CHALMERS
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Product and Business Development in Successful Start-Up Companies

A Study About Success Factors in Start-Up Companies and the Creation of a New Venture

Master's thesis in Product Development

VIKTOR JOHANSSON

Department of Industrial and Materials Science
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2019

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Foreword and Acknowledgements

This has been more than a thesis project. It has been an opportunity for me to explore my dreams and get a first taste of what it takes to start my own company. Personal development, entrepreneurship and growth is my true passion and it has been a blessing to work with those things full time. It was a gamble to take on this project on my own, but it paid of tenfold in experience and achievements. Mistakes were made, but each mistake gave me new knowledge and it helped me grow as a person.

This thesis project would not have been possible without the support, faith, and guidance of my supervisor Lars Almefelt. Thank you for picking up your phone in the middle of the summer to hear my ideas and visions, and thank you for believing in to me explore those ideas. To Johan Bunse, who has given me advice and support both in my career and personal life, thank you for all the encouragement and opportunities you have given me. I would like to devote a thank you to Bengt Nilsson for all the knowledge and insight in what it takes to run a business, thank you for the guidance throughout this project. I give my greatest gratitude to both Johan and Bengt for believing in me, and letting me develop this business idea. Thank you for always pushing me in the right direction, but also giving me the freedom to manage this project on my own.

I would like to express my most profound gratitude to all my friends and family. Thank you for putting up with my obsession of personal development and entrepreneurship, thank you for being there when I need you. My childhood friend and hero Gustav Hägneby, every time we speak I learn something new. Thank you for traveling besides me on this journey and never being further than a phone call away.

Lastly, thank you to the 'Lamera Team' whom I started this project with. I've never experiences so much stress as during those last project weeks, but I would lie if I said we did not have a good time. Thank you to Erik Folke, Clare Harrison, Martin Hill, Karl-Johan Holm, Marius Johr, David Paul and Varun Radhakrishnan Hariharan. Without you, none of this would have been possible.

Viktor Johansson
Gothenburg, June 18, 2019

Abstract

During the 2017/ 2018 semester, the product development project 'Lamera Housing Project' was performed at Chalmers University of Technology in Gothenburg, Sweden. The goal of the project was to explore the product idea of a self-bearing construction exclusively made out of Hybrix ™, a sandwich structured lightweight material developed by the Swedish company Lamera. The self-bearing construction was intended to be used as a shelter for emergency relieving situations.

This thesis project was a continuation of that development project, to continue developing the product concept and develop a start-up company around it. This also included a literature study to explore the specific topic of *Product Development Strategies and Business Development Management in Start-Up Companies*. Three objectives were defined for the project, (1) distinguish the product development strategies and business development management making start-up companies successful, (2) develop a start-up company around the idea of a self-bearing construction to be used in emergency relieving situations, and (3) realize the product idea of the self-bearing construction.

The literature study resulted in the creation of a theory that business development management should be aimed towards investing in the personal traits of the entrepreneur, such as the ability to handle success, ability to recognize opportunity, ability to take on challenges, learn from mistakes and have a good perseverance and determination. That theory also included that the human capital and social capital of the entrepreneur should be focused on through the business development management. The social capital provides knowledge through relationships with potential partners, suppliers, customers. The human capital implies the experience, knowledge and capacities of the entrepreneur. It also was found that a start-up company should aim its product development strategies towards innovation and growth. Since it lies in the nature of start-up companies to be innovative, and they share the common goal of growing.

Objective 2 and 3, regarding the development of the self-bearing construction and a business around it, were considered fulfilled. Objective 1 was not fulfilled in the sense that specific product development strategies and business development management in successful start-up companies were identified. Either way, the theory regarding what those operations should be focused towards provided interesting knowledge on the nature of start-up success and entrepreneurship.

Keywords: Entrepreneurship, Start-Up, Product Development, Business Development, Strategy, Management, New Venture, Innovation

Contents

1

Introduction

This chapter is an introduction to the project, giving information about the background and how the project was derived. The study questions are based upon certain theory which is presented in section 1.2, labeled Theory of Particular Interest. The project purpose, objectives, study questions and study objects are presented in this chapter.

1.1 Project Background

This section is included to give insight in how the project came to be and the background of the product idea. The settings in which the project takes place is presented to give an overview of the conditions surrounding the project.

The Lamera Housing Project - How did it all start?

During the 2017/ 2018 semester, the product development project 'Lamera Housing Project' was performed at Chalmers University of Technology in Gothenburg, Sweden. This development project was initiated and brought to Chalmers by two actors collaborating to explore a product idea. One actor was the Swedish company Lamera AB, who are specializing in material technology and distribute their trademarked material Hybrix ^{TM}. The other was a private actor with ties to Lamera, whom had been the first person to articulate the product idea.

Once the project was brought to Chalmers, a team of eight students were assigned to explore the product idea and develop a product concept. The project proved successful and resulted in a product concept which was realized through a full scale prototype, see fig. 1.3. The Lamera Housing Project was finalized and terminated during the spring of 2018.

The Product - What was the product idea and where did it come from?

By the end of 2016, the amount of people under UNHCR (United Nations High Commissioner for Refugees) mandate living in refugee-like situations had risen to more than 16 million (UNHCR, 2016). In Turkey alone has the present population of refugees reached 4 million people, making Turkey the largest host for refugees in the world. However, only 5% of that population are provided with direct access to basic facilities and shelters. The remaining 95% (equivalent to 3'750'000 people) are forced to struggle outside of the camps with no real sheltering (European Commission, 2019). The same situation could be observed in Nyarugusu, Tanzania where 18'000 new shelters were planned to be built by the end of 2017, this build would only cover 38% of the need as another 30'550 shelters were required (European Commission, 2019). People living in these camps describe the shelters as unsafe with little comfort, privacy and security. Diseases are spreading quickly and better conditions are required to improve the standards for the people living in forced displacement. A collective illustration of forcibly displaced people is presented in fig. 1.1. The numbers were updated in June 2018.

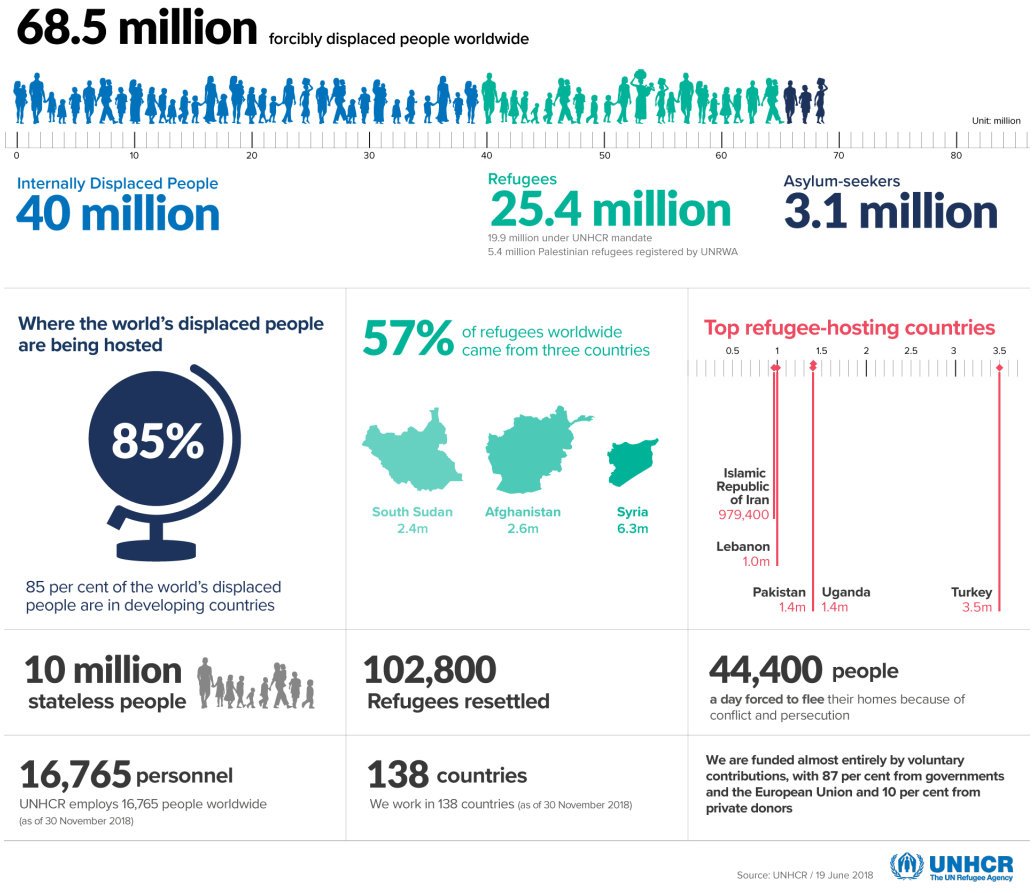


Figure 1.1: UNHCR Statistics

The initial product idea was born out of statistics and examples like this. There is a need for modular lightweight emergency shelters that could easily be transported to the remote refugee camps, and easily be assembled to quickly provide safety for the people in those camps.

The idea was to design such a shelter exclusively made out of Hybrix ™, a material made by Lamera AB. By utilizing the properties of Hybrix ™, the shelter could be designed around the principle of excluding a separate frame structure and instead be supported by integrated beams in the panels. The benefits was to minimize the amount of components, lowering the overall weight and making the full production and distribution process more efficient, while still offering a shelter with structural robustness and weather resistance.

Hybrix ™is a sandwich structured material composing of three layers. Two layers of aluminum, separated by a layer of microscopic fibres. This composition can provide up to 75% weight reduction while still offering a preserved bending stiffness as compared with the equivalent sheet metal. These properties made it possible to develop a shelter that was both light and strong. The structure of Hybrix ™can be seen in fig. 1.2.

Figure 1.2: Hybrix Sandwich Structure

In camps like the ones in Turkey and Nyarugusu, is it often not allowed to build permanent buildings since the displacements are determined to only be temporary. However, it is not unusual that people stay for many years due to wars and uncertainties in their home countries. The average stay for a refugee in a camp is 12 years (Mcclelland, 2014). This creates the need for shelters that are both easy to acquire and assemble, and durable enough to last for the entire stay.

The product idea of a modular lightweight emergency shelter was developed throughout the Lamera Housing Project, and resulted in a concept of a self-bearing construction entirely made out of Hybrix ™. The properties of this shelter are defined in table 1.1 and a picture of the prototype can be seen in fig. 1.3.

Figure 1.3: Prototype - Lamera Housing Project.

As mentioned, the benefits of this shelter was the low overall weight, structural robustness, fast assembly and modularity. These were all important criteria to fulfill in emergency relieving situations according to the Sphere Handbook, a collection of standards in humanitarian response that was used to establish product requirements during the Lamera Housing Project.

Snowload resistance	Withstand minimum snowload of 10 kg/m^2
Packing efficiency	96 units could be packed in two 40ft containers
Weight	162 kg per unit
Assembly time	Approximately 2 hours by 4 persons
Floor area	17.5 m^2
Roof height at highest point	2 m
Fire classification	EU standard EN 13501-1

Table 1.1: Product Concept Properties

This thesis project will explore further areas of usage for the product, and the product will such henceforth be refereed to as 'the self-bearing construction' and not be defined strictly as an emergency shelter.

Thesis Work Initiative - How did this thesis work came to be?

After the conclusion of the Lamera Housing Project there was no definite plan for the continuation of the project and the business idea. The product concept was proved successful, but was still in need of further development, and a business model had to be designed in order to commercialize the product. This thesis work was initiated to continue that development of the product and develop a start-up company around it. Parallel to that, the thesis work was formulated to include a study about entrepreneurship and start-up companies.

