Design Thinking as a Tool for Opportunity Assessment

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Abstract:

In this Master's Thesis, a curiosity is sparked regarding how a given entrepreneurial opportunity can be assessed and determined whether it is worth pursuing. In order address this, the topic of entrepreneurial opportunities were investigated as well as how to assess opportunities. It was found that business planning was a recognized method of making such assessments, however business plans are based on hypothesis regarding the identified market need and the proposed business concept, which leads to various potential risks.

An analysis of how a user-driven innovation method can reduce these risks were performed by using design thinking on a case. Through iterations of this method, a desirable product was created to solve the proposed market need, which validates the business concept before enganging in business planning activities.

Contents

Summary

Denne rapport er blevet udarbejdet som et kandidatspeciale på uddannelsen Entrepreneurial Engineering på Aalborg Universitet i forårssemestret 2019.

Rapporten tager afsæt i en undren over, hvorledes en forretningsmulighed kan blive evalueret og bestemme hvorvidt den er værd at forfølge. For at samle den nødvendige viden blev en foranalyse udarbejdet. Her blev det undersøgt hvad en forretningsmulighed er, hvilke typer der er, hvordan de kan identificeres og hvorledes de udvikles fra et identificeret markedsbehov og frem til opstart af virksomhed. Det blev ydermere undersøgt hvorledes forretningsmuligheder kan evalueres gennem udvikling af en forretningsplan. En problemstilling blev her identificeret, da en forretningsplan baserer sit indhold på hypoteser omkring kunderne, deres behov og det produkt, som skal tilfredstille dette behov.

For at potentielt adressere denne problemstilling blev brugerdrevne innovationsmetoder beskrevet som potentiel løsning. Dette ledte til den endelige problem formulering, som fokuserer på, hvorledes design thinking kan anvendes til at reducere hypotesen om et fit mellem det fundme markendsbehov og det foreslåede forretningskoncept.

For at besvare denne problemformulering blev design thinking anvendt på en potentiel forretnigsmulighed vedrørende digitalt efterliv, for at undersøge om et produkt, som de potentille brugere begærer og ønsker at

anvende, kunne udvikles. Igennem denne design thinking process blev den eksisterende viden omkring emnet først udvidet inden de potentille brugere blev interviewet omkring emnet, hvilket resulterede i en række indblik, som kunne bruges til at udvikle en række produkt idéer til. Idéerne blev evalueret og en enkelt blev udvalgt til videreudvikling som prototype. Der blev itereret igennem udviklingen af prototypen og tests med brugere indtil der ikke var flere bekymringer om produktet fra brugerne. Dette mundede ud i et produktkoncept, som kan løse de præsenterede markedsbehov inden for digitalt efterliv, som brugerne ønsker at anvende. Dette resulterede i at det foreslåede forretningskoncept blev valideret forinden forretningsplanlægningsprocessen.

Preface

This Master's Thesis has been produced at Aalborg University by Mikkel Thorup, Entreprenerial Engineering on the 4th semester. The project has been produced in the time span from February 4th, 2019 to June 3rd, 2019.

I am very thankful for all the help which has been received during the project period. I would like to thank my supervisor Kjeld Nielsen for assisting me in maintaining the direction of the project and provided constructive feedback throughout the whole project. Kjeld has showed great flexibility in planning the necessary supervision meetings, which has proven to be very beneficial during the project period. I would also like to thanks Maria Støttrup Schiønning Larsen, who has been acting as a co-supervisor during the supervision meetings.

Aalborg University, June 3rd, 2019.

Mikkel Thorup

Chapter 1

Introduction

This chapter contains an introduction to the project and a presentation of a proposed business opportunity. This leads up to initial problem statement of the project.

1.1 Engaging in Entrepreneurship

Entrepreneurial success is more than just having that one incredible golden idea. Shane et al. (2003) states that "*entrepreneurship is a process that begins with the recognition of an entrepreneurial opportunity and is followed by the development of an idea for how to pursue that opportunity, the evaluation of the feasibility of the opportunity, the development of the product or service that will be provided to customers, assembly of human and financial resources, organizational design, and the pursuit of customers*" [p. 19].

Developing a successful startup less about the great idea and is more about depending on the people's willingness to become entrepreneurs and "play" the game of entrepreneurship (Shane et al., 2003). The entrepreneurial game consists of many steps and decisions must be made after discovering a business opportunity. This includes the evaluation the opportunities, pursuit of the resources as well as the design of the mechanism of exploitation. Shane

and Venkataraman (2000) defines entrepreneurial opportunities as *"situations in which new goods, services, raw materials and organizing methods can be introduced and sold at a greater than the cost of the production"*[p. 220]. But what makes the individual entrepreneur want the play the game and pursue the opportunity? According to Venkataraman (1997) an opportunity is valuable enough for the individual when it generates enough profit to exceed the opportunity cost, premium for illiquidity of money, time and effort, as well as a premium for taking the risks and engaging in the uncertainty.

Additional motivational factors also exists other than financial profit. Independence is also a motivational factor for entrepreneurs to pursue a business opportunity. This involves taking the responsibility of oneself and utilize one's own judgement to take control on one's own life instead of following the footsteps of others. Other motivations include need of achievement, locus of control, vision, passion, drive, goal setting and self-efficacy (Shane et al., 2003).

1.2 A Business Opportunity

With the ever-so-fast digitization of businesses, personal assets, social lives and wealth, people are storing more and more digital assets on online or cloud-based services (Hopkins, 2013). Hopkins defines digital assets as: *"any asset that exists only as a numeric encoding expressed in binary form. For example, information stored on the internet, photographs, account information,videos, electronic documents, software, e-mails, and digital applications are all types of possible digital assets. Essentially, digital assets include any electronically stored information"* [p. 211].

These digital assets are also hugely valuable. According to a study by McAfee, the average internet user have approximately $35,000 in digital assets spread throughout personal memories, personal records, career information, hobbies, personal communication and entertainment files. These

valuable assets are often spread across multiple online services, cloud platforms, email accounts and social networks (McAfee, 2013).

But what happens with these digital assets if the owner passes away without sharing the necessary information, instructions and wishes of what should happen with his or her assets? According to Hopkins, it is important to know what assets the deceased posses and where they are stored. On top of that, they also need to know how access the different accounts with usernames and passwords. If the deceased fails to transfer the digital assets and the associated security details, the assets will become unobtainable and will be lost forever.

Hopkins also raises the concern of choosing which assets to pass on and which to be destroyed purposefully. Even with the access to the deceased's assets, some items might not be sought to be shared or known by whoever gains the access. This could be, for example, dating service or accounts adult content accounts. Other assets could have an indefinite lifespan, such as photographs and videos, which are crucial in order to ensure and protect the deceased's digital legacy.

Hopkins encourages the need of creative and innovative digital estate planning solutions in order to ensure the privacy, security and proper disposition of digital estates [p. 242-243]. Creating a solution aiming to solve these issues presents a possible entrepreneurial opportunity and the possibility of creating a successful startup venture.

1.3 Initial Problem Statement

A potential entrepreneurial opportunity has been identified, and a possibility of turning that into a startup venture is present. However, as described, entrepreneurship is more than just having the idea, as there are some financial costs as well as a large requirement of time and effort, which leads to

potential risks and requires engaging in uncertainty. The factors leads to a major decision point of whether to the opportunity is pursued or not. However, before engaging in entrepreneurial processes and activities, how can a potential entrepreneur address whether the opportunity has the potential to be valuable enough to cover the inherent risks?

This question leads to the following initial problem statement:

> **How can the viability of an entrepreneurial opportunity be assessed and determined if it is worthwhile to pursue?**

This initial problem statement will make the basis of the following analysis. This analysis looks to address the question and lead onto a final problem statement, which the remainder of the project will look to address.

Chapter 2

Pre-Analysis

This chapter investigates what entrepreneurial opportunities are, how they are recognized and how they are developed, followed by a presentation of a tool for assessing opportunities.

2.1 Entrepreneurial Opportunities

In order to figure out how to evaluate an opportunity it is relevant to keep the definition of entrepreneurial opportunities in mind. As previously stated, Shane and Venkataraman (2000) defines entrepreneurial opportunities as "*situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at a greater that the cost of their production*" [p. 220]. Opportunities can be pursued in any industry at any given time (Shane et al., 2003). Some entrepreneurial opportunities exists as the possibility of developing a new industry or building new companies in already developed industries (Shane et al., 2003). Eckhardt and Shane (2003) argues, that for an entrepreneurial opportunity to exist, people cannot agree on the value of resources at a given point in time. If the entrepreneur believe that he or she can exploit the resources in its current form and increase its value, profit can be made. In contrast, if there is an agreement, the potential profit is limited.

