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Business Plan – Innovative Platform to Create Digital Memorials

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MSc in Management

Supervisor:

PhD Renato Telo de Freitas Barbosa Pereira, Assistant Professor,

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BUSINESS
SCHOOL

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Abstract

The innovative proposal presented in this business plan consists of a web and mobile application that enables the creation of a digital memorial of a person's life. It will allow everyone to remember and preserve memories of a loved one or friend by gathering key and joyful memories such as photos, videos and audios, building a family tree, documenting a person's life story in an online space, and sharing it with family and friends.

Thus, it will enable anyone to eternalize their existence in a private, safe, accessible online space from anywhere in the world and far from the noise of invasive advertising, such as in traditional social media nowadays.

The underlying subject is extremely relevant as each year 110,000 people die, on average, in Portugal and recent research developed by University of Oxford researchers suggests that, between 2050 and 2070, the number of Facebook active users will be exceeded by the number of accounts of deceased users, amounting to approximately 4.9 billion before the year 2100.

The target market will be people from 18 to 59 years old, social media user, direct relatives of deceased persons and the typical visitor of a cemetery.

Furthermore, the main revenue stream will be based on a freemium model and its main costs will be marketing and human resources, particularly for the software development area. Its prototype is projected to take 6 months to be developed and will be the next step to follow.

Keywords: business plan, innovation, digital afterlife, web and mobile application, memory preservation

JEL Classification: O35 (Social Innovation), M13 (New Firms, Startups)

Resumo

A proposta inovadora apresentada neste plano de negócios consiste numa aplicação móvel e web que possibilita a criação de um memorial digital da vida de uma pessoa, falecida ou viva. Permitirá a preservação da memória e identidade de um ente querido ou amigo, compilando memórias de sua vida, como fotos, vídeos e áudios, construindo uma árvore genealógica e documentando a história de vida da pessoa num espaço online e compartilhando com a família e amigos.

Assim, dará a possibilidade a qualquer pessoa de eternizar a sua existência num espaço online privado, seguro, acessível em qualquer parte do mundo e longe do ruído da publicidade, como é o caso das redes sociais atuais.

O tema subjacente é extremamente relevante uma vez que, todos os anos morrem, em média, 110.000 pessoas em Portugal e uma investigação recente desenvolvida por investigadores da Universidade de Oxford sugere que, entre 2050 e 2070, o número de utilizadores ativos do Facebook será ultrapassado pelo número de contas de utilizadores falecidos, totalizando aproximadamente 4,9 mil milhões antes do ano 2100.

O público-alvo serão pessoas das faixas etárias entre os 18 a 59 anos, utilizadores de redes sociais, familiares diretos de falecidos e o típico visitante de cemitério.

Adicionalmente, a principal fonte de receita será baseada num modelo freemium e as principais rubricas de custos e fatores críticos de sucesso serão o marketing e recursos humanos, especialmente para o desenvolvimento de software. O protótipo funcional está previsto estar concluído ao fim de 6 meses e será o próximo passo.

Palavras-chave: plano de negócios, inovação, depois da morte, aplicação móvel e web, preservação de memória

Classificação JEL: O35 (Social Innovation), M13 (New Firms, Startups)

Executive Summary

This report will approach the reason why this theme is relevant, as well as pertinent information to support it and motivations for this theme's choice. Moreover, a literature review will be presented beginning with the introduction of the concept, perspectives regarding Digital Afterlife, an overview of the Digital Afterlife Industry (DAI), viewpoints regarding its economics and ethical issues and the role of current social media about the matter. To get a deeper understanding of the Digital Afterlife industry, further literature review will be developed, as more scientific studies and literary endeavours on the subject emerge, considering that it is still a fresh topic.

Brainstorming and the gathering of technical requisites regarding the platform's features took place in order to develop visual mock-ups as an initial proposal of the user interface and user experience (UI/UX). To make this possible, a web search and inquiries to the promoter's network of computer and software engineers occurred to determine which software to use in the mock-up's creation. The mock-ups will provide an initial version of the service to be delivered, without which, it will not be possible to conduct a quantitative concept test and get reliable primary data. Additionally, it is vital to put the project's assumptions and the platform to test and validation, as not only the problem but also the solution, the platform's traffic and the business model were validated by potential customers through the completion of an online questionnaire and the verification of the minimum success criteria.

Subsequently, a market analysis was conducted not only through secondary data but also through the primary data gathered by the conduction of an online questionnaire. Hereupon, valuable feedback was gathered from potential consumers, where valuable conclusions concerning its adherence and critical viewpoints on the present version for improvement were withdrawn, as well as assess the fit of the business model with the value proposition.

Next, a competitive analysis was developed starting with an overview of the megatrends that drive most of the external environment, doing an intensive analysis of the domestic and direct competition and crossing it with the main attributes of Biomory to conclude whether the platform has the competitive advantage necessary to survive and thrive in the marketplace. In addition, a Porter 5 Forces analysis was developed, that lead to conclude that the industry is moderately attractive and, ultimately, a SWOT analysis, were internal and external forces, such strengths, weaknesses, opportunities and threats were outlined and cross-compared with each other in order to facilitate the creation of strategies to exploit opportunities or to mitigate possible risks.

The identification of clear objectives and a development strategy was of critical importance since it provided not only the identification of the mission and the vision of the business, as well as the

orientation and guidance so that implementation policies and actions can be directed. Both the objectives and the development strategy were placed in short, mid and long term perspectives.

Following, implementation policies were defined, as well as its requisites. Here lie the main critical success factors, regarding the technology, the platform will be developed with Flutter and the data will be stored in AWS cloud services, the human resources organizational structure will start with two cofounders and at the end of year 5, 12 elements will compose the team, the marketing strategies will be focused mainly in Facebook ads and a financial plan was developed.

Succeeding, the financial computations enabled the conclusion of the financial viability of the project. Even though the financing amount required is 170,000€, estimates carried out suggest that the project will generate a net present value of 96,444.83€, an internal rate of return of 19.82%, a payback period of 4.45 years and a profitability index of 5.95. Moreover, in the longer-term scenario, it is expected a very promising return on investment both for its cofounders and its investors, as the enterprise value in perpetuity amounts to 9,262,430.57€.

Lastly, further plans will commence, namely proceeding to the development of a functional prototype, raise of capital, team increment, development of the full software and the platform launch.

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Glossary

AWS - Amazon Web Services

AWS S3 - AWS Simple Storage Service

BEP – Break-even point

CAC - Customer Acquisition Cost

CAPEX - Capital expenditure

CEO - Chief executive officer

CFO - Chief financial officer

CMO - Chief marketing officer

COGS - Cost of goods sold

COO - Chief operating officer

CPC - Cost-per-click

CTO - Chief technology officer

CVR - Conversion Rate

DAI - Digital afterlife industry

FCFE - Free cash flow to equity

FCFF - Free cash flow to firm

ICOM - International Council of Museums

IOS - iPhone Operating System

IRR - Internal rate of return

NDA - Non-disclosure agreement

NPV - Net present value

OPEX - Operational Expenses

PPC - Pay-per-click

QR Code – Quick response code

ROI - Return on Investment

SNS - Social network site

SWOT - Strengths, Weaknesses, Opportunities and Threats

UI - User Interface

URL - Uniform resource locator

UX - User Experience

VAT - Value added tax

WACC - Weighted average cost of capital

WC - Working capital

1. Promoter and Innovative Proposal

The innovative proposal presented in this business plan consists of a web and mobile application that enables the creation of a digital memorial of a person's life. It will allow everyone to remember and preserve memories of a loved one or friend by gathering key and joyful memories such as photos, videos and audios, building a family tree and documenting a person's life story in an online space and sharing it with family and friends.

Thus, it will enable anyone to eternalize their existence in a private, safe and accessible online space from anywhere in the world and far from the noise of invasive advertising, such as in traditional social media nowadays.

People could get to know their ancestors better, where they came from, where they went and what they did. Likewise, people could record their own life story so that their children, grandchildren, and future generations will know who they were, what mark they left in the community and prevent those hundreds of memories contained in mobile phones, computers or in some physical format to get lost and forgotten.

The promoter is original from Madeira Island and is now living in Lisbon. He has a bachelor's degree in Finance and Accounting from ISCTE Business School, a post-graduate diploma in Foresight, Strategy and Innovation from ISEG Executive Education and is currently a finalist of the master's in management at ISCTE Business School. Furthermore, he was a member of ISCTE Students Union where he had the opportunity to collaborate, create and monitor small to big, formal to informal university events.

An Innovative Business Plan was chosen for the reason that the promoter considers it the perfect fit to combine his academic background in management, personal interest, motives, to contribute in the best possible way to the community and is often looking for new and differentiated ways of value creation, whatever the industry might be. In this day and age, people of his generation often are highly processed to follow the herd and are not encouraged to think from themselves and outside the box. Nevertheless, I believe that one of my missions, in my lifetime, is to create and bring forth a differentiated product or service that can impact and improve people's lives through innovation.

Moreover, he would like to briefly expose the trigger for the coming about of the innovative proposal. For the first 22 years of his life, he had experienced plenty of happy times with my family. Suddenly, in 3 years, 3 grandparents of mine passed away. For the first time, he faced the hard truth about life: it is ephemeral and finite. A path that all human beings must take. He felt that he came out of a box full of illusions, which made him question everything, but also made him grow emotionally. Suddenly, when he was visiting one of his grandparent's grave, he thought to himself

how unfortunate it is to come to a place to visit his grandmother's last resting place and honour her memory and there is only the date of birth, the date of death, a photo of her face and a "random" quote of the bible. He thought that there is so much more to remember, not only her, but also all the deceased deserve a better remembering practice for their memory and even he felt that the bereaved needed a better experience to remember the beloved one that has departed, not to replace the visit to the grave but to complement it. Now, at 26 years old, those events changed his perspective about life in a variety of ways, namely in acknowledging the importance of human relations and in different areas such as time management, communication, prioritization, and productivity.

2. Literature Review

2.1 Relevance

The practices of mourning and honouring the deceased vary by culture and region. Even so, they are the same that have been around for hundreds, if not thousands of years, such as burial, cremation and embalming. In what regards remembering practices, it is also the same, considering the similar timeline, with some people visiting the deceased's grave, others keeping a few photographic memories but, ultimately, in the vast majority of cases, the result is the progressive forgetfulness of the deceased's memory as it remains mainly in the physical memories of close family and friends. The memory of an average deceased individual is considered almost completely obliviated around 75 years after his death (Unruh, 1983), at least before the internet came about.

After a person dies, his/her memory or existence perdures in the memories of the people who were close to him/her such as family and close friends. However, research indicates that, as time goes by, not only a person's existence starts to fade away from a loved one's memory, but also, as new generations come along, it tends to be forgotten and almost completely obliviated over the decades. There is not much the average person can do about it unless he/she is famous or rich.

People normally visit his/her last resting place to the cemetery and honour his/her memory only to behold the date of birth, the date of death, a photo of his/her face and often a quote from the Holy Bible. Besides that, people generally keep photos and albums in boxes at home, in the basement, and fewer ones keep one or two photos in the living room.

The promoter thinks that there is so much more to remember and that there must be another and a better way. Not only the deceased deserve a better memory preservation practice, but also, the author felt that the bereaved needed a better experience to remember the beloved one that has departed, not to replace the visit to the grave but to complement it.

In addition, primary and secondary data, further analysed in chapter 6, both demonstrate that this is a relevant issue and topic to be addressed in the coming years and in the future. The dead are becoming increasingly present in cyberspace. For instance, Facebook has more than 2,7 billion active users as of Q2 2020 and an estimation of 8000 users die every day (Westreich, 2020). A study from University of Oxford researchers found that Facebook could have 4,9 billion dead users by 2100 (Öhman, 2019), indicating that sometime by the end of the century, depending on Facebook's user growth rate, the profiles of deceased people are expected to surpass the number of active living user profiles (Brown 2016), thereby creating a form of "digital graveyard'' (Ambrosino 2016). Initially, the emergence of "dead" users posed a challenge for businesses (McCallig 2013, 11), however soon led to the development of several innovative services and new opportunities for enterprises to monetize the digital afterlife of the perished Internet users.

Moreover, the world population has grown rapidly, particularly over the past century: in 1900 there were fewer than 2 billion people on the planet; today there are around 7,8 billion (Worldometer, 2020). The total number of deaths in the world in 2019 was estimated to be around 58,39 million people (United Nations, 2019). In 2050, the number of deaths is projected to be around 92,74 million people as it is forecasted that the world population will continue to rapidly grow reaching the 10 billion people mark around that year (Worldometer, 2020).

Beyond that, digital technology is disrupting society and culture. The effects of the COVID-19 pandemic forced these changes, accelerating the speed of change. Traditions held for years are being set aside as technology is allowing new choices about how remembering our lives will occur. Most of these choices are projected to be online (Billingham, n.d.). As a result, a digital eternity might now be possible (Aceti, 2015).

Ultimately, online memorials allow participation in the process of grief from a distance at anytime and anyplace; in the view of some sociologists, such exhibitions of grief are vital for emotional recapture after bereavement (Mitchel, 2012), continuing ties and expressing feelings for the deceased might be considered beneficial to the ones left behind (Bell et al., 2015). Dissimilar from some other forms of memorials, they have a marginal to none environmental impact (Veerman, 2011).

2.2 Perspectives on Digital Afterlife

The concept of Digital Afterlife is defined as the continuation of an active or passive digital presence after death (Savin-Baden, Burden, & Taylor, 2017).

Advances in data mining and artificial intelligence are now making an active presence after death possible, and the deceased remain part of our lives as they continue to live in our digital devices (Bassett, 2015).

Recent developments seem to suggest changes in perceptions about embodiment, death, and afterlife (Walter, 2017). Digital media are currently being used to enlarge the options of honouring the deceased and managing the grief of the bereaved, complementing and sometimes replacing the well-established formal structures and rituals of Christianity and other faiths. For instance, it is now possible to light online memorial “candles” and create augmented coffins and gravestones with QR codes.

Furthermore, Richman (2016) suggests that people are motivated to document their experience at the end of life because it is a way of enduring when physical existence is not possible in death: “to create because nobody (physically) endures and create in order that you endure”. A highly visible example of documenting one’s end of life journey while creating a Digital Afterlife is that of Randy Pausch, a Carnegie Mellon professor whose journey with pancreatic cancer between his diagnosis in

2006 and his death on July 25, 2008 was captured in an online blog. Public awareness of his impending death skyrocketed in September 2007 when the video of his Last Lecture (a talk presumed to be the professor's final opportunity to convey his wisdom) went viral. Professor Pausch noted that "Under the ruse of giving an academic lecture, I was trying to put myself in a bottle that would one day wash up on the beach for my children", who were all under age 6 at the time (Pausch & Zaslow, 2008). Nowadays, Professor Pausch's Digital Afterlife continues via several Facebook pages and over 20 million YouTube views of his lecture.

Even with growing attention and research concerning online mortality (Hutchings, 2017) there is not enough investigation of the impact of the use of digital media and the creation of digital immortality on religious practices and grief management (Savin-Baden & Mason-Robbie, 2020).

Moreover, Savin-Baden and Mason-Robbie (2020) proposed 3 types of stakeholders that can play a role in the usage of digital media, that are presented below.

2.2.1 Preservers of Digital Media

Preservers are those who use memories and artefacts to create a digital legacy, such as a memorial site or a digitally immortal persona, and may include the deceased themselves before death. Three potential types of creators of Digital Afterlives can be identified:

- Memory creators - Those creating passive digital memories and artefacts pre and post the subject's death. These have already been considered above in examples such as virtual venerations, digital commemoration, digital memorisation and durable biographies, and are typically not created by the subject.
- Avatar creators - The ones creating a representative interactive avatar prior death, typically by the subject, which is able to conduct a limited conversation with others but has a very limited capability to learn, grow, act on, and influence the wider environmente around it (and therefore could be considered a virtual humanoid in the typology identified by Burden & Savin-Baden, 2019). It has minimal likelihood of being mistaken for a still-living subject.
- Persona creators - Those creating a digitally immortal persona before death that learns and adapts over time and can influence and act on the wider environment around it and consequently could be considered a virtual human or even a virtual sapiens (Burden & Savin-Baden, 2019), being that it has a considerable likelihood of being mistaken for a still-living subject.

2.2.2 Mediators

Mediators are professionals, such as bereavement counsellors, religious leaders, or lawyers who support both people pre-death to create digital legacies of themselves, and the bereaved who receive or encounter legacies, memorial sites or digitally immortal persona. An understanding of

multiple perspectives, including the wishes and desires of the person pre-death, and the potential personal response of the receivers of the digital afterlife content of the deceased person are becoming more important to this group.

2.2.3 Receivers of Digital Media

These are people who receive the memories and artefacts, including memorial sites, digital messages, and/or digitally immortal persona. Reactions to the Digital Afterlife of the deceased may be highly idiosyncratic and unpredictable, and indeed may change over time. The perspective of this group should be an important consideration, in the cultural context within which they are embedded. Additionally, the postings specially provide a digital record for those whose geographic location prohibits face-to-face involvement (Mehring, 2013).

2.3 Social Media and Digital Afterlife

When the digital revolution came along, with its megabytes, gigabytes and then terabytes of inexpensive storage, it became possible to comprehensively document and even reproduce an individual's life. Not only do we deliberately capture, store, and share information across multiple platforms and on multiple devices, but we also fail to switch of the automatic data-capturing settings that lie buried deep in our devices, like the iPhone feature that tracks everywhere you have ever been (Zahradnik, 2019). In fewer than two decades, we have Social Media and moved from no digital trace at all, to digital 'footprints', to well-developed digital identities. As artificial intelligence (AI) advances, phenomenon as artificially intelligent humanoid robot created from the digital remains of a woman's dead partner may become possible too (Kasket, 2020, p.31).

Facebook, with its two billion (living) users, has made significant advances in supporting users who wish to mourn and stay in touch with the profiles of the departed (Öhman, 2018). In 2009, for example, Facebook began to allow bereaved family members to turn the profiles of their lost ones into memorial sites, spaces to meet, mourn, and collectively ''keep in touch'' with the deceased (Facebook, 2016).

Trying to ensure that the friends of deceased users do not get birthday notifications or invite suggestions from their deceased friend, once Facebook is aware of a user passing away from a friend or relative contacting offers two options for dead accounts: turn them into memorials, where the social network rolled out a memorial tab, which allows people to designate legacy contacts who can curate posts, modify tag settings, change or cover photos, pin posts, and respond to friend requests. Legacy contacts are not able to read private messages or remove friends or make new ones. The account is flagged as deceased, but all the content stays up, and friends and family will be allowed to share "memories" on their timeline; or flag them to be deleted. If someone notifies Facebook that

the account holder is dead, and this option is selected, the account will be permanently deleted (Weistreich, 2020).

To avoid the mistreatment of this feature and targeting someone who is still alive, the memorialization request procedure requires documentation – relatives are asked to upload or provide a link to an funerary agency or obituary or other credible entity to verify the death before a team from Facebook assesses the request (Facebook, 2016).

Instagram, owned by Facebook, likewise memorializes profiles of deceased users upon requests from relatives. But the accounts are frozen afterwards — nobody can login, the account will not appear on Instagram's "Search" page, and its original privacy and visibility settings will remain. Twitter, meanwhile, only allows family members to request that a deceased user's account be deleted by means of identification and a death certificate (Greenspan, 2019).

Likewise, Google has recently launched an "inactive account manager" to deal with the inevitable deaths of its users, thereby following in the footsteps of numerous digital afterlife start-ups (Öhman, 2018). This service is more related with digital asset management.

2.4 The Digital Afterlife Industry (DAI)

The DAI includes a wide-ranging of actors (Oliveira et al., 2014) from small start-up platforms, to technology giants, such as Facebook and Google. It also includes a variety of services ranging from innovative artificial intelligence based avatars to simple password deposits. Although they differ in their particular business models, these organizations might all be placed under the same umbrella, the digital afterlife industry (DAI) (Öhman, 2017).

University of Oxford researchers Öhman and Floridi constructed a conceptual map of the industry (Öhman, 2018) indicating the presence of four types of services:

1. information management services**:** help users deal with problems concerning digital asset management, which may occur in the event of their own, or someone else's death. Such firms are seldom extremely technologically sophisticated. They generally create only a form of "digital will", ensuring that assets are passed on (or destroyed) on the event of death. Usage of digital remains: social media account management, death and afterlife planning, digital asset management (eg. digital bank accounts), personal information management and general posthumous instruction.
2. posthumous messaging services: provide a more customized product. The typical company sends out an e-mail to the user and if it goes unanswered, it activates messages and/or other forms of digital content to be sent to specified receivers. Whereas one or two messages are often sent for free, almost every site encourages their users to upgrade to some sort of a

premium paid package. Usage of digital remains: posthumous audio, video messaging, emailing, social media messaging, transactions of general social content, etc.

3. online memorial services**:** more explicitly directed towards the bereaved. They provide an online space for a deceased individual or group to be grieved and remembered. These websites often include features such as logs and other forms of intercommunication channels, where the bereaved can mourn together and store memories such as photos, videos and other content, which function as a sort of digital grave marker. This type of service is many times delivered by a start-up with around 50,000 users. However, Facebook currently hosts the majority of online memorials, despite the feature not being part of its primary business model. Just as Facebook, most services advertise themselves as free, but almost without exception there is some form of paid "premium" version. Usage of digital remains: online spaces for memorial and grief, crowdsourcing digital content about the deceased and SNS (Social Network Site) Memorials.
4. re-creation services**:** use personal data to create new content reproducing a deceased person's social behaviour, often through a chat bot-like application that generates new messages based on past data. Re-creation services are typically provided by fairly young start-up companies. Unlike with the previous categories, this type of feature has yet to be adopted by technology giants. Nevertheless, user statistics are growing promptly, Eter9 being one of the fastest-growing cases. Likewise, Massachusetts Institute of Technology start-up Eterni.me also has roughly 33,000 beta-subscribers, and Replica alleges to have around half a million users. Usage of digital remains: "mind-backup" creation, digital avatars and SNS with artificial intelligence.

2.5 Economics and Data in the DAI

Due to its novelty, and despite the significance and magnitude of the issue, very little is currently known about the industry data in terms of economics (Öhman, 2017).

In what regards memorials, unlike the physical world, there are practically no space restrictions in cyberspace and since the deceased do not generate much new content, it costs relatively little to keep profiles of deceased people online, compared to live ones (Carroll, 2010).

Among the different types of value proposition firms described above, different monetization modes were also found. Some use a "free of charge" model, selling targeted ads. Others offer products for consumers to purchase. Regardless of how they go about doing so, they all share an interest in monetizing digital remains. For instance, financially lucrative chat-bot services represent not just any version of the deceased, but rather the one which appeals most to consumers and that

optimizes profit. The remains thus become a resource, a form of (fixed) capital in the DAI economy (Öhman, 2018).

Öhman and Floridi (2018) argue that such capitalization of digital remains may have broad consequences, especially as capital requires human labour to remain productive. In other words, if not deleting digital remains, the only solution to make the cost of storing billions of profiles of deceased people financially viable might have to be the increasing commercialization, in which private businesses exhibit their services in a commercial form, unless the public domain takes responsibility for it (Savin-Baden & Mason-Robbie, 2020). Nonetheless, there are has been millions of dollars investment of in these companies, venture investors find significant opportunities for return on investment as these businesses gain momentum (Billingham, n.d.).

Furthermore, according to a recent a study from University of Oxford researchers, a sense of volume can be withdrawn concerning the magnitude and the scalability of digital remains as it projects the future accumulation of profiles belonging to deceased Facebook users. The findings based on United Nations population data and information from Facebook's Audience Insights tool of the year 2018 suggests that a minimum of 1,4 billion Facebook users will pass away before 2100 if Facebook ceases to attract new users as of 2018 (no growth scenario). Whereas if Facebook's user base continues expanding at current rates, this number will exceed 4,9 billion (growth of 13% annually). In both cases, the majority of the profiles will belong to non-Western users, regardless of whether a conservative or liberal scenario is employed, both Asia and Africa will have the highest number of deceased users on Facebook in the coming decades (Öhman & Watson, 2019). The same study predicts that between 2050 and 2070, depending on Facebook's user growth rate, the dead profiles are even expected to exceed the number of living user profiles (Brown 2016), thereby creating a form of a "digital graveyard'' (Ambrosino 2016). Along with, if Facebook becomes less popular with the younger generations as they could not sign up to it as enthusiastically as the current generations have, the overtaking point could be sooner than researchers expect.

2.6 Ethics in Digital Afterlife

"Who has the right to all this data, how should it be managed in the best interests of the families and friends of the deceased and its use by future historians to understand the past?", stated Carl Öhman of the Oxford Internet Institute (OLL) in a statement (University of Oxford, 2019). Researchers Öhman and Watson (2019) argue that an exclusively commercial approach to data preservation poses significant ethical and political risks that demand urgent consideration. Although the creation of digital afterlives was not a huge question at first, as most users of social media tend to be younger, it will become a growing issue in the future (Westreich, 2020).

Ethically, human dignity requires that digital remains, seen as the informational corpse of the deceased, may not be used solely as a means to an end, such as profit, but regarded instead as an entity holding an inherent value. This is stated explicitly in ICOM's code - International Council of Museums (ICOM) (Code of Professional Ethics, 1986). As museums often sell and produce replicas of exhibited objects (human or not), the code further specifies that "all aspects of the commercial venture" must be done with respect for "the intrinsic value of the original object." Adopting a similar regulative approach to the DAI would clarify the relationship between deceased individuals and the firms holding and displaying their data. Despite sometimes being the sole legal owner of the data, and irrespective of the desires of those next to kin, DAI firms would be obliged to abide by certain conventions, such as preventing hate speech and refraining from commercial exploitation of memorialized profiles. As indicated by ICOM, human remains are not meant to be consumed by the 'morbidly curious' (Öhman, 2018).

Researchers Öhman and Floridi (2018) propose minimal requirements for firms to guarantee that: (1) consumers are informed on how their data may come to be displayed post-mortem; (2) users are not depicted radically differently from the bot that they originally signed up for; and (3) users only upload data that belongs to them personally, that is, not making bots out of a deceased relative or friend. Requirements like these could be imposed by regulators but may just as well be set by internal agreements within the industry, such as the ICOM code of ethics, or even be incorporated within the ethical policy work of individual firms. Today however, there are no - or very few - explicit requirements such as these.

Ethical concerns require prudent investigation and discussion between policymakers, industry and academic experts. They will only grow in significance as the deceased become progressively more numerous online. In fostering a constructive ethical approach, the first step is to decide to what extent, and under what circumstances, the memory of the deceased is to be managed and shaped by business interests. The second, and equally important step will be to develop a regulatory framework, widely implemented, to ensure dignity for those who are remembered online (Savin-Baden & Mason-Robbie, 2020).

3. Methodology

The methodology strategy to be put in motion in this business plan to support planning and decision making will be based in three selected references. Firstly, the *Product Design and Development 5th edition (2012)* book written by a Professor of the University of Pennsylvania, Karl T. Ulrich, and a Professor of the Massachusetts Institute of Technology, Steven D. Eppinger. Furthermore, it was also used the *Lean Startup* book (2011) written by Eric Ries and *Lean Service Creation* handbook (2016) written by Risto Sarvas, Hanno Nevanlinna and Juha Pesonen, members of Futurice, a Finnish organization focused on providing innovation and digital engineering services to the European business ecosystem.

3.1 Opportunity identification

Based on the opportunity identification framework proposed by Ulrich and Eppinger (2012), the promoter decided to exploit an opportunity to the extent to which he is familiar with the need that the solution addresses. In conceptual terms, the promoter, wanting to make a real difference in the world, had more eager to exploit Horizon 3 opportunities, as depicted in figure *3.1* (Annex), that represent attempts to exploit opportunities that are new to the world, embodying the highest level of innovation and uncertainty, exploring new markets, categories of products and services and building new solutions and approaches.

