimate with typical company valuation methodologies. Consequently, we estimated the value at around € 45.000.000.

Furthermore, to confirm this value and to confirm our analyses, we used the three-stage DCF model. This model, known for its use in the context of emerging businesses and startups, is divided into three phases: growth, transition, and maturity. This model was chosen for its ability to provide an accurate valuation of the company upon exit from the market. Revenue growth rates (g), profitability (p), and capital intensity (a) were calculated from our financial records up to 2028, after which we relied on an average of indicators from healthcare products and biotechnology (drugs) in Europe (Damodaran 2024). Any free cash flow was discounted using the industry's cost of equity. By doing so, we obtained a valuation of the company at the time of exit, in late 2028, resulting in a value of 3,04 EV/Sales and 31,84 EV/EBIAT. These values align with the average of the two sectors, i.e., EV/Sales 5,15 and EV/EBIAT 38,10. With a final valuation of €16.977.517. However, it is important to note that this review only considers the Spanish and Portuguese markets and one specific product. As a result, it does not consider possible future market expansions or the use of enzymes and medical devices to monitor other diseases. Therefore, considering all these factors and the possibility of further expansion both geographically and in terms of further diseases, we believe that the valuation of €45.000.000 is reasonable and will guarantee a good return for both investors and founders.

16.2. Exit Opportunity

As previously stated, we estimate EXIT at the end of 2028. Specifically, we examined three alternative scenarios:

Acquisition By Another Company in The Sector

Our first priority is to be acquired by an industry leader while preserving the integrity of our corporate personnel. There are various reasons for this decision. For starters, it would provide us access to more substantial financial resources and a broader distribution network, allowing us to expand our operations and grow more rapidly. Additionally, a significant player could provide financial and operational stability, eliminating traditional risks associated with startups and ensuring the long-term sustainability of our businesses. Any synergies with the new partner could also bring competitive advantages on the market. This option could represent the pinnacle of our entrepreneurial journey, allowing a large company to quickly utilize our technology while providing sufficient returns for us and our investors. Given its keen interest in the medical device industry and specifically in patient monitoring, Philips is one of the possible buyers of our startup.

As illustrated in Table 5, we intend to do this with a good return that results in an exceptional IRR and ROI for both us and our investors. Considering the acquisition of €45.000.000 in 2028, this would ensure a significant return on investment for our early investors. Our first investor, holding a trailing diluted stake of 20,4%, should expect a return of 17x on its initial investment, translating to an IRR of 90,9% and an ROI of 1.735%. The second investor, with an 11,7% diluted stake, could achieve a return of 9x its initial investment with an IRR of 87,1% and an ROI of 949%, while the third investor could achieve an expected return of six times its initial investment with an IRR of 96,8% and an ROI of 663%. These returns are consistent with

Venture Capital's expectations for high-risk investments in this type of company.

Instead, as founders, we would have an IRR of 90.9% and an ROI of 54,998%, resulting in a return on our investment 549 times over.

Table 4 - Exit and returns.

Exit Dec-28 40,92 €				
45.000.000 €				
	Exit value	years	IRR	ROI
Alessandro Luraghi	4.588.189 €	4,5	90,9%	54958%
Matteo Vocale	4.588.189 €	4,5	90,9%	54958%
Francesco Mancuso	4.588.189 €	4,5	90,9%	54958%
Margarida Rodrigues	4.588.189 €	4,5	90,9%	54958%
Célia Silveira	4.588.189 €	4,5	90,9%	54958%
NOVA ITQB	4.588.189 €	4,5	90,9%	54958%
Founders	27.529.131 €	4,5	90,9%	54958%
Portugal Ventures	9.176.377 €	4,5	90,9%	1735%
ENISA	5.243.644 €	3,75	87,1%	949%
Think Health	3.050.847 €	3	96,8%	663%
Total	45.000.000 €			

Mergers with Similar-sized Companies

If we do not receive an offer or the proposal is not satisfactory, we will consider merging with another startup or a similar company in the sector. Collaboration with other startups or foreign enterprises of comparable size and competence provides a strategic opportunity to enhance growth and strengthen competitiveness. This synergy can drive innovation and market expansion while also assuring economies of scale, which boost profit margins and lower production costs. The new combined firm gains more bargaining power as its market share grows, which improves its position with suppliers and distributors. Diversifying revenue

sources through acquisitions can also help to manage risks associated with market fluctuations or changes in consumer behaviour. Finally, the merger gives access to a larger pool of people and specialized skills, which promotes innovation and improves operational efficiency.

Organic Expansion Strategy

Another alternative is to preserve ownership of the business and focus on organic development. This includes reinvesting revenues in R&D to expand the application of our product to monitor a wider range of diseases or explore new biosensor applications, hiring more people, expanding marketing efforts to reach new consumers or markets, and improving operating efficiencies to optimize profits. This strategy strives to further boost the company's growth, with the goal of attracting possible purchasers in the future or examining the possibility of going public (IPO).