2.1.1 Types of Opportunities

Ardichvili et al. (2003) describes four different types of opportunities; "Dreams", Problem Solving, Technology Transfer and Business Formation. "Dreams" are when someone wants to move existing knowledge in a new direction or push the technology past its limits. The value sought for these types of opportunities are unidentified, meaning that the market need is unknown, and the value creation capability is also undefined, meaning that there is a lack of general specifications of the resources. Problem Solving are when the problems are known, but the solutions are not. The main goal for these types of opportunities are to develop products and/or services for an expressed need. Technology transfer relates to the opportunities where the problems are unknown but solutions are available, i.e. capabilities in search for an application. Business Formation is where the value sought is identified and the value creation capability is defined. This means that the problems to be solved and the solutions are known. It is about matching known resources and needs to form a business that delivers value. The types of opportunities can be seen in the following figure 2.1:

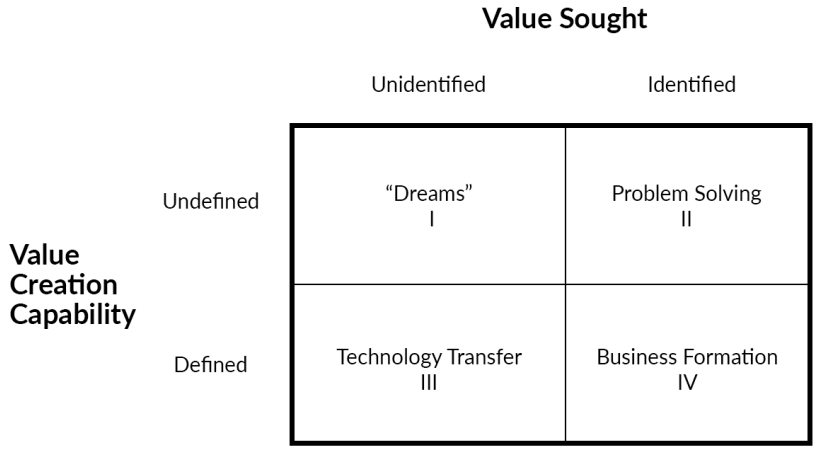

Figure 2.1: Types of opportunities (with inspiration from Ardichvili et al. (2003)

2.1.2 Opportunity Recognition

Opportunities begins as simple concepts and becomes more detailed as the entrepreneurs continuously develops them. They start as elemental ideas and are over time developed into fully detailed business plans. However, the process of firstly recognizing the opportunities are different. Recognizing opportunities is often done through three different processes (Ardichvili et al., 2003)[p. 109-111]:

(1) Perception The first process is about sensing or perceiving market needs and/or underemployed resources. Any kind of opportunity may be recognized by some and not by others. Some entrepreneurs are able to see the market needs or possibilities for new products or solutions all the time no matter which environment they are in. Other entrepreneurs are more likely to identify un- or underemployed resources, but they may not however be able to define the use or the potential users for which value can be created. The more an opportunity is developed for value creation, the more likely they are to be perceived by a wider group of entrepreneurs.

(2) Discovery The second process is the recognition or discovery of a fit between specific market needs and specified resources. Entrepreneurs choose to start a new business or expand in a new product-market when they believe that there is a an opportunity to deploy the same resources elsewhere from the existing sub optimal configurations to a more promising opportunity. Entrepreneurs are not just selling products but rather their ability and knowledge to assemble resources. Deciding which product to produce is not about economizing given resources, but rather about recognizing what kind of products customers are willing to buy, the kind of products the available technology and resources can produce and resources which can be assembled by the entrepreneur.

(3) Creation The third process is about the creation of a business concept between previous separate needs and resources in the form of a business

concept. It is more than just perception and discovery, as it involves redirecting or recombining resources in order to create and deliver value which is superior to what is currently available. It can also lead to dramatic restructuring of existing business or radical innovation.

2.1.3 Opportunity Development

According to Ardichvili et al. (2003), while some parts of opportunities gets recognized, opportunities are developed, not found. They require creative input by the entrepreneur, as the recognized needs or resources cannot become viable businesses without development. An opportunity starts in its most elemental form as either a market need or as un- or underemployed resources or capabilities (Kirzner, 1997). As the market need and resources becomes more defined, the opportunity develops into a business concept, which contains product/service concepts, market concepts as well as concepts for how it will be delivered to the market. As the business concept develops, it turns into a business model, which combines either the market need with the necessary resources to satisfy the need or the un- or underemployed resources with the value it brings to the users. The business model also includes a financial model, which also develops in detail over time. As the business model develops, formal cash flows, schedules of activities, and resource requirements are added, which turns in into a full business plan. When the business plan is developed, the business is then formed based on the evaluation of its content. This process is visualized in the following figure 2.2:

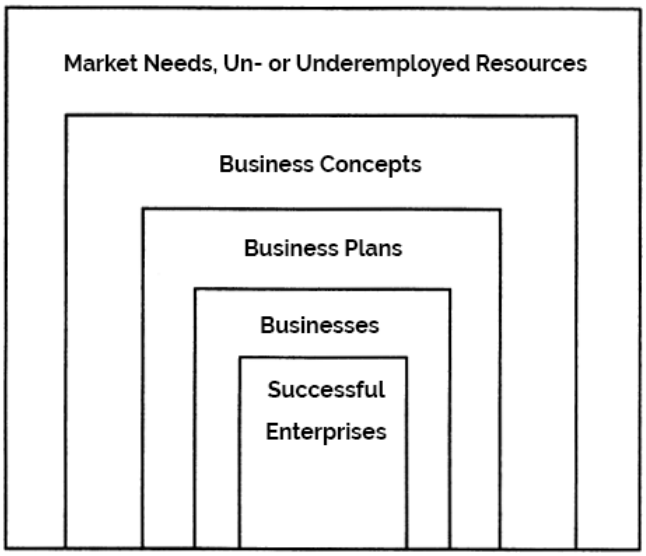

Figure 2.2: The opportunity development process (own creation with inspiration from Ardichvili et al. (2003)).

This model shows that numerous market needs and un- or under employed resources are never turned into business concepts. Not all business concepts are then developed into business plans and not all business plans are then turned into business formations. And lastly, not all formed businesses are developed into successful enterprises.

At each stage of the development phase, opportunities are evaluated. This evaluation may be informal as the entrepreneur investigates the presumed market needs or resources until it can be concluded that there is no need for further consideration or that a more formal investigation is necessary. Once more than time has been committed in the development process by the entrepreneur it becomes more formal. A feasibility analysis may be used in order to figure out whether the combination of resources can deliver the specified value. The analysis will also asses whether the value delivered can turn into economic success of the entrepreneur. Such an analysis can be used to imply an existence of a business model for potential stakeholders. However, if a business concept is yet to be delivered, the analysis can be based on the value sought or the value creation capability in order to specify the feasible business concept(s) (Ardichvili et al., 2003).

2.2 Opportunity Assessment

Chwolka and Raith (2012) states that planning in the sense of evaluating the business opportunity, has a significant value for deciding whether or not enter the given market. Terminating a business opportunity is not implying that the entrepreneur is not interested in starting a business at all, however it could imply that he or she is moving on to another business opportunity. According to Botha and Robertson (2014) evaluation is key to differentiate ideas from opportunities. Their study postulates that the business plan could be used as the tool to make the necessary assessment of business opportunities.

2.2.1 Business Planning

According to Castrogiovanni (1996) most new small business fail within the first five years. He suggests that through pre-startup planning, the mortality rate of new small businesses can be reduced. They also state that, pre-startup planning is about collecting and analysing data which is used to develop the business plan. Castogiovanni defines pre-startup planning as *"the process by which the entrepreneur, in exploiting an opportunity, creates a vision of the future and develops the necessary objectives, resources, and procedures to achieve that vision"*[p. 803]. A study by Sexton and Van Auken (1985) shows that 20% of business who did not perform pre-startup planning failed within the first three years. The mortality rate of businesses who did pre-startup planning was only 8%. However, Castrogiovanni states that the survival, profitability or other performance outcomes is not a direct results of the pre-startup planning. The planning can enhance the business's ability to perform survival-related or profit maximization actions.

According to Kraus and Schwarz (2007), creating a business plan is one of the most important aspects of pre-startup planning. Botha and Robertson (2014) states that through formulating a detailed business plan, potential entrepreneurs are able to assess business opportunities and distinguish

them from ideas. A business plan is defined as *"those efforts by firm founders to gather information about a business opportunity and to specify how that information will be used to create a new organization to exploit the opportunity"* (Delmar and Shane, 2003)[p.1165].

A business plan serves three main purposes: Firstly, it serves as an internal planning purpose for the business and provides a roadmap for accountability around the business performance. Secondly, it aids in the communication to and persuasion of stakeholders, investors, team members, employees and strategic partners. Thirdly, it can be used as a tool to reduce risk by asking important questions regarding the business and identifying the strength and weaknesses of the business itself and its team. The business plan reveals the business' ability to create or add value to customers, solve a problem or meet a market need, have robust moneymaking capabilities, fit well with the founders at the current time regarding the market and with the risk-reward balance and scale with the focus on creating a sustainable business (Botha and Robertson, 2014)(Spinelli and Adams, 2011). Delmar and Shane (2003) found that by engaging in business planning, entrepreneurs will enhance the survival rate of their new business, facilitate product development and venture organizing efforts, which is something all new ventures must engage in.

The University of Pretoria has developed a framework for business plan content which can be used as a template in order to figure out what questions to answer and what topics to gather insights about regarding the proposed opportunity (Botha and Robertson, 2014) (The business plan framework can be seen in appendix A).

By gathering and analyzing the information needed to fill out the business plan, it enables the entrepreneur to make an informed decision of whether the opportunity is worth pursuing (Botha and Robertson, 2014). However, according to Spinelli and Adams (2011), entrepreneurs often conclude that all they need is a detailed and polished business plan in order to succeed. It is important to simultaneously develop the business in order to actually exploit the opportunity.

The Problem of the Business Planning Process

As mentioned, Botha and Robertson (2014) suggests that by gathering the necessary information needed to create the business plan, the entrepreneur can make an informed decision if a given opportunity is worth pursuing. Hisrich et al. (2008) states that a good business plan must be developed in order to take advantage of the business opportunity. According the the opportunity development process described in section 2.1.3 the opportunity first arises from the identification of market needs or of un-/underemployed resources, which product or services are developed to solve those needs or exploit the resources. One of the proposed business concepts are then used to develop the business plan.

