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Digital Transformation in Healthcare: An Innovative Business Plan  
For an Application Digitizing Physical Rehabilitation

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## Abstract (PT)

O Sistema de Saúde adapta-se às inovações muito lentamente, uma vez que regras rígidas controlam todas as medidas. É um desafio ainda maior quando se deseja introduzir uma solução digital no setor da Saúde. Mesmo pequenas alterações no código podem significar grandes dificuldades para aprovações. Este desafio é abordado na presente tese de mestrado. O status quo da locomoção praticamente não foi inovado durante décadas. A abordagem do Reha Buddy passa por analisar como um humano se desloca através de sensores sem fios, o que representa uma inovação que irá revolucionar o mercado da locomoção. Acima de tudo, as tendências dos últimos dois anos, que foram impulsionadas ainda mais pela última pandemia, mostraram que provavelmente não há melhor momento para avançar com este projeto. Foi realizada uma revisão de literatura, assim como entrevistas com especialistas com o objetivo de apoiar todas as afirmações. Adicionalmente, para uma análise eficaz de cada capítulo do plano de negócios, foi realizada uma análise de mercado com foco em todas as características específicas do mercado da Saúde. A equipa do Reha Buddy terá que superar alguns obstáculos importantes nos próximos anos; está, no entanto, bem posicionada com a sua equipa de especialistas que estabeleceu alguns marcos importantes para gerir esses obstáculos. O resultado do presente projeto é um plano de negócios que esclarece que a visão do Reha Buddy tem uma base empreendedora e que a ideia apresentada pela equipa deve ser concretizada.

Keywords (PT):

Saúde Digital, Inovação no Modelo de Negócio, Marketing na área da Saúde, B2B na área da Saúde

## Abstract (EN)

The health care system adapts to innovations very slowly, as strict rules control all measures. It is even more challenging when one wants to introduce a digital solution for the healthcare market. Even minor changes to the code can mean major hurdles for approvals. This challenge was taken up in the following master thesis. The status quo of gait analysis has hardly been innovated for decades. The approach of reha buddy is to analyze how a human walks through wireless sensors. This represents an innovation that will revolutionize the market for gait analysis. Above all, trends of the last two years, which were pushed even more by the last pandemic, have shown that there is probably no better time to pursue this project. Additionally, a literature review and expert interviews were conducted to support all statements in the thesis. What is more, for a precise examination of each chapter of the business plan, a market analysis was carried out focusing on all specific characteristics of the health care market. The team of reha buddy has to overcome some major obstacles in the next few years but is well-positioned with their team of experts who set some important milestones for managing those hurdles. The result of this work is a business plan which clarifies that reha buddy's vision has an entrepreneurial foundation and that the team's idea should be pursued.

Keywords (EN):

Digital Health, Business-model innovation, Healthcare marketing, B2B Healthcare



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# 1 Executive Summary

The reha buddy app makes it possible to turn the smartphone into a smart sensor for determining the progress of therapy. A core objective of reha buddy is to help promote the flow of data between patients, devices, and clinicians. Increasing this connectivity enables more innovative and more suitable information-sharing between clinicians and patients. The concept has strong links to digital health's predictive and personalized principles. Connected health solutions also became a crucial element in the international response to the COVID-19 pandemic. However, the current speed of technological advances for reha buddy also brings safety concerns, namely data protection and often a lack of quality and evidence-based research highlighting the associated health benefits of the newest technologies. There are also many inherent challenges in demonstrating that more recent approaches and technologies are indeed more practical and effective. The following will summarize reha buddy's strategy to support patients during physical rehabilitation while simultaneously setting up a sustainable digital health business.

## Product

An app collects movement data with the help of body-worn sensors and gives users feedback about their mobility status. This can be utilized, for example, to assess progress during rehabilitation after an accident or surgery and positively influence the healing process. Patients and therapists receive information about progress during physical rehabilitation based on data and profound evaluation of algorithms, e.g., after orthopedic surgery, injuries, or neurological diseases. The reha buddy solution is easy to use and can be well integrated into everyday clinical practice, making it frictionless and available to all stakeholders. Movement assessments can be evaluated at the push of a button, and the results seamlessly transferred to the hospital information system. Additionally, patients will have the option to continue their therapy measures at home and feel as confident as they would in inpatient treatment. They receive feedback on their exercise performance and playfully packaged exercises providing the necessary motivation for regular training at home.

## Market

The positive development that peoples in modern society are able to get older and older than past generations, goes hand in hand with an unpleasant side effect of age. The number of people with chronic diseases is increasing dramatically, together with the number of people over 65. For example, 70 million people worldwide currently suffer from joint arthrosis. 80% of these people have movement limitations, and 25% cannot perform daily activities of standard living. Currently the so-called payers (health insurance) of our health care systems prescribe which movement assessments must be performed with the patients to verify the effectiveness of the interventions. However, the directly

affected therapists often lack the means to collect valid data quickly and easily in the busy clinic routine. Therefore, the reha buddy solution achieved a highly demanded improvement and innovation of the status quo.

### **Company**

Four medical engineers who already have several years of experience in research and development in the field of physical rehabilitation technology, founded reha buddy. Each of the founders has his specialization in this field. To effectively fulfill the required areas of expertise, the team also enlisted support in finance, sales and marketing, and the programming of the app. This mix ensures a balanced competence profile. The team has already proven remarkable resilience and flexibility and is very passionate about their work and is full of drive to revolutionize the world of physical rehabilitation.

### **Business model**

reha buddy strives for quality leadership and the most frictionless solution in the market gait analysis. A subscription-based modular pricing system was developed to offer every potential customer precisely the service they need. Over the next few years, the main cost drivers will be expenses relating to the staff and the certification processes.

### **Marketing**

When addressing hospitals as their main targets, the focus will be on the cost advantages and therapy efficiency gains that the new treatment method will bring. Hospitals will be approached via direct marketing measures, while reha buddy will also attract decision-makers through online marketing campaigns. Furthermore, there will be presentations at medical conferences and congresses. In addition, regular publications in professional journals are planned. Moreover, a university class for physical therapists is prepared and likely to happen, given the academic background of the founders.

### **Financing**

Austrian government funding has supported the company's developments to date. The financial planning was based on three development scenarios up to 2023. Considering the latest 600.000 Euro funding and investments by the founder circle, the company expenses are covered until it reaches its break-even point at the end of 2022. By Q3 2023, the first revenues will be generated by setting up contracts with current research partners and clinics. From 2021, Austria will be the initial target market. The next market entry will be Germany, and from 2023 an expansion into the European Union. Even assuming a Sales downside of 30%, reha buddy will still reach its break-even point in the planning period at the end of 2023.

## 2 Introduction

Recent technological developments in the healthcare sector paint an undeniable picture that shows a tendency direction towards digitization. Digital solutions and applications for potential use in a clinical setting are becoming more interesting for hospitals and their patients. The healthcare sector follows a trend here that many other industries already went through during the last two decades.

For my thesis, I decided to write a business plan and partner with a promising start-up in the digital health sector because I genuinely believe that digital healthcare can transform our current healing processes - physically and mentally. It can prevent disease and lower healthcare costs while helping patients monitor and manage chronic conditions. It can also tailor medicine for individual patients, while healthcare providers can benefit from advances in digital health. Moreover, I chose reha buddy and, therefore, the digital health market since I believe that there is still a huge opportunity since this sector was lagging during the last decades and still must reach its full potential.

This master thesis followed a traditional business plan methodology. It includes an executive summary, a business description, a market or competitive analysis, a marketing plan, a description of the proposed operational structure, a product description, while additional 12 expert interviews have been conducted to support the given statements. The expert interviews helped clarify and better understand the current market environment, consequently finding the best conclusions and recommendations for the project partner.

In regard of the current developments, the healthcare sector is expected to finally take advantage of the numerous benefits the digital revolution has to offer. Namely, e.g., the new contact channels hospitals can build up with their patients online. This constant digital presence can offer instant support at any time and, consequently, an even better relationship with the patients. Furthermore, digitalization can result in better data-driven decision making for doctors and therapists since it goes hand in hand with data management. This is because science considers data as knowledge, and in-depth knowledge consequently leads to better decision making. Digitization improves efficiency and productivity and reduce costs, which will be essential for the future physical rehabilitation industry. Studies show that the average human gets older, which leads to more health care demand with increased age. With this development, the treatments need to be more effective to ensure the best possible therapy and, consequently, high mobility in later life stages. The healthcare sector's digitization leads to dynamic innovations, like many other sectors that experienced digitization. High expectations and trust in future data security developments allow the health industry to be more open to new trends and the possibilities offered by new health innovations. Finally, this whole process improves internal and external communication and teamwork. Described as easy as with an internal

chat where team members can communicate and discuss patients' developments more efficiently so that medical professionals can act faster and make better decisions.

The Viennese startup reha ruddy found its place in precisely this niche since they aim to digitize physical rehabilitation. The company is currently developing an app that collects movement data and gives users feedback on their mobility status. The app can provide the users with reliable information on mobility and accurate measurement of gait. Mobility monitoring and the real progress made during rehabilitation after an accident or surgery can be better assessed, and the healing process can be positively influenced. The reha buddy app can also provide quantitative measures of gait, and it can identify specific gait changes in patients. Therefore, it can provide an added objective and quantitative dimension to gait analysis when combined with clinical assessment. It is currently used mainly in research settings in various hospitals in Austria; however, with recent advances, incorporation into clinical practice is very likely. Therefore, this business plan aims to support the journey from a promising start-up to becoming a profitable company with the higher purpose to accompany patients in their healing journey all over the world.

### **3 Literature Review**

The following literature review is divided into three parts that will be equally important for an in-depth understanding of this business plan and the master thesis's objectives. The first part will explain the digitalization of the health care sector. The second part will review marketing efforts in the digitalized health care sector. Finally, the third and last part will analyze and give examples of current digital health care business models.

#### **3.1 Digitalization in Health Care**

In this part, we will evaluate the current state in the digitalization of health care services. Moreover, we focus on the impact on health care services and less on the digital transformation's technical aspects.

The digital transformation in the health care industry is as disruptive as it is in other sectors. Technologies such as the Internet of things, virtual care, artificial intelligence, big data analytics, blockchain, or smart wearables capable of data exchanges through different platforms and channels across the health ecosystem can enhance health outcomes. The benefits lie primarily in improving medical diagnosis, data-based treatment decisions, digital therapeutics, clinical trials, self-management of care, and supporting the health workforce (WHO, 2018).

The expectations regarding the impact of digitalization in the health care sector can differ a lot between industry experts. However, the fact that the impact will be very profound is broadly accepted. There is no doubt that health care will change rapidly in the following decades, with a crucial change being the move to a more consumer-centric system. Those systems will allow citizens to be more responsible about managing their health data and quickly connecting with health professionals for advice and therapy. This shift will lead to patient empowerment, better self-management, shared decision-making, and the achievement of individuals' life goals (Haggerty, 2017).

These developments are now also very likely to result in essential shifts from diagnosis and treatment to prevention and management, which will consequently entail a shift in the treatment location. Hospitals and other treatment centers might experience a decreasing rate of patients in their facilities but an increasing number of patients that need to be managed through future health care delivery applications. Those improvements would result in radical changes in how health care delivery will be organized and financed.

In 2016 the World Health Organization (WHO) classified digital health services into different categories by the variables' interventions and the services' primary users. It is crucial to highlight that the health service end user is often not directly paying for hospital services.

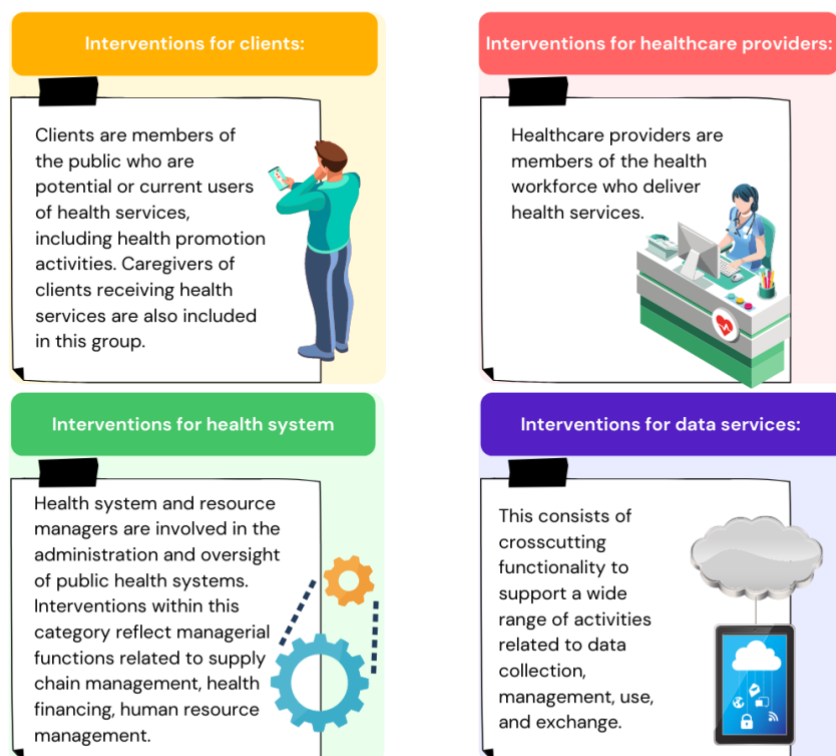


Figure 1: WHO classification of digital health services (WHO, 2016)

The figure above makes it easier to understand how vital an intense collaboration of diverse stakeholder groups is for further digitalization in health care. Each participant can bring their expertise and experience to carry the responsibility for such a socially important issue. Members of the public, patients, health professionals, researchers, policymakers, insurance companies, and technology companies all have an essential voice. These efforts will drive innovation and support a transparent and trustworthy market, which will lead the industry towards realizing the true potential of these digital technologies. Another different but promising prospect could originate from the potential of machine-to-machine communication, allowing devices to interact with each other and respond to new conditions without any human intervention (WHO, 2016).

The discussed developments and technologies are promising but require excellent knowledge about the functionalities to integrate them into professionals and patients' health routines all over the world appropriately. The general impact of those innovations has already been profound and will be even more profound in the future if the technologies get further developed and broadly accepted. However, it is also essential to evaluate whether those digital health services contribute to the general health system goals. Therefore, decisions to integrate digital health services should ideally be based on evidence concerning their performance and evaluated continuously. Thus, the adoption of digital healthcare services will depend on how effective the industry can create digital health service solutions and how well those innovations will meet the health system goals (Lapão, 2019).

### **3.2 Marketing in Digital Health Care**

Health care marketing aims to learn and understand patients' needs and desires to meet those requirements at the highest standards. A significant advantage of digital marketing is the targeting ability that has led to it being used by most marketers for external promotion of medical institutions when they develop their marketing strategies today. Besides, digital marketing is a cheap channel to advertise and promote information about discounts, offers, and benefits of accessing the products provided by a specific institution (Copley, 2014).

It is safe to say that digital communication platforms can promote certain behaviors and influence decision-making. But the current market environment shows that many apps are not well designed. Because of this flaw, they do not adequately alter behavior sufficiently to justify their development costs, marketing costs, and time investments by patients and health care professionals (Klonoff, 2019).

Institutions must evaluate digital medical services further to benefit from the whole sector's digitalization and bring new patients to their clinics. It became necessary in almost all sectors to implement digital marketing methods to expand a business in the last two decades. A strategic management approach implies attracting new patients and offering them quality healthcare services,

ensuring their satisfaction and the probability of further recommending the health facility. Following the exponential growth in the use of electronic devices by consumers, marketing experts must develop new ways to incorporate the latest technologies into their long-term strategies. Moreover, digital marketing and its channels like the Internet, e-mail, and social media are cheaper than direct marketing or even older methods. They also create the opportunity to market a service virtually to customers, break the distance barrier, and make consumers aware of the offered services. An interactive and user-friendly website also provides lots of information representing an excellent advertising platform and, therefore, is always advisable to have. It can be a source of information for potential patients, employees, or other staff members. The patients can also analyze companies, their services, read other customers' reviews, browse digital content, or compare prices and offers with other providers. Another benefit is that potential customers can use simple search engines like Google to find and access the company's website using keywords. Medical organizations can communicate to responsible institutions about their product offerings through their website, permitting the researcher to search for and maintain communication between the consumers, the health facilities, and the product offering company (Berkowitz, 2021).

However, a website can only be successful if integrated into the whole marketing strategy of the company. Therefore, marketing managers can elaborate offers, promotions, and discounts through the website, encouraging potential clients to visit, recommend, and ask for its product in the health care facilities. Types of digital tools that are usually additionally integrated into a medical organization's marketing strategies are, affiliate links, banner advertisements on other websites, or a consistent social media appearance regularly leading the potential visitors to the clinic's website. Through social media, people can not only stay in touch with other people but also with organizations. They provide a channel for medical institutions to communicate with the existing patients or potential ones permanently. Using e-mail communication to inform stakeholders about special offers and newly available services is another excellent use of recent digital marketing. Besides the immediate delivery of e-mail over direct postal mail, the significant advantage is the minimal expense needed for information to reach its destination. Furthermore, most of those communication tools can be further used for co-creation, including patients, and creating value in this context of a more profound relationship among stakeholders. Concordance, which is a type of value co-creation, is an effective way for physicians and patients to facilitate health outcomes consequently (Anderson, 2019).

Another way of including modern marketing techniques into the strategy is the use of mobile phones. Nowadays, everyone has a cell phone, and therefore it is an easy method for the medical organization to keep in contact with its customers. Whether through text messages, voicemails, phone calls, or the Internet, the clients can receive information about anything in a matter of seconds. Marketing efforts and the impact of streaming through platforms like YouTube or Spotify, often used on mobile phones,



should not be underestimated. Compared with the traditional systems, streaming expands the variety of channels even further with a more effective way to profile and target the right person through available data (Radu, 2017).

Existing customers generate the most sales in the B2B healthcare sector, so maintaining customer relationships is one of the most critical digital marketing components. At the lead generation phase, high-quality content is also an essential link for customer care. B2B newsletters are ideal for providing your customers with current information or collecting their feedback through surveys. Social media is also helpful for connecting with customers, making it easier for them to stay updated. Finally, it is essential to consider that a sales process in B2B Healthcare Marketing can take multiple months. During the so-called lead nurturing, marketing executives should continue to provide the customer contact with valuable content, for example, through mentioned channels like e-mails. If a lead shows interest in the product, the sales team may even send the interested party a product video through digital streaming channels like YouTube. Marketing automation software can also increase the likelihood that a deal will be closed. Furthermore, it is then better to analyze leads and, thanks to automated processes, provide them with the appropriate medical content (Ekiyor, 2020).

To sum up, Marketing in digital health care is a way to promote health care services to the target market, including patients and their families, communities, doctors, therapists, medical personnel, hospital staff, insurance companies, governments, and hospitals. The biggest challenge here is meeting the needs of this variety of stakeholders while still acting sustainably and profitably as a business. But the need for digital methods of promoting medical care services to expand a business is undeniable. A strategic way of thinking, in this case, implies attracting new patients and offering them quality health care services, which ensures their satisfaction and the probability for them to recommend innovative offers (Jiwani, 2017).

### **3.3 Business Models in Digital Health Care**

Digitization is improving our health and the business of healthcare in exciting ways. Amidst ongoing data privacy debates, the Internet and related digital technologies significantly grow information in healthcare. Emerging data evidence provides support for some beneficial effects of interactive digital systems (Lapão, 2019). However, many challenges remain, especially in creating sustainable and profitable business models. It is impressive to see the creativity and quality of ideas that emerged on the market in recent years.

Few markets have such a wide variety of business models like the digital health care sector. Nevertheless, the focus should be developing models that will make digital health care sustainable and profitable. The leading Business models researched are very diverse and exciting. Among them are

freemium combined with subscription-based models, business models where insurance companies cover the costs and others where hospitals cover the costs. Additionally, licensing particular intellectual property or software becomes increasingly popular, with consultation offerings emerging as well. This variety is fascinating but, at the same time, challenging to find the best option for a newly funded start-up.

The following examples will overlook the current digital health care market and its current successful business models. This is an essential issue since those benchmark companies will make it easier to understand how digital health care business models might work in current market conditions.

1. Wearables company Fitbit, recently acquired by Google, provides digitally connected devices to their customers. Those devices can collect, transfer, and analyze biometric data. Fitbit is currently also expanding into other healthcare services with a new premium subscription service for users that offers coaching and personalized insights mined from the health data it collects. Fitbit executives announced the company plans to roll out a one-on-one coaching service in 2021 to help consumers manage chronic conditions. Their first business model provides subscription-based services to end-users and collects personal data used by the user's complementary apps. The second business model is generating revenue through selling their very own product range like smartwatches. The third business model aims to sell data to other organizations with regulatory concerns being high.
2. Runtastic is a native app that offers a collaborative network for runners, promoting fun, well-being, and active life. The first business model relies on a freemium model offering users to share their running sessions' data. Monetization of the huge community is driven by ads. The second business model is in-app sales, namely the subscription to premium offers. The third business model consists of B2B deals, e.g., companies that offer their employees premium subscriptions for the Runtastic app as a work benefit.
3. Nomadeec provides medicine counseling services by phone or Internet for affiliated patients to their respective health care insurance companies. The solution connects remote doctors and therapists with patients to provide simple or emergency treatment. Their business model is based on a secure platform to sell the doctors' time, mainly covered by health insurance providers.
4. BePatient offers the first patient-centric platform, monitoring hospitalization, chronic care, prevention, and research. The first Business Model targets hospitals and insurance companies with a value proposition. Their services promise time and money savings and better decision-making. In a second step, entrepreneurs designed a second business model to offer complementary products and services, like home monitoring of patients with chronic disease

or prevention. The third business model captures value from data by selling them to research institutes.

5. The Medical Realities Platform is an award-winning immersive technology offering a new way to learn medical procedures. The company uses virtual reality to teach complex healthcare topics to healthcare professionals. The business model mainly involves selling its product to universities and other medical education facilities and having mainly B2B customers.
6. Babylon Health is a revolutionary digital health company that focuses on combining cutting-edge AI technology with professional doctor's consultation. This company aims to make healthcare more accessible through its apps by automating routine tasks of doctors and leaving them more time for essential responsibilities. It helps doctors by saving them time but at the same time replaces them through automation of every possible task, which should not be seen as unfavorable but rather an improvement because of the large shortages of medical professionals all over the world. The business model works with either annual membership subscriptions or through paying for every single consultation.
7. Another business model in health care is licensing. The healthcare and cloud technology start-up Abacus aims to improve people's lives by helping generate actionable insights through its patient data integration platform to deliver better care for everyone. Abacus developed contracts with multiple other partner companies, including numerous health insurances and service providers. The company first charges an implementation fee and a licensing fee for its software platform, with contracts lasting three to five years.

Social research in health studies highlights the patients' new role as a digital technology user creating content and sharing it with a community of other users through social media and community apps (Lupton, 2016). But in the race to develop new digital health business strategies, it is easy to forget that it is not only consumers who will provide the greatest leverage on the market but also industrial stakeholders. The B2B health customers are mainly governments, employers, insurance companies, and producers worldwide – an unparalleled spectrum of players with considerable buying power. Working together with these B2B stakeholders could therefore prove to be a win-win situation for everyone involved. Thus, the success of those innovations is heavily dependent on patient-centered product development, as it is on managing stakeholder authority (Van Velthoven, 2019).