17. References

- "Data: Current." 2024. Damodaran Online. January 5, 2024. Accessed April 20, 2024. https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datacurrent.html.
- "40 Acquisitions of Companies in the Biotechnology Industry." 2023. BitsForDigits. January 15, 2023. Accessed April 21, 2024. <https://www.bitsfordigits.com/acquisitions/biotechnology-industry-acquisitions>.
- "Oxidative Stress, Inflammation, and Disease." In *Oxidative Stress and Biomaterials*, 3rd ed., 35–58. Academic Press. <https://doi.org/10.1016/b978-0-12-803269-5.00002-4>.
- Barbosa, Catarina, Célia M. Silveira, Diogo Silva, Vânia Brissos, Peter Hildebrandt, Lígia O. Martins, and Smilja Todorović. 2020. "Immobilized Dye-decolorizing Peroxidase (DyP) and Directed Evolution Variants for Hydrogen Peroxide Biosensing." *Biosensors and Bioelectronics* 153 (April): 112055. <https://doi.org/10.1016/j.bios.2020.112055>.
- Bestsennyy, Oleg, Michelle Chmielewski, Anne Koffel, and Amit Shah. 2022. "From Facility to Home: How Healthcare Could Shift by 2025." McKinsey & Company. February 1, 2022. https://www.mckinsey.com/industries/healthcare/our-insights/from-facility-to-home-how-healthcare-could-shift-by-2025#/.
- Bhalla, Nikhil, Pawan Jolly, Nello Formisano, and Pedro Estrela. 2016. "Introduction to Biosensors." *Essays in Biochemistry* 60 (1): 1–8. <https://doi.org/10.1042/ebc20150001>.
- Bhatia, Dinesh, Sohini Paul, Tania Acharjee, and Shrimanata Sundar Ramachairy. 2024. "Biosensors and Their Widespread Impact on Human Health." *Sensors International* 5 (January): 100257. <https://doi.org/10.1016/j.sintl.2023.100257>.
- Castelyn, Grant, Liliana Laranjo, Günter Schreier, and Blanca Gallego. 2021. "Predictive Performance and Impact of Algorithms in Remote Monitoring of Chronic Conditions: A Systematic Review and Meta-analysis." *International Journal of Medical Informatics (Print)* 156 (December): 104620. <https://doi.org/10.1016/j.ijmedinf.2021.104620>.
- Clemente, Fabrizio, Amina Antonacci, Maria Teresa Giardi, Valeria Frisulli, Francesco Paolo Tambaro, and Viviana Scognamiglio. 2023. "Last Trends in Point-of-Care (POC) Diagnostics for the Management of Hematological Indices in Home Care Patients." *Biosensors* 13 (3): 345. <https://doi.org/10.3390/bios13030345>.

Erbarch, Gregor. 2014. "In Vitro Diagnostic Medical Devices." European Parliamentary Research Service. November 2014. Accessed April 15, 2024. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2014/542151/EPRS_BRI\(2014\)542151_REV1_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2014/542151/EPRS_BRI(2014)542151_REV1_EN.pdf).

Eurofins Medical Device Testing. 2024. "Safety & Performance Testing - Eurofins Medical Device Testing." Eurofins Scientific. 2024. Accessed April 14, 2024. <https://www.eurofins.com/medical-device/testing/electrical-medical-equipment/safety-performance-testing/>.

European Innovation Council. 2024. "EIC Transition." January 2024. Accessed April 22, 2024. https://eic.ec.europa.eu/eic-funding-opportunities/eic-transition_en.

Ferrari, Alejandro García-Miranda, Samuel J. Rowley-Neale, and Craig E. Banks. 2021. "Screen-printed Electrodes: Transitioning the Laboratory In-to-the Field." *Talanta Open* 3 (August): 100032. <https://doi.org/10.1016/j.talo.2021.100032>.

Hanson, Mark A., and Peter D. Gluckman. 2011. "Developmental Origins of Noncommunicable Disease: Population and Public Health Implications." *The American Journal of Clinical Nutrition* 94 (December): S1754–58. <https://doi.org/10.3945/ajcn.110.001206>.

Howard-Wilson, Sakeina, Ziyue Wang, Taylor Orwig, Denise Dunlap, Nathaniel Hafer, Bryan Buchholz, Shailen Sutaria, David D. McManus, and Craig M. Lilly. 2024. "Point-of-Care Testing Preferences 2020-2022: Trends Over the Years." *Cardiovascular Digital Health Journal*, March. <https://doi.org/10.1016/j.cvdhj.2024.03.002>.

Kampfrath, Thomas. 2022. "Inflammation and Autoimmune Testing - Testing.com." Testing.Com. October 4, 2022. Accessed April 7, 2024. <https://www.testing.com/inflammation-and-autoimmune-testing/>.

Khan, Aqsa, Emily DeVoe, and Silvana Andreescu. 2023. "Carbon-based Electrochemical Biosensors as Diagnostic Platforms for Connected Decentralized Healthcare." *Sensors & Diagnostics* 2 (3): 529–58. <https://doi.org/10.1039/d2sd00226d>.

Larkins, Michael C., and Aparna Thombare. 2023. Point-of-Care Testing. StatPearls - NCBI Bookshelf. <https://www.ncbi.nlm.nih.gov/books/NBK592387/>.

Leitão Afonso, Ana Marta. 2020. "Resultados Reportados Pelos Doentes Em Reumatologia: A

Perspetiva Do Doente.” MSc Thesis, Universidade da Beira Interior. https://ubibliorum.ubi.pt/bitstream/10400.6/10666/1/7569_16036.pdf.

Manning, Catherine G. 2023. “Technology Readiness Levels - NASA.” NASA (blog). September 27, 2023. <https://www.nasa.gov/directorates/somd/space-communications-navigation-program/technology-readiness-levels/>.

Manzo, Ciro. 2019. “Incidence and Prevalence of Polymyalgia Rheumatica (PMR): The Importance of the Epidemiological Context. The Italian Case.” *Medical Sciences* 7 (9): 92. <https://doi.org/10.3390/medsci7090092>.

Martins, Patrícia, and Cristina Ponte. 2019. “Polimialgia Reumática: O Que Precisa Saber.” Sociedade Portuguesa De Reumatologia, April. https://spreumatologia.pt/wp-content/uploads/2020/02/13_Polimialgia_AF.pdf.

Meier, Jakob, Eric M Hofferber, Joseph Stapleton, and Nicole M. Iverson. 2019. “Hydrogen Peroxide Sensors for Biomedical Applications.” *Chemosensors* 7 (4): 64. <https://doi.org/10.3390/chemosensors7040064>.

Netherlands Enterprise Agency (RVO). 2023. “Filing a Patent Application Worldwide.” Netherlands Enterprise Agency. August 2023. Accessed April 20, 2024. <https://english.rvo.nl/topics/patents-intellectual-property-rights/apply/worldwide>.