However, the process does not address whether the developed business concept is something the customers actually want and is something that actually solves the need satisfyingly. Mueller and Thoring (2012) states that the biggest waste is creating a product or service that nobody needs. Since this product-market fit is not validated with the customers before engaging the business planning activities, the business plan will be majorly based on hypotheses about the customers, the product and the overall market. By not validating these hypothesis with the customers the data used in the business plan carry an increased risk of being incorrect. This could lead to a completely different need of resources in order to develop and maintain the product, which can have major implications of the cost analysis of the business. If the resources needed and the associated costs are wrong, it can also lead to the pricing of the product being either way too low or way too high, which can have implication of the financial forecasts.

Therefore, without validating that the correct product is being made for the right customers, engaging in business planning activities may become wasteful and redundant. Additionally, opportunity cost is also a major factor as planning activities can be very time consuming. During that time,

market conditions could change because i.e. of newly entered competitors, which can have a negative impact in the obtainable market share (Chwolka and Raith, 2012).

While the business plan is still a great tool for assessing the opportunity, identifying the inherent risks associated with the opportunity and then use that knowledge to reduce those risks, the preceding processes lacks customer engagement in order to improve the validity and quality of the content. Many elements of the plan are unnecessary to plan for if they are not validated first. In order to potentially solve this issue and reduce the risk of spending time and resources on redundancy, it is relevant to look into additional methods, which are suited for developing products for customers, which the customers actually want.

2.3 User-Driven Innovation Methods

According to Baldassarre et al. (2017), user-driven innovation *"identifies opportunities and develops new concepts by involving different groups of customers and/or potential users"* [p. 6]. It proposes that innovation is driven by the user's needs, ideas and personal opinions, and is a result of a close collaboration with users. In order to create meaningful and innovative solutions for the users, creativity and prototyping is very important. The practice of iterating is a central part of user-driven innovation, especially in the practice of developing and testing solutions early to validate the business viability. This results in saving significant time and resources in the development processes (Baldassarre et al., 2017).

Two major user-driven innovation methods exists; design thinking and lean startup. Both of these methods involves customers, users and/or stakeholders in the development process. Through both of these methods, solutions are developed iteratively along with the customers in order to validate the business viability and customer desirability (Baldassarre et al., 2017). The two methods will be further elaborated in the following sections.

2.3.1 Design Thinking

The design thinking process was developed by a design consultancy called "IDEO" back in the 1990's and focuses on incorporating consumer insights in depth and rapid prototyping, which aims at getting beyond all of the assumptions that block great solutions. It addresses the need of the people who consumes the product and the infrastructure that enables it. It focuses on creating human-centered products and services (Brown and Wyatt, 2010). *"Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success."*(Glaveski, 2017). Design thinking offers the opportunity to apply design tools to different contexts of problem solving than designing appearance and functionality, such as business, services and processes.

Brown (2009) describes three criteria for successful innovation: *"Desirability"*, *"Viability"*, and *"Feasbility"*. He states that where these three criteria intersect, innovation is created. *"Desirability"* describes what the end users desire of the product and whether or not it serves as a solution for one or multiple needs. *"Viability"* is whether or not it makes economical sense for the developing company to create the product. If there is little to no economical gains of developing the product, the motivation for creating and delivering it to the end users is minimal. *"Feasibility"* is whether it is possible to develop the product, as it will not be innovative if it is not possible to be developed in the first place. The three criteria are represented in figure 2.3:

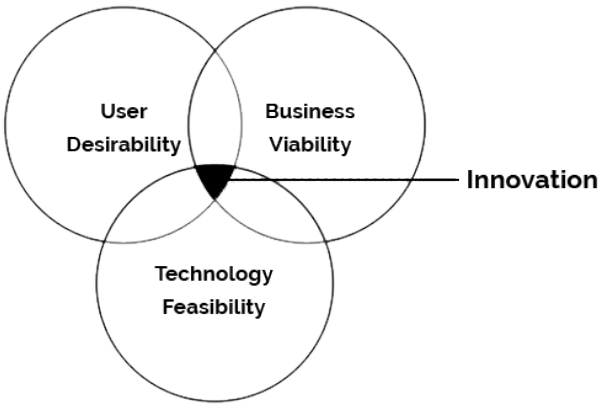

Figure 2.3: The Three Criteria for Successful Innovation (own creation with inspiration from (Mueller and Thoring, 2012)).

According to Mueller and Thoring (2012), many companies focus too much on the viability and feasibility criteria, without validating the user's desirability at first. This leads to companies spending a various amount of time, money and resources in developing product that are economically viable and technologically feasible, but will never take off due to the lack user desirability, as it does solve any need or problem for the user. Design thinking looks to develop products which users find desirable.

One of the main characteristics of design thinking is the usage of early prototyping in the design phase. It is a way of visualizing and testing different solutions. Rapidly creating prototypes enables the possibility of testing various hypotheses about the product and about the users as early as possible. As rapid prototypes are meant to be quick and cheap, making changes are fairly easy and does not require a lot of resources, which permits early failure. Understanding and accepting failure and mistakes are important aspects of Design Thinking. According to Pombo and Tschimmel (2005), dealing with incomplete information with unpredictable situations requires the designer to feel comfortable with uncertainty. This helps shape the business details, forms and nuances without having the waste expensive resources by first learning this in the later stages of the development process.

Another key aspect of design thinking is the human-centered approach which it takes. It makes a shift from designing for user towards designing with users. The designers does not only work with their colleagues in teams, but also in collaboration with the final customers or users of the product or service. By engaging in this co-creation process, it improves the image of the product, the well-beings of the future users, as well as the effectiveness of the creative and innovation processes. In design thinking, the users are seen as experts of the product or service being developed, as they are the ones interacting and experiencing it (Tschimmel, 2012).

The Models of Design Thinking

Within design thinking, several different process models has been developed. According to Tschimmel (2012), the most known models are: *The 3 I Model*, *The Design Thinking Model by the Hasso-Plattner Institute* and *The Double Diamond Model*. The three models are very similar in their nature, as they are developed with the same philosophy of getting users insights to develop prototypes, which can be bested and validated with users before further developing them into final products. No model is necessarily better than the others and each may prove to be more suitable for the individual depending on the case.

The 3 I Model. This was developed by Brown and Wyatt (2010) and stands for *"Inspiration"*, *"Ideation"*, and *"Implementation"*. These "spaces" must be seen as overlapping each other rather than sequential steps. The reason for that being, that they do not necessarily follow each other in an order, since projects can loop back between each space whenever the team needs to refine their idea and explore new directions. The *Inspiration* space is the problem or opportunity that motivates the search for solutions. It starts with a design brief which gives the team a framework to work from, consisting of benchmarks and a set of objectives such as price point and market segment. Following that, observations are made of the behaviour of the target group

in order to identify their needs or problems in their daily environment. The *Ideation* space is process of generating, developing and testing ideas. After observing the target group, the team goes through the process of synthesis where they boil down what they have learned into insights, which results in opportunities of change or the immediate development of a solution. Different concepts are generated through a brainstorming session, where crazy ideas are encouraged and often visualized in order to better communicate complex ideas. The *Implementation* stage is where the best ideas from the previous stage are then developed into prototypes which are then tested with the end users, then iterated and refined based on the learnings hereof. After the final product has been created, the last activity is to develop a communication strategy to help communicate the solution both inside and outside of the organisation (Brown and Wyatt, 2010)(Tschimmel, 2012).

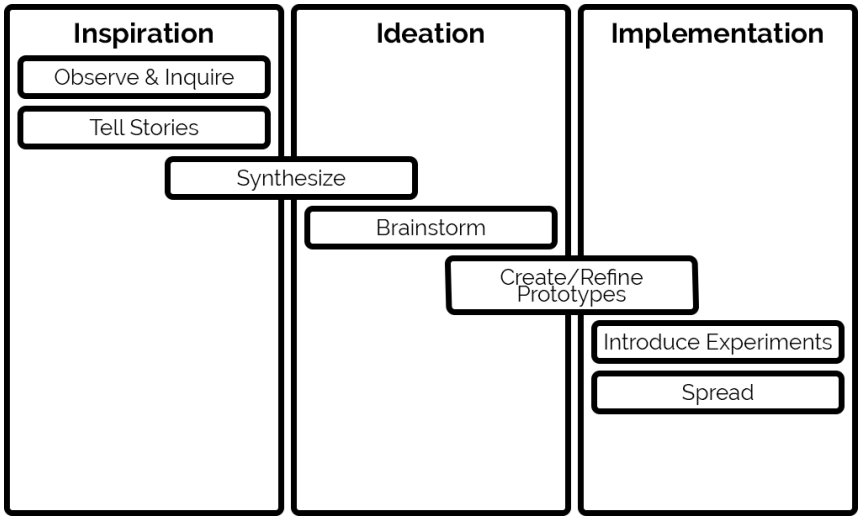

Figure 2.4: The 3 I Model (own creation with inspiration from Tschimmel (2012))

The Design Thinking Model by the Hasso-Plattner Institute. The Hasso-Plattner-Institute at the University of Potsdam in Germany has developed a model that visualises the process in six iterative steps. The first step is "*Understand*, where existing information about the topic is gathered. The second step is *"Observe"*, where qualitative data is gathered through interviews and/or observing methods to collect insight about the needs of the users. The third step is *"Point of View"*, where storytelling is used on the

gathered insights in order to reflect the user's perspective. The fourth step is *"Ideation"*, which is the process of generating, developing and testing ideas. In the fifth step, *"Prototyping"*, one or more prototypes are developed of the best proposed solution(s), which are thereafter tested, iterated and refined in the last and sixth step, *"Test"* (Tschimmel, 2012). Figure 2.5 visualizes this process:

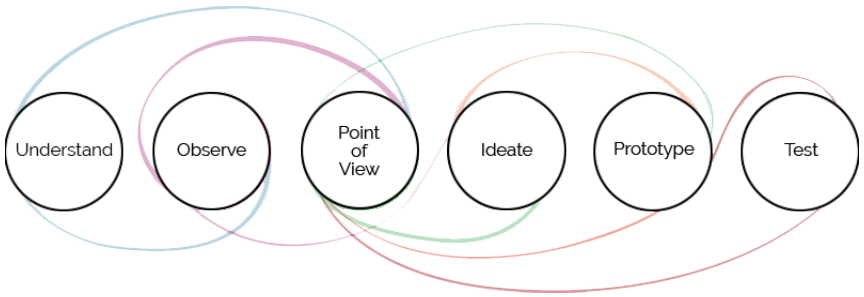

Figure 2.5: The six step design thinking model (own creation with inspiration from Hasso-Plattner-Institute (2019)).