The digital health sector brings tremendous growth opportunities for the entire tech scene. Given its nascent nature, it presents unprecedented opportunities for fast movers to shape the digital health environment and capture excessive value through innovative business models. Digital technology is improving healthcare in fascinating ways. It is just awe-inspiring to capture the creativity and the quality of ideas in the current market. Still, the future main research focus will shift to developing strategies to make those innovative business models in the digital health care sector profitable.

Marketing in digital health care is a way to promote health care services to the target market, including patients and their families, communities, doctors, therapists, medical personnel, hospital staff, insurance companies, governments, and hospitals. The biggest challenge here is meeting the needs of this variety of stakeholders while still acting sustainably and profitably as a business. But the need for digital methods of promoting medical care services to expand a business is undeniable. A strategic way of thinking, in this case, implies attracting new patients and offering them quality health care services, which ensures their satisfaction and the probability for them to recommend innovative offers (Mathews, 2019).

More importantly, research shows the pitfalls of information management. Entrepreneurs must consider patients' willingness to disclose sensitive information and their emotional risk. For years, the challenge in digitalization of healthcare has been to create a smooth and seamless work experience with minimum friction. Data produced by digital health devices, social media, and apps are of considerable value for various public and private stakeholders. Entrepreneurs around the world are very aware of this source of value creation. However, they must also respect how knowledge, social relations, and power relations are correlated in the health sector to develop the most value through their business models (Wadmann, 2018).

The global trend of subscription-based payments has changed consumer behavior by encouraging demand without variable cost penalties. Most of the seven mentioned examples offer some sort of subscription-based service. Subscription payment services require corporations to provide an unlimited supply of goods and services, satisfying consumer demand for a prospectively determined fixed price (Andonova, 2021). How to calculate and agree upon negotiated subscription pricing may pose challenges that must be addressed in the following creation of the business plan. Much will depend on negotiations between Health Insurance Funds and the business, here reha buddy, of a digital health application. The parties need to agree on a standardized reimbursement price that will apply to all statutory health insurers. Furthermore, although the manufacturer retains the right to charge a higher selling price than the negotiated price (in that case, the difference would need to be paid by the insured individual), manufacturers will likely stick to the negotiated prices to maximize demand for their products (Gerke, 2020).

The challenges and best solutions are best approachable using the business model canvas, adding the research contributions within the digital ecosystem model considering actors, interactions, resources, legal requirements, and devices. The Business Model Canvas also has the power to guide businesses in the healthcare field. The Business Model Canvas explanations can help visualize Business Models' structural and integrated nature and substantiating it through coming to a more transparent domain knowledge representation through conceptual modeling (Gand, 2018).

## 4 Macro-Environmental Analysis - PESTEL

The success of a company depends immensely on its ability to interact with the macro-environment. The constant evolution of markets generates multiple opportunities and potential threats to which firms need to know how to improve their reactions. Therefore, it is of high importance to make use of analytical tools to understand those interactions better. The following macro-environment analysis uses the PESTEL framework that considers a company's political and legal aspects, economic indicators, sociocultural trends, demographic facts, technological changes, and environmental elements.

### 4.1 Political Factors

The healthcare industry undoubtedly requires many regulations considering many different factors, like customers' insurance, employment regulations, changing tax legislation, and more. One of the main aspects that is important to highlight for reha buddy is laws considering data protection. An application that requires storing a patient's data must meet all related requirements and ensure that it is secure for the user. What is more, one should remember that the healthcare industry is a constant object of political discussions. Any changes introduced by the government may impact society and health care, especially tax changes. New developments through the COVID-19 pandemic can be seen as a shortcut to current digital health innovations. Politicians worldwide were forced to adapt faster to be able to profit from those innovative digital technologies. (Bayram, 2020)

### 4.2 Economic factors

Many factors can affect healthcare services, such as unemployment, age structure, interest rate, or inflation. This is because each of these changes can influence how society spends its money, affecting political spending. A high unemployment rate means that households will reduce their expenses, including costs for health care services. Moreover, the fewer people working in society, the fewer people receive benefits such as healthcare. According to the latest data, Austria's unemployment rate in October 2020 increased to 11% compared to 9% in October 2019. This increase is mainly due to the COVID-19 pandemic. (Böheim, 2021) To cope with the increasing future workload for health systems, following the pandemic and the rise of the population's average age, optimizations through digitalization are of even greater value now. (Nepomuceno, 2020)

### 4.3 Sociocultural factors

When analyzing health care's social aspects, special consideration should be given to demographic changes and changes in public values. Considering the applications that should help diagnose health problems, it is essential to consider how strong patients' faith is in these types of solutions and whether

the new technology could trick the physician into treating the patient. Edelman (2020) prepared a report, "Special Report: Trust in Technology" according to which the trust in technology is declining on the market, including the German and Austrian market, mainly due to the fear that technological development is slipping out of control. (Edelman, 2020) On the other hand, the current demographic change, for example, aging populations create space for medical technologies, as their demand will increase in the coming years. According to the World Population Prospects 2019 of the United Nations, the global population of people aged 65 years and over is expected to more than double, from 703 million to 1.5 billion by 2050. The share of older people in the global population is expected to rise from 9% to 16%. (Guillaume, 2021)

The general trend towards wearables to support self-improvement can be seen as an opportunity to maintain physical activity in an aging society for as long as possible. The improved process through visually edited data helps patients develop better learning curves and have more fun through gamification. (Düking, 2020)

#### **4.4 Technological Factors**

Despite the lack of full trust in technology, it cannot be denied that technological development causes constant life changes. Every sector, including health care, should develop in this direction. Now it can be noticed that medical applications are becoming more and more popular - e-visits, the possibility of consultation without leaving home.

Such development encourages patients to use newly available technologies, not only for the hope of a better diagnosis but also because of time savings, which is possible thanks to the available applications. In addition to the direct impact of technological development on healthcare, there is also an indirect impact. It manifests itself, among other things, in more significant marketing opportunities or with more effective communication with potential patients.

#### **4.5 Environmental Factors**

Being environmentally friendly is becoming an increasingly important issue for an increasing number of people and enterprises. Therefore, technologies that reduce the overall energy consumption, necessary hygiene measures, or paperwork are regarded to be of great value to potential patients and clinics that use it.

#### **4.6 Legal Factors**

All applicable regulations or legal restrictions are significant when introducing new solutions for the health service. One should consider, among other things, the Discrimination Law, Health and Safety

Law and, as mentioned before, Data Protection. Experts agree that data protection regulations in healthcare are stricter than in most other areas. This is because patients' and providers' data in exchange for analytics, software, and tracking support makes it critical for companies to ensure their data integrity. (Pandey, 2020)

The European System of Medicines framework ensures the representation and participation of all member states in the various evaluation and supervision bodies and activities of the European Medicines Agency (EMA), the European Commission, and the European Network of Medicines Health Products Authorities. Medical validation is in general very complex for software and even worse for AI products, especially with regards to updates. The medical validation approval is granted only for one exact part. This means that sometimes if only one line of code gets changed, it is necessary to apply for a new validation, including updates.

#### **4.7 Austrian Government Program 2020-2024**

The Austrian Federal Government program (2020-2024) contains some points or chapters that show a clear tendency towards (indirect) funding of, e.g., telemedical measures.

##### **Chapter "Health" (page 264 f.)**

*[...] Advances in digitization should also enable more comfortable and improved access to medical services in the health sector. [...] We also want to advance digitization in diagnosis, treatment, and (medical) research and further strengthen Austria as a health location. This leaves people in health professions more time for contact with patients.*

The application of reha buddy will start at the point mentioned in the last sentence and will reduce the effort for administration and documentation for therapists and thus free up time that can be used for active work on patients.

##### **Subchapter "Prevention and Health Promotion" (page 266)**

*[...] Modernization of evidence-based preventive examinations (e.g., breast screening, colon cancer screening)*

With the use of reha buddy, a comprehensive recording and quantification of the therapy progress become possible. These data create the (evidence) base for ...

##### **Subchapter "High quality, tiered, area-wide and local health care" (page 267 f.)**

- *Implement telemedical treatment in the best possible way*
- *Advancing digitization in medical research, diagnosis, and treatment as well*

- *Strengthening integrated care for chronic diseases (expansion of disease management programs)*
- *Strengthening and upgrading the non-medical health professions*
  - *Expansion of competencies and enabling of specific supply steps*
  - *Greater involvement in primary health care (community nurses)*
- *Expansion of outpatient physical rehabilitation, which relieves inpatient physical rehabilitation*

#### **Subchapter "Optimal Conditions in the Health System" (page 269)**

- *Increase transparency and quality*
  - *Ensure independent quality promise for the residential and inpatient areas*
  - *Optimize framework conditions for innovation and planning security (e.g., pilot projects, research)*

#### **Chapter Digitization & Innovation (page 316 f.)**

*[...] The federal government is committed to making Austria one of the leading digital nations within the European Union. Every Austrian should be able to use the advantages of digitization in all life areas transparently, successfully, and as independently as possible. An active digitalization policy creates socio-political, economic, legal, infrastructural, and democratic framework conditions and ensures digital skills development.*

*[...] A comprehensive and broad strategy ensures the efficient and rapid expansion of the required extensive infrastructures. [...]*

## **5 Market**

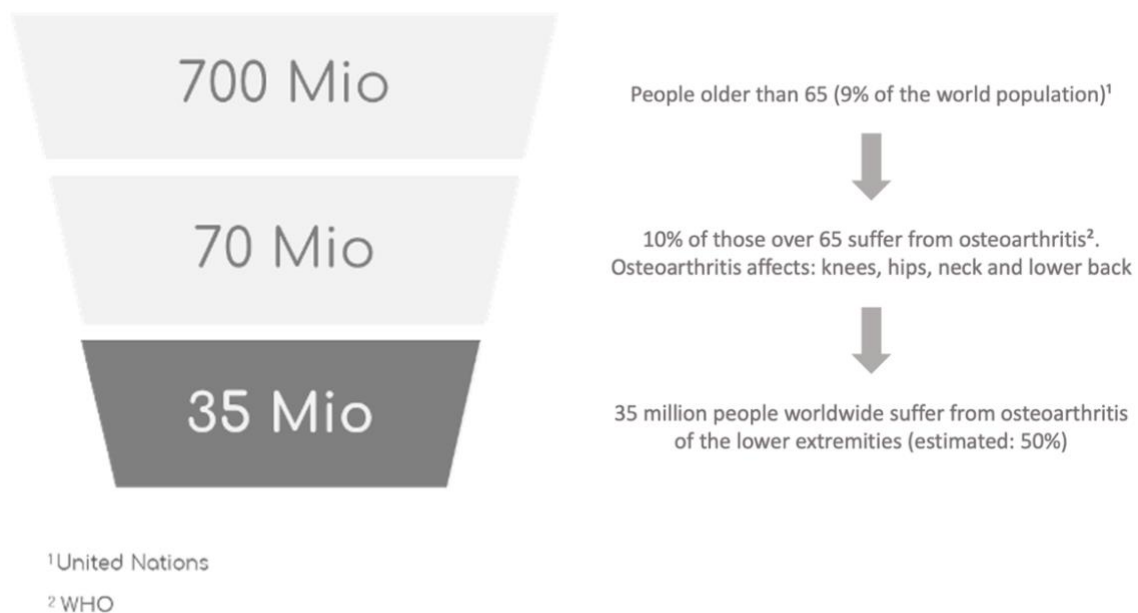
Generally speaking, our society's demographic development shows that there will be more and more older people. The World Health Organization reports that the share of people over 65 years was around 9% in 2019, approximately 700 million people. In 2050, a rise to about 16% is expected, which will correspond to 1.5 billion people (UN, 2019).

### **5.1 Market Potential**

As the number of people over 65 increases, so does the number of chronic musculoskeletal disorders. An example of such a disease is osteoarthritis of the joint. 80% of people with osteoarthritis have movement restrictions, and 25% cannot fully engage in daily activities. Osteoarthritis usually affects the knees, hips, neck, and lower back. The WHO states that around 10% of people over 65 suffer from (at least) one of the four osteoarthritis forms (~ 70 million people worldwide) (Wittenauer, 2013).

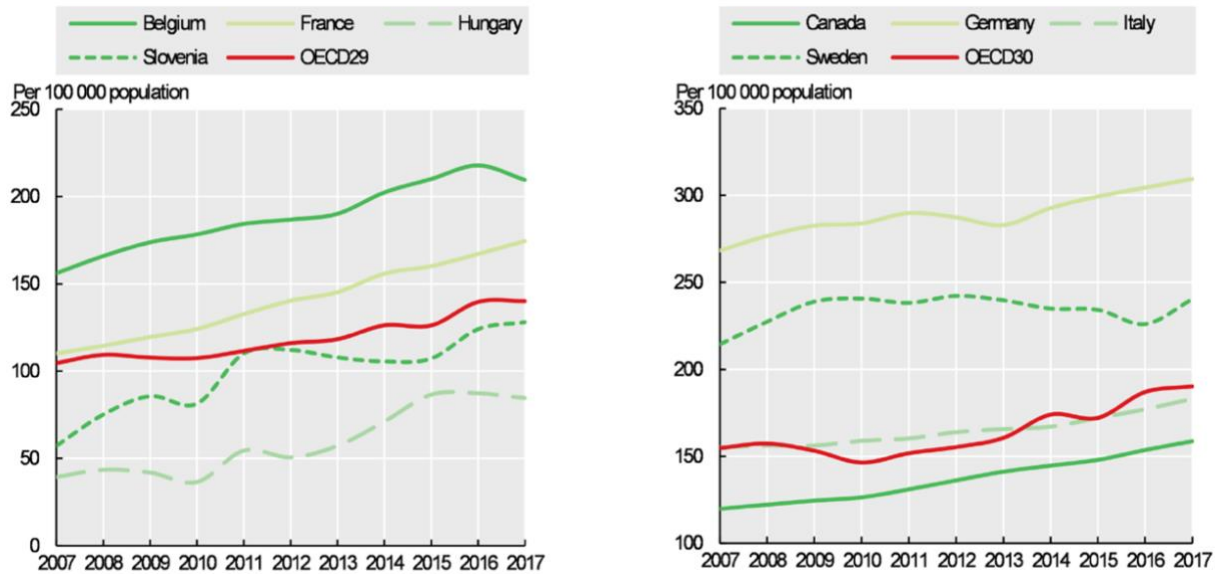


Approximately half of them have restrictions in the area of the lower extremities (~ 35 million). This group of people represents the main user segment of reha buddy. As a result, these potential users must also be looked after, done by clinics, practices, and physical rehabilitation centers. The market potential here is currently relatively high, as the reha buddy solution is a relevant alternative to conventional systems. Thanks to its flexibility/mobility, it is also interesting for many customer segments (clinics, etc.). Due to digitization and the demand for more comfortable, more practical, and cheaper solutions, the market should gain even more potential in the future. The right time for a product launch is critical here: the market must be open and ready. Additionally, the legal and organizational framework must also be considered to sell reha buddy's solution sustainably and profitably.



**Figure 2: Market Overview (WHO and United Nations, 2020)**

Osteoarthritis of the knee and hip joints often leads to partial or complete joint replacement with endoprostheses. The OECD also reports ever-increasing numbers of such endoprostheses being implanted (see Figure 7).



**Figure 3: The increasing number of knee (left) and hip (right) replacement surgeries (OECD, 2019)**

Avoiding or postponing these medical interventions as long as possible is one of reha buddy's goals. The aim is to save money for the health system and enable customers to have a longer, more carefree life.

**Stakeholder impact on the market potential**

New technologies and the more immediate, broad-based effect of change have impacted all healthcare stakeholders in the last two decades. Although businesses have widely followed many studies and changes in the healthcare market, trends that are still emerging need to be identified to better prepare for success in the healthcare market. Stakeholders and their decision-making will impact the high-level market potential identified here. Trends can continue the market transformation and affect relationships among multiple stakeholders further. Individual stakeholders will have to innovate and adapt to understand their impact on clinical care decision-making better because stakeholder decisions will directly impact the success of reha buddy's market potential in the long run.

**5.2 Market Actors**

When entering a market or when having the goal to increase market share with health care, you need to have a clear idea of who you are selling to in the end. The plans from clinic to clinic often differ immensely regarding their offerings. Additionally, there are differences in other matters, like their goals, challenges, responsibilities, motivations, roles, and behavioral patterns. For instance, when applying target personas, you could have "Private Practitioner Lara," "Hospital Administrator Peter," or "Clinician Ines". In reha buddies' case, the most exciting target will be physical rehabilitation clinics and physical therapy centers.

After gathering data from experts, it is now clear that health insurance companies have little to no interest in those innovations since they do not decide what therapies will be conducted. Health insurances, in general, pay daily fees relating to the patient's condition to clinics. Those hospitals following determine what treatments to apply. On the other hand, hospitals and clinics are in constant competition with other clinics and are therefore interested in constantly innovating. Therefore, the best approach is to target decision-makers like medical directors or head of therapies in physical rehabilitation clinics mainly.

As a pioneer in mobile phone-based gait analysis and Germany having 1112 and Austria 124 physical rehabilitation centers, totaling in over 2 million patients yearly the initial target market of reha buddy is immense (Statistisches Bundesamt, 2020). It is worth mentioning that it makes more sense to consider the number of physical rehabilitation clinics above the number of beds since a rehabilitation center can buy reha buddy's equipment and will be able to use it with many patients afterward when needed. Additionally, medical and therapeutic directors are highly valued since they are also highly interested in the data and documentation. Only through data can potential customers understand the whole impact reha buddy can have on their therapies, like time savings, better evidence on treatments' success, or less paperwork. Insurance companies do not benefit from reha buddy's data other than prevention-based statistics that are still not considered truly relevant, even though many promising approaches exist. What is more, physical rehabilitation is also not a very digitized environment yet. Especially after experts approved that most planned digital innovations are in the management field to, for instance, save paperwork and simplify processes, this can be recognized as a significant opportunity for reha buddy. Therefore, with innovation in the therapeutic area lagging and medical directors' considerable interest in better gait analysis and its data, clinics offer the perfect target for the reha buddy's project.

## 5.3 Trends

### 5.3.1 Optimized Well-Being

Applying wellness and well-being to our daily life became even more critical with the surge of the internet, smartphones, and apps because more and more users contribute time to collecting and sharing data about their health. Regular physical activity, healthy eating habits, developing a positive sense of self, personal responsibility, self-care, or seeking medical attention when needed became more relevant than ever before. Reaching an optimal level of wellness is considered essential to living a higher quality of life. And making use of more efficient ways to achieve this optimal level of well-being became one of the most significant movements of our times. Wellness matters because the quality of our choices, actions, and emotions is directly correlated to it. Studies show that it is crucial

to gain optimal health to manage daily stress, reduce the risk of illness, ensure positive interactions, reach peak performance and live the highest quality of life. (Thompson, 2020)

The combination of mental and physical health dimensions is conceptualized as optimal well-being. It is essential to consider interrelated wellness dimensions like emotional, spiritual, environmental, physical, social, and intellectual well-being in pursuing optimal health. One can reach an optimal level of wellness by understanding how to maintain and optimize those mentioned dimensions of wellness. Nowadays, users desire more and more help in achieving their optimal health levels through the effective and easy use of their smartphones, wearables, and applications. (McKay, 2018)

### **5.3.2 COVID-19 Pandemic**

The COVID-19 pandemic played a crucial role as an accelerator of digital health in the last year of 2020. Digital tools such as contact tracing apps or online consultations to help keep health professionals and patients safe while being able to continue providing care are some of the ways that the potential of digital health has been shown and widely accepted during the last months.

Therefore, digital methods of delivering health care were pushed immensely and will very likely stay. Excellent leadership and knowledge sharing in this area are essential to ensure that individuals are treated well and that health systems, professionals and patients continue to benefit from those new technologies (Whitelaw, 2020).

Additionally, COVID-19 will be with us longer than most expected since the consequences and long-term effects to the whole population are yet to be identified. The number of COVID-19 survivors will continue to grow, leading to an increasing number of people with health and physical therapy needs. Studies have shown that increasing numbers of patients demand more physical therapy after COVID-19, leading to a lower incidence of mortality (Postigo-Martin, 2021). Those increasing numbers of patients will push demand and adaption for digital solutions like reha buddy even further.

## **6 Company**

### **6.1 History**

reha buddy as a collaborative project began with a research project at the Medical University of Vienna on the subject of "Support for the rehabilitation of stroke patients" (MISTRAAL; FFG project number: 840716) under the direction of Prof. Rafolt. Dr. Harald Jagoš worked as a research assistant and technical project manager in this project. In the course of the R&D work, Dr. Jagoš supervised several bachelor and master theses, including that of Andrés Tkachenko. After the project was over and Andrés Tkachenko had completed his master's thesis, doctors' and therapists' responses were so optimistic

that Prof. Rafolt, Andrés Tkachenko, and Dr. Jagoš decided to convert the research results into a commercial product. After an unsuccessful funding application, early errors were discovered and corrected. Paul Kressnik, a long-time employee of Prof. Rafolt at MedUni Vienna, expanded the team, and a successful application for the INiTS' Startup Camp #10 followed.

## 6.2 Company Foundation and Identity

After founding the company, it was initially not clear where the journey should go, as it often is with many startups. Originally, reha buddy wanted to work with hardware in the soles of shoes, but this concept was quickly discarded. After many rounds of consulting and coaching in their former incubator, it was clear that the company will focus primarily on software and its app. This way, they have created a differentiation from their competition from the very beginning. In 2019 reha buddy matured from an idea developed in university settings and articles to a software solution company for gait analysis that is not available anywhere else so far.

## 6.3 Management and Founders

### DI(FH) Dr. techn. Harald Jagoš

*Chief executive officer (CEO)*

Harald completed his doctoral thesis with the title "Detection of movement patterns and development of other experimental features" in the field of medical informatics at the Vienna University of Technology with excellent success. Before that, he attended the electronics course focusing on biomedical technology at the UAS Technikum Wien. Ever since his studies, Harald's primary interest has been to use technology in a meaningful way. For this reason, he turned to applied research in the AAL area at an early stage, where he laid the foundation for reha buddy. During his research and development work, he worked on mobile movement and gait analysis methods and their testing in the medical environment in everyday life. He then took on content-related and technical project responsibility for national research projects (technical and organizational management of the FFG project MISTRAAL.)

**Andrés Igor Tkachenko Bril, MSc.***Chief technical officer (CTO)*

Andrés was born in Ukraine, grew up in Spain, and then came to Austria to study “Health and Physical Rehabilitation Technology” at the UAS Technikum Wien. He saw this as an opportunity to steer his career in a direction in which he could pursue an activity useful for society. During his studies, Andrés discovered his passion for programming mobile applications (apps). During his master’s degree, he developed an app that gave patients with hip fractures real-time feedback on partial stress. This app was tested in practice in a clinical pilot study. He then further developed his programming skills as a research assistant at the Medical University of Vienna, where he was also able to familiarize himself with measurement technology and transmission technology.

**Paul Kressnik, BSc.***Head of Regulatory Affairs & Quality Management*

Paul received his bachelor's degree in biomedical engineering from the Graz University of Technology. During his bachelor thesis, he designed a safety circuit for a nuclear quadrupole spectrometer and integrated it into the control software. He set less focus and priority to completing his master's thesis in favor of reha buddy’s developments. Paul gained his first experience in quality and process management during the practical part of his master's thesis (developing a production database for an in-vitro diagnostic system). In addition to his studies, Paul worked as a hardware and software developer in various projects at the Medical University of Vienna.