When generating opportunities, the promoter had in mind three of the suggested techniques by Ulrich and Eppinger (2012): follow a personal passion, compilation of bug lists and consider implication of trends. Besides that, the promoter sought to pursue an opportunity that was innovative and geographically and economically scalable. Thus, the promoter identified an unmet need that was in connection with a personal interest and considered how emerging technologies, trends and modern business models might fit with that unmet need. Hereupon, the unmet need identified was: *a better memory preservation of a person's life.* In conjunction with the effects of digital technology's rapid breakthrough for the past decades, its penetration in worldwide communities and in its everyday deeds are changing how societies and even businesses work. That is why, the promoter strongly believes that offering a digital platform for families and friends to share and relive memories of their loved ones will have its space in the future. The value proposition overview and demonstration will be further deepened in chapter 4.

3.2 Concept generation

A brainstorming and the gather of initial technical requisites regarding the application's features took place in order to develop visual mock-ups of the initial version of the platform, or what is technically known as the User Interface (UI) and User Experience (UX) design.

The promoter started to draw sketches of the UI design, in pieces of paper, as can be seen in figures *3.2* and *3.3* in the Annex. The more the promoter drawn, more ideas came along of what could an could not be best suited to include in the platform. Whenever ideas came about regarding a specific screen design or feature, but did not grasp how it could be designed, the promoter sometimes used platforms such as Facebook, Instagram, LinkedIn and Wikipedia to seek for inspiration and use as a role model.

Subsequently, a web search and inquiries to the promoter's network of computer and software engineers as well as designers occurred to determine which software to use in the mock-up's creation. Afterwards, it was decided that Adobe XD was the most cost efficient tool to be used for the UI design build up. The promoter took roughly one and a half month to design the mobile application and the web application (for computer screen dimensions) UI designs both in English and in Portuguese. Some of these mock-ups will be demonstrated in chapter 4 "Value Proposition".

The mock-ups are of critical importance, since they will provide a clear first version of the product, without which, it will not be possible to collect qualitative and quantitative reliable primary data regarding its concept testing and validation among possible users.

3.3 Qualitative Concept Testing

3.3.1 Purpose

As a first step in concept testing, as an experimental activity, understanding the purpose of the experiment is essential to designing an effective methodology. Thereby, before the closure of the concept's UI and overall architecture, the promoter intends to gather qualitative primary data seeking primarily to collect initial feedback on the attractiveness of the basic concept, confirmation of ease of perception and usability, critical viewpoints in order to assess how can the concept be improved to better meet customer needs, detection of possible incongruities and bugs, solicit improvement ideas, suggestions of possible inclusion of additional features and the exclusion of existent ones. Afterwards, the goal is to carefully analyse feedback and make the necessary iterations.

3.3.2 Population and Format

Since the team defined, early in the product development process, as the 18 to 59 age group individuals living in Portugal as the target population for which the product is being developed, that line will be maintained.

In what regards the sample size of the implicit empirical qualitative research, 10 individuals were interviewed separately in Portuguese. Three were interviewed in person and seven in an online format in the Zoom platform.

The interview's sequence initiates with greetings to the interviewed and a brief verbal description of the problem or gap identified and the presentation of the solution intended to solve it. Following, a set of the main sketches depicting the UI of the application are demonstrated to the interviewed alongside with the promoter's explanation of how it will work by giving real life examples sketch by sketch. The sketches were demonstrated in paper sheets to the face-to-face interviewed, while with the Zoom meeting interviewed, the demonstration was carried out through screen sharing. Next, a set of questions were asked to the interviewed in order to withdraw the information targeted in the previous subchapter.

3.4 Definition of the Business Model

Subsequent to the value proposition and the first visual product prototype are set and since the ultimate goal of a business plan is to test its financial viability, the promoter believes it is of utmost relevance to identify in advance a possible suited business model prior to the primary data collection, so that it could be tested and validated by the inherent target market. Namely, in what concerns its very sources of income streams, otherwise, a critical figure such as sales projection would be unrealistically estimated, based on assumptions that would not be subject to customer judgement.

To define the business model the promoter, through a creative brainstorming, listed multiple possible revenue streams, analysed direct competition business models both domestically and internationally and used tools such as the Business Model Canvas. After getting some feedback from the supervisor, friends and family the optimal business model was gradually found and will be further detailed further ahead in chapter 5 "Business Model".

3.5 Concept Validation

Posterior to having the concept and the business model identified, in the "old world", the next step would have been to commence establishing implementation policies and financing applications. However, following the Lean Service Creation model (2016), the next phase is to test if the promoter's assumptions are correct. Such methodology's main purpose not only helps mitigating risk, but also speeds up the delivery of a value-creating service in the market and helps saving or minimizing time and resources invested on the possibility of pursuing a farfetched dream.

Although every aspiring entrepreneur wants his or her idea to be successful, only a fraction of those are worth executing. Thus, to learn if the innovative proposal presented in this document has a chance to succeed, it needs to be validated. The process of gathering evidence will occur by means of primary data concerning key aspects of the business idea through experimentation with the ultimate goal of making the most rapidly, educated and de-risked decisions as possible.

3.5.1 Quantitative Concept Testing

3.5.1.1 Purpose

Bridging with the second phase of the concept's testing procedure, the experiment methodology selected to extract valuable primary data to validate the promoter's assumptions is required to be quantitatively related. Hereupon, the promoter intends to focus gatherings on a larger sample size that allows this study to achieve enhanced and concise results seeking to collect reliable information and to test and validate the problem, the solution, the platform's traffic and its business model.

Therefore, the promoter mainly expects to assess, approximately, how many accounts should be created, how many users the platform will host, how many leads will be generated, how many units of products and services are likely to be sold in order to estimate a demand forecast on which financial projections and managerial decisions could be based upon and, ultimately, if the conditions will be aligned to proceed to the platform development stage.

3.5.1.2 Population and Format

In what regards the sample size of the implicit empirical quantitative research, it should be large enough that the promoter's confidence in the results is high enough to guide decision making. That being said, the goal of getting a larger sample size was obtained with 208 individuals answering the online questionnaire separately, in confidentiality and in Portuguese. This sampling volume allows the study to have a 95% of confidence level and a 7% margin of error to be extrapolated to represent the target market of 4,476,542 individuals (*figure 3.4* - Annex).

Inevitably, the sample will have more concentration of people in the 24 to 39 age groups due to the promoter's network of possible respondents are mainly from that specific age groups.

The online questionnaire was constructed through Google Forms and distributed through various social media applications such as Facebook, Messenger, WhatsApp, Instagram and LinkedIn and also through e-mail.

The online survey's sequence initiates with an introduction, a brief description of the problem or gap identified and the presentation of the solution intended to solve it. Following, a set of the main mock-ups depicting the interface of the application are demonstrated to the inquired alongside with a textual explanation of how it will work by depicting a real life example. The mock-ups were demonstrated in the form of print screen images. Next, a set of questions were asked to the respondent in order to withdraw the information aimed in the previous subchapter. The analysis on findings will take place on chapter 6 "Market Analysis".

3.5.1.3 Measuring customer response

Subsequently, the promoter will attempt to measure the purchase intent by using the method of price rating scales suggested by K. Ulrich and E. Eppinger (2012) to understand the consumer's preferences by using a purchase-intent scale with five response categories: 5 – "Definitely would

buy."; 4 – "Probably would buy."; 3 – "Might or might not buy."; 2 - "Probably would not buy."; 1 – "Definitely would not buy."

3.5.2 Objectives and assumptions testing

The purpose of selecting specific variables subject to validation is to identify and test the most critical assumptions related to the specific innovative proposal and considering that it is at an embryonic stage. That being said, four elements were selected to be validated in this stage, namely the problem, the solution, the traffic and the business model, respectively (*table 3.1 - Annex*).

The first element to be validated is the *problem* or the implicit need, since it is a new concept, evaluating if people want the problem to be solved is critical as there may not even be a market for a solution to be designed for. The experiment method to be used is an online questionnaire, specifically by first presenting the problem to the inquired and asking if he or she also agrees that the problem mentioned is in fact real.

Secondly, the next element to be tested is the *solution*, as it may occur that people, despite agreeing that the problem exists, do not believe that the platform is enough to solve it. The experiment methodology to be applied is an online questionnaire, in particular by first demonstrating visual mock-ups of the platform to the inquired and posteriorly asking if he or she thinks that the platform will fill the gap previously identified. Dealing with such a delicate and intimate matter it may very well occur that people think that the platform could partially solve the problem. That is why the promoter will account 1 to respondents that will answer "yes" and 0,5 to respondents that answer "maybe".

In third place, the following component to be validated is the *traffic*, since it can happen that people, despite believing that the solution will solve completely or partially the problem, there must be downloads, accounts created and followers, correspondingly. Thus, the experiment process to be employed is via an online questionnaire, explicitly by asking whether the respondent would create an account and, if not, if he or she would tell someone to create it instead and be a follower or if the inquired would just be a follower if existed an account dedicated to a loved one, within the next year. Taking into account that the respondent may want to create an account but feels that there are people more close or that would be a better fit for taking that high responsibility of creating and managing a loved one's biographical page, the promoter will count the answers "Yes" as 1 account to be created and answers "No. But I would tell someone to create it (father, mother, brother, uncle, friend, etc)" as 0,5.

Fourth, the last element to be tested is the *business model*, the ultimate phase to assess if there will be demand for purchasing products and services available. In the case that all the previous elements are validated, it does not necessarily mean the bills will be paid, unless a monetary

compromise is made by at least a portion of the platform's user base. The promoter conceived various possibilities for revenue streams, that will be further expounded in chapter 5 "Business Model", although the premium subscription is highlighted as the core income stream to be the main responsible for the project's financial viability. Taking into consideration the difficulty to assert about an hypothetical purchase in the future, leading to an eventual typical bias of respondents to overestimate the probability that they would actually purchase the product, the promoter will use calibration fractions accounting with 40% of the answers "Definitely would buy", 20% of the answers "Probably would buy" and 10% of the answers "Maybe would buy" as suggested by Ulrich and Eppinger (2012).

Lastly, subsequent to a financial evaluation (chapter 12), a sensitivity analysis will be computed in order to find the minimum success criteria for the project to be financially viable and to validate the assumptions. Furthermore, elements such as *features* and the estimation of the optimal *price* range for each product will be validated in a later stage once the firstly selected four components of the business are solid enough.

4. Value Proposition

4.1 The problem

The practices of mourning and honouring the deceased vary by culture and region. Even so, they are the same that have been around for hundreds of years, if not thousands, such as burial, cremation and embalming. In what regards traditional remembering practices, it is also the same, considering the same timeline. People normally go to visit a loved one's last resting place to the cemetery and honour his or her memory only to behold 5 elements of the deceased's existence: the name, the date of birth, the date of death, a photo of the face and often a quote from the Holy Bible. In other words, a tremendous lack of information of who the person did and was in life. Besides, the family generally keep photos and albums in boxes at the home basement somewhat forgotten and others keep a few photos in the living room. Ultimately, in the vast majority of cases, the result is the progressive forgetfulness of the deceased's memory and existence as it remains mainly in the physical memories of close family and friends. Hence, previous research reinforces that the memory of an average deceased individual is considered almost completely forgotten and obliviated several decades after death (Unruh, 1983), unless the individual is famous. At least before the internet came about.

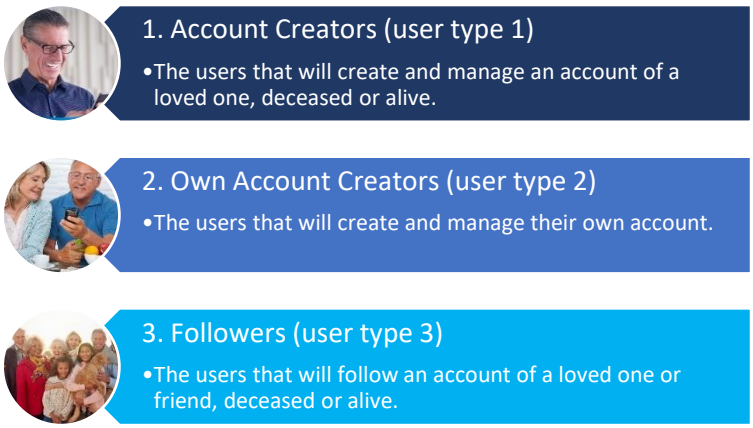
Furthermore, cemeteries may be considered as sad, often a careless place, make people remember sad memories and ultimately discourage people to visit it. In addition, the grave is removed a few years after burial.

4.2 The solution

Considering the Alexander Osterwalder's Business Model Canvas Value Proposition building block (2010), novelty is pointed out as the main attribute of the underlying value proposition. Since the needs, that will be satisfied, are somewhat new or not previously clearly perceived by the target audience, it may very well be considered as novelty, as the platform explores a brand new field on the marketplace, having a slight potential to even disrupt a part of the social media marketplace.

A name was chosen to the platform, Biomory, that will be further expounded in chapter 10. Following are the key benefits that will be offered: privacy, safety, advertising free, life story timeline, accessibility from anywhere, compilation and storage of memories, family tree building, content sharing with family and friends, emotional recovery, dignity and memory and identity preservation.

4.3 User types



4.4 Usability Process

In order to get a clearer understanding of what the platform offers and to get a sense of how it actually works, a demonstration of the main screen mock-ups will be shown next. Although the platform will be available both for mobile and computer screens, it will only be exhibited on this business plan the mobile screen size, as it is the most used electronic device by the target audience and by the vast majority of worldwide population. Note that it is the first version of the platform's interface design, conceived amateurishly by the promoter.

For a better understanding it will be presented a simulation of a real situation. Suppose you are Jeremy Shepard (green border), your Mother created a page for your Grandfather Joseph and nominated you and your Uncle Bob to be administrators of his page. On *figure 4.1* it shows the administration page, where it can be consulted and managed the followers, namely acceptance or rejection of requests to follow, privacy and accessibility definitions and edit profile information.

On *figure 4.2* (Annex) and *figure 4.3* (Annex), it portrays how to invite administrators, followers and in what level of accessibility each of them will be in, from the default categories (close family, family, close friends, friends and public). Each follower will have access to the content allowed, for instance, a follower from family level cannot have access to the content reserved to the close family level of access. Moreover, followers from close family have the same access to the ones in the family category, although not the other way around. The same applies to the close friends and friends categories.

In addition, administrators can control and manage the account in various ways, from choosing who can post, add multimedia and life stories to even block users. Thus, by performing this screening, administrators can control the level of access of each follower (from the "public" level to "close family") in order to safeguard the privacy of the profile and its followers. Additionally, on *figure 4.4* exhibits the chronological feed, where it can be seen the memories shared by other

followers and share your memories about the loved one or friend you follow and select your preferred audience. Furthermore, on *figure 4.5* it displays your network, that is who you are following, which pages you administrate and invitations to follow.

On *figure 4.6* it demonstrates the profile view where only the account creator and nominated administrators can set the level of access to each content and edit such content as the profile information, gallery, biography and family tree. Additionally, as demonstrated, account creator and administrators will be able to choose a set of photos to be highlighted and shown in the profile overview, as well as videos and audios - as can be observed further on *figure 4.7* (Annex).

On *figure 4.8* depicts a display of albums of photos, videos and audios. These contents can be added from any smartphone or computer with granted access.

On *figure 4.9*, presented below, exhibits the life story's timeline or a visual biography of Grandpa Joseph. First, an index of contents is displayed and, afterwards, the chronological sequence of Mr. Joseph Shepard's life. Moreover, by clicking on each of the life chapters, users have the possibility to consult them in greater detail with a written description of that specific life stage, as well as through various images alongside the text, as can be seen in the example "Childhood", depicted on *figure 4.10*. Moreover, an illustration of Mr. Joseph Shepard's family tree can be observed on the below *figure 4.11*.

Finally, the user can switch between 3 modes: "your profile" "memorials", "your network", as depicted on *figure 4.12* (Annex).

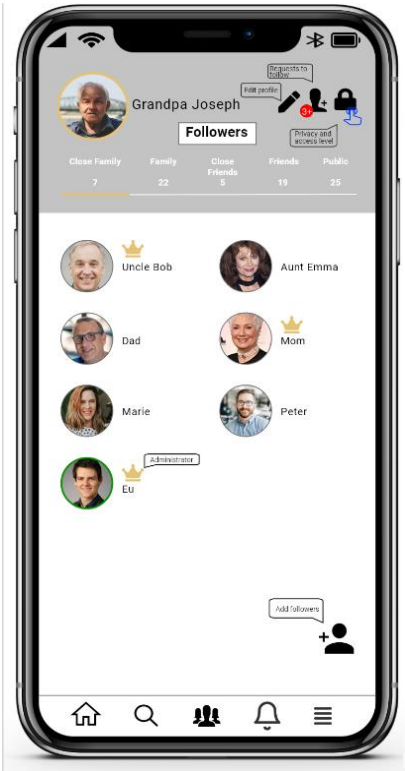


Figure 4.1 – Administration

Figure 4.4 – Feed

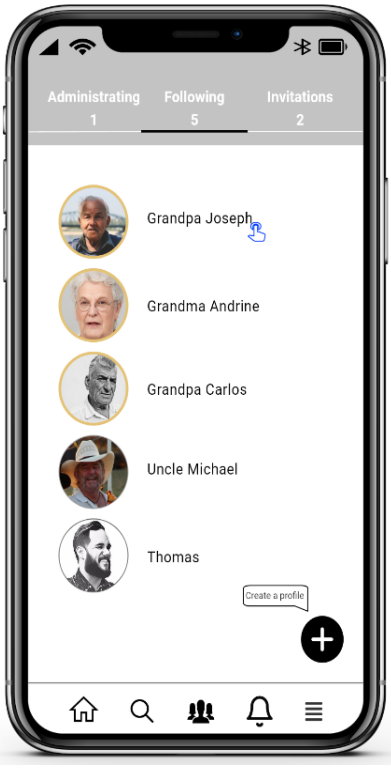


Figure 4.5 – Your network

Figure 4.6 - Profile view

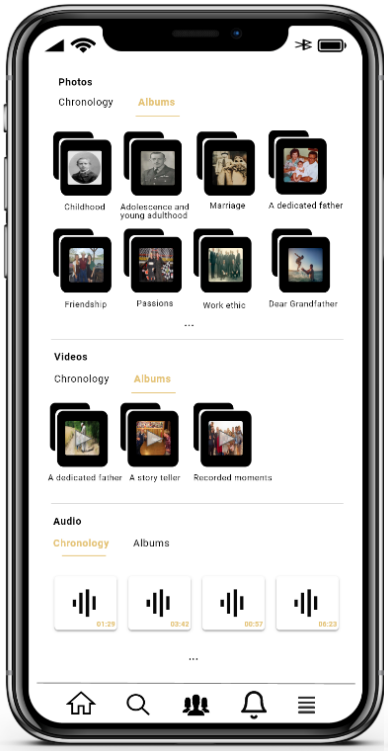


Figure 4.8 – Gallery

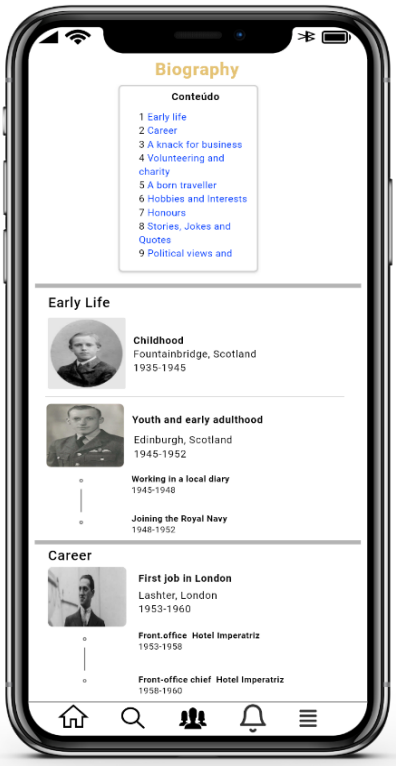


Figure 4.9 - Life story timeline

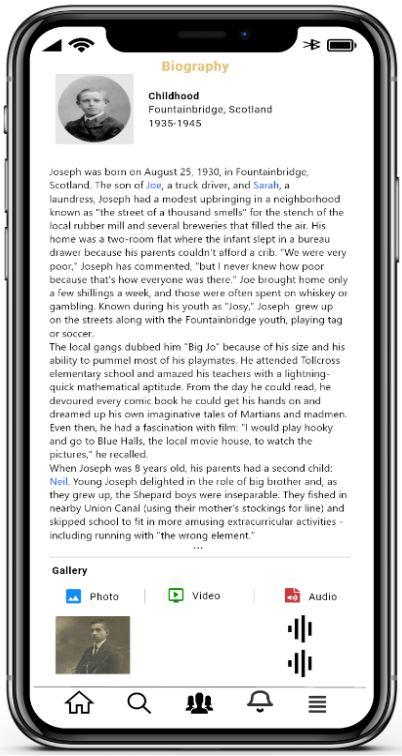


Figure 4.10 - Biography

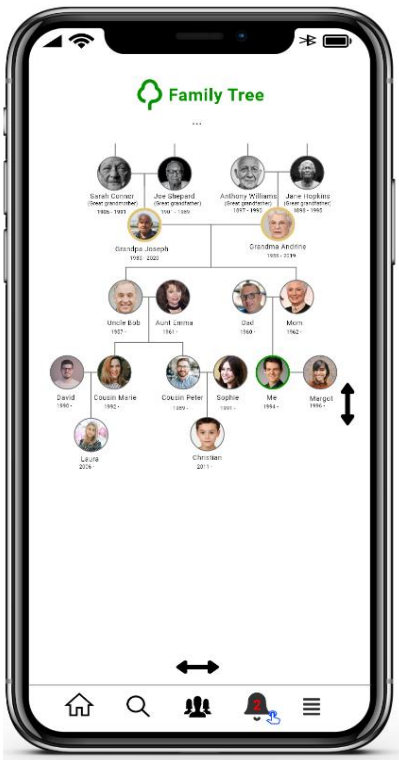


Figure 4.11 – Family tree

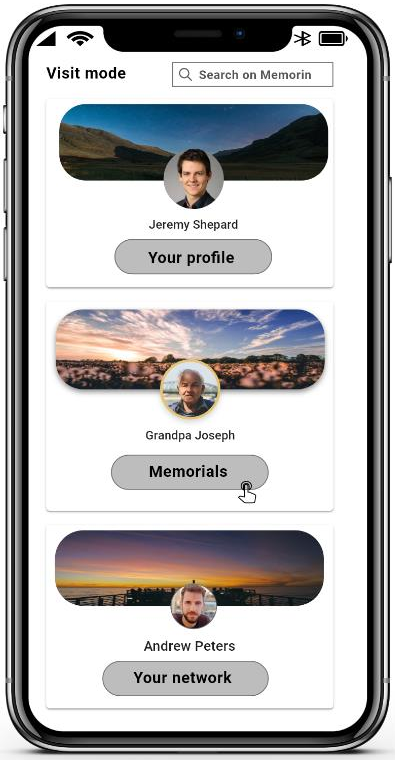


Figure 4.12 – Modes

5. Business Model

Contemplating the Alexander Osterwalder's Business Model Canvas nine building blocks, adding to the previously discussed value proposition building block, two additional will be highlighted on this chapter, namely the customer segments and the revenue streams. Thus, the main questions to be answered on this chapter are objectively how the value proposition will be monetized, what will be the sources of revenue and what distinctive customer segments have the specific needs formerly signalized that are trying to be fulfilled through the inherent value proposition.

5.1 Target Market

From the various generic customer segments types suggested in the Alexander Osterwalder's approach (2010), it is believed that both the massified and segmented types are the ones that best fits with the nature of the three categories of users indicated previously, as the implied value proposition, distribution channels and customer relationships are oriented towards a large group of customers with similar needs and problems, pointed out earlier on chapter 4 "Value Proposition". However, different types of distribution channels and customer relationships must be established as it serves a slightly different customer segments, since the user-base will comprise different and vast age groups and generations such as generation X, millennials and generation Z – a description of the mentioned generations can be found on chapter 6 "Market Analysis".

The most effective method to segment the target market was by age and geography. Hereupon, the targeted Portuguese population was divided in five age groups from 18 to 23, 24 to 29, 30 to 39, 40 to 49 and 50 to 59.

In what regards the user type 1, the "account creators", the aimed targeted customer segments are going to be the group of people from ages above 40 years old, as it is the group of people that will most probably have direct deceased parents in the future or in the past. Additionally, these people are, generally, the most suitable to create an account to honour someone else's memory, regarding its emotional proximity and affection, considering all the other assumptions are verified such as internet access and smartphone usage. Although there might be exceptions, these are guidelines for implementation policies to be put in motion such as social media marketing campaign aims, among others.

As far as what concerns the user type 2 "own account creators", the customer segments to be targeted will be similarly people from the ages above 40 years old with internet access and smartphone usage, based on the assumption that it is from that range of age groups that people, allegedly, with higher probability, start to do a retrospective of their lives, thinking about the meaning of life, its ephemerality and its fulfilment, for various reasons. Therefore, people from these

age groups would likely be more interested to storage memories and do a resumé of their life for themselves or to share with their closer ones. In the other hand, it might simply be a fun experience to compile and observe, afterwards, what people have done in their lives, just as writing a personal diary.

Regarding the user type 3, the "followers", the directed customer segments will be people ranging all the way from the ages of 18 to 59 years old, although the great majority of this group of users will be acquired by means of the account creators' and administrators' invitation.

That being said, the 18 to 59 age group individuals that live in Portugal with internet access, and use smartphone were defined as the target population in the short-term and mid-term. This represents a total market of 5,561,131 people as it is further analysed in chapter 6 "Market analysis".

5.2 Revenue Model

Considering the user type 1 "account creators", two additional value elements are foreseen to be offered turning out to be sources of income, namely a premium subscription plan and a QR code to be fixed on the deceased's grave. Following, in what regards the user type 2 "own account creators", the same extra value will be provided, except for the grave affixation QR code. At long last, the platform will be completely free of charge to the user type 3 "followers".

5.2.1 Premium Subscription Plan

The premium subscription plan was thought to be the best approach to try to make this project profitable and scalable based on a monthly, semi-annually, annually payment mode or a one-time fee. In what regards the periodic subscription mentioned it is a recurring type of revenue stream, as it obliges a systematic payment overtime. Whereas, concerning the one-time fee option for the premium subscription plan, it is a transactional type of revenue stream that is paid only once. Furthermore, pricing establishment will be presented in chapter 10 "implementation policies".

The nature of the platform will not properly be a traditional social media but rather a shared archive of memories. These memories, such as photos, videos, audios or even text, have specific sizes and must be stored, thereby, the main revenue stream basis should primarily be storage oriented. Therefore, the plan is to generate a freemium business model in which the platform usage will be free, so that everyone can record their life story and memories, up to a certain threshold of usage. It was thought to be free of charge up to a 1Gb of content storage, 50 followers and, as it was previously mentioned it will be completely advertising free both in the free and paid modes.

In addition, as regards to the premium subscription plan a more complete experience could be obtained as it allows unlimited storage, unlimited number of followers, receival of messages on special days, build tool of the family tree, renaming the profile name of other users and advanced privacy control.

5.2.1.1 Special Features

Some special features deserve a more detailed explanation. Namely, concerning the receival of messages on special days, followers of such account will be able to receive personalized messages by text of with a multimedia format (photos, videos, audios) on special days such as anniversaries, Christmas, graduation, professional promotion, etc.

Regarding the followers profile name renaming feature, it will enable followers to edit the name of the profile account they are following as well as other followers such as family members and friends. For instance, changing the defaulted name from “Joseph Shepard” to “Grandpa Joseph”, to provide a more personal and sensitive way of usability of the platform.