During the design thinking process, a constant shift between generating ideas and selecting them is present. This constantly changes the current possibility space, which is the amount of variations available. In the first to steps of this model, the possibility space widens as more knowledge and understanding is gathered. At the *"Point of View step"*, selection of direction must be made for the further work, which them narrows the possibility space. During the *"Ideation"* step, ideas regarding the problem are generated, which then again expands the possibility space before it then gets drastically narrowed when an idea is selected. Different prototypes are developed to further expand the space before then selecting one or a few of these for testing to re-narrow the space. In the final iteration step, alternative solutions and improvements has to be figured out, which then again widens the possibility space, since it is necessary to back the previous steps (Thoring and Mueller, 2011b).

The Double Diamond Model. The Double Diamond model is divided into four different phases: *"Discover"*, *"Define"*, *"Develop"* and *"Deliver"*. Its graphical representation resembles the divergent and convergent stages of

the design process. The divergent thinking in creative processes are when numerous initial ideas are created, and the convergent thinking is when it narrows down the best idea, which can be illustrated by a diamond shape. The Double Diamond model then does this twice; The first diamond confirms the problem statement and the second diamond creates the solution. Design Council (2019) states that *"One of the greatest mistakes is to omit the left-hand diamond and end up solving the wrong problem"*. The first divergent phase, *Discover*, is when a project starts and the designers looks at things in a fresh way in order to notice new things and gather insights. In the following convergent stage, *Define*, the designers try to make sense of the gathered insights and possibilities, which ends up in a clear design brief, which can be used as framework for the design work. The next divergent phase, *Develop*, then focuses on developing concepts, prototyping them, testing them and iterating them in order to refine the ideas. In the final convergent phase, *Deliver*, is when the product is then finalized, produced and launched (Design Council, 2019). The Double Diamond model is shown in figure 2.6:

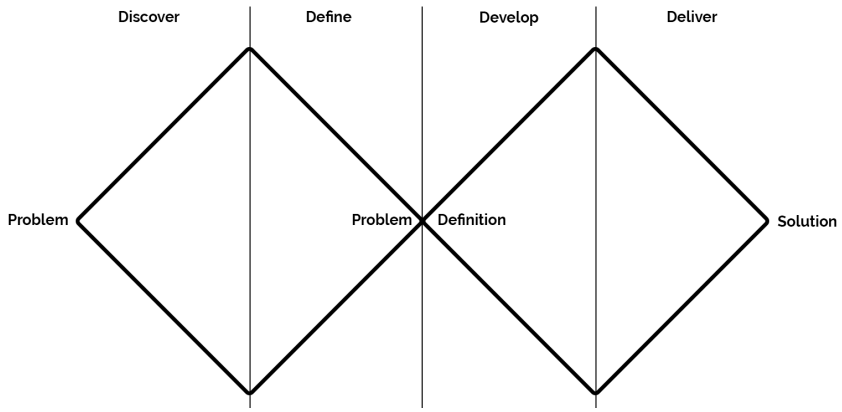

Figure 2.6: The Double Diamond Model with inspiration from Design Council (2019)

2.3.2 Lean Startup

The lean startup method is an evolution of the *"customer development"* method by Blank (2006), made by Ries (2011). Ries states that new startup ventures spend huge amount of time and resources on developing products and services for people, without the affirmation of the potential customers. After a

long development process, the startup turns to the customers only to realize that the customers does not have the same perception of the problem which the product looks to solve or that they disagree with the proposed value of the product. Having spend a large sum of money up until this point often results in the failure of the startup venture.

Compared to design thinking, which includes ideation in its process, the lean startup method is based on the founder already having a product vision to start from. The product is then tested in order to check its validity and from there iterated throughout the process (Mueller and Thoring, 2012). The lean startup method can be used as a framework of how to build and develop a product while minimizing waste of resources by failing fast and cheap. It looks to increase the rate of success of the startup by performing continuous experiments to validate the business model (Ries, 2011).

The lean startup method consists of five principles (Ries, 2011):

(1) Entrepreneurs are everywhere. Entrepreneurship is not just for people working in their garages. Entrepreneurship is about working within a startup, designing new products under extreme uncertainty, which can be done in both existing organizations as well as new ventures.

(2) Entrepreneurship is management. A startup is an institution, not only a product. Therefore, it requires a different style of management geared towards extreme uncertainty. The management must be capable to decide whether to pivot or not during the process, which means to make a change in strategy without changing the vision.

(3) Validated learning. The lean startup focuses on developing a sustainable business by creating products that the customers actually want. By performing continuous experiments in order to test the business hypotheses about the customers, it reduces the risk of developing unwanted products.

(4) Build-Measure-Learn. The lean startup is based on a customer feedback loop consisting of three steps: Build, Measure and Learn. This loop demonstrates the process of which the startup build a Minimal Viable Product (MVP), which is *"that version of the product that enables a full turn of the Build-Measure-Learn loop with a minimum amount of effort and the least amount of development time"* (Ries, 2011)[p. 82] . Metrics is then set up in order to evaluate the feedback of the MVP. The gathered learnings is then used to refine the MVP and start a new cycle of the loop. All successful startups process should be geared to accelerate this feedback loop.

(5) Innovation accounting. This focuses on how to measure progress, how to set up milestones and how to prioritize work. It works in three steps: First an MVP must be developed in order to establish the current state of the company. Secondly, through pivots and small optimizations, the startup must develop this current state towards the end goal. Thirdly is the decision of whether to pivot or to persevere.

The aim of the lean startup method is to continuously gather feedback from the customer during the product development phases. It focuses on testing the essential product and customer hypotheses as early in the process as possible in order lower the risk of wasting time and resources on developing something of no value to the customers (Mueller and Thoring, 2012).

2.4 Analysis Summary

This analysis sought to shed light on what entrepreneurial opportunities are, how they are recognized and developed, and finally how they can be assessed. It was identified, that opportunities can be categorized into four different types: *"Dreams"*, *"Problem Solving"*, *"Technology Transfer"* and *"Business Formation"*. The presented case in section 1.2 can be categorized as *Problem Solving*, as a potential market need has been identified, but there is yet to be developed potential business concepts to satisfy the need. How

opportunities are recognized were thereafter described in order to understand how they go from the perception of a need, to a discovery of fit between the need and specified resources, and finally to the creation of a business concept based on this fit. The opportunity development process were thereafter described, as creating a viable business needs not only the opportunity recognition, but also development. Opportunities starts as either a market need or as un- or underemployed resources. When these are more clearly defined, the opportunity develops into one or more business concepts, which consists of product or service concepts, market concepts and a plan for how to deliver it to that target market. It then develops into a business plan before forming the business.

Returning to the initial problem statement:

> **How can the viability of an entrepreneurial opportunity be assessed and determined if it is worthwhile to pursue?**

The business planning process is a recognized method of determining the viability of entrepreneurial opportunities. By engaging in this process, it enables the entrepreneur to make an informed decision of whether the opportunity is worth pursuing. It was however identified that this process does not address whether the business concept, which the business plan is based on, is something the customers actually want and feel like satisfy their needs. This results in the business plan having increased risks of being wasteful and redundant, as its content is based on hypotheses made by the entrepreneur. As the process can be very time consuming and therefore costly, it can potentially have great implications of the success rate of the proposed business.

In order to address this issue, two user-driven innovation methods were looked into, as they focus on identifying opportunities and developing new concepts by involving users and/or customers in the development processes; design thinking and lean startup. By utilizing one of these user-driven innovation methods preceding the business planning process, it could potentially reduce the amount of hypotheses regarding the customers

and the product. While these two methods appear very similar in their goals, there are some key aspects which differentiates them. Lean startup focuses on developing innovations for startups and for existing companies, design thinking focuses on innovation in general and not necessarily in a business context. These innovations from design thinking could of course be turned into startups should it be of interest for the designers. Due to the business focus of the lean startup, it also utilizes the business model canvas by Osterwalder and Pigneur (2010) in order to align the stakeholders, value propositions, required key resources and activities, costs and revenue structures, channels and customer relationships. Design thinking does emphasize on the use of the business model of an idea (Mueller and Thoring, 2012).

As stated, in order to satisfy a market need or utilize un- or underemployed resources, business concepts must be developed. In order to increase the validity of the following business planing process, the two preceding steps in the process must be matched. As design thinking focuses on developing new product ideas and turn them into final products which the users desire, rather than developing on an existing product idea in the lean startup, design thinking is potentially the most suitable method.

2.5 Problem Statement

In the preceding analysis, it became evident that the business planning in itself is not sufficient in regards to determining the viability of an entrepreneurial opportunity due to the amount of non-validated hypotheses of whether the proposed business concept is the right fit for the proposed market need. It is therefore necessary to figure out how a product can be developed that actually solves the need are developed and validated with the customers. Design thinking is a process that looks to validate the user desirability of a proposed product by co-developing it with them. It is therefore relevant to ask:

> **How can design thinking be used in the opportunity development process in order to reduce the hypothesis of fit regarding the market need and the proposed business concept?**

In order to further process the above problem statement, the following research question will be investigated:

- How might a potential product concept look to solve the need of digital estate planning?