News Farma. 2019. “Sociedade Portuguesa De Reumatologia Alerta Para Impacto Social E Económico Da Doença - News Farma.” October 11, 2019. Accessed April 22, 2024. <https://www.newsfarma.pt/noticias/8424-sociedade-portuguesa-de-reumatologia-alerta-para-impacto-social-e-econ%C3%B3mico-da-doen%C3%A7a.html>.

Pahwa, Roma, Amandeep Goyal, and Ishwarlal Jialal. 2023. “Chronic Inflammation.” StatPearls - NCBI Bookshelf. August 7, 2023. <https://www.ncbi.nlm.nih.gov/books/NBK493173/>.

Santos-Longhurst, Adrienne. 2024. “Understanding and Managing Chronic Inflammation.” Healthline. February 19, 2024. Accessed April 7, 2024. <https://www.healthline.com/health/chronic-inflammation>.

Smallwood, Miranda J., Ahuva Nissim, Annie R. Knight, Matthew Whiteman, Richard Haigh, and Paul G. Winyard. 2018. “Oxidative Stress in Autoimmune Rheumatic Diseases.” *Free Radical Biology & Medicine* 125 (September): 3–14.

<https://doi.org/10.1016/j.freeradbiomed.2018.05.086>.

Srivastava, Shikha, Deependra Singh, Satish Patel, and Manju Rawat Singh. 2017. "Role of Enzymatic Free Radical Scavengers in Management of Oxidative Stress in Autoimmune Disorders." *International Journal of Biological Macromolecules* 101 (August): 502–17. <https://doi.org/10.1016/j.ijbiomac.2017.03.100>.

Taleat, Zahra, Alireza Khoshroo, and Mohammad Mazloum-Ardakani. 2014. "Screen-printed Electrodes for Biosensing: A Review (2008–2013)." *Mikrochimica Acta* 181 (9–10): 865–91. <https://doi.org/10.1007/s00604-014-1181-1>.

United Nations, Department of Economic and Social Affairs, Population Division (2022). *World Population Prospects: The 2022 Revision*. Accessed March 17, 2024. <https://population.un.org/dataportal/data/indicators/49/locations/900/start/1950/end/2100/line/linetimeplotsingle?df=cc7cd233-9829-415e-a4d3-9970799c0c9e>

Wang, Tongyao, Mu-Hsing Ho, Michael C. F. Tong, James Chung-Hang Chow, Joachim Voss, and Chia-Chin Lin. 2023. "Effects of Patient-Reported Outcome Tracking and Health Information Provision via Remote Patient Monitoring Software on Patient Outcomes in Oncology Care: A Systematic Review and Meta-Analysis." *Seminars in Oncology Nursing* 39 (5): 151473. <https://doi.org/10.1016/j.soncn.2023.151473>.

WIPO 2022. "Protecting your Inventions Abroad: Frequently Asked Questions About the Patent Cooperation Treaty (PCT)." 2022. Accessed April 20, 2024. <https://www.wipo.int/pct/en/faqs/faqs.html>.

WIPO 2024. "PCT Applicant's Guide Portugal." January 2024. Accessed April 20, 2024. <https://pctlegal.wipo.int/eGuide/view-doc.xhtml?doc-code=PT&doc-lang=en#NATIONAL%20CHAPTER>.

World Health Organization. 2020. "Life Expectancy at Birth (Years)." December 7, 2020. Accessed March 17, 2024. [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/life-expectancy-at-birth-\(years\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/life-expectancy-at-birth-(years)).

World Health Organization: WHO. 2023. "Noncommunicable Diseases." September 16, 2023. Accessed March 17, 2024. <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>.

Zhang, Li, Wenqiang Guo, Chenrui Lv, Xiaomeng Liu, Minghui Yang, Meng Guo, and Qing

Fu. 2023. "Electrochemical Biosensors Represent Promising Detection Tools in Medical Field." *Advanced Sensor and Energy Materials* 2 (4): 100081. <https://doi.org/10.1016/j.asems.2023.100081>.

18. Appendix III – Financial Data

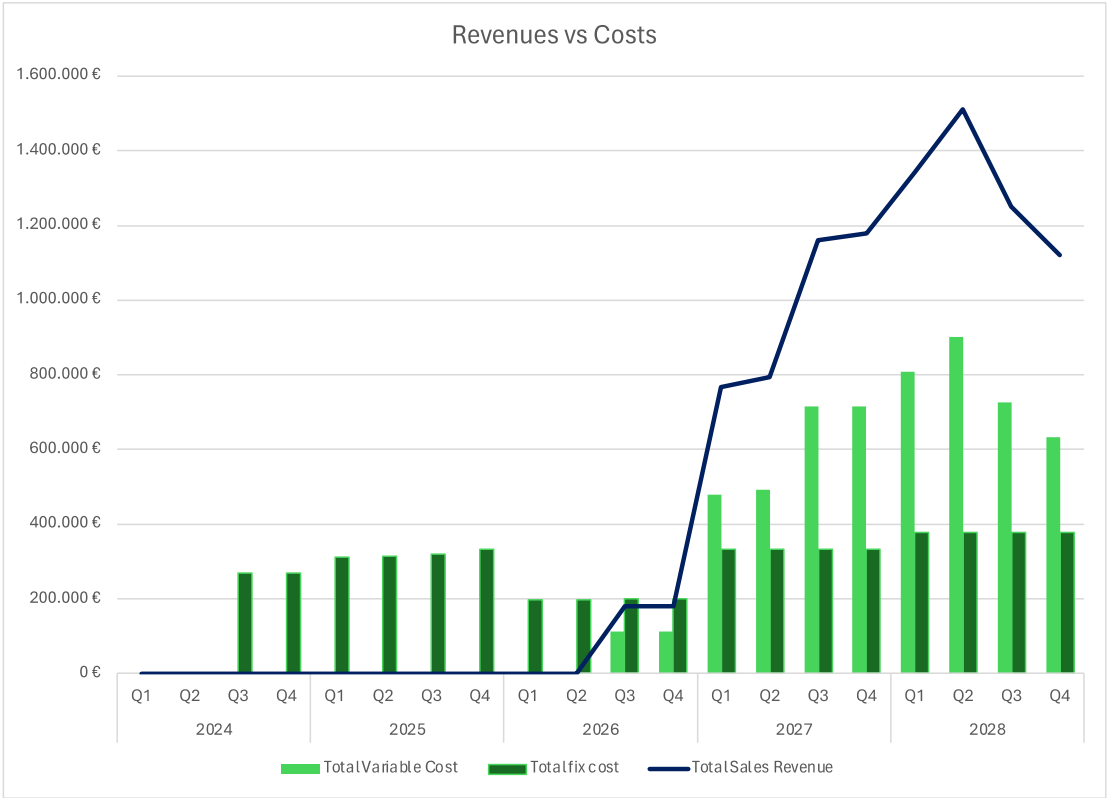


Figure 5 - Revenues vs Costs.