Settings - What are the conditions surrounding the thesis project?

This thesis work is performed in collaboration with the original private actor and Lamera AB. It is however an independent project and it is not performed for any individual company. The author of this report will not receive any compensation for this thesis work. The formulation of questions, project aim, project structure, methodology and planning are all defined and managed by the author of this thesis.

Study Background - Entrepreneurial Research

In this sub-section, the background of the research topic of entrepreneurship is presented. This research topic regards one of three objectives defined in section 1.3. Start-up companies are often seen as organizations with a possibility of fast growth and scalability (Santisteban and Mauricio, 2017b), and are often recognized for their contribution to economical stability and growth, and creation of jobs (Sulayman, 2014; Hormiga et al., 2011). The systematic research of start-up success factors begun during the 1980s (March-Chorda, 2004), and between year 2000-2010 that research topic experienced the most substantial growth of the decade (Vesper, 2010; Gartner, 2007; Busenitz et al., 2003). From 2010 there has also been a significant increase in the number of articles released on critical success factors in start-up companies (Santisteban and Mauricio, 2017b).

Despite of that increase there are still aspects of entrepreneurship and start-up companies that are considered under-represented (Drnovšek et al., 2010) and it is a complex topic in which researchers base their work on own interpretations. Success, entrepreneurship and start-up companies are all concepts that are widely defined differently, depending on who you're asking. This is used as motivation when initiating the study on entrepreneurship and start-up companies, as defined in section 1.3.

1.2 Theory of Particular Interest

This section introduce certain theory which creates an understanding for the research questions and objectives defined in section 1.3 and section 1.4. This theory regards the distinction between development strategies and development management.

As mentioned in section 1.1, the further development of the self-bearing construction is combined with research on the topic of entrepreneurship and success in start-up companies. To understand the research questions and objectives it is important to distinguish the difference between development *strategies* and development *management*. Generally, the strategy of an operation can be considered the long-term vision that guides the day-to-day activities, or management, of that operation. A strategy is:

> *...the direction and scope of an organisation over the long term.*
>
> *Johnson et al. (2014)*

The management of an operation goes more into detail and handles tangible activities as compared to the strategy which is more abstract and general, fig. 1.4 illustrates the differences between the characteristics of management and strategy.

Figure 1.4: Characteristics of Management and Strategy

This is a general summation of what a strategy is, and what management implies, but it gives perspective on how the two terms are related in a business context. However, the content of 'product development' and 'business development' can vary a lot depending on the context, this is further discussed in chapter 2 to give understanding of the research.

1.3 Project Purpose and Objectives

In this section the project purpose and objectives are presented. A comprehensive figure is included to give a better overview of the project.

The purpose of this project is to explore the nature of entrepreneurship and start-up companies, and to distinguish what it takes to make a start-up company successful while realizing the product idea of a self-bearing construction which a start-up company will be built around.

In working with regard to this purpose, three objectives are defined to guide the project forward.

1. Distinguish the product development strategies and business development management in start-up companies making them successful.

2. Design and build a company whose business is the distribution of self-bearing constructions as the product is described in section 1.1.

3. Realize the product idea described in section 1.1 and have it fulfilling customer requirements.

These three objectives can be categorized into two fields which define the thesis work; a research field and a development field. This categorization, together with the project propose are illustrated in fig. 1.5. Notice that the abbreviations PD (Product Development) and BD (Business Development) are used, this is done to fit the text in the figure.

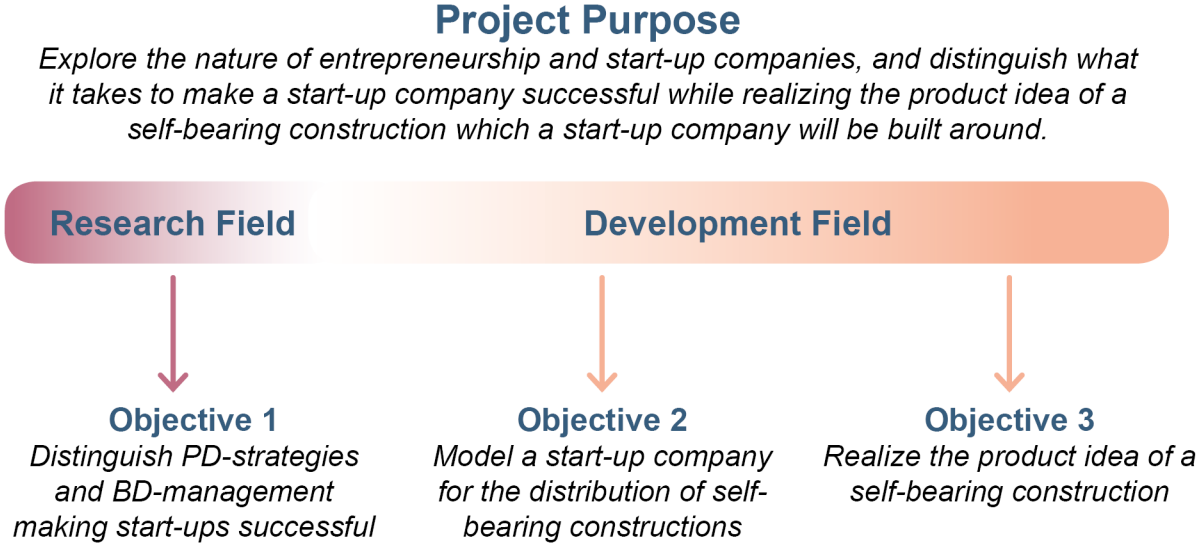


Figure 1.5: Project Categorization

1.4 Formulation of Questions and Study Objects

In this section the research questions and study objects are defined. In fulfilling objective 1 and living up the the project purpose, these research questions are to be answered and the study objects analysed.

The research questions for this thesis project are presented in table 1.2. The selection process used to define these questions is presented in section 3.1.

Table 1.2: Research Questions

Research Questions 1	In terms of size, structure and organization; what is defined as a 'start-up company' - and how is product and business development affected by the characteristics of a start-up company? E.g. industries, offerings and size.
Research Question 2	Based on the success stories from different start-up companies, how are product development strategies structured in terms of content, time-span, implementation and execution in those companies, and how does this relate to the existing theory?
Research Question 3	Based on the success stories from different start-up companies, which are the methods used for managing business development in those companies, and how is this management structured and handled continually? How does this relate to the existing theory?
Research Question 4	How is business development and product development related? Both directly and through other organizational elements?
Research Question 5	How are product development strategies and business development management affecting the environmental and ethical considerations in a start-up company?

The study objects are the elements which are being observed in trying to answer the study questions. The research objects should not be confused with the research questions or the project objectives. For example, objective 3 regards the realization of the self-bearing construction previously described, but this product is not a study object and will not be examined in a scientific way. The study objects are presented in fig. 1.6.

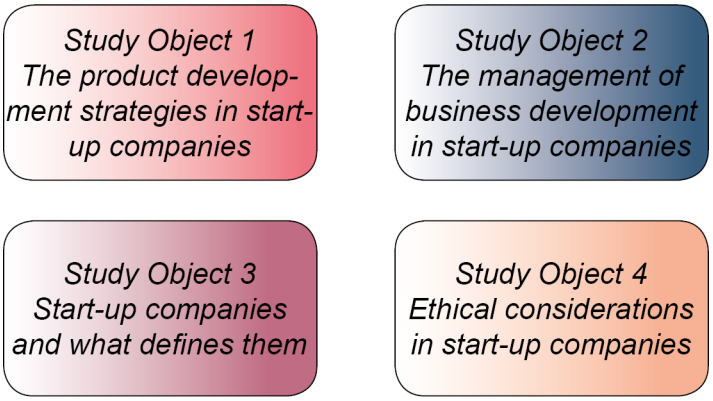


Figure 1.6: Research Study Objects

2

Study Approach and Associated Theory

An approach is not the same as a method. A method is a specific way of doing a particular type of task, e.g collecting data. An approach is rather the direction and considerations taken while defining a project. By understanding the approach, and the theory associated with it, it will be easier to comprehend how the project is planned and structured. The approach and theory presented in this chapter relates to different parts of the project. Every section is introduced with an ingress and figures showing which area of the project that section regards. This same type of structure will be used throughout the report.

This chapter is divided into three parts. The first part, section 2.1, gives an understanding of the approach of researching product and business development. The second part, section 2.2 - section 2.3 , focuses on the development of the self-bearing construction and the start-up company around it. The third part, section 2.4 - section 2.6, covers concepts used to motivate decision making in the project.

2.1 Specific Theories in Research

In this section, questions such as: 'What is business development?' and 'What defines success?' are discussed to give foundation for the process of answering the research questions defined in section 1.4

When studying e.g. success in product development, one might come to pose further questions of how success is defined, or what product development strategies consist of? The reason for these questions to arise is that all literature might not speak about 'product development strategies' per se, but maybe about product innovation or customer focus. Which could be considered elements of a product development strategy by some, and not by others. In other words, there is no universal accepted definition of e.g. 'product development strategy' or 'success' that a researcher could, or should, define their study after. An example of this is described by Eppinger and Ulrich (1995) who defines different strategic approaches to guide which products and opportunities to pursue.

By focusing on basic R&D of new technologies and implementing those technologies through product development, a business applies a 'technology leadership' strategy. By collaborating closely with customers to assess their needs and preferences, the business applies a 'customer focused' strategy (Eppinger and Ulrich, 1995). This shows how certain theory could come across as elements of product development strategies, though not labeled as such. The strategies just mentioned are labeled as *Competitive Strategies*.

Another dilemma is to decide which definition to use for certain phrases, such as 'success'. March-Chordà (2004) define success for start-up companies accordingly:

> *Success is defined by the number of jobs the company has generated*
>
> *March-Chordà (2004)*

By this definition, start-up success has a direct link to the quantity of jobs the company has generated, and so excluding other theories and definitions. Such as Sulayman (2014), who express start-up success to be *something that truly contributes to improving the life of others*. In a systematic literature review of critical success factors, Santisteban and Mauricio (2017a) reviews 74 primary studies to answer, among other questions, what success is for start-up companies. It is observed that no definite definition of start-up success exists, but there are two common factors for most definitions: company growth and number of jobs generated. The growth of a company is a validation that the offering is received well by its customers, and the creation of jobs is linked to the growth of the company. After this conclusion Santisteban and Mauricio (2017a) continue to make their own definition of success:

> *A successful startup is considered a new company that offers products and/or services capable of being well recieved in the market, looking for a repeatable, profitable and scalable business model, generating jobs or manage to transform the way people do things*
>
> *(Santisteban and Mauricio, 2017a)*

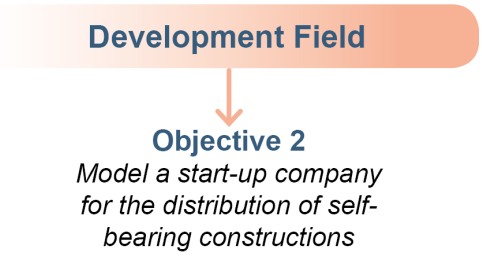
This is included to give some examples of what 'success' can be in a start-up company. No definition of success is more right than the other, and it really depends on the ambitions and motivations of the entrepreneur. Some people value money, some value knowledge, and some value sustainability.

These examples illustrates a predicament about which theory to consider and which theory to disregard in a study. What definitions of success should be included and which should not? One way to handle this dilemma is to make clear delimitations to each subject in the study, so that definitions of success, product development, etc. are specified. In other words, stick to one specific definition of success and only look for theory that corresponds to that definition. The other option is to to leave the questions open and allow for different definitions to be included and reflected upon throughout the study.