**A.o. Univ.-Prof. DI Dr. Dietmar Rafolt***Scientific Advisor*

Dietmar Rafolt is a Professor of Biomedical Technology at the Center for Medical Physics and Biomedical Technology at the Medical University of Vienna. He was born in Lustenau, Vorarlberg, in 1959 and graduated from HTL Bregenz and TU Graz (communications engineering and electronics). He developed measurement technology and intelligent clothing for space experiments on the MIR space station with excellent success in his dissertation. Since 1992 he has been employed at the Medical University of Vienna. In 2005 he completed his habilitation in the entire field of biomedical engineering. Due to the proximity to the medical institutions within the AKH, Prof. Rafolt is involved in a multidisciplinary team in many cooperation projects. His research interests lie in sensor technologies, analog design, biomechanics, functional electrical stimulation (FES), transcranial magnetic stimulation (TMS), haptic feedback systems, electrophysiology, biotelemetry, and test stand developments. In 2017 he was a founding partner of the start-up company Edera-Safety GmbH & CoKG, which among

other things, develops spinal column protectors for sport and work. Its extensive national and international network will make it much easier for reha buddy to bring further stakeholders on board and find potential investors.

### **Elisabeth Siencnik, Magister (equivalent to MSc.)**

*Chief financial officer (CFO - Part-time)*

Elisabeth has been with us since the beginning of our entrepreneurial activity. She has already given us active support in finance, customer contacts, consulting, and team coaching. She has 20+ years of experience in project and financial management and is a certified coach. She joined our team as a Business Angel and is now a permanent part of the reha buddy shareholders while taking on the chief financial officer's (CFO) crucial role and responsibilities.

## **6.4 Employees**

### **Katrin Wrulich, MSc.**

*Marketing & Business Development*

Katrin completed her master's degree in "Business in Emerging Markets" at the FH Joanneum Graz in summer 2020. Before that, she gained experience in an apprenticeship as a photo and multimedia saleswoman and six years in retail. As a part-time job, Katrin built up a foothold as a photographer and took valuable small and large self-employment steps for three years. During her studies, topics such as entrepreneurship, business modeling, and cultural skills emerged as exciting fields, which she also worked on during her two theses.

### **Max Prem, MSc.**

*Machine Learning Engineer (Part-time)*

Max graduated in Bioinformatics from the FH Campus Wien part-time master program. During this period, he worked as an analytical chemistry laboratory technician at the University of Natural Resources and Life Sciences (BOKU). His tasks included developing Machine and Deep Learning Pipelines for Near-Infrared Spectroscopy (NIRS) applications and students' supervision with their wet lab chemistry experiments at the Institute of Animal Nutrition. Upon graduation, he seized the opportunity to work as a part-time Data Scientist at reha buddy to develop Neural Nets for Human Activity Recognition. The objectives are to automate feature extraction and the usage of all available sensors. With more data becoming available from clinical trials, the future aim is to make more detailed Human activity predictions using Big Data methods.

**Teodora Măgurean, BSc.**

*Data Scientist (Part-time)*

Teodora completed a summer internship at reha buddy in the field "UI / UX design of an app." Following that in 2020, she worked at reha buddy on her bachelor thesis for the "UAS Technikum Wien" on the subject of "Differentiation of movement patterns during therapeutic exercises with smart insoles." During this work, she was able to integrate herself well into the team and build up specific know-how. Since autumn 2020, as part of her master's degree, she will continue to support reha buddy to analyze data collected during physiotherapy exercises with wearables. Besides, she is working part-time at reha buddy in the area of data collection and management.

## 6.5 Advisory Board

**Prim. Prof Dr. Katharina Pils**

*Medical-scientific mentoring*

Prim. Pils is currently the head of the Institute for Physical Medicine and Rehabilitation (IPMR) at the Rudolfstiftung Hospital. Before that, she was head of the IPMR of the Social Medical Center Sophienspital. She was the medical director of two clinical studies that have already been carried out based on reha buddy's services. She continues to support reha buddy with her extensive medical expertise. She also acts as a crucial connection to the medical community (network).

**Dr. Wolfgang Mandl**

*Consultant for management and leadership, finance, controlling and human resources*

Wolfgang Mandl has many years of experience in the areas of human resources, finance, and management. He was Managing Director and CFO at Quester Baustoffhandel GmbH in Vienna, Head of Human Resources at Hornbach Baumarkt GmbH in Wr. Neudorf and now runs his own consulting company, "Dr. Mandl Consulting KG." He is also active as a business angel.

**Bernd Gegenbauer**

*Telemedical expertise*

Bernd Gegenbauer worked 19 years at Philips in the medical division in project management and business development. Since then, he has been actively involved in eHealth and telemedicine and regularly part of working groups of the WKO (Wirtschaftskammer Österreich). Besides, he is a board member of Telemed Austria and has extensive insight into the Austrian health system's organization.



## 6.6 Future Employees

### Junior Android developer

In 2021 a part-time employee or a freelancer (20 to 30 h / week) for the front-end Android development will be hired to advance the reha buddy app's development.

### Junior back-end developer

The connection to hospital operating IT systems will gain higher importance in the next year. In 2021, a part-time employee or a freelancer (20 to 30 hours per week) will be hired to further develop reha buddy's back-end.

### Marketing & Sales

Katrin, the Marketing & Business Development Manager of reha buddy, is currently taking care of this department. From 2022, a dedicated employee will be hired to help expand into the DACH region and master the growing challenges.

## 6.7 Company Details

### 6.7.1 General information

**Company name:** reha buddy GmbH

**Founding date:** 28.06.2019

**Company headquarters:** 1070 Wien, Lindengasse 56 / Top 18-19

reha buddy was registered as a trademark at the European Union Intellectual Property Office (EUIPO) on September 26, 2019. On February 28, 2020, we received the certificate from the EUIPO through our law firm, which confirmed and finalized the application.

### 6.7.2 Ownership structure

**Table 1 - Ownership structure**

Shareholder	Holdings
Harald Jagoš	36 %
Andrés Tkachenko	28 %
Paul Kressnik	21 %
Dietmar Rafolt	9 %
Elisabeth Siencnik	6 %

### 6.7.3 Organizational structure

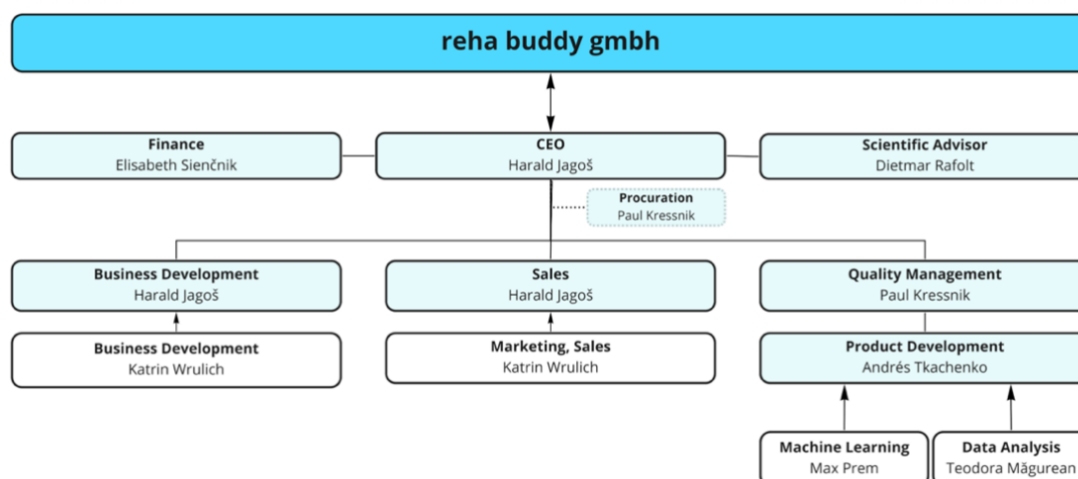


Figure 4: Organigram reha buddy

### 6.7.4 Core tasks of reha buddy

- Management tasks
  - Project management
  - Financial management
  - Strategy development
  - Employee development and team building
  - Preservation of the corporate culture
  - Actively living company values
  - Representative activities
- Research and development
  - Programming of mobile applications (apps)
  - Programming of interfaces to:
    - external IT systems, such as Hospital information systems (HIS)
    - on-premise performance databases
- Quality management and regulatory
  - Introduction and control of ISO 13485 processes
  - Support and updating of technical documentation
  - Preparation and implementation of post-market tasks according to MDR 2017/745 (e.g., post market surveillance, post market clinical follow-up, regular risk reports for the notified body)
  - Contact to the notified body

- Risk management
- Marketing and sales
  - Marketing content creation
  - Implementation of the market entry strategy
  - Regular maintenance of the (potential) customer base
  - Presence at congresses and (trade) fairs
  - Creation of training material
- Establishing and maintaining a network with cooperation partners
  - Deepening of cooperative relationships through joint (clinical) studies
  - Active outreach to potential cooperation partners

## 6.8 Company Progress and Future

There has been a lot of interest in digital health in recent years. Numerous health insurance companies have been promoting the use of various health apps for a long time or have invested in smartphone applications' development. Not only because it saves costs but also because it can reduce friction between the stakeholders.

reha buddy, with its app solution, aims to become one of the leading players in this field. Surveyed experts watched the progress of reha buddy's app with excitement. However, there has also been some controversy in this area since those applications use sensitive data. Therefore, reha buddy needs to avoid sharing or losing data to third parties at all costs.

The future progress is very promising, but there is a demand of integrating the online and offline worlds. For reha buddy to become a successful player in this field, they must focus on a frictionless journey for patients and other healthcare stakeholders.

Almost every expert expects to see a growth of applications and platforms that combine digital and real-world health care services. For example, patients may first have a video consultation via a diagnostic platform. Second, they go to the specialist doctor they got sent to after their first consultation. reha buddy will be important in this case if there is the need for the patient to be transferred to a specialist for a physical investigation. This physical investigation mostly starts with a gait analysis, where reha buddy comes into play with the future potential of being downloaded by patients themselves to follow and control the treatment or healing progress even at home.

## 7 Product



# reha buddy



Figure 5: The main product (smartphone, app and belt)

**reha buddy enables movement analysis for medical purposes with significantly less effort, lower costs, and more extensive expansion options than the current state of the art.**

The product developed by reha buddy is a software system; above all, a smartphone application. This app collects and processes data from a smartphone worn with a belt on the body. The app's data is evaluated with scientifically tested and validated algorithms and can thus be used for the easier and faster analysis of therapy-relevant movements. Since such a service is not place-bound, it can also measure standardized movement tasks for classic gait analysis from a distance. Those analyses include movement assessments, such as timed-up-and-go test, 6-minute walk test, sit-to-stand (or chair rising) test, as used regularly in everyday clinical practice to evaluate therapy progress.

Every commercially available smartphone has a built-in position sensor. The reha buddy app accesses movement data from this sensor and can interpret it. The data can be collected quickly by just wearing the smartphone with a special belt or, for some information, even only in a pocket. Through this, it is possible to analyze a person's walking behavior easily but fundamentally. Additionally, you can evaluate so-called movement assessments (identifying a person's mobility status) automatically. The user can be given biofeedback on the quality of specific movements via acoustic signals or vibrations.

The app makes innovative physiotherapeutic training possible by controlling an active and playful application using predefined movement patterns.

## 7.1 State of the Art and Current Practice

In this context, biometric measurement systems are considered state of the art, which are either generally based on the principle of “wearable electronics,” which are worn on foot or represent external and extramural systems. In any case, their area of application falls in physical rehabilitation after illnesses that restrict movement and mobility.

### Rehabilitation concepts and technical equipment in clinical settings

Physical rehabilitation - for example, after a fall, osteoarthritis, total endoprosthesis of joints, after a stroke - takes place mostly in an inpatient setting. The documentation of the healing or functional therapy progress is of great importance for physical therapy planning. This is always done through analog measurements, such as observing patients (by therapists) while performing standardized movement tasks. In some institutions, complex technical systems are also used to describe or document simple movement sequences in detail.

For example, the biomechanical characteristics of walking (distance-time characteristics, kinematic and kinetic parameters) are recorded in some physical rehabilitation centers using instrumented gait analysis (videometry, 3-D gait analysis) at the beginning and the end of the therapy to objectively represent the success of the treatment. However, these examinations are always laboratory-based, so results cannot be applied to a familiar environment, e.g., your own home. In the instrumented gait analysis, (passive) reflective markers are attached to predefined locations on the patient's skin. The movements of the tags in space are then recorded using special cameras (high-speed infrared cameras). The patients are usually instructed to walk a certain distance (up and down) in an enclosed space. Specific evaluation software then creates a simple 3D model of the test subjects and outputs standard gait parameters. The acquisition of such a gait laboratory is expensive (150.000-300.000 Euro). It usually also requires the employment of experts (sports scientists) who run the laboratory.

Additionally, doctors and therapists often discuss whether walking in one of the described movement laboratories can be compared to walking in everyday life. The patients are in a "spotlight situation" here and can actively compensate for their deficits (for the duration of the analysis).

Facilities with a walking laboratory, but no dedicated staff to operate it, those rooms often degenerate into a junk room. In everyday clinical practice, doctors and/or therapists often lack (1) the time to visit the walking laboratory with a patient and (2) the technical understanding to operate the devices in it and to use the data obtained accordingly.

Apart from videometry systems, there are other stationary solutions, such as Mats or carpets equipped with pressure sensors (GAITRite®). The costs are lower (50.000 to 100.000 Euro) with these systems, but the walking distance is massively limited to the mat's length. They also don't allow the patient's measurements during other important movement tasks, such as climbing stairs.

### **The use of "wearable" technologies in rehabilitation**

There is enormous value in physical rehabilitation assessment, but it contrasts with implementing comprehensive and expensive evaluations of impairments. For all relevant applications, either the continuous recording of sensor data or observation over long periods is necessary to design and implement an effective clinical intervention. Inconspicuous "wearable" systems, which are user-friendly and comfortable when collecting the data, have great potential for implementing research in medical and physical rehabilitative practice (Bonato P., 2005).

### **Physical therapy on the example of systems worn on the foot**

The RehaWatch® system, which is very sophisticated in sensor technology, has severe limitations in its AAL suitability. For example, it is necessary to attach sensors and data loggers to the outside of the body with cables used to connect the two elements. Other measuring systems such as medilogic®, paroTec®, or x-pedar® are based on pressure measurement soles placed in the shoe. Like the RehaWatch®, these other solutions are connected with cables to a data logger worn on the body influencing the patient. Less intrusive insole-based systems such as Moticon or stAPPone impress through useful hardware but do not offer any software that is easy to use and suitable for everyday clinical use.

## **7.2 Customer Needs and Offered Solution**

Reha buddy customers are hospitals, but also therapy centers and physical rehabilitation facilities. Those institutions are in contact with reha buddy as direct customers and are considered the most critical stakeholders, together with the institutions and the legislature. They will also be responsible for a large part of reha buddy's income. Our solution makes it possible to treat more patients with seamless integration of measurement results in the IT system.

Therefore, our active users are doctors, therapists, and patients, who are currently also significantly involved in developing the best solution for everyone. Since these users will work directly with reha buddy, it is crucial to meet their needs and become an indispensable element of their work. The reha buddy solution allows the staff a higher degree of automation. Thus, it saves time in the documentation, and a quick and easy application on the patient is possible. In turn, users experience

less stress and get to see concrete and understandable evaluations, and are possibly more motivated in training.

### **Ease of use**

Movement or gait analysis in medical centers is associated with much effort and high acquisition costs (video systems, sensor fields). The solutions must be operated by trained staff with high technical expertise. Still, such analyzes are necessary to determine the course or the success of medical-therapeutic measures. Therefore, the logical conclusion is often a shorter staff training period for those complex devices and thus cost savings for the clinic operator.

### **Mobility & flexibility**

The marker-based analysis of walking, in which reflective elements ("markers") are attached to the skin and special infrared high-speed cameras are used, is the most widely applied method. There are also a handful of other stationary systems. All systems have in common that they are bound to a room and define the measurements' framework. Many systems require a considerable amount of time to prepare the test subjects for the measurements. That, and the fact that they are in the spotlight, puts patients under additional stress.

### **Objective data**

It is currently difficult for clinics/doctors/therapists to provide quick and easy evidence that the measures were effective. On the one hand, improvements here benefit the patient (because it enables better planning by the therapist). On the other hand, it is also extremely interesting for clinic operators and payers, who can also use the collected data to interpret the economic efficiency of the measures taken.

### **Customer loyalty**

Patients are often discharged without any further connection to the clinic after therapy. The reha buddy solution offers even aftercare at home. Patients can continue to follow their healing progress and, if necessary, receive further care. In this way, the medical centers increase the bond with the patient, score with better care, and sustainably improve their image

### 7.3 Pain Points of Key Actors

The benefits for all participants aim to eliminate pain points. Those pain points are, in general, very different for all the relevant stakeholders. Patients want the best treatment for their physical and emotional pain. The most effective way to treat patients and save time is what the medical staff aims to resolve. Clinics have to be profitable to guarantee a sustainable business environment, so their main pain points are a good reputation and cost savings. Health insurance companies aim for the long-term success of their insurance plans. Therefore, wanting to collect necessary data and save cost.

**Table 2: Customer group and areas of application**

Area of application	Patient	Medical staff	Clinic operator	Health insurance companies
<b>outpatient</b>	shorter waiting times through better and quicker diagnoses	quick and easy screening	more patients can be treated on an outpatient basis	
<b>stationary</b>	optimized stay times	<ul style="list-style-type: none"> <li>- less documentation costs through digitization of standard processes</li> <li>- more time for core tasks</li> <li>- Comprehensive data collection</li> </ul>	<ul style="list-style-type: none"> <li>- seamless integration of measurement results into the IT system</li> <li>- evidence of the effectiveness of medical-therapeutic interventions</li> </ul>	Information about the effectiveness of medical-therapeutic interventions
<b>at home</b> e.g., post-op, after an accident, stroke, etc.	<ul style="list-style-type: none"> <li>- Motivation for home training, e.g., through gamification of therapeutic exercises</li> <li>- Information about healing progress</li> <li>- Remote access for doctors / therapists possible</li> </ul>		<ul style="list-style-type: none"> <li>- additional services can be offered</li> <li>- Stay times can be optimized</li> <li>- Patient turnover can be increased</li> </ul>	better healing success → fewer relapses or side effects → less financial burden on the system



## 7.4 Customer Benefits

The use of reha buddy creates advantages on several levels or for several stakeholders, namely, **medical centers, therapists, and patients.**

**Medical centers** can offer innovative and better services to patients and can, therefore, offer better care. With the use of new technologies, they can differentiate their institutions from other clinics or operators. Using modern devices also has a positive effect on the image. reha buddy's system also opens up new possibilities for scientific studies, with publishable results being decisive for the facilities' reputation.

**Therapists** benefit from the possibility of automating or digitizing time-consuming activities (such as manual documentation of the therapy progress) and thus have more time and peace of mind to work with the patient. The use and knowledge of using modern tools will become more and more important (especially for young therapists) in order to optimize one's offer and to stand out from the competition. Being innovative and making new tools and devices available to clients also helps to increase self-esteem and image.

**Patients** benefit directly and indirectly from reha buddy's services. The simple visualization of the therapy progress (e.g., using simple graphics or printable reports) empowers patients to take on more responsibility. The endless options of physiotherapy gamification will also empower people to do more - urgently needed - independent practice at home.

## 7.5 Technological Leap

### Algorithms for the intelligent evaluation of 3D movement data

Sensors that can be worn on the body provide data on everyday motion sequences. The primary sensor is the smartphone itself, worn on the hip via a belt. It can provide data from the built-in position sensor (IMU). Instrumented shoe insoles (e.g., Moticon Science, stAPPone) expand the spectrum of applications related to the lower extremities (e.g., walking, climbing stairs). Fitness wristbands (such as the Xiaomi MiBand) are used to collect data from the upper extremities. They can also be used as simple remote controls for the smartphone.

Based on several years of research, the founding team of reha buddy has developed algorithms to evaluate movement data supplied by these sensors. By analyzing human gait and more complex movement tasks, they determine therapy progress and mobility. Complex movements include standardized mobility assessments (timed up-and-go test, 6-minute walk test, chair rising test) regularly used in everyday clinical practice.

**Digitization and automation of previously analog processes**

Therapists will use reha buddy in clinics or private practice, e.g., by digitizing and automating patient healing progress documentation. At the given time, the documentation is still primarily carried out by hand. Suppose a therapist carries out one (or more) mobility assessment (s) with a patient. In that case, the results are documented on paper and transferred to an IT or hospital information system at a later point in time. This process can be completely digitized by implementing standardized interfaces.

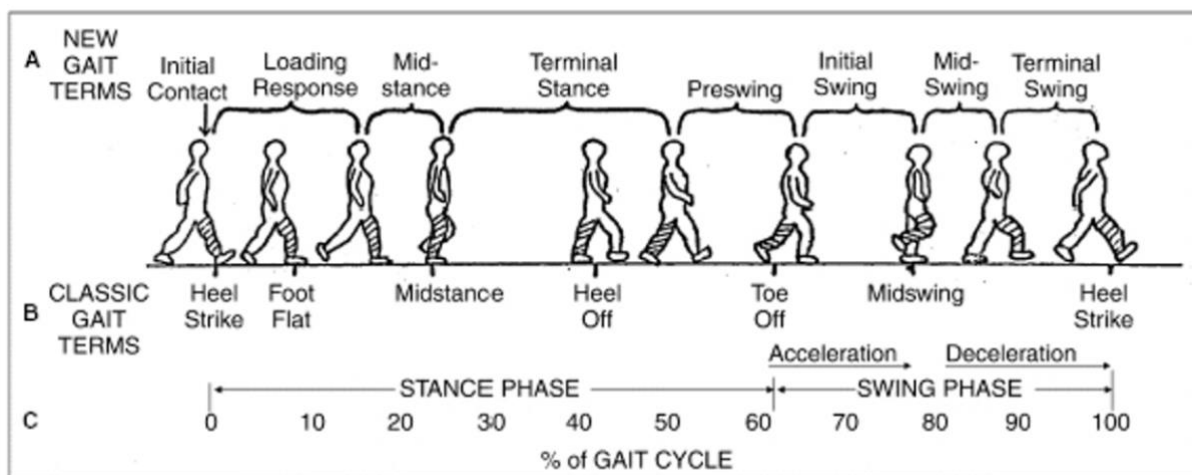
**Simplifying the implementation of technical and scientific methods**

Diagnostics and therapy are almost always locally separated units in medical centers. Therapists in clinics are dependent on information from diagnostics in order to plan the therapeutic interventions accordingly. With the reha buddy app, therapists get a new tool with which they can easily and quickly carry out (interim) diagnoses themselves, e.g., evaluate their interventions' success.

**7.6 reha buddy’s Features (Compared to State of The Art)**

**Gait phases / gait analysis**

Gait analysis is all about the description of walking based on biomechanical characteristics, such as path-time characteristics, kinematic and kinetic parameters. The gait pattern of a person can be broken down into eight phases: 1. initial contact – IC, 2. loading response – LR, 3. mid stance – MSt, 4. terminal stance – TSt, 5. pre swing – PSw, 6. initial swing – ISw, 7. mid swing – MSw, 8. terminal swing – TSw (Castermans, 2014). Further descriptive parameters are double step, step, stance and swing phase duration. They serve i.a. to determine the symmetry and variability of a person's gait.