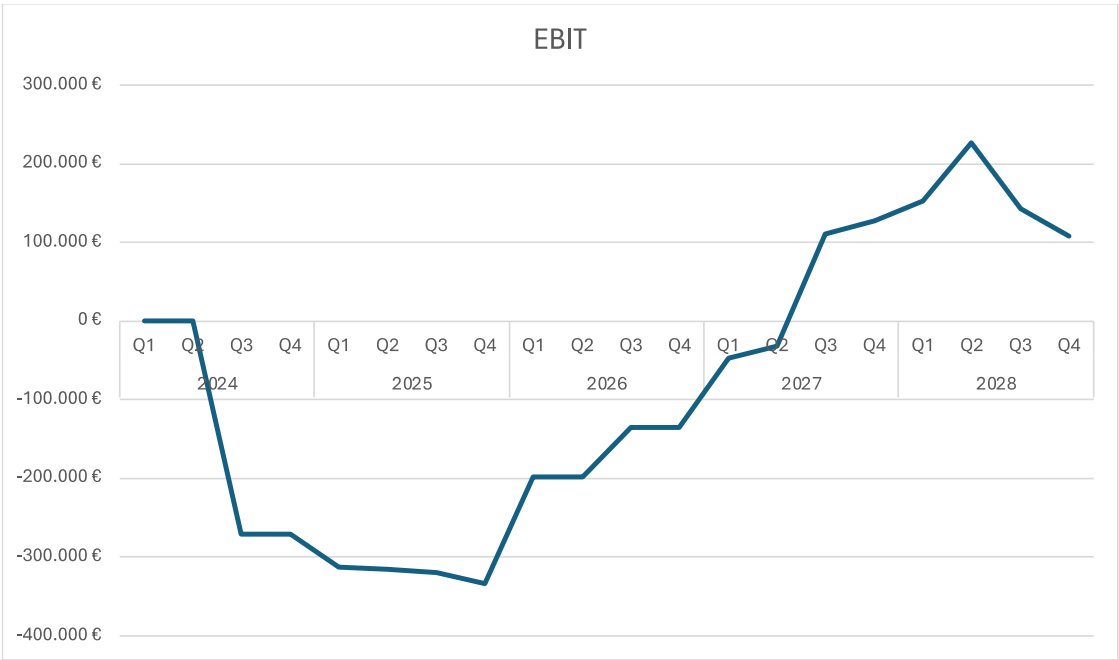


Figure 6 – EBIT.

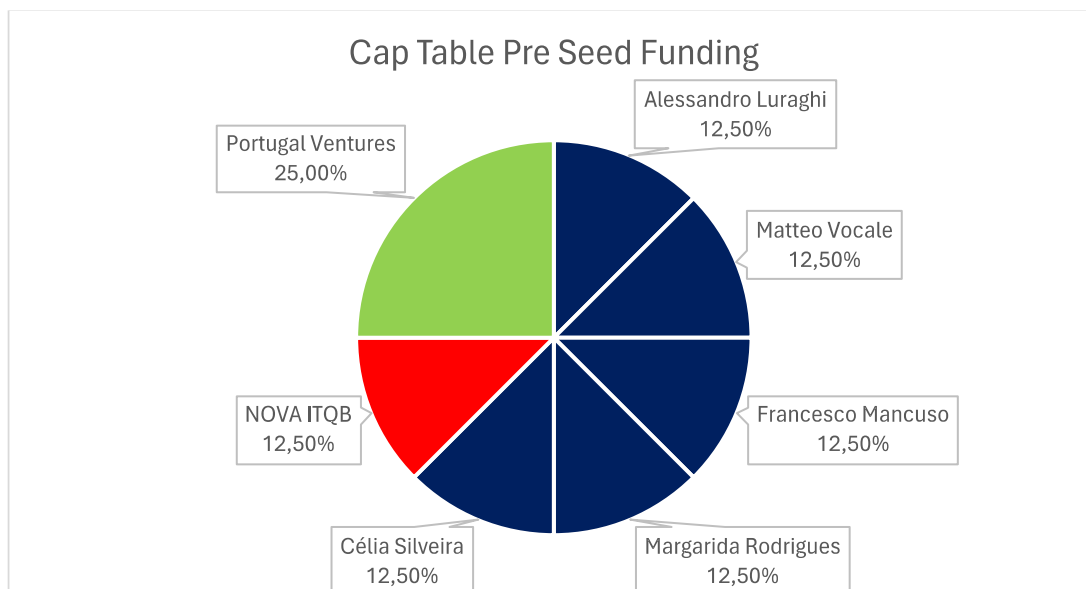


Figure 7 - Cap Table Pre Seed Funding.

