

ABSTRACT

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Keywords: startup, business markets, B2B markets, high-speed machine market, startup survival

Hakusanat: startup, yritysmarkkinat, B2B-markkinat, suurnopeuskonemarkkinat, startupin selviytyminen

The aim of this thesis is to research startup survival factors in B2B markets, in the context of high-speed machine market. The objective is to provide information to ASynRo project about the target market. The thesis does not provide a plan for market entry, only information about survival and success factors.

The literature of this thesis focuses on startup survival and success in B2B markets separately. High-speed machine market is studied through PESTLE and Porter's five forces analyses. The empirical research uses semi-structured interviews, to gather information from professionals experienced with startups. The key findings of the research include factors affecting startup survival in B2B markets and some special features of high-speed machine market from startup's perspective. The starting capital is essential, and it should come through sales work to investors. Lack of marketing skills, seems to be a common problem as well as startups getting stuck in the development phase, never starting the sales work. Credibility and trust are the most important factors in the high-speed machine market affecting startup survival. The results contribute to the market research of ASynRo project and based on them the research of market potential can continue.

TIIVISTELMÄ

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Tämä diplomityö tutkii startupien selviytymiseen vaikuttavia tekijöitä B2B markkinoilla. Kontekstina toimii suurnopeuskonemarkkina. Tavoitteena on tuottaa ASynRo -projektille tietoa kohdemarkkinasta ja startupin mahdollisuuksista siinä. Tutkimus ei anna tietoa tai suunnitelmaa markkinoille menemisestä, ainoastaan selviytymis- ja menestymistekijöistä.

Tämän työn teoreettinen osa keskittyy startupin selviytymiseen ja menestymiseen, sekä B2B markkinoihin erikseen. Suurnopeuskonemarkkinoita tutkitaan PESTLE -analyysin ja Porterin viiden voiman mallin avulla. Nämä analyysit perustuvat kirjallisuuteen. Empiirinen tutkimus toteutetaan kvalitatiivisin metodein teemahaastatteluja käyttäen. Tavoitteena on kerätä tietoa startupien menestymistekijöistä niiden parissa kokeneilta asiantuntijoilta. Keskeiset tutkimustulokset sisältävät tekijöitä, jotka vaikuttavat startupien selviytymiseen B2B-markkinoilla. Aloitusvaiheen rahoitus on elintärkeää ja sen voi saada hyvällä sijoittajiin kohdistetulla myyntityöllä. Markkinointitaitojen puute on yleinen ongelma, samoin startupin juuttuminen tuotekehitykseen, jolloin myyntityötä ei aloiteta koskaan. Uskottavuus ja luottamus ovat tärkeimpiä suurnopeusmarkkinan tekijöitä. Tämän diplomityön tulokset vievät ASynRo -projektia eteenpäin ja niiden perusteella markkinapotentiaalin kartoitus voi jatkua.

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*“No thief, however skillful, can rob one of knowledge,
and that is why knowledge is the best and safest treasure to acquire”*

– L. Frank Baum

Lappeenranta, 25th October 2019

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LIST OF ABBREVIATIONS

ASynRo	Axially Laminated Rotor of a Synchronous Reluctance Machine
CAGR	Compound Annual Growth Rate
B2B	Business-to-Business
B2C	Business-to-Consumer
IM	Induction Machine
LTKK	Lappeenrannan teknillinen korkeakoulu
NdFeB	Neodymium Iron Boron
PM	Permanent Magnet
PMM	Permanent Magnet Motor
R&D	Research & Development
Saimia	Saimaa University of Applied Sciences
SRM	Switched Reluctance Machine
TMP	Turbomolecular Pump
TW _y	Terawatt years

1 INTRODUCTION

In this chapter the background of high-speed motors is introduced shortly leading to the introduction of ASynRo (axially laminated rotor of a synchronous reluctance machine) project. After this startup survival and through it, research questions are contemplated. Lastly the execution of the study and the structure of this thesis are covered. The purpose of this chapter is to give the reader a short insight into the topic and explain shortly the background as well as aim of the study.

1.1 Background

For the past couple of centuries electric motors have been important electricity sources especially in developed countries where most of this electricity is consumed by industry. For example, in the USA almost 30% of electricity produced with electric motors is consumed by industry, and from the whole industry electricity consumption, electric motor drives consume almost 65%. It is estimated that 1,87 TWy of electricity was consumed in the world in 2006 and it is predicted to rise. Figure 1 shows the forecast of industrial delivered energy consumption in the USA, in the cases of high and low economic growth. In turn according to International Energy Agency (2017), the global energy need is expected to rise 30% between 2017 and 2040, which can be compared to the energy need of China and India combined. Because of this huge electricity need even 1% improvement in efficiency of electrical motors would result in huge savings economically, as alone in the USA the electricity consumption by motors amounts to nearly 45 billion US dollars (41 billion euros). And there would be huge environmental benefits as well in the form of reduction in carbon dioxide emissions. (Gutfleisch et al., 2011; U.S. Energy Information Administration, 2019) This creates a huge potential market for efficiency improving solutions.

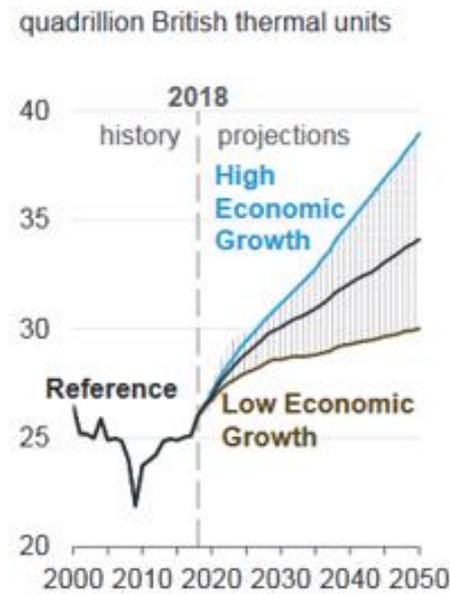


Figure 1 Industrial delivered energy consumption (adopted from U.S. Energy Information Administration, 2019)

One of the possibilities to improve the efficiency of electricity production is the developing high-speed technology. High-speed rotating mechanical machinery has been in development for a long time already, and it has gained a lot of interest in the last few decades. It is starting to be considered more mature and reliable technology and it is already a state of the art in some applications. (Abebe et al., 2016; Gerada et al., 2014) The rising interest towards high-speed applications can also be seen from the steady increase of patent applications amongst the corresponding technology classes (Figure 2). Automotive, power conversion, pumps and compressors are some of the applications using high-speed drives. In some other niche applications, they have improved the performance and product quality as well as product innovation. (Abebe et al., 2016)

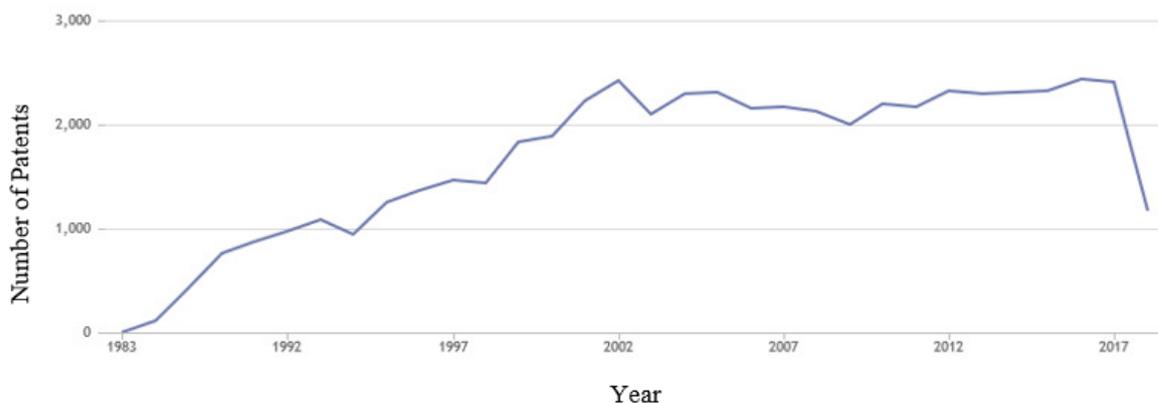


Figure 2 Patent applications in the interesting technology classes (TURNIP Innovations, 2019)