**Figure 6: Illustration of different phases of the gait cycle (Castermans, 2014)**

**Table 3: Gait Analysis - Comparison of Classic Systems / Methods vs. reha buddy**

	<b>State of the Art</b> (Instrumented gait analysis)	reha buddy <b>Smartphone only</b>	reha buddy <b>Smartphone + sensor soles</b>
Gait phases	Yes	Yes	Yes
Movement trajectories	Yes	No	Yes
Ground reaction forces	Yes	No	Yes
User friendly (e.g., quick and easy)	No	Yes	Yes
Connectability to IT system (HIS)	No	Yes	Yes

The instrumented gait analysis with 3D videometry systems is already widespread and provides precise measurement results. It can currently be regarded as the gold standard. On the other hand, it is very costly to purchase and can only be operated by well-trained experts. Moreover, although these systems are digital, very few are connected to the in-house IT infrastructure, i.e., the hospital information system (HIS).

reha buddy offers a quick and, above all, simple and user-friendly option for analyzing the gait phases with the smartphone. A further possible combination with sensor soles would then even have a similar range of functions to the stationary systems.

**Timed up and go Test (TUG)**

The timed up and go test is a simple but effective functional test of rehabilitation patients' mobility. At the beginning of the test, the test person sits on a chair. In response to a start signal (given by the therapist), the test person has to stand up, walk straight ahead to a marker three meters away, turn around there, go back, and sit down on the chair again. The time it takes the test subject to take this test is recorded, usually with pen and paper. Depending on how long the test person needs to cope with this task, their mobility is rated. There are different (scientifically investigated) threshold values, but a total duration of more than 14 seconds is associated with a significantly increased risk of falling (Shumway-Cook, 2000).

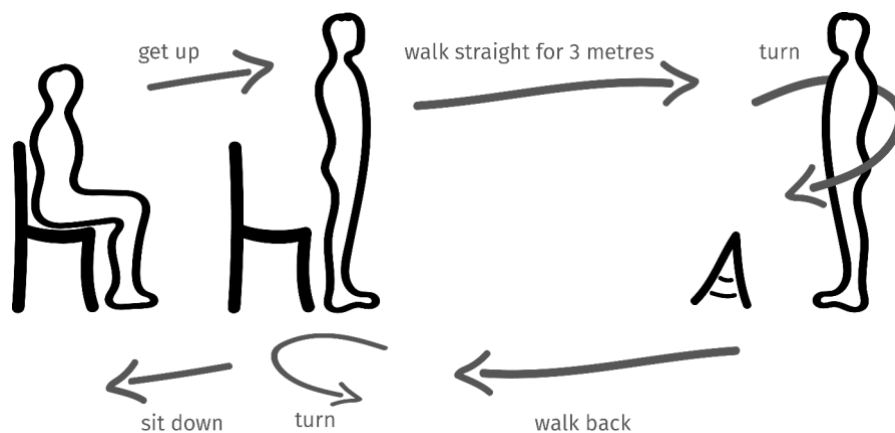


Figure 7: Presentation of the processes of a timed up and go test

Table 4: TUG - classic systems / methods vs. reha buddy

	State of the Art (Stopwatch, pen, paper)	reha buddy Smartphone only
Total time	Yes	Yes
Gait phases	No	Yes
Recognizing specific phases	No	Yes
Connectability to IT system (HIS)	No	Yes

**6-minute walk Test (6MWT)**

The six-minute walk test (6MWT) is a diagnostic tool that was developed in cardiology and pulmonology to assess the performance of a patient below the anaerobic threshold and to be able to control it during the course (ATS statement, 2002). It is meanwhile also used in geriatrics, orthopedics, and neurology to measure mobility and therapy progress or success.

The patient walks for six minutes on a straight ground, on a circuit, or in a hallway, ideally at least 30 meters. (Many) changes of direction can falsify the result. The goal is to go as far as possible in six minutes (according to your ability). Breaks and changes of pace are allowed.

In comparison to the classic method, a minute-to-minute analysis is possible with reha buddy in both forms. The smartphone-only solution also offers the option of recording the walking speed change from minute 1 to minute 6.

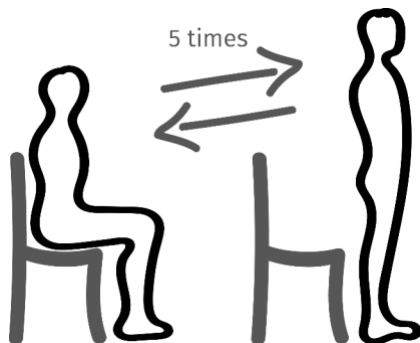
**Table 5: 6MWT - Classical Systems / Methods vs. reha buddy**

	State of the Art (Eye, pen, paper)	reha buddy <b>Smartphone only</b>
Total distance	Yes*	Yes
Gait phases	No	Yes
Minute-to-minute analysis	No	Yes
Report for patients	No	Yes
Connectability to IT system (HIS)	No	Yes

\* The total distance covered can only be measured if the test person walks along a standardized route (e.g., circular course or a hallway of a certain length).

**Sit-to-stand Test (STS)**

The sit-to-stand test was developed to assess the functional muscle strength of the lower extremities. The test person is asked to sit down on a chair and, without using their arms, get up and sit down five times in a row as quickly as possible. The primarily observed parameter of this test is the time required to perform it (Bohannon, 2006).



**Figure 8: Presentation of the processes of a Sit-to-stand test**

**Table 6: STS - Classic systems / Methods vs. reha buddy**

	<b>State of the Art</b> (Eye, stopwatch, pen, paper)	reha buddy <b>Smartphone only</b>	reha buddy <b>Smartphone + sensor soles</b>
Total distance	Yes	Yes	Yes
Single phases	Yes*	Yes	Yes
Pressure distribution	<i>nein</i>	<i>nein</i>	Yes
Report for patients	<i>nein</i>	Yes	Yes
Connectability to IT system (HIS)	<i>nein</i>	Yes	Yes

*\*Single phases can only be assessed by observing from the therapist.*

In the classic setting, the test person is observed during implementation, and the time is measured using a stopwatch. The supervising therapist can assess the individual phases, i.e., the quality of getting up and sitting down, with the naked eye. A smartphone with reha buddy is already able to run the test entirely automatically. The integrated position sensors (IMU) detect standing up and sitting down and automatically end the test after the last repetition. A report is then created for the patient and therapist. The data can additionally be transferred to the HIS, and the individual repetitions can be analyzed separately. Moreover, if the soles are used, the pressure distribution can also be analyzed (e.g., standing up).

## 7.7 Current Level of Development

The current primary goal is to close a partnership with the first big clinic. Therefore, their strategy is aligned with the common goals of this clinic. The clinics' request was the 6MWT which is the main focus of reha buddy's developments currently. After optimizing and finishing this development in July 2021, reha buddies' first sale with this clinic is expected.

## 7.8 Screenshots of the reha buddy App

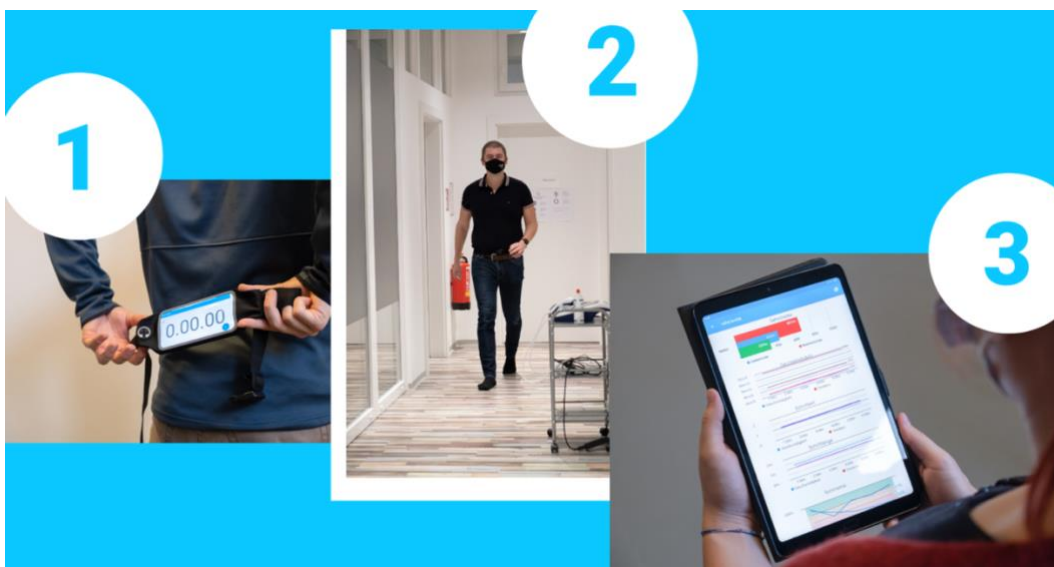
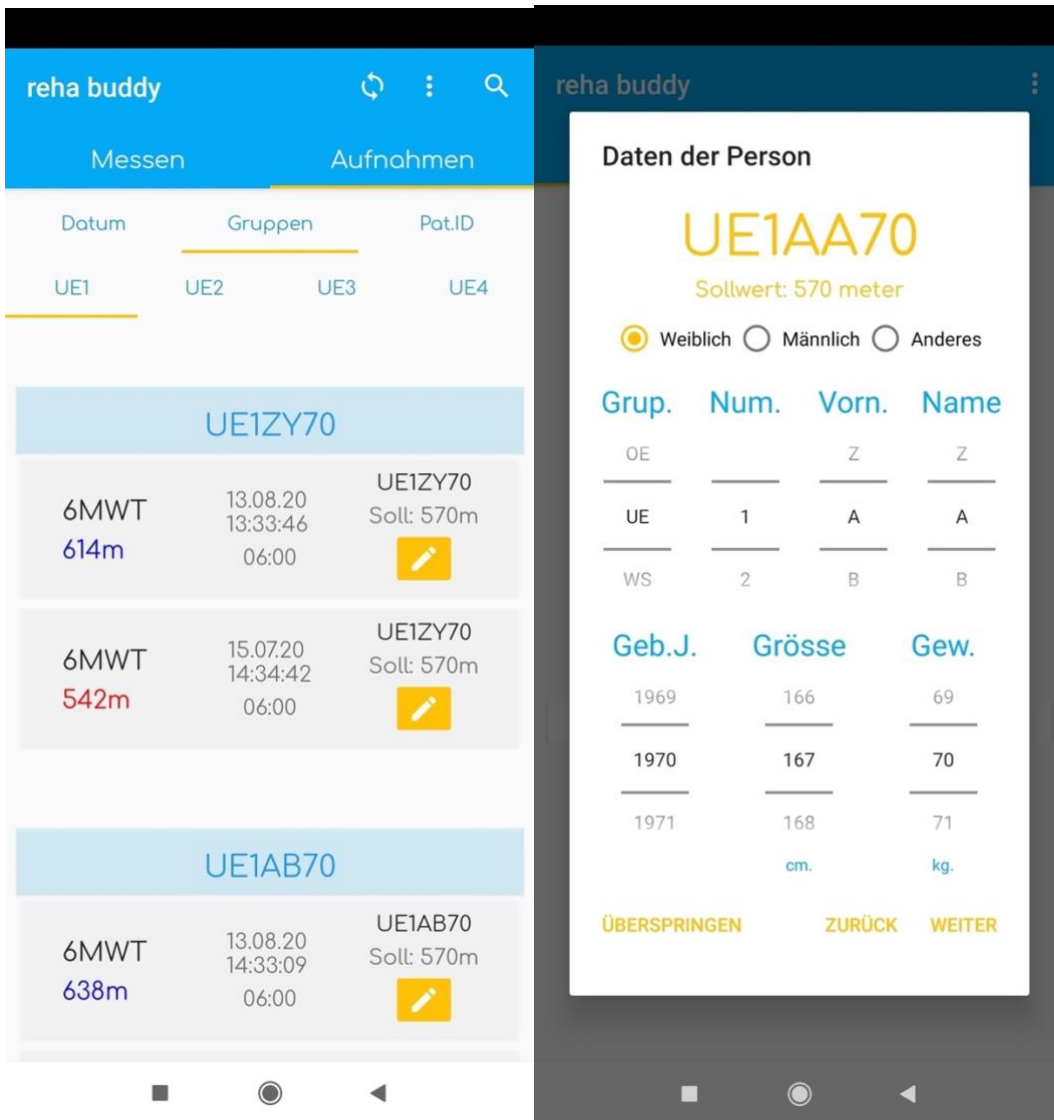


Figure 9: Screenshots of reha buddy in action

## 7.9 Intellectual Property

Since reha buddy has its origins in the academic sector, numerous relevant content and results have already been published in the past. At the same time, however, in the sense of defensive publication, a form of protection has arisen so that no one can have the same content protected by a patent. Reha buddy is currently placing great emphasis on the newly developed content's secrecy and has provided corresponding clauses in all contracts for work and services.

The trademark "reha buddy" was registered at the European Union Intellectual Property Office (EUIPO) on September 26, 2019. On February 28th, 2020 we received the registration certificate in electronic form. It bears the number 018129616 and is dated 02/21/2020. Our list of goods and services includes classes 9, 10, 42 and 44, according to the Nice classification - 11th edition, version 2017 (NCL 11 - 2017).

Where it is necessary for the smooth exchange of information, there are (mutual) non-disclosure agreements (NDA's) with potential and current cooperation partners. All of our contracts for work and services contain a corresponding clause that obliges the contractors to maintain confidentiality.

### **Service inventions, in particular, service inventions by software developers**

In the case of permanently employed programmers, Section 40b of the Copyright Act applies, which grants the employer an unlimited right to use the "computer program (CP) created in fulfillment of official duties." However, this only applies to the CP, but not to the accompanying materials such as functional specifications, manuals, operating instructions, etc. Therefore, it is always advisable to secure all rights (usage and modification rights) to the resulting "frameworks" (functional specification, accompanying data such as manuals, operating instructions, maintenance books, hypertext, etc.) and to regulate their transfer contractually.

## 7.10 Medical Device Certification

The medical device certification is divided into two parts: 1) the technical certification (MDR) and 2) the certification of the quality management system (QMS) according to ISO 13485. Class 1m medical devices are covered by the QMS certification; only higher levels require a technical certification. The reha buddy software (app) will be assigned to class 2a. Therefore, technical documentation of the software will be required for reha buddy.

The technical review will be carried out as a "desktop review." reha buddy will upload all documents to the reported server and then gets them evaluated by the experts. The QMS certification will take place "in-house." An expert will travel to the reha buddy office and carries out the testing and certification on site. Reha buddy has to pay for all travel and accommodation costs.



The group of experts from "BSI Group Deutschland GmbH" will most probably evaluate reha buddy, and is called the group "active products." The documentation must be in English; German is only permitted in exceptional cases. The QMS auditor is usually selected from the company's region to keep costs for the companies audition as low as possible.

The following certifications are aimed for or required:

- QMS certification, based on ISO 13485,
- MDR / CE certification based on the MDR 745/2017 regulation

Essential subcontractors must also be ISO 13485 certified or at least comply with this standard. If these do not have certification, they will be checked together with reha buddy.

An initial estimate of the costs for ISO 13485 certification was discussed with BSI and can be summarized as follows:

1. Cost of certification

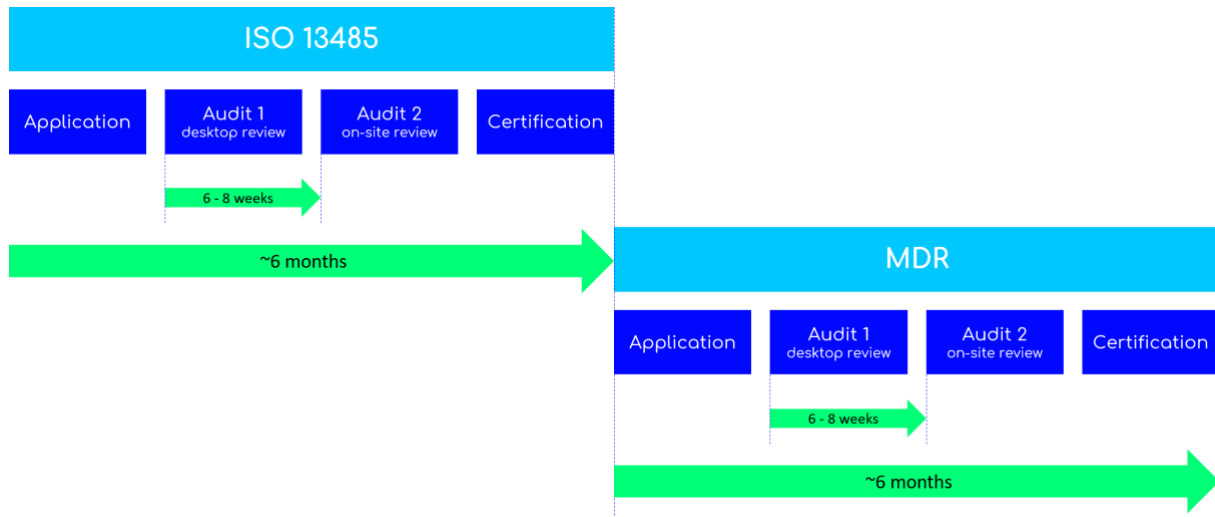
**Table 7: Cost of certification**

a. Application fee – ISO 13485	..... € 1.920,-
b. initial audit (stage 1 – document review) of 1,5 days (€ 1.860 per day)	..... € 2.790,-
c. initial audit (stage 2 – 6-8 weeks after stage 1 audit, goal is to monitor if the documented processes are really implemented and lived in the company) of 2 days (€ 1.860 per day)	..... € 3.720,-
SUM	<b>€ 8.430,-</b>

2. Costs for maintaining the certificate

**Table 8: Costs of maintaining the certificate**

a. Annual management fees	..... € 1.280,-
b. Surveillance audit of 1.5 days per year (€ 1.860 per day)	..... € 2.790,-
c. Recertification audit of 2 days every 3 years (certificate is only valid for 3 years) (€ 1.860 per day)	..... € 3.720,-
d. Certificate renewal fee	..... € 800,-
SUM	<b>€ 7.790,-</b>



**Figure 10: Timeline of certification(s).**

The timing of the certification is illustrated in the figure 5. The two required certifications must be carried out sequentially. Each of the two will take a total of around six months to complete. Buffers are already taken into account in this estimate.

## 7.11 Services

### 7.11.1 Self-provided services

- Software development
- Software and process support
- IT infrastructure development and support
- Data analysis/data science
- Business development
- Quality management

### 7.11.2 Outsourced services

**Table 9: Outsourced Services**

Service	Supplier
Hardware (incl. all sensors built in smartphones)	Moticon, Pacemaker, Helpsole, Smartphones
Tax advice and payroll accounting	Ecovis GmbH
Legal advice	Höhne, In der Maur & Partner

### 7.11.3 Positioning against the Competition

The intended sales to clinic operators create an opportunity for close customer loyalty. Once an operator has decided to work with a company, they will:

- 1.) not replace with a competitor easily (switching costs are high)
- 2.) equip many (possibly all) of their facilities with reha buddy's system

Besides, there is already a considerable evaluation of algorithms, which have already been clinically and scientifically validated.

In contrast to the competition, reha buddy relies heavily on application-related development with end-users' involvement (therapists). This way, the user face, and app experiences gets developed together with the stakeholders instead of bypassing them. The algorithms also work without additional sensors worn on the body, increasing the flexibility and making reha buddy more independent from cooperation partners or suppliers.

## 7.12 Market Entry Barriers & Dependencies

### 7.12.1 Medical Device

By far the greatest market entry barrier is the certification of reha buddy's software as a medical product. Due to the selected application in the medical-therapeutic area, the software must meet the requirements of MDR 2017/745 / EU. Following (Article 15) Regulation (EU) 2017/745 of the European Parliament and the Council of April 5, 2017, on medical devices (MDR 2017/745), the manufacturer of a medical device must specify a responsible person (ERVP - compliance with the regulatory provisions responsible person). Paul Kressnik, reha buddy co-founder, will take over this role. He is now also named in the EUDAMED (European database for medical devices). He is primarily responsible for ensuring that the technical documentation and declaration of conformity are up-to-date and available. Furthermore, the ERVP must meet reporting obligations at regular intervals.

### 7.12.2 Use of Third-Party Hardware

Since we have decided to rely on external manufacturers' hardware and sensors, there is a clear relationship of dependency. However, the resulting risk can be minimized because reha buddy 1.) can work with different hardware providers and 2.) they also offer a basic solution that only works smartphone based. There are already letters of intent with two manufacturers, Pacemaker Technologies and Helpsole, in which both contracting parties have already expressed their interest and willingness to work together.

## 8 Competitor Analysis

Competitive analysis can help learn about how the competition works and to identify potential opportunities where one can out-perform them. Therefore, a structured analysis was carried out to get a good overview of the market and the main competitors. Following deep research into the current environment and multiple expert interviews, a list of competitors was produced. Four were considered the main competition (see Table 6), from the initial 19 companies characterized by a certain similarity, since experts often mentioned those during interviews. Additionally, the four final most interesting competitors analyzed also share multiple touchpoints to reha buddy's vision while still having enough that distinguishes them.

### Main Competitors

Table 10 shows an overview of the most relevant competitors; FeetMe Medical, stAPPone, and Tyromotion have emerged as the most relevant. Due to their proximity to reha buddy's idea, similar target groups, certification as a medical product, and their reputation on the market, they are currently seen as the biggest competitors.

**Table 10: reha buddy's main competitors**

	Mission, Values	Concept,	Team	USP	Brand Awareness	Competitive advantage
<i>Tyromotion (Austria)</i>	<ul style="list-style-type: none"> <li>- Long-term innovation</li> <li>- market leadership</li> <li>- Patient at the center of therapy</li> <li>- Sustainably improve people's quality of life</li> <li>- Freedom and creativity</li> </ul>		100-200	All-in-one solution (R&D, production, sales, service); High motivation and support of their medical technology through new technologies from the fields of robotics, sensor technology, virtual reality, and gamification.	+++	Hardware Product Performance
<i>Oped (Germany)</i>	<ul style="list-style-type: none"> <li>- innovative medical products</li> <li>- comprehensive therapy concepts</li> <li>- fresh impulses for medical technology</li> <li>- market leadership in Germany</li> </ul>		350	Products can be individualized to the customers' needs and offer multiple use cases. There is also an increasing number of digital solutions for patient information and physical rehabilitation.	+++	Flexibility and legal approvals
<i>stAPPone (Austria)</i>	Support in the diagnosis, treatment and motivation of patients with innovative, and globally unique findings that are regularly updated and improved.		<50	<ul style="list-style-type: none"> <li>- Faster, more flexible, cheaper and easy to understand</li> <li>- Independent of special facilities</li> <li>- Accelerated rehabilitation process and better outcome</li> </ul>	++	Perception of product and brand image
<i>FeetMe Medical (France)</i>	Improve mobility with the help of wearables and influence therapeutic decision making through data.		32	The combination of integrated calculation systems, pressure and movement sensors promises real-time evaluation of gait -> 20 different data points can be evaluated (e.g., pressure distribution, asymmetries, differences in stride length, etc.)	+	Strong Series A Funding

The clear advantages of these competitors are their level of brand awareness and company size. **Tyromotion** is the world market leader in robotics in the therapeutic area which makes them a considerable advantage in this field. The soles USP and the corresponding analytics are only a fraction of their portfolio; the rest are various other training devices. The company is characterized by strong innovation potential. They have developed from a small startup at TU Graz into a big name and benefit from a young team and a good company network since their start.