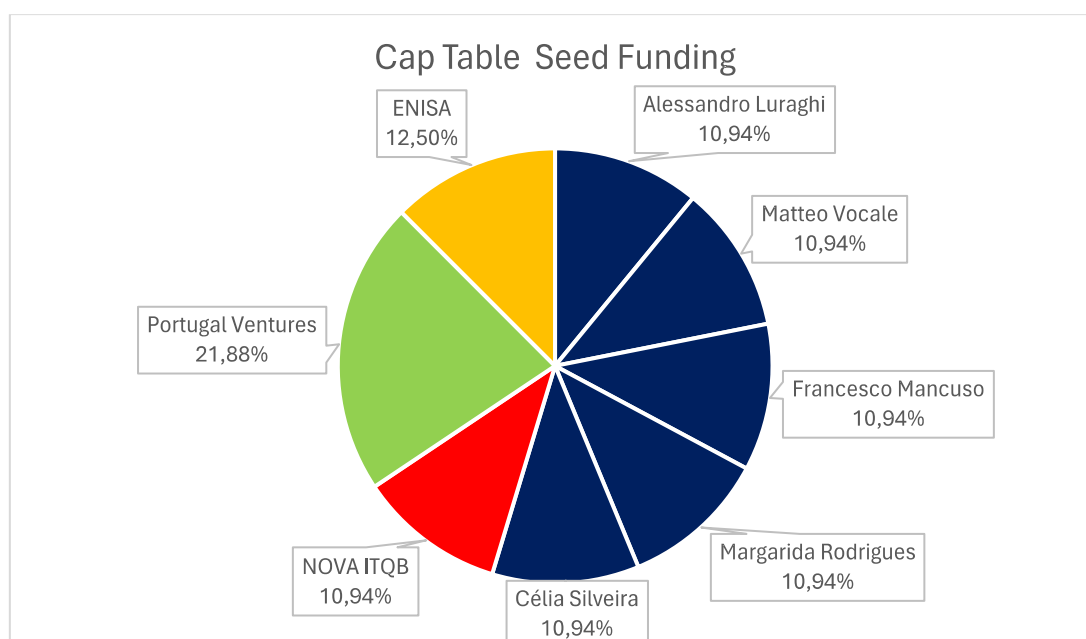


Figure 8 - Cap Table Seed Funding.

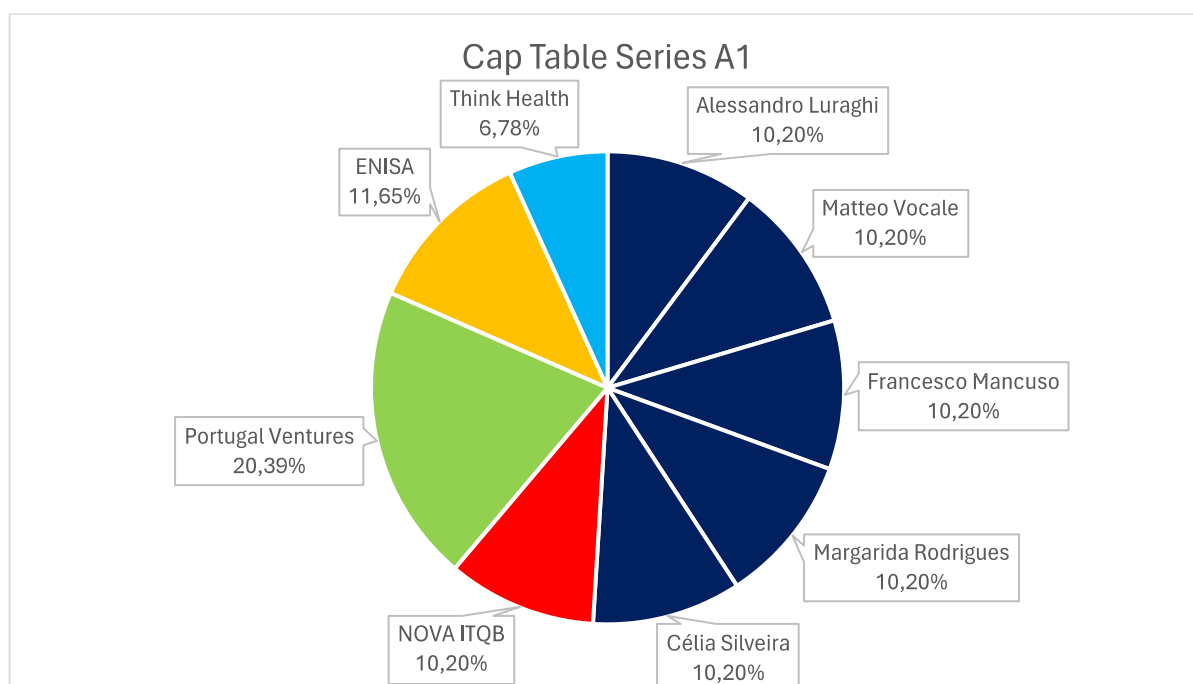


Figure 9 - Cap Table Series A1.

Table 5 - Three-stage DCF model.

Starting year		2024											
Cost of capital		10,81%											
NPV of terminal value		7.562.342 €											
Enterprise Value (2024)		10.802.199 €											
Enterprise Value (2028)		16.977.517 €											

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Sales	0 €	0 €	361.306 €	3.900.957 €	5.225.474 €	6.232.945 €	7.434.657 €	8.868.059 €	10.577.820 €	12.617.224 €	15.049.825 €	15.426.071 €	15.811.722 €
g				980%	34%	19%	19%	19%	19%	19%	19%	2,5%	2,5%
p			-146%	-12%	10%	9%	9%	9%	9%	9%	9%	12%	12%
a	0%	0%	-12%	-13%	-12%	-12%	-12%	-12%	-12%	-12%	-12%	-12%	-12%
EBIAT	-427.809 €	-1.013.207 €	-527.163 €	127.321 €	498.647 €	589.013 €	702.575 €	838.032 €	999.604 €	1.192.328 €	1.422.208 €	1.851.128 €	1.897.407 €
NOA	-427.809 €	0 €	-44.625 €	-514.897 €	-634.140 €	-747.953 €	-892.159 €	-1.064.167 €	-1.269.338 €	-1.514.067 €	-1.805.979 €	-1.851.128 €	-1.897.407 €
FCF	0 €	-1.013.207 €	-482.539 €	597.594 €	617.890 €	702.827 €	846.780 €	1.010.040 €	1.204.775 €	1.437.056 €	1.714.121 €	1.896.278 €	1.943.685 €
Cum. FCF	-1.013.207 €	-2.026.414 €	-1.495.745 €	-898.151 €	-280.261 €	422.565 €	1.269.346 €	2.279.386 €	3.484.161 €	4.921.217 €	6.635.338 €	8.531.616 €	10.475.300 €
discounted cashflow	-914.364 €	-1.495.745 €	-392.984 €	439.207 €	409.822 €	420.682 €	457.401 €	492.363 €	529.998 €	570.510 €	614.118 €	613.103 €	7.751.401 €
EV	10.802.199 €	12.983.124 €	14.869.138 €	15.878.898 €	16.977.517 €	18.109.960 €	19.220.866 €	20.288.602 €	21.277.024 €	22.140.014 €	22.819.229 €	23.389.710 €	23.974.453 €
EV/EBIAT		-10,66	-24,63	116,78	31,84	28,82	25,78	22,94	20,30	17,84	15,57	12,33	12,33
EV/Sales			35,93	3,81	3,04	2,72	2,44	2,17	1,92	1,69	1,47	1,48	1,48