To answer this problem statement, the following analysis will apply the design thinking process on the proposed business opportunity from section 1.2 in order to validate the market need, develop a potential solution concepts and validate it through prototyping and testing.

Chapter 3

Analysis

This chapter looks to address the problem statement by working through the design thinking process on the proposed business opportunity. First, one of the presented design thinking models is chosen for the process, after which each step is worked through, resulting in a product concept desirable by the users.

3.1 Selection of Design Thinking Model

Three models of design thinking was presented in section 2.3.1, all with the same philosophy of user co-creation. As no models are necessarily better than the others, a subjective decision of which to use must be made. As it is to be used as a guidance framework trough the process, the model of the Hasso-Plattner Institute is preferred, due to its more clear step-for-step directions with its numerous individual steps. In contrast to the other two models, it also visually represents the iterativeness between each step, which is a very important aspect of design thinking. As this model clearly defines the process, it may prove to be more beneficial for entrepreneurs with less experience with the design thinking process.

The business opportunity will therefore work through the model's six it-

erative steps in the following sections: *"Understand"*, *"Observe"*, *"Point of View"*, *"Ideate"*, *"Prototype"* and *"Test"*.

3.2 Understand

In order to better understand the topic of digital afterlife, information regarding this topic must be gathered in order to become an expert in the area, which is done through secondary research. This gives a much deeper foundation to better understand the potential users in the following steps of the process. (Thoring and Mueller, 2011b).

In section 1.2, much information has already been gathered and described regarding the topic. Firstly, the definition of digital assets was defined as by Hopkins (2013) in order to get a better understanding of the topic. Following, a study by McAfee (2013) was presented to showcase how much value there actually is in the average internet user's digital assets. The inherent issues of having these assets stored on digitally was then described followed by an encouragement of Hopkins to create innovative solutions to solve these issues.

In addition to this, more knowledge is gathered about the issues. Hopkins (2013) states that it is crucial to understand three key pieces of information in order to understand what happens to one's digital assets upon death: (1) where the digital assets are stored, (2) who owns the assets and (3) did the deceased prepare for a transfer of the assets upon death.

It is crucial to know where the digital assets are stored. People can store them on physical devices as well as on one or more of the numerous digital storage services available like Dropbox, Google Drive and Microsoft OneDrive. Without knowing exactly where the digital assets are stored, there is a great chance that they can get lost and never to retrieved, as their existence remains unknown. Even if their location is known, they are often

secured by a username and password, which are also often unknown to everybody else than the owner.

Secondly, there are some challenges regarding the ownership of the digital assets when they are stored online. Some laws of individual countries that may restrict the transferability of the assets could exist. Also, the ownership rights can also can vary from service provider to service provider depending of their terms of service.

Thirdly, is it necessary to know whether the deceased has prepared for a transfer and the handling of the assets upon death. Instructions to the receiving people could have been made in order to ensure that the assets are handled properly and the digital legacy of the owner is kept intact.

Another dilemma is the estate planning itself. By using a traditional will, its details will become public upon death. If usernames and passwords are stored within the will, the security and privacy will be exposed to great risks. But if no access details to the digital services are passed on, the receiving parties will have no way of accessing the assets and they will therefore be lost forever (Hopkins, 2013).

3.3 Observe

The goal of the observation phase is to gather insights from prospective users about the knowledge gathered in the preceding step, which is done through qualitative research. Through this research, facts are collected and interpreted. It is important to note, that the users are not directly asked what their needs are, since they are often unaware of this. The needs must be identified through the observation and/or interviews (Thoring and Mueller, 2011b). In order to determine who the prospective users are, a hypothesis must be made in this regard. The hypothesis is that both men and women with either kids still living at home, or near retirement age, where

considerations regarding estate planning often occur, are the potential customers until proven otherwise.

3.3.1 Interviews

In order to get the better insight about the needs of the users, three potential users were interviewed. They were asked regarding the following topics:

1. If they have considered what happens to their digital assets upon death
2. What kind of digital assets they posses
3. Which services they are currently using to store their digital assets
4. What solutions are they currently using to ensure the digital assets can get passed on
5. What digital assets are most vital to them to not get lost.

The answers from these interviews are summarized in the following table 3.1:

Question #1	Question #2	Question #3	Question #4	Question #5
More in relations to the assets getting lost in fire or robbery	Photos	Google Drive	Self made solution. Locked Dropbox folder where one person knows the access information and another person has the password to the specific folder	Family photos and videos are the most important.
I have a self-made solution set up for some of my most important things	Videos	Dropbox	I make physical backups which I update a few times every year	Family albums are the most important to me. I also have some documents that my family can benefit from if I should suddenly pass away
I never considered that	Business documents	iCloud	No solution	
	Family recipes	External hard drive		

Table 3.1: Interview answers (own creation)

Through these interviews it became evident that some of the participants

are thinking about and making efforts towards their digital estate planning. However, none of them have a solution in which their are completely satisfied with, and the mentioned solutions are somewhat homemade. As it was found out in the previous *"understanding"* step, the participants have their digital assets scattered across multiple online services as well as additional physical devices. Family photos and videos appeared to be the most valuable digital assets to the participants, followed by some important personal documents.

3.4 Point of View

The purpose of the Point of View step is to use the gathered insights from the previous step and create a micro-theory about the problem area and the user needs in order to reflect the user's perspective (Thoring and Mueller, 2011b). This perspective can be visualized by developing a user persona. According to Blank and Dorf (2012), user personas can help to better understand the user's motivations and the barriers and issues they are facing. This can help to better develop ideas and concepts to solve these needs and issues in the following steps of the design thinking process.

Based on the gathered insights, the developed user persona is showcased in the following figure 3.1:

Name: Jane.

Age: 54.

Family: Married with three teenage kids.

Influencers: Kids, Husband.

Key Pains: Keeping updated backups of the family photos and securing them from potential loss.

Jane is married with three teenage kids. She loves looking at the old family photos from all the vacations they have been on during the kids' lives. These albums means the world to Jane, and she keeps a physical backup stored in her closet, which she updates a couple of times per year. She also stores a digital backup on her iCloud account. Her husband knows her password and the kids knows the location of the backup in case something happens to her. She finds it very tiresome to always have to keep multiple backups and she is worried that her photos will get lost in a house fire or if her iCloud account should suddenly be closed.

Figure 3.1: User persona (own creation)

By having this user persona, it becomes easier to create and develop ideas to match the needs and problems described.

3.5 Ideate

The purpose of the ideation phase is to develop ideas, based on the previous Point of View phase, which looks to solve the issues of the users. The brainstorming session looks to generate as many ideas as possible. These ideas are written down or sketched on various Post-It notes, which makes it easy to quickly generate wild ideas, which may or may not yet be thought out. This may assist in the in birth of other ideas building upon the existing ones (Thoring and Mueller, 2011a).

According to Thoring and Mueller (2011b) the ideation step consists of four steps: (1) generate brainstorming questions that address the previously defined problem/user need, (2) generate ideas for possible solutions to the defined problem or needs, (3) structure all ideas, and (4) decide on one idea to develop further. In the first step, questions are generated based on the user needs defined the in the Point of View step. These questions often starts with *"How might we..?"* in order to inspire solution based ideas. In the second step, classical brainstorming techniques are used to generate as many ideas as possible. In this case, mindmapping and lateral thinking was used spark different ideas and concepts. In the third step, the ideas are then clustered into different relevant categories. In the fourth step, one idea is then selected to go into the next phase.

3.5.1 Brainstorming Questions

The following brainstorming questions were developed to inspire the brainstorming session:

- How might we store digital assets?

- How might we be able to pass on digital assets to other people?
- How might we ensure that the assets are stored securely?
- How might we ensure that the privacy of the owner is kept intact?

3.5.2 Ideation

These questions inspired the following mindmap, which led to the identification of various topics and thoughts related to the different question, which could be used for further ideation:

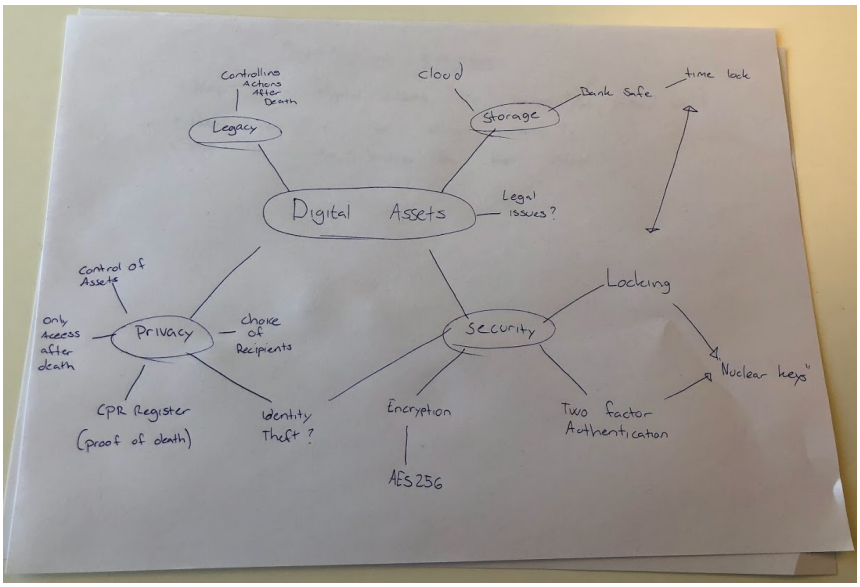

Figure 3.2: Mindmap based on the brainstorming questions (own creation)