Another serious competitor is **Oped**, especially with its new product Orthelligent. Orthelligent supports your physical therapy after knee injuries and other illnesses that lead to the legs' limited mobility. Additionally, an app guides you through the various movement exercises and tests and supports the

product with its associated sensor records movement parameters. This app also analyzes and evaluates the data and then gives you direct feedback. These analyzes and evaluations provide conclusions about individual healing and the physical rehabilitation process. It is also one of the leading companies in orthotics. Around 350 employees are involved in the development, manufacture, reconditioning, and sale of their products. With over twenty years of experience, OPED is the market leader in Germany and Switzerland. The company operates at five locations worldwide.

**stAPPone**, a company from Vorarlberg, has been known for a long time - at first, they had to deal with delivery delays and changed its target group. They planned to introduce their sole for end consumers to the market in the summer of 2019 and make it available via the webshop. Currently, the website is still without a webshop, and it also appears that they are now specializing in clinics. Therefore, stAPPone is considered among the main competition. Mainly because they seem to be flexible, have often reinvented themselves, and have a significant media presence.

The last company of the main competitors is **FeetMe**. The Paris-based company is working on three collaborative solutions, namely recording, evaluation, and rehabilitation. Several solutions are currently being considered but have not yet been significantly tested - FeetMe Evaluation is currently only being tested for multiple sclerosis. However, the required sole has already been certified and registered as a medical product. This laid the foundation for further projects, and a third, strong competitor could develop in the future.

Since many manufacturers are primarily concerned with their physical products their application areas are strictly limited to clinics or private households, but reha buddy has to be regarded more like an interface. An app that unites both worlds – clinics and private households - to create transparency, build bridges, and to get the best out of existing hardware and sensors. This happens through combining these products with validated algorithms and a user-friendly app. No other company is currently positioning itself in this area, which means there is significant market potential.

## 9 SWOT analysis

Table 11: SWOT analysis

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>+ Core competencies are represented in the team (know-how)</li> <li>+ Network (medical / scientific / business)</li> <li>+ Lon-term orientation</li> <li>+ „Lean Startup“-approach - prevention against poor investment decisions</li> <li>+ Business idea is based on several years of research – therefore, already technically validated</li> <li>+ Young and motivated team</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>- Individual consideration of every country / market necessary</li> <li>- Greater need for adjustment (support) per customer</li> <li>- Long period to final market entry, since             <ul style="list-style-type: none"> <li>o Medical device</li> <li>o Long sales-cycles</li> </ul> </li> <li>- Low level of awareness in entry market Austria</li> <li>- Currently no patents pending</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>+ Current push of digitization topics such as telemedicine, telereha and teletherapy (partly due to COVID-19)</li> <li>+ Promising negotiations with medical centers running</li> <li>+ reha buddy’s DigiReha can become the dominant design</li> <li>+ Current trend in promoting startups</li> <li>+ First mover advantage</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>- Complex and long sales-cycles in medical area</li> <li>- Medical device certification necessary</li> <li>- Difficult market entry if not supported by important institutions</li> <li>- High certifications costs</li> <li>- Reputation (should something go wrong)</li> </ul>

## 10 Business Model

We are living in times of aging societies in which the number of retirees has been increasing for decades. It is expected that this development will even further intensify in the future. By 2030, the proportion of senior citizens in the DACH region will have increased to around 40% (Statistisches Bundesamt, 2020).

This trend is accompanied by an increasing need for suitable therapeutic offerings. Therefore, medical centers are more in demand than ever. They need to approach those developments very carefully to remain innovative and cope with the growing number of patients. With their services, reha buddy creates significant benefits for stakeholders such as patients, doctors, clinics, and hospitals. The often, overloaded hospitals and overworked medical staff benefit from the more innovative treatment: reha buddy intends to help through less intensive usage of the premises and time-savings for medical workforce while ensuring high-quality treatment. The positive effect of a promise for the best possible treatment on the market to patients also provides an increased reputation of clinics and hospitals.

### 10.1 Business Model Canvas

The Business model canvas helps to better understand a business by breaking it down into easily understandable segments like Key Partners, Key Activities, Key Resources, Value Propositions, Customer Relationships, Channels, Customer Segments, Cost Structure, and Revenue Streams.

Filling it helps identify which elements can be improved while creating a clearer idea of what future path is best suited for reha buddy's innovation. The key partners were identified to be clinics and medical networks. Additionally, IT platform operators and suppliers play a vital role in giving reha buddy's algorithm the proper foundation. The company's key activities will be focused on optimizing and creating the app and on training medical personnel. The team and its extensive knowledge are reha buddy's key resources, while its value proposition is improved time and data management through making evident-based therapy possible. The customer relationship will be nurtured through continuous updates and relevant training. The distribution channels will be online and offline marketing techniques like Website, social media, or direct sales initiatives. Besides clinics, universities and education centers were identified as customer segments to reach potential users like aspiring physiotherapists as soon as possible. The main costs of reha buddy will be mainly its staff and marketing expenses as well as necessary subscriptions for other software services. Money will be floating in through their own modular subscription-based pricing model, including staff training and optional ecosystem updates when a new feature gets released.

The detailed business model canvas can be found in the following Figure.



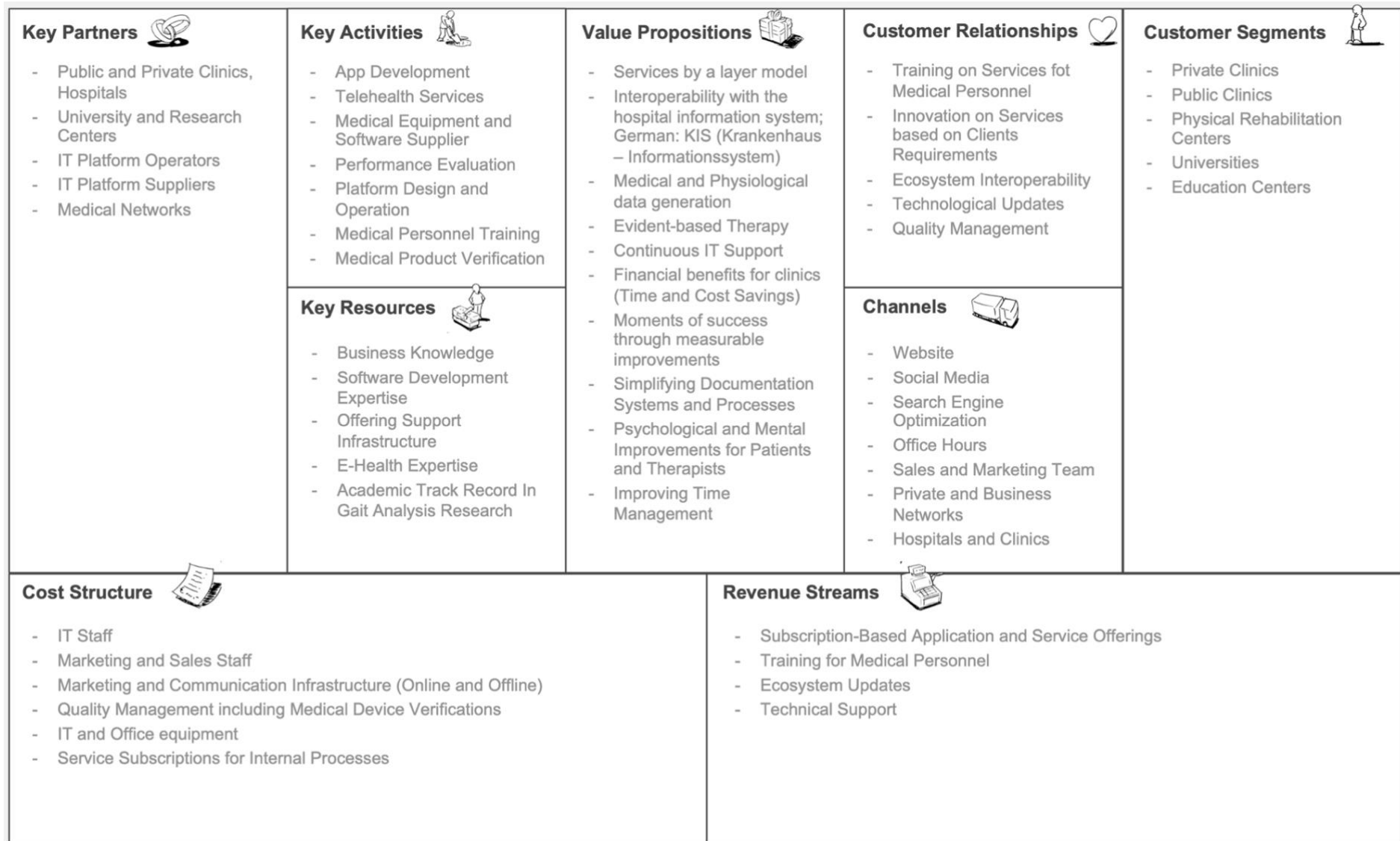


Figure 11: Business Model Canvas

## 10.2 Stakeholder Map

The main benefit of a stakeholder map is to get a visual representation of all the people who can influence the entire project and idea and how they are connected. Stakeholder mapping is the visual process of laying out all the stakeholders of reha buddy's services. Stakeholders can be individuals or organizations and must be categorized accordingly to help guide an engagement strategy.

The relevant stakeholders and aspects of reha buddy can be found in the following stakeholder map:

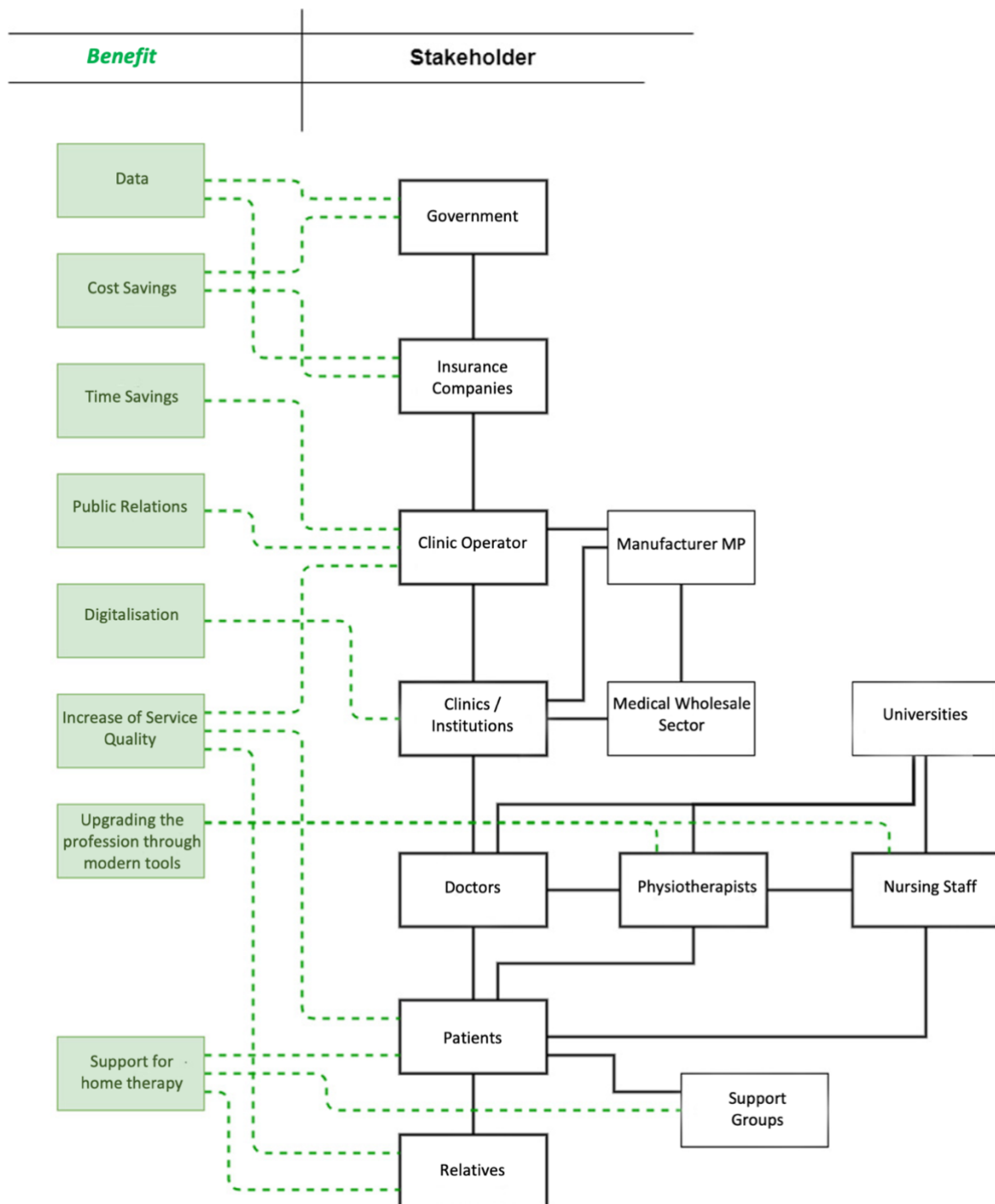


Figure 12: Stakeholder Map

### 10.3 Earnings Model

reha buddy strives for quality leadership in the digital gait analysis market, with clinics being the target customer. The main product will be the app, which clinics will have to pay as a monthly or yearly subscription. The required training and equipment costs, such as belts and smartphones, will already be included in the subscription fees. The price of reha buddy is determined by defining various modules. A wide range of sizes from XS-XXL will be available. This modular system is chosen because customers can better decide which tests and assessments are relevant and then only receive and pay for those they need. The price of the cheapest Modular XS will be 249 euros per month – paid annually: 2990 euros. The price of the most expensive Modular XXL will be 1916 euros per month – with annual costs of 22.990 euros.

The Modules will be as follows:

- Modular XS: VAS (Visual analogue scale) questionnaire
- Modular S: STS (Sit-to-stand) test
- Modular M: 6MWT (6-minute-walk) test
- Modular L: TUG (times-up-and-go) test
- Modular XL: EQ-5D questionnaire
- Modular XXL: HIS (hospital information system) integration and individualization

Everything that clinics need to apply reha buddies' modules will be included in those prices, from the occasional service to the equipment. Compared to other mobile phone applications, the high price is easily explainable by the complications of the approval for a medical product.

The pricing is based on the estimated cost for staff, devices, and software and will guarantee a safe implementation of reha buddy into the client's medical environment. reha buddy must be seen as a partner for clients and not just as an app that can be downloaded and used directly. Therefore, the modules will represent how deep the integration of reha buddy will be. Additionally, potential pricing models were discussed with multiple experts ensuring that the chosen pricing will not exceed the willingness to pay for most clinics.

Moreover, it is more than put into perspective by the savings potential. For example, a therapist costs a clinic 75,000-80,000 euros a year. Thanks to the time saved by reha buddy, it is guaranteed that a higher workload can be carried out with fewer employees in the future. Since there is already a labor shortage in the medical field, the result is positive in every respect. Another approach would be current gait laboratories' costs: A new gait laboratory currently costs around 30,000-50,000 euros with additional service costs of about 2000 euros per year. In this comparison, reha buddy would offer financial advantages and use less space than those gait laboratories mentioned. Newly acquired

customers are tied for the long term due to the benefits mentioned. The price mentioned is solely paid by clinics. In the future, however, it will be possible for patients to download the reha buddy app in the most popular app stores so that they can continue to benefit from its service even after their therapy. Whether this app, which will be optimized for patients, will cost anything will depend on the offer and the implementation and can currently not be specified. Likely, reha buddy can even offer the patient version of its app free of charge to patients since reha buddy will collect enormous amounts of data, which can significantly benefit internal research and development.

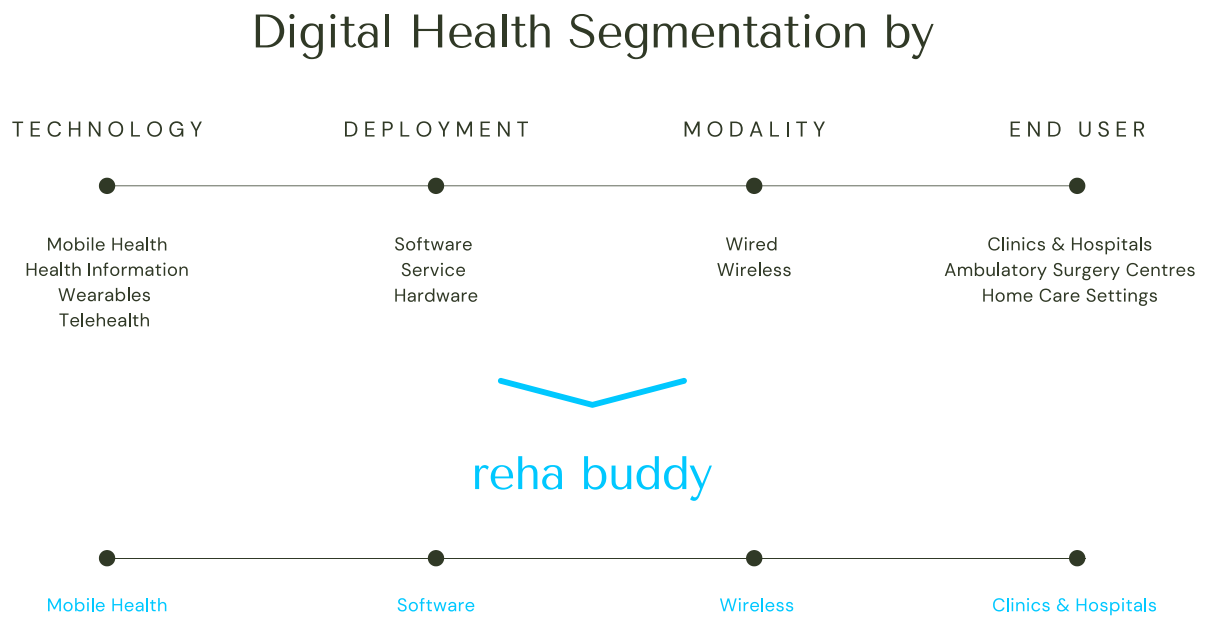
#### **10.4 Cost structure**

reha buddy will continuously invest more and more efforts into the research and development of their products and services. The team is very dedicated to maintaining the quality standard and is also planning to grow extensively in the following years. The company can only pursue these activities based on the team's extensive experience, which is why the staff is the core resource of reha buddy. Therefore, the team's basic pay and further development are reha buddy's primary cost drivers in the long term.

## 11 Segmentation, Targeting and Positioning

### 11.1 Segmentation

Digital health combines information systems and healthcare processes to increase patient participation, advance disease management, and improve quality of life. The following figure simplifies a deep analysis based on the segmentation process of reha buddy.



**Figure 13: Segmentation Analysis**

These are the most crucial variables and critical to the segmentation of the health care market. The clear objective of reha buddy in the planning period of this business plan is to become a leading mobile health application with its primary end-users becoming clinics and hospitals.

### 11.2 Targeting

#### 11.2.1 Main target group

##### Private clinic operators

Private clinic operators are the financially most crucial customer group in the start-up phase of reha buddy. A promising existing lead in this area is VAMED Management and Service GmbH (Hospital Management IT and Digitalization). VAMED operates 23 facilities in Austria and 60 in Germany. The aim is to gain a foothold in VAMED and gradually equip many clinics with reha buddy's solution. Due to the size, there is excellent growth potential because it is possible to reach many patients this way.

The use of reha buddy in the clinic thus serves to raise awareness among patients and relatives, which will act as a multiplier.

### **Health insurance companies**

Secondly, health insurance companies will represent an exciting group of customers that will develop over time. The reha buddy's solution offers the possibility of making each patient's healing progress or success quantifiable. This can optimize therapy planning, among other things, and the possibility of accompanying the patient at home can increase therapy measures' long-term success.

### **Marketing strategies and how to reach decision-makers**

Expert interviews and talks showed a clear bias that the most effective and successful way for reha buddy would be to follow a direct sales approach. Through direct sales, the offer, price, distribution, and communication can be wholly controlled and even better adjusted to the target group's needs. To better represent the excellent and academically highly educated team behind reha buddy, it is also crucial to have direct contact with decision-makers in this environment. Especially since having a highly scientifically ambitious team was considered essential by all experts. The primary way to get into direct contact with decision-makers is still considered to be through offline marketing techniques like press releases, partnerships, and recommendations. Nevertheless, online strategies gain more and more significance. Both approaches will be closer examined in the marketing chapters of this business plan.

## **11.2.2 Measures for the long-term implementation**

### **Addressing decision-makers and clinics**

Doctors, therapists, and other decision-makers in hospitals will be addressed through direct marketing measures like presentations of the product at conferences and congresses and publications in expert journals and scientific media. In addition to the company management, Dr. Harald Jagos, Katrin Wrulich will play a leading role in approaching decision-makers thanks to her academic business background and expertise. Further reference projects in universities are planned as an additional component of the communication concept to reach specialists, doctors, and medical university clinics.

### **Addressing universities**

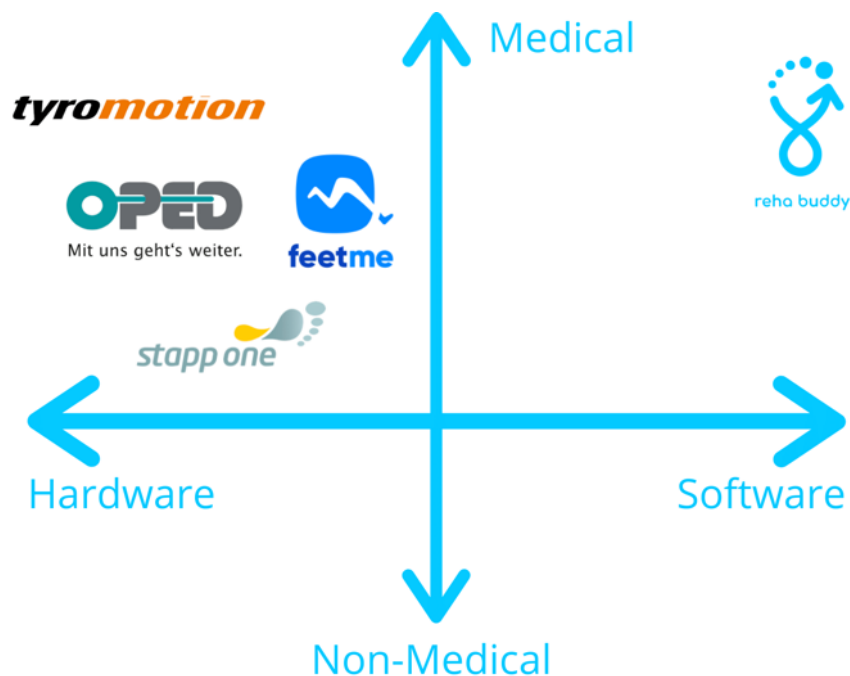
Univ.-Prof. DI Dr. Dietmar Rafolt and Dr. Harald Jagos have a great network in the academic field, universities, and technically highly experienced institutes. Those contacts will be used to develop further long-term project-based relationships with them. The introduction of reha buddy in university courses should also serve as a best practice example for young future doctors, therapists, and potential customers. The cooperation with educational institutions will also create social proof, which is especially essential in the medical field. Besides, the possibility of presenting reha buddy to a large

number of future medical professionals in an educational environment is of very high benefit. Students will be able to quickly understand the services in a safe environment without being sold to them. Also, discussions with experts quickly revealed that young doctors and therapists, in particular, are showing higher interest in digital innovations.