Table 6 - Different rounds of investments, VC method and Exit.

Table 7 - Market Data and TAM, SAM, SOM.

Market Data				
	Spain	Portugal		
Population	47.482.973	10.410.000		
Over 55	32,0%	38,5%		
Total 55+	15.194.551	4.007.850		
Incidence	0,019%	0,016%		
Total Incidence	2.837	641		
Prevalence	0,225%	0,1%		
Total Prevalence	34.188	4.008		
	TAM	SAM	SOM	N° at the end of the period
N° hospitals in Portugal	240	120	60	
N° hospitals in Spain	776	388	194	
N ° patients in Portugal	4.008	2.004	1.002	1.403
N ° patients in Spain	34.188	17.094	8.547	9.965
N° New Patient in Portugal	641	321	160	
N° New Patient in Spain	2.837	1.418	709	

Table 8 - Income Statement and Cashflow Statement.

Income Statement	2024	2025	2026	2027	2028
Total Hospitals and clinic center in Portugal	0	0	10	43	60
Total Patients in Portugal	0	0	159	822	1.340
Total Hospitals and clinic center in Spain	0	0	0	73	190
Total Patients in Spain	0	0	0	3.663	9.643
Total Hospitals and clinic center	0	0	10	116	250
Total Patients	0	0	159	4.485	10.983
Total Sales Revenue Portugal	0 €	0 €	361.306 €	1.198.360 €	683.694 €
Total Sales Revenue Spain	0 €	0 €	0 €	2.702.597 €	4.541.780 €
Total Sales Revenue	0 €	0 €	361.306 €	3.900.957 €	5.225.474 €
Total Variable Cost Portugal	0 €	0 €	225.761 €	740.513 €	396.102 €
Total Variable Cost Spain	0 €	0 €	0 €	1.662.358 €	2.674.112 €
Total Variable Cost	0 €	0 €	225.761 €	2.402.871 €	3.070.214 €
Gross Profit	0 €	0 €	135.544 €	1.498.086 €	2.155.259 €
Wages	18.000 €	160.500 €	597.000 €	1.080.000 €	1.233.000 €
Maintanance cost	0 €	20.000 €	25.000 €	30.000 €	35.000 €
Office rent	6.930 €	25.740 €	55.440 €	77.220 €	83.160 €
Legal cost	6.000 €	30.000 €	30.000 €	30.000 €	30.000 €
IT & IT Security	4.000 €	4.000 €	6.000 €	6.000 €	6.000 €
Marketing Expenses	0 €	30.000 €	74.400 €	96.000 €	116.000 €
insurance	4.800 €	6.000 €	7.200 €	8.400 €	9.600 €
Medical device validation	500.000 €	1.000.000 €	0 €	0 €	0 €
Total fix cost	539.730 €	1.276.240 €	795.040 €	1.327.620 €	1.512.760 €
EBITDA	-539.730 €	-1.276.240 €	-659.496 €	170.466 €	642.499 €
Depreciation	1.000 €	2.500 €	4.000 €	5.500 €	7.500 €
Amortization	800 €	3.800 €	3.800 €	3.800 €	3.800 €
EBIT	-541.530 €	-1.282.540 €	-667.296 €	161.166 €	631.199 €
Interest	0 €	0 €	0 €	0 €	0 €
Grants and Contributions	0 €	840.000 €	360.000 €	0 €	0 €
EBT	-541.530 €	-442.540 €	-307.296 €	161.166 €	631.199 €
Taxes (21%)	0 €	0 €	0 €	33.845 €	132.552 €
Net Profit	-541.530 €	-442.540 €	-307.296 €	127.321 €	498.647 €
Net Profit Margin in %			-85%	3%	10%
Cashflow Statement	2024	2025	2026	2027	2028
EBIT	-541.530 €	-1.282.540 €	-667.296 €	161.166 €	631.199 €
Depreciation	1.000 €	2.500 €	4.000 €	5.500 €	7.500 €
Amortization	800 €	3.800 €	3.800 €	3.800 €	3.800 €
Change in NWC	0 €	-552 €	45.176 €	470.273 €	119.243 €
Income taxes paid	0 €	0 €	0 €	33.845 €	132.552 €
Cashflow from operations	-539.730 €	-1.276.792 €	-614.319 €	674.584 €	894.294 €
Capex	-9.000 €	-12.500 €	-11.000 €	-9.500 €	-12.500 €
Cashflow from investments	-9.000 €	-12.500 €	-11.000 €	-9.500 €	-12.500 €
Grants and Contributions	0 €	840.000 €	360.000 €	0 €	0 €
Equity issuance	550.000 €	500.000 €	400.000 €	0 €	0 €
Cashflow from financig	550.000 €	1.340.000 €	760.000 €	0 €	0 €
Free Cashflow	1.270 €	50.709 €	134.681 €	665.084 €	881.794 €
Cumulative Cashflow	1.270 €	51.979 €	186.659 €	851.743 €	1.733.537 €
Cash Burn Rate	1.270 €	50.709 €	134.681 €	665.084 €	881.794 €

Table 9 - Balance Sheet.