Lastly, in what refers to the advanced privacy control feature, it will enable the account creators and respective administrators to extend their control and its manoeuvrability over the account. Some clear examples of this specific feature are the creation of more categories of access besides the ones existent already (vide *figure 4.4*), for instance, creating more groups of access within the “close family” category; block the copy of page URL; hide the profile from being seen by "public" followers; disable other followers to make requests to follow; control (enable, disable and edit) the format of notifications, messages or emails that followers may receive from the platform; activate mandatory identity verification of followers.

5.2.2 Grave QR Code

Next, another one-time transactional type of revenue arose, in which the account creator (user type 1) will have the possibility to affix on the their loved one’s tomb a QR Code in a trimmed and polished acrylic glass that is waterproof resistant, has UV radiation protection and a 10-year warranty against cracks and yellowing. The piece lasts for several decades and it would allow every person visiting user’s beloved ones to learn a little bit more about his or her life story. They would just need to take a photo with their smartphone to the QR Code and it will automatically redirect to the person's public level of access profile page, except if the QR code reader is already an approved follower.

6. Market Analysis

6.1 Primary Data

6.1.1 Interviews

From the 10 interviews carried out by the promoter, the following are the most important takeaways: focus on family tree builder, life story timeline, design the most appealing and easy to use UI, offer the possibility of a family subscription package, make partnerships with funerary agencies, insurance companies and psychology offices and highlight the importance of management and security of personal data.

6.1.2 Online Questionnaire

The sample description can be observed on *table 6.1* (Annex). As can be seen on *table 6.2* (Annex), it is highlighted in green colour the responses that enable the respondent to continue answering questions throughout the survey. The whole questionnaire was based in a 1 year horizon. Out of the 208 sample size, 71.6% of respondents agree that the lack of a memory preservation practice and tool exists, 16.8% do not know and 10.1% do not think that it needs to be fulfilled. In addition, 93,58% of respondents have a deceased close family or friend. Posterior to demonstrating the platform's user interface by means of mock-ups' print screens, 53.14% believe that the application will fulfil the gap identified, 40% considered maybe, 4.57% do not believe and 2.29% did not understand its use. Moreover, 88% of respondents stated that it was the first time they had encountered that kind of a concept.

Subsequent to the validation and exclusion questions, 77 leads were identified, representing 37.02% of the total sample. Leads are considered as the respondents that gave a personal contact, in the form of an email or a phone number, when asked if they would want to be notified when the platform was officially launched. Out of the 77 leads, 44 (57.14%) stated that they would create a profile of a close relative or friend in Biomory (user type 1). To reflect the typical bias of respondents caused by sympathy or by spontaneous excitement, a calibration constant of 0,3 was applied, as suggested by K. Ulrich and E. Eppinger (2012), resulting in a 17.14% probability of leads actually creating a profile, representing 6.35% of the 208 sample size. Furthermore, 22.27% of profile creators indicated that they would subscribe a premium plan and 15.91% stated that they will purchase a QR Code to fix in the deceased's grave, which signifies a 1.41% and 1.01% conversion rates of the 208 total sample size (*table 6.3* - Annex), correspondingly. In addition, profile creators indicated that they would invite on average 15 people to follow the account, on which a 0.6 bias calibration was applied, resulting in 9.

On the other hand, out of the 77 leads identified, 17.66% of respondents were interested in creating their own account profile (user type 2), already biased calibrated, representing 6.54% of the

total sample size, to which 24.41% of these had the intent to subscribe a premium subscription plan that ultimately results in a 1.60% of the total sample size (*table 6.4* - Annex). In addition, own profile creators indicated that they would invite on average 23 people to follow their account, on which a 0.6 bias calibration was applied, resulting in 14.

Further analysis can be observed on chapter 12 “financial evaluation”, specifically on the “demand estimation” subchapter.

6.2 Secondary Data

6.2.1 Demographics

As it was previously mentioned, the platform will be designed to serve three types of major generations of the western world: the generation X, the millennials and the generation Z. A well-recognized reference in the study of different generations is the Pew Research Center - a United States of America non-partisan think-tank - that takes into account several factors, notably the labour force as well as attitudinal and behavioural trends of a group.

6.2.1.1 Generation X

The Pew Research Center defines the Generation X as the people born between 1965 and 1980 which has, gradually, gaining acceptance in academic spheres recently. Nevertheless, for this particular study, the 40 to 59 age range will be considered to perfectly match with the quantitative concept test carried out. This specific generation is often characterized as hard-working and production was their philosophy of life, leaving no room for idealism. Family building, ambition and work are definitions of success and the values with which they grew up. They grew up as television expanded dramatically, changing their lifestyles and connection to the world in fundamental ways.

Moreover, considering the data withdrawn from INE concerning the average annual resident population in Portugal by age in 2020 (vide *table 6.5* - Annex), there are 3,057,259 people from this generation.

6.2.1.2 Millennials

The Pew Research Center delineates the Millennials as the group of people born between 1981 and 1996. Having said that, the 24 to 39 age range will be taken into account to fit with the quantitative concept test carried out and previously analysed. Elza Venter, an educational psychologist and lecturer describes Millennials as “digital natives” since they have grown up during the computer and internet boom and have been experiencing digital technology roughly their entire lives. The concept “digital natives” was conceived for this exact reason (Venter, 2017). This generation's older members usually use a combination of face-to-face interaction and computer mediated communication, while its younger members use mainly electronic and digital technologies for interpersonal communication.

Furthermore, considering the data withdrawn from INE concerning the average annual resident population in Portugal by age in 2020 (vide *table 6.5* - Annex), there are 1,883,184 people from this particular generation.

6.2.1.3 Generation Z

Pew Research Center considers that everyone born between 1997 and 2012 (ages 9 to 24) is from Generation Z. The turn of the century marks the moment where Millennials stop and Gen Z begin. Regarding the data extracted from INE about the average annual resident population in Portugal by age in 2020 (vide *table 6.5* - Annex), it will only be considered the people from the 18 to 23 age range to fit with the quantitative concept test carried out. Having that said, there are 670,688 people from this specific age groups.

The dotcom bubble or the internet boom occurred in the nineties and the iPhone was launched in 2007 when the oldest individual of Generation Z was ten years old. By the time they were teenagers, the primary method to connect with the web was already through mobile devices and Wi-Fi. People from this generation almost intuitively adapted to social media, video games, constant connectivity and on-demand entertainment and communication as they came of age as a natural thing.

6.2.1.4 Total deaths per year

In 2020, there were not so many deaths of residents in Portugal since 1920, largely and curiously caused by the Covid-19 pandemic and the Spanish flu, correspondingly. According to PORDATA (*table 6.6* - Annex), the total number of deaths of residents in Portugal in 2020 were 123,358, which is significantly higher than the average number of deaths of residents in Portugal between 2000 and 2020, 107,337.

6.2.2 Internet access

With the progressive use of the Internet, some sociodemographic segments have already reached practically full access, in which includes the younger generations in contrast with elder generations (*figure 6.1* - Annex). Still, some facts stand out when specific performance is analyzed by platforms – PC, mobile phone, tablet or others.

Thus, the growth of the total regular web users is not evenly distributed across the population, as it would be expected, considering the characteristics identified in the previous subchapter between the different generations.

A recent study *Bareme Internet* was carried out by Marktest Group (Cabeça, 2020) about internet access and users in Portugal in 2020 that concluded that 74% of the Portuguese access the internet at least once a month (*figure 6.2* - Annex). On *figure 6.1* (Annex) shows that 100% of the Generation Z individuals are regular web users, that is, they visited more than once a month a website. Moreover, 98% of Millennials are regular internet users, in which an average calculus was

made considering two age groups represented in the inherent study: 25-34 = 99% and 35-44 = 96%. In addition, in what regards the Generation X, 86% of individuals from this particular group are regular internet and web users. Nevertheless to fit with the target population identified for this business plan (40 to 59), an average calculation was made taking into account the *Bareme Internet* study (Cabeça, 2020): 35-44 = 96%; 45-54 = 92% and 55-64 = 63%.

Another study carried out by IDC Portugal in 2020 (Associação Economia Digital & IDC, 2020), predicts that in 2025 the percentage of the population that uses the Internet will increase to 93%, converging with the European average.

In terms of electronic devices usage, on *figure 6.3* (Annex), it shows that the mobile phone is the most used device (72%) when accessing internet seeing a dramatic rise from 2010 (9%), ahead of computer (61%), Smart TV (25%) tablets (22%) and video game consoles (9%).

6.2.3 Social media usage

A recent study conducted by Marktest Consulting in 2020 found that 87% of regular internet users in Portugal visit social media various times per day.

According to the "Digital Consumer Survey Portugal 2021 – Powered by Nielsen & Dynata", the Portuguese spend 43% of their week connected to the internet, more than what they spend sleeping, an average of 72 hours per week. From this time, they dedicate an average of 13 hours a week exclusively to social media, with 23% of the total time spent watching content from influencers, especially on Instagram (Nielsen & Dynata, 2021).

Moreover, the Portuguese spend, on average, 129 minutes per day on social media, with Portugal being the fifth country in the European Union with the greatest use of these platforms (Marktest, 2020). "Social networks have become an omnipresent element of life", as through these digital platforms it is possible to get instant access to information, from family events and friends' adventures to political developments, just by checking Facebook, Instagram or Twitter feeds, points out Marktest in the report.

6.2.4 Key applications statistics

Statista found in a mobile phone usage study, that 90% of mobile usage time is spent on applications. In addition, there are 2,09 million apps available on the Apple App Store, 3,15 million on the Google Play Store and 669,000 more on the Windows Store (Statista, 2021).

In 2020, global mobile app revenues reached over 581.9 billion U.S. dollars. In 2023, mobile apps are expected to commercialize more than 935 billion U.S. dollars in revenue via paid downloads and in-app advertising, as depicted in *figure 6.4* (Annex). This figure is a somewhat normal consequence when taken into account the fact that an average person uses 30 apps per month and 21% of millennials check their apps more than 50 times a day in the western world (Statista, 2021).

In 2018, mobile app downloads in Europe amounted to 25.8 billion and are projected to reach 30.4 billion annual app downloads in 2023. In comparison, mobile app downloads in Europe represent roughly 10% of the whole world, as depicted in *figure 6.5* (Annex).

Whereas in Portugal, a study from Marktest (Marktest, 2020), released on September 8th 2020, found that smartphones became so important that 31% of consumers would prefer not having a television than not having a smartphone, 46% of consumers make searches on the smartphone every day, making this type of equipment an important access point for research and 79% searched for a product or service on their smartphone.

The same study quantifies, in the July 2020 wave, at 4,144,365 the number of individuals who downloaded free mobile applications in the last 12 months, representing 48.4% of mainland residents aged 15 and over as depicted in *figure 6.6* (Annex). In addition, the number of those who report having downloaded free mobile applications in the last 12 months has been increasing, being, according to the July 2020 trend, 3 times more than in 2014. Moreover, male individuals between 25 and 34 years old, as well as those belonging to the higher social classes are the ones who most download free mobile applications in the 12 months prior to July 2020.

Lastly, further secondary data about the digital afterlife industry can be found on chapter 2 “literature review”.

7. Competitive Analysis

7.1 Mega trends

Three major driving trends were selected as the most likely that will shape the future outcome of the digital afterlife industry: technology, demographics and behaviours and consumer trends. For each of them, specific trends were highlighted and signalized as opportunities and threats to Biomory, as can be observed in table *7.1*.

Table 7.1 - Mega trends

Technology	Demographics	Behaviour and consumer trends
Increased smartphone usage - Opportunity	**Increased older people in the western countries** - Opportunity	Less ad noise - Opportunity
Global internet connectivity increased - Opportunity	**Increased social media presence across all age groups** - Opportunity	**More privacy on social media desired** - Opportunity
AI person and personality recreation developments - Opportunity	Generation X have a desire to preserve their memory and have more disposal income to spare - Opportunity	**Consumers want free products and services, including applications** - Threat
		Death is a taboo subject for some people - Threat

7.2 Domestic Competition

It is extremely important to regularly conduct a thorough analysis to the competition in order to try staying one step ahead and preserve a competitive advantage. Since the target market is the Portuguese population, the competitive analysis will consist mainly on its domestic competition and environment. One direct domestic competitor was found, a website named *InMemorium.pt* with related characteristics with Biomory, founded in May 2020 at Ferreira do Zêzere, Portugal (vide company fact sheet on *table 7.2* - Annex).

Subsequently, its value proposition is similar as Biomory, to some extent, as it offers an online space to storage memories through photos, videos and written stories about a deceased person and for tributes and condolence messages. It is accessible only as a website browser (weakness) and it has a social media presence of 3,068 followers on Facebook. Furthermore, it positions itself in roughly the same target market as Biomory, except that InMemorium.pt targets only 1 customer segment, which is the loved ones of the deceased person.

Successively, its business model and main product is based on a freemium revenue model by offering a free limited version and commercializing a premium subscription for access to additional features. The pricing options are 5.90€/month, 64€/year or 139€ as a lifetime fee.

Next, the platform has a somewhat obsolete user interface, which makes it not incredibly appealing and appears to have a modest technical architecture. A possible reason for this is that In Memorium appears to be almost a perfect mimic of its strategic partner forevermissed.com, a United States based company founded in 2008. Incidentally, even though the content of the partnership is unknown, this might be a competitive weakness as it possibly reveals that InMemorium.pt has a low degree of innovation, technological and design expertise and resources inside the company.

In what concerns its strengths, highlight to the previously mentioned strategic partnership with forevermissed.com, the fact that InMemorium.pt is first-to-market in Portugal, meaning that the website is able to enjoy a slight brand awareness advantage and the fact that it is advertising free.

Lastly, adding to some weaknesses already mentioned, stand out the fact that human resources accounts only with the founder, which is a retired finance broker and not with technology nor marketing know-how, according to statements given in an interview by its founder. Moreover, the free version account is very limited as it allows the storage of only 3 photos, the page creator does not have the control of the followers' degree of access to content nor its privacy, it does not allow integration with YouTube, Facebook and other social media platforms and is limited to just 1 page administrator.

7.2.1 How Biomory differentiates from competition

Comparing the main attributes of InMemorium.pt with Biomory (vide *table 7.3* - Annex), it can be concluded that Biomory differentiates from the competition starting by offering a UI/UX much more appealing, mobile application available on the Apple Store and Play Store, the family tree builder, the advanced access and privacy control, the lower pricing on monthly and annual subscription and the ID verification obligation, avoiding false profiles. Moreover, the free version of Biomory is significantly more powerful than InMemorium.pt, since the multimedia storage on free mode is up to 1Gb while InMemorium.pt allows only 3 photos, the number of page administrators in unlimited whereas on InMemorium.pt only allow 1 and the access and privacy control, since InMemorium.pt only allows control of followers' accessibility to content with a premium subscription.

It is thought that all the above gives a clear competitive advantage for Biomory, primarily because, according to the mega trends presented previously, the nowadays consumer often looks for more privacy on social media and have reluctance to paying for it, prioritizing free products and services whenever possible, including applications and specially social media, accented by the already accustomated and massive free use of Facebook, Instagram, Twitter, LinkedIn, etc.

7.3 Porter 5 forces – industry attractiveness overview

Table 7.4 - Porter's 5 Forces Overview

Forces	Impact	Attractiveness
Threats of new entry	2.13	2.88
Threat of Substitution	2.00	3.00
Supplier Power	3.00	2.00
Customer Power	2.00	3.00
Competitive Rivalry	1.50	3.50
Average	**2.13**	**2.88**

Subsequent to a Porter 5 forces analysis concerning the particular digital afterlife industry in Portugal carried out by the promoter, that can be observed in more detail in *table 7.5* (Annex), it was found that it has a 2.88 level of attractiveness on a scale of 1 to 5, a medium degree of attractiveness.

7.4 SWOT Analysis

Table 7.6 - SWOT Matrix

Strengths	Weaknesses
1. Differentiation. 2. Easy to use and design-friendly (great UI/UX). 3. Advertising free. 4. Advanced access and privacy control. 5. Available in all devices (specially mobile). 6. Family tree build tool. 7. A complete free version. 8. Enabling the creation of 2 types of profile: memorial or personal bio. 9. Life story timeline.	1. Biomory may be confounded with traditional social networking platforms by the target market. 2. Team lack of senior experience. 3. Absence of capital. 4. High investment needs in marketing.
Opportunities	**Threats**
1. Direct competitor has a more limited free version. 2. InMemorium.pt seems to be a "one man team" with finance brokerage background and not technology nor marketing know-how. 3. Low number of direct competition in Portugal. 4. Increased smartphone usage growth. 5. Global internet connectivity increased. 6. Increased older people in the western countries. 7. Increased social media presence across all age groups. 8. Generation X have a desire to preserve their memory and have more disposal income to spare. 9. Too much ad noise on traditional social media. 10. More privacy on social media desired. 11. AI based person and personality recreation developments. 12. 2.6 million Portuguese emigrants. 13. Potential high market size. 14. Industry growth.	1. Direct competitor has a strategic partnership with U.S. based company forevermissed.com. 2. InMemorium.pt is first-to-market in Portugal, gaining market and brand awareness advantage. 3. Consumers preferability for free products and services, including applications. 4. Customer price sensitivity. 5. Death is often a taboo subject in Portugal. 6. Premium accounts can take up a lot of storage space and cost. 7. Medium-high switching costs from suppliers, namely backend and frontend providers. 8. Possibility of entry of technology giants (Facebook or Google). 9. Legal issues between family members profile creation or management disagreements.

On the above *table 7.6*, a SWOT analysis can be observed, in which both external and internal forces are compiled about the business, that is, the opportunities and threats and the strengths and weakness, correspondingly. Such set of analysis is of utmost importance as these variables will influence, affect and determine with high probability the future outcome of the digital afterlife industry macro and micro environment.

Thus, by confronting the various external with the internal forces (*table 7.7*), a set of nuances became clearer such as risks, constraints, warnings and matters to exploit, as well as allowed the conception of strategies that may be proven as critical to the platform's future success.

Table 7.7 – TWOS Matrix

		External forces	
		Opportunities	**Threats**
Internal forces	**Strengths**	**S-O Strategies (Exploit)** **S.1 + O.4, O.5, O.14, O.15** – early entry with differentiation to take advantage of future industry growth. **S.3 + O.9, O.10** – take advantage of privacy seek by traditional social media users. **S.2 + O.2, O.4, O.5** – take advantage of increase in smartphone usage and poor competitor UI/X. **S.1 + O.1 –** main market share increase strategy.	**S-T Strategies (Warnings)** **S.1, S.3 + T.8 –** discourage big social media giants as their business model is based on advertising. **S.7 + T.3, T.4 –** a better free version comparing with direct competition gives competitive advantage since users are price sensitive.
	Weaknesses	**W-O Strategies (Constraints)** **W.2 + O.2 –** take advantage of lack of technology and marketing resources of direct competitor to minimize team lack of senior experience. **W.1 + O.9, O.10 –** take advantage of privacy desirability to differentiate from traditional social media.	**W-T Strategies (Risks)** **W.3 + T.6 –** trying to raise capital through debt or equity may be critical, as cloud storage costs may increase sharply. **W.1, W4 + T.8 –** focusing on a differentiation strategy and a clear message to the market may be crucial.

8.Vision, Mission and Objectives

The identification of clear objectives and a development strategy is of critical importance, since it will provide not only the identification of the mission and the vision of the business, as well as the orientation and guidance so that implementation policies and actions can be directed. Both the objectives and the development strategy will be placed in a short, mid and long term perspectives.

8.1 Vision and Mission

Biomory's mission is to help people eternalize their memory, personal identity and transmit a legacy for generations to come and its vision is to help people reach that goal throughout the globe, independent from religion, nationality, ethnicity or borders.

8.2 Business Objectives

Table 8.1 - Short-term objectives (up to 1 year)

Qualitative	Build the mobile application and Website Platform launch in the Q2 of 2022 Launch the premium subscriptions commercialization Launch the QR Code (grave) commercialization
Quantitative	6,346 accounts created (user type 1) 6,538 accounts created (user type 2) Sell 1,413 premium subscriptions (user type 1) Sell 1,596 premium subscriptions (user type 2)

Table 8.2 - Mid-term objectives (2 to 3 years)

Qualitative	Platform accessible in all devices Achieve the highest market share in Portugal
Quantitative	12,058 accounts created (user type 1) – year 2 15,546 accounts created (user type 2) – year 2 Sell 3,436 premium subscriptions (user type 1) – year 2 Sell 4,728 premium subscriptions (user type 2) – year 2
	14,628 accounts created (user type 1) – year 3 21,752 accounts created (user type 2) – year 3 Sell 5,433 premium subscriptions (user type 1) – year 3 Sell 8,460 premium subscriptions (user type 2) – year 3

Table 8.3 - Long-term objectives (more than 3 years)

Qualitative	International expansion (Europe and Brazil)
Quantitative	13,778 accounts created (user type 1) – year 4 21,637 accounts created (user type 2) – year 4 Sell 6,973 premium subscriptions (user type 1) – year 4 Sell 11,535 premium subscriptions (user type 2) – year 4
	16,878 accounts created (user type 1) – year 5 29,089 accounts created (user type 2) – year 5 Sell 9,291 premium subscriptions (user type 1) – year 5 Sell 16,441 premium subscriptions (user type 2) – year 5

9. Development Strategy

According to the Michael Porter's three generic strategies (1985) for business success (vide *figure 9.1* - Annex), it is believed that Biomory will attain a sustainable competitive advantage following a differentiation focus strategy, in which the differentiation will be the basis for competitive advantage and focusing on a narrow market as the competitive scope.

Next will be presented the journey and the strategies to accomplish the preestablished objectives, namely in what regards key aspects such as the value proposition, target market and business model. In addition, each of them will be projected in a short, mid and long term horizons.

Table 9.1 - Value Proposition development strategy

	Short term (up to 1y)	Mid term (2 to 3 years)		Long term (more than 3 years)		
Value Proposition	1y	2y	3y	4y	5y	
Memorials	x	x	x	x	x	
Personal Bios	x	x	x	x	x	
Collective Group Page						x
Company bio						x

Memorials to honour the deceased will be the primary focus of the solution and personal bios for the living to create their own profile as a secondary aim. In the long term, the possibility of creating a collective group page aiming to collect joint memories of, for instance, a family holiday or a group of friends' trip will be thought to be offered and also the creation of a bio of a company to share, for instance, the company's history, past employees, endeavours, mission, vision and core values to the current and past employees.

Table 9.2 - Target market development strategy

	Short term (up to 1y)	Mid term (2 to 3 years)		Long term (more than 3 years)		
Target Market	1y	2y	3y	4y	5y	
Deceased's loved ones	x	x	x	x	x	
Generation X	x	x	x	x	x	
Millennials		x	x	x	x	
Companies						x

As already mentioned, there will be 2 types of customers: profile creators (user type 1) and own profile creators (user type 2). The platform will be free of charge for followers (user type 3).

Similar to the value proposition development strategy, primarily marketing and sales orientation and focus efforts will be made towards the deceased's loved ones in order to fit with the creation of memorials. Moreover, Generation X will be the targeted individuals for personal bios creation in the short term and Millennials later on mid-term. Lastly, in the long run, there might be the possibility to target companies in order to enable the creation of a company's bio, as well as to commercialize targeted advertising.

The above targeting and value proposition prioritization relates to the need to be the most differentiated and unique as possible in the early stage communication to the market. Taking into consideration that there is social media giants in the market already well-established it would be naive to think competition with them is the best strategy, besides, the target market would not think there would be a need to change to a paid alternative. Therefore, the primary focus will be on the creation of memorials of deceased targeted to the bereaved, thereby implementing the differentiation focus strategy (Porter, 1985).

Table 9.3 - Business model development strategy

	Short term (up to 1y)	Mid term (2 to 3 years)		Long term (more than 3 years)		
Revenue Stream	1y	2y	3y	4y	5y	
Premium Subscription	x	x	x	x	x	
Qr Code (grave)	x	x	x	x	x	
Biography Writing						x
Biography Book						x
DNA Test Kit						x
Photo Album						x
Targeted advertising						x
Regions	Portugal			Portugal + International		

While the premium subscription plan and the grave stamped QR code will be commercialized in the short, mid and long terms, there is the possibility to commercialize biography writing services, a printed biography book and photo album services, as well as a DNA test kit to the platform users, nevertheless it is not foreseen before 5 years. In addition, if the user base turns out to be large enough, targeted advertising can be possible by charging companies for preferred ad placement on the feed (vide *figure 4.4 - Annex*), except when users are viewing loved ones' memorials ("Memorials mode").

Regarding the geographic strategy in which Biomory will mark its presence, will solely be consolidating the Portuguese market in the first 3 years. Afterwards, considering that there is a considerable degree of scalability potential, it is expected to cross the Portuguese borders in the long run, not only fuelled by the fact that there is several Portuguese emigrant communities around the world namely in Europe, Brazil and North America, to where Biomory could certainly spread, but also most of the social networking being made is family-based and because of the digital borderless access provided by the internet. Therefore, such foreseen momentum should be seized to foment internationalisation and increase the platform's growth.

10. Implementation Policies

10.1 Brand

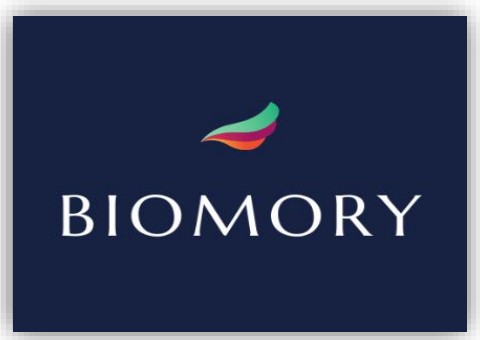


Figure 10.1 - Brand name and logo: Biomory

The brand name choice was made taking into account the conjunction between 2 key words, bio and memory, conveying the platform's main value proposition which is documenting and sharing a person's life memories. "Bio" is the short version of several words, specially of biography and associated with life, while memory is something remembered from the past. In addition, in order to differentiate from direct competition and reinforce the Biomory mission, the brand logo was built in a colourful manner representing what life should be: joy, diversity and celebration.

Furthermore, the name was likewise chosen considering the future scalability and expansion potential of the business, namely by verifying the domain and trademark availability, with the help of the Portuguese website ptisp.pt (vide *figure 10.2* - Annex), not only in Portugal (.pt), but also worldwide (.com, .es, .org, .net, etc) and to not be confused by another brand or thing or have legal issues to face in the future.

In order to register the domain name, the Biomory.pt and Biomory.com domains will be registered, which will result in an annual cost of 12.5€ and 10€ without VAT, correspondingly.

10.2 Intellectual property protection

In order to protect Biomory all necessary measures will be taken, such as finding reliable partners, asking the signature of a NDA agreement before meetings, register the code copyright, register the trademark, to protect the brand name and the logo and register the intellectual property.

In what regards intellectual property protection, one registration will be made for the EUIPO (European Union Intellectual Property Office) in Portugal, as a member of the European Union. Thus, the brand will be protected in all of the 28 European Union countries for 10 years. It costs 850€, the registration procedure takes roughly 10 months and the protection will be renewed automatically every 10 years.

10.3 Distribution Channels

Apart from being available in every internet browser, Biomory could be downloaded from the Google Play App Store, for the Android mobile operating system and from the App Store, considering the IOS mobile operating system. There is only a one-time fee of $25 to upload the application on the Google Play App Store, while on the App Store it costs $99/year.

10.4 Product implementation (COGS)

QR code orders will be shipped to the customer's address in a cardboard box containing the QR code stamped in a trimmed and polished acrylic glass (*figure 10.3* - Annex) with 5x5cm dimensions, that lasts for several decades, is waterproof resistant, has a 10-year microcrack and yellowing warranty and UV radiation protection. Furthermore, the shipment will be paid by the customer, will include an instruction manual and a dose of a nail glue, so that the customer can easily fix the structure (*figure 10.4* - Annex). Afterwards, anyone visiting the person's grave just need to take a photo with a smartphone to the QR Code and it will automatically redirect to the person's profile page.