### 11.3 Positioning

#### 11.3.1 Perceptual Map

Product positioning is the foundation of every marketing and sales story. The goal is to distill what the target audience is, what they demand, and how reha buddy can uniquely help. It is a strategic practice that defines where the product or service fits in the marketplace and why it is better than alternative solutions.



**Figure 14: Perceptual Map**

The outcome of this perceptual map depicts beautifully how reha buddy's main competitors all position themselves in the medical field - some more and some less. What makes reha buddy stand out is that they are not offering any hardware but are entirely focused on their app. The hardware market for gait analysis grew very competitive, showing that the winning design is yet to be found. On the other end, reha buddy works on a solution that defines itself as solely software-based, making it easier to use and more accessible for all parties. This positioning helps ground the future marketing efforts in the real value reha buddy provides beyond features and functionality by articulating the key benefits of the product. This excellent positioning will make it possible to craft meaningful messages and create even more value for customers.

### **11.3.2 USP - Unique selling proposition of reha buddy**

#### **Research and development**

Three of the founders of reha buddy already have several years of experience in mobile gait and movement analysis, as well as in the development of algorithms and software in this area. Throughout Harald Jagos' dissertation and Andrés Tkachenko's master's thesis, 14 scientific works were published (see appendix), demonstrating the algorithms' validity developed in-house.

#### **Independence and flexibility - Focus on software**

reha buddy algorithms can analyze movements (1) with a smartphone and (2) with additional sensor soles from various (external) manufacturers. Functionality and accuracy depend to a certain extent on the hardware generating the data. Accordingly, the more sensors are used, the better the motion analysis. However, even analyzing with only a smartphone enables significant and most necessary data creation. The software's focus is on user-friendliness and aims to make life easier for users by making complex processes possible, such as the documentation of therapy progress and seamless integration into IT or hospital information systems.

#### **Medical product as USP**

reha buddy is consciously committed to offering a medical product and wanting to face the challenges that come with it. Becoming a certified medical device is very complex for software and even worse for AI products. The medical validation approval is granted only for specific functions that are not easily adaptable. This means that sometimes even if only one line of code gets changed, it is necessary to apply for a new validation. This process is also including updates which makes it particularly difficult to become a copycat and enter the market. Therefore, the certification for use in the medical field is widely regarded as an additional seal of quality.

## **12 Marketing Strategy**

The marketing strategy's primary goal is to make the product known to the target group and convince the decision-makers to use this innovative treatment assessment method. To succeed, ongoing communication of progress is an essential element of the marketing strategy. The different interests of the two target groups - hospitals as well as doctors and therapists - must be understood and continuously considered.



## 12.1 Market Entry

### Pre-launch phase

Simultaneously, as reha buddy is working on the prototype, the reha buddy innovation is advertised online and among experts. By promoting reha buddy at congresses (pre-pandemic), it was possible to raise awareness for the new technology and research. Insights gained at those activities and additionally from expert feedback were helpful to establish an appealing online appearance. The project's financial funding is mainly from Austria's government, where reha buddy aims to use their founders' contacts to enter the market in 2021.

### Product launch in Austria (2021) and Germany (2022)

The product launch takes place as some current test clients who currently use reha buddy for free will be converted into paying clients. The aim is to enter the market in Austria (March 2021) using one of the features (the 6-Minute-Walk test) while planning to add the other components when completed. The information gathered from the first feature will serve as the basis for expanding the service range and promises a smooth customer experience. The funds from the first paying customers from Austria will be used to expand into the German market in late 2021 or the beginning of 2022.

### Product launch across Europe (2023)

Market entry in the other countries of the European Union is planned for 2023. Thanks to the experience gained and the optimization of the processes, sales throughout Europe can be achieved quicker. The sales figures are to be scaled further in the following years to expand the product range and product developments.

## 12.2 Distribution channels

### Direct Sales

The reha buddy aims to deliver a direct sales approach by the management and its employees. Besides, the offer is presented and marketed on a professional website. This multi-channel sales concept offers many advantages that can wonderfully convey the benefits of reha buddy to the outside world. For example, through direct sales, the company's image and vision can be controlled entirely (product, price, distribution, or communication). The purchase decision can also be directly influenced by having face-to-face contact with decision-makers. Direct selling is considered one of the most challenging approaches while creating the fastest feedback loop, further improving the market's understanding. This approach reveals valuable market information from the target group, e.g., satisfaction score.

Furthermore, direct sales offer excellent conditions for building regular customers, which is particularly promising for reha buddy, mainly due to the academically high reputed reha buddy team.

### **Online sales**

However, reha buddy also stands for innovation, which is why online sales are indispensable. Online tools offer ideal conditions for market penetration, reach, and increasing interest in potential customers. They can significantly expand the outreach by opening the business to a broader international target group more easily. Therefore, rapid expansion from the company's headquarters in Vienna, Austria, to Germany is more likely. Online tools also give clinics a quick, free, and always available way to get an overview of the companies' offerings. An appealing design of the online presence can also make use of storytelling techniques and emotionalize the offer, which works particularly well in the medical field. Marketing materials can also be made available to interested individuals at any time free of charge utilizing an instant download. In the long term, the convincing website will also create a positive reputation for the entire company.

## **12.3 Marketing mix**

To publicize and establish reha buddy on the market and sustainably increase business, an appropriate marketing mix in the areas of "offline marketing" and "online marketing" was developed.

### **12.3.1 Offline marketing**

#### **Stationery files**

Stationery files like the design of business letters will be created, considering the corporate identity (logo, fonts, font sizes) and compliance with the legal requirements for business letters. Stationary files are vital for a professional and consistent appearance and a productive workflow.

#### **Business cards**

The creation of business cards, including contact details and QR code, linking to the online presence. Distribution of the business cards will happen at trade fairs and sales meetings.

#### **Press release**

Preparation of press releases informing about the company's updates like market entry, developments, and offers. The first press release will be sent to all interested local and regional press. Later press releases will also be sent to international media outside Austria. Press releases help make the audience aware of new products or services and will be sent out every time reha buddy has significant news to share.

**Opening event**

The implementation and investment in a market launch event with fun competitions and special reha buddy product gamifications. This event will occur in the first paying customer's clinic to show gratitude and will be promoted online.

**Brochures**

Targeted sales promotion and building and strengthening a positive image through brochures that provide detailed information about the offer and the advantages. The brochures will be distributed in clinics to create touchpoints with customers, promoting reha buddy and growing acceptance.

**Advertisements**

Creation of advertisements and regular placements in expert publications to reach decision makers.

**Affiliate marketing**

If necessary, offering short-term discounts to clinics that recommend other clinics. For instance, for each newly recommended clinic reha buddy's clients get two months of reha buddy discounted.

**Hospital partnerships**

Maintaining close relationships with hospital staff and their managers aiming towards long-term partnerships and joint development.

**12.3.2 Online marketing****Website**

Creation of a professional website based on a modern content management system (CMS). A website is crucial because it helps reha buddy drive more qualified leads to their product. Targeting specific leads with their content management will encourage them to book demonstrations and meetings.

**Google My Business**

Creation of a Google My Business company entry, with which new customers can be generated free of charge, as Google automatically displays the entry for matching search queries.

**Search Engine Optimization**

On-page search engine optimization: Definition of relevant keywords, meta tags, title tags, meta descriptions, URL structure, image file names, as well as internal links or redirects and creation of high-quality, target group-specific and SEO-optimized texts. Avoidance of duplicate content is essential, too.

Off-page search engine optimization: Construction of high-quality organic backlinks, e.g., from publishers, portals, daily newspapers, and magazines.

Those efforts will help improve the customer experience, increase authority, drive more people to the website site, and give reha buddy an edge over the competition. SEO efforts will sustainably increase conversions without spending money on it constantly, which means more sales, more loyal customers, and more growth for reha buddy's business with lower conversion costs.

### **Blog**

Starting a blog to maintain contact with the target group by regularly sharing high-quality information. In terms of SEO, blogs are also very relevant and essential – in both On-Page and Off-Page SEO.

### **Social media marketing**

The active use of social media channels such as Facebook, Instagram, and LinkedIn is critical in our current business environment. Social media and content creation help maintain positive results and consistent branding. Social Media strategies can take anywhere from a couple of weeks to a year and can only be accomplished through consistent efforts. Furthermore, social media is often much more affordable than other marketing channels after reha buddy has developed an engaging content creation routine.

### **Company video**

Creating a company video and integrating it into the website and Facebook or YouTube will make it easier to understand reha buddy's product.

### **Monitoring**

Continuous monitoring of all online marketing measures, e.g., using Google Analytics or Google Search Console, is vital for a better strategic decision-making process.

## 12.4 Marketing Measures

### 12.4.1 Roadmap

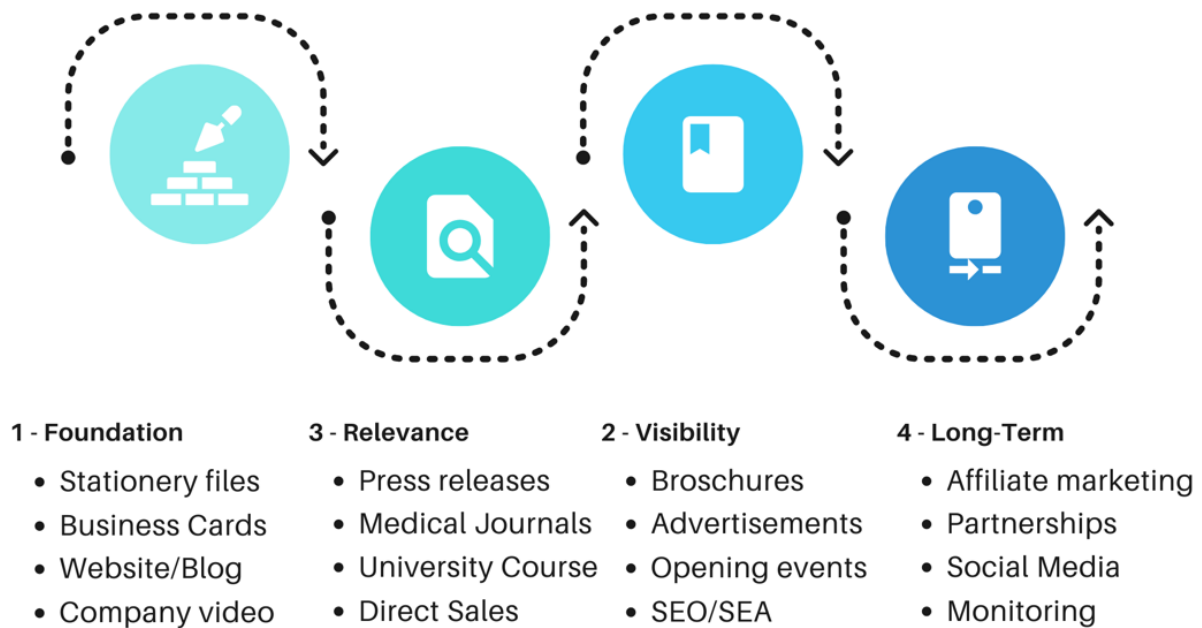


Figure 15: Roadmap Marketing Efforts

### 12.4.2 Timeline

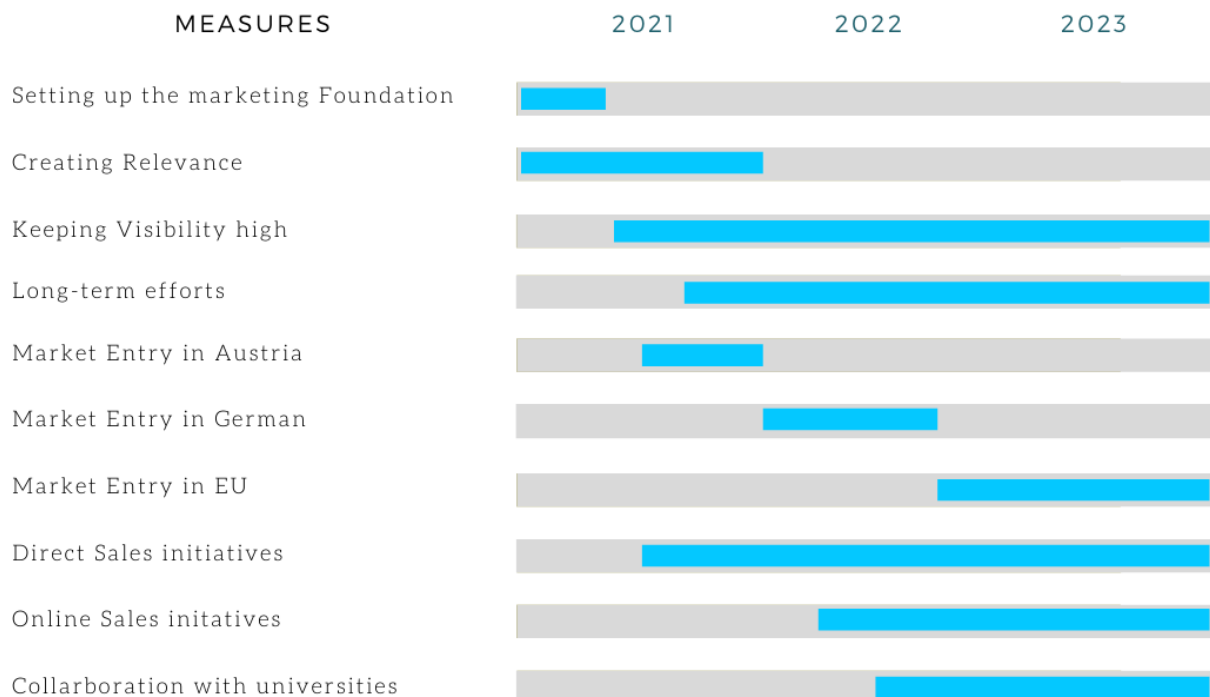


Figure 16: Marketing Efforts

## 13 Objectives and Milestones

### 13.1 Short-term

- Partnership with clinic operators to further develop products and gather data
- Establish and test central hypotheses about the potential
  - Gait analysis: faster, easier, and cheaper
  - Better suited to document therapy progress across the board
  - Time savings for key personnel (therapists)

### 13.2 Mid-term

- Pilot phases in 3 to 5 clinics
- ISO 13485 and MDR approval
- Market entry in Austria
- Extension of the range of functions to different external sensors
  - Instrumented shoe insoles (of other manufacturers)
  - Additional IMU-based sensors

### 13.3 Long-term

- Equip medical centers in German-speaking countries (DACH)
- Become an international partner for mobile gait analysis
- Continuously support patients during their physical rehabilitation
- A settlement with the ÖGK (Austrian health system authorities)
- FDA approval and expansion to the USA
- Enabling people to remain independent, active, and mobile for a longer part of their lives

## 14 Financial Plan

The observation period extends from 2021 to 2023 since the market entry is planned for 2021. Therefore, this year also serves as the starting point for this 3-year plan.

### 14.1 Risk on investment

The acquisition of the following fundings and deposits is successfully submitted and implemented into the financial plan:

- Entrepreneur team contribution: **€ 80.000**
- Pre-seed funding (until end 2020): **€ 200,000** (does not have to be repaid)
- Seed funding: **€ 600,000** (has to be repaid in part if project successful; repayment time not within the period of this financial plan)

#### Financing Planning

Net assets		in €
Founders Financing		80.000
Public funding (Dec 2020)		180.000
Public Funding (Jun 2021)		180.000
Public Funding (Dec 2021)		180.000
Public Funding (Jun 2022)		60.000
Sum		680.000
External financing		in €
Loans		0
Credits		0
Sum		0
<b>Sum Net Assets und External-financing</b>		<b>680.000</b>
Capital Needs (Sum) 11.1.		13.800
Difference		666.200
Additional details		
Loans		in % pro Jahr
Interest rate		
Repayment		
Credits		in % pro Jahr
Interest rate		
Repayment		

Figure 17: Financing planning

Those investments will serve as the primary source of liquidity, especially in the first two years. At the end of 2022, reha buddy will become profitable, making it qualified to grow organically and sustainably without further fundings from 2023 and onwards.

#### Capital needs for market Entry

The capital needs for reha buddy's market entry in Austria in 2021 are calculated to be 13.800 Euros.

#### Capital Expenses

Investments for Market Entry (2021)		in €
Sales Coaching		3.000
Consulting		5.000
Opening Event		2.000
Clothing		800
Medical Device Training		3.000
Sum Investments		13.800
Capital Needs (Sum)		13.800

Figure 18: Capital Expenses

The Pre-seed funding does not have to be paid back, and the Seed funding only in case of a profitability and without any interest rates. Therefore, the risk of investment is comparably low with only the personal investment of the founders.

## 14.2 Depreciation

The business equipment is depreciated either directly or on a linear basis over 3 years. Generally speaking, reha buddy invests in one laptop and monitor for every new Employee when necessary. They expect to hire two new employees in the year 2022 and again two in the year 2023. Also, the current six employees received this benefit this year. Besides that, as a software company, reha buddy has no expenses for equipment that needs to be depreciated.

## 14.3 Cost planning

Paying the employees will be reha buddy's biggest expense. The 13th and 14th wages of the employees have already been proportionally included in the figures. In addition, the CFO will not be paid until 2023 as she will receive 6% of the company for her contribution in the first two years of this planning period.

Cost Planning 2021

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
Labor-cost	Sum	16.600	16.600	16.600	16.600	16.600	18.200	18.200	18.200	18.200	18.200	18.200	18.200	210.400
Location costs	Sum	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	12.000
Services	Sum	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
Travel Expenses	Sum	0	0	0	0	0	670	670	670	670	670	670	670	4.690
Insurances	Sum	100	100	100	100	100	100	100	100	100	100	100	100	1.200
Marketing	Sum	1.740	1.740	1.740	1.740	1.740	1.740	2.240	2.240	2.240	2.240	2.240	2.240	23.880
Interests	Sum	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	Sum	400	400	400	400	400	400	400	400	400	400	400	400	4.800
<b>SUM</b>		<b>22.440</b>	<b>22.440</b>	<b>22.440</b>	<b>22.440</b>	<b>22.440</b>	<b>24.710</b>	<b>25.210</b>	<b>25.210</b>	<b>25.210</b>	<b>25.210</b>	<b>25.210</b>	<b>25.210</b>	<b>288.170</b>

Figure 19: Cost Planning 2021

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
Labor-cost	Sum	20.200	20.200	20.200	20.200	20.200	20.200	25.400	25.400	25.400	25.400	25.400	25.400	273.600
Location costs	Sum	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	18.000
Services	Sum	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	33.600
Travel Expenses	Sum	670	670	670	670	670	670	670	670	670	670	670	670	8.040
Insurances	Sum	100	100	100	100	100	100	100	100	100	100	100	100	1.200
Marketing	Sum	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	26.880
Interests	Sum	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	Sum	133	133	133	133	133	133	133	133	133	133	133	133	1.600
<b>SUM</b>		<b>27.643</b>	<b>27.643</b>	<b>27.643</b>	<b>27.643</b>	<b>27.643</b>	<b>27.643</b>	<b>32.843</b>	<b>32.843</b>	<b>32.843</b>	<b>32.843</b>	<b>32.843</b>	<b>32.843</b>	<b>362.920</b>

Figure 20: Cost Planning 2022

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
Labor-cost	Sum	31.600	31.600	31.600	31.600	31.600	31.600	34.200	34.200	34.200	34.200	34.200	34.200	394.800
Location costs	Sum	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	18.000
Services	Sum	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	36.000
Travel Expenses	Sum	670	670	670	670	670	670	670	670	670	670	670	670	8.040
Insurances	Sum	100	100	100	100	100	100	100	100	100	100	100	100	1.200
Marketing	Sum	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	26.880
Interests	Sum	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	Sum	133	133	133	133	133	133	133	133	133	133	133	133	1.600
<b>SUM</b>		<b>39.243</b>	<b>39.243</b>	<b>39.243</b>	<b>39.243</b>	<b>39.243</b>	<b>39.243</b>	<b>41.843</b>	<b>41.843</b>	<b>41.843</b>	<b>41.843</b>	<b>41.843</b>	<b>41.843</b>	<b>486.520</b>

Figure 21: Cost Planning 2023



## 14.4 Sales Plan of The Most Realistic Case

The following modules will be presented and available in sequences over the next few months after the market launch in 2021. It is expected that reha buddy's main product, the Module XXL, will be introduced in mid-2022 and adopted by 80% of the clinics.

The prices already include service, staff training and the additionally required equipment.

Product / Service	monthly	yearly
Module XS: VAS	249	2.990
Module S: STS	583	6.990
Module M: XMWT	916	10.990
Module L: TUG	1.249	14.990
Module XL: EQ-5D	1.583	18.990
Module XXL: KIS	1.916	22.990

**Figure 22: Pricing of modules**

The central assumption of the following sales plan is that reha buddy aims to sell two modules every month. The upsell to existing customers is possible whenever a new module is introduced, which means that one customer might order all six modules as soon as they are available.

The first sales occurred via the current reha buddy partners, who were also testing in a clinical setting. After the first successful sale reha buddy started the sales process with other clinics.

Since the sales process is lengthy, potential clients can take weeks or months from when they first got contacted to when a purchase is made. Salespeople at reha buddy will spend more time getting to know a buyer, answering questions, and providing information about their product or service. Additionally, every clinic has different requirements. The estimations of the sales numbers are based on discussions with reha buddy's team and other experts about the demand on the market and interest in potential types of modules sold. The defined volume of sales was estimated through the limited capacities of reha buddy's sales team and expert surveys on the estimation of what the sales team can deliver and is therefore considered achievable.

Even though around 40 sold module subscriptions would be enough to reach break-even at the end of the planning period, the possible aim in the most realistic case is to sell a minimum of 60 module subscriptions by the end of 2023.