BALANCE SHEET					
Assets	2024	2025	2026	2027	2028
Patent	7.200 €	33.400 €	29.600 €	25.800 €	22.000 €
Intangible assets	7.200 €	33.400 €	29.600 €	25.800 €	22.000 €
Equipment	9.000 €	21.500 €	32.500 €	42.000 €	54.500 €
Tangible assets	9.000 €	21.500 €	32.500 €	42.000 €	54.500 €
Total non current assets	16.200 €	54.900 €	62.100 €	67.800 €	76.500 €
Inventories	0 €	0 €	3.613 €	39.010 €	52.255 €
Trade receivables	0 €	0 €	0 €	0 €	0 €
Cash	0 €	11.030 €	148.589 €	771.634 €	1.412.887 €
<i>Operating cash</i>	<i>0 €</i>	<i>552 €</i>	<i>7.429 €</i>	<i>38.582 €</i>	<i>70.644 €</i>
Total current assets	0 €	11.030 €	152.202 €	810.644 €	1.465.142 €
Total assets	16.200 €	65.930 €	214.302 €	878.444 €	1.541.642 €
Equity and liabilities					
Lease liabilities	0 €	0 €	0 €	0 €	0 €
Mortgage loans	0 €	0 €	0 €	0 €	0 €
Total non-current liabilities	0 €	0 €	0 €	0 €	0 €
Bank overdraft	7.730 €	0 €	0 €	0 €	0 €
Lease liabilities	0 €	0 €	0 €	0 €	0 €
Mortgage loans	0 €	0 €	0 €	0 €	0 €
Bank loans	0 €	0 €	0 €	0 €	0 €
Trade payables	0 €	0 €	55.667 €	592.489 €	757.039 €
Total current liabilities	7.730 €	0 €	55.667 €	592.489 €	757.039 €
Total liabilities	7.730 €	0 €	55.667 €	592.489 €	757.039 €
Share capital	550.000 €	1.050.000 €	1.450.000 €	1.450.000 €	1.450.000 €
Retained earnings	-541.530 €	-984.070 €	-1.291.366 €	-1.164.044 €	-665.397 €
Total equity	8.470 €	65.930 €	158.634 €	285.956 €	784.603 €
Total equity and liabilities	16.200 €	65.930 €	214.302 €	878.444 €	1.541.642 €

Table 10 - Similar Acquisitions in the industry.

Acquisitions of Companies in the Biotechnology Industry	price
ArcherDX acquired by Integrated DNA Technologies	48.000.000 €
ADx NeuroSciences acquired by Fujirebio	42.080.458 €
BioD acquired by Derma Sciences	21.300.000 €
Orchid Cellmark acquired by LabCorp	85.400.000 €
cCAM Biotherapeutics acquired by Merck	95.000.000 €
Edico Genome acquired by Illumina	100.000.000 €
Genkyotex acquired by Calliditas Therapeutics	20.300.000 €
Pu'an Pharmaceutical acquired by Gansu Longshenrongfa Pharmaceutical Industry	45.732.563 €
Xiangyu Biotechnology acquired by Hubei Forbon Technology	13.742.736 €
Primaeva Medical acquired by Candela Medical	30.000.000 €
Altan Pharma acquired by Malin Corporation	38.787.012 €
IsoPlexis acquired by Berkeley Lights	57.800.000 €
Gateway Genomics acquired by Myriad Genetics	67.500.000 €
GeneTx Biotherapeutics acquired by Ultragenyx Pharmaceutical	75.000.000 €
Nora Pharma acquired by Sunshine Biopharma	21.774.395 €
Oaknet Healthcare acquired by Eris Lifesciences	85.524.290 €
Rigenerand Srl acquired by Evotec	24.777.674 €
AGTC acquired by Syncona Partners LLP	23.500.000 €
Alta Technology acquired by Dian Diagnostics	29.731.981 €
ARTham Therapeutics acquired by Kaken Pharmaceutical	48.542.261 €
Avioq acquired by Shandong Oriental Ocean Sci-Tech	65.000.000 €
Boulder Botanical & Bioscience Labs acquired by Real Brands	12.000.000 €
BioStrand acquired by ImmunoPrecise Antibodies	22.183.057 €
Distributed Bio acquired by Charles River Laboratories International	83.000.000 €
Eden Biologics acquired by Bora Pharmaceuticals	50.000.000 €
GVB Biopharma acquired by 22nd Century Group	55.000.000 €
Healeon Medical. Inc. acquired by Bimini Health Tech	11.300.000 €
Letco acquired by Fagron SA	34.000.000 €
NIPD Genetics acquired by Medicover	50.143.881 €
AltheaDx acquired by Castle Biosciences	65.000.000 €
Surgical Innovation Associates acquired by Integra LifeSciences	50.000.000 €
Invitae's Acquisition of Singular Bio	55.000.000 €
average	47.722.510 €

Table 11 – Wages per month.

Wages per month					
Year	2024	2025	2026	2027	2028
Founders	0 €	1.000 €	1.500 €	2.000 €	2.500 €
<i>chief financial officer (CFO)</i>	0 €	1.000 €	1.500 €	2.000 €	2.500 €
<i>CEO - Product manager</i>	0 €	1.000 €	1.500 €	2.000 €	2.500 €
<i>chief operating officer (COO)</i>	0 €	1.000 €	1.500 €	2.000 €	2.500 €
<i>chief marketing officer (CMO)</i>	0 €	1.000 €	1.500 €	2.000 €	2.500 €
<i>Researcher - Célia Silveira</i>	0 €	1.000 €	1.500 €	2.000 €	2.500 €
R&D Team	1.500 €	1.500 €	2.000 €	2.500 €	3.000 €
Sales and Marketing Team	1.500 €	1.500 €	2.000 €	2.500 €	2.500 €
Quality Assurance and Quality Control Team	0 €	1.500 €	2.000 €	2.500 €	2.500 €
OperationsTeam	1.500 €	1.500 €	2.000 €	2.500 €	2.500 €
Finance and Accounting Team	0 €	1.500 €	2.000 €	2.500 €	2.500 €
HR Team	0 €	1.500 €	2.000 €	2.500 €	2.500 €
Total	4.500 €	10.000 €	13.500 €	17.000 €	18.000 €

Table 12 - Number of employees.