The selected supplier of the acrylic glass stamp is 100 Despiques (100despiques.pt) headquartered in Charneca da Caparica, 10km away from Lisbon. The sourcing price of one unit is 12.50€ without VAT. In addition, the Biomory will generate the QR code through a free of charge QR code generator website (Pageloot.com) and will send through email to the supplier. Moreover, considering that 10 doses of nail glue costs 1.94€ with VAT included with a shipment cost of 3.24€ on the website wish.com, which results in a 0.52€ per unit cost. Total Costs can be observed on *table 10.1*.

Table 10.1 - QR Code (COGS)

	Year 1	Year 2	Year 3	Year 4	Year 5
Unit price (VAT included)	15.38 €	15.38 €	15.38 €	15.38 €	15.38 €
Nail glue unit price (VAT included)	0.52 €	0.52 €	0.52 €	0.52 €	0.52 €
Total without VAT	13,045.38 €	18,915.80 €	20,236.65 €	22,440.99 €	19,762.87 €

10.5 Pricing

Table 10.2 - Pricing

Price	Premium Subscription	QR Code (grave)
Monthly	5 €	
Semiannually	25 €	
Annually	50 €	
One-time fee	150 €	25 €
Strategy	Market	Cost

The pricing strategy of the premium subscription is market-oriented, taking into account not only direct competition but also international direct competitors. Whereas the strategy of the QR Code grave stamp price is a cost pricing strategy based on a bottom-up approach. This means that the

price is established first by calculating the cost of offering the product and subsequently add in a preferred profit margin (Witmer, 2014) of 57,32%.

Furthermore, a recent research carried out by Waterstone Group in the USA found that 84% of Americans are unaware of how much they spend on subscription services and that they underestimate what they spend on subscription services monthly – and usually by a huge margin. Although it is a study from the USA, it is worth taking into account, since Portugal is part of much of the same western culture. Regardless, the average amount of money that the average american spend on 21 types of subscription services is $237.33 per month. However, when respondents had 10 seconds to guess how much money they spend monthly, they said $79.74 on average. Also, the study found that subscriptions below 10$ per month are often forgotten by the consumer (Farrington, 2020).

10.6 Marketing

The Biomory main digital marketing strategy will consist of launching Facebook advertisement campaigns and to promote the platform in social media through Facebook and Instagram, since it is where the vast majority of the target market spends its free time. Moreover, other strategies were also considered such as partnerships with digital influencers, funerary agencies and psychology offices, by creating an affiliate program to encourage them to bring more profile creators and users to the platform in exchange for benefits. However after computing an ROI calculation, these alternatives had a lower performance potential when compared with the Facebook advertising calculations presented further ahead and were disregarded. Those strategies might be used in a spontaneous basis, when a relevant ROI could be obtained.

10.6.1 Facebook ads

The primary goal of the advertisements is to attract new profile creators and users by generating application downloads and profile creation. Moreover, the content within the ads will mainly be focused on the key benefits of using the platform and a brief demonstration of the key mock-ups and its usability process.

In what regards Facebook ads PPC (pay-per-click) campaigns, a trial business account was created in Facebook to test the traction of one video advertisement on Facebook under the name “Memorial Digital” and to collect more responses, using the Google Forms online questionnaire link as landing page. The ad and the video, with 22 seconds, were created by the promoter (*figure 10.5* - Annex) in the video creating tool Vimeo, with a free trial account. The Vimeo premium subscription of 6€ per month will be purchased in order to produce more video ads. Additionally, the target audience were Facebook users that live in Portugal with ages from 30 to 59. The ad was published in

Portuguese, for a 7 day campaign and had a cost of 6.87€. The results were astonishing reaching 3160 people, 4365 impressions and 113 clicks (*figure 10.6, 10.7, 10.8, 10.9* - Annex). Such statistics resulted in a 0,06€ CPC (cost-per-click) which is significantly below the benchmark of $1.72 across all industries (Irvine, 2020). Taking into account that the ad trial's sample size is too low to withdraw long lasting takeaways, a 1€ CPC will be considered for further calculations.

Furthermore, it is worth mentioning that 72% of the individuals that clicked on the add were woman, while 27% where men. This gender disparity is specially accentuated on the older age groups, such as 45-54 and 55-64 (*figure 10.10* - Annex). Relevant signs of engagement were identified, accounting with 5 likes, 2 comments and 2 users shared the advertisement in their own Facebook page chronology. Therefore, with this video ad campaign being a proven success, even though other ads will be created and published, this strategy will be supported with a total 200 000€ yearly investment. As can be observed on *table 10.3* and *table 10.4*, the investment will be divided into two, focused on profile creators (user type 1) and on own profile creators (user type 2).

Table 10.3 – Facebook ads ROI (user type 1)

Indicators			
Average CPC	1 €		
Annual Investment	100,000 €		
Visitors	100,000		
Leads	37.02%		
Profile creators	6.35%		
Premium subscribers CVR1	1.41%	Qr Code CVR2	1.01%
Customer Acquisition Cost	70.75 €		99.05 €
Average Yearly Revenue	122.17 €		25.00 €
Profit	93.54 €		9.11 €
ROI	32.22%		-90.81%

Table 10.4 – Facebook ads ROI (user type 2)

Indicators	
Average CPC	1 €
Annual Investment	100,000 €
Visitors	100,000
Leads	37.02%
Own profile creators	6.54%
Premium subscribers CVR3	1.60%
Customer Acquisition Cost	62.65 €
Average Yearly Revenue	117.74 €
Profit	90.15 €
ROI	43.90%

Primarily, the conversion rates of profile creators turning into premium subscribers and fixable QR Code are 1.41% (CVR1) and 1.01% (CVR2), correspondingly, meaning, the percentage of clicks though to the platform that result in a sale. Dividing the CPC by the CVR1 and CVR2 results in a Customer Acquisition Cost (CAC) of 70.75€ and 99.05€, respectively. Considering an average yearly revenue of 122.17€ by multiplying the weight of each subscription payment model by its maximum yearly revenue (*table 10.5* - Annex) and after liquidating commissions to the distribution stores, the ROI is a resounding 32.22%. Whereas, the investment will definitely not be returned with fixable QR Codes.

Likewise, the conversion rates of own profile creators turning into premium subscribers is 1.60% (CVR3). Dividing the CPC by the CVR3 leads to a CAC of 62.65€. Considering an average yearly revenue of 117.74€ by multiplying the weight of each subscription payment mode by its maximum

yearly revenue (*table 10.6* - Annex) and after liquidating commissions to the distribution stores, the ROI is 43.90%.

In order to invest in the most efficient advertisements possible, avoid wasting time and money, testing different types of advertisements in the same campaign, whether in an image or video format (A/B testing) and investing in the ones that have better results, namely when a lower CPC and a higher number of clicks are obtained, are of utmost importance. Having said that, an investment of 300€ should be enough to get the most out of A/B advertisement testing.

Table 10.7 – Marketing Costs

Marketing Costs	Year 1	Year 2	Year 3	Year 4	Year 5
Facebook advertisement A/B testing	300.00 €	300.00 €	300.00 €	300.00 €	300.00 €
Vimeo Subscription	72.00 €	72.00 €	72.00 €	72.00 €	72.00 €
Facebook advertisement	200,000.00 €	200,000.00 €	200,000.00 €	200,000.00 €	200,000.00 €
Total	200,372.00 €	200,372.00 €	200,372.00 €	200,372.00 €	200,372.00 €

10.7 Technology

This project will be based on a client-server architecture. As for the front-end software development, it will be used a more recent multiplatform development framework, Flutter, which will allow, at an initial stage, to develop simultaneously for Android, iOS and Web, thus saving resources and time. Developed by Google, efforts are being put in motion for Flutter to become the new standard. The great advantage is that Flutter allows to program simultaneously for Android, iOS and Web, without having to have a developer for each application or overloading a team member and helps keeping the platform's features synchronized.

As for the back-end software development, namely in what regards the server, a microservices architecture will be used with Amazon Web Services (AWS) in order to guarantee the scalability of the platform, preventing the increase in profiles created and number of followers from having a negative impact on its use. All should be implemented in the cloud, starting with utilizing the current serverless technologies such as AWS Lambda and information storage in a fast and flexible NoSQL database service like Amazon DynamoDB. Additionally, the necessary files storage, such as texts, images and videos, in file storage services such as AWS S3 and user authentication services with AWS Cognito. It will not only reduce the cost of infrastructure, in an early stage, but also ensure that users are never left hanging waiting for responses from the server, as Amazon has one of the best and most efficient infrastructures in the marketplace worldwide.

As it can be observed in the below tables *10.8* and *10.9*, using AWS is extremely cost efficient for small scale enterprises, as can be noted in the first 2 to 3 years of operations. Nevertheless, from that stage forward, the business begins to gain considerable traction and high user growth, as the number of users and accounts created rises, thus, the amount of storage capacity and service costs

associated soars, likewise. Basically, the more the platform's user-base grows and services are utilized the greater the costs will be, solely. That is why that, after Year 3, a confrontation has to be carried out between continuing to use AWS or to invest in an own server infrastructure, for cost and scalability reasons in the long-term. All costs were estimated using AWS Pricing Calculator (https://calculator.aws/#/estimate). As the estimates were given in US dollars, a EUR/USD exchange rate of 1.1830 at September 8th 2021 has been considered.

Table 10.8 – Total AWS costs (user type 1)

User type 1 - Profile creators	Year 1	Year 2	Year 3	Year 4	Year 5
AWS S3 Cost (€)	13,429.72 €	49,684.93 €	81,811.12 €	111,096.22 €	137,436.50 €
AWS Cognito (€)	463.16 €	5,269.18 €	11,105.85 €	16,415.98 €	21,659.72 €
AWS DynamoDB (€)	1,798.99 €	1,982.12 €	1,988.81 €	1,995.40 €	1,998.75 €
AWS Lambda (€)	0.00 €	3.24 €	25.33 €	69.07 €	107.79 €
Total AWS Cost	15,691.87 €	56,939.46 €	94,931.12 €	129,576.67 €	161,202.75 €

Table 10.9 - Total AWS costs (user type 2)

User type 2 - Own profile creators	Year 1	Year 2	Year 3	Year 4	Year 5
AWS S3 Cost (€)	21,626.44 €	82,143.50 €	142,134.99 €	197,258.01 €	245,819.94 €
AWS Cognito (€)	734.81 €	10,635.32 €	21,899.95 €	35,312.51 €	47,133.26 €
AWS DynamoDB (€)	1,798.99 €	1,985.47 €	1,992.16 €	1,998.75 €	2,005.33 €
AWS Lambda (€)	0.00 €	3.79 €	40.95 €	98.86 €	148.51 €
Total AWS Cost	24,160.24 €	94,768.08 €	166,068.05 €	234,668.12 €	295,107.04 €

In order to calculate AWS S3 costs (tables 10.10 and 10.11 - Annex), 2 important figures had to be computed: storage and data transfer costs. Regarding storage, for the example of year 1 and considering the amount of profile creators (user type 1), it was assumed that each premium account would storage 5Gb of data and every non-premium account would storage 1Gb on average, resulting in a 12,000Gb of data storage and 1,000Gb per month, growing year by year according to the account creation growth expected. In what concerns data transfer, inbound from the internet to AWS it is free of charge. However, the outbound data transfer from AWS to the internet, which is whenever a user views content on a profile, is where the great majority of costs come from. Thus, a total of 14,625Gb of outbound data transfer was estimated (table 10.11 - Annex), taking into account the monthly average number of users (table 10.12 and 10.13 - Annex) per type of account and the amount of content (Gb) they consume per month, in which a 2.5Gb of data was assumed for users belonging to premium accounts and 0.5Gb for those users that follow a non-premium account.

Moreover, in what regards the user authentication services costs calculation, AWS Cognito, the average monthly user-base was taken into account (*table 10.12 and 10.13* - Annex). Until 50,000 active users per month is always free of charge and costs 0.0055$ per extra active user. In addition, concerning AWS DynamoDB services costs, the storage size for NoSQL database tables and indexes was estimated in roughly a 1Gb in the first year and the user-base growth yearly multiplier (*table 12.4*) was used to calculate storage size yearly growth in approximately the same proportion (*table 10.14* **-** Annex). Lastly, regarding AWS Lambda, a serverless computing service, will allow to run code

without provisioning or managing servers, among other benefits and offers a 1 million of free tier requests to the back-end per month and $3.50 after that layer. Precisely 1 million requests were assumed for the first year, with 256mb of memory allocated, 500 milliseconds (ms) duration of each code run request and in the following years the number of requests will grow according to the user-base growth yearly multiplier (*table 12.4*) to reflect a correlation rationale (*table 10.15* **-** Annex).

Furthermore, for the development environment, CI/CD tools such as GitHub Actions will be used and the language most adopted by the industry such as Node.js for server logic should also be used, which is completely free of charge. Thus, the speed of this process will be maximized, allowing the user to quickly get the best possible experience. Costs associated are presented on chapter 12 “financial evaluation”, in the OPEX sub chapter. The whole project development will be carried out by its founders, who will maintain the rights to the respective source codes.

As a potential start-up company, betting on the cloud makes perfect sense. The alternative would have been to have own servers on premise, which not only implies more workload but turns out to be more expensive with more human resources expenses, upfront costs with infrastructure and maintenance, turning it potentially unsustainable in the short to mid-term, time consuming and increasing the risk of failure. Besides, it makes total sense to utilize cloud services as it scales depending on the number of users and their activity, exclusively, as well as its costs, following the platform’s growth. As such, it should not be faced as an option for later, but rather to be implemented from the beginning boosts the growth of the platform, if not, a lot of time would be wasted when the application needs to grow. Whereas if having own servers, if there is the need to increase capacity, more servers have to be installed and with time and costs associated with it or, by the contrary, it might occur that the servers are too many for the user base and reveal unnecessary. Ultimately, the goal is not to reinvent the wheel in this regard, in which time and effort will be spent in things that are already done when they could be dedicated to what matters most, which is to improve the user experience and provide more features quickly, things that really impact customers, beyond that, it would be almost impossible to guarantee better quality than Amazon's infrastructure in a short time period.

10.8 Human Resources

Rather than having a “one man show”, that could turn out to be cost and time inefficient, the promoter will invite a computer engineer to partner, to grow together and to develop the platform’s minimum viable product, which should take around 6 months to be fully completed. While the promoter designed the idea, the platform’s first version UI and developed the business plan, the software development process is still to be commenced by the software engineer. In exchange for his

efforts, the software engineer will receive a fraction of equity, in other words, the "sweat equity", cofound the business alongside the promoter and be responsible for the whole software development granting the CTO position (*figure 10.11* - Annex).

He is a master engineer in electrotechnical and computer from Instituto Superior Técnico (average GPA: 19/20), specialized in the field of computers and with high interest and experience in developing applications using Flutter. Having worked for a year on a cloud architecture for his thesis, he has the necessary knowledge and know-how to design and implement a secure, highly scalable and extensible system with the latest technologies. As they are developing their training in areas fully compatible with this project, the skills of both founders allow a great synergy and complementarity in favour of the enrichment of the project, essentially, with regard to the tasks necessary for execution, the sharing of risk and different perspectives, bringing together both soft and hard skills in management and engineering.

However, he does not have web design skills. Therefore, a web and mobile application design freelancer will be hired to professionally design the UI of the platform both for web and mobile versions, through the platform Fiverr. After consultation, a freelancer was chosen, being a verified Pro service by Fiverr, and he designs 12 screens in exchange for 355.43€ (vide *figure 10.12* - Annex). Since each of the 3 UI versions (IOS, Android and Web) accounts with roughly 24 screens, the total amount to be paid is 2,132.58 €.

In the first year of activity the start-up company will be formed with 3 employees (*figure 10.13* - Annex): the CEO, the CTO and a software engineer. The CEO will have a salary of 1,300€ and will be responsible for the whole business matters such as finance, marketing, management, strategy and human resources management. While accounting, auditing and legal services will be outsourced. The CTO will be granted a gross salary of 1,500€ and will be responsible for the whole software development with a main focus on the back-end, namely in what regards server architecture, databases and security. Additionally, a front-end software developer/engineer with designing skills will be hired with a 1,500€ gross salary and will focus mainly on the front-end software development as well as the UI and the UX.

In the second year, 3 new hires will take place (*figure 10.14* - Annex): a CFO, CMO and a software engineer. The CFO will have a gross salary of 1,300€ and will be responsible for the financial strategy strengthen, budget, control, cash flow management and improving efficiencies and reducing costs across the business. The CMO have a gross salary of 1,300€ will be responsible for the marketing plan, strategy, implementation and continuing to expand the brand awareness among consumers with new creative insights. The software engineer will have a gross salary of 1,500€ and will focus mostly on the back-end side to help deal with the high user base growth.

In the third year, 3 more people will join the ranks (*figure 10.15* - Annex): a COO, a marketeer and a software engineer. The COO will have a gross salary of 1,300€ and will be responsible for the whole operations side, namely make important policy, planning, and strategy decisions, develop, implement, and review operational policies and procedures and assist with recruiting when necessary. The marketeer will have a gross salary of 1,300€ and will mostly contribute to the development of the overall marketing strategy, participate in creating brand marketing strategies, plan, develop and execute print and online campaigns and use statistics and other tools to track the effectiveness of the existing marketing strategies. Lastly, the software engineer will have a gross salary of 1,500€ and will focus mostly on the front-end side to help make the user experience the best as possible and to help keep up with the high user base growth.

In the fourth year, 2 new hires will be held (*figure 10.16* - Annex): a financial controller and an operator. The financial controller will have a gross salary of 1,100€ will focus on risk management and minimisation plans and opportunity forecasting, high-level financial reporting and analysis and regular budget consolidation. Whereas, the operator will have a gross salary of 1100€ and besides assistance to the COO, his/her main duties will be focused mostly on customer service such as resolution of every user related issues by answering questions and requests, responding to incoming telephone calls, email, voice mail inquiries and be responsible for the QR Code supplier relationships as well as control of supply inventory levels regularly.

In the year 5, 2 more hires will take place (*figure 10.17* - Annex): an operator and a software engineer. The main duties and responsibilities is to support the workflow of their correspondent departments, considering the high-level user base growth.

All employee salaries were established taking into account their average market value, considering recent graduates, from bachelor or master degrees. Moreover, since the operational cash flow in year 1 and in year 2 will be negative, there will not be Holidays nor Christmas bonuses. Food allowance is 6€ per working day for the entire 5 years. Employer social security contribution or single social tax is 23.75% per employee gross salary. A Personal Accident Insurance (annual premium) is also included, supplied by Generali, which is 597.02€ per employee.

Table 10.16 - Personnel costs

	Year 1	Year 2	Year 3	Year 4	Year 5
Gross Salary	51,600.00 €	100,800.00 €	150,000.00 €	176,400.00 €	207,600.00 €
Bonus (Christmas and Holidays)			25,000.00 €	29,400.00 €	31,600.00 €
Food allowance	4,752.00 €	9,504.00 €	14,256.00 €	17,424.00 €	19,008.00 €
Total remuneration	**56,352.00 €**	**110,304.00 €**	**189,256.00 €**	**223,224.00 €**	**258,208.00 €**
Total taxable remuneration	51,600.00 €	100,800.00 €	175,000.00 €	205,800.00 €	239,200.00 €
Single Social Tax	**14,297.50 €**	**27,930.00 €**	**41,562.50 €**	**48,877.50 €**	**56,810.00 €**
Insurance	**1791.06**	**3582.12**	**5373.18**	**6567.22**	**7164.24**
TOTAL COST	72,440.56 €	141,816.12 €	236,191.68 €	278,668.72 €	322,182.24 €

10.9 External Supplies and Services

Table 10.17 – External supplies and services' costs

	Year 1	Year 2	Year 3	Year 4	Year 5
Accounting Service	2,520.00 €	2,520.00 €	3,120.00 €	3,360.00 €	3,360.00 €
Auditing Service	3,840.00 €	3,840.00 €	4,560.00 €	4,800.00 €	4,800.00 €
Labs Lisbon - Rent (70m2)	8,400.00 €	8,400.00 €	8,400.00 €	0.00 €	0.00 €
Office Rent (60 m2-Benfica)				7,800.00 €	7,800.00 €
Electricity				1,280.82 €	1,354.02 €
Water				950.98 €	950.98 €
Telecommunications Service (Internet, Phone)				292.91 €	292.91 €
Total without VAT	14,760.00 €	14,760.00 €	16,080.00 €	18,484.70 €	18,557.90 €

An incubation in the Labs Lisbon will take place to start-up the company until the third year. By doing so, the company has to pay the rent (10€/m2, monthly) and has access to the space (70m2), internet, electricity and water. From the year 4 forth, it is considered the renting of an office in Benfica (100m2, 1000€/month), in which electricity, internet, water and other essential external services and supplies expenses will be considered. In addition, Auditing and Accounting services are going to be outsourced due to the fact that it is a requisite to open activity by Portuguese finance authorities. Any variations in the prices are justified with the business volume fluctuation.

11. Implementation Requisites

As mentioned previously, the project will be kicked off with two cofounders, the promoter of this business plan and an invited software engineer that will be responsible for the minimum viable product software development, being expected to take about 6 months.

Table 11.1 - Initial investment

Initial Investment	without VAT	With VAT
Registration Fee in AppStore	99.00 €	121.77 €
Registration Fee in Google Play	25.00 €	30.75 €
Company Creation (Registration)	360.00 €	442.80 €
European brand trademark	654.50 €	850.00 €
Beginning of Finance Activity fee	30.00 €	36.90 €
Computers (3)	4,388.98 €	5,398.44 €
Printer (1)	269.49 €	331.48 €
Designer UI and UX	1,642.09 €	2,132.58 €
Total	7,469.06 €	9,344.72 €

Table 11.2 – Financing requirements

All amount in EUR

Financing Needs	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Initial Investment	9,344.72 €					
Cash Flow		135,198.41 €	22,139.67 €			
Total	166,682.80 €					
Security Margin	2%					
Financing Amount	**170,000.00 €**					

Posterior to having developed a comprehensive business plan alongside with a functional prototype, the conditions are reunited to raise capital in order to support the implementation policies outlined in the previous chapter, that will lead to the platform's success and financial sustainability, as can be verified in the next chapter.

Table 11.3 - Capital and shareholding structure

Capital Structure	%	€	Shareholding (Equity)	%	€
Equity	100%	170,000.00 €	Founder 1	40%	25,000.00 €
Debt	0%	- €	Founder 2	30%	15,000.00 €
			Investor 1	30%	130,000.00 €

The amount to be financed is 170,000€ and is based on the initial investment and to cover the first three years of operational activity. In addition, it is intended to secure a 2% treasury safety margin regarding the financing needs.

While 40,000€ of the project will be financed with capital from the two founders, an extra 130,000€ will be requested to an investor that is interested to inject such amount of capital in exchange for 30% of equity.

This project requires a considerable amount of capital upfront to invest mainly in two of the most critical success factors: human resources, that will develop, maintain and improve the full

software, and marketing, being responsible to drive sales and a strong user-base. Other major expenses are recurrent from the operational activity of the business, thus, dependent on sales.

Since start-ups typically have little collateral to account for a traditional loan, the interest rate is normally high, given its inherent high risk of not paying back debt and Biomory is no exception. Taking that into account, the best way, at this stage, is to seek for an equity investor, whether a business angel or a venture capital firm. Apart from the capital itself, valuable support, guidance, and resources that can help to shape the company and increase its chances of success is also what will be looked for. Additionally, the industry average cost of capital is at 4.47% (vide chapter 12 “financial evaluation”), which is considerably low when compared with what a bank would charge for an interest rate.

Furthermore, although, in the long run, the cost of accepting that capital might be higher, as new investors will have rights to a percentage of the enterprise’s profits in perpetuity, it is preferable to not compromise the projects’ financial sustainability, incurring with enormously high interest payments, even though the interest rates are fixed. On the other hand, the cofounders prefer to be obliged to build a successful enterprise and to multiply the investors investment, rather than an obligation to repay a loan and interests. Besides, the cofounders both share the vision of growing together, rather than trying to bootstrap the whole business by themselves to keep all the profits and to risk not even entering the racetrack.

12. Financial Evaluation

12.1 Revenue

Forecasting sales of new products is subject to a great deal of uncertainty and exhibits notoriously high margin of error, particularly for a digital platform and a brand new industry. Nevertheless, forecasts tend to be correlated with demand estimates. A such, primary data withdrawn from the online survey provided useful information to calculate the sales projections more accurately using a method suggested in the book *Product Design and Development*, published in 2012 by Karl T. Ulrich, a University of Pennsylvania professor and Steven D. Eppinger, a Massachusetts Institute of Technology professor. A proper adaption was made to better suit the nature of the products being sold.

12.1.1 Demand Estimation

Q will be estimated as the quantity of premium subscriptions expected to be sold within 1 year, as:

$$Q = N \times A \times L \times C \times P \qquad (12.1)$$

N is the number of potential customers expected to make purchases during the time period, that is, the total target market identified in chapter 6 "market analysis" 4,476,542 (*table 12.1*).

Table 12.1 - Target market age groups

Target market age groups	Population	Internet Acess (%)	Social Media Use (%)	N
18 to 23	670,688	100%	87%	583,499
24 to 39	1,883,184	98%	87%	1,605,603
40 to 59	3,057,259	86%	87%	2,287,441
Total	5,611,131			4,476,542

A is the fraction of these potential customers or purchases for which the product is available and the customer is aware of the product. The projected number of visits resulting from the marketing strategy will be 200,000 per year, which is a 2.23% fraction of the total targeted market (*table 12.2*).

Table 12.2 – Q1, Q2 and Q3 estimations (year 1)

	Product	Formula	N	A	L	C1	P1 + P2	Q1 + Q2
User type 1 - Profile creators	Subscription Plan	Q1=N*A*L*C1*P1	4,476,542	2.23%	37.02%	17.14%	22.27%	1413
	Qr Code	Q2=N*A*L*C1*P2	4,476,542	2.23%	37.02%	17.14%	15.91%	1010
	Product	Formula	N	A	L	C2	P3	Q3
User type 2 - Own profile creators	Subscription Plan	Q3=N*A*L*C2*P3	4,476,542	2.23%	37.02%	17.66%	24.41%	1596

L is 37.02%, as the fraction of leads generated from platform visits, discovered in the quantitative concept test survey. C is the fraction of leads that will actually create a profile (C1 or C2), within a year, and P is the probability that the product is purchased by profile creators (P1 or P2) or own profile creators (P3), which in turn is estimated by:

$$P = C_{definitely} \times F_{definitely} + C_{probably} \times F_{probably} + C_{maybe} \times F_{maybe} \qquad (12.2)$$

For instance, Fdefinitely is the fraction of survey respondents indicating in the online survey that they would definitely purchase and Cdefinitely a calibration constant to reflect the typical bias of respondents to overestimate the probability of actually purchasing the product. Calibration constants for Cdefinitely is 0.4, Cprobably is 0.2 and Cmaybe is 0.1. *P1*, *P2* and *P3* calculations can be observed on tables *6.3* and *6.4* (Annex).

Table 12.3 – Customer conversion rates

Sample	Variables	%				
	Problem Validation	89.90%				
	Deceased close relatives/friends	93.58%				
	Solution validation	78.37%				
208	Leads	37.02%	37,019			
	Profile creators (type 1)	6.35%	6,346	Own profile creators (type 2)	6.54%	6,538
	Premium subscribers (CVR1)	1.41%	1,413	Premium subscribers (CVR3)	1.60%	1,596
	Qr Code buyers (CVR2)	1.01%	1,010			

The table *12.3* demonstrates that, within 1 year, 6346 profiles are projected to be created for loved ones or close friends and 6,536 own profiles. Moreover, 1,413 premium plans are expected to be subscribed by profile creators, 1,010 fixable QR Codes will be purchased and 1,596 premium plans by own profile creators.