The problem with high-speed technology, and permanent magnet motors (PMM) specifically, is that they use rare earth materials (such as neodymium and dysprosium) which are produced mainly in China. This makes their supply sometimes uncertain as it is dependent mainly on one producer. This problem actualized in 2011 and 2012 when China cut off the supply of its rare earth materials leading to huge rise in prices. In Figure 3 the price development of neodymium and dysprosium can be seen in comparison to the price level in January 2008. For example, neodymium prices rose from 100 USD/kg to 460 USD/kg. In euros this means from 91 €/kg to 421 €/kg. (Bourzac, 2011; Rowlatt, 2014; Widmer et al., 2015)

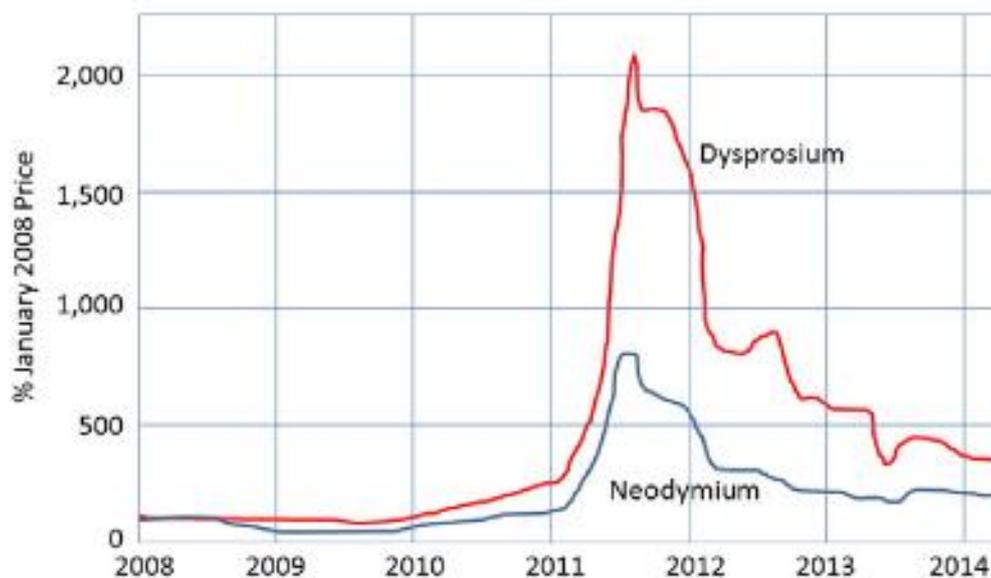


Figure 3 Neodymium and dysprosium price development (adopted from Rowlatt, 2014; Widmer, Martin and Kimiabeigi 2015)

Because of this the supply of high-speed machines and their parts cannot always be controlled and it is vulnerable, for example, to political and geographical problems. This unpredictability causes uncertainty in the markets and it can sometimes even cause the dismissal of the use of high-speed applications despite their benefits.

The history of high-speed technology in LUT University (previously LTKK) goes back to the late 70's and early 80's (Larjola et al., 2010). ASynRo is a continuum of this know-how. The basic idea of the invention is to have a bipolar high-speed electrical machine rotor which is

made by laminating alternating layers of ferromagnetic and paramagnetic (magnetic and non-magnetic) steel together. These materials are cost effective and expensive permanent magnets are not needed. This negates then the possible supply problems with rare earth metals. ASynRo can also reach rotational speeds from 50 000 to 70 000 rpm with power from 500 to 1 000 kW. (LUT Lappeenranta University of Technology and Saimaan ammattikorkeakoulu, 2018) This area cannot be reached with the current high-speed electricity machines, which reach maximum rotational speed of 300 000 rpm with power of 60 kW or in turn maximum power of 15 MW with rotational speed of 15 000 rpm (Abebe et al., 2016). This gives ASynRo an even better market potential. Table 1 summarizes different high-speed application types listing their power and rotational speed.

Table 1 Power and speed nodes for different high-speed applications (adopted from Abebe et al. 2016)

Application	Power	Speed (krpm)
Oil & Gas	3 MW to 15 MW	5-15
Spindles	300 W to 60 kW	15-300
Turbocharger	1-3 kW / 10 kW	150 / 80
Air Compressor	40 kW tp 500 kW	15-80
Micro-turbines	30 kW to 400 kW	15-120
Turbo-molecular pumps	50 W to 3 kW	70-100

ASynRo has clear market potential as an efficiency improving solution for high-speed machines. Because of the materials used in its manufacturing, it is cost effective and doesn't face other current problems of permanent magnet electrical machines. Its operating area covers combination of high rotational speeds and power, which current high-speed solutions cannot reach. ASynRo can offer clear improvements to the current solutions on the market. This does not mean it is easy to actualize this market potential, as the market is contested and mature. There are big companies who have operated in the market for decades, and they have knowledge and resources, which are unattainable for a new operator in the market (Abebe et al., 2016). With the right approach and product, it is possible to enter this market successfully, but knowledge of the main competitors and market is needed to make the right decisions regarding market entry and positioning when starting a hi-tech startup.

1.2 Research gap

Startups do not fit the description of any traditional companies and Järvillehto (2018) even describes them as a group of tests trying to find a suitable business model, rather than a company. They have a higher tolerance for risks than traditional companies. Startups are important for society due to their positive effect on economy. They contribute to economic growth and overall market development, besides being a notable employer and a source of tax revenue. (Geroski, 1995; Hathaway, 2013; Järvillehto, 2018) According to Nobelist Edmund Phelps, sustainable economic growth requires the ability to do new innovations. More risk ready startups are good for new development and make the competition, as well as growth in fast global markets possible. They support new ways of thinking and thus innovation, creating new businesses. Startups often develop better products and solve current problems, which would have not been discovered otherwise. (Järvillehto, 2018)

Startup survival rates vary highly depending on the source, partly due to the definition of failure and partly because sometimes it is hard to find information on the failed attempts as they are usually not reported about that much. It is said that even three-quarters of venture-backed startups in the USA don't return the capital of the investors and in the UK yearly 50 new firms are gained and 38 lost making the net entry rate $-1,5\%$. (Gage, 2012; Geroski, 1995) When calculating the amount of exiting companies, it has to be taken into account that some of the companies don't close up because of failure. Acquisitions are one example of this, and it is also possible that the founders cannot or do not want to continue with the company anymore for reasons other than failure. (Gage, 2012) In any case the failure rate is quite high, and most startups fail after product launch. This period is also sometimes called the "valley of death", when studying cumulative loss/profit over time.

The time period from product launch to success is extremely important for a startup and it involves the crossing of the so called "valley of death". As can be seen from Figure 4 during this time the cumulative profit starts to drop even more and will probably hit the project's all-time low. If the new product is successfully commercialized, the business has a chance at success and the cumulative loss will turn into a profit. (Osawa and Miyazaki, 2006) The

problem is how can a startup survive its early stages and what are the factors helping it to reach a point, where the business has a greater chance at success.

1.3 Objectives and scope

The aim of this thesis is to analyze the market situation of hi-tech startups in the area of high-speed electrical machines from the aspect of ASynRo. Different startup pitfalls and success factors are researched and in the end of the thesis, market information is combined with the information about startup success. All of this is considered in the specific case of ASynRo and the possible startup. From the researched success factors recommendations can be made on the best (and/or worst) options found. The purpose is to get insight into the specific market and the function of a startup in it, because a good product is not enough to guarantee success of a business. The information collected in this thesis will help in deciding the first steps for ASynRo as a startup. It has been recognized in the beginning of the project that competing against the big operators already in the market is not a viable option, so a suitable niche for ASynRo should be found through market analysis.

To fulfill the aim of the research three research questions were formed, and they are presented below.

1. What factors affect the survival and success of a new startup in B2B markets?
2. What is the operational and competitive environment in high-speed machine market like?
3. What are the main challenges for a startup when entering high-speed machine market?

The aim of RQ1 is to provide general information about startup survival in B2B markets. The objective of RQ2 is to identify the main operators already in the market and study the market's special features. This will give a better view of the overall market situation and make it easier to start identifying the opportunities for a startup in the target market. RQ3 is combining the information gathered in RQ1 and RQ2 to make conclusions about what this information means to a startup in terms of market entry. The aim of this study is to provide more information to

the ASynRo project, by answering these research questions. Based on gained knowledge possible options for ASynRo as a startup can be identified, and there will be more information about the pitfalls ASynRo could face.