The approach taken in this project is the later mentioned. Rather than filtering data based upon pre-determined definitions of e.g. success and product development, all type of data will be considered and reflected upon. This regards all subjects covered in the study questions, section 1.4. Notice however that 'success' is not a study object, but still an element of the research questions which needs to be covered.

2.2 Developing the Self-Bearing Construction

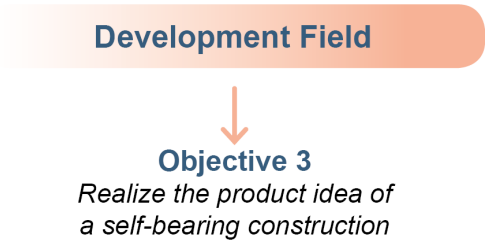
Objective 3 is to realize the product idea of a self bearing construction, and is categorized into the development field. This section present the approach to continue the development of that construction and how it relates to the developing of a start-up company.



As mentioned in section 1.1, after the conclusion of the Lamera Housing Project the construction was still in need of further development for the product idea to be realized. Up to that point the construction had been developed to fulfill requirements from the Sphere Handbook, Sphere (2011), to make the it adaptable for emergency relieving situations. In this thesis project the aim is till to develop the construction to be used for emergency relieving situations, and improve the life of forcibly displaced people. The approach however will include looking at other markets and aiming to introduce the product at those markets first, to test the product. This will bring in a new set of customer requirements which can generate new ideas and inspiration to how the construction can be re-designed.It will also give the start-up company time to mature and grow, and hopefully generate profits that can be re-invested into the R&D of the product.

2.3 Developing a Start-Up Company

This section presents the approach towards developing a start-up company as defined in Objective 2, part of the development field of the project. The exact methods used while designing the start-up company are presented in chapter 3.



The approach for both the product and business development in this project is generic and is capable to adapt accordingly to the changing needs that comes with developing a new company. This section was included to highlight that the business development effort will not follow a normalized method with strict activities. But rather a general process that is flexible and can be customized after the specific project needs. In the book *Business model generation: a handbook for visionaries, game changers, and challengers* Osterwalder and Pigneur (2010) ties together the business model canvas, a common tool for business model development, with other tools and concepts to form a generic business design process consisting of five phases: mobilize, understand, design, implement and manage. The approach in this project is to follow those five phases and take inspiration from the theory it is based on. The process is explained more in chapter 3.

2.4 The Research Paradigm

The methodology and study approach adopted in this project are influenced by something referred to as 'the research paradigm', a philosophical concept predicated of the two teachings; ontology and epistemology. This section is included to motivate decision making and use of certain methods in the project. This part concerns all of the objectives.

Every method used, every approach adopted and essentially every decision made throughout this thesis project needs to be justified in order to prove a level of originality or use of own ideas. In this project, the ontological and epistemological positions are used as justifications for the methods chosen to observe the study objects. This section presents a review of the theory behind the research paradigm and the influence it has on research. Alan Bryman defines a paradigm as:

> *A cluster of beliefs and dictates for which scientists in a particular discipline influence what should be studied, how research should be done, [and] how results should be interpreted*
>
> *Bryman (1998)*

What can be interpreted from this is that all scientists are influenced by their own beliefs and philosophies, which in turn will affect their research. It is close to unavoidable to conduct research completely unbiased, but the importance lies in recognising one's own bias in order to foresee its effect on the research and discuss its significance. The research paradigm dictates around two philosophical teachings, ontology and epistemology. Åsberg (1998) defines the following questions as a way to identify ones own beliefs and view on reality (ones ontological position).

What is being taken for granted?

Is it necessary to problematize existing 'non-problematic starting-points'?

Ontology is the teaching of existence, or 'being'. Seemingly very abstract, but still important to consider in research. The ontological position is based on a predetermined view of the characteristics of subsistence that determines a frame inside which knowledge is created. Put more simply, the ontological position defines how reality is viewed. When this view of reality if established, knowledge can be created within that reality. Which leads to the definition of epistemology, the teaching of knowledge (Hillerbrand, 1988). The epistemological position becomes relevant for research when questioning what is regarded as acceptable knowledge (Bell et al., 2011). For example, what definitions of 'success' will be regarded as knowledge. This influence the choice of methods to apply in a study. These concepts are well established and frequently discussed within classic philosophy. But as mentioned, also critical in research.

When not considering these philosophical concepts and rather applying strategies and methodologies without conducting debates whether those methodologies are best suited, a study risks producing results of lower quality. Also, the result of that study could have become significantly different had the researcher considered their ontological and epistemological view, or lack of view. Åsberg (1998) argues that it is misguided to begin a study by distinguishing what methods to use before identifying the ontological and epistemological position and then claim the study to have scientific affiliation. Åsberg (1998) illustrates the process of defining methods for a study as fig. 2.1

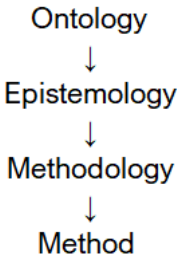


Figure 2.1: Method Derivation Process

To give further clarification to how these philosophical concepts relate to research, a made up scenario is presented in the text-box below.

> John is working as a consultant, his current mission is to improve the communication processes within the firm 'Innovation Inc'. John lays down a plan to how Innovation Inc can improve on their communication through the use of certain standardized methods. Innovation Inc carefully follows the plan John has written. However, when the project ends they come to the horrible realization that the communication has become even worse. What happened?
>
> John has failed to realize that he is taking for granted the structure within Innovation Inc to be formalized and existing as its own being, meaning John believes that all social entities are objective. By not recognizing his own bias, he was not able to question its significance and problematize it. In other words, John did not explore and question his ontological perspective to how the company is existing. Neither did John define what 'knowledge' meant for his scenario, leading him to pick unsuitable methods.
> Had instead John analysed the ontology of Innovation Inc, he would have realized that the company is created by social entities and cultures, created by individuals. The reality of the company is not normative but rather formed by the empiry of the people working there. Knowledge within Innovation Inc does not consist of standardized elements which correlates exactly to a standardized method. Knowledge is rational (it cannot be observed) and created through empiry (experience) of employees. This mistake led John to think he was producing quality, when in reality his entire project was misaligned.

Following are the ontological and epistemological positions for this project defined:

For study objects 1 and 2 defined in fig. 1.6 (product development strategies, and business development management in start-up companies) the ontological position taken reviews that a start-up company is constructed of both tangible and intangible elements. The tangible elements are in its nature concrete and contains knowledge that could be quantifiable. The intangible elements are based on visions and purposes through which knowledge is general and subjective. table 2.1 exemplifies both types of elements and the knowledge within it.

Table 2.1: Tangible and Intangible Elements in a Start-Up Company

Tangible	Intangible
Financial statements and budgets	Purpose and visions
Organizational titles	Unique personalities
Physical assets	Personal skills

This point of view offers two sides of defining knowledge. Knowledge can either be something quantifiable and concrete, or something abstract and intangible. Since the research questions are aimed towards product development strategies and business development management, in other words very tangible operations inside the company, knowledge will be considered as something quantifiable and concrete. Some researchers would call the methods suitable for this type of knowledge as 'quantitative methods' Bryman (1998). A quick way of collecting and interpreting data is through a literature study, which will be the method used in this project. The literature study is further elaborated in chapter 3.

As mentioned, this can be seemingly abstract and more so if the philosophical concepts of different opinions are included, which is why none of those concepts will be presented in detail. However, to show that those concepts have been explored and considered a short presentation of them is included below.

The tangible elements could, simply put, be considered part of a *Materialistic* point of view. Materialism claims that everything which exists is of physical, material and objective nature, and so reality exists independently of human consciousness. One step further would be to categorize the tangible elements to *Positivism*, that which can be observed and measured. The intangible elements are of *Idealistic* nature since they are considered in a perceivable, mental or spiritual reality. Here knowledge is something that originates from *Empiry* (experience) and visions.

2.5 Empirical Data and Theory

To understand the method used while fulfilling Objective 1 it is necessary to also understand whether the project has its foothold in theory or empirical data. This section distinguish the difference between the two, and their relationship to 'the research cycle'. The two phrases are defined accordingly:

Empirical - Based on, concerned with, or verifiable by observation or experience rather than theory or pure logic.

Theory - A coherent group of tested general propositions, commonly regarded as correct, that can be used as principles of explanation and prediction for a class of phenomena.

It is interesting to consider these concepts in research, because it tells what the input and output of the project is. Whether the study is based on, and aimed to produce, empirical data or theory. Research goes through cycles, when a hypothesis has been empirically tested for a certain period of time, it transforms it into theory. But sooner or later this theory will be challenged to once again go through empirical testing and research. This process is natural, and it proves that science and research are progressing.

When conducting research, it is important to consider where in this cycle the study has its foothold. In other words:

1. Question if the study is aimed to produce results based on empirical data or on existing theories.

2. Identify what type of output is being created. Is the output new theories, or a summation of that which has been observed (empirical data)?

A study rarely depends on just empirical data or just existing theories, but rather a mix the two, as is the case for this project. Objective 1 regards identifying product development strategies and business development management in successful start-up companies. This research is based on other researcher's theories and empirical testing. Notice how research questions 2 and 3 in section 1.4 are defined: *based on the success stories from different start-up companies.* This formulation is selected to state that the research is based on empirical data, or in the experience of successful start-up companies. Research question 2 and 3 also state: '*How does this relate to the existing theory?*', which implies the consideration of existing theory on the research topic. The output of the research is considered to become theory.

Objective 2 and 3 regards the practical development of a product and a start-up company, and analysis is done based on the execution of this development. In other words, the input is empiry and the analysis will result in empirical data.

2.6 Quality of Research

The quality of research in a project can be very different depending on the researchers and the nature of the project. It is important to define for oneself, and for others observing the project, what is considered as 'quality'. By doing so, it becomes easier to get an overview of the project and examine if the project is going in the right direction. This section presents theory about 'quality of research' and a statement to how quality is regarded in this project.

All types of studies are taking place under different circumstances, the view on quality in a specific study is often depicted through the project purpose and the visions of the researcher. It is important to clarify for oneself how 'quality' is being viewed in order to evaluate if the chosen methodologies are capable to produce that quality. Oancea (2011) points out that poor quality in research is often recognized by the misalignment's of research questions, techniques and aims, and methodological oversights. In other words, poor quality can be identified through a poor methodology. Which, according to Åsberg (1998) can be the result of starting in the wrong end of fig. 2.1.

This project is an academic work, and should be approached as such by outputting scientifically contributing results. The specific purpose of this project is to explore the nature of entrepreneurship and distinguish what it takes to make start-up companies successful, which is why the project results needs to be reliable and externally valid. What that implies is explained further below. A personal purpose of the author is to execute the project based on the use of own ideas. This is summarized into 3 factors that determine the quality of research for this project:

The quality of the project results are evaluated based on:

1. The result's scientific contribution

2. The reliability and external validity of the results

3. The use of own ideas and visions during the project execution

It is not sufficient to only state how quality is regarded in the project. There must be a way to control and verify whether that quality has been achieved. Firstly, the concepts of reliability and external validity needs to be expanded upon. There are four common criteria in quality of research, those are reliability, replication, validity and trustworthiness. Validity can be divided into two, internal and external validity. External validity regards whether the results can be generalized beyond the specific research context, and reliability regards whether the results are repeatable/ if the measures are consistent (Alänge, 2018). If the results can be generalized for more than one context, and if the same results are repeatable, they can be considered of high quality, according to the definition of quality in this project. That however would require further research and long-term verification. This is discussed further in chapter 5.