Table 12.4 - Growth forecast

User type 1 - Profile creators					
User base	Year 1	Year 2	Year 3	Year 4	Year 5
Total profile creators	6,346	18,404	33,032	46,810	63,688
Total followers	57,115	165,635	297,286	421,290	573,196
User type 2 - Own profile creators		190.00%	79.48%	41.71%	36.06%
User base	Year 1	Year 2	Year 3	Year 4	Year 5
Total own profile creators	6,538	22,085	43,837	65,474	94,563
Total Followers	90,080	304,264	603,937	902,028	1,302,789
		237.77%	98.49%	49.36%	44.43%

The yearly sales growth forecast is based on the total profile creators (user type 1), total own profile creators (user type 2) and followers growth in the previous year. As such, the profile creators yearly growth is calculated with the following formula:

Total Profile Creators (Previous Year) + Marketing Campaigns' Effects + Networking Effects (12.3)

New profile creators (user type 1) estimates from marketing campaigns have already been calculated and explained previously. Whereas the new profile creators generated from networking effects are based on a fraction of the "Total followers" of the previous year, specifically, 10% on year 2, 5% on year 3, 2.5% on year 4 and 5. In addition, the estimated total followers per account is 9, as previously explained in chapter 6 "market analysis".

Likewise, the same logic is applied on the own profile creators (user type 2) yearly growth forecast, with exception that the estimated total followers per account are higher, 14, as previously explained on chapter 6 "market analysis", which is what makes it grow more rapidly when compared with profile creators (user type 1). In fact, this is one of the reasons why there is the potential to

scale and to reach other customer segments and slightly shift the business model in the long term, as can be reflected in the "development strategy", chapter 9.

Considering that the nature of the platform is memory sharing oriented between families and close friends, it is inevitable to generate networking effects. Additionally, there is a considerable probability of the platform's rapid scalability and propagation, taking into account the vast Portuguese emigrant communities, that a recent study indicated that were approximately 2,6 million worldwide in 2019 (*Countryeconomy*, 2019), mostly throughout Europe, North America and South America. Similarly, considering that there is a considerable amount of recent immigrants in Portugal, namely from Brazil, it is slightly probable that some of these take the platform's name to their homeland.

As a result, the detailed demand volume estimation for the 5 years project valuation are as follows on table *12.5*.

Table 12.5 - Demand volume estimate (user type 1 + user type 2)

User type 1 - Profile creators	Demand Volume Estimate					
	Year 1	Year 2	Year 3	Year 4	Year 5	Price
Premium Subscription	**1,413**	**3,436**	**5,433**	**6,973**	**9,291**	
Monthly	519	1,506	2,703	3,830	5,211	**5.00 €**
Semiannually	144	418	751	1,064	1,447	**25.00 €**
Annually	87	251	450	638	868	**50.00 €**
One time fee	663	1,261	1,529	1,440	1,765	**150.00 €**
Grave QR Code	**1,010**	**1,918**	**2,327**	**2,192**	**2,685**	
Fee	1,010	1,918	2,327	2,192	2,685	**25.00 €**
User type 2 - Own profile creators	**Demand Volume Estimate**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Price
Premium Subscription	**1,596**	**4,728**	**8,460**	**11,535**	**16,441**	
Monthly	663	2,241	4,448	6,644	9,595	**5.00 €**
Semiannually	144	487	967	1,444	2,086	**25.00 €**
Annually	125	422	838	1,252	1,808	**50.00 €**
One time fee	663	1,578	2,207	2,196	2,952	**150.00 €**

12.1.2 Sales

After calculations, it is common consensus that although the one time fee subscription payment mode generates significant upfront cashflow, the semi-annually, annually and, specially, the monthly subscription payment modes gives a steadier sales growth overtime, ending up being the highest revenue generator in year 5 in what regards profile creators (user type 1), even though there is a higher potential of subscription cancelation, leastwise, the storage cost will be marginal.

Table 12.6 - Sales estimate (user type 1 + user type 2)

User type 1 - Profile creators	Sales Estimate				
	Year 1	Year 2	Year 3	Year 4	Year 5
Premium Subscription	142,211.54 €	312,894.23 €	451,605.29 €	530,972.49 €	693,133.61 €
Monthly	31,153.85 €	90,346.15 €	162,155.77 €	229,794.66 €	312,652.31 €
Semiannually	7,211.54 €	20,913.46 €	37,536.06 €	53,193.21 €	72,373.22 €
Annually	4,326.92 €	12,548.08 €	22,521.63 €	31,915.93 €	43,423.93 €
One time fee	99,519.23 €	189,086.54 €	229,391.83 €	216,068.69 €	264,684.15 €
Grave QR Code	25,240.38 €	47,956.73 €	58,179.09 €	54,800.03 €	67,130.04 €
Fee	25,240.38 €	47,956.73 €	58,179.09 €	54,800.03 €	67,130.04 €
Total	**167,451.92 €**	**360,850.96 €**	**509,784.38 €**	**585,772.52 €**	**760,263.64 €**
User type 2 - Own profile creators	**Sales Estimate**				
	Year 1	Year 2	Year 3	Year 4	Year 5
Premium Subscription	152,788.46 €	416,554.18 €	688,212.76 €	862,742.49 €	1,213,161.55 €
Monthly	39,807.69 €	134,458.40 €	266,887.68 €	398,618.09 €	575,719.70 €
Semiannually	7,211.54 €	24,358.41 €	48,349.22 €	72,213.42 €	104,297.05 €
Annually	6,250.00 €	21,110.62 €	41,902.66 €	62,584.97 €	90,390.77 €
One time fee	99,519.23 €	236,626.76 €	331,073.21 €	329,326.01 €	442,754.03 €
Total	**152,788.46 €**	**416,554.18 €**	**688,212.76 €**	**862,742.49 €**	**1,213,161.55 €**

12.2 Costs

12.2.1 Direct costs

Among the direct costs correlated with sales and that, therefore, are variable, there are the costs of QR Codes sold, the AWS costs, that were already computed previously, and also the commissions to be paid to distribution channel's partners such as the IOS App Store and the Google Play Store regarding the subscriptions sold to the users that use the platform through the mobile application (*table 12.7*). Therefore, there is a 15% commission of every subscription sold through the App Store and Google Play Store

Furthermore, from the survey it was found that 89.80% of respondents use primarily the smartphone to access the internet and social media (*table 6.1* - Annex). Moreover, although the mobile operating system market share in Portugal as of August 2021 is 74.60% Android users and 24.75% IOS users, according to new research *(Statcounter Global Stats*, 2021), these percentages will be applied for the 5 years of the project.

Table 12.7 – Commissions to mobile application distribution channels

	Year 1	Year 2	Year 3	Year 4	Year 5
Commission to App Store	9,834.78 €	24,318.53 €	37,999.54 €	46,464.02 €	63,552.54 €
Commission to Google Play	29,643.43 €	73,299.50 €	114,535.98 €	140,049.12 €	191,556.36 €
Total without VAT	32,096.11 €	79,364.25 €	124,012.62 €	151,636.70 €	207,405.61 €

12.2.2 OPEX

Most of the operational expenses, also considered as fixed costs, were previously calculated and presented on chapter 10 "Implementation Policies" regarding marketing costs, personnel costs and the external supplies and services.

In addition, other costs are compiled in *table 12.8***.** A GitHub Enterprise subscription plan will be purchased for the entire 5 years (*figure 12.1* - Annex) to host a version controlled source-code and

provide multiple users (programmers) to contribute, at the same time, to private and/or open source projects. It costs 21$ per user per month, counting with all the software engineers and the CTO. The euro dollar conversion was applied with a EUR/USD exchange rate of 1.1830 at September 8th 2021. Additionally, on year 2, a translation service will be purchased to alphatrad.pt (*figure 12.2* - Annex) for the platform to be translated from Portuguese into 5 languages: English, Spanish, French, German and Italian. Except for German (0.08€ per word), it costs 0.07€ per word translated, assuming that the number of words being translated will be roughly 10,000, it will cost 3,600€. The translation will only be made upon the platform's UI and not upon the content contained in the profile by users.

Table 12.8 - Other costs

	Year 1	Year 2	Year 3	Year 4	Year 5
GitHub Enterprise subscription	426.04 €	639.05 €	852.07 €	852.07 €	1,065.09 €
Platform Translations		3,600.00 €			
Total without VAT	426.04 €	4,239.05 €	852.07 €	852.07 €	1,065.09 €

12.3 Income Statement

Table 12.9 - Income Statement

All amounts in EUR

Income Statement	Year 1	Year 2	Year 3	Year 4	Year 5
Premium Subscription	227,150.00 €	561,675.28 €	877,659.90 €	1,073,160.53 €	1,467,847.27 €
QR code	19,435.10 €	36,926.68 €	44,797.90 €	42,196.02 €	51,690.13 €
Total Revenue	**246,585.10 €**	**598,601.96 €**	**922,457.79 €**	**1,115,356.55 €**	**1,519,537.40 €**
Comissions - Google Play and App Store	32,096.11 €	79,364.25 €	124,012.62 €	151,636.70 €	207,405.61 €
Amazon Web Services	39,852.10 €	151,707.54 €	260,999.17 €	364,244.79 €	456,309.79 €
QR code	13,045.38 €	24,786.22 €	30,069.60 €	28,323.15 €	34,695.86 €
Direct Costs	**84,993.59 €**	**255,858.01 €**	**415,081.39 €**	**544,204.64 €**	**698,411.26 €**
Gross Sales	161,591.50 €	342,743.95 €	507,376.41 €	571,151.91 €	821,126.14 €
Marketing Costs (FB ads)	200,372.00 €	200,372.00 €	200,372.00 €	200,372.00 €	200,372.00 €
Employee Expenses	72,440.56 €	141,816.12 €	236,191.68 €	278,668.72 €	322,182.24 €
External Supplies and Services	14,760.00 €	14,760.00 €	16,080.00 €	22,684.70 €	22,757.90 €
Other Costs	426.04 €	4,239.05 €	852.07 €	852.07 €	1,065.09 €
OPEX	**287,998.60 €**	**361,187.17 €**	**453,495.75 €**	**502,577.50 €**	**546,377.23 €**
EBITDA	-126,407.09 €	-18,443.23 €	53,880.65 €	68,574.41 €	274,748.90 €
Depreciations	904.74 €	1,809.49 €	2,687.28 €	3,272.48 €	3,565.08 €
EBIT	-127,311.84 €	-20,252.71 €	51,193.37 €	65,301.93 €	271,183.82 €
Interest					
EBT	-127,311.84 €	-20,252.71 €	51,193.37 €	65,301.93 €	271,183.82 €
Taxes	- €	- €	10,750.61 €	13,713.41 €	61,016.36 €
Net Income	-127,311.84 €	-20,252.71 €	40,442.76 €	51,588.53 €	210,167.46 €
Operational Cash Flow	-126,407.09 €	-18,443.23 €	43,130.05 €	54,861.01 €	213,732.54 €

Since the financial success of the platform is correlated with its user-base and number of premium subscribers, a significant effort was made in the first couple of years in order to boost future revenue. That is precisely why, in years 1 and 2 the high operational expenses compared with gross sales, cause a negative net income, although with sales margin ranging from 50% to 65% in all 5 years, as variable costs only grow according with the user-base and premium accounts in the given moment.

Nevertheless, it can be observed in *table 12.9* that total revenue begin to gain momentum from Year 3 onwards, as there is revenue incoming from customers already acquired in previous years, particularly regarding the monthly, semi-annually and annually premium subscription payment modes adding to the customers acquired year by year through marketing campaigns, envisioning great potential for future scalability.

Furthermore, as opposed to the monthly, semi-annually and annually subscription payment modes, the 150€ one time fee is fixed. As such, given the continuous user and storage cost, some day in the future, the cost will surpass the 150€ mark for that particular type of premium account. That is why it is critical to sustain the acquisition of new premium accounts that will compensate for the costs of older accounts. Considering that each year dies approximately 110,000 people in Portugal (*table 6.6* - Annex), there is potential to maintain the platform's growth.

A corporate tax of 21% was applied on earnings before taxes in years 3, 4 and 5. Since earnings before taxes were above 150,000€ in year 5, 1.5% of additional municipal surcharges (Lisbon) are projected to be paid. In addition, there was exemption from state surcharges due to the fact that earnings did not surpass 1,500,000€.

Table 12.10 – Sales breakeven point

Sales Breakeven Point	Year 1	Year 2	Year 3	Year 4	Year 5
Variable Costs	84,993.59 €	255,858.01 €	415,081.39 €	544,204.64 €	698,411.26 €
Fixed Costs	288,903.34 €	362,996.66 €	456,183.04 €	505,849.98 €	549,942.31 €
BEP	373,896.93 €	618,854.68 €	871,264.42 €	1,050,054.62 €	1,248,353.58 €
Sales	246,585.10 €	598,601.96 €	922,457.79 €	1,115,356.55 €	1,519,537.40 €
	65.95%	96.73%	105.88%	106.22%	121.72%

As can be observed in *table 12.10*, the sales volume only covers the breakeven point, that is, fixed and variable costs, by 65.95% and 96.73% in the first two years, correspondingly. Thereafter, forecasted revenue surpasses the breakeven point by 5.88% in year 3, 6.22% in year 4 and 21.72% in year 5.

12.4 Cash Flow

Table 12.11 – Working capital

Working Capital	Average Payment Period (days)	Year 1	Year 2	Year 3	Year 4	Year 5	
1 - Exploration Needs							
Subscriptions App Store	28	3,497.67 €	8,456.29 €	12,990.55 €	15,666.74 €	21,324.51 €	
Subscriptions Google Play Store	15	5,647.75 €	13,654.53 €	20,976.08 €	25,297.38 €	34,433.08 €	
State and Other Public Entities - VAT to receive	56						
Total (1)		**9,145.41 €**	**22,110.82 €**	**33,966.62 €**	**40,964.12 €**	**55,757.59 €**	
2 - Exploration Resources							
AWS	5	553.50 €	2,107.05 €	3,624.99 €	5,058.96 €	6,337.64 €	
External Supply and Services' Suppliers	28	1,261.77 €	1,261.77 €	1,388.05 €	2,157.60 €	2,164.60 €	
State and Other Public Enitites - VAT to pay	56	788.50 €	10,895.27 €	20,332.93 €	24,232.45 €	37,553.14 €	
State and Other Public Entities - employee charges	28	1,296.76 €	2,503.57 €	3,710.39 €	4,290.11 €	4,976.18 €	
State and Other Public Entities - company charges	28	1,112.03 €	2,172.33 €	3,232.64 €	3,801.58 €	4,418.56 €	
Total (2)		**5,012.56 €**	**18,940.00 €**	**32,289.00 €**	**39,540.70 €**	**55,450.10 €**	
Working Capital		**4,132.85 €**	**3,170.83 €**	**1,677.63 €**	**1,423.43 €**	**307.48 €**	**WC Terminal Value**
Investment in Working Capital		4,132.85 €	-962.03 €	-1,493.20 €	-254.20 €	-1,115.94 €	

In order to compute certain calculations, the assumptions presented on *table 12.12* (Annex) were considered.

Even though, premium subscribers pay upfront for subscriptions, receivables coming from the App Store and Google Play Store are net from commissions, as Apple and Google subtracts the respective commissions to the subscription sale price and pays the remaining amount, correspondingly.

Throughout the five years of the project, its current assets are projected to be higher when compared with current liabilities, although ending up by decreasing its difference year by year. Thus, operational treasury surplus is estimated to be generated in the last four years of the project, except on year 1. The main reason why this may occur is that since considerable marketing efforts are planned to be taken into account, ends up driving revenue for the following years, as customers, such as premium subscribers, acquired in the first year, that pay in a monthly, semi-annually or annually basis, are expected to pay continuously. Thereafter, the referred effect can be verified by means of the sharp increase of the item "State and Other Public Entities – VAT to pay".

Table 12.13 - CAPEX

CAPEX	Quantity	Value	Depreciation rate	Depreciation Period	Yearly Depreciation	ccumulated Depreciatio	Book value
Computers (Year 1)	3	4,388.98 €	20%	5	877.80 €	4,388.98 €	0.00 €
Computers (Year 2)	3	4,388.98 €	20%	5	877.80 €	3,511.18 €	877.80 €
Computers (Year 3)	3	4,388.98 €	20%	5	877.80 €	2,633.39 €	1,755.59 €
Computers (Year 4)	2	2,925.98 €	20%	5	585.20 €	1,170.39 €	1,755.59 €
Computers (Year 5)	1	1,462.99 €	20%	5	292.60 €	292.60 €	1,170.39 €
Printer (Year 1)	1	269.49 €	10%	10	26.95 €	134.75 €	134.75 €
Printer (Year 2)	1	269.49 €	10%	10	26.95 €	107.80 €	161.70 €
							5,855.81 €
							CAPEX Terminal Value

The capital expenditure (CAPEX) will consist of hardware equipment such as computers and printers. Two printers will be acquired in the first 2 years, while in what concerns computers, will be purchased for each new personnel that will join the team. Furthermore, the useful lifetime of the computers is 5 years, a printer has a useful lifetime of 10 years and the total CAPEX terminal value will amount to 5,855.81€ as can be observed in the *table 12.13*.

Table 12.14 - Cash flow statement

All amounts in EUR

Cash Flow Statement	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
1 - Inflows						
Operational Cash Flow				43,130.05 €	54,861.01 €	213,732.54 €
CAPEX Terminal Value						5,855.81 €
Investment in WC			962.03 €	1,493.20 €	254.20 €	1,115.94 €
WC Terminal Value						307.48 €
Total (1)		- €	962.03 €	44,623.25 €	55,115.21 €	221,011.78 €
2 - Outflows						
Operational Cash Flow		126,407.09 €	18,443.23 €			
CAPEX	9,344.72 €	4,658.47 €	4,658.47 €	4,388.98 €	2,925.98 €	1,462.99 €
Investment in WC		4,132.85 €				
Total (2)	9,344.72 €	135,198.41 €	23,101.69 €	4,388.98 €	2,925.98 €	1,462.99 €
Cash Flow	- 9,344.72 €	- 135,198.41 €	- 22,139.67 €	40,234.27 €	52,189.22 €	219,548.79 €

As can be noted in the *table 12.14*, the elevated negative cash flow observed in year 1 is somewhat expected, as required strategies were put in motion to boost the platform's user-base growth. Nevertheless, in the following year, a significant recovery can be noted, carving a path for the third, fourth and fifth years resulting in the overall yearly cash flow turning positive.

12.5 Valuation

Table 12.15 – Cost of capital

Cost of Capital			
Cost of equity	5.83%	Equity	100.00%
Cost of debt	3.35%	Debt	0.00%
Levered Beta (Industry)	0.88	Levered Beta (Company)	0.88
Unlevered Beta (Industry)	0.86	Unlevered Beta (Company)	0.88
WACC (US$)	5.83%	Expected inflation rate in US$	1.50%
WACC (Euros)	**4.47%**	Expected inflation rate in €	0.20%

To calculate the weighted average cost of capital (*table 12.15*), the method of Professor Aswath Damodaran was used, depicting the industry benchmark values for "Software (System + Application)", in the "Western Europe" region and considering 310 companies. The data extracted is updated for 05/01/2021 (Damodaran, 2021) and is adjusted from inflation and exchange rate deviation.

Table 12.16 – Valuation results

Indicators		Criteria	Result
NPV	96,444.83 €	> 0	✓
IRR	19.82%	> WACC (4.47%)	✓
Payback Period (years)	4.45	< 5	✓
Profitability Index	5.95	> 1	✓

Furthermore, the net present value (NPV) valuation method was used in order to compare the present value of the future cash flows generated by the project, taking into account the initial investment. Thus, considering the figures from *table 12.14* regarding the initial investment and future cash flows and from *table 12.15*, concerning the weighted average cost of capital that will serve as the discount rate, the NPV is 96,444.83€. Therefore, the cash flows generated by the business are sufficient enough to remunerate investors at the discount rate, withal, a surplus, equal to the NPV value, is generated. Moreover, the maximum discount rate for the project to be financially viable equals to the internal rate of return (IRR), 19,82%, which is considerably higher than the actual discount rate (4.47%). In addition, the payback period of 4.45 years (*table 12.17* - Annex) is below the project's lifetime (5 years) and the profitability index of 5.95 (*table 12.18* - Annex) indicates that the venture will be profitable, as each 1€ invested in CAPEX, would have a return of 5.95€. At last, in light of the previously mentioned, it can be concluded that the project is financially viable and the decision to advance with the project is affirmative, as depicted in *table 12.16*.

Table 12.19 – FCFF and FCFE

Free cash flow to firm (FCFF)				
Year 1	Year 2	Year 3	Year 4	Year 5
- 135,198.41 €	- 22,139.67 €	40,234.27 €	52,189.22 €	219,548.79 €

Free cash flow to equity (FCFE)				
Year 1	Year 2	Year 3	Year 4	Year 5
- 135,198.41 €	- 22,139.67 €	40,234.27 €	52,189.22 €	219,548.79 €

Furthermore, the discounted cash flows (DCF) method was similarly used to value the project's finances, in which two slightly different approaches were computed (*table 12.19*), the free cash flow to firm (FCFF) and the free cash flow to equity (FCFE). Since, FCFF are the cash flow that are available to pay shareholders and creditors and FCFE the cash flow that are available only to pay shareholders, the figures are similar, as the project will be funded solely with equity and will not have financial expenses.

Table 12.20 – Enterprise value (scenario 1 + 2)

Scenario 1 - Initial stage		Scenario 2 - Perpetuity	
Enterprise Value	105,789.55 €	Enterprise Value	9,262,430.57 €
		Perpetuity growth rate (g)	2.50%
		Terminal Value	11,396,947.97 €

An important aspect in the DCF valuation method is the definition of the time horizon under analysis. At first, the life of companies is unlimited. In this framework, it is usual to divide the forecast period into two sub-periods: (1) an initial period in which each yearly cash flow are explicitly estimated and (2) a continuity period, generally perpetual, in which the FCFF are not projected only with the explicit lifetime of the project (Custódio & Mota, 2022).

Firstly, in an initial stage, the current enterprise value is 105,789.55€, as it portrays the net present value of the FCFF considering the project's lifetime of 5 years. Whereas, in a perpetuity scenario, the enterprise value reaches 9,262,430.57€ that amounts to the net present value of the FCFF during the project's lifetime plus the net present value of all the free cash flows to firm generated beyond the forecast period, also designated as terminal value (11,396,947.97€), reflecting a perpetuity growth rate of 2.5%. The business sits at an early stage of its life cycle and expansion, even though is expected to be on a well-established position in the Portugal market, will seek to enter new markets such as Europe and Brazil. As such, a sharp growth is expected in revenue and, thus, in free cash flow. On the other hand, given the threat of rising competition, the acknowledgement of an ever changing environment and as the business reaches a mature stage in the future, there is a high likelihood of approximation to historic inflation rates of developed countries, between 2% and 3%, and to the average GDP growth rate of the same group of countries,

between 3% and 4% (INE & Eurostat, 2018). Since it is expected a solid potential for the business to thrive and, thus, having a good performance overtime, a 2.5% will be considered as the perpetuity growth rate.

12.6 Validation

Table 12.21 – Validation board

Assumption	Objective	Experiment method	Hypothesis	Validation	
			Minimum success criteria	Results of experiment	Aftermath
Problem	Validate that the problem is real and worth solving.	Online questionnaire	86.57% say yes	89.90%	✓
Solution	Validate that the potential customer thinks the product is going to solve the problem.	Online questionnaire	75.46% say yes	78.37%	✓
Traffic	Validate that there will be accounts created	Online questionnaire	Accounts (type 1): 5.765% Accounts (type 2): 6.130%	Accounts (type 1): 6.35% Accounts (type 2): 6.54%	✓
Features	Validate that the core features of the product work.	-	-	-	
Business Model	Validate that there will be enough customers	Online questionnaire	Premium Subscribers 1: 1.278% Premium subscribers 2: 1.497%	Premium Subscribers 1: 1.41% Premium subscribers 2: 1.6%	✓
Price	Validate that there is enough demand accepting the price	-	-	-	

As can be observed in table 12.21, the four elements selected for assumption testing were validated, as all the results of the experiment were over the minimum success criteria for the project to be financially viable. The minimum success criteria were computed under a sensitivity analysis calculated according to the impact in the net present value, as can be observed in *table 12.22* (Annex).

13. Conclusions

The lack of empirical information on the subject reveals that there is room for new endeavours and findings in the digital afterlife industry.

In the wise words of Mrs. Lafley and Martin (2013), it is critical to test the riskiest assumptions in an early stage of product development to avoid wasting time and resources on a project that does not have the potential that was thought of, based on untested assumptions. Thereafter, the project's assumptions were validated as not only the problem, but also the solution, the platform's traffic and the business model were validated by potential customers through the completion of an online questionnaire and the verification of the minimum success criteria.

It is worth highlighting key estimations withdrawn from primary data, upon which the financials and the platform's success were evaluated, such as 6.35% of the Portuguese population are interested in creating a profile for a loved one, 1.41% would subscribe a premium plan and 1.01% would purchase a QR code to fix in the grave. Furthermore, 6.54% would create their own page and 1.6% would subscribe a premium plan.

It can be withdrawn that there are more opportunities than threats in what concerns mega trends comprising forces such as technology, demographics, social behaviour and consumer trends.

The industry is moderately attractive and Biomory has substantial competitive advantage when compared with its direct domestic competitor, with whom it will compete at least in the short and mid-term time horizons.

It can be concluded that the project will be financially viable, as estimates suggest that the project will generate a net present value of 96,444.83€, an internal rate of return of 19.82%, a payback period of 4.45 years and a profitability index of 5.95. Moreover, in a longer term scenario, it is expected a very promising return on investment both for its cofounders and its investors, as the enterprise value in perpetuity amounts to 9,262,430.57€. Nevertheless, the financing amount required is 170,000€.

Thus, the promoter will proceed with the development of the business idea, already encountered the CTO and future cofounder to develop a functional prototype and test the platform's UI and UX. Subsequently, the conditions will be reunited to present Biomory to investors to raise capital in order to sustain the required implementation policies, especially to increase the team and invest in marketing, in order to develop the full software and launch the platform.

Furthermore, it can be concluded that Biomory has a considerable high degree of scalability, as it intends to solve a common unsatisfied need that appears in every peoples' lives sooner or later, regardless of ethnicity, nationality, gender or religion.

Ultimately, considering the digital revolution the world has been witnessing for the last decades, literature and scientific findings, the collected primary and secondary data lead to the conclusion that offering a digital platform such as Biomory will help the transition between the physical and limited remembering practices in which families and friends could pleasantly remember its beloved one's memory in a centralized and sensitive way, as well as to eternalize it and give everyone the possibility to transmit a legacy for generations to come.