This mindmap was used as a foundation for the following product ideas, which looks to solve the user problems and needs. Each idea is placed on top of the underlying lateral thinking process, which has sparked the idea:

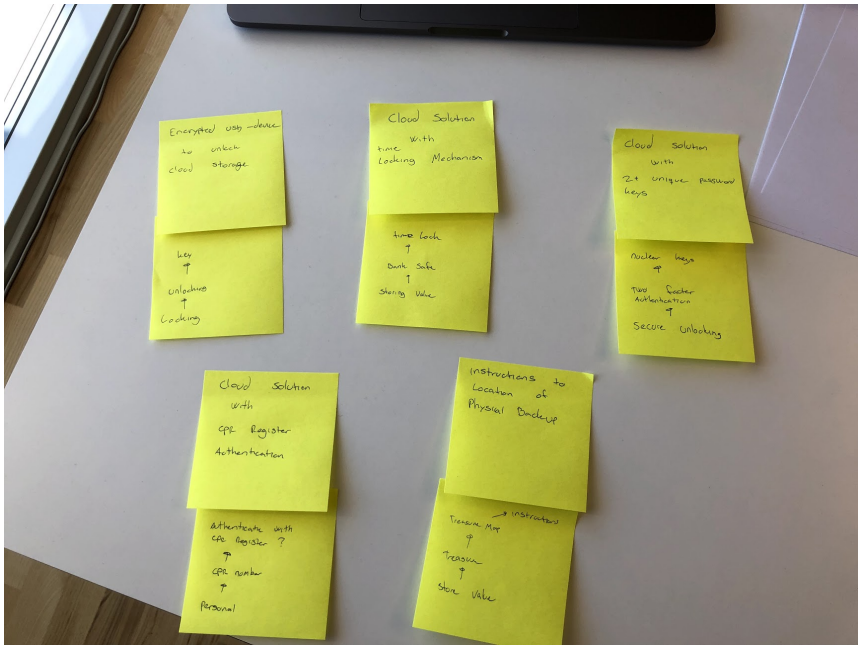

Figure 3.3: Initial ideas based on lateral thinking (own creation)

The ideas were as following:

1. An encrypted USB-device which is used to unlock the digital assets, which are stored on a cloud storage platform.
2. A set of instructions which leads the recipients to a physical backup of the digital assets.
3. A cloud storage solution where users can store their digital assets, which can only be unlocked by select recipients when their social security number has been marked as deceased.
4. A cloud storage solution with a time locking mechanism, where users can store their digital assets. When select recipients wants to access the assets, a time lock sequence is initiated.
5. A cloud storage solution where users can store their digital assets. Two or more unique access codes are then generated which the owner can choose to share with select others. In order to gain access these select individuals must each use their unique codes within a short time span of each other in order to gain access.

3.5.3 Structuring of Ideas & Selection

The initial grouping of ideas was between physical and fully digital solutions. As idea 1 and 2 involves physical backups of the digital assets, it increases the risks of losing them by either forgetting the location of them, they get lost in robbery, or they get damaged by a house fire, water damage etc. In order to reduce the risk of losing the digital assets, these two ideas were excluded.

The other three ideas were very similar, as they all are based on a cloud storage solution. The only major differences are in the way the owner's digital assets are unlocked and accessed by others. Idea 5 had an increased risk of security and privacy breach, as the selected individuals with the access codes can either lose them or they could decide to get access to all of the owner's digital assets together. Therefore this idea was also excluded.

Idea 3 ensures that the access can only be obtained whenever the owner officially has passed away, by having the system check whether the owner's social security number has been marked as deceased. However, this solution has to rely on a third party system in order to function, which questions the life span of it.

Idea 4 allows for the owner to deny any access by others as long he or she is still alive by getting notified by the system that one of the chosen recipients are trying to get access. Should the owner pass away, he or she will not be able to deny access by the recipients, who then obtains access after a set time period. As this solution does not rely on other parties or systems, this was chosen for further development in the prototyping phase.

3.6 Prototype

Based on the selected idea, a low-fidelity prototype was made. A low-fidelity prototype is a rough representation of a concept that helps in the validation of a concept in the early stages of the design process. Its goal is to learn from the users, not impress them, and it requires less time, skills and resources to produce.

Early low-fidelity prototypes comes with several important advantages. It allows for early detection of essential flaws in the usability and the proposed functionality. It can also easily be built by individuals with little to no technical skills, and it is also very cheap compared to high-fidelity prototypes as they are often made from sketches on paper or with free tools. By keeping the prototype low-fidelity, it forces the users to give feedback on the core functionality and content rather than the choice of colors or fonts. The users will also recognize that the prototype is nowhere near the final product and will therefore not be disappointed with the state of the product. Low-fidelity prototypes are also designed to be produced quickly, and also to be able to be thrown away just as quickly (Busche, 2014)(Benyon, 2014).

3.6.1 Sketching

In order to quickly produce a prototype, a paper-based sketched solution was selected. The sketched solution allows for quick drastic changes and allows for easy conversation regarding the concept with the end users. The goal for this prototype was to get initial feedback for the proposed solution idea before spending more resources on the further development. The sketched prototype is shown in the following figure 3.4:

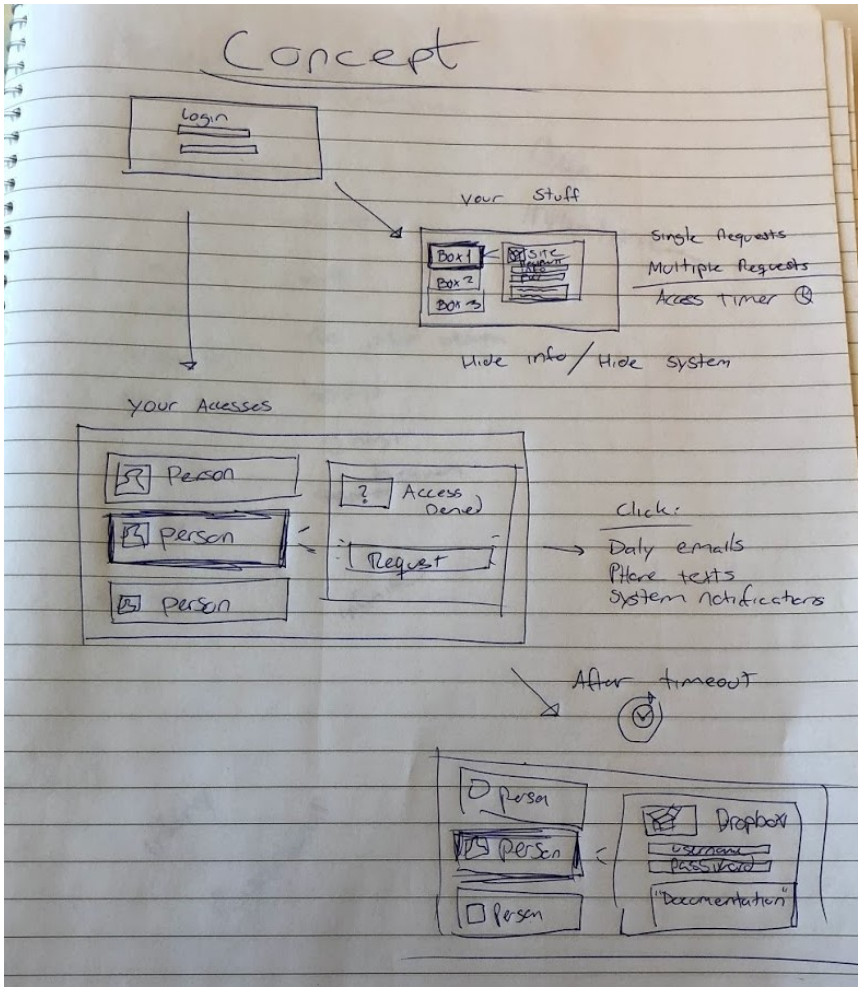

Figure 3.4: Initial low-fidelity prototype (own creation)

The image shows the different pages and functionalities in the solution. Firstly, the user is prompted to log in to their account. If the user is the owner of a *"vault"*, which is where the digital assets are stored, he or she is directed to an overview of the different *"boxes"* within, which are separate groups of assets, which can be managed individually. The user can choose to create additional boxes and assign directions for the recipients of how they should use it. On each *"box"* the user can manage who the recipients are as well as the access options, such as amount of access requests required to start the time lock as well as the duration of the time lock.

If the user who logs in is a recipient, he or she is directed to a page where an overview of the different vault owners, for whom he or she is a recipient of, is presented. The user can select a vault owner and request access to their designated box. Once the request has been made, the time lock countdown begins. During this time, the owner of the vault will continuously receive notifications in the form of e-mails, text messages and/or system notifications, allowing the vault owner to deny the access request if he or she is still alive. Once the time lock countdown ends, the access is given to the assets along with the associated instructions for usage.

The purpose of this prototype was to be used as a communication tool about the concept with the end users in order to get initial feedback on the core elements in the following testing phase.

3.7 Test

In order to test, whether a concept can be communicated to the end users, it is necessary to show the prototype to them, so they can provide feedback for the further development. If the feedback proves to be somewhat negative, the process iterates back to the previous step and the prototype is then refined before testing again. This is done until the feedback proves to be positive from the users (Thoring and Mueller, 2011b).