Regarding the criteria of being scientifically contributing, many would claim that the criteria is the use of scientific methods. That of course leads to the question, 'what is regarded as scientific methods?'. Rather, in this study transparency is the key to whether results are scientifically contributing or not. Instead of having a threshold above which everything is considered scientifically contributing, as long as the study is executed with full transparency the weakness of certain results can be identified and developed by other researchers. Thus being scientifically contributing. Whether the project is based on the use of own ideas can only by evaluated by the author. Summarized, the quality is evaluated and verified, through the answering the questions below. The answer to these questions are discussed in chapter 5.

1. Can the results be generalized outside of this project?

2. Are the results repeatable?

3. Is the project executed with the highest transparency possible?

4. Was this project formed and executed based on, and through the use of own ideas?

3

Methodology

This chapter presents the methodology used in this project, and how those methods were derived. Particular theory associated with each method is included to create a better understanding of the process.

3.1 Literature Study and Method Derivation

This section presents the literature study used to fulfill objective 1, and how that study process was derived. It also presents theory regarding how literature studies usually are applied.

Commonly, a literature review is performed to establish what is already known in a research area, and used to motivate research questions and build the research design (Bell et al., 2011). In this project, the literature study was used as a way of collecting data, establishing what is known, and forming new theories. This method was chosen through the identification of how knowledge is regarded in the research topic. The literature research was divided into three phases that are presented in table 3.1. Each phase is followed up throughout this section.

Table 3.1: Literature Search Phases

1. **Phase 1 - Search strategy** Define a search strategy consisting of keywords and search terms which are used to structure the literature list
2. **Phase 2 - Produce the literature list** Use the search terms to find relevant literature, and create a list to read and analyze in the study
3. **Phase 3 - Execution** Read and interpret the literature, try to find patterns and create theories based on the findings.

Phase 1 - Search Strategy
The search strategy was used as guidance when structuring and preparing the literature study. The search strategy had to be comprehensive enough to cover all that was necessary to achieve the project objectives, whilst not being to extensive. For this project, the search strategy was influenced by a six steps process defined by the University Libraries at the University of West Florida (2018), a comprehensive guide of conducting literature research by the Irish Governmental Department of Health (2013), a summary of research strategies by the University of Leeds (2019), and Bell et al. (2011). These sources were used because of their collective ability to capture that of a search strategy which was determined sufficient to answer the research questions and achieve the project objectives. The processes suggested by each source can be found in appendix C. A detailed methods analysis should have been performed in order to create real quality of research. However, this was not done in keeping the study from becoming to extensive. The search strategy was formulated as a six steps process based on the sources mentioned. These six steps and the information created in each step are presented below.

Step 1 - Define research topic and questions
Defining a general research topic and identifying which aspects of that topic are of interest will guide the literature study. In this project, the research topic was *Entrepreneurship and Start-Up Companies*. The specific aspect of that topic was *Product Development Strategies and Business Development Management in Start-Up Companies*, as defined in section 1.3. When defining the research questions, the first step was to generate as many questions as possible and put these questions through an evaluation process. This increased the possibility to come up with suitable research questions. A grand total of 40 research questions were formulated and put through the evaluation criteria and evaluation questions defined in table 3.2 and table 3.3. The 40 research questions can be seen in appendix A.

Table 3.2: Evaluation Questions

Ask the following:
Are two questions asking for the same thing?
Can two questions be formulated into one question?
Does any question fall outside of the project scope?
Can a question be removed because it does not fulfill evaluation criteria?

Table 3.3: Evaluation Criteria

The research questions should:
Be clear and understandable
Be researchable
Relate to each other
Contribute to the research topic
Relate to the established theory
Not be too wide nor too narrow

After going through the evaluation process, a definite set of research questions remained. These are the questions defined in section 1.4.

Step 2 - Define the scope of the study
The scope of the study included defining what type of data and how much data to analyze in this study, the type of data included was mainly articles on the research topic. Articles are often easy to comprehend and provide a good overview of the results and conclusions. The amount of articles to study was not determined beforehand since it was hard to justify a specific quantity. Instead, it was determined more efficient to let the study run its course and create conclusions when the results were considered reliable. The research questions regards start-up companies in all industries and markets, this is further discussed in chapter 5. In defining the scope of the study it was included to define a time plan for the study. A comprehensive Gantt schedule was created for the entire project and deadlines were defined specifically for each objective using backwards design planning. This method was done by firstly defining the final objectives and then move 'backwards' in time and question 'what is required to fulfill this objective?' which gave information about the step before the final objective, and so on. This method helped foreseeing all the activities which were required during the project, and from that establish the time schedule. This same method was used for all three objectives in the project. The major deadlines/ milestones for the literature study are presented in table 3.4.

Table 3.4: Milestones Literature Study

Date	Goal/ Objective	Notes
8/06/2019	Achieve the objective of distinguishing the PD-strategies and BD-management in start-up companies making them successful	The end goal is to fulfil the objective
17/05/2019	Finish all conclusions and discussions for the literature research	Have the literature study done three weeks before the end date
20/04/2019	Finish the analysis of the literature	Analyse relationships and find patterns in the literature
04/04/2019	Finish the reading	All the reading needs to be done and ready for processing
17/03/2019	Establish the reading list	Define the exact list of literature that is to be read in the study
17/02/2019	Define the search strategy	Define the keywords that will be used to search literature

Step 3 - Develop keywords and exact phases
Keyword searches were used to find the search term in the title and abstract of the literature. It was also beneficial to use synonyms to increase the chances of getting results. Keywords and exact phases were derived by brainstorming words related to the research topic, and finding synonyms to those words. The keywords and exact phases that were defined are presented table 3.5 and table 3.6

Table 3.5: Exact phrases

Business Development Management
Product Development Strategies
Start-up companies
Small business
Ethical considerations
Environmental considerations
Operations Management

Table 3.6: Keywords and Synonyms

Entrepreneur, manager, promoter, administrator
Success, achievement, accomplishment, realization, profit
Management, governance, operations, control, handle
Ethical, honest
Environmental, climate, atmosphere, ecosystem
Strategy, vision, purpose

Step 4 - Develop truncation terms
Truncation means to use the built-in tool of search engines to find variations of search terms, it is usually done by typing an asterisk (*) after the search term. By typing, for example, manage* into a search engine, the output will include manage, manager and management. The truncation terms used in this study were: Manage* , environment*, success*, startup*, business development* and product development*

Step 5 - Choose which database(s) to use
It is good to use multiple databases through which the literature search is conducted. Different databases can provide different results for the same search. However, instead of using a specific set of databases in this project, the Chalmers Library search engine was used, which gives access to a wide range of databases and sources.

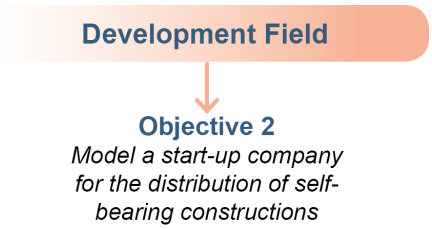
Step 6 - Design a means of recording
Having a way of recording the searches, findings and notes helped to synthesize the results in the project, and it gave an overview of what had been done on the research topic. A reading log was used to keep track of the search specification including search date, the database, keywords used and the results of that search. Then a separate document was used for taking reading notes and drawing up a mind-map of the results and ideas that came from analyzing the literature

Phase 2 - Produce the reading list
The plan was initially to produce a reading list based only on the searches of keywords and exact phrases. However, many of the articles contained interesting references and sources that were added to the reading list as well. Meaning that it was an iterative process, where reading and searching for new data was done in parallel. In a way, the reading list was not completely finalized until the project was. This proved to be an efficient method, even if that was not the initial plan. The finalized reading list contained 15 articles spanning between the years 1998-2019. The full reading list can be found in appendix B,

Phase 3 - Execution
The last phase was to read all the literature and bring together the results to make conclusions. This process is called 'meta-ethnography' by Bell et al. (2011). Since new articles were being added to the reading list progressively, the analysis was performed in a general way where correlations and patterns were analysed in the literature, and theories was created based on those correlations.

3.2 Start-Up Company Development

This section regards the development of the start-up company defined in objective 2. The process used for developing the start-up company is presented in this section, together with how business model prototypes were created in a customized template.



As previously mentioned, the development of the start-up company was done accordingly to a five stage process created by Osterwalder and Pigneur (2010). This process is a composition of tools and concepts presented in the book *Business model generation: a handbook for visionaries, game changers, and challengers*, including the business model canvas. During this thesis project, stage 2 and 3 were the main focus points as stage 1 had somewhat been completed during the Lamera Housing Project, and stage 4 was just getting initiated as the thesis project was being finalized. The development process was generic and allowed for modification to fit the specific situation, which was important for this project. The business model development process is presented below together with how it was adapted and applied.

Stage 1 - Mobilize
The first stage in designing a business model was the preparations, or as Osterwalder and Pigneur (2010) calls it 'Setting the stage'. Four main activities were in focus during the first stage:

- Define project objectives
- Test preliminary business idea
- Plan
- Assemble team (the right type of team is a critical success factor)

As mentioned earlier, when this thesis project was started some of the stages had already been initiated and the mobilization of the project was somewhat completed. A team was formed, consisting of the original actors and the author of this thesis. The objective for the product idea was already defined, the objective was to realize the product idea of a self-bearing construction to be used in emergency relieving situations. The product concept had been tested with the prototype in the Lamera Housing Project. The only activity which was not completed was the planning of the business development, this was done during the first few weeks of the thesis work.

The same backwards design planning that was used for the literature study was also used in developing the start-up company. The main deadlines/ milestones defined for the business development are presented in table 3.7.

Table 3.7: Milestones Business Development

Date	Goal/ Objective	Notes
8/06/2019	Achieve the objective of developing a start-up company whose business is the distribution of self-bearing constructions as the product is described in section 1.1	The end goal is to fulfil the objective
25/05/2019	Select the business model for the company, and be in a state ready for Stage 4 Implementation	The business model is set to be finalized two weeks before the project termination
13/04/2019	Have the business model prototypes ready and continue developing the best one	Defined as 'Stage 3 Design'. It is beneficial to have different business models created for different situations and scenarios
26/04/2019	Summarize market and customer needs, and compile information about the environment in which the start-up will operate	Defined as 'Stage 2 Understand'. Learn about customers, environments and technology concerning the project
23/03/2019	Summarize the work already established during the project mobilization	The stage has already been set, during the Lamera Housing Project

Note how the third and fourth milestone are overlapping, this is because stage 2 and 3 in the business development process often runs parallel (Osterwalder and Pigneur, 2010).

Stage 2 - Understand
The second stage was about developing an understanding of the environment in which the business will operate. This stage consisted of the following activities:

- Scan environment
- Study potential customers
- Interview experts
- Collect ideas and opinions

During the Lamera Housing Project an interview was held with the Head of Marketing at Better Shelter, a Swedish company specializing in the manufacturing and distribution of emergency shelters. This expert interview was done to better understand the market and requirements put on the shelters used in emergency reliving situations. A focus group was also held at Restad Gård with people who had previously lived as refugees, mainly because of war and persecution, this session provided the project group with new perspectives on the product needs.

During this thesis project, focus was put especially on reviewing potential suppliers for processing the construction panels, mapping out specific areas of use, reviewing customers and creating an understanding of the business administration. The business administration, specifically the financial statement, played a key role in the direction of the start-up company since it determined inside which prices and costs the business could operate. The financial statement was also heavily dependant on product volumes and material costs, which in turn was dependant on suppliers, customers and market need (a demanding market need allows for higher selling prices and larger quantities).