Sales plan

Year 2021													
Product / Service	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
	SALES												
Module XS							249	249	249	498	498	498	2.243
Module S									583	583	583	1.165	2.913
Mosule M					916	916	916	1.832	1.832	1.832	2.748	2.748	13.738
Module L											1.249	1.249	2.498
Module XL							1.583	1.583	1.583	3.165	3.165	3.165	14.243
Module XXL													0
<b>Sum</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>916</b>	<b>916</b>	<b>2.748</b>	<b>3.663</b>	<b>4.246</b>	<b>6.078</b>	<b>8.243</b>	<b>8.825</b>	<b>35.633</b>

Figure 23: Sales Plan 2021

Sales plan

Year 2022													
Product / Service	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
	SALES												
Module XS	748	748	748	997	997	997	1.246	1.246	1.246	1.495	1.495	1.495	13.455
Module S	1.165	1.165	1.748	1.748	1.748	2.330	2.330	2.330	2.913	2.913	2.913	3.495	26.795
Mosule M	2.748	3.663	3.663	3.663	4.579	4.579	4.579	5.495	5.495	5.495	6.411	6.411	56.782
Module L	1.249	2.498	2.498	2.498	3.748	3.748	3.748	4.997	4.997	4.997	6.246	6.246	47.468
Module XL	4.748	4.748	4.748	6.330	6.330	6.330	7.913	7.913	7.913	9.495	9.495	9.495	85.455
Module XXL							5.748	5.748	5.748	7.663	7.663	7.663	40.233
<b>Sum</b>	<b>10.657</b>	<b>12.822</b>	<b>13.404</b>	<b>15.236</b>	<b>17.401</b>	<b>17.983</b>	<b>25.563</b>	<b>27.728</b>	<b>28.310</b>	<b>32.058</b>	<b>34.223</b>	<b>34.805</b>	<b>270.188</b>

Figure 24: Sales Plan 2022

Sales plan

Year 2023													
Product / Service	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
	SALES												
Module XS	1.744	1.744	1.744	1.993	1.993	1.993	2.243	2.243	2.243	2.492	2.492	2.492	25.415
Module S	3.495	3.495	4.078	4.078	4.078	4.660	4.660	4.660	5.243	5.243	5.243	5.825	54.755
Mosule M	6.411	7.327	7.327	7.327	8.243	8.243	8.243	9.158	9.158	9.158	10.074	10.074	100.742
Module L	6.246	7.495	7.495	7.495	8.744	8.744	8.744	9.993	9.993	9.993	11.243	11.243	107.428
Module XL	11.078	11.078	11.078	12.660	12.660	12.660	14.243	14.243	14.243	15.825	15.825	15.825	161.415
Module XXL	9.579	9.579	9.579	11.495	11.495	11.495	13.411	13.411	13.411	15.327	15.327	15.327	149.435
<b>Sum</b>	<b>38.553</b>	<b>40.718</b>	<b>41.300</b>	<b>45.048</b>	<b>47.213</b>	<b>47.795</b>	<b>51.543</b>	<b>53.708</b>	<b>54.290</b>	<b>58.038</b>	<b>60.203</b>	<b>60.785</b>	<b>599.190</b>

Figure 25: Sales Plan 2023

## 14.5 Optimistic and Pessimistic Scenarios

### 14.5.1 Optimistic Scenario

This financial plan is based on the most realistic case with a conservative and linear increase in sales for this scenario. Based on this, however, a faster expansion can also be expected in the optimistic case. Accordingly, a more substantial absolute annual increase in sales would be the result. The only problem here might be the limited sales capacities because of a correlated staff shortage.

In principle, a second optimistic scenario is conceivable. Further private capital providers may generate more extensive investments for personnel and workspace, resulting in higher induced demand.

### 14.5.2 Pessimistic Scenario

The pessimistic scenario, on the other hand, is based on the basic assumption of sales shifts. It can also be expected that the sales targeted in the realistic case will only be achieved at a later point in time. Possible reasons for this include, for example, that there are internally caused delays in the agreed acceptance date in some clinics. Or that the market entry can not take place as planned in all countries.

However, such a possible pessimistic scenario is included in the planned costs and the available funding. The respective disadvantage can be compensated since the break-even will only be reached later, so not yet at the end of 2022. However, a break-even can still be achieved in 2023 within the planning period, even with a sales downside of 30%.

### 14.6 Break-even Analysis

Considering the cost and sales plans, reha buddy is expected to reach the break-even point at the end of 2022 (or at the end of 2023 for the pessimistic scenario).

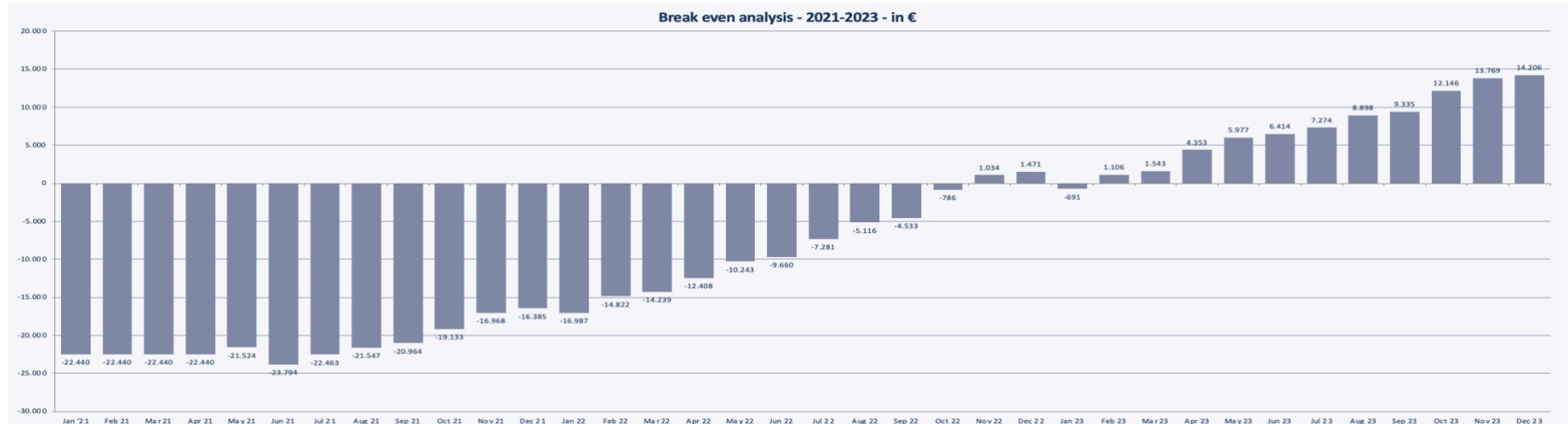


Figure 26: Break-even analysis - 2021-2023 - in €

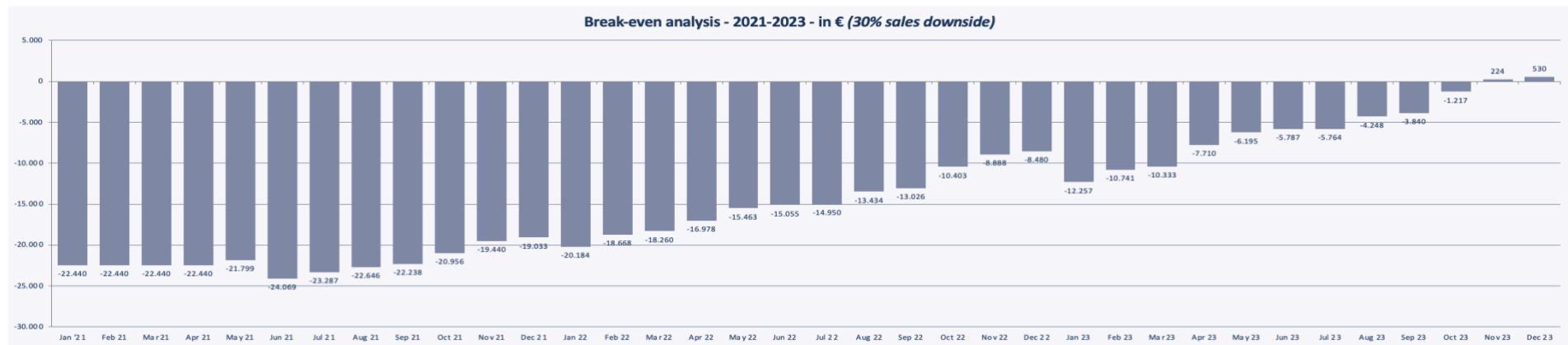


Figure 27: Break-even analysis - 2021-2023 - in € (30% sales downside)

### 14.7 Cash Flow Analysis

Supported by the fundings, reha buddy’s cash flow can be regarded as safe. Especially from the beginning of 2023, an upwards tendency without government support but only through own earnings is expected. This will lead to further investments and development in the following years.

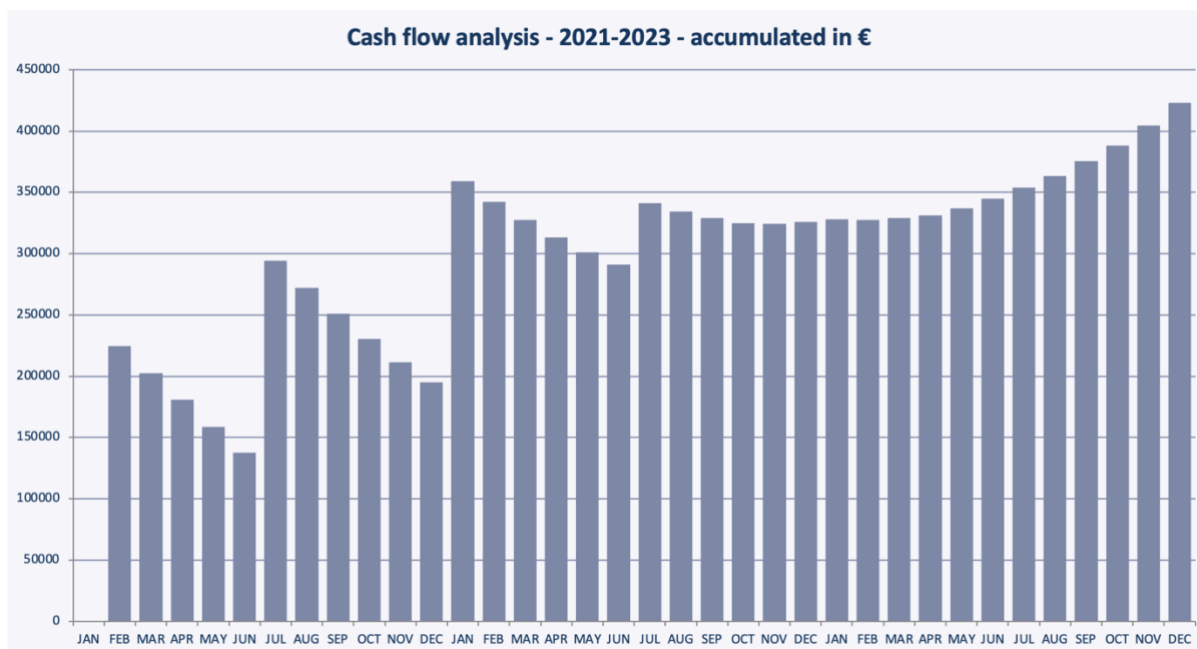


Figure 28: Cash flow analysis - 2021-2023

### 14.8 Key Performance Indicators

In the following, some crucial key performance indicators for the most realistic case are presented. The debt ratio is shown as 0% here, even though reha buddy will most probably have to repay parts of the Seed funding. The repayment of the Seed funding is expected to be outside of this planning period. Additionally, it will be according to the financial situation of reha buddy. Therefore, it is not considered relevant for the planning period.

#### KPI'S

Key Performance Indicator	Calculation	Goal	Current state
Equity Ratio	Equity / Total Capital * 100	> 30%	100%
Debt Ratio	Outside Capital / Total Capital * 100	< 70%	0%
Return on Investment (2021)	Profit / Total Capital * 100	> 5%	-37%
Return on Investment (2022)	Profit / Total Capital * 100	> 5%	-14%
Return on Investment (2023)	Profit / Total Capital * 100	> 5%	12%

Figure 29: Key Performance Indicators

## 14.9 Exit

In general, the shareholders of reha buddy GmbH are ready to sell their shares to a partner or a suitable third party at an appropriate time. However, until 2023, the company's market launch and the successful implementation of its business and sales strategy will be the focus of all shareholders. Therefore, the earliest time of sale would be in 2024, when all the license and approval procedures required have been completed and the service is distributed in the market and widely used by clinics.

## 15 Conclusion

The road to validating digital health solutions takes resources, collaboration, and time. After many interviews with experts and many discussions with the reha buddy team, it became clear that this project has a real purpose and is one of those ventures worth the effort.

The resources in reha buddy's case are coming mainly from fundings in the first years. Still, those fundings give this excellent team the time they need to develop their product. The deeper one gets into the topic of gait analysis, and the more one realizes how critical a better gait analysis is for patients - the more one realizes how necessary this innovative product is. Above all, it is shocking how old-fashioned people still analyze something as crucial to health as the human gait. This business plan shows that through ongoing and excellent collaboration with clinics, reha buddy is well-positioned to become the validated digital health care solutions to solve this problem soon.

The main strength of reha buddy is, by no doubt, its strong team with a deep scientific background. Initially, it was challenging for them to set up a business and sales department. Nevertheless, they were able to grow into it and are well on the way and well poised in Sales with Harald the CEO, Marketing with Katrin, and Finance with Elisabeth.

The reha buddy management is confident that they can achieve their realistic sales forecasts, generating total sales of approximately 35.000 €, 270.000 €, and 600.000 € in 2021, 2022, and 2023. Those sales forecasts are predictions that carefully consider the market entry in July 2021, the current market environment, potential customer base, and its ability to grow its sales and recognition to gain market share in the industry. Especially in consideration of the ROI, which goes far beyond the target, especially in the third planning year.

Critically regarded, reha buddy can fail due to development costs, long sales cycles, and high efforts to implement their service in clinics and get every end-user on board. Additionally, healthcare ecosystems usually evolve slower than other industries because of strict guidelines.

Still, with the world emerging following the Covid-19 pandemic, digital health solutions are more in demand than ever, creating the perfect timing for reha buddy's product.

The product is built and based on patient engagement, data, and analytics. With a wide diversity of players in this segment, reha buddy isolates itself with its SaaS (Software-as-a-Service) positioning. Their focus on the app, algorithms, and platform can evolve to create the dominant design by frictionless experiences and services for all stakeholders.

In addition, although the focus is currently on designing a medical product, one can only imagine the great potential that reha buddy technology also has outside of the clinical environment. It is possible to develop creative solutions for the gait analyses of competitive athletes or provide shoe stores with technology to give their customers better recommendations.

To conclude, reha buddy experiences excellent support from the communities, physical therapy centers, and the Austrian government. Given the access to their superb intellectual property combined with the team's joint expertise, one can say that reha buddy is ready for greater challenges with a very promising path to change the status quo for gait analysis.

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## 19 Appendix

### 19.1 List of publications (with involvement of the founders)

David V, Forjan M, Martinek J, Kotzian S, Jagos H, Rafolt D. Evaluating wearable multimodal sensor insoles for motion-pattern measurements in stroke rehabilitation – A pilot study. *IEEE Int Conf Rehabil Robot.* 2017 Jul;2017:1543-1548. doi: 10.1109/ICORR.2017.8009467. PubMed PMID: 28814039.

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Tkachenko B.A., Scherer M., David V., Kafka P., Sabo A., Jagos H. Development of a wearable live-feedback system to support partial weight-bearing while recovering from lower extremity injuries. 11th conference of the International Sports Engineering Association, ISEA 2016.

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Jagos H, David V, Reichel M, Kotzian S, Schlossarek S, Haller M, Rafolt D. Tele-monitoring of the rehabilitation progress in stroke patients. *Stud Health Technol Inform.* 2015;211:311-3. PubMed PMID: 25980890.

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Jagos H, Reich S, Rattay F, Mehnen L, Pils K, Wassermann C, Chhatwal C, Reichel M. Determination of Gait Parameters from the Wearable Motion Analysis System eSHOE. *Biomed Tech (Berl).* 2013 Sep 7. pii: /j/bmte.2013.58.issue-s1-K/bmt-2013-4241/bmt-2013-4241. xml. doi: 10.1515/bmt-2013-4241. [Epub ahead of print] PubMed PMID: 24042893.

Jagos H., David V., Litzenberger S., Reichel M.: vitaliSHOE – Monitoringsystem für Aktivität, Balance und Sturzrisiko bei älteren Menschen in Ihrer Alltagsumgebung. 6. Forschungsforum der österreichischen Fachhochschulen, Graz, 2012.

David V., Jagos H., Litzenberger S., Reichel M.: vitaliSHOE – Validierung des mobilen Bewegungsanalysesystems mit State-of-the-Art Messsystemen, Jahrestagung ÖGBMT, Hall 2012

Oberzaucher J., Jagos H., Zödl C., Hlauschek W., Zagler W.L. (2011); Extramural Fall Risk Assessment using a Wearable Insole Motion Measurement System – A Base for new AAL Applications; published at 2nd International Conference on Ambulatory Monitoring of Physical Activity and Movement, ICAMPAM (24.-27. Mai 2011, Glasgow)

Jagos H., Oberzaucher J. Posterpräsentation am Dt.-öste. Geriatriekongress 2011, Mai 2011, Wien

Jagos H., Oberzaucher J., Reichel M., Zagler W. L., Hlauschek. W. “A Multimodal Approach for Insole Motion Measurement and Analysis”, in procedia engineering – Te engineering of sport 8, 2010, Elsevier, ISBN 1877-7058

Oberzaucher, J., Jagos H., Zödl, C., Hlauschek, W. & Zagler W. L. (2010). Using a Wearable Insole Gait Analyzing System for Automated Mobility Assessment for Older People. In Proceedings of 12th ICCHP 2010, Springer Verlag, ISBN 978-3-642-14099-0.

## **19.2 Other academic theses**

### **19.2.1 Dissertations – Technische Universität Wien**

#### **2016**

H. Jagos – “Mobile Gait Analysis via instrumented Shoe Insoles – eSHOE. Detection of movement patterns and features in healthy subjects and hip fracture patients”

#### **2011**

J. Oberzaucher – “iAssessment – Aspekte eines instrumentierten Sturzrisikoassessments basierend auf einer extramuralen Gang und Bewegungsanalyse – im Hinblick auf eine Anwendung im Bereich des Ambient Assisted Living”

### **19.2.2 Dissertations – Medizinische Universität Wien**

#### **ongoing**

V. David

### 19.2.3 Master theses – FH Technikum Wien

#### ongoing

M. Riechl – „Methodological evaluation of different feedback methods for sports or medical stress situations, based on movement data from body-worn sensors.“

#### 2019

T. Schön – „Development of 3D printed force/pressure sensors – Comparison to state-of-the-art sensors“

#### 2017

A. Tkachenko – “Development of a mobile live-feedback-system for detection of load distribution between lower extremities”

#### 2015

T. Haftner – “Energy harvesting and power management for the mobile gait analysis system eSHOE”

#### 2014

M. Birnbaumer – “Evaluation of Home Assessments for stroke rehabilitation using the eSHOE System”

J. Flandorfer – “eBALANCE – Development and Usability Evaluation of a Computer Game for Rehabilitative Training”

K. Kastner – “Recording and generating reference data for the mobile gait analysis system eSHOE under laboratory conditions”

#### 2013

S. Reich – “Development of a software package to gather, analyze and store gait data with the mobile motion analysis system eSHOE”

#### 2012

V. David – “Development of Validation Methods for the Mobile Gait and Motion Pattern Analysis System vitaliSHOE”

#### 2010

C. Zödl – “Sensorsystem zur Abstandsmessung”

### 19.2.4 Master theses – Zürcher Hochschule für Angewandte Wissenschaften (ZHAW)

#### 2014

D. Polasek – “Foot-Mounted IMU Sensor Data Processing for Gait Analysis Parameter Extraction”



### **19.2.5 Master theses – FH Hagenberg**

**2011**

L. Aigner – “Balancespiel”

### **19.2.6 Bachelor theses – fh technikum wien**

**2020**

T. Magurean – „Differentiation of movement patterns during therapeutic exercises with smart insoles“

**2014**

S. Durstberger – “Development of a graphic user interface to present data from the mobile motion analysis system eSHOE”

P. Laurent – “Assessment of calibration methods for force sensitive resistors for the purpose of the insole monitoring system eSHOE”

**2012**

M. Kury – “Stair climbing versus level walking: differences in gait parameters measured by vitaliSHOE insoles”

**2011**

S. Reich – “Validation and development of algorithms for calculating gait parameters out of vitaliSHOE insoles in level walking”

M. Kroath – “Evaluation of gait quality in the case of stair climbing using the vitaliSHOE

### 19.3 Financial model calculations

#### Schedule of Depreciation

1) Immediate depreciation until 800 EUR (without tax)

Year 2021	
Investment	Cost
Monitor 1	400
Monitor 2	400
Monitor 3	400
Monitor 4	400
Monitor 5	400
Monitor 6	400
Summe:	2.400

Year 2022	
Investment	Cost
Monitor 1	400
Monitor 2	400
Summe:	800

Year 2023	
Investment	Cost
Monitor 1	400
Monitor 2	400
Summe:	800

2) Depreciation related to duration/usage > 800 EUR (without tax)

Year 2021																
Investment	Cost	depreciation (years)	Year 1 (months)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Laptop 1	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Laptop 2	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Laptop 3	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Laptop 4	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Laptop 5	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Laptop 6	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Summe:	7.200			200	200	200	200	200	200	200	200	200	200	200	200	

Year 2022																
Investment	Cost	depreciation (years)	Year 2 (months)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Laptop 1	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Laptop 2	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Summe:	2.400			67	67	67	67	67	67	67	67	67	67	67	67	

Year 2023																
Investment	Cost	depreciation (years)	Year 3 (months)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Laptop 1	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Laptop 2	1.200	3	12	33	33	33	33	33	33	33	33	33	33	33	33	
Summe:	2.400			67	67	67	67	67	67	67	67	67	67	67	67	

Cost Planning 2021

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
<b>Labor-cost</b>	<b>Sum</b>	16.600	16.600	16.600	16.600	16.600	18.200	18.200	18.200	18.200	18.200	18.200	18.200	210.400
	CEO (1)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	43.200
	CTO (2)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	43.200
	Head of Quality & R. A. (3)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	43.200
	Marketing & Sales (4)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	(part-time) Data Science (5)	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	19.200
	(part-time) Data Science (5)	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	19.200
	(part-time) CFO (7)	0	0	0	0	0	0	0	0	0	0	0	0	0
	(part-time) Administration (8)						1.600	1.600	1.600	1.600	1.600	1.600	1.600	11.200
<b>Location costs</b>	<b>Sum</b>	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	12.000
	Rent	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	12.000
<b>Services</b>	<b>Sum</b>	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	External Services	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Supporting devices	200	200	200	200	200	200	200	200	200	200	200	200	2.400
	Accounting and Tax Consultanc	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Medical product certification	700	700	700	700	700	700	700	700	700	700	700	700	8.400
	Medical product consultation	600	600	600	600	600	600	600	600	600	600	600	600	7.200
	Other Consultation	500	500	500	500	500	500	500	500	500	500	500	500	6.000
<b>Travel Expenses</b>	<b>Sum</b>	0	0	0	0	0	670	670	670	670	670	670	670	4.680
	Taxi						100	100	100	100	100	100	100	700
	Train						200	200	200	200	200	200	200	1.400
	Flights						150	150	150	150	150	150	150	1.050
	Hotels						100	100	100	100	100	100	100	700
	Rental Cars						100	100	100	100	100	100	100	700
	Parking						20	20	20	20	20	20	20	140
<b>Insurances</b>	<b>Sum</b>	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Legal protection insurance	100	100	100	100	100	100	100	100	100	100	100	100	1.200
<b>Marketing</b>	<b>Sum</b>	1.740	1.740	1.740	1.740	1.740	1.740	2.240	2.240	2.240	2.240	2.240	2.240	23.880
	Stationary Files	10	10	10	10	10	10	10	10	10	10	10	10	120
	Business cards	10	10	10	10	10	10	10	10	10	10	10	10	120
	Advertising material	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Ads	200	200	200	200	200	200	200	200	200	200	200	200	2.400
	Promotional Gifts	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Customer loyalty programs	200	200	200	200	200	200	200	200	200	200	200	200	2.400
	Sponsoring	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Webhosting	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Plugins	50	50	50	50	50	50	50	50	50	50	50	50	600
	image licenses	20	20	20	20	20	20	20	20	20	20	20	20	240
	Quality labels	50	50	50	50	50	50	50	50	50	50	50	50	600
	Customer rating portals	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	SEO/SEA	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Fairs							500	500	500	500	500	500	3.000
<b>Interests</b>	<b>Sum</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
	Loans	0	0	0	0	0	0	0	0	0	0	0	0	0
	Credits	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Depreciation</b>	<b>Sum</b>	400	400	400	400	400	400	400	400	400	400	400	400	4.800
<b>SUM</b>		22.440	22.440	22.440	22.440	22.440	24.710	25.210	25.210	25.210	25.210	25.210	25.210	288.170