Number of employees					
Year	2024	2025	2026	2027	2028
Founders	5	5	5	5	5
<i>chief financial officer (CFO)</i>	1	1	1	1	1
<i>CEO - Product manager</i>	1	1	1	1	1
<i>chief operating officer (COO)</i>	1	1	1	1	1
<i>chief marketing officer (CMO)</i>	1	1	1	1	1
<i>Researcher - Célia Silveira</i>	1	1	1	1	1
R&D Team	2	4	6	8	8
Sales and Marketing Team	0	1	6	9	9
Quality Assurance and Quality Control Team	0	0	1	3	6
Operations Team	0	2	6	9	9
Finance and Accounting Team	0	1	3	4	4
HR Team	0	0	1	1	1
Total	7	13	28	39	42

Table 13 – Fixed Costs.

Fixed Cost		2024	2025	2026	2027	2028
Year						
Wages	Founders	0 €	30.000 €	45.000 €	60.000 €	75.000 €
	R&D Team	18.000 €	72.000 €	144.000 €	240.000 €	288.000 €
	Sales and Marketing Team	0 €	4.500 €	144.000 €	270.000 €	270.000 €
	Quality Assurance and Quality Control Team	0 €	0 €	24.000 €	90.000 €	180.000 €
	Operations Team	0 €	36.000 €	144.000 €	270.000 €	270.000 €
	Finance and Accounting Team	0 €	18.000 €	72.000 €	120.000 €	120.000 €
	HR Team	0 €	0 €	24.000 €	30.000 €	30.000 €
	sum	18.000 €	160.500 €	597.000 €	1.080.000 €	1.233.000 €
Maintenance Cost	Cost/year	0 €	20.000 €	25.000 €	30.000 €	35.000 €
Office/ Warehouse rent	Number of employees	7	13	28	39	42
	Square meters/person	10	10	10	10	10
	m ² price of rent per month	15 €	15 €	15 €	15 €	15 €
	Costs/year	6.300 €	23.400 €	50.400 €	70.200 €	75.600 €
	Utilities	630 €	2.340 €	5.040 €	7.020 €	7.560 €
	Sum	6.930 €	25.740 €	55.440 €	77.220 €	83.160 €
Legal costs	Cost/year	6.000 €	30.000 €	30.000 €	30.000 €	30.000 €
Patent		8.000 €	30.000 €			
IT & IT Security	Cost/year	4.000,00 €	4.000,00 €	6.000,00 €	6.000,00 €	6.000,00 €
Marketing Expenses	Cost/year	0,00 €	30.000,00 €	74.400,00 €	96.000,00 €	116.000,00 €
Equipment	Laptops, office furniture, instruments, etc	10.000 €	15.000 €	15.000 €	15.000 €	20.000 €
Insurance	Cost/year	4.800 €	6.000 €	7.200 €	8.400 €	9.600 €
Medical device validations		500.000 €	1.000.000 €			
Total Fixed Costs		557.730 €	1.321.240 €	810.040 €	1.342.620 €	1.532.760 €

Table 14 - List of possible investors.

Investor	Country	Sector	Type of investor	N° of investments
Ideias Glaciares	Portugal	Health Care	Business Angel	2
Jeremy Hendon	Portugal	Health Care	Business Angel	1
Michael Chang	Portugal	Health Care	Business Angel	1
Scott MacMillan	Portugal	Health Care	Business Angel	1
Vasco Lopes da Silva	Portugal	Health Care	Business Angel	1
Portugal Ventures	Portugal	Health Care	Venture Capital	25
Armilar Venture Partners	Portugal	Health Care	Venture Capital	8
Caixa Capital	Portugal	Health Care	Venture Capital	7
Bynd Venture Capital	Portugal	Health Care	Venture Capital	7
Shilling	Portugal	Health Care	Venture Capital	5
Portugal Ventures	Portugal	Biotech	Venture Capital	9
Caixa Capital	Portugal	Biotech	Venture Capital	6
Bynd Venture Capital	Portugal	Biotech	Venture Capital	3
Armilar Venture Partners	Portugal	Biotech	Venture Capital	3
Critical Ventures	Portugal	Biotech	Venture Capital	2
Albert Armengol	Spain	Health Care	Business Angel	2
Shane Neman	Spain	Health Care	Business Angel	2
Kike Corral	Spain	Health Care	Business Angel	2
Luis M. García	Spain	Health Care	Business Angel	2
Juan Knuth	Spain	Health Care	Business Angel	2
Juan Knuth	Spain	Biotech	Business Angel	2
ENISA	Spain	Health Care	Venture Capital	23
Centre for the Development of Industrial Technology (CDTI)	Spain	Health Care	Venture Capital	22
Caixa Capital Risc	Spain	Health Care	Venture Capital	21
Inveready	Spain	Health Care	Venture Capital	18
SODENA	Spain	Health Care	Venture Capital	17
Centre for the Development of Industrial Technology (CDTI)	Spain	Biotech	Venture Capital	20
Caixa Capital Risc	Spain	Biotech	Venture Capital	18
SODENA	Spain	Biotech	Venture Capital	13
Inveready	Spain	Biotech	Venture Capital	12
ENISA	Spain	Biotech	Venture Capital	11
HTGF High-Tech Gruenderfonds	Germany	Health Care	Venture Capital	65
IBB Ventures	Germany	Health Care	Venture Capital	33
Atlantic Labs	Germany	Health Care	Venture Capital	25
Bayern Kapital	Germany	Health Care	Venture Capital	23
Think Health	Germany	Health Care	Venture Capital	22