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15. Annex

Annex A – Types of opportunity

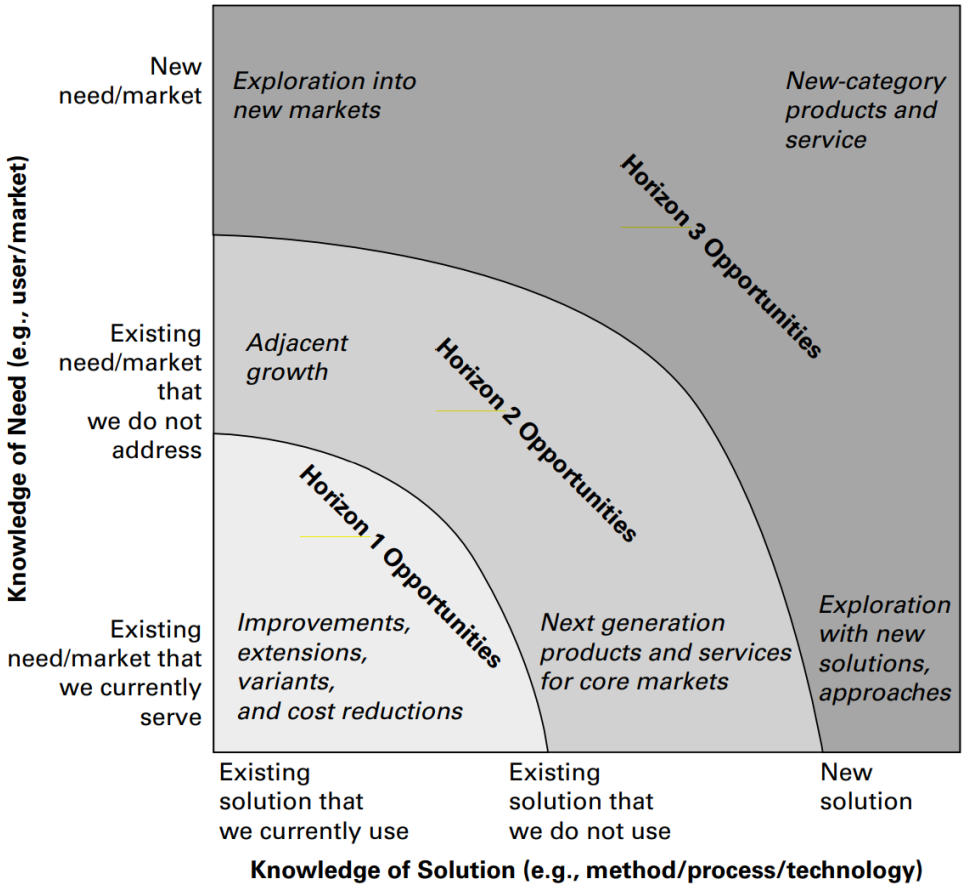

Figure 3.1 - Types of opportunities. Horizons 1, 2, and 3 represent increasing levels of risk, reflecting different types of uncertainty. Source: Terwiesch and Ulrich (2009)

Annex B – UI Sketches

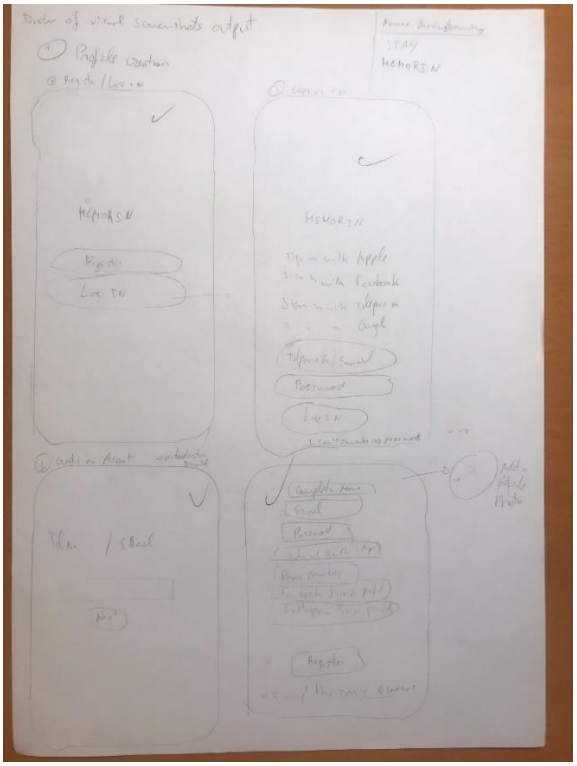

Figure 3.2 - Sketch 1: Log in

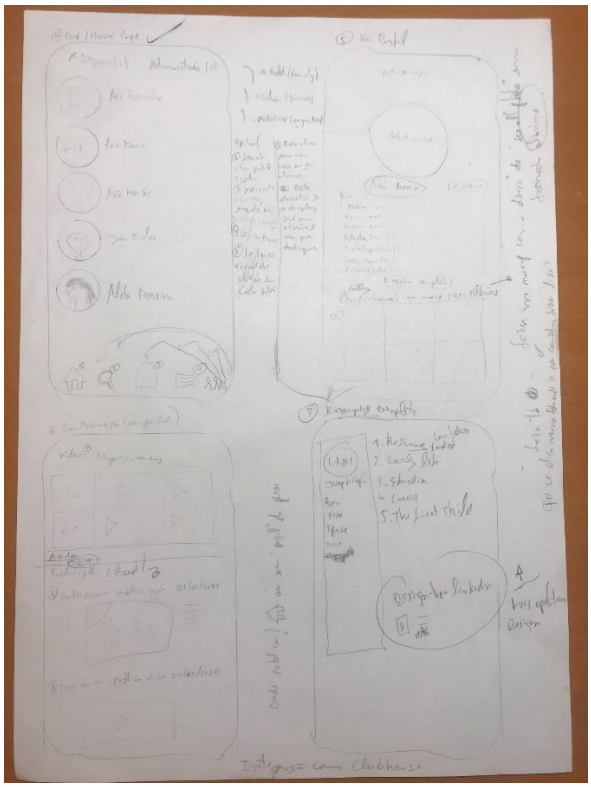

Figure 3.3 - Sketch 2: Profile view

Annex C – Validation

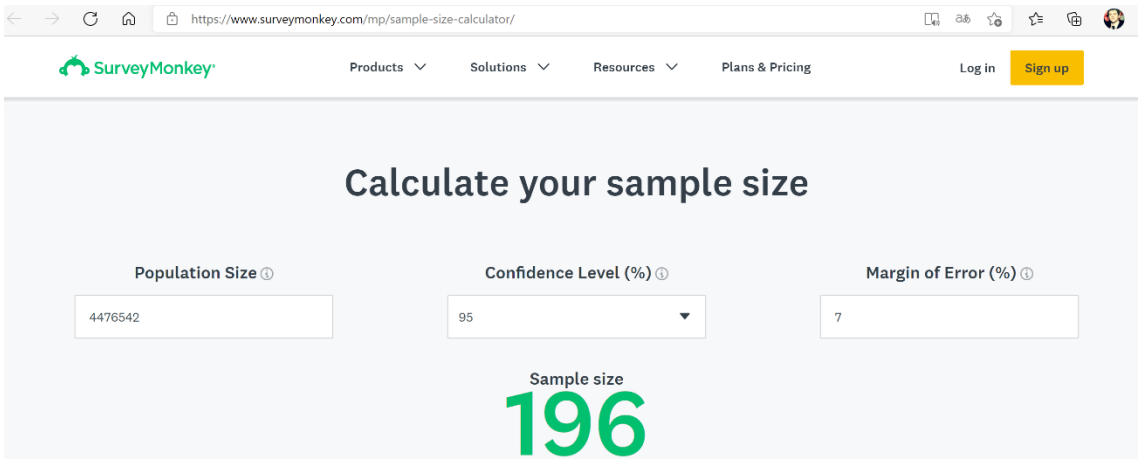

Figure 3.4 - Sample size, confidence level and margin of error. Source: https://www.surveymonkey.com/mp/sample-size-calculator/

Assumption	Objective	Experiment method	Hypothesis	Validation	
			Minimum success criteria	Results of experiment	Aftermath
Problem	Validate that the problem is real and worth solving.	Online questionnaire			
Solution	Validate that the potential customer thinks the product is going to solve the problem.	Online questionnaire			
Traffic	Validate that there will be accounts created	Online questionnaire			
Features	Validate that the core features of the product work.	-	-	-	
Business Model	Validate that there will be enough customers	Online questionnaire			
Price	Validate that there is enough demand accepting the price	-	-	-	

Table 3.1 – Validation board

Annex D – UI Mockups

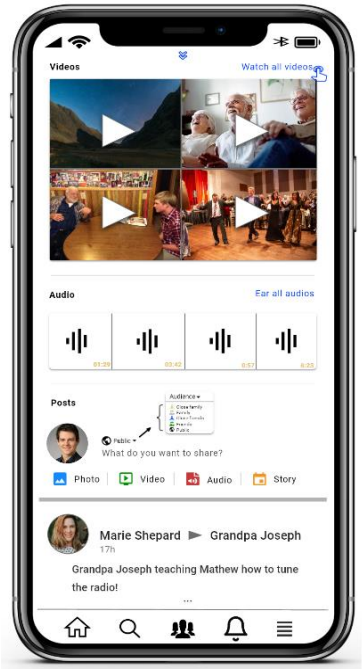

Figure 4.7 - Profile view 2

Figure 4.2 - Settings

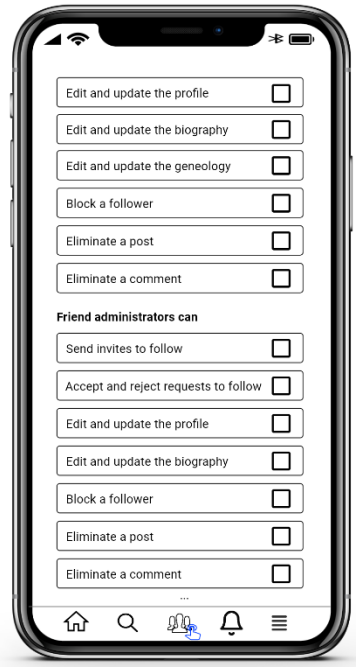

Figure 4.3 - Settings 2

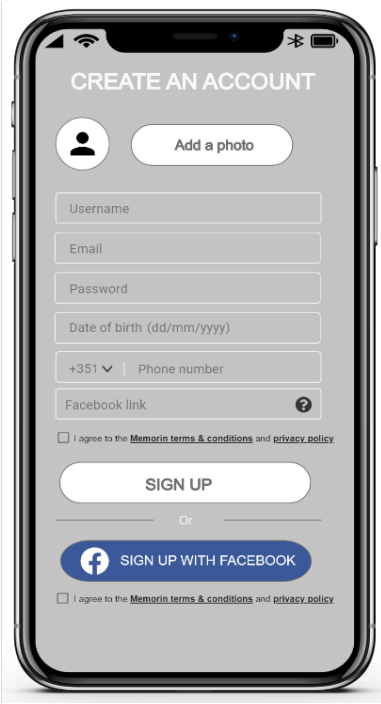

Figure 4.13 – Create account

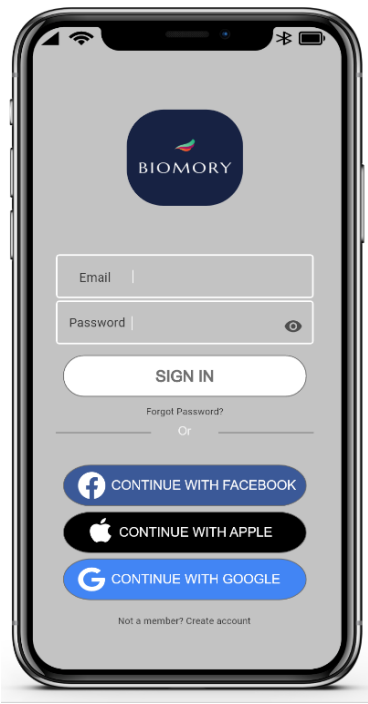

Figure 4.14 – Log in

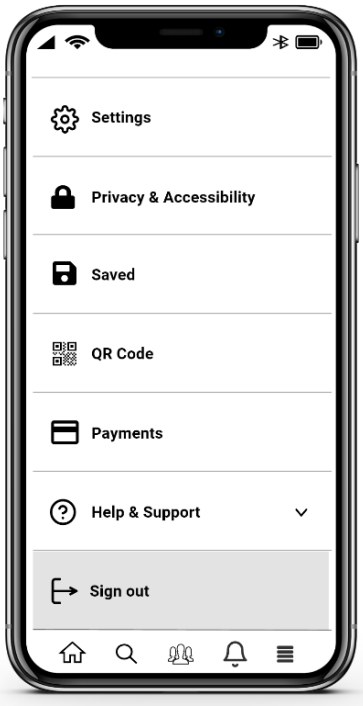

Figure 4.15 - Options

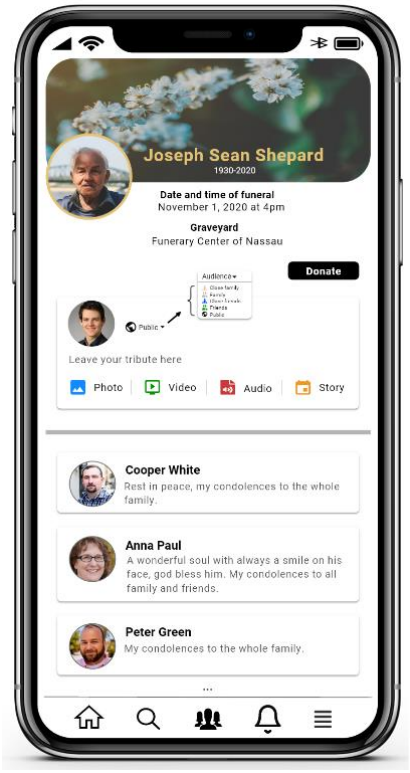

Figure 4.16 - Public condolences page

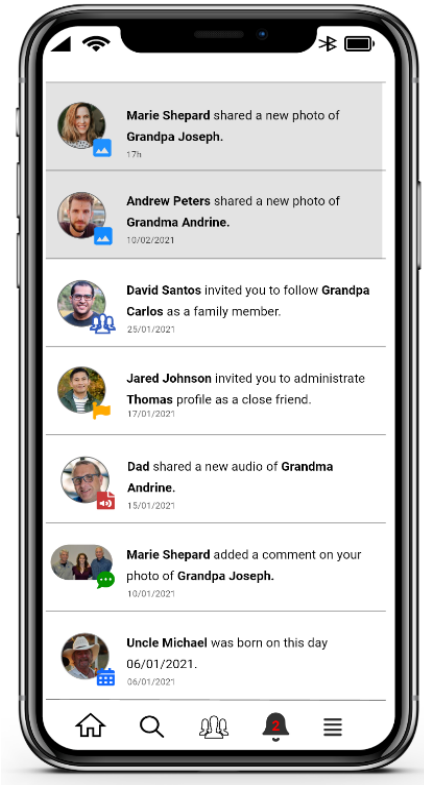

Figure 4.17 - Notifications

Annex E – Premium Subscription Plan

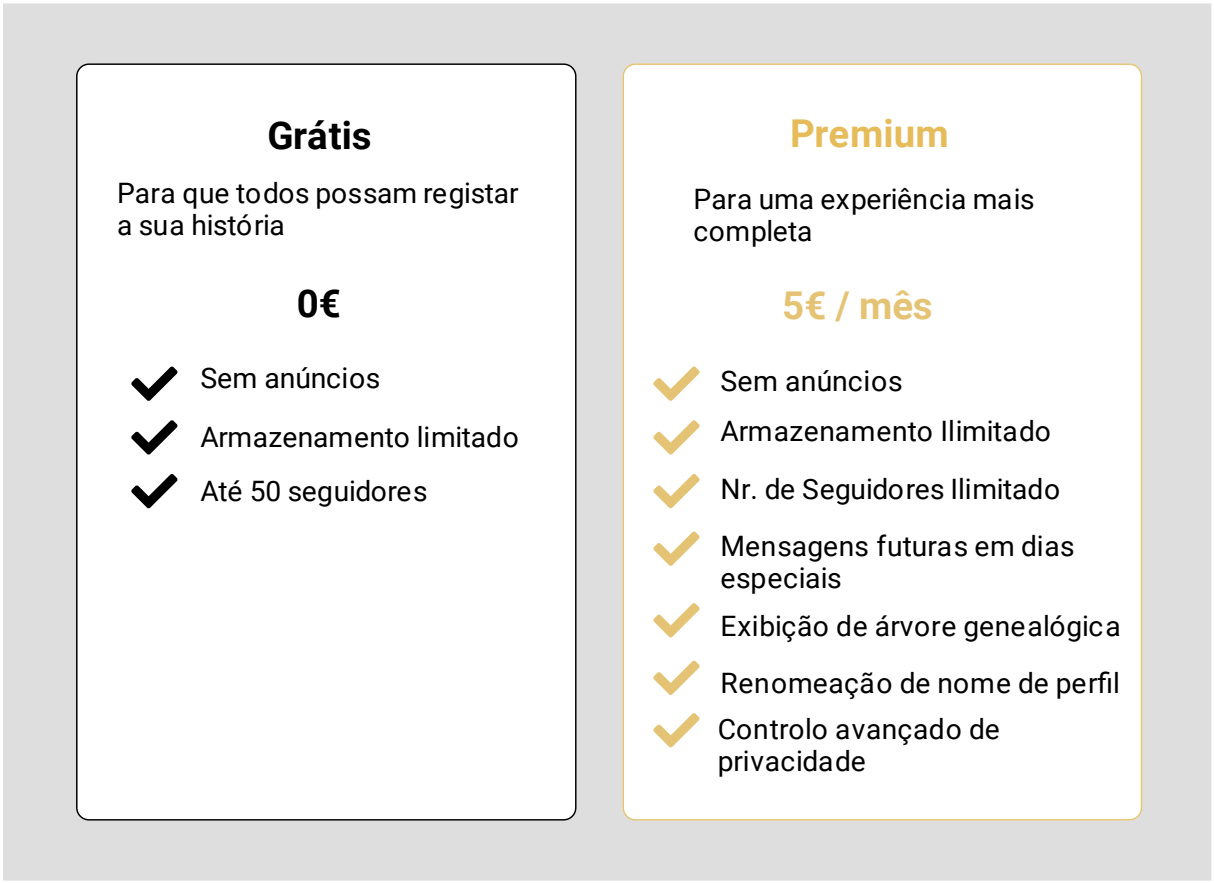

Figure 5.1 – Premium Subscription Plan

Annex F – Survey Results

Table 6.1 – Sample description

Sample size	208	
Social Media usage frequency	Daily	28.37%
	Some times a day	62.02%
	Some times a week	5.77%
	Weekly	3.37%
	Never	0.48%
Most frequently used electronic device	Smartphone	89.90%
	Desktop	10.10%
Age groups	18 - 23	14.42%
	24 - 29	63.94%
	30 - 39	10.58%
	40 - 49	9.13%
	50 - 59	1.92%
Gender	Female	53.85%
	Male	46.15%
Occupation	Student	11.54%
	Student-worker	15.38%
	Employee	61.54%
	Self-employed worker	9.62%
	Unemployed	1.92%
District of residence	Açores	0.96%
	Aveiro	1.92%
	Beja	0.48%
	Braga	0.96%
	Castelo Branco	0.48%
	Coimbra	1.44%
	Évora	1.92%
	Faro	1.92%
	Leiria	0.48%
	Lisboa	49.04%
	Madeira	31.73%
	Portalegre	0.48%
	Porto	1.44%
	Santarém	1.44%
	Setúbal	4.81%
	Viseu	0.48%

Table 6.2 - Survey results

Gap validation	Yes	71.63%	208
	Do not know	16.83%	
	Comments	1.44%	
	No	10.10%	
Deceased close family or friend	Yes	93.58%	187
	No	6.52%	
Solution will fulfill the gap	Yes	53.14%	175
	Maybe	40.00%	
	Could not understand its use	2.29%	
	No	4.57%	
Platform's novelty to the user	Yes	88.00%	175
	Not sure	2.86%	
	No	2.29%	
Leads	Nr of contacts given		77
Profile Creation (user type 1)	Yes	57.14%	44
	Not me. But would tell someone to create	24.68%	
	No, but would be a follower if existed	16.88%	
	No	1.30%	
Followers per account	1 to 5	9.09%	44
	6 to 10	25.00%	
	11 to 15	22.73%	
	16 to 20	15.91%	
	21 to 25	4.55%	
	26 to 30	18.18%	
	>30	2.27%	
Own account creators (user type 2)	Definitely would create	20.78%	64
	Probably would create	31.17%	
	Maybe would create	31.17%	
	Probably would not create	15.58%	
	Definitely would not create	1.30%	
Followers per account	1 to 5	7.81%	64
	6 to 10	38.64%	
	11 to 15	20.45%	
	16 to 20	15.91%	
	21 to 25	13.64%	
	26 to 30	36.36%	
	>30	2.27%	

37.02%	Out of sample	
bias calibration constant 0.3	Profile creators	
	Out of leads	Out of sample
	17.14%	**6.35%**
Followers per account	9	
	Calibration constant applied to reflect bias and followers' refusal: 0.6	
bias calibration constant 0.4	Profile creators	
bias calibration constant 0.2	Out of leads	Out of sample
bias calibration constant 0.1	**17.66%**	**6.54%**
Followers per account	14	
	Calibration constant applied to reflect bias and followers' refusal: 0.6	

Table 6.3 - Premium subscribers (user type 1)

User type 1 - Profile creators				
Premium Subscription Plan	Definitely would buy	Probably would buy	Maybe would buy	P1
5€/month	4.55%	3.18%	0.45%	8.18%
25€/semiannually	0.00%	1.82%	0.45%	2.27%
50€/annually	0.00%	1.36%	0.00%	1.36%
One time fee	4.55%	5.45%	0.45%	10.45%
Total	9.09%	11.82%	1.36%	22.27%

Grave QR code	Definitely would buy	Probably would buy	Maybe would buy	P2
25 €	6.36%	6.36%	3.18%	15.91%

Premium Subscribers		QR Code buyers	
Out of profile creators	Out of sample	Out of profile creators	Out of sample
22.27%	1.41%	15.91%	1.41%

Table 6.4 - Premium subscribers (user type 2)

User type 2 - Own profile creators	Definitely would create account			47.06%	
Premium Subscription Plan	Definitely would buy	Probably would buy	Maybe would buy	P	
5€/month	12.50%	1.25%	0.00%	13.75%	6.47%
25€/semiannually	0.00%	0.00%	1.25%	1.25%	0.59%
50€/annually	2.50%	0.00%	0.00%	2.50%	1.18%
One time fee	5.00%	5.00%	0.00%	10.00%	4.71%
Total	20.00%	6.25%	1.25%	27.50%	

User type 2 - Own profile creators	Probably would create account			35.29%	
Premium Subscription Plan	Definitely would buy	Probably would buy	Maybe would buy	P	
5€/month	1.67%	3.33%	0.42%	5.42%	1.91%
25€/semiannually	0.00%	1.67%	0.42%	2.08%	0.74%
50€/annually	0.00%	1.67%	0.00%	1.67%	0.59%
One time fee	6.67%	4.17%	0.42%	11.25%	3.97%
Total	8.33%	10.83%	1.25%	20.42%	

User type 2 - Own profile creators	Maybe would create account			17.65%	
Premium Subscription Plan	Definitely would buy	Probably would buy	Maybe would buy	P	
5€/month	3.33%	6.67%	0.00%	10.00%	1.76%
25€/semiannually	5.00%	0.00%	0.00%	5.00%	0.88%
50€/annually	0.00%	0.00%	0.83%	0.83%	0.15%
One time fee	3.33%	5.00%	0.00%	8.33%	1.47%
Total	11.67%	11.67%	0.83%	24.17%	

User type 2 - Own profile creators	Total
Premium Subscription Plan	P3
5€/month	10.15%
25€/semiannually	2.21%
50€/annually	1.91%
One time fee	10.15%
Total	24.41%

Premium Subscribers	
Out of profile creators	Out of sample
24.41%	1.60%

Annex G – Secondary Data

Table 6.5 - Average annual resident population by Age (2020) in Portugal

Período de referência dos dados	Local de residência		População média anual residente (Série longa, início 1971 - N.º) por Sexo e Idade; Anual (1)	
2020	Portugal	PT	Idade	Nº
			18 anos	108,396
			19 anos	112,924
			20 anos	116,201
			21 anos	113,047
			22 anos	110,720
			23 anos	109,401
			24 anos	107,751
			25 anos	106,457
			26 anos	107,886
			27 anos	110,102
			28 anos	111,199
			29 anos	111,994
			30 anos	111,486
			31 anos	111,895
			32 anos	112,795
			33 anos	113,821
			34 anos	116,426
			35 anos	122,294
			36 anos	128,119
			37 anos	132,916
			38 anos	137,059
			39 anos	140,937
			40 anos	144,254
			41 anos	146,574
			42 anos	155,084
			43 anos	163,228
			44 anos	165,310
			45 anos	164,253
			46 anos	160,661
			47 anos	158,550
			48 anos	158,003
			49 anos	154,810
			50 anos	150,526
			51 anos	148,218
			52 anos	147,724
			53 anos	148,590
			54 anos	150,043
			55 anos	151,169
			56 anos	149,862
			57 anos	147,631
			58 anos	146,898
			59 anos	145,876

População média anual residente (Série longa, início 1971 - N.º) por Sexo e Idade; Anual - INE, Estimativas anuais da população residente

Nota(s):

*(1) 2011, Estimativas Provisórias de População Residente - valores revistos: as estimativas pós-censitárias de população residente de 2011 - exercício ad hoc assente nos resultados provisórios dos Censos 2011 - foram revistas, em função dos resultados definitivos dos Censos 2011.
 2001 - 2010, Estimativas Definitivas de População Residente - valores revistos: as estimativas provisórias de população residente de 2001 a 2010 foram revistas - revisão regular geral -, em função dos resultados definitivos dos Censos 2011.
 1991 - 2000, Estimativas Definitivas de População Residente - valores revistos: as estimativas intercensitárias de população residente em Portugal de 1991 a 2000 foram revistas - revisão extraordinária -, com o objetivo de harmonização, em termos conceptuais e metodológicos, com a série Estimativas Definitivas de População Residente 2001-2010.*

Quadro (parte 1) extraído em 12 de Agosto de 2021 (15:07:13)

http://www.ine.pt

Última atualização destes dados: 14 de junho de 2021

Table 6.6 - Total deaths of residents in Portugal

PORDATA

Óbitos de residentes em Portugal: total e no primeiro ano de vida

Anos	Total de Óbitos
2000	105,364
2001	105,092
2002	106,258
2003	108,795
2004	102,012
2005	107,464
2006	101,990
2007	103,512
2008	104,280
2009	104,434
2010	105,954
2011	102,848
2012	107,612
2013	106,554
2014	104,843
2015	108,539
2016	110,573
2017	109,758
2018	113,051
2019	111,793
2020	123,358

Óbitos de residentes em Portugal: total e no pr
Fontes de Dados: INE - Estatísticas de Óbitos
Fonte: PORDATA
Última actualização: 2021-04-27

Dados obtidos em https:www.pordata.pt a 18-08-2021

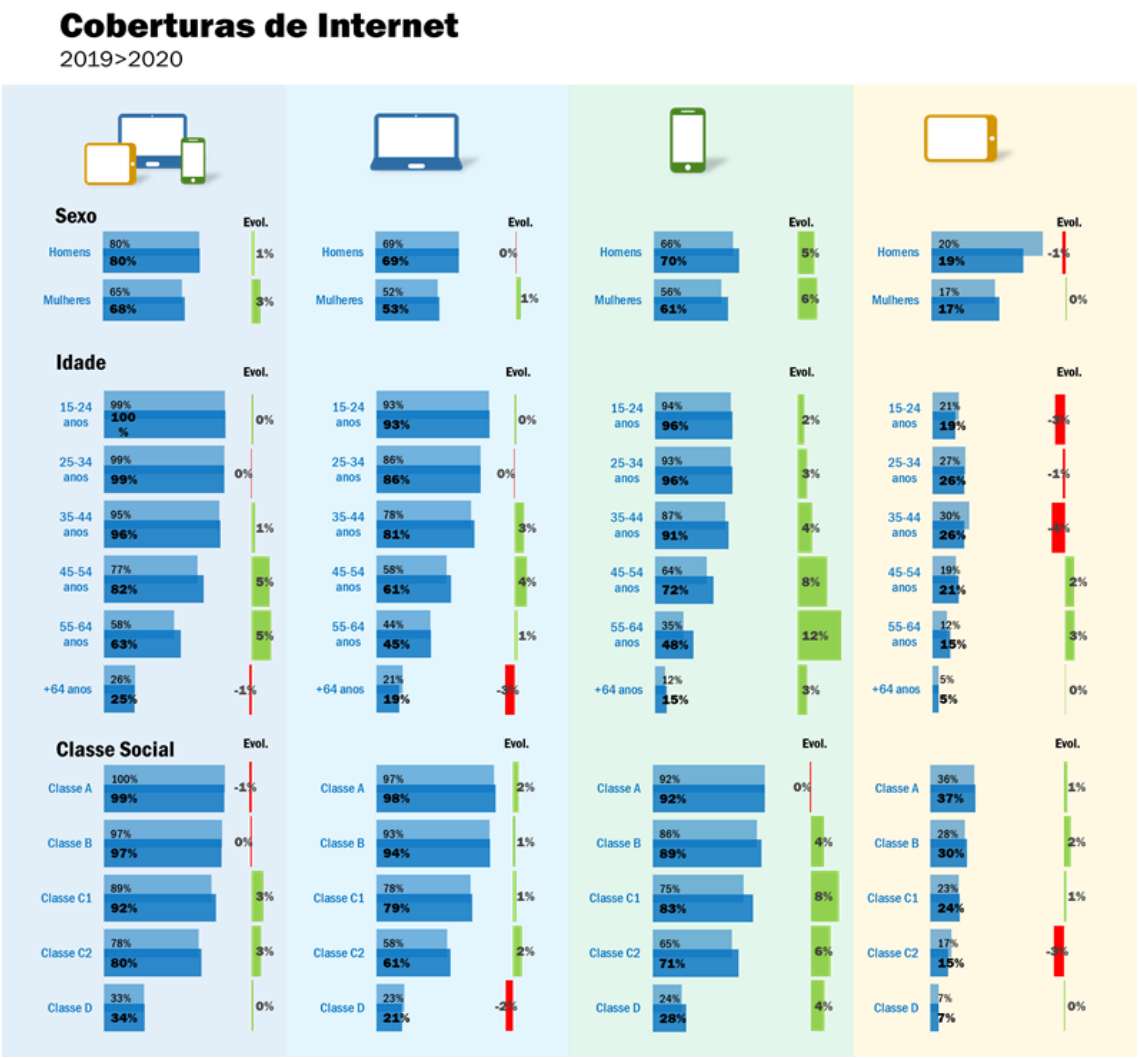

Figure 6.1 - Regular 2019/2020 Internet coverage for Multiplatform, PC, Phone and Tablet, with sociodemographic breakdown. Source: Bareme Internet 2019 and 2020