This thesis is made in reference to ASynRo, a project between LUT University and Saimia. The research and analysis are restricted to concern only areas of interest for the project. All the options for ASynRo as a startup are not going to be covered, only ones found to be the most important are going to be researched further. The results will give some insight into the market and startups situation in it, but they will not be a strategy for the startup, only opinions/recommendations based on the results of the research.

1.4 Execution of the research

The execution of the study happened in three parts, the first being the theoretical part. It focused on startup survival, B2B markets and an analysis of high-speed machine market through PESTLE and Porter's five forces analyses. The theoretical part was conducted through a literature review, including the analyses of the market and took place from May to July 2019. The second part of the study was data collection in which the empirical data was collected through in-depth interviews. The interview preparation and contacting of interviewees started in August 2019. The interviews were conducted between September and October 2019. The interviews focused on getting empirical data on personal experiences of individuals experienced in startups. Startup survival, B2B markets and high-speed machine market were the main topics of the interviews. The aim of this part was to extend and compare the empirical data to the findings in the theoretical part. In the last part the results of the theoretical and empirical parts were combined to conduct final results. This final part of the research took place in September and October 2019. The theoretical and empirical findings were compared to find any possible inconsistencies between them as well as to supplement the findings. Methodology and research design are going to be introduced more in detail in Chapter 3.

1.5 Structure of the report

The structure of the thesis by input and output of every chapter is summarized in Figure 4. The thesis consists of eight chapters. Chapter 1 is where the background of the thesis is explained. The aim and the research questions are also introduced. In chapters 2, 3 and 4 literature review is made about startup survival, B2B markets and high-speed machine markets. Chapter 5 describes the research process and data collection. Methods used in the thesis are introduced and reasons of the use of these specific methods are given. The empirical part starts in Chapter 6 where interview results are going to be introduced. The literature review and interview results will provide the base for Chapter 7 where the final analysis is conducted. Chapter 7 will also give the answer to the set research questions. Chapter 8 will present conclusions and summarize the research.

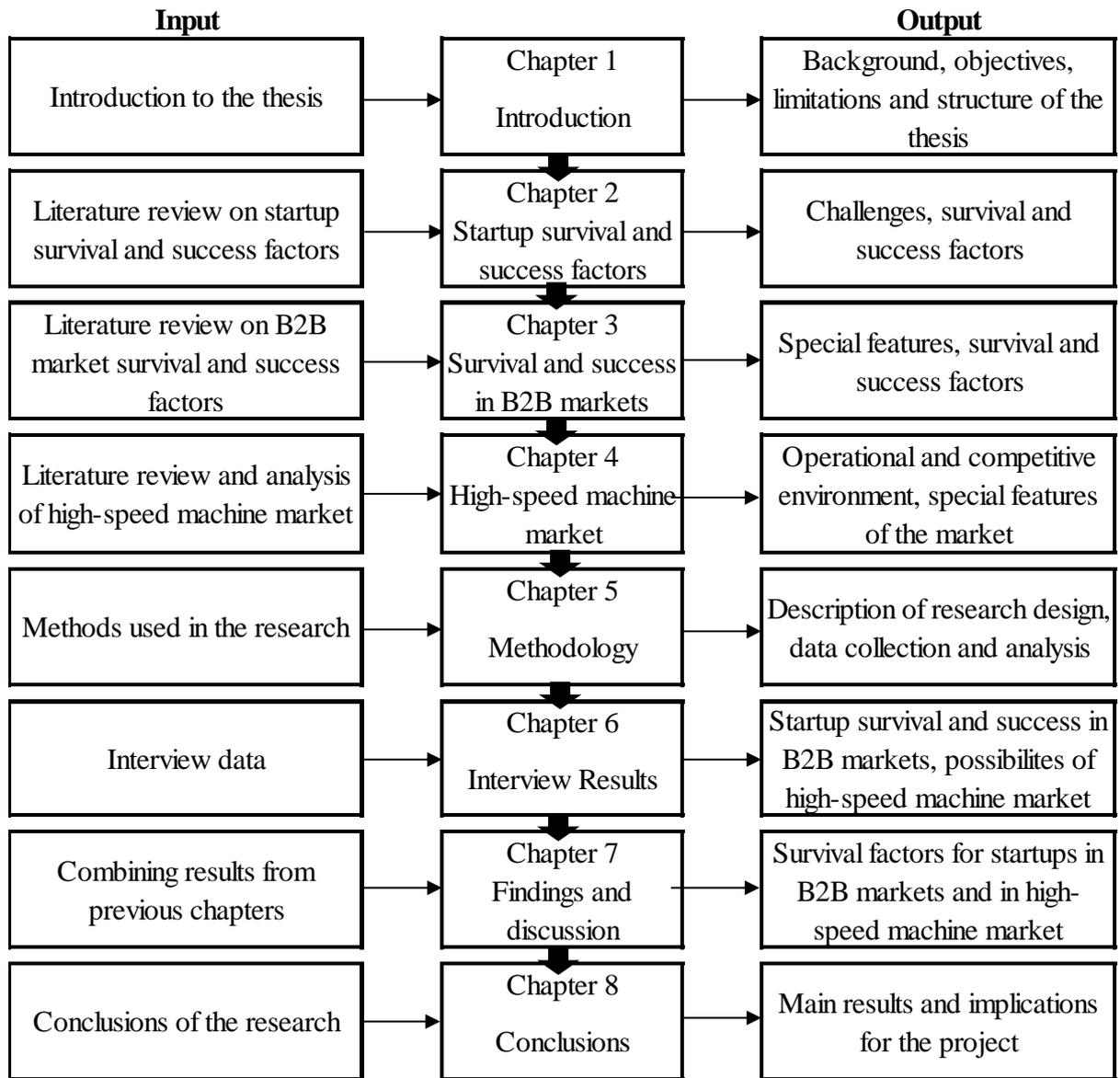


Figure 4 Structure of the thesis

2 STARTUP SURVIVAL AND SUCCESS FACTORS

Startup survival and success has been studied quite widely over the years and different factors affecting it have been recognized. In the following chapter a literature review about startup survival is made and some of these factors are being introduced.

In Table 2 different articles about startup survival are presented by their topics. As can be seen from the table the most discussed topic is spinoffs and collaboration with universities. This topic is usually covered quite thoroughly in the articles. Different spinoff options are researched and the benefits of startup connection to universities are analyzed. The age and size of startups comes up in many articles, but this matter is quite often mentioned shortly, and it is not a main focus of the research. The experience of founders, markets and business strategy are topics often discussed in detail and from different perspectives. Patents, networks and support come up in the articles sometimes but mainly in articles that concentrate on these topics, so they are not general topics occurring all the time. Rest of the topics, which are more specific, are mentioned in only a few of the articles. The complete tables can be found from Appendix 3 and Appendix 4.

There are a lot of factors that affect startup survival, directly or indirectly, and some of them might not be even recognized yet. The initial conditions of a startup have a permanent effect upon survival. This is also something that cannot be later fixed, as the initial conditions will still have an effect, even if they are changed later on to better serve the startup. (Geroski et al., 2010) Vohora, Wright and Lockett (2004) however argue, that with the right entrepreneurial capabilities, some deficiencies and weaknesses, that are the result of earlier decisions, can be overcome.