Reviewing customers and suppliers was done through direct contact, which provided good insight in their needs and capacities. The financial statement was defined in a template including a profit & loss statement, cash flow analysis and a cost analysis. This template would later be used to express the full business model, this is further explained in the next sub-section.

Stage 3 - Design
The last stage that was completed during this project was the designing of a start-up company business model. A business model 'prototype' that expressed the full business model was created. It consisted statements of the value proposition, the vision and purpose of the business, the product need, the market strategy, and financial statements. All of which were derived from the analysis during the previous stage. It started with analysing the market and customer needs, which transcended into product specifications. Then different scenarios were set up where sales volume and selling price were put in relation to each other. This gave an insight regarding inside which selling volumes certain prices were profitable in relation to a specified margin. Below are questions to answer for each element in the business model.

Table 3.8: Elements of the Business Model

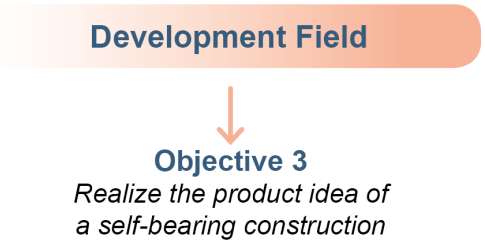
Business Model Element	Questions to Answer
Value Proposition	How does the company intend to create value for the market and for customers? How does the company intend making money while creating value?
Vision and Purpose	What is the purpose of the business and how does that transcend into a long term vision?
Market Strategy	What is the strategy for penetrating the market? What are the sales channels?
Product Need	Why is there a need for the product?
Financial Statements	How does the financial models look?

A business model consisting of these elements was used instead of the business model canvas, a tool suggested by Osterwalder and Pigneur (2010) that summarizes 9 important building blocks of a business. The reason for that was to create a business model that was customized in accordance with the context of this project. The template that was created for expressing the business model prototype is presented in chapter 4.

Stage 4 and 5- Implement and Manage
The implementation stage implies taking the chosen business model and executing a full implementation of the start-up company, and the managing stage signifies managing and optimizing that model. As this thesis project came to an end, a business model had been created and chosen. However, an actual firm had not yet been founded and such was the implementation stage not possible to be fully initiated. Parts of the implementation stage as Osterwalder and Pigneur (2010) defines it, was started during the design stage. Such as organizing legal details, setting up a budget, and attracting funding and financial support. These activities came naturally due to the state the development project was in. The implementation and management of the business model will be part of the next project stage, after the termination of this thesis project, this is further discussed in chapter 6.

3.3 Product Development

This section presents the methods used while continuing the development of the self-bearing construction, and fulfilling Objective 3. The development process did not follow a generalized method, but was rather formed around an optimization process with regards to different factors.



As this thesis project started, there was already a conception of how to product would be designed. This prevented major changes to be made, since it would affect that conception to much. Rather than going through a product development process to make break through design changes, the process became an optimization of the design. The optimization was done with regards to the market analysis, cost analysis, customer needs and production capacities. All of which affect the product design one way or another. For example, if the cost analysis proved material costs to be too high, then the design would be optimized to minimize use of material and material spill.
Or, the if the market analysis resulted in a set of new requirements, then the design would be optimized to fulfill those requirements. All of these analyses was made for multiple markets as stated in section 2.2, where the product would be introduced before entering the market for emergency shelters.

The prototype presented in fig. 1.3 was used to evaluate the current design. An overview of the product design was created by simply going over the prototype and look for details that could be improved/ optimized. A categorization of the product elements was made accordingly:

1. Structural elements - E.g improving the robustness and load capacity of the panels

2. Functional elements - E.g adding solar panels to the roof

3. Esthetical elements - E.g making the construction more esthetical

The most prioritized elements were the 'structural elements' since the product has to withstand outside forces such as wind and snow. Much of the development work was done through the use of CAD-systems. A time schedule defining all the milestones was created using the backwards design planning, see table 3.9.

Table 3.9: Milestones Product Development

Date	Goal/ Objective	Notes
8/06/2019	Achieve the objective of realizing the product idea	The end goal is to fulfil the objective
25/05/2019	Have a finalized prototype	The goal is to prove the concept with a full scale prototype
11/05/2019	Have all the panels produced and ready for processing	Processing includes bending and cutting
20/04/2019	Have a finalized product concept	Decide on a finalized concept 2 weeks before the production
13/04/2019	Make a final decision on external parts for the product concept	External parts such as fasteners, doors and windows
16/02/2019	Define concept improvements	Define what improvements are required for the product concept

As can be interpreted from the time schedule, a major aim was to create a prototype of the product concept before the project ends. This included developing the product concept and identifying what external parts were required. The external parts includes everything that needs to be bought besides the Hybrix ^{TM}, such as windows and fasteners.

4

Results

This chapter presents the results derived from applying the methods defined in chapter 3. The results are presented in the order of the three objectives and are followed up with discussions and analyses in chapter 5. There are two considerations to take before reading this chapter. Firstly, parts of the results from the product and business development will directly be used to start the company distributing the self-bearing constructions. For this reason, section 4.2 and section 4.3 are limited and does not include specific information about the business model and product design. Secondly, if was found that product development strategies and business development management in start-up companies cannot be analyzed as normalized concepts, as initially thought. This resulted in a shift of focus during the study, which left research question 5 to be unanswered.

4.1 Literature Study

This section presents the results from the literature study. This includes answering the research questions, fulfilling objective 1 and analysing each study object. The section is structured accordingly to the research questions.

It was found during the study that a business model conceptualized as a fixed structure is not suitable for start-up companies, because of the permanent flux that comes with the early development stages (Spiegel et al., 2016). A business model for a start-up company is better understood as a framework for changing elements that explain '*the rational to how an organization creates, delivers, and captures value*' (Osterwalder and Pigneur, 2010). This relates to the ontological characteristics of start-up companies, meaning practically that business models in start-up companies cannot be analyzed as its own being, but rather as something that reacts to changing environments and changing critical success factors. This is the reason why start-up companies often customize and alter their business models (Shirky, 2008; Teece, 2010; McGrath, 2010). In light of this, study objects 1 and 2 (business development management and product development strategies) could not be analysed as normalized concepts. It was found that business development management and product development strategies are determined based on general success factors in start-up companies, which is primarily related to the personal traits and assets of the entrepreneur. This is recognized in the answers of research questions 2, 3 and 4.

Research Question 1

In terms of size, structure and organization; what is defined as a 'start-up company' - and how is product and business development affected by the characteristics of a start-up company? E.g. industries, offerings and size.

There are many definitions and concepts to explain what a start up company is. Examples include that a start-up company is:

> *... a new company that is in the earliest stages of development*
>
> *Spiegel et al. (2016)*

> *... a company working to solve a problem where the solution is not obvious and success is not guaranteed.*
>
> *Robehmed (2013)*

> *... a new and temporary company that has a business model based on innovation and technology... (start-ups) have a potential for rapid growth.*
>
> *Santisteban and Mauricio (2017b)*

Instead of finding a pattern or a common denominator between definitions, a comprehensive concept of how a start-up is defined through its organization was recognized. The organization in a start-up company can be defined through (1) a structural viewpoint (Hall, 1977) which according to Parsons (1964) and Blau et al. (1966) transcends into a focus on structural attributes, and (2) a process based viewpoint. Through a mix of these McKelvey (1982) indicates that an organization is defined through:

1. The reflection of the goals of the founding entrepreneur.

2. The barriers to gain new resources

3. The start-up resources in terms of human and financial capital

4. The cycles of selling the product/ service

These elements collectively creates a definition of what a start-up company is. Firstly, as discussed in section 2.1, success in start-up companies are commonly related to the growth of the company and an increase in the number of employees. It is reasonable to assume that an overall goal for entrepreneurs is to achieve that growth. This goal is reflected in the definition of a start-up company. Practically, that could mean organizing activities that are growth seeking and preparing for future expansion.

Secondly, it seems that the barrier for start-up companies to acquire new resources is the challenge to identify new opportunities and having access to critical knowledge, which is commonly acquired through the use of social capital (Ardichvili et al., 2003; Bhagavatula et al., 2010), and human capital (Santisteban and Mauricio, 2017b; March-Chorda, 2004). It has been extensively pointed out that the social capital, or the social network of the entrepreneur, is a critical success factor for start-up companies in order to succeed (Spiegel et al., 2016; Zhao et al., 2015; Laage-Hellman et al., 2018; Hormiga et al., 2011; La Rocca et al., 2017; Dowling and Helm, 2006). The social capital provides knowledge through relationships with potential partners, suppliers, customers. It is based on the idea that a company cannot be considered an isolated system, but rather a system dependent on the relationships with the environment (ontological characteristics) (Hormiga et al., 2011). The social capital of a company provides information, resources and status benefits that helps that company to grow (Spiegel et al., 2016) and companies that does not exploit those benefits, or have access to it, will experience barriers in their ability to gain new resources. The human capital implies the experience, knowledge and capacities of people, which naturally is hard to acquire for start-up companies since a the majority begin their ventures with limited resources (La Rocca et al., 2017; March-Chorda, 2004; Preisendörfer et al., 2012; Dowling and Helm, 2006). March-Chorda (2004) express that the entrepreneurial environment is heavily influenced by the resources of skilled people and that success is dependant on the ability to learn from mistakes, react positively to challenges, taking initiative, among other things. All of which are derived from previous experience.

Thirdly, the resources start-up companies posses in the early development stages are often scarce, both in terms of human and financial capital (La Rocca et al., 2017; March-Chorda, 2004; Preisendörfer et al., 2012). In those early stages, the identification and collection of resources is of key importance for that firm to perform both short term, and long term (Katz and Gartner, 1988; Brush et al., 1997; Lichtenstein and Brush, 2001).

Lastly, as for any company, the sales and performance are reliant on a company's capability to produce value. There seems to be a consensus that start-up companies are based on innovation and technology. Hormiga et al. (2011) presents that start-up companies are born through a growing trend for innovative businesses, which has transformed into an innovative and technological nature around entrepreneurship and start-up companies (Krejcí et al., 2015; Santisteban and Mauricio, 2017b; Cho and McLean, 2009; Zhao et al., 2015). Meaning that the cycles of selling the product/ service is enabled through the value creation and use of innovative solutions and high technologies.

The size of a start-up company can be defined through the number of founders (human capital) and the amount of cash (financial capital) in possession during the upstart of the company (Preisendörfer et al., 2012). A specific amount of founders and capital was not recognized in this study. However, much literature subjectively expressed the resources of start-up companies to be 'small', 'scarce' or 'limited' (La Rocca et al., 2017; March-Chorda, 2004; Preisendörfer et al., 2012; Dowling and Helm, 2006).

To summarize this answer, if this research question was be answered in short it would be with the following definition of a start-up company: *A start-up company is a new organization with limited human and financial resources, characterized by the strive to grow and overcome barriers blocking the inflow of new resources. A start-up company creates value through the use of innovative and technological solutions.*

The question also regards how business and product development is affected bu the characteristics of a start-up company. As a start-up company is defined above it is believed that the business development management is directed to promote company growth and introduce new resources, and the product development strategies are aimed towards innovation and new technologies. In other words, the product and business development is a reflection of the goals, barriers, resources and value creating in a start-up company.

Research Question 2

Based on the success stories from different start-up companies, how are product development strategies structured in terms of content, time-span, implementation and execution in those companies, and how does this relate to the existing theory.