As this initial prototype was just a set of sketches, it was difficult to let the users "try it" for themselves. Therefore, the concept was demonstrated as a *"Storyboard"*, which is a series of images displayed in a sequence in order to visualise the process of the concept (Tschimmel, 2012). This is was done with three different users. They brought both negative and positive feedback on the initial concept:

- Positive:
  - The problem was not as profound as initially thought. The users saw a definite need for solution to the problem the concept tries

to solve.

- Negative:
  - The time lock was very difficult to understand, and its functionality was not very clear.
  - The term *"digital assets"* was also difficult to understand, as it is not an often used term about the items it describes.

It was difficult for the users to provide much more feedback because of the simplicity of the prototype. However, the feedback regards some very fundamental elements of the concept, which is very important to get positive validation from before developing much further.

3.7.1 Reflections

This testing session proved to be very beneficial, as showed that even though the initial concept description was thought to be pretty clear, it proved otherwise when testing with the actual users. The value of developing alongside the users become very clear from this test, and the value from going through the design thinking process was very present.

As there were some very critical negative feedback provided, mainly regarding the communication of the concept, it was necessary to take a step back in the process and reiterate the prototyping step.

3.8 Prototype - Reiteration #1

In order to better communicate the concept with the users, a different kind of prototype was made. Instead of sketches, the concept was further described and elaborated on a digital landing page, where users could get a better understanding of the concept in their own time. It also allows for

easier sharing and testing, since it can be viewed by many people simultaneously. By getting interest from more users, it further helps the validation of the desirability success criteria mentioned in section 2.3.1. Compared to more hi-fi prototypes, landing pages are also easier to make changes to regarding the overall concept, without having to change lots of different functionalities.

3.8.1 Landing Page

As stated previously, the negative feedback was regarding the communication of the concept in its elements. Therefore, in this iteration of the prototype, actions were made to improve those issues. To improve the communication a tool such as *"storytelling"* could be used. By presenting the concept with an emotional context, it allows the users to follow much closer to the details of the proposal. Such stories are often illustrative, symbolic and easy to remember in order to create an emotional bond with the users (Tschimmel, 2012). The storytelling were therefore used throughout the whole landing page. The full landing page can be found in appendix B.

On the top of the page, the user is presented with some descriptive text along with some images. The headline states: *"Get full control over your digital afterlife"* with the first three words marked in bold. This is communicated to tell the users, that by using this product, they can obtain a sense control over something in which they do not currently have. The text underneath describes the value proposition of the product and creates an emotional setting for the user, forcing them to think about their responsibilities to their next of kin should they suddenly pass away. The images placed next to the text shows two kids playing, an elderly couple, and a recipe being displayed on an iPad. The kids are shown to draw the emotions of the users towards their kids and what they mean to them. Thoughts about how the kids should be taking care of in the case of sudden passing is away to address the necessity of a solution to the overall problem. The elderly couple indicates both possibly the user themselves, as someone who should think about their afterlife at this stage of their life, or as the users' parents who

could be of interest in having them take over some of the users' digital assets. The recipe resembles the grandma's old recipe which has been passed on for iterations and has now been digitized in this day and age, as an example of a digital asset. An easily available call-to-action button, where the user can sign up immediately is placed on the top as well. This part of the landing page is shown in the following figure 3.5:

Figure 3.5: Top part of the landing page (own creation).

In the following section, a note makes the user clear of the increasing amount of digital assets people have, such as the family's photo albums, grandma's recipes and other important personal documents. This also defines the term of digital asset to the user. Following this, the text asks how ones next of kin can get access to everything that stands close to the user, if you suddenly pass away. This is done to provoke and make the overall problem clear for the user and make it clear that a need for a solution is present. After this need identification, the text immediately describes value of the product and how it can solve this need.

In the next section, the feature list is presented in order to show the users what they can expect from the product. The first feature is ability to pass

on digital assets and ensuring they do not get lost, without making a compromise with the security. This is ensure the users, that their assets are safe and secure when they are stored on the platform. The next feature is the ability to personally control who gets the access to specific digital assets. This is presented to ensure that the users feel like they are in control and therefore feel more safe by using the product. The third feature is the time lock, which is used to ensure that access is not given without the permission of the owner. Finally, the fourth feature listed is the security of the digital assets. This is listed in order gain the trust of the users and to ensure them that their assets are safe on the platform. The feature list is shown in the following figure 3.6:

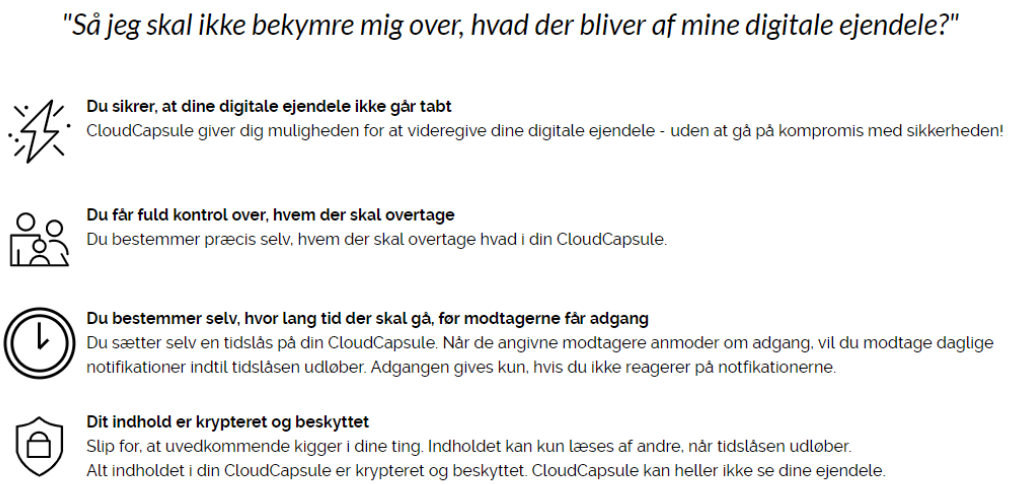

Figure 3.6: The feature list (own creation).

Next is a simple quote highlighted and presented, that describes how one user sees the value in the product. The quote expresses the significance of not having to share passwords with others and still have it possible to pass on digital assets if he or she gets into an accident. The quote is intended to help the users see the use case and another value in the product.

After having been presented with so much different information, the user must not feel like its too much hassle to use and thereby get scared away. A

simple step-for-step process of how the product works is visualised in order to show how easy and hassle free it is to use. The process is: (1) upload your files and information, (2) choose who you want to receive these items, (3) set the duration for the time lock, for how long it takes from the access is requested to the access is given, and (4) the access is given, if the owner of the vault has not responded to the many notifications. This process is shown in the following figure 3.7:

Figure 3.7: The step-for-step process (own creation).

Lastly, a call-to-action function is presented, where the users can sign up to a waiting list. By having people submitting their e-mail addresses it is possible to gauge the interest in the product, while also getting a way to contact a list of potential customers when the product is finally available for launch. It is also possible to contact these users for further testing before releasing the product.

3.9 Test - Reiteration #1

After developing the new iteration of the prototype, it was also necessary to go through the testing step again. The prototype was tested with five new potential users of the product. Each individual was sent a link to the landing page where they were asked to read through it. Afterwards,

the participants could provide feedback, and in order to check if the new prototype helped solve some of the previous identified issues, they were asked questions regarding these, if they were not mentioned already. In the following table 3.2, quotes from the tests are presented. They have been sorted into concerns which they found with either the landing page or the concept in general, and general feedback on the solutions and things to consider for the end product.

Concerns:

No.	Quote
#1	"I think I understand how the time lock works, but it is not very clear on the page."
#2	"What if I have images that I do not want to share when I die?"
#3	"I think you need to put the security more in focus. The content is very private."
#4	"Step 3 and 4 in the bottom are not very clear."
#5	"I think one of the main concerns will be the privacy of using this."
#6	"People will be afraid of sharing their things I think"

Feedback:

No.	Quote
#1	"I have actually never thought of this before. Very eye opening."
#2	"I see so much potential in this. Everybody has pictures and documents in their Dropbox."
#3	"It is very important that is easy to use."
#4	"I think you should have recurring reminders to update the content in your vault."
#5	"When can I get it?"
#6	"I think my grandpa would love this!"
#7	"This is not stupid!"
#8	"It would be cool if it works with my Dropbox or iCloud"

Table 3.2: Quotes from the test (own creation).

In order to analyse the above mentioned concerns and figure out how to solve them, they can be divided into several categories. This makes it clear which areas of the concept the concerns are regarding and where to put in effort to fix it. They can be categorized as shown in the following table 3.3:

Time Lock	Control	Security	Privacy
Concern #1	Concern #2	Concern #3	Concern #5
Concern #4			Concern #6

Table 3.3: Categorization of concerns (own creation).

Due to the still existing negative feedback, another iteration of the proto-

typing step had to be performed in order to solve these issues.

3.10 Prototype - Reiteration #2

In this iteration, the concerns categorized in table 3.3 had to be addressed. Firstly, the time lock concepts still lacked some clarity for some users. Both the concept itself, but also the integration of it in the concept. An effort therefore had be made to clarify the concept. Since it appeared to very difficult to understand, the description of it therefore had to be as simple and easy to understand as possible. Therefore, a simple step-for-step *"this is how it works"* model was therefore added to the landing page. This model shows each individual step with a belonging explanatory text to get a better understanding of the flow of decisions being made in the process. This should hopefully also make the step-for-step process easier to understand, as concern #4 regards the time lock parts of that process. The model is shown in the following figure 3.8:

Figure 3.8: The model describing the time lock (own creation).

The concern regarding control of how to chose which items are passed on and which are not should be resolved by reformulating the regarding sentences.