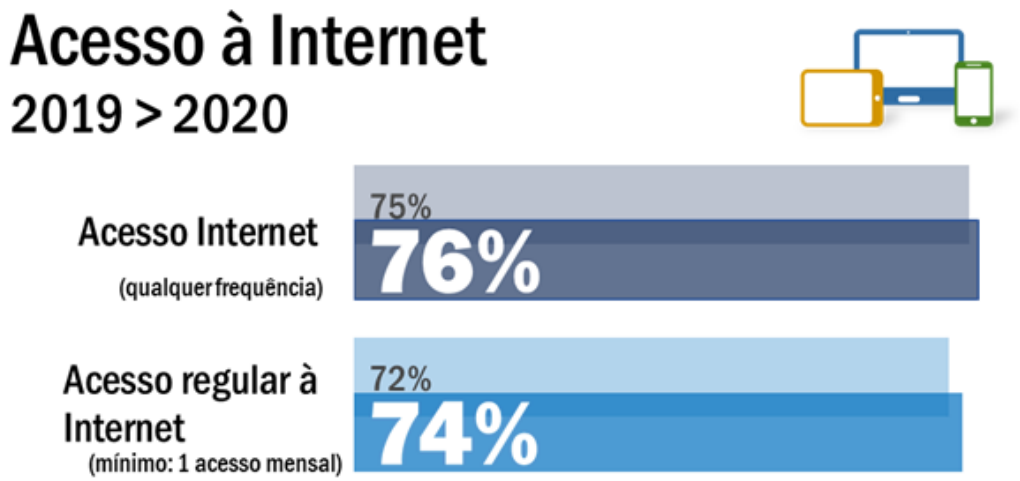

Figure 6.2 - Regular general internet coverage. Source: Bareme Internet 2019 and 2020

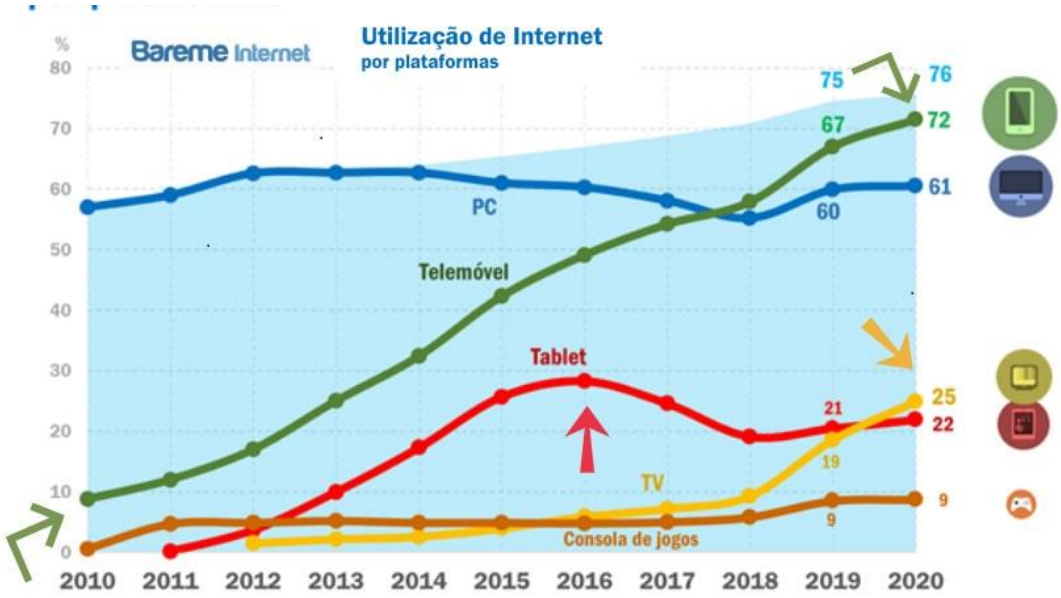

Figure 6.3 - General internet coverage and regular webpage coverage by electronic device

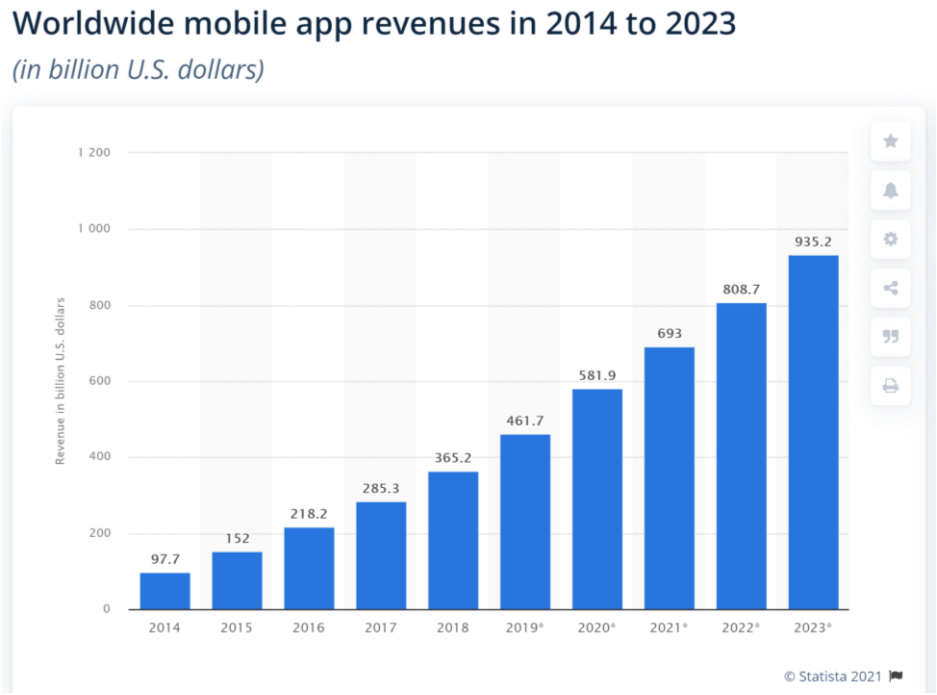

Figure 6.4 - Worldwide mobile app revenues in 2014 to 2023

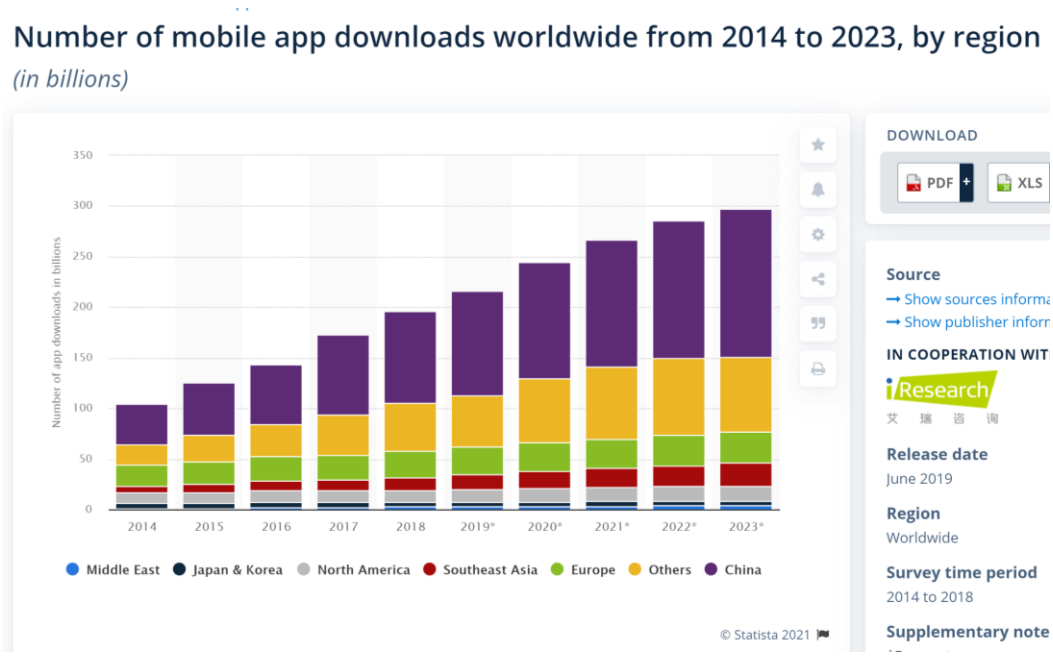

Figure 6.5 - Nrº of mobile app downloads worldwide from 2014 to 2023, by region

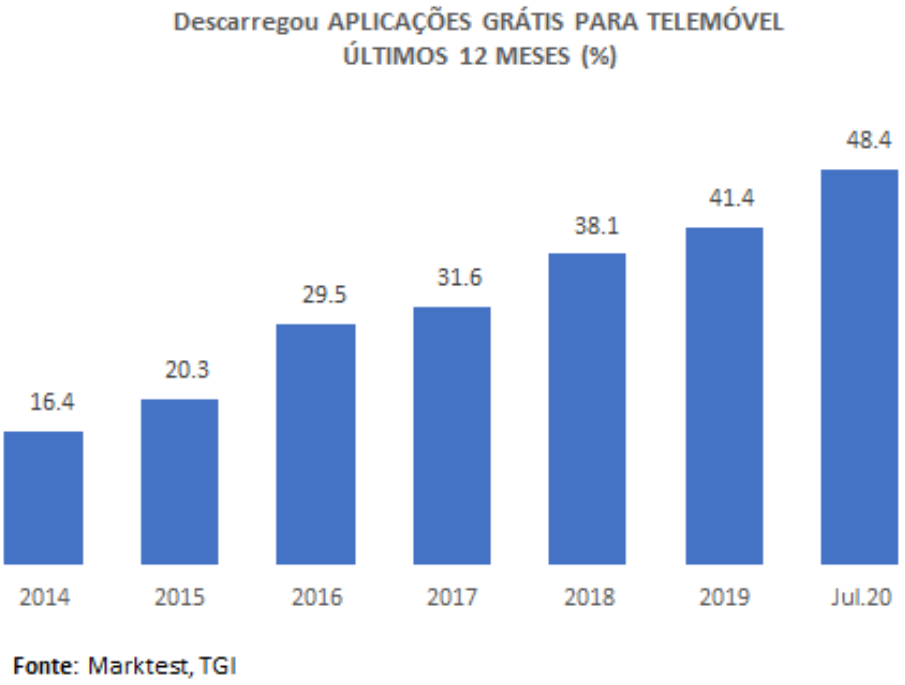

Figure 6.6 – free mobile app downloads in the last 12 months (%) in Portugal

Annex H – Domestic Competition

Table 7.2 - Direct competitor fact sheet

	inmemorium
Founded	Founded by Paulo Marques in May 2020. Incubated in Associação de Melhoramentos e Bem Estar Social de Areias, Ferreira do Zêzere – Portugal.
Funding	Unknown
Value Proposition	• An online space to storage memories through photos, videos and written stories about a deceased person. • Create the chronological biography of the deceased person • Share with everyone
Main Product	Premium Subscription
Revenue Model	Freemium business model
Sales/distribution channel	Account creations and sales only through the website (inmemorium.pt). Social media advertising, that is, Facebook and Google Advertising
Pricing	5,90€ / month; 64€ / year and 139€ lifetime fee
Features	Photo sharing, video sharing, stories sharing (by text).
Traffic	"176 333 visitants and 2 734 tributes created". Probably is in total numbers.
# customers	Unknown
Customer experience	Very usual user interface, not incredibly appealing.
Technology	Unknown. However, it seems to have a very simple technical architecture and design.
Market positioning	High subscription prices with a very limited free mode.

Target customer	Only 1 target segment, which is the loved ones of the deceased person.
SEO	1st link on the 1st page when searched "in memorium" on Google search engine
Social media presence	3068 followers on Facebook
Strategic nuances	Partnership with U.S. based company: forevermissed.com
Strengths	• Strategic partnership with forevermissed.com • First-to-market (market and brand awareness advantage) • Advertising free
Weaknesses	• The free mode is very limited: allows the storage of only 3 photos, not allows control of followers' degree of access and privacy, not allows integration with YouTube, Facebook and other social media platforms and is limited to just 1 page administrator (the creator). • Appears to be a "one man team" with finance brokerage background and not technology nor marketing know-how - (309) Entrevista a Paulo Marques, sobre in Memorium - YouTube. • Limited privacy management. Offers just 2 possibilities of profile display: accessible for the creator or for everyone. • Strategic partnership with forevermissed.com demonstrates that In Memorium has a low degree of internal innovation, technical and marketing knowledge, as the website appears to be an almost perfect mimic of forevermissed.com.

Table 7.3 – Comparison between In Memorium and Biomory

	In Memorium	Biomory
Mobile		X
Computer	X	X
Life story timeline building	X	X
Family Tree builder		X
Ad free	X	X
Pricing	5,90€/month, 64€/year or 139€ lifetime fee	5€/month, 50€/year or 150€ lifetime fee
Multimedia storage -free mode	Up to 3 photos	Up to 1Gb
Number of page administrators – free mode	1	Unlimited
Advanced access and privacy control – free mode		X
ID verification		X

Table 7.5 - Full Porter's 5 Forces Impact

Porter's 5 forces	Impact of the force					Total
	Low	Medium-low	Medium	Medium-high	High	
	1	2	3	4	5	
Threats of new entry						2.13
Capital requirements			x			
Economies of scale		x				
Retaliation from existing players		x				
Access to technology		x				
Product complexity			x			
Rival's brand reputation		x				
Technical know-how		x				
Legal barriers	x					
Threat of Substitution						2.00
Current substitute products		x				
Performance of substitute products		x				
Consumer switching costs	x					
Agressiveness of substitute products		x				
Brand loyalty of substitute products			x			
Supplier Power						3.00
Switching costs			x			
Uniqueness of service provided			x			
Customer Power						2.00
Number of costumers		x				
Number of alternative products	x					
Service relevance	x					
Customer price sensitivity				x		
Switching costs		x				
Brand loyalty		x				
Competitive Rivalry						1.50
Number of direct competitors	x					
Market size	x					
Industry growth	x					
Switching costs		x				
Service differentiation		x				
Customer loyalty		x				
Total						2.13

Annex I – Michael Porter's Generic Strategies

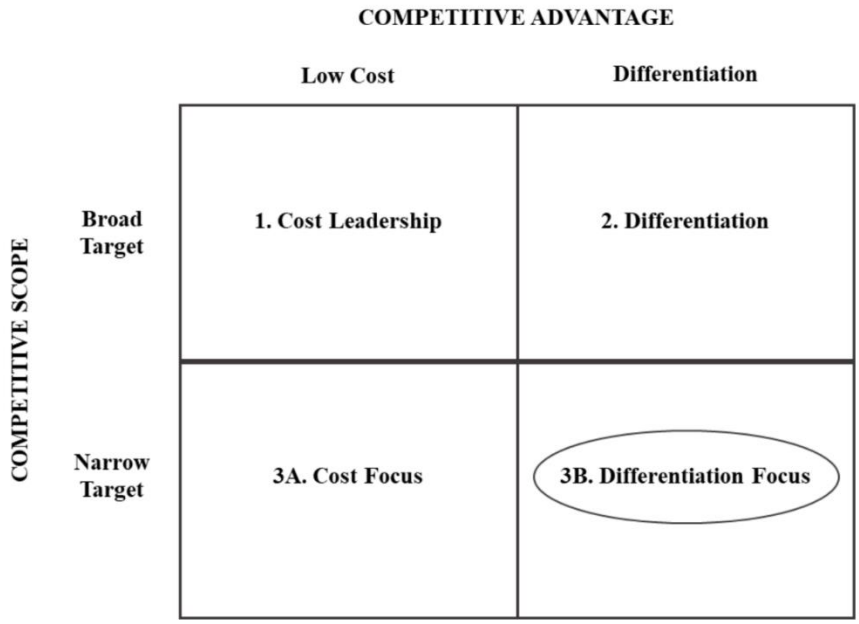

Figure 9.1 - Michael Porter's Generic Strategies. Source: "Competitive Advantage" (Porter, 1985)

Annex J – Implementation Policies

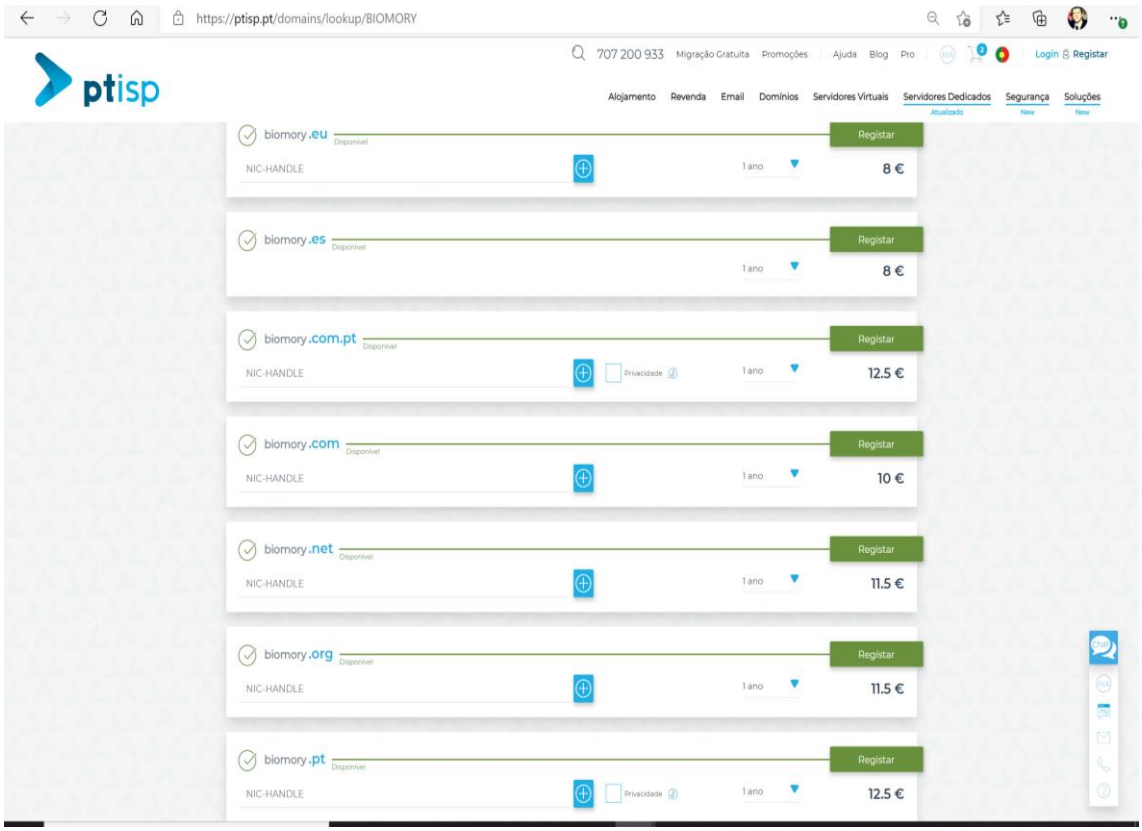

Figure 10.2 - Domain name registration available

Source: https://ptisp.pt/domains/lookup/Biomory

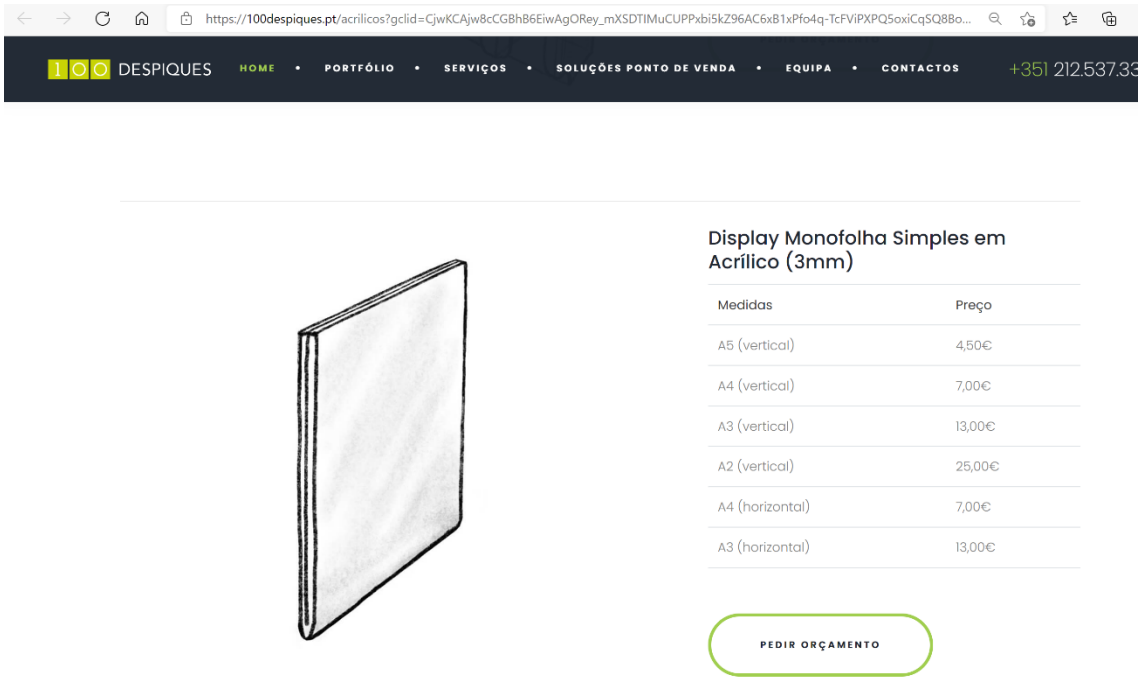

Figure 10.3 - trimmed and polished acrylic glass (100despiques.pt)

Figure 10.4 - Nail glue

Figure 10.5 - Facebook vídeo ad campaign Source:https://www.facebook.com/Memorial-Digital-107654648265465/videos/2071441536356206/