No specific product development strategies in successful start-up companies were recognized in this study. It was not much literature that spoke about product development strategies directly, but rather about the characteristics of start-up companies and how product development strategies needs to be customized to fit those characteristics (MacCormack et al., 2012). The answer to research question 2 reviews how focus should be aimed in product development strategies, and inside which time span different strategies are required. After a certain period of time, a company will stop identifying itself as a start-up and new requirements will arise. This supports the theory of MacCormack et al. (2012) that multiple product development strategies are required to fit different contexts. One strategy is required for the medium-term period where first product success is of predominant importance for future success (Zhao et al., 2015). Another strategy is required in the long-term period where the company eventually steps away from being a start-up. A pattern was recognized, as mentioned previously, that start-up companies are in its nature innovative and exploits and use of technology in order to be successful (Hormiga et al., 2011; Krejcí et al., 2015; Santisteban and Mauricio, 2017b; Cho and McLean, 2009; Zhao et al., 2015). Which leads to the conclusion that product development strategies has to be aimed towards such innovation and technology. Summarized, a start-up company needs a medium and long-term strategy to fit different development stages. Those strategies needs to be focused towards innovation and technology.

Research Question 3

Based on the success stories from different start-up companies, which are the methods used for managing business development in those companies, and how is this management structured and handled continually? How does this relate to the existing theory?

No result was found related specifically to the business development management of successful start-up companies. Instead, general critical success factors of start-up companies were identified and related to the business development management. The critical success factors of start-up companies were found to be (1) the social and human capital of the entrepreneur, and (2) the personal traits of the entrepreneur. It was established that success in start-up companies is focused more towards the individual entrepreneur and her assets, rather than the organizational operations of the actual company. Some researchers claim that entrepreneurial research should not be focused on the business models and business development at all, but rather on the entrepreneurs themselves (Spiegel et al., 2016), since a business model is massively dependant on the entrepreneur's abilities (Andries and Debackere, 2007; Trimi and Berbegal-Mirabent, 2012). These personal traits include the ability to handle success, ability to recognize opportunity, ability to take on challenges, learn from mistakes and have a good perseverance and determination (March-Chorda, 2004). Another important trait of the entrepreneur is the 'entrepreneurial self-efficacy' which in short regards the entrepreneur's capabilities of achieving success and handling challenges, and the entrepreneur's own beliefs in those capabilities. The entrepreneurial self-efficacy has been motivated by a significant collection of evidence that supports its influences on start-up success (Drnovšek et al., 2010).

As previously mentioned, it was observed that human capital and social capital are crucial resources for an entrepreneur to acquire in order for the start-up to survive (Spiegel et al., 2016; Zhao et al., 2015; Laage-Hellman et al., 2018; Hormiga et al., 2011; La Rocca et al., 2017; Dowling and Helm, 2006), (Santisteban and Mauricio, 2017b; March-Chorda, 2004). As the business development management regards the everyday activities of managing the business and the people within it, a conclusion was made that successful business development management needs to be focused towards those success factors.

Summarized, for start-up companies to be successful they should direct their business development management towards the personal traits, human capital and social capital of the entrepreneur.

Research Question 4

How is business development and product development related? Both directly and through other organizational elements?

This research question was answered through an interpretation of the two previous answers. Regarding the business development, the key findings were the personal traits, human capital and social capital of the entrepreneur. Regarding the product development, the key findings were the different time horizons and innovative nature of start-up companies.

The relationship between these two operations, with regards to the findings, is that much of the success relies on the characteristics of the start-up company and the entrepreneur, rather than the actual operations and activities. For example, an entrepreneur with the right spirit and an innovative mindset will most probably succeed better than an entrepreneur with a negative mindset that lacks creativity, independently on the method and activities they use. This was believed to resonate throughout all organizational operations and elements in a start-up company.

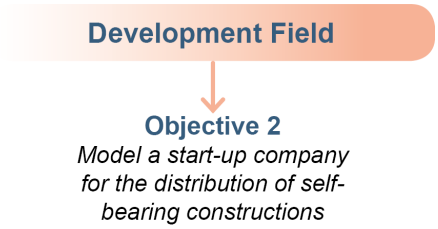
Research Question 5

How are product development strategies and business development management affecting the environmental and ethical considerations in a start-up company?

This research question was left unanswered in the study. The reason for that has been evaluated to be a misalignment in the research questions, planning and execution. This is discussed further in chapter 5.

4.2 Start-Up Company Development

This section presents the results derived from following the methodology defined in section 3.2, trying to fulfill objective 2. Parts of the results are considered sensitive information and are not included in the report.



The end result for this part of the project was that a start-up company had been developed for the distribution of self-bearing constructions, as the product is defined in section 1.1. In detail, that result would have been expanded to present the specifics about the financial statements and business model. However, that information was regarded as sensitive for the start-up company and was such not included in this report. Instead of presenting the details of the business model, this section presents the characteristics of the business model and financial statements. Another result for the project as a whole was that the author of this thesis received an investment to be used for the company to grow. This result is included later in the section.

To follow are six sub-sections, presenting the value proposition, vision and purpose of the business, the product need, the market strategy, financial statements, and information about the investment received.

Value Proposition
The company intends to create value by offering products superior in both functionality and cost saving, as compared to the market competitors. The company intends to make money by ensuring that the product price represent all the cost savings the customers will benefit from.

The value proposition is intended to communicate why the product is suitable for a specific customer segment. In the segment of emergency relieving a major factor is the need for efficiency both in transportation and assembly. When fulfilled, will save resources for the customers.

Vision and Purpose
The purpose of the business is to be profit-driven and earn money to be re-invested into the company for growth. The long-term vision is to achieve sales volumes that allow maximal profitability and a market leading position in emergency relieving.

Market Strategy
The strategy is to find a so-called 'beach point', another market to first introduce the product, to test it and give the company time to mature before entering the market of emergency relieving. The considered sales channels include retail and personal selling, depending on the market and context.

Product Need

Emergency situations around the world call for more robust and efficient shelters, examples are often recognized in refugee situations. The information about the refugee camps in Turkey and Tanzania presented in section 1.1 are good examples of the need for more durable and efficient shelters.

Financial Statements

The financial statement consist of the models illustrated in fig. 4.1, fig. 4.2 and fig. 4.3. The 'profit and loss statement' gives an overview of the total costs and income in the company during the year. This shows whether the business is doing profit or taking financial losses. Notice that the figures have been cropped so all months are not showing, but the column '2020' summarizes the results of the whole year. Unrelated numbers have been inserted into the model.

	2020	jan-20	feb-20	mar-20	apr-20	maj-20
Total Sales	12 000,0 kr	1 000,0 kr	1 000,0 kr	1 000,0 kr	1 000,0 kr	1 000,0 kr
VARIABLE COSTS						
Direct Material	360,0 kr	30,0 kr	30,0 kr	30,0 kr	30,0 kr	30,0 kr
Direct Manufacturing	1 800,0 kr	200,0 kr	100,0 kr	200,0 kr	100,0 kr	200,0 kr
Direct Supply	600,0 kr	50,0 kr	50,0 kr	50,0 kr	50,0 kr	50,0 kr
Direct Labour	6 000,0 kr	500,0 kr	500,0 kr	500,0 kr	500,0 kr	500,0 kr
Storage	- kr	- kr	- kr	- kr	- kr	- kr
Other	- kr					
TOTAL VARIABLE COSTS	8 760,0 kr	780,0 kr	680,0 kr	780,0 kr	680,0 kr	780,0 kr
FIXED COSTS						
Insurances	- kr					
Facilities	2 400,0 kr	200,0 kr	200,0 kr	200,0 kr	200,0 kr	200,0 kr
Traveling	- kr					
IT-Services	1 200,0 kr	100,0 kr	100,0 kr	100,0 kr	100,0 kr	100,0 kr
Legal services	- kr					
Patent Costs	- kr					
CAPEX	- kr					
TOTAL FIXED COSTS	3 600,0 kr					
TOTAL RESULT	- 360,0 kr	220,0 kr	320,0 kr	220,0 kr	320,0 kr	220,0 kr

Figure 4.1: Profit and Loss Statement

It is not enough to know if the company is making profit or not. It is equally important to know how much cash is available at any time. For that a cash flow analysis was created, see fig. 4.2. Notice that the closing balance of one month is the same as the opening balance the following month, compare cells highlighted red.

Cash inflow		2020	jan-20	feb-20	mar-20	apr-20
	Opening Balance	10 000,00 kr	10 000,00 kr	33 200,00 kr	56 400,00 kr	79 600,00 kr
Operating activities	Sales	240 000,00 kr	20 000,0 kr	20 000,0 kr	20 000,0 kr	20 000,0 kr
Financing activities	Capital	120 000,00 kr	10 000,00 kr	10 000,00 kr	10 000,00 kr	10 000,00 kr
	Loans	- kr	- kr	- kr	- kr	- kr
Investing activities	Long term investments	6 000,00 kr	500,00 kr	500,00 kr	500,00 kr	500,00 kr
	Long term assets	- kr				
	Other	- kr				
	Total:	366 000,00 kr	30 500,00 kr	30 500,00 kr	30 500,00 kr	30 500,00 kr
Cash outflows						
Operating activities	Sales related expenses	60 000,00 kr	5 000,00 kr	5 000,00 kr	5 000,00 kr	5 000,00 kr
	Supplier costs	3 600,00 kr	300,00 kr	300,00 kr	300,00 kr	300,00 kr
	Labour cost	24 000,00 kr	2 000,0 kr	2 000,0 kr	2 000,0 kr	2 000,0 kr
	Storage	- kr	- kr	- kr	- kr	- kr
Financing activities	Loan re-payment	- kr	- kr	- kr	- kr	- kr
	Loan interest	- kr	- kr	- kr	- kr	- kr
Investing activities	CAPEX	- kr	- kr	- kr	- kr	- kr
	Other	- kr	- kr	- kr	- kr	- kr
	Total:	87 600,00 kr	7 300,00 kr	7 300,00 kr	7 300,00 kr	7 300,00 kr
	Closing Balance	265 200,00 kr	33 200,00 kr	56 400,00 kr	79 600,00 kr	102 800,00 kr

Figure 4.2: Cash Flow Analysis

It is also common to include a balance sheet as a financial statement. The balance sheet arrange a company's liabilities, equity and assets that together present the company's net worth. This was however not determined necessary to include as an actual company had yet not been founded.

The other part of the business model template is presented in fig. 4.3 and it includes value proposition, company visions and market strategy. Further explanation for each of these elements can be seen in fig. 4.3.

Value proporsition	**Vision and purpose**	**Market strategy**	**Product need**
How does the company plan to create value for the market and customers?	What is the purpose of the business and how does that transcend into a long term vision?	What is the strategy for penetrating the market? Give concrete examples of how contact is established with customers.	Present why there is a need for the product and give concrete examples of where that need exists.
How does the company plan to make money while creating value?		What are the sales channels?	

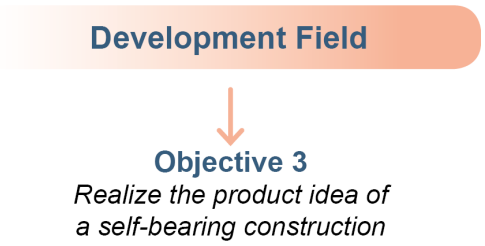
Figure 4.3: Value Proposition and Business Purpose

Start-Up Funding
During the course of this project, a summation of the business model was taken to a division within Chalmers University of Technology that gives funding to innovation projects. This division is financed by the Swedish governmental organization Vinnova, whose mission is to support innovation and growth with regards to, inter alia, 'Europe 2020', a strategy defined by the European Commission for the economic advancement in the European Union.