There seems not to be an ideal number of founders for a startup. It has been studied that smaller and bigger founder groups can both work well, so the group size in itself does not have a significant effect on startup survival. (Aspelund et al., 2005; Kalleberg and Leicht, 1991) More important factor seems to be the heterogeneity in the functional background of the founders, especially in case of a larger founder group (Aspelund et al., 2005). It is also helpful, if the founders have previous experience of working together. What comes to the rest of the startup, team individuals with different backgrounds and personalities can bring diversity to the team. (Grandi and Grimaldi, 2005; Siepel et al., 2017) The choice should however be made carefully, as the initial human capital a startup has at its founding, can have a long-term effect on the firm survival and success (Geroski et al., 2010; Ungerer et al., 2017). This has been found to concern especially the absence of general skills, usually in marketing, and it cannot be deflected by the founder's sufficient human capital. What comes to shortfalls in general complementary skills, they can be compensated by the founder's own human capital, but this is not the case with lack of specific complementary skills. Overall availability of skills can be a significant hazard for startup survival. (Siepel et al., 2017)

The more studied aspect of startup founders is their previous experience, and its effect on startup survival. Former startup experience does not seem to have any effect on survival, but prior experience in business and project management, as well as entrepreneurial education, has been found to positively influence survival. (Coad et al., 2014; Criaco et al., 2014; Helm and Mauroner, 2007) However, Aspelund, Berg-Utby and Skjevdal (2005) did not find entrepreneurial experience to have any effect. Management experience has been found to have a negative impact on early firm growth, but at the same time it has been found to have an overall positive impact on survival (Grilli, 2010; Helm and Mauroner, 2007) The effect founders'

experience, in a specific industry, has on startup survival has been found to be positive as well as negative, while one study did not find connection with industry experience and survival. It seems that generally industry-specific experience can help startups, but it also makes it easy for the experienced founder to return to work in industry. Experience in the startup's industry raises probability of exit by merger and acquisition, while experience in another industry makes closure of startup operations more probable. (Baptista et al., 2011; Criaco et al., 2014; Grilli, 2010; Kalleberg and Leicht, 1991) Emotional commitment towards the startup is also helpful in the early stages, to drive the company forward (Vohora et al., 2004).

University human capital has been found to enhance startup survival, as it helps to create strong ties to universities, supporting the creation of technological alliances and international R&D collaborative projects. Technical expertise is also especially important, when the startup is relying on new technology development. (Criaco et al., 2014; Mustar, 1997) In this university startups have a good position, as they have a strong relationship with universities starting from their founding. An outward-looking attitude combined with institutional constraints, makes a university into a good partner for a startup. Universities often have policies in place that can help a startup, for example, with commercialization and networking. (Box, 2008; Grandi and Grimaldi, 2005; Helm and Mauroner, 2007) This is supported on a more general level by the fact that, registered startups seem to be more likely to survive, as they have to follow some requirements and guidelines to complete the registration (Ungerer et al., 2017). There is also a location benefit associated with universities, and their support may give a startup more credibility. This helps them to overcome the lack of reputation. (Ferguson and Olofsson, 2004; Helm and Mauroner, 2007) Overall university spinoffs (and regular spinoffs) are more likely to survive and succeed than de novo (new) startups, but their concentration on technology can also be their weakness. This is because university researchers often have a narrow knowledge scope. Meaning they are experts only on a narrow field, and they have a lack of training in finance, marketing, manufacturing and other skills needed for general operations management of a startup. (Geroski, 1995; Jorge, 2006) When concentrating too much on technology, consumer needs are easily forgotten. With it the ability to conceptualize, how a technological discovery could satisfy them is lost too. (Vohora et al., 2004)

A startup doesn't have to be a university spinoff, in order to profit from the locational benefit of settling close to a university. Science parks and other different clusters provide image benefits, and startup growth has been observed to be better in these locations. Location is important also to ensure availability of qualified staff, suppliers and purchasers. In case of pilot applications, reference customers are also easier to find. In clusters there is more local competition, which can be a benefit since it forces startups to enhance their operations. A benefit in one cluster might be a hazard in another, as different clusters can operate differently. (Ferguson and Olofsson, 2004; Helm and Mauroner, 2007; Pe'er and Keil, 2013) Startups possessing less resources will benefit from clusters even more, as the importance of access to labor, suppliers and purchasers is heightened. They suffer less from high level of local competition. The same goes with startups with above-average quality of human capital, as they know how to utilize the benefits better to their advantage. Good human capital makes them able to build capabilities, and develop the ability to withstand competition better, so local competition will not cause issues. (Pe'er and Keil, 2013)

Clusters and university collaboration offer networking possibilities, and for startup survival it is important to not isolate the company. Creating links with different players in the target market is a precondition. These players include, not only other enterprises, but research laboratories, public authorities and clients. Networking should be made early in the lifecycle of the startup, to help with growth from the start. Outward-looking approach and open mind about internationalization can support a startup. Research based international contacts are an asset. It should be remembered however, that not all international contacts are beneficial for a startup. Especially foreign R&D subsidiaries, and some acquisitions (not technology related), could hinder startup growth. (Grandi and Grimaldi, 2005; Helm and Mauroner, 2007; Löfsten, 2016; Mustar, 1997) Networking can also lead to different alliances instead of only partnerships. Alliances should be made with more caution, because they can also have negative effects. Before a startup, especially a high technology startup, enters an alliance it should have a specialized technological capability base to benefit as much as possible from the alliance. (Haeussler et al., 2012) Additionally, an insufficient level of social capital can hinder the acquirement of information and resources from the alliance or partnership (Vohora et al., 2004). Collaboration with other organizations at the same value chain level (horizontal alliance) has been sometimes thought to be more harmful, but if a firm possesses the needed capabilities it

can be beneficial. Alliances with organizations downstream in the value chain (downstream alliances), are complicated and no pattern has been found about their benefits. (Haeussler et al., 2012) Surviving startups have more mature value network also in customer dimension, so networking should cover customer relationships as well. This benefit concerns registered businesses, and value network in partner dimension was not affected by maturity when studying startup survival. (Ungerer et al., 2017)

Other connections should be made besides collaboration and alliances. As said before it is important for a startup not to remain isolated, and this extends to financing. Developing organizational processes, routines and capabilities necessary for the startup is expensive and time-consuming (Vohora et al., 2004). Sufficient funding is a must for any startup and, for example, public funding during the initial development phase gives a good basis for operations. Assistance of financial institutions, venture capital support and support from other organizations, public or private, are all viable options for financing. Additionally organizations and institutions have other support activities, or at least monitoring of the progress of the startup after funding is granted, and this is often beneficial for the startup contributing to growth. (Chang, 2011a; Helm and Mauroner, 2007; Jorge, 2006; Löfsten, 2016; Mustar, 1997) However, accounting and banking advice have been noted to not be helpful for a startup, but the more mature financier relationships are in the value network the better (Löfsten, 2016; Ungerer et al., 2017). The key issue with obtaining financing seems to be the credibility of the startup. If this can be overcome, it seems the startup has then crossed one critical step in its development. (Vohora et al., 2004)

It has to be remembered however that no matter how good a startup idea is, no funding will be granted if it requires too much capital, or if it will take too long to get to an exit, and thus for the investors to get a return for their investment. Overall a business plan has to be convincing, including the plan for its implementation. A business model requiring less capital will be more probable to succeed, and one option for this is to create a niche business in a familiar area. When focusing on a narrow niche and specific markets, technological leadership and customer orientation have been observed to be a successful strategy. But even when serving a niche, the product shouldn't be too customized. However, there is no ideal sequence for a business plan for startup survival and success. (Chang, 2011a; Haeussler et al., 2012; Helm and Mauroner,

2007; Mustar, 1997) Being active and encouraging entrepreneurial business behavior and competition, is a good basis for any startup. (Jorge, 2006; Löfsten, 2016) Being able to transform during the development of the startup is important, and this relates to entrepreneurial capabilities. A startup should be able to re-configure existing weaknesses, such as inadequate capabilities, resource weaknesses and social liabilities, into strengths, resources, distinctive capabilities and social capital, to support its survival and success. (Vohora et al., 2004)

A business plan cannot be made without thinking about the target market. Knowing the market is important, and market trends and requirements should be monitored. When deciding which market to enter, market growth is an important factor. A positive rate of growth reflects improved opportunities and increasing markets, while fluctuating markets decrease the survival ability of a startup. Of course, the general economic situation will always affect a startup regardless of industry, but specific markets have their own economic fluctuations and contractions, when entering the market would be more hazardous than normal. (Box, 2008; Geroski et al., 2010; Grandi and Grimaldi, 2005; Helm and Mauroner, 2007; Kalleberg and Leicht, 1991) It is good to note that industries don't seem to have any differences between them in regards of survival (Kalleberg and Leicht, 1991; Ungerer et al., 2017). It is better if entry does not impact market leaders' efforts to serve their customers. Entry to fragmented markets is better, when comparing to concentrated markets. This is because fragmented markets have a smaller average company size, and the few established firms do not control all the necessary assets. Concentration in a market, especially at the time of entry, has a negative effect on firm survival. In concentrated markets a couple of firms have the cost advantage and market power, which leads to fierce competition reducing survival possibilities for startups. It is also enough, if there are a lot of potential entrants trying to get into the market, to cause the same effect an already concentrated market has. Some firm attributes, such as technological radicalness and patent scope, can increase the failure rate when operating in concentrated markets. (Geroski et al., 2010; Nerkar and Shane, 2003)