Cost Planning 2022

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
<b>Labor-cost</b>	<b>Sum</b>	<b>20.200</b>	<b>20.200</b>	<b>20.200</b>	<b>20.200</b>	<b>20.200</b>	<b>20.200</b>	<b>25.400</b>	<b>25.400</b>	<b>25.400</b>	<b>25.400</b>	<b>25.400</b>	<b>25.400</b>	<b>273.600</b>
	CEO (1)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	43.200
	CTO (2)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	43.200
	Head of Quality & R. A. (3)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	43.200
	Marketing & Sales (4)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	Data Science (5)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	Programmer (6)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	CFO (7)	0	0	0	0	0	0	0	0	0	0	0	0	0
	(part-time) Administration (8)	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	19.200
	Programmer (9)							2.600	2.600	2.600	2.600	2.600	2.600	15.600
	Marketing & Sales (10)							2.600	2.600	2.600	2.600	2.600	2.600	15.600
<b>Location costs</b>	<b>Sum</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>18.000</b>
	Rent	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	18.000
<b>Services</b>	<b>Sum</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>2.800</b>	<b>33.600</b>
	External Services	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Supporting devices	400	400	400	400	400	400	400	400	400	400	400	400	4.800
	Accounting and Tax Consultancy	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Medical product certification	700	700	700	700	700	700	700	700	700	700	700	700	8.400
	Medical product consultation	600	600	600	600	600	600	600	600	600	600	600	600	7.200
	Other Consultation	500	500	500	500	500	500	500	500	500	500	500	500	6.000
<b>Travel Expenses</b>	<b>Sum</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>8.040</b>
	Taxi	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Train	200	200	200	200	200	200	200	200	200	200	200	200	2.400
	Flights	150	150	150	150	150	150	150	150	150	150	150	150	1.800
	Hotels	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Rental Cars	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Parking	20	20	20	20	20	20	20	20	20	20	20	20	240
<b>Insurances</b>	<b>Sum</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>1.200</b>
	Legal protection insurance	100	100	100	100	100	100	100	100	100	100	100	100	1.200
<b>Marketing</b>	<b>Sum</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>26.880</b>
	Stationary Files	10	10	10	10	10	10	10	10	10	10	10	10	120
	Business cards	10	10	10	10	10	10	10	10	10	10	10	10	120
	Advertising material	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Ads	200	200	200	200	200	200	200	200	200	200	200	200	2.400
	Promotional Gifts	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Customer loyalty programs	200	200	200	200	200	200	200	200	200	200	200	200	2.400
	Sponsoring	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Webhosting	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Plugins	50	50	50	50	50	50	50	50	50	50	50	50	600
	image licenses	20	20	20	20	20	20	20	20	20	20	20	20	240
	Quality labels	50	50	50	50	50	50	50	50	50	50	50	50	600
	Sustomer rating portals	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	SEO/SEA	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Fairs	500	500	500	500	500	500	500	500	500	500	500	500	6.000
<b>Interests</b>	<b>Sum</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	Loans	0	0	0	0	0	0	0	0	0	0	0	0	0
	Credits	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Depreciation</b>	<b>Sum</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>1.600</b>
<b>SUM</b>		<b>27.643</b>	<b>27.643</b>	<b>27.643</b>	<b>27.643</b>	<b>27.643</b>	<b>27.643</b>	<b>32.843</b>	<b>32.843</b>	<b>32.843</b>	<b>32.843</b>	<b>32.843</b>	<b>32.843</b>	<b>362.920</b>

Cost Planning 2023

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
<b>Labor-cost</b>	<b>Sum</b>	<b>31.600</b>	<b>31.600</b>	<b>31.600</b>	<b>31.600</b>	<b>31.600</b>	<b>31.600</b>	<b>34.200</b>	<b>34.200</b>	<b>34.200</b>	<b>34.200</b>	<b>34.200</b>	<b>34.200</b>	<b>394.800</b>
	CEO (1)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	43.200
	CTO (2)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	43.200
	Head of Quality & R. A. (3)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	43.200
	Marketing & Sales (4)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	Data Science (5)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	Programmer (6)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	CFO (7)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	Administration (8)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	Marketing & Sales (9)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	Programmer (10)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	Programmer (11)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
	Administration (12)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	15.600
<b>Location costs</b>	<b>Sum</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>1.500</b>	<b>18.000</b>
	Rent	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	18.000
<b>Services</b>	<b>Sum</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>36.000</b>
	External Services	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Supporting devices	600	600	600	600	600	600	600	600	600	600	600	600	7.200
	Accounting and Tax Consultancy	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Medical product certification	700	700	700	700	700	700	700	700	700	700	700	700	8.400
	Medical product consultation	600	600	600	600	600	600	600	600	600	600	600	600	7.200
	Other Consultation	500	500	500	500	500	500	500	500	500	500	500	500	6.000
<b>Travel Expenses</b>	<b>Sum</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>8.040</b>
	Taxi	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Train	200	200	200	200	200	200	200	200	200	200	200	200	2.400
	Flights	150	150	150	150	150	150	150	150	150	150	150	150	1.800
	Hotels	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Rental Cars	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Parking	20	20	20	20	20	20	20	20	20	20	20	20	240
<b>Insurances</b>	<b>Sum</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>1.200</b>
	Legal protection insurance	100	100	100	100	100	100	100	100	100	100	100	100	1.200
<b>Marketing</b>	<b>Sum</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>26.880</b>
	Stationary Files	10	10	10	10	10	10	10	10	10	10	10	10	120
	Business cards	10	10	10	10	10	10	10	10	10	10	10	10	120
	Advertising material	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Ads	200	200	200	200	200	200	200	200	200	200	200	200	2.400
	Promotional Gifts	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Customer loyalty programs	200	200	200	200	200	200	200	200	200	200	200	200	2.400
	Sponsoring	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Webhosting	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	Plugins	50	50	50	50	50	50	50	50	50	50	50	50	600
	image licenses	20	20	20	20	20	20	20	20	20	20	20	20	240
	Quality labels	50	50	50	50	50	50	50	50	50	50	50	50	600
	Sustomer rating portals	100	100	100	100	100	100	100	100	100	100	100	100	1.200
	SEO/SEA	300	300	300	300	300	300	300	300	300	300	300	300	3.600
	Fairs	500	500	500	500	500	500	500	500	500	500	500	500	6.000
<b>Interests</b>	<b>Sum</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	Loans	0	0	0	0	0	0	0	0	0	0	0	0	0
	Credits	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Depreciation</b>	<b>Sum</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>133</b>	<b>1.600</b>
<b>SUM</b>		<b>39.243</b>	<b>39.243</b>	<b>39.243</b>	<b>39.243</b>	<b>39.243</b>	<b>39.243</b>	<b>41.843</b>	<b>41.843</b>	<b>41.843</b>	<b>41.843</b>	<b>41.843</b>	<b>41.843</b>	<b>486.520</b>

**Profit and loss statement 2021**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
Sales	0	0	0	0	916	916	2.748	3.663	4.246	6.078	8.243	8.825	35.633
Labor-cost	16.600	16.600	16.600	16.600	16.600	18.200	18.200	18.200	18.200	18.200	18.200	18.200	210.400
Location costs	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	12.000
Services	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	31.200
Travel Expenses	0	0	0	0	0	670	670	670	670	670	670	670	4.690
Insurances	100	100	100	100	100	100	100	100	100	100	100	100	1.200
Marketing	1.740	1.740	1.740	1.740	1.740	1.740	2.240	2.240	2.240	2.240	2.240	2.240	23.880
Interests	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	400	400	400	400	400	400	400	400	400	400	400	400	4.800
=													
Operating income (before taxes)	-22.440	-22.440	-22.440	-22.440	-21.524	-23.794	-22.463	-21.547	-20.964	-19.133	-16.968	-16.385	-252.537
business tax	0	0	0	0	0	0	0	0	0	0	0	0	0
repayment credits/loans	0	0	0	0	0	0	0	0	0	0	0	0	0
=													
Surplus/Deficit	-22.440	-22.440	-22.440	-22.440	-21.524	-23.794	-22.463	-21.547	-20.964	-19.133	-16.968	-16.385	-252.537

**Profit and loss statement 2022**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
Sales	10.657	12.822	13.404	15.236	17.401	17.983	25.563	27.728	28.310	32.058	34.223	34.805	270.188
Labor-cost	20.200	20.200	20.200	20.200	20.200	20.200	25.400	25.400	25.400	25.400	25.400	25.400	273.600
Location costs	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	18.000
Services	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	33.600
Travel Expenses	670	670	670	670	670	670	670	670	670	670	670	670	8.040
Insurances	100	100	100	100	100	100	100	100	100	100	100	100	1.200
Marketing	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	26.880
Interests	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	133	133	133	133	133	133	133	133	133	133	133	133	1.600
=													
Operating income (before taxes)	-16.987	-14.822	-14.239	-12.408	-10.243	-9.660	-7.281	-5.116	-4.533	-786	1.379	1.962	-55.933
minus taxes 1	0	0	0	0	0	0	0	0	0	0	345	490	835
minus repayment credits/loans	0	0	0	0	0	0	0	0	0	0	0	0	0
=													
Surplus/Deficit	-16.987	-14.822	-14.239	-12.408	-10.243	-9.660	-7.281	-5.116	-4.533	-786	1.034	1.471	-93.568

**Profit and loss statement 2023**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUM
Sales	38.553	40.718	41.300	45.048	47.213	47.795	51.543	53.708	54.290	58.038	60.203	60.785	599.190
Labor-cost	31.600	31.600	31.600	31.600	31.600	31.600	34.200	34.200	34.200	34.200	34.200	34.200	394.800
Location costs	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	18.000
Services	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	36.000
Travel Expenses	670	670	670	670	670	670	670	670	670	670	670	670	8.040
Insurances	100	100	100	100	100	100	100	100	100	100	100	100	1.200
Marketing	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	26.880
Other	0	0	0	0	0	0	0	0	0	0	0	0	0
Interests	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	133	133	133	133	133	133	133	133	133	133	133	133	1.600
=													
Operating income (before taxes)	-691	1.474	2.057	5.804	7.969	8.552	9.699	11.864	12.447	16.194	18.359	18.942	112.670
minus taxes 1	0	369	514	1.451	1.992	2.138	2.425	2.966	3.112	4.049	4.590	4.735	28.340
minus repayment credits/loans	0	0	0	0	0	0	0	0	0	0	0	0	0
=													
Surplus/Deficit	-691	1.106	1.543	4.353	5.977	6.414	7.274	8.898	9.335	12.146	13.769	14.206	84.330

Cash flow analysis 2021

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>Revenue</b>												
Sales	0	0	0	0	916	916	2.748	3.663	4.246	6.078	8.243	8.825
Assets	260.000					180.000						180.000
External-financing	0											
<b>Total liquidity access</b>	<b>260.000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>916</b>	<b>180.916</b>	<b>2.748</b>	<b>3.663</b>	<b>4.246</b>	<b>6.078</b>	<b>8.243</b>	<b>188.825</b>
<b>Spending</b>												
<b>Investments</b>	<b>13.800</b>											
<b>Labor-cost</b>	<b>16.600</b>	<b>16.600</b>	<b>16.600</b>	<b>16.600</b>	<b>16.600</b>	<b>18.200</b>	<b>18.200</b>	<b>18.200</b>	<b>18.200</b>	<b>18.200</b>	<b>18.200</b>	<b>18.200</b>
CEO (1)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600
CTO (2)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600
Head of Quality & R. A. (3)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600
Marketing & Sales (4)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
(part-time) Data Science (5)	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600
(part-time) Data Science (5)	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600
(part-time) CFO (7)	0	0	0	0	0	0	0	0	0	0	0	0
(part-time) Administration (8)	0	0	0	0	0	1.600	1.600	1.600	1.600	1.600	1.600	1.600
<b>Location costs</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>
Rent	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
<b>Services</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>	<b>2.600</b>
External Services	300	300	300	300	300	300	300	300	300	300	300	300
Supporting devices	200	200	200	200	200	200	200	200	200	200	200	200
Accounting and Tax Consultancy	300	300	300	300	300	300	300	300	300	300	300	300
Medical product certification	700	700	700	700	700	700	700	700	700	700	700	700
Medical product consultation	600	600	600	600	600	600	600	600	600	600	600	600
Other Consultation	500	500	500	500	500	500	500	500	500	500	500	500
<b>Travel Expenses</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>
Taxi	0	0	0	0	0	100	100	100	100	100	100	100
Train	0	0	0	0	0	200	200	200	200	200	200	200
Flights	0	0	0	0	0	150	150	150	150	150	150	150
Hotels	0	0	0	0	0	100	100	100	100	100	100	100
Rental Cars	0	0	0	0	0	100	100	100	100	100	100	100
Parking	0	0	0	0	0	20	20	20	20	20	20	20
<b>Insurances</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Legal protection insurance	100	100	100	100	100	100	100	100	100	100	100	100
<b>Marketing</b>	<b>1.740</b>	<b>1.740</b>	<b>1.740</b>	<b>1.740</b>	<b>1.740</b>	<b>1.740</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>	<b>2.240</b>
Stationary Files	10	10	10	10	10	10	10	10	10	10	10	10
Business cards	10	10	10	10	10	10	10	10	10	10	10	10
Advertising material	300	300	300	300	300	300	300	300	300	300	300	300
Ads	200	200	200	200	200	200	200	200	200	200	200	200
Promotional Gifts	100	100	100	100	100	100	100	100	100	100	100	100
Customer loyalty programs	200	200	200	200	200	200	200	200	200	200	200	200
Sponsoring	300	300	300	300	300	300	300	300	300	300	300	300
Webhosting	100	100	100	100	100	100	100	100	100	100	100	100
Plugins	50	50	50	50	50	50	50	50	50	50	50	50
image licenses	20	20	20	20	20	20	20	20	20	20	20	20
Quality labels	50	50	50	50	50	50	50	50	50	50	50	50
Sustomer rating portals	100	100	100	100	100	100	100	100	100	100	100	100
SEO	300	300	300	300	300	300	300	300	300	300	300	300
SEA	0	0	0	0	0	0	500	500	500	500	500	500
<b>Total outflow of liquidity</b>	<b>35.840</b>	<b>22.040</b>	<b>22.040</b>	<b>22.040</b>	<b>22.040</b>	<b>24.310</b>	<b>24.810</b>	<b>24.810</b>	<b>24.810</b>	<b>24.810</b>	<b>24.810</b>	<b>24.810</b>
Interests credits/loans	0	0	0	0	0	0	0	0	0	0	0	0
Repayments credits/loans	0	0	0	0	0	0	0	0	0	0	0	0
<b>Liquidity</b>	<b>0</b>	<b>224.160</b>	<b>202.120</b>	<b>180.080</b>	<b>158.040</b>	<b>136.916</b>	<b>293.522</b>	<b>271.459</b>	<b>250.313</b>	<b>229.748</b>	<b>211.016</b>	<b>194.448</b>

Cash flow analysis 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>Revenue</b>												
Sales	10.657	12.822	13.404	15.236	17.401	17.983	25.563	27.728	28.310	32.058	34.223	34.805
Assets						60.000						
External-financing												
<b>Total liquidity access</b>	<b>10.657</b>	<b>12.822</b>	<b>13.404</b>	<b>15.236</b>	<b>17.401</b>	<b>77.983</b>	<b>25.563</b>	<b>27.728</b>	<b>28.310</b>	<b>32.058</b>	<b>34.223</b>	<b>34.805</b>
<b>Spending</b>												
Labor-cost	20.200	20.200	20.200	20.200	20.200	20.200	25.400	25.400	25.400	25.400	25.400	25.400
CEO (1)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600
CTO (2)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600
Head of Quality & R. A. (3)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600
Marketing & Sales (4)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
Data Science (5)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
Programmer (6)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
CFO (7)	0	0	0	0	0	0	0	0	0	0	0	0
(part-time) Administration (8)	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600
Programmer (9)	0	0	0	0	0	0	2.600	2.600	2.600	2.600	2.600	2.600
Marketing & Sales (10)	0	0	0	0	0	0	2.600	2.600	2.600	2.600	2.600	2.600
Location costs	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500
Rent	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500
Services	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800
External Services	300	300	300	300	300	300	300	300	300	300	300	300
Supporting devices	400	400	400	400	400	400	400	400	400	400	400	400
Accounting and Tax Consultancy	300	300	300	300	300	300	300	300	300	300	300	300
Medical product certification	700	700	700	700	700	700	700	700	700	700	700	700
Medical product consultation	600	600	600	600	600	600	600	600	600	600	600	600
Other Consultation	500	500	500	500	500	500	500	500	500	500	500	500
Travel Expenses	670	670	670	670	670	670	670	670	670	670	670	670
Taxi	100	100	100	100	100	100	100	100	100	100	100	100
Train	200	200	200	200	200	200	200	200	200	200	200	200
Flights	150	150	150	150	150	150	150	150	150	150	150	150
Hotels	100	100	100	100	100	100	100	100	100	100	100	100
Rental Cars	100	100	100	100	100	100	100	100	100	100	100	100
Parking	20	20	20	20	20	20	20	20	20	20	20	20
Insurances	100	100	100	100	100	100	100	100	100	100	100	100
Legal protection insurance	100	100	100	100	100	100	100	100	100	100	100	100
Marketing	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240
Stationary Files	10	10	10	10	10	10	10	10	10	10	10	10
Business cards	10	10	10	10	10	10	10	10	10	10	10	10
Advertising material	300	300	300	300	300	300	300	300	300	300	300	300
Ads	200	200	200	200	200	200	200	200	200	200	200	200
Promotional Gifts	100	100	100	100	100	100	100	100	100	100	100	100
Customer loyalty programs	200	200	200	200	200	200	200	200	200	200	200	200
Sponsoring	300	300	300	300	300	300	300	300	300	300	300	300
Webhosting	100	100	100	100	100	100	100	100	100	100	100	100
Plugins	50	50	50	50	50	50	50	50	50	50	50	50
image licenses	20	20	20	20	20	20	20	20	20	20	20	20
Quality labels	50	50	50	50	50	50	50	50	50	50	50	50
Sustomer rating portals	100	100	100	100	100	100	100	100	100	100	100	100
SEO	300	300	300	300	300	300	300	300	300	300	300	300
SEA	500	500	500	500	500	500	500	500	500	500	500	500
<b>Total outflow of liquidity</b>	<b>27.510</b>	<b>27.510</b>	<b>27.510</b>	<b>27.510</b>	<b>27.510</b>	<b>27.510</b>	<b>32.710</b>	<b>32.710</b>	<b>32.710</b>	<b>32.710</b>	<b>32.710</b>	<b>32.710</b>
minus interests credits/loans	0	0	0	0	0	0	0	0	0	0	0	0
minus repayments credits/loans	0	0	0	0	0	0	0	0	0	0	0	0
<b>Liquidity</b>	<b>358.463</b>	<b>341.610</b>	<b>326.922</b>	<b>312.816</b>	<b>300.542</b>	<b>290.433</b>	<b>340.906</b>	<b>333.758</b>	<b>328.776</b>	<b>324.376</b>	<b>323.723</b>	<b>325.236</b>



Cash flow analysis 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>Revenue</b>												
Sales	38.553	40.718	41.300	45.048	47.213	47.795	51.543	53.708	54.290	58.038	60.203	60.785
Assets												
External-financing												
<b>Total liquidity access</b>	<b>38.553</b>	<b>40.718</b>	<b>41.300</b>	<b>45.048</b>	<b>47.213</b>	<b>47.795</b>	<b>51.543</b>	<b>53.708</b>	<b>54.290</b>	<b>58.038</b>	<b>60.203</b>	<b>60.785</b>
<b>Spending</b>												
Labor-cost	31.600	31.600	31.600	31.600	31.600	31.600	34.200	34.200	34.200	34.200	34.200	34.200
CEO (1)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600
CTO (2)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600
Head of Quality & R. A. (3)	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600	3.600
Marketing & Sales (4)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
Data Science (5)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
Programmer (6)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
CFO (7)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
Administration (8)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
Marketing & Sales (9)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
Programmer (10)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
Programmer (11)	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.600
Administration (12)	0	0	0	0	0	0	2.600	2.600	2.600	2.600	2.600	2.600
Location costs	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500
Rent	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500
Services	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
External Services	300	300	300	300	300	300	300	300	300	300	300	300
Supporting devices	600	600	600	600	600	600	600	600	600	600	600	600
Accounting and Tax Consultancy	300	300	300	300	300	300	300	300	300	300	300	300
IT-Service Provider	700	700	700	700	700	700	700	700	700	700	700	700
Training and Development	600	600	600	600	600	600	600	600	600	600	600	600
Other Services	500	500	500	500	500	500	500	500	500	500	500	500
Travel Expenses	670	670	670	670	670	670	670	670	670	670	670	670
Taxi	100	100	100	100	100	100	100	100	100	100	100	100
Train	200	200	200	200	200	200	200	200	200	200	200	200
Flights	150	150	150	150	150	150	150	150	150	150	150	150
Hotels	100	100	100	100	100	100	100	100	100	100	100	100
Rental Cars	100	100	100	100	100	100	100	100	100	100	100	100
Parking	20	20	20	20	20	20	20	20	20	20	20	20
Insurances	100	100	100	100	100	100	100	100	100	100	100	100
Legal protection insurance	100	100	100	100	100	100	100	100	100	100	100	100
Marketing	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240
Stationary Files	10	10	10	10	10	10	10	10	10	10	10	10
Business cards	10	10	10	10	10	10	10	10	10	10	10	10
Advertising material	300	300	300	300	300	300	300	300	300	300	300	300
Ads	200	200	200	200	200	200	200	200	200	200	200	200
Promotional Gifts	100	100	100	100	100	100	100	100	100	100	100	100
Customer loyalty programs	200	200	200	200	200	200	200	200	200	200	200	200
Sponsoring	300	300	300	300	300	300	300	300	300	300	300	300
Webhosting	100	100	100	100	100	100	100	100	100	100	100	100
Plugins	50	50	50	50	50	50	50	50	50	50	50	50
image licenses	20	20	20	20	20	20	20	20	20	20	20	20
Quality labels	50	50	50	50	50	50	50	50	50	50	50	50
Sustomer rating portals	100	100	100	100	100	100	100	100	100	100	100	100
SEO	300	300	300	300	300	300	300	300	300	300	300	300
SEA	500	500	500	500	500	500	500	500	500	500	500	500
<b>Total outflow of liquidity</b>	<b>39.110</b>	<b>39.110</b>	<b>39.110</b>	<b>39.110</b>	<b>39.110</b>	<b>39.110</b>	<b>41.710</b>	<b>41.710</b>	<b>41.710</b>	<b>41.710</b>	<b>41.710</b>	<b>41.710</b>
minus interests credits/loans	0	0	0	0	0	0	0	0	0	0	0	0
minus repayments credits/loans	0	0	0	0	0	0	0	0	0	0	0	0
<b>Liquidity</b>	<b>327.331</b>	<b>326.773</b>	<b>328.381</b>	<b>330.571</b>	<b>336.508</b>	<b>344.611</b>	<b>353.296</b>	<b>363.128</b>	<b>375.126</b>	<b>387.706</b>	<b>404.033</b>	<b>422.526</b>