The aim of this meeting was to attract funding that would allow this project to be taken to the next step, which would be working on it full time and evaluate certain verification questions before taking the product to full commercialization. The meeting resulted in a funding of ca 100'000 SEK to cover development and labour costs. The significance of this funding, in regards to the future of the project and the accomplishment of this current thesis project, is discussed in chapter 5.

4.3 Product Development

In this section, the results of the product development process are presented. Because of previously mentioned reasons, no detailed information of the product concept is included.



As stated in section 4.3, the optimization of the product design started with going over the prototype and look for elements that could be improved. Below are the results of that examination presented, together with the improvements that was made to the product.

1. Production efficiency
During the Lamera Housing Project, there was no specific considerations to how the design could be optimized in order to increase the efficiency of the production. By developing parts that differed as little as possible and were simple to manufacture, the production efficiency was increased significantly. In the new current design, more parts are not necessarily the same, but they are easier to manufacture and the whole composition of parts is easier to comprehend and assemble.

2. Material waste
The designing of parts was optimized to minimize the waste of material. For example, by shortening the length of a flange by 5 cm, a grand total of 2 sqm less material per unit could be saved, which saves a lot of money. This way of looking at the design related to the production efficiency, because if there were any material waste it meant that resources were being put into something that would not be included in the final design. The design optimization resulted in significantly reducing the material waste, and saving a lot of costs.

3. Structural robustness
It was stated in section 2.2 that the most prioritized elements in the product were the ones regarding the structural robustness of the shelter. This resonated into the optimization of both production efficiency and material waste in the sense that structural robustness was not to be impaired by any of those changes. For example, if a window was included for functional purposes it would be designed in a way that provided structural properties for the shelter. The structural robustness was focused on directly by analysing weak spots in the design and introducing new supports that would compensate those weaknesses.

This effort resulted in an increase in the structural robustness of the product concept, with better abilities to withstand rain and keeping water out. A model of the final product concept is presented in fig. 4.4

Figure 4.4: Self-Bearing Construction - Product Concept

It was stated in section 3.3 that a major aim with the product development effort was to create a physical prototype to prove the product concept, before the thesis project was finalized. However, when the funding was received the project got a new horizon and added resources which moderated the pressure to get the prototype done early. For that reason, the new aim became to manufacture the prototype during the summer of 2019. Before that decision was made, detailed drawings had been created and suppliers were already involved to discuss the price of the prototype. Besides these design improvements, it was found that the panels building the construction could be assembled differently and create additional products, without introducing any new parts or concepts. A storage unit that could be used in garden environments is presented in fig. 4.5. The possibility to use the product concept for different applications proves the modularity of the concept, and it gives the start-up company a possibility to enter more markets.

Figure 4.5: Storage Unit - Modular Product Concept

Figure 4.6: Storage Unit - Modular Product Concept

5

Discussion

In this chapter the project is evaluated. This includes the meaning of the results, whether approaches and methods used were suitable, what errors was made, and what changes could have been done. The chapter is divided into two, the research field and the development fields of the project.

5.1 Literature study

This section presents a discussion on the literature study and the results derived from it. The methods used are evaluated, and the results are analysed with regards to the quality of research. Changes that could have affected the study outcome are suggested.

The definition of a start-up company was derived from looking at the organizational structures within the company. Based on that viewpoint a holistic definition was created, meaning it could be interpreted and applied differently to different contexts. Such a definition was suitable because it did not define specifically what a start-up company is, but rather generally what a start-up company could be. The definition mentions technology and innovation, which could be consider a fairly strict requirement. However, innovation comes in many forms and not just through advanced technology. Value is created by doing something differently and better than competitors, which requires an innovative approach.

Besides the definition of a start-up company, the literature study showed that success in start-up companies depends on the entrepreneur and intangible elements more than the organizational operations, such as product and business development. This was not expected and it somewhat affected objective 1 to be aimed more towards general success factors than organizational operations. Which led the focus to be shifted during the literature study, and it was this shift in focus that partly left research question 5 unanswered. During the literature search, the main topics being searched for were product development strategies and business development management. It was never realized that 'ethics and environmental considerations' was something of a research topic on its own that would require a significant amount of more resources. Looking back, this research question might have been defined too broadly, which led the allocation of resources to not be sufficient enough, leaving it unanswered.

The reason it was not foreseen that success in start-up companies depend more on the intangible elements could have been related to the believed ontological characteristics of a start-up company defined in section 2.4. The ontological position that was taken, considered a start-up company to consist of both tangible and intangible elements. More attention however was put towards the tangible elements, such as business and product development. The results from the literature study proved that the attention should have been put onto the intangible elements, such as personal traits and personal resources of the entrepreneur. This was the danger pointed out in section 2.4 accordingly: *..the result of that study could have become significantly different had the researcher considered their ontological and epistemological view*, only in this case the ontological view was a bit misaligned.

The results are however interesting since it shows that there are areas within entrepreneurship and start-up companies that are under-represented in research. Namely the relationship between start-up success and specific operations such as product development strategies and business development management.

Even though the research questions did not get answered in the way intended, the results are determined to be of high quality. Quality of research was defined through three criteria in section 2.6, these criteria stated that the research needs to be scientifically contributing through transparency, based on the use of own ideas and visions, and be reliable and externally valid. Transparency was kept by presenting the approach, methods, results and discussions from the project. This gives future researchers the possibility to expand upon the research topic and make changes to achieve further results, which is considered to be scientifically contributing. The entire study was planned, executed and evaluated by the author of this thesis. Both the achievements and shortcomings are results of the decisions made, which proves an originality. The last quality criteria will require future research to be made under similar circumstances where the results are tested and evaluated, which is why that criteria cannot be determined fulfilled nor failed at this time.

Although quality was achieved, it is important to evaluate and review the results and what it was based on. As stated in section 3.1, no limitation was made with respect to the industries and markets of the observed start-up companies. Neither were there any limitations made towards the definition of success, product development and business development. The reason for that was to find a common factor for all entrepreneurs and start-up companies. The personal traits and capital of the entrepreneur, and the innovative nature of start-up companies proved to be such factors. In further research, it would benefit the project to make such limitations because it would explore if the results can be generalized and repeated. If the results are true, that all start-up companies depend on the entrepreneur's personal traits, human and social capital, and innovative focus, the results should not change by only looking at one specific market, or by only using one definition of success.

Finally, some parts of the methods used in the literature study was described as 'general' instead of being pre-determined and standardized. That includes the way the amount of articles were included in the study, and the way the analysis of literature was performed, see section 3.1. Those methods were evaluated as effective and they suited the way this entire project was structured, since many activities were being done simultaneously, it benefited of some of those activities were flexible.

The rest of this section consists of certain changes in the project that could have affected the outcome. These possible changes should be considered in further research, to evaluate the quality of research in this study.

1. Re-defining the research questions
The research questions were defined in accordance with an evaluation process, where one of the criteria was that research questions should not be defined to narrow. At that time, all research questions in section 1.4 were considered to fulfill that criteria. However, during the literature search it was observed that very little research had been made on business development management and product development strategies, which led to the realization that the research questions might have been defined too narrow. The results showed that success in start-up companies should be viewed from a holistic perspective, that deals with the 'intangible' aspects such as personal traits, and not a detailed perspective that looks at certain operations in a start-up company. If this was known before the project started, the research questions could have been defined differently to result in a more dynamic literature study. The reason why no literature was found on business development management and product development strategies can be that the subject of entrepreneurship and start-up companies is still relatively unexplored.

However, as mentioned previously research question 5 was left unanswered partly because of being defined to broadly. This research question would on the contrary benefit from being defined a bit narrower.

2. Defining specific theories in research
In section 2.1 it says that the approach to specific theories in research was to leave definitions open and explore different concepts of e.g. 'success', instead of dealing with one specific definition and only looking for literature that correlates to that definition. This approach gave the study an open and interpretative characteristic, which benefited the aim of finding common factors for multiple markets and contexts, as stated earlier in this section. However, if such definitions was made the project could have provided specific results through a more dynamic study. Those results would not necessarily have been better, but it would have provided a different perspective for the study.

3. Having fewer research questions
To make the focus more concentrated in the study, it could have been efficient to only analyse two or three research questions, as compared to the five questions in section 1.4.

4. Using a different search strategy
The main improvement for the search strategy could have been to include more keywords and databases, and make the study more extensive. By applying a search strategy based on introducing more resources and increasing the scope of the study, the chances of achieving better results increase. Also, it would benefit the quality of research by having more than one person to interpret and analyse all the literature. Which is why bringing in more researchers could have been a consideration.

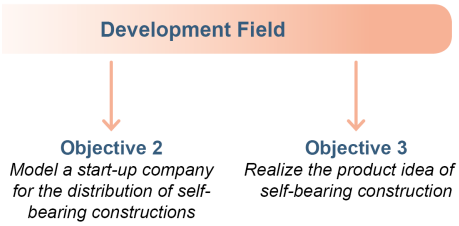
5. Using more than one data collecting method
The research questions defined in section 1.4 state that start-up companies are being studied based on their 'success stories'. It was hard to identify if literature was based specifically on success stories or not, since analysing literature leave much space for interpretation. A complement to the literature study could have been conducting interviews and focus groups with entrepreneurs, and get first hand knowledge from the people experiencing success. This approach is called 'triangulation' and involves the use of more than one data collecting method to analyse a study object.

6. Applying a different ontological viewpoint
As mentioned earlier, the reason why the study took a turn and shifted focus was possibly through a misalignment in the ontological viewpoint of start-up companies. It might be that start-up companies are more 'abstract' and 'philosophical' in the sense that success relies on the mindset and personality of the entrepreneur, as compared to a large established company where the critical success factor lies in organizational operations. Had this realization come earlier in the project, it could have affected the formulation of research questions and created a more dynamic study.

Much of this section discuss how the study could have been improved, this is not to say that the study was a failure. The results are very interesting because it says something about the very nature of entrepreneurship and start-up companies. This is useful for future research and for the continuation of the development project which involves implementing and managing the start-up company distributing the self-bearing constructions.

5.2 Product and Business Development

This section includes discussions on the product and business development effort. The main discussion regards whether the development effort can be verified without presenting the detailed results



Neither the product concept or business model was presented in chapter 4, this affects the legitimacy and verification of the results. It is mentioned in section 4.3 that production efficiency was increased, material waste was decreased and the structural robustness was improved for the self-bearing construction. It is also mentioned in section 4.2 that the objective of developing a start-up company is considered fulfilled. These statements are hard to prove without providing detailed results of the product concept and business model of the start-up company. However, one way to verify that the product concept and business model are of high quality is through the funding the project received. This simply showcase that the development effort has been substantial enough to attract the trust and resources of investors. The development effort is considered successful due to this funding.

Business Development

The three-stage method used to develop the start-up company proved to be effective, mostly due to the adaptability it provided. The entire business model was based upon the understanding of the market and customer needs, and the method allowed the development to be customized as new market information was included. When the start-up company matures, different business development methods will be required to fit the more organized structures of an established company. The template that was created did not contain anything groundbreaking, but it was customized to fit the state in which the start-up company was, making it very suitable. The financial statement will always be a critical element since production is very volume dependant, and it is important to have a clear understanding of the volumes and prices required to make the business profitable. In the future,much of the further development will be about managing the business model and look for new ways to improve it.