As mentioned, technological radicalness and patent scope have a negative effect on firm survival in concentrated markets, although they are usually observed as startup failure reducing attributes. Technological radicalness does not always create competitive advantage directly, but the resources controlled by already operating businesses do not give them an advantage over

the startup in this instance. (Aspelund et al., 2005; Nerkar and Shane, 2003) What comes to patents, a broad patent scope can enhance startup survival in fragmented markets. In concentrated markets it would unnecessarily challenge the market leaders. (Nerkar and Shane, 2003) When used in proper setting patents support startup growth, but there has been some evidence that patent advice in itself is not helpful (Chang, 2011b; Jorge, 2006; Löfsten, 2016). Generally, patents have been found to be better way of securing startup's inventions, when comparing to trade secrets. This is because patents have potential future value and can be used as negotiating assets. This value is realized through patent trading. The partial claim patents have on the possible follow-up innovations, is also often forgotten. (Panagopoulos and Park, 2018)

Continuous innovation and new product development is important for a firm to be able to create new patents and radical innovations (Helm and Mauroner, 2007; Hyytinen et al., 2015). Innovativeness can, for example, reduce production costs, enhance market power and help creating dynamic capabilities as well as absorptive capacity. All of which can help a startup to survive and succeed. Startups can also be hindered by innovativeness. Innovativeness can laden a startup with excess liability of smallness and novelty, which then can limit the startup's access to external finance. Overall this reduces the chances of survival for a startup, and if innovativeness is combined with the founders' greater risk tolerance, it can magnify the negative impact on survival even more. (Hyytinen et al., 2015)

Startup size and age are connected with the probability of survival and growth. Generally, the older a startup is the more likely it is to survive. This is loosely consistent with the view, that the older a startup is, the more it has had time to learn to operate in the markets. So the younger a startup is, the higher hazard rate it is likely to have. (Box, 2008; Geroski, 1995; Jorge, 2006; Kalleberg and Leicht, 1991) The size of a startup helps it to accumulate basic competitive assets and skills, which can then help it to survive. It has been noticed that a larger size in the initial year of a startup, will help it to survive longer Just increasing the size of a startup later will be beneficial too. This means that smaller firms have usually higher hazard rates. (Box, 2008; Coad et al., 2014; Geroski, 1995; Geroski et al., 2010) This is not always the case, as there are many other factors that come to play when considering an ideal startup size, and these factors are always individual to a specific startup (Helm and Mauroner, 2007)

The main findings on startup survival factors by their sources are presented in Table 3. The table covers only the most emphasized factors and articles with more information on the topic.

Table 3 Summary of main startup survival affecting factors found in literature

Author(s)	Year	Main affecting factors mentioned
Aspelund, Arild Berg-Utby, Terje Skjevda, Rune	2005	Heterogeneity of the team
Chang, Milton	2011	Segmentation
Criaco, Giuseppe Minola, Tommaso Migliorini, Pablo Serarols-Tarrés, Christian	2014	Industry experience affects university spinoff survival negatively
Ferguson, Richard Olofsson, Christer	2004	Location in cluster
Geroski, P.A.	1995	Spinoffs more successful in entry
Grandi, Alessandro Grimaldi, Rosa	2005	Prior working experience with the team Monitoring market environment Diverse team
Grilli, Luca	2011	Prior work experience in industry raises probability of exit
Helm, Roland Mauroner, Oliver	2007	Location Spinoffs have support of parent company Team Sufficient funding
Hyytinen, Ari Pajarinen, Mika Rouvinen, Petri	2015	Innovativeness can affect survival negatively
Mustar, P.	1997	Networking early on
Niosi, Jorge	2006	Lack of knowledge in finance, marketing, manufacturing and management has a negative impact
Pe'Er, Aviad Keil, Thomas	2012	Location in cluster
Siepel, Josh Cowling, Marc Coad, Alex	2016	Lack of marketing skills a problem Lack of human capital a barrier for growth
Ungerer, Cristina Konig, Marc Baltes, Guido Maki, Katetaka M.	2017	Networking with customers and investors/financiers

3 SURVIVAL AND SUCCESS IN B2B MARKETS

In this chapter a literature review about Business-to-business (B2B) markets and their success factors is made. The context behind the literature review is startup survival in B2B markets, affecting the review and the literature used.

B2B or industrial markets differ from business-to-consumer (B2C) markets greatly, and it is obvious firm survival and success cannot be achieved the same way, as these differences have to be taken into consideration. (Gary L., 2016) Some of the main differences between B2B and B2C markets are listed in Table 4.

Table 4 B2B and B2C market differences (Gary L., 2016; Gordon et al., 1993; Keller and Webster, 2004; Kleinaltenkamp et al., 2015)

B2B markets	B2C markets
Culture of manufacturing and technology	Culture of marketing
Technical value proposition	Perceptual value proposition
Characterized by buyers	Characterized by products
Profit-driven customers	Comfort-driven individual customers
Demand is not based on direct customers	Demand based on direct customers
Few customers	Large customer segments
Large transactions	Small transactions
Personal relationships with customers	Generic relationships with customers
Complex relationship network with multiple stakeholders	More simple networks
Complex buying process	More direct buying
Decisions made by multiple participants	Consumer decides

B2B markets are driven by culture of manufacturing and technology. Their value proposition is usually technical, or economic incorporating significant economic value. (Gary L., 2016) They are not characterized by their products rather the buyers, unlike B2C markets (Keller and Webster, 2004). These buyers, business firms or different institutions, are often profit-driven and constrained by strict budgets (Keller and Webster, 2004; Leek and Christodoulides, 2011). The demand of goods or services is based on, directly or indirectly, the demand of products other companies, households and individuals use. There are relatively few customers and the transactions are large making individual relationships between operators more significant, as most of the profit comes from this small set of customers. (Gary L., 2016; Keller and Webster, 2004) However, this relationship is only a small part of the complete business relationship network the operators live in, involving a variety of different stakeholders (Gary L., 2016; Kleinaltenkamp et al., 2015). The purchasing process is complex in B2B markets and it is guided by the purchaser's customers, products and costs (Gary L., 2016; Keller and Webster, 2004). The process takes usually a long period of time, going through several decision stages making it a combination of individual and organizational decision making. (Keller and Webster, 2004) The buying process is taking this long, because purchasers usually commit to a longer relationship at the end of the process, having long lasting effects on the purchaser's organization. After the purchase a commitment to a technology and supplier has been made. (Kleinaltenkamp et al., 2015) Loyalty can cover also the channel used to distribute the product. Overall in B2B markets strong interdependencies can develop between the operators. (Gary L., 2016; Gordon et al., 1993) All of these aspects, with lack of domain knowledge, make B2B markets complex to research. Data is not that easy to acquire, as different companies consider it a business secret. B2B research can easily be done in different levels, meaning the unit of analysis can be, for example, the buying process. (Gary L., 2016)

As just discussed, single relationships are extremely important in B2B markets, and alliances can add to those relationships strengthening them even further. Suppliers' main strategy is to appear as an attractive and competent partner, which is supported by interaction-oriented capabilities. This can lead to new organizational routines, which can support continuous improvement in new product development and product quality. Continuous development has to be ensured by the supplier, for it is important for the success of the business. The main supporting activities to achieve this are developing, sharing and integrating knowledge within

the suppliers' organization. Interaction-oriented capabilities are not the only ones to support continuous development, as absorptive capability of the supplier can be more important in integrating external knowledge. It helps the adoption of new capabilities, that support developing internal learning in the organization, and can continuously improve the supplier's knowledge base. The relationship between supplier and buyer can benefit from the learning-oriented mindset of both firms, as it strengthens the adaptability of the relationship, and thus its survival and success. (Moreira, 2009) Relationships are long-lasting, and the value assessment by customer occurs before and after the delivery of the product, making it an on-going process. This again makes relationships between customers and suppliers tighter in B2B markets. (Keränen and Jalkala, 2013) The current problems with these relationships, and especially the buying process, stem from the fact that the information and research available consist of old models done decades ago. It is obvious that B2B markets have not stayed the same, as evolving technologies and globalization have had a dramatic impact. The sophistication of sellers is increasing, and suppliers are expected to create value with and for their customers (buyers). (Gary L., 2016; Moreira, 2009) The centralization of buying is increasing and digital information technology, with digital manufacturing technology, has changed the buying behavior (Gary L., 2016).