In order to resolve the concern regarding security, more information regarding how the data is stored in secure way had to be added to the feature list. This was done by describing the usage of 256-AES encryption, which is proved to be effectively impossible to decrypt. This would hopefully add a

sense of confidence for the users, as they should now know that necessary efforts are being made to protect their digital assets. The update is shown in the following figure 3.9:

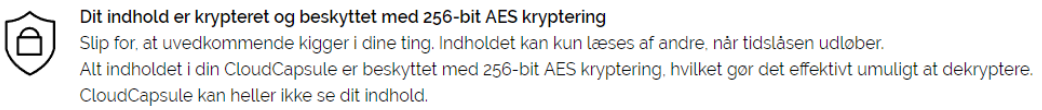

Figure 3.9: Updated part of the feature list (own creation).

Lastly, the privacy concerns also had to be addressed. Other than a single phrase on the landing page, no other mentions of privacy was made. Due to its clear importance from the users, an additional section on the landing page was created. This section describes how important the users' privacy is to the company and why they can trust the company with their digital assets. To try and gain even more trust, it was made clear that the company is 100% Danish, which ensures them that the company complies with the Danish laws. This new section is shown in the following figure 3.10:

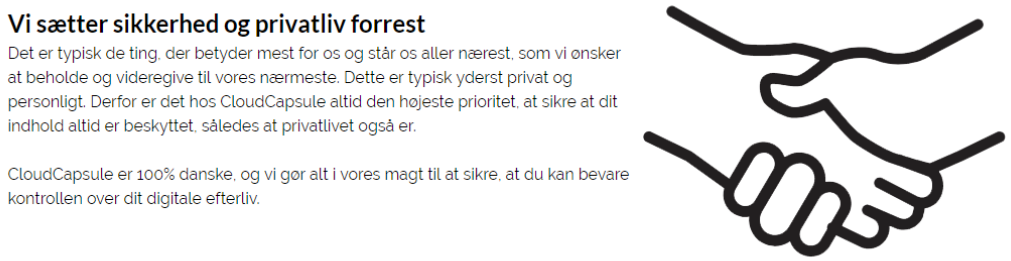

Figure 3.10: New section regarding privacy and trust (own creation).

These new additions would hopefully address and solve the identified concerns regarding the concept and reduce the risks of either misunderstanding or not understanding some elements at all.

3.11 Test - Reiteration #2

In order to test the efforts of addressing the concerns in table 3.2, the changes were tested on the same users from reiteration #1. As these users already had been through the prototype, and only few additions were made to the page, the tests proved to be rather short and effective.

The model showcasing (figure 3.8 the decision flow of the time lock feature received all positive feedback with every participant feeling sure about how the feature works. Especially the two final points which are forked out to indicate the different potential results of the time lock process, seemed to clear up the confusion about the process. The updated security and privacy item on the feature list also received positive feedback (figure 3.9. Even though most of the participants were unaware of what *"256-bit AES encryption"* is and how it works, it made them feel more reassured about the security. The final addition of the privacy section was also positively received. However, one of the participants stated that while this is still a positive effort to address the topic, the participant still believed the topic of privacy will be a challenge for the product due to current societal concerns.

Due to having solved the identified concerns of the users, there was no need to further reiterate any of the previous steps, which means that no further validation of the business concept was necessary. This would conclude the design thinking process.

3.12 Analysis Summary

The aim of the design thinking process was to develop a product for the identified market need of digital estate planning, which the users find desirable. Through this process multiple potential ideas were developed based on the gathered knowledge and insights of the users, wherefrom one of those was developed into a prototype. This prototype was then tested and

reiterated multiple times with potential users, before having developed a desirable product.

After going through the process, the desirability of the product was clear from the participants with some of them directly asking when it would available to use for them. While there is no set level of desirability needed in order to determine if the opportunity is worth continuing pursuing, a subjective conclusion must be made from the quotes and learnings of the test sessions with the participants. In this case, this opportunity can be concluded to be very interesting for further development.

Chapter 4

Discussion

After iterating through the design thinking process some natural points of discussion occurs. Firstly is the selection of the user-driven innovation method. While proving the desirability of the business concept through the design thinking method, the lean startup method could also potentially have proven this through its build-measure-learn loop. However, an idea for a product should already have been present, which was not the case for this project. Should a basic idea have been made early on, it could potentially have taken shape into a desirable product as well through continuous learning from the customers and through pivoting.

Another point to discuss is the solo application of the design thinking method. The method is intended for a team of interdisciplinary people with experience and expertise in different fields, which can utilize the different strengths to compliment the whole team. While it has not proven to be a road block to iterate through the method, it could have affected the understandings of the problems as well as the ideation and prototyping phases. Experiences from other fields could have provided a wider variety of ideas which could also turn out to be as desirable or even more so.

While the design thinking model of the Hasso-Plattner Institute was selected for application, another of the presented models could also have been

suitable for the project. The selection process was rather subjective, as the models in their essence has the same philosophy and purpose. The process of determining the desirability of the product would have been slightly different and it could potentially also vary in effectiveness time and resource wise.

A hypothesis regarding who the users were had to be made, as no clear segmentation was made through the understanding step of the process. As the proposed potential users seemed to fit this hypothesis, no changes were made to this segmentation. However other segments could potentially also find this product desirable, which would have to be further tested.

The desirability of the product is also based off of the concept of a product described through the landing page. The level of desirability can greatly vary depending on the ability to create a solution matching the described features whilst also being also to sell it at a price which the customers would be willing to pay. Since the idea of the product imagined by each individual participant of the tests can vary, it could be very relevant to further test the product through a hi-fi prototype which the users can try out themselves before deciding on going into full development. As previously stated, in the opportunity development process, business concepts turns into business models in the following step before being developed into a business plan. Since the lean startup takes its offset in an existing idea and also focuses on the business modelling aspect of the business, it could possibly be beneficial from this stage on to further validate the business viability a long with the continuous validation of user desirability.

Chapter 5

Conclusion

In the introduction the following initial problem statement was presented based on the theory of entrepreneurial opportunities and the potential business opportunity in the field of digital estate planning:

> **How can the viability of an entrepreneurial opportunity be assessed and determined if it is worthwhile to pursue?**

Through the pre-analysis, a problem regarding the opportunity development processes was identified, which led to the following final problem statement:

> **How can design thinking be used in the opportunity development process in order to reduce the hypothesis of fit regarding the market need and the proposed business concept?**

In order to answer this problem statement, the analysis sought to analyse the design thinking process by utilizing the case presented in the introduction. The goal was to match the market need with a business concept, which the users find desirable and satisfy their need. By doing so it reduces the risk on spending time and resources on developing something that nobody wants and planning the entire business around that. By creating a desirable product which has been validated by the customers, it eliminates wasteful and redundant planning activities in the following business planning process.

The result of using the design thinking user-driven innovation method was a desirable product concept, which has been validated with the customers as they saw a potential in satisfying their need and solving their problems. It can therefore be concluded that design thinking can benefit the opportunity development process, as the identified market need has been matched a suitable business concept, before further developing on the business plan. The business planning activities therefore has a reduced risk of being wrong, potentially increasing the success potential of the business venture.

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Appendix A

Business Plan Content

Content Category	Content Details
Executive summary	Synopsis of all the subsequent sections (3 pages)
Business description	History; start date and basic nature / activities ofbusiness, entrepreneurs and other people involved,vision statement, mission statement, brand promise,organisational values, sustainable competitiveadvantage, form of ownership (legal implications),achievements to date, objectives and Swot analysis.
Products and services	Range of products and services that will be offered;costs / purpose / distribution of products, luxuryitems / addresses weakness, creates opportunity,value proposition of product/s, unique/ innovativefeatures over competitors; benefit to customers,technology effects, the limitations or legalimplications, environmental implications and theventure and product life cycle
Industry analysis	Primary industry characteristics, size and trends; success factors to compete in industry, geographic location and segmentation (target market of industry), major role players in the industry; competition, problems in the industry (also globally), legislation influencing the industry, industry trends, peak periods, seasonal trends and developments, is the industry growing or declining?, profit characteristics of the industry, intermediaries and distribution channels; how they operate and their costs.
Production, manufacturing and operational plans	Production of products, geographic location ofpremises, factory facility, production strategy andregulatory issues
Management team	Management / organisational chart; and anyinvestors?, organisational structure; describestructure / business units / subsidiaries,management / owners' profiles, roles andresponsibilities; job description / duties, managementstyle, training; motivation for employees / trainer?,supporting professionals; accountants /transportation and additional staff for future.

Marketing research andanalysis	The size and the maturity of the market; pricehistory, forecasts, seasonality, potential for growth,trends, market research: market segmentation,customers' demographic profile (target market),competitive analysis and positioning maps, primary /direct competitors, secondary / indirect competitors,competitor analysis summary, future research;possible developments and new markets
Marketing plan	Marketing and brand strategy, advertising andproduct promotion, advertising media, target market,product composition; packaging and labelling,product pricing; guarantees and market penetration.
Economics of the business	Break-even analysis; show fixed / variable costs,time to positive cash flow, and costs.
Financial plan	Financial management; historical financial data,income statement projections for three years,balance sheet projections for three years, cash flowprojections for three years.
Design and development	Development status and tasks; admin policies,procedures, controls, difficulty and risk concerningdesign and development.
Growth plan	A growth plan for five years and new products for thefuture.
Action plan	A detailed action plan for 12 months.
Critical risks, problems andassumptions	Major problems and risks, 'what ifs' followed bycontingency plans, environmental impact.
Proposed offering (Desired finance)	Show how you are going to spend the funding,investors' return and security.

Figure A.1: Business plan framework by the University of Pretoria (own creation with inspiration from Botha and Robertson (2014).

Appendix B

Landing Page

LINK: https://cloudcapsule.landinglion.com/