Product Development

The product development process was referred to as an 'optimization' process since the product was in a state of refinement. This approach proved suitable for the project, since the product development depended on results from the market analysis which was running in parallel. By not following a normalized method the product development process was allowed to be more flexible. The use of this flexible method resulted in a self-bearing construction that has its benefits in being very light and easy to assemble, by understanding that, it becomes easier to find customers that are willing to pay for those properties.

6

Conclusion and Recommendations

This chapter presents conclusions of the project with related recommendations. The thesis objectives are related to and the main points of the findings are highlighted.

Study Approach - The Research Paradigm, Empirical Data and Theory

The research paradigm was explained as the way researchers are influenced by their own beliefs and philosophies. With special regards to their ontological and epistemological viewpoint. Meaning how researchers define the existence of, and knowledge in the study objects. By questioning oneself 'what is being taken for granted?' such beliefs and philosophies can be evaluated. In this project, the product development strategies and business development management were regarded as tangible elements of success in a start-up company. It was also noted that start-up companies are created with intangible elements, such as visions and personal traits of the people working there. This viewpoint was not proven incorrect, but the results from the literature study demonstrated that start-up success is more dependant on the intangible elements of a start-up company, such as personal traits and resources of the entrepreneur. Had this been realized earlier, the formulation of research questions might have been aimed more towards personal traits, resulting in a more dynamic study.

> ***Recommendation:*** *For future research, independently of the research topic, consider spending extra resources to consider the importance of the research paradigm to that research. Identify which ontological and epistemological viewpoints are best suited for the study objects and continuously investigate if this viewpoint aligns with the results from the study.*

It was stated in section 2.5 that the literature study (objective 1) was aimed to take in the empirical data and theories of other researchers, to create new theories. After the literature study was finalized, those aims were considered fulfilled as the input had been empirical data and theory, and the output was theories regarding success in start-up companies. It was also stated that the product and business development (objective 2 and 3) regards the input to be empiry, creating output of empirical data. Meaning that the input is the empirical development effort, and the output is the data based on the experience and analysis of that development effort. This aim was also considered fulfilled.

> ***Recommendation:*** *The difference between empirical data and theory is a well-known subject in research. For future researchers it is recommended to consider both the input and output of data in a study, and identify where in the 'research cycle' the study has its foothold.*

Development Field - Business and Product Development

Much of the result from the development field were not included in the report, which affected the legitimacy of the entire development field. This mainly affected how the methods used for product and business development were suitable or not. The use of an iterative optimization process and the five-stage business development process could not be evaluated in accordance with all of the results, which lowers the quality of that development effort.

> ***Recommendation:*** *To create a proper evaluation of the methods used in the development field, the results needs to be presented in detail. A recommendation is made for future developers to conduct development projects similar to this one, and utilizing the same methods to evaluate if those methods are suitable.*

As highlighted in section 1.1, there is a tremendous need for emergency relieving due to refugee situations around the world. Shelters, transportation, food and water supply, and clothes are just a few to mention areas which are in need of development and improvement.

> ***Recommendation:*** *For entrepreneurs and developers it is recommended to not only develop business ideas for commercial purposes, but also for humanitarian and emergency relieving purposes. The creativity and innovative spirit can be used for a tremendous purpose which can improve the living standards for many people.*

A consideration taken in the beginning of this development project was to apply all the findings from the literature study to the practical development of the start-up company. This was however not possible since the findings and conclusions were never identified until the end of the project. These findings and conclusions will be applied in the future development of the business, but it would be interesting to see a study evaluating that relationship between the findings from the literature study and the practical business and product development.

> ***Recommendation:*** *Investigate if the results from the literature study can be applied directly to the development of a start-up company. These results include that success in a start-up company depends on the personal traits and resources of the entrepreneur, and the innovative nature and technological focus of the start-up company.*

Research Field - Literature Study

The research topic of entrepreneurship and start-up companies is well represented, but still relatively unexplored as compared to the research area of operations in larger established companies.

> ***Recommendation:*** *The first recommendation regards the research topic of entrepreneurship and start-up companies. It is recommended for future researchers to build upon the research topic to widen the knowledge and understanding of what entrepreneurship implies, and how that transcends to success in start-up companies.*

No direct correlation was found between business development management and successful start-up companies. Instead, it was found that start-up success depends on (1) the personal traits of the entrepreneur and (2) the human and social capital possessed by the entrepreneur. A theory was created that the business development management in start-up companies should be aimed towards these success factors, meaning investing in the personal development of the entrepreneur and creating human and social capital.

> ***Recommendation:*** *Recommendation for future researchers is to continue investigating the success factors in start-up companies, and identify whether the success depends more on the personal traits and resources of the entrepreneur. As compared to the activities and operations of the start-up company. It is further recommended for entrepreneurs to apply these findings, and invest in their personal abilities and resources by striving for personal growth and development.*

Regarding the product development strategies, it was found that all start-up companies share the ambition of growth and it lies in the nature of start-up companies to be innovative. Hence giving motivation to assume that product development strategies needs to be focused towards growth and innovation in order for start-up companies to be successful.

> ***Recommendation:*** *It is recommended for future researchers to study this relationship between success and innovation and technology focus. Not only in areas of complex technology, such as IT, but also in areas lesser known for innovation. The reason for this is that innovation comes in many different forms, and to claim that all start-up companies are innovative creates an incentive to study all types of start-up companies, and not just the ones utilizing advanced technology.*

The result from the literature study were evaluated based on three quality criteria as defined section 2.6. The results of the literature study are determined to fulfill two of those criteria. Firstly, the results are considered to be scientifically contributing due to the transparency that was kept throughout the study. Secondly, everything in this project was created by the author of this thesis, including the literature study, which was a criteria for quality.

The last criteria was that the results would be reliable and externally valid. Meaning that the results could be generalized for other contexts, and be repeated. To evaluate if the results fulfill this criteria, further research is required. Which is why that criteria neither can be determined fulfilled nor failed.

> ***Recommendation:*** *This way of defining an own set of criteria shows originality and use of own ideas. It is recommended for future researchers to do the same thing and evaluate how quality is achieved in specific projects. Regarding the quality criteria that could not be determined fulfilled, it is recommended for future researchers to build upon this study to identify whether the results are reliable and externally valid, thus contributing to the research topic as a whole.*

Objective 1 was not entirely fulfilled in the sense that business development management in successful start-up companies were identified. However, other interesting results were found on start-up success and the nature of entrepreneurship which determines the literature study as successful. The project purpose was also to *explore the nature of entrepreneurship and start-up companies... to distinguish what it takes to make a start-up company successful.* The literature study did provided results that fulfilled this purpose. Several suggestions for changes in the study are presented in section 5.1, the are aimed towards improving the literature study and achieving results of higher quality.

> ***Recommendation:*** *It is recommended for future researchers to consider the changes suggested in section 5.1. Including applying different ontological viewpoints, using different search strategies and re-defining certain research questions. All with the reason to improve the quality of research.*

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Appendices

A Research Questions Formulations

Abbreviations:

Mgmt	Management
PD	Product Development
BD	Business Development

1. What are the most common and popular strategies for product development in start-up companies?
2. Which are the most successful strategies for product development in start-up companies?
3. What are the most common and popular management methodologies used in business development in start-up companies?
4. Which are the most successful management methodologies for business development in start-up companies?
5. What determines a start-up company successful?
6. What is the time-span for PD-strategies in start-up companies?
7. How do PD-strategies differentiate from other strategies in a start-up company?
8. How much time is spent on PD strategies and BD-management in a start-up company?
9. How much time should be spent on PD strategies and BD-management for a start-up company to become successful?
10. How do PD-strategies and BD-management relate to other factors making a start-up company successful?
11. How is BD-management and PD-strategies related?
12. What is included in a PD-strategy?
13. What is included in a BD-mgmt methodology?
14. What does the existing theory say about PD strategies and BD-management?
15. How do PD strategies and BD-management differ between different industries?
16. How is managing the BD-different from managing other operations?
17. Who is managing and setting the BD- and PD-strategies in a start-up company?
18. Is it an iterative or linear process working with PD-strategies and BD-management?
19. At what stage does the company stop being a start-up company?
20. When the company no longer is counted as a start-up, does the PD-strategies and BD-management methodology have to change?

21. Are PD-strategies and BD-management defined for star-ups suitable for other types of companies?
22. How big can a start-up company be?
23. How to PD-strategies and BD-management differ between a larger and a smaller start-up?
24. How does the PD-strategy and BD-management direct the business?
25. Who are the stakeholders affected by the PD-strategy and BD-management?
26. In what ways can a PD strategy be defined?
27. What role does the BD-management methodology plan in the PD strategy, and vice versa?
28. What is the content of a PD strategy?
29. What is the level of abstraction for respective?
30. What are the steps in creating a PD-strategy?
31. How is BD-management worked with continually?
32. How do PD-strategies and BD-management relate to customer mgmt?
33. How do PD-strategies and BD-management affect the performance (quality, time, cost, quantity)?
34. How do PD-strategies and BD-management relate to environmental and ethical engineering questions?
35. Is it necessary for PD-strategies and BD-management to consider environmental and ethical issues?
36. Does PD-strategies and BD-management differ if the business sells services or products?
37. As an operation, how can BD be characterized? (Volume, variety, variation in demand, visibility).
38. Why is PD-strategies and BD-management important? 39. Which key features in a process are trying to be captured with PD-strategies and BD-management?
40. Can PD-strategy and BD-mgmt. be viewed as processes?

B Reading List

1. First Product Success: A Mediated Moderating Model of Resources, Funding Team Startup Experience, And Product-Positioning Strategy* (Zhao et al., 2015)

2. Product Iterations in Venture Capital Funded Technology-Based Start-ups: Pivoting as Critical Success Factor? (Jocquet et al., 2015)

3. Systematic Literature Review of Critical Success Factors of Information Technology Start-ups (Santisteban and Mauricio, 2017b)

4. The Role of Supplier Relationships in the Development of new Business Ventures (La Rocca et al., 2017)

5. Business Creation in Networks: How a Technology-Based Start-up collaborates With Customers in Product Development (Laage-Hellman et al., 2018)

6. Entrepreneurial Self-Efficacy and Business Start-up: Developing a Multi-Dimensional Definition (Drnovšek et al., 2010)

7. Product Development Success Through Cooperation: A Study of Entreprenurial Firms (Dowling and Helm, 2006)

8. Business Model Development, Founder's Social Capital and the Success of Early Stage Internet Start-ups: A Mixed Methods Study (Spiegel et al., 2016)

9. Success Factors and Barriers Facing the Innovative Start-ups and Their Influence Upon Performance Over Time (March-Chorda, 2004)

10. Do You Need a New Product Development Strategy? (MacCormack et al., 2012)

11. Business Start-ups and Their Prospects pf Success in South African Townships (Preisendörfer et al., 2012)

12. Ireland Offers a Perfect Start-up Environment (Shivangi, 2019)

13. Putting Process on Track: Empirical Research on Start-ups' Growth Drivers (Pugliese et al., 2016)

14. The Role of Intellectual Capital in the Success of New Ventures (Hormiga et al., 2011)

15. Vissa Grundläggande Vetenskapsteoretiska Begrepp om Ontologi, Epistemologi och Metodologi (Åsberg, 1998)

C Search Strategy References

University of Leeds
1. Choose search terms - Keywords and exact phrases
2. Define truncated searches
3. Define Boolean logic?
4. Define citation searching

University of West Florida
1. Choose a topic and define research questions
2. Define the search scope
3. Identify databases to use
4. Review the literature

Irish Governmental Department of Health 1. Define the topic
2. Identify the type of literature sought for
3. Identify sources to search (Databases etc)
4. Develop keywords
5. Define the search scope
6. Design a means of recording