Marketing in B2B markets is about focusing on the relationships. It studies the repurchase behavior of the customers, through which it wants to achieve strong lasting relationships. (Kleinaltenkamp et al., 2015) Marketing provides knowledge of the customers' needs, and it is a basis for B2B market success (Griffin and Hauser, 1993). Because in B2B markets precision target marketing (personalization and target marketing) is usually a successful strategy, the thorough knowledge of customers is vital (Weinstein, 2014). This customer awareness and knowledge of their preferences and buying processes, is gained through relevant, consistent and creative marketing. With well-done marketing it is possible to achieve a competitive advantage, lower costs and gain support from partners in the value chain. (Keller and Webster, 2004) According to Bossidy and Charan (2004) most marketing plans concentrate on describing product features and promotional material, leaving out important information about customer profiles, sought benefits and business relationships. This leaves marketing lacking, and will not further the success of the business as much. Market orientation has been identified to have quite a wide impact on business performance, and Hult, Hurley and Knight (2004) even found it to

be the most important business performance determinant in their research. This is not a surprise as market orientation, and its approaches, have been identified to have a positive impact on product and process innovation, management, branding, research and development funds. (Merrilees et al., 2011; Weinstein, 2014) The effect towards innovativeness is especially significant (Hult et al., 2004). Branding and innovation are in fact two key marketing capabilities, and they are central factors in explaining marketing performance. Segmentation is part of marketing as well, and it should not be left out from the marketing strategy. (Merrilees et al., 2011) Learning orientation can enhance the effects of market orientation, resulting in better products, processes and ideas. However, learning orientation alone has not been found to have a significant effect on this. (Hult et al., 2004) Figure 5 summarizes factors affecting market orientation, and thus firm performance studied by Adhikari and Gill, 2012.

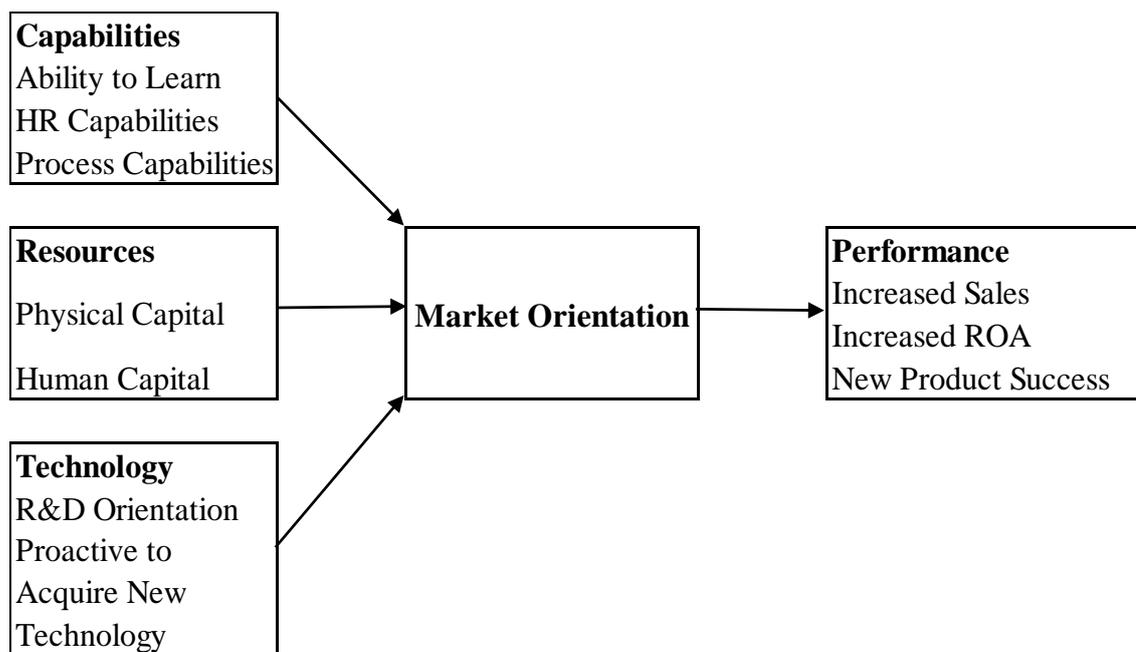


Figure 5 Factors affecting market orientation and firm performance (adopted from Adhikari and Gill, 2011)

The number of employees has a negative effect on sales. This might be because it is harder to manage and coordinate a larger number of employees effectively, resulting in poorer information gathering. Then information gathering about customers suffers, which is vital for market orientation. There is also a negative relationship between marketing expenses and sales, again affecting market orientation negatively. It comes again down to the information about customers, as the lack of marketing resources will make it harder to gain knowledge about them.

Without customer knowledge, it is not possible to concentrate on activities enhancing customer value. Technology orientation has a positive relationship with market orientation, but only when the benefits of the technology can be exploited. This means investments into original technology development and adaptation to them. This is more likely in developed countries. The training of employees can have a negative relationship with sales and market orientation. This happens, if the training needs are not assessed correctly, and then the correct employee capabilities are not going to be enhanced. These capabilities would be required to deliver superior customer value and strengthen market orientation. However, it is not good to focus too much on acquiring capabilities, technologies or resources, if a firm cannot exploit these advantages to the benefit of the customers. It can cause the firm to lose focus of the customer, and negatively affect market orientation, even if the opposite was the desired result. Capabilities should be developed for a reason, and not just for the sake of developing them. (Adhikari and Gill, 2012)

In B2B markets' marketing mix (product, price, place, promotion) should focus more on creating individualized content. Overall marketing mix should be managed in a formalized manner and have measurable objectives, because it leads to higher probability of success. The variables should be developed in synergy with each other, and especially price and product policy interdependencies should have clear management procedures. Synergy should exist also outside the mix between business strategies and marketing mix strategies. (Wieland, 2018)

Branding is of course quite different in B2B markets when comparing to B2C markets, but it does not make its part in marketing any less important. According to a study done by Michell, King and Reast (2001) industrial firms associate strong brands with perceived quality, market leadership, recognizable image and differentiation. Brands are more about intangible qualities, as they emphasize differences in intangible assets, such as reliability, reputation, credibility, service quality and technical expertise. This creates the basis for differentiation and value offering through brands. (Keller and Webster, 2004; Michell et al., 2001) For buyers branding can reduce the perceived risk, provide buyers with reassurance, greater comfort and higher confidence, as well as increase satisfaction. Overall, being able to identify with a strong brand provides the buyer with multiple benefits, in turn making brands important for the suppliers. (Leek and Christodoulides, 2011) Industrial branding should be based on marketing strategy

(Keller and Webster, 2004), and many supplier's brand benefits are actually marketing benefits, as they cannot be always separated. Quality differentiation is made possible by branding, and it leads to premium prices. If the quality differentiation is done properly, it leads to higher demand. Later on, a good brand can be continued with brand extensions, as then it is not needed to build a completely new brand. Branding gives the supplier distribution power, and powerful brands can even act as barriers to entry, protecting the company from new entrants. Brands can be used in goodwill, and they collect more loyal customers also in B2B markets. As mentioned already in buyer benefits, customer satisfaction is usually better with brands and this can lead to referrals. (Leek and Christodoulides, 2011) It is not only the supplier and buyer who benefit from a strong brand, but rather the whole value chain (Keller and Webster, 2004). Branding can help small entrepreneurially oriented firms to focus on the opportunities, that have greater potential to better business performance. It serves as a mediating factor between business growth and entrepreneurial orientation, and it is linked with market performance, through which it enhances business growth. (Reijonen et al., 2015) However, firms in B2B markets find it quite hard to establish and develop their brands consistently, as they have to adjust to changing customer needs at the same time (Beverland et al., 2007).

As an important part of marketing, innovativeness provides solutions for problems and challenges businesses face. These solutions work as a long-term basis for firm survival and success. Innovativeness has been found to be an important factor in business performance, regardless of market turbulence, and it at least partly manages the relationships between market, learning and entrepreneurial orientation, as well as business performance. When a firm is more in touch with buyers and can understand their markets, is innovativeness also more effective, and this can be achieved when innovativeness is supported by learning and market orientation. Learning orientation especially, has an accelerating effect towards innovative activities. All in all, innovative activities are really important for B2B companies, as they are a significant factor in business performance, and thus firm survival and success. (Hult et al., 2004) Innovation has of course challenges in B2B markets, the most notable ones being marketing resources, time and functional power structures. Marketing resources have a direct effect on innovation in firms, as it is part of marketing, and tight marketing resources limit the resources for innovation. Even if innovation has enough resources, limited marketing resources will have a negative effect on innovativeness, as marketing activities help innovation as well. Time-to-market

pressures limit the time innovation has, and innovation processes might not be able to finish completely, if the time pressure is too much. Functional power structures will also hinder creative innovation activities, if they limit the freedom of innovativeness too much. (Workman, 1993)

Agostini and Nosella (2016) studied some factors affecting customer performance, in other words, firm's ability to satisfy customers and gain loyalty. The focus of the study was in brands, innovation and social capital. Their main findings are summarized in Figure 6.

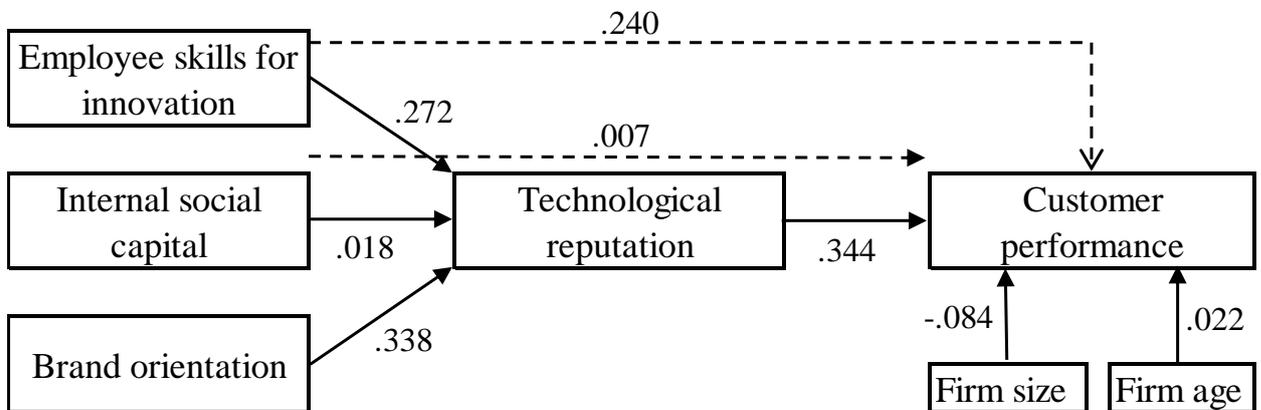


Figure 6 Factors affecting customer performance (adopted from Agostini and Nosella, 2016)

As can be seen from Figure 6, technological reputation acts as a mediating factor between employee skills for innovation, internal social capital and brand orientation. From these, brand orientation has the strongest effect, having the strongest indirect positive effect on customer performance as well. The direct relationship between brand orientation and customer performance was found to be insignificant. Brand orientation has a significant effect on customer performance, only with a mediator present. Employee skills for innovation were found to have quite a strong direct effect on customer performance. It decreased however in the presence of a mediator, technological reputation, but the mediated effect was found to be strong too. Internal social capital had the smallest effect, direct as well as indirect. Firm age and size were also found to affect customer performance. The former had a positive impact and the latter negative, meaning older and smaller firms have a better chance at success. The key factor in Figure 6 is however, the significant role technological reputation has in customer performance. (Agostini and Nosella, 2016) However, in the pursuit of technological reputation a firm should

not be swayed too much away from customers. When developing different technologies, a firm should always keep in mind its customers. (Kohli and Jaworski, 1990)

Segmentation in B2B markets is extremely important for success, as businesses with little to no segmentation are usually not that successful, meaning the target market selection should be done carefully. Its value comes from improved marketing and business performance, which in turn, enhance the firm's chances at success. To ensure proper segmentation it should be included into the marketing plan, as it is part of marketing. Segmentation should not be done too widely or narrowly though. It should prevent companies from fighting operators that are not their true competitors. There is also a danger of over-extending resources, if too many market segments are pursued at the same time. (Kleinaltenkamp et al., 2015; Weinstein, 2014) Additionally, product portfolios should be manageable with no more than four product lines (Wieland, 2018). This is probably why operators concentrating on one segment understand their business and target market extremely well. Precision target marketers are found to be the most successful, as they have personal experience on the segment and know their customers' needs and wants precisely. The single segment strategy is found to be a good strategy for new and small companies, or when a new line of business is entered. The main deciding factors for segmentation are opportunities, sustainable differential advantage, profitability, product differentiation and customer satisfaction. A competitive analysis can help, to find out some of the needed information. The basic selection criteria for segmentation should include the target customers and their quantity, as well as their demands. The number of competitors, their main strategy, role of potential other operators, rules of competition and the degree of success aspired to reach, shouldn't be forgotten either. The more successful companies are however the ones, who are creative in their market selection criteria. (Kleinaltenkamp et al., 2015; Weinstein, 2014)

In Figure 7 the effect of learning orientation, market orientation, entrepreneurial orientation and innovativeness on business performance is demonstrated. Market orientation has the strongest effect. Innovativeness and entrepreneurial orientation were next having an equal effect on performance. Learning orientation had the weakest effect, and as discussed before learning orientation alone has no significant effect, but with, for example, innovativeness or market orientation, its effect is notable. (Hult et al., 2004)

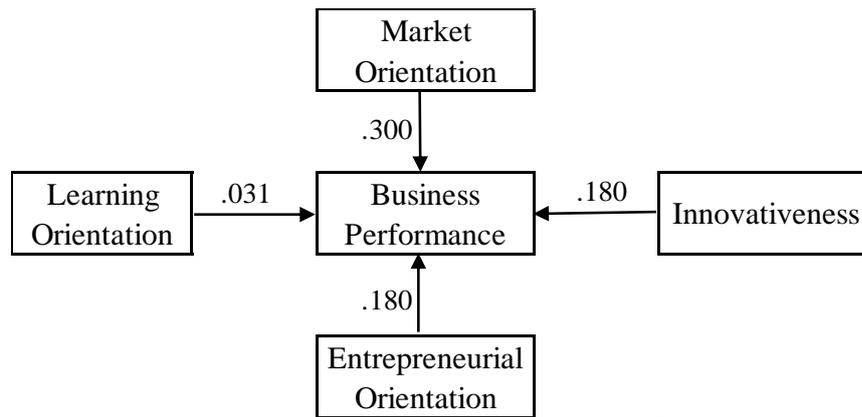


Figure 7 Factors affecting business performance (adopted from Hult, Hurley and Knight, 2004)

Management capabilities can support marketing capabilities by creating an optimal space and atmosphere for market orientation. It is important to be able to tap into the creative market orientation driven processes. At the same time the more disciplined and structured management processes should not be forgotten but be rather closely controlled. (Merrilees et al., 2011) One way how management capabilities support marketing capabilities, is through innovation when managerial emphasis concentrates in creating internal business environment, supporting innovative activities. (Hult et al., 2004)

Figure 8 in turn demonstrates the findings of Reijonen *et al.* (2015). It shows how entrepreneurial orientation affects branding and market performance, as well as business growth, through market performance. Only the significant effects found in the study are shown.

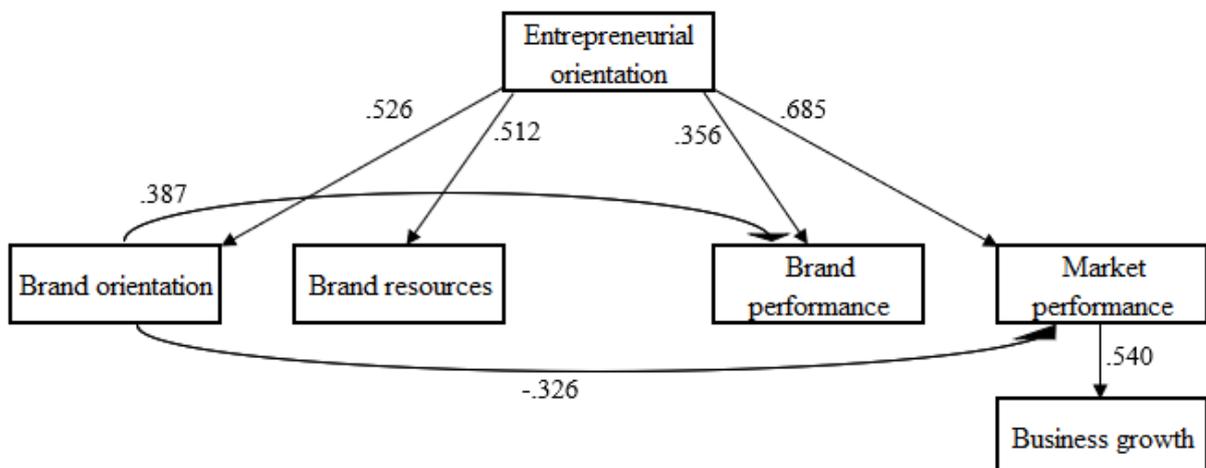


Figure 8 Effects of entrepreneurial orientation on several factors (adopted from Reijonen et al., 2015)

Entrepreneurial orientation is about innovativeness, proactiveness and risk-taking. It is a market driving approach bringing changes and novelty to operations. It is seen as a positive effect towards success, but this effect is mostly indirect. Firstly, entrepreneurial orientation affects brand orientation and resources, as well as business growth, as can be seen from Figure 8. (Reijonen et al., 2015) And as seen from Figure 7 before, it affects business performance on a significant level. It also stimulates market and learning orientation through proactive and risky acts, trying to exploit opportunities. Additionally, entrepreneurial orientation plays a key role in innovation, maintaining and developing it further. (Hult et al., 2004)

4 HIGH-SPEED MACHINE MARKET

Knowing your business environment and responding to the changes happening in it is extremely important for organizations. Changes happen constantly, and if they are not identified and dealt with correctly, it can lead to problems or even failure of the business. To examine the operating business environment of an organization it is possible to use PESTLE analysis and Porter's Five Forces analysis. Using them together helps in painting a detailed picture of the business environment and evaluating a situation an organization is facing. Through these analyses' factors providing insight into future problems or opportunities might be identified. (Cadle et al., 2010) In this chapter PESTLE analysis and Porter's Five Forces analysis are made of the high-speed machine market.

4.1 External operation environment

Below in Table 5 a PESTLE analysis has been made about high-speed machine market, to analyze the operation environment. The analysis is based on literature findings on high-speed technology and markets.

Table 5 PESTLE analysis of high-speed machine market

Political	Geopolitical concerns (Bourzac, 2011; Rowlatt, 2014; Widmer et al., 2015) Funded research programs (Gerada et al., 2014) Overall political atmosphere (Pettorelli et al., 2019)
Economic	Increased cost of energy (Abebe et al., 2016) Lower prices in power electronic circuits (Rahman et al., 2004) Expected fluctuations in gross margin (The Jenner News, 2019)
Socio-cultural	Trend of electrifying future transportation systems (Gerada et al., 2014) Drive towards research and development rising (Gerada et al., 2014) Rising societal concerns about environmental decline among consumers as well as companies (Cambra-Fierro et al., 2008) Rising energy need around the world (International Energy Agency, 2017)
Technological	Advancements in material technology (Gerada et al., 2014) Reliability improvements in high rotational speed machines and bearings (Rahman et al., 2004) Computer analysis and simulation technologies for design processes (Rahman et al., 2004)
Legal	Emission regulations (Abebe et al., 2016) Environmental restrictions (Abebe et al., 2016) Government regulations encouraging increased motor efficiency and reduction in energy consumption (Market Research Future, 2019)
Environmental	Environmental sustainability of the materials (Widmer et al., 2015) Overall mindset towards more environmentally friendly solutions (Cohen, 2014)

For high-speed machines political factors can be a surprisingly big influencer. Geopolitical concerns regarding the security and supply of NdFeB (Neodymium Iron Boron) and Dysprosium have already caused problems in 2008, when China threatened to cut the supply. This was because of political disagreements and tension. (Bourzac, 2011; Rowlatt, 2014; Widmer et al., 2015). Some organizations are aiming to open new mines to negate this threat but at least heavy rare earths (Dysprosium) supply remains in China as the new mines are focused on light rare earths (Neodymium). The new mines will then not take that much of the

supply away from China. As long as this is the case, and these materials are still needed as the main material for high-speed machines, there is no change in sight for the supply dependence on China. (Widmer et al., 2015) Governments may threaten research and development also deliberately or unintentionally in a more general level. This has happened already with the research concerning environmental challenges as, for example, Trump administration in the USA is continuously ignoring the warnings of scientists about climate change. Governments have the power to either help or hinder research and market development, political atmosphere being one important deciding factor in this. (Pettorelli et al., 2019) An example of positive political factor issued by governments is the large number of national and international funded research programs in the area of high-speed machines. This of course drives the research and development of high-speed technologies. (Gerada et al., 2014) Politics can affect the market also in the case of a trade war or other national and global political disagreements. This is why the political atmosphere is an important factor as even its indirect effects can be major to the market. (Cadle et al., 2010)

The cost of energy is increasing, and it is an economic factor driving the market towards research and development. Industry has become more interested in direct drive solutions, which have high power to weight ratio to further enhance the reliability and efficiency of their systems. (Abebe et al., 2016) The prices of power electronic circuits have decreased encouraging even further the R&D of high-speed machines. (Rahman et al., 2004) Overall economic fluctuations around the world will also affect the market (The Jenner News, 2019).

The trend of transportation systems becoming more electricity driven is boosting the interest towards high-speed motors considerably. Overall the drive towards research and development of high-speed applications has seen rapid growth with considerable application uptake in the last few decades. (Gerada et al., 2014) This trend is caused by the strong growth in high-speed machine markets and it is predicted to continue still. The annual growth rate of the global market is predicted to be 3-4%, and a little more in China. The market value is estimated to grow at CAGR (compound annual growth rate) of 2,6% according to a recent study. The intensifying competition will also continue the slow downward trend in price development, that has been going on in recent years. (Market Research Future, 2019; The Jenner News, 2019) Air compressors have been one of the fastest growing market segments inside high-speed motors

(Abebe et al., 2016). The rising energy need around the world is a strong trend and it is not predicted to slow down anytime soon. This trend is feeding the growth of the high-speed market even more. The global energy need is predicted to rise 30% by the end of 2040. (International Energy Agency, 2017) It is probable that high-speed motors will dominate the electrical machine drive research and development due to their market growth, the global energy need and the significant impact these machines could have in many different application areas (Gerada et al., 2014). The trend of rising environmental awareness among consumers and companies will play a part as well (Cambra-Fierro et al., 2008).

Many technological advancements affecting high-speed technology have been made in the recent years. For example, there has been advancements in material technology and reliability of bearings. This has made high rotational speed machines more reliable. And improvements in the enabling technologies, will of course drive the development of the actual technology even further. (Gerada et al., 2014; Rahman et al., 2004) Design processes have improved with the help of computer analysis and simulation technologies, again driving the development of high-speed motors (Rahman et al., 2004). Traditionally spindle applications have been the driving force pushing research and industry towards high-speed direct drive solutions (Abebe et al., 2016).

The legal factor is quite important for high-speed machine market as there are many laws and regulations concerning it. There are regulations about emissions and predictably an increasing amount of environmental restrictions. For example, gas drives would be convenient in many cases, but environmental restrictions have made them increasingly difficult to install. Because electric high-speed drives are the most environmentally friendly compressor drives, they are becoming more and more popular. (Abebe et al., 2016) Many government regulations encourage increased motor efficiency as well as reductions in energy consumption (Market Research Future, 2019).

With the raising awareness of environmental issues there are concerns about the environmental sustainability of the materials used in high-speed motors (Cohen, 2014; Widmer et al., 2015). This concerns specifically the extraction and refinement of Dysprosium and NdFeB, because it is more taxing to mine and produce when comparing, for example, to copper or steel. Overall

when comparing the complete lifecycle production of different materials used in electric motors, NdFeB is clearly the most taxing for environment when produced. (Widmer et al., 2015) The acidification and global warming potential of different electric motor materials can be seen from Figure 9.