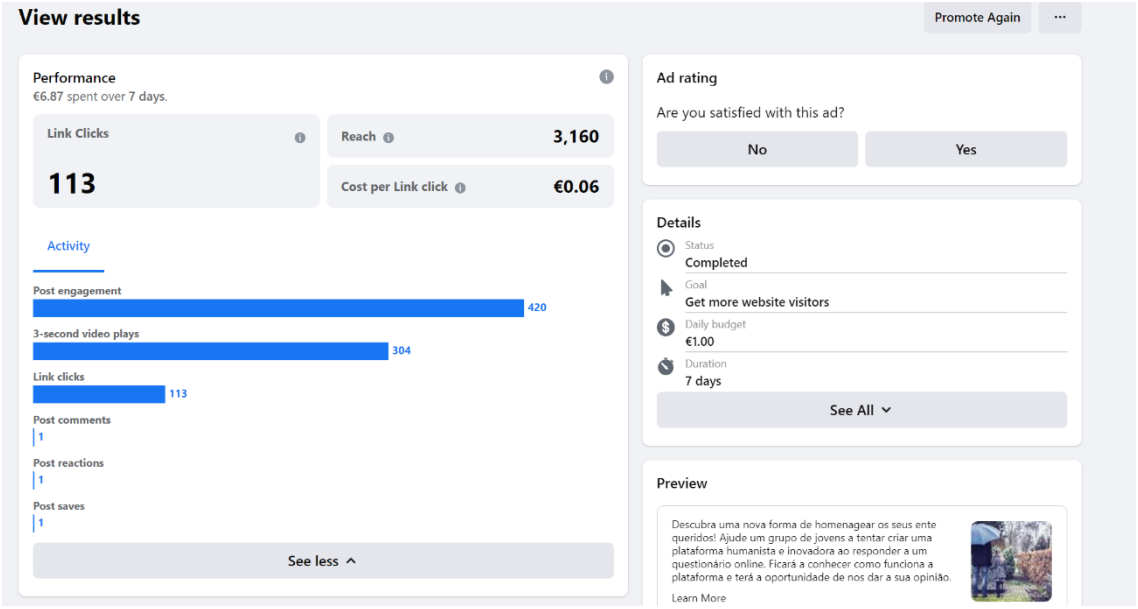

Figure 10.6 – Facebook video ad results

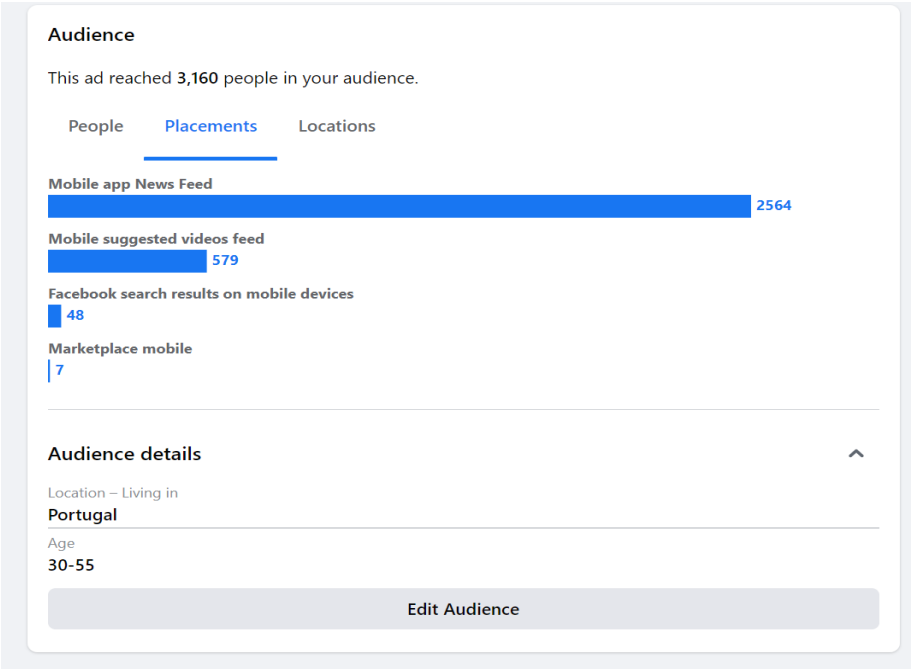

Figure 10.7 – Facebook video ad results 2

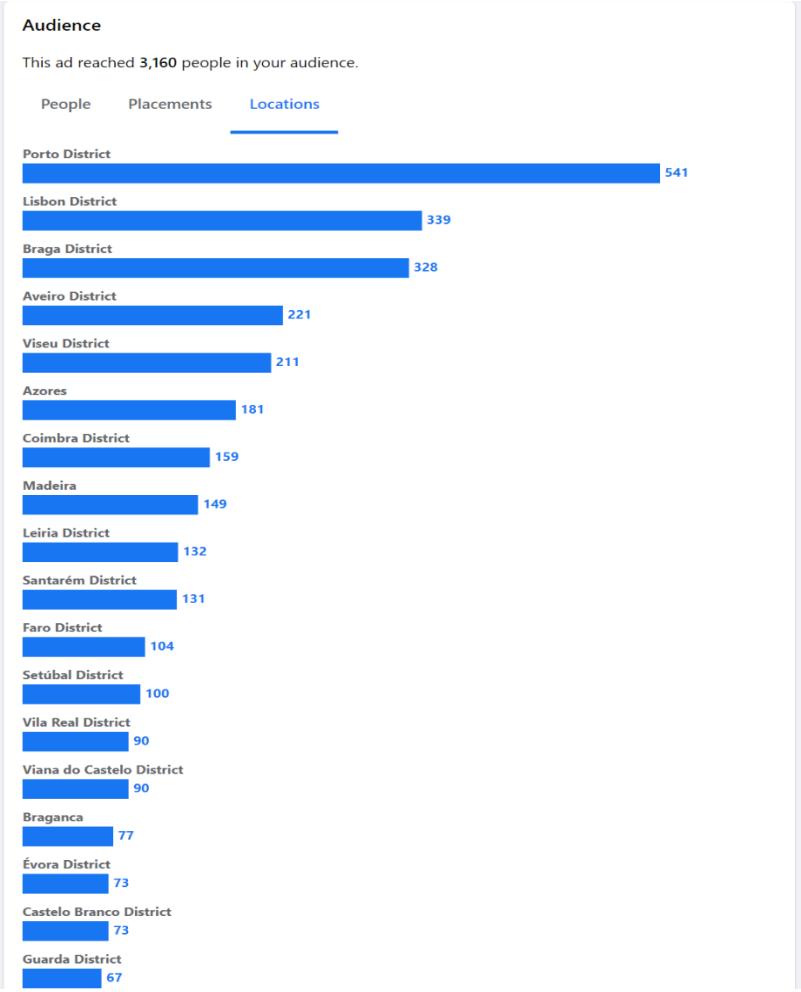

Figure 10.8 - Facebook video ad results 3

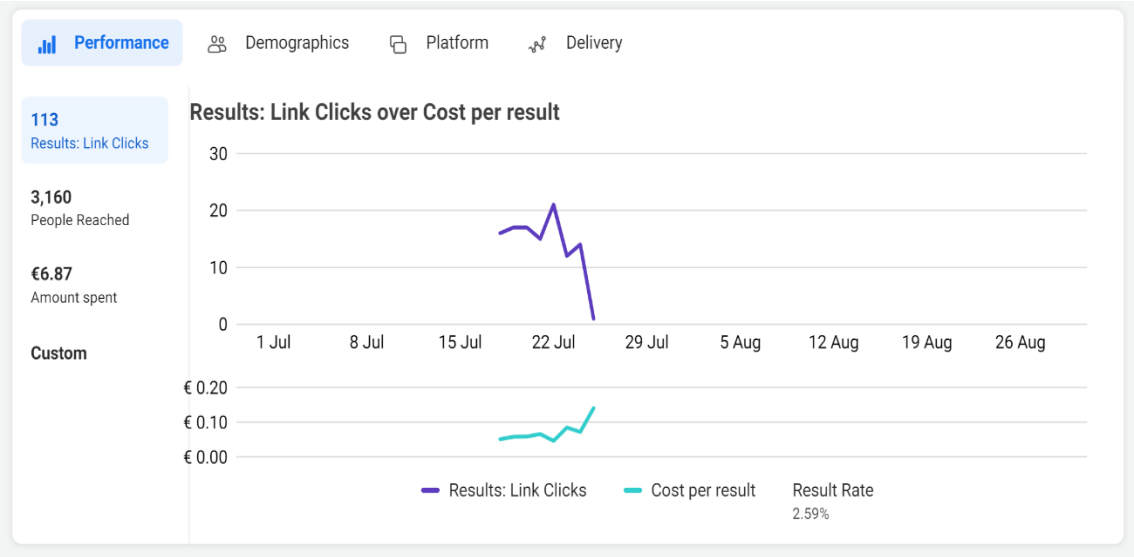

Figure 10.9 - Facebook ad results 4

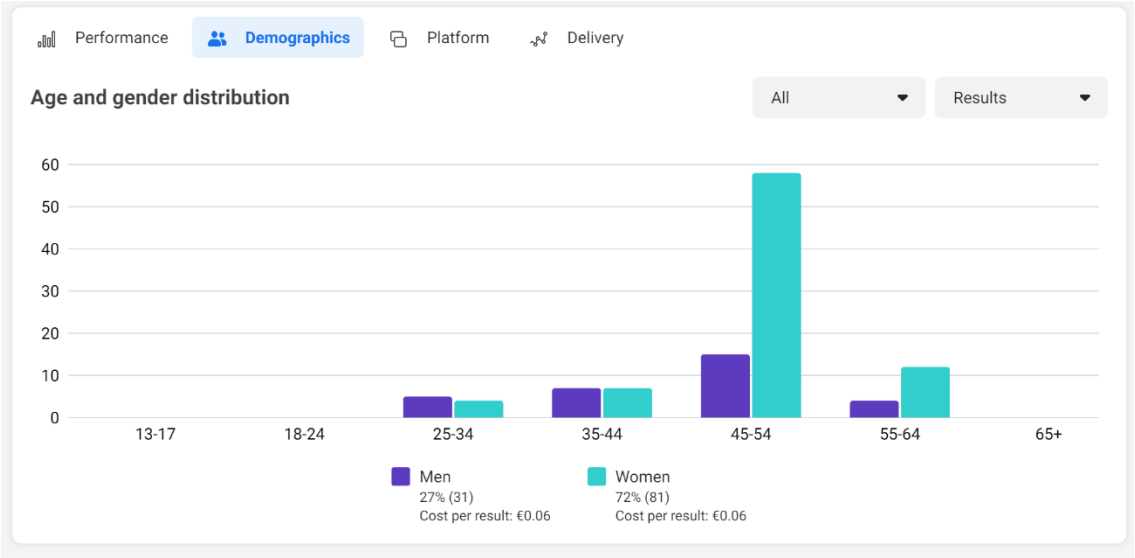

Figure 10.10 – Facebook video ad results 5

Table 10.5 - Yearly average revenue (user type 1)

	Maximum revenue	% weight on year 1 total sales	Average revenue
Monthly	60.00 €	21.91%	13.14 €
Semiannually	50.00 €	5.07%	2.54 €
Annually	50.00 €	3.04%	1.52 €
One time fee	150.00 €	69.98%	104.97 €
Total			**122.17 €**

Table 10.6 - Yearly average revenue (user type 2)

	Maximum revenue	% weight on year 1 total sales	Average revenue
Monthly	60.00 €	26.05%	15.63 €
Semiannually	50.00 €	4.72%	2.36 €
Annually	50.00 €	4.09%	2.05 €
One time fee	150.00 €	65.14%	97.70 €
total			**117.74 €**

Table 10.10 - AWS costs calculation (user type 1)

User type 1 - Profile creators	Year 1	Year 2	Year 3	Year 4	Year 5
Profile creators	6,346	18,404	33,032	46,810	63,688
Total followers	57,115	165,635	297,286	421,290	573,196
Average per month	30,937	127,677	24,774	35,108	47,766
Premium accounts (5Gb/account)	1,413	3,436	5,433	6,973	9,291
Follwers (users)	12,721	30,920	48,897	62,753	83,622
Data Transfer per user (Gb)	3	3	3	3	3
Non premium accounts (up to 1Gb)	4,933	14,968	27,599	39,837	54,397
Follwers (users)	44,394	134,714	248,388	358,537	489,574
Data Transfer per user (Gb)	1	1	1	1	1
Storage (Gb)	12,000	32,146	54,764	74,700	100,854
Storage (Tb)	12	32	55	75	101
Storage per month (Gb)	**1000**	**2679**	**4564**	**6225**	**8404**
Storage per month (Tb)	1	3	5	6	8
Data Transfer Inbound (Tb)	1	3	5	6	8
Data Transfer Outbound (Gb)	**14,625**	**60,356**	**119,064**	**166,891**	**215,816**
AWS S3 Cost ($)	15,887	58,777	96,783	131,427	162,587
AWS S3 Cost (€)	13,429.72 €	49,684.93 €	81,811.12 €	111,096.22 €	137,436.50 €
AWS Cognito ($)	548	6,233	13,138	19,420	25,623
AWS Cognito (€)	463.16 €	5,269.18 €	11,105.85 €	16,415.98 €	21,659.72 €
AWS DynamoDB ($)	2,128	2,345	2,353	2,361	2,365
AWS DynamoDB (€)	1,798.99 €	1,982.12 €	1,988.81 €	1,995.40 €	1,998.75 €
AWS Lambda ($)		3.8	30.0	81.7	127.5
AWS Lambda (€)	- €	3.24 €	25.33 €	69.07 €	107.79 €
Total (without VAT)	15,691.87 €	56,939.46 €	94,931.12 €	129,576.67 €	161,202.75 €

Table 10.11 – AWS costs calculation (user type 2)

User type 2 - Own creators	Year 1	Year 2	Year 3	Year 4	Year 5
Profile creators	6538	22085	43837	65474	94563
Total followers	90080	304264	603937	902028	1302789
Average per month	48794	234537	511669	798670	1183366
Premium accounts (5Gb/account)	1,596	4,728	8,460	11,535	16,441
Follwers (users)	21,990	65,136	116,558	158,919	226,504
Data Transfer per user (Gb)	3	3	3	3	3
Non premium accounts (up to 1Gb)	4,942	17,357	35,376	53,938	78,122
Follwers (users)	68,090	239,128	487,379	743,109	1,076,284
Data Transfer per user (Gb)	1	1	1	1	1
Storage (Gb)	12923	40996	77678	111614	160326
Storage (Tb)	12.92	41	78	112	160
Storage per month (Gb)	**1077**	**3416**	**6473**	**9301**	**13360**
Storage per month (Tb)	1	3	6	9	13
Data Transfer Inbound (Tb)	1	3	6	9	13
Data Transfer Outbound (Gb)	**24,110**	**115,889**	**252,824**	**394,637**	**584,722**
AWS S3 Cost	25,584	97,176	168,146	233,356	290,805
AWS S3 Cost (€)	21,626.44 €	82,143.50 €	142,134.99 €	197,258.01 €	245,819.94 €
AWS Cognito	869	12,582	25,908	41,775	55,759
AWS Cognito (€)	734.81 €	10,635.32 €	21,899.95 €	35,312.51 €	47,133.26 €
AWS DynamoDB	2,128	2,349	2,357	2,365	2,372
AWS DynamoDB (€)	1,798.99 €	1,985.47 €	1,992.16 €	1,998.75 €	2,005.33 €
AWS Lambda		4.5	48.4	117.0	175.7
AWS Lambda (€)	- €	3.79 €	40.95 €	98.86 €	148.51 €
Total (without VAT)	24,160.24 €	94,768.08 €	166,068.05 €	234,668.12 €	295,107.04 €

Table 10.12 - Average users per month (user type 1)

User type 1 - Profile creators	Year 1	Year 2	Year 3	Year 4	Year 5
Premium	6,891	28,437	56,098	78,631	101,683
Non premium	24,047	99,240	195,769	274,407	354,851
Average users per month	30,937	127,677	251,867	353,038	456,534

Table 10.13 – Average users per month (user type 2)

User type 2 - Own profile creators	Year 1	Year 2	Year 3	Year 4	Year 5
Premium	11,911	57,255	124,907	194,970	288,881
Non premium	36,882	177,282	386,761	603,701	894,486
Average users per month	48,794	234,537	511,669	798,670	1,183,366

Table 10.14 – AWS DynamoDB database storage

User type 1 - Profile creators	Year 1	Year 2	Year 3	Year 4	Year 5
Database Storage (Gb)	1	2.45	4	5.72	7.24

User type 2 - Own profile creators	Year 1	Year 2	Year 3	Year 4	Year 5
Database Storage (Gb)	1	2.69	4.61	6.89	8.84

Table 10.15 - AWS Lambda number of requests

User type 1 - Profile creators	Year 1	Year 2	Year 3	Year 4	Year 5
Requests	1,000,000	2,900,000	5,205,000	7,376,125	10,035,753

User type 2 - Own profile creators	Year 1	Year 2	Year 3	Year 4	Year 5
Requests	1,000,000	3,377,699	6,704,425	10,013,594	14,462,524

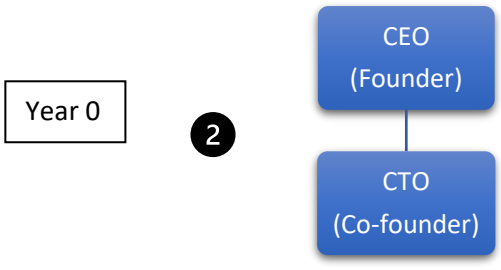

Figure 10.11 – Organization chart year 0

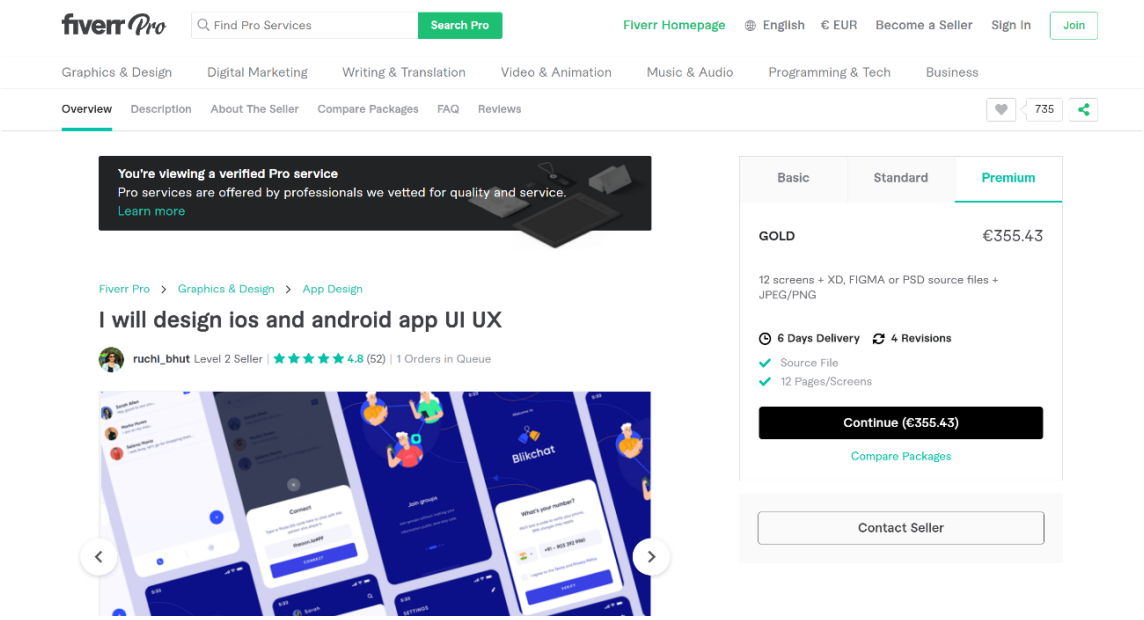

Figure 10.12 – Hiring a UI/UX designer freelancer Source: *www.fiverr.com*

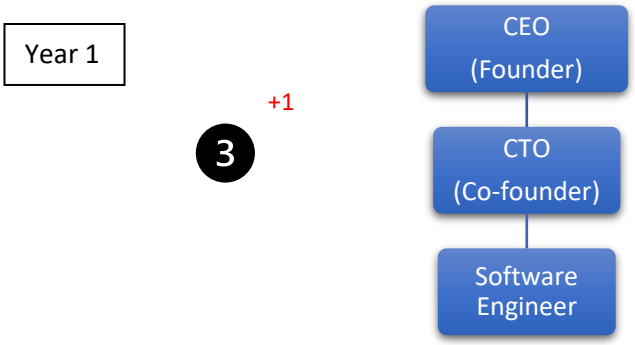

Figure 10.13 – Organization chart year 1

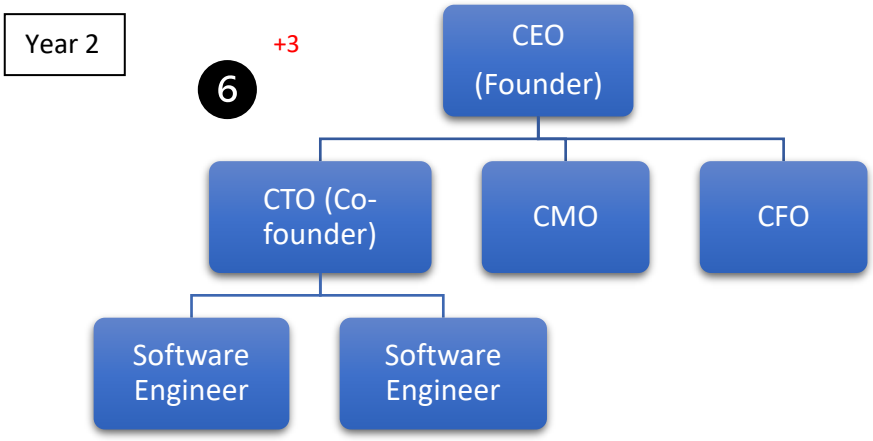

Figure 10.14 – Organization chart year 2

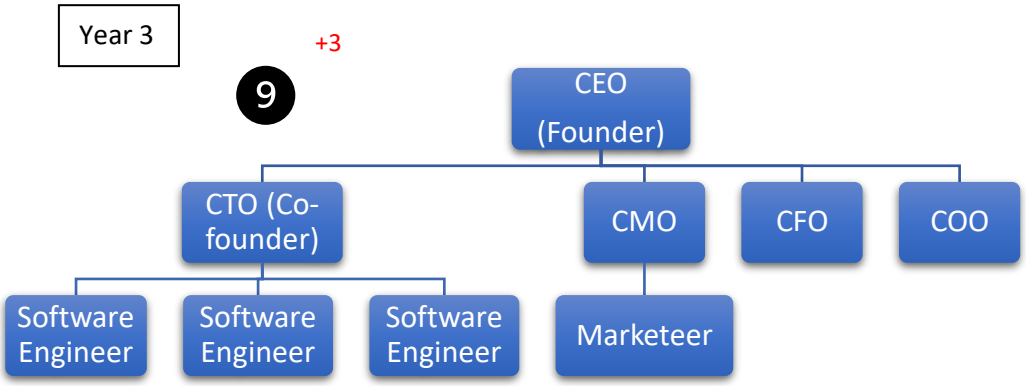

Figure 10.15 – Organization chart year 3

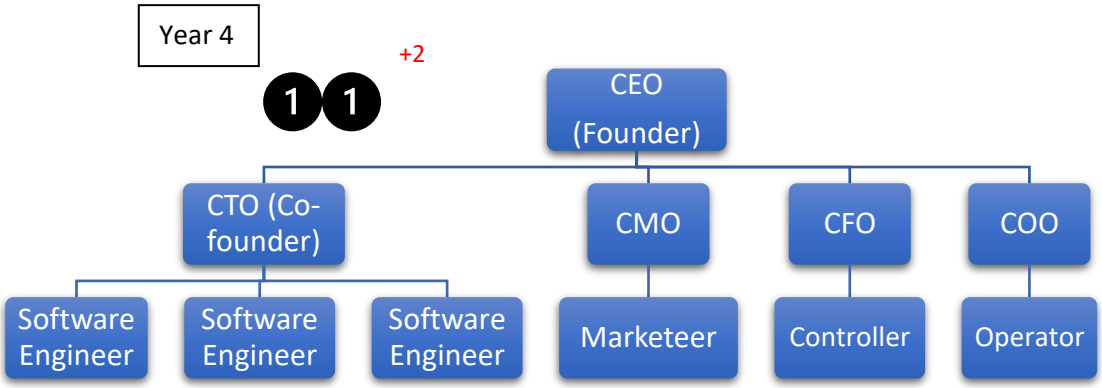

Figure 10.16 – Organization chart year 4

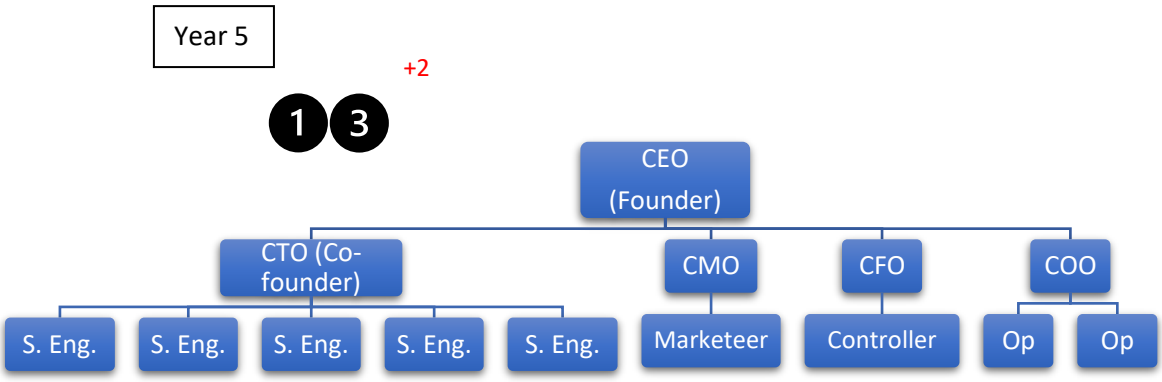

Figure 10.17 – Organization chart year 5

Annex L – Financial Evaluation

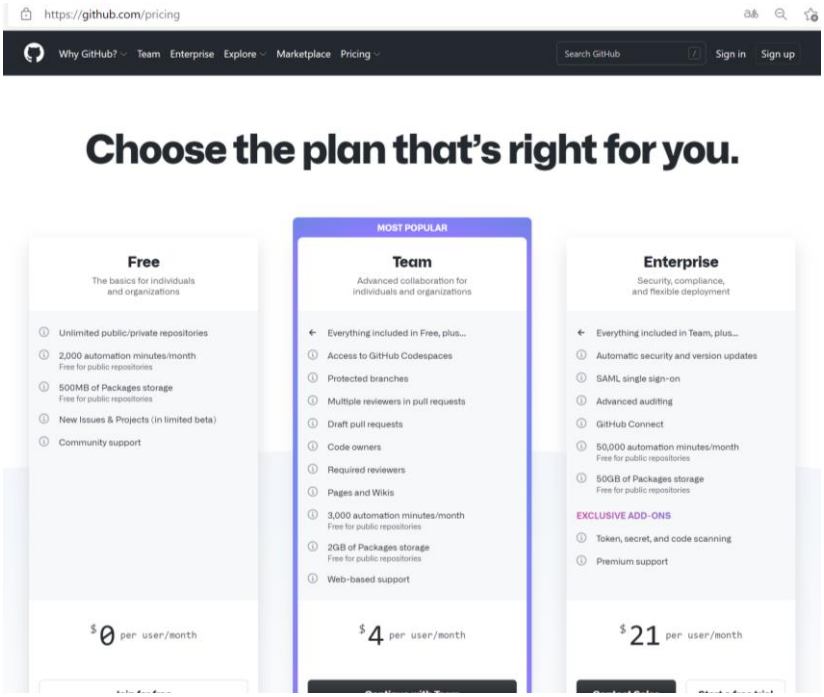

Figure 12.1 – GitHub "Team" subscription plan

Figure 12.2 – Alphatrad.pt translation services

Table 12.12 - Assumptions

Assumptions	
General Assumptions	
Currency	EUR
Forecast period	5 years
First year	2022
Headquarters	Lisbon, Portugal
Average nº of days per year	360
Average nº of days per month	28
Tax	
Value added tax (VAT)	23%
Water VAT	6%
Corporate Tax	21%
Municipal Surcharge	1.5%
State Surcharge (1,5M < EBT < 7,5M)	3.0%
State Surcharge (7,5M < EBT < 35M)	5.0%
State Surcharge (EBT > 35M)	9.0%
Working Capital	**Average Payment Period (days)**
Receivables	
Subscriptions App Store	28
Subscriptions Google Play Store	15
State and Other Public Entities - VAT to receive	56
Payables	
Amazon Web Services	5
External Supply and Services' Suppliers	28
State and Other Public Enitites - VAT to pay	56
State and Other Public Entities - employee charges	28
State and Other Public Entities - company charges	28
User Growth	
Accounts per creator	1
Followers per account (profile creators - user type 1)	9
Followers per account (own profile creators - user type 2)	15
Total accounts yearly growth	Accounts of previous year + marketing effects + networking effects
Marketing effects (profile creators - user type 1)	6346
Marketing effects (own profile creators - user type 2)	6538
Networking effects (year 2)	5% of followers of year 1
Networking effects (year 3)	2.5% of followers of year 2
Networking effects (year 4)	2% of followers of year 3
Networking effects (year 5)	1% of followers of year 4

Table 12.17 – Payback period (years)

Payback Period (Years)	4.45					
Year	0	1	2	3	4	5
Cash Flow	- 9,344.72 €	- 135,198.41 €	- 22,139.67 €	40,234.27 €	52,189.22 €	219,548.79 €
PV Cash Flow	- 9,344.72 €	- 129,408.00 €	- 20,283.84 €	35,282.93 €	43,806.54 €	176,391.91 €
Accum PV Cash Flow	- 9,344.72 €	- 138,752.72 €	- 159,036.55 €	- 123,753.62 €	- 79,947.08 €	96,444.83 €

Table 12.18 – Profitability index

Profitability Index	5.95					
Year	0	1	2	3	4	5
CAPEX		4,658.47 €	4,658.47 €	4,388.98 €	2,925.98 €	1,462.99 €
PV CAPEX	16,207.21 €					
Cash Flows	- 9,344.72 €	- 135,198.41 €	- 22,139.67 €	40,234.27 €	52,189.22 €	219,548.79 €
PV (Cash Flows)	96,444.83 €					

Table 12.22 - Sensitivity analysis

Sensitivity Analysis	
Yes to problem	NPV
86.57%	245.64 €
89.90%	**96,444.83 €**

Sensitivity Analysis - solution	
Yes to solution	NPV
75.46%	265.11 €
78.37%	**96,444.83 €**

	Sensitivity Analysis - traffic		
	Accounts created (type 1)	NPV	Number of accounts created (year 1)
Pessimistic	5.765%	544.13 €	5,765
Realistic	**6.35%**	**96,444.83 €**	**6,346**
Optimistic	7.0%	204,280.62 €	7,000

	Sensitivity Analysis - traffic		
	Accounts created (type 2)	NPV	Number of accounts created (year 1)
Pessimistic	6.130%	95.42 €	6,130
Realistic	**6.54%**	**96,444.83 €**	**6,538**
Optimistic	7.0%	205,314.22 €	7,000

	Sensitivity Analysis - business model		
	Premium Accounts (type 1)	NPV	Premium subscribers (year 1)
Pessimistic	1.278%	149.19 €	1,278
Realistic	**1.41%**	**96,444.83 €**	**1,413**
Optimistic	2.0%	498,072.55 €	2,000

	Sensitivity Analysis - business model		
	Premium Accounts (type 2)	NPV	Premium subscribers (year 1)
Pessimistic	1.497%	635.39 €	1,497
Realistic	**1.60%**	**96,444.83 €**	**1,596**
Optimistic	2.0%	475,120.62 €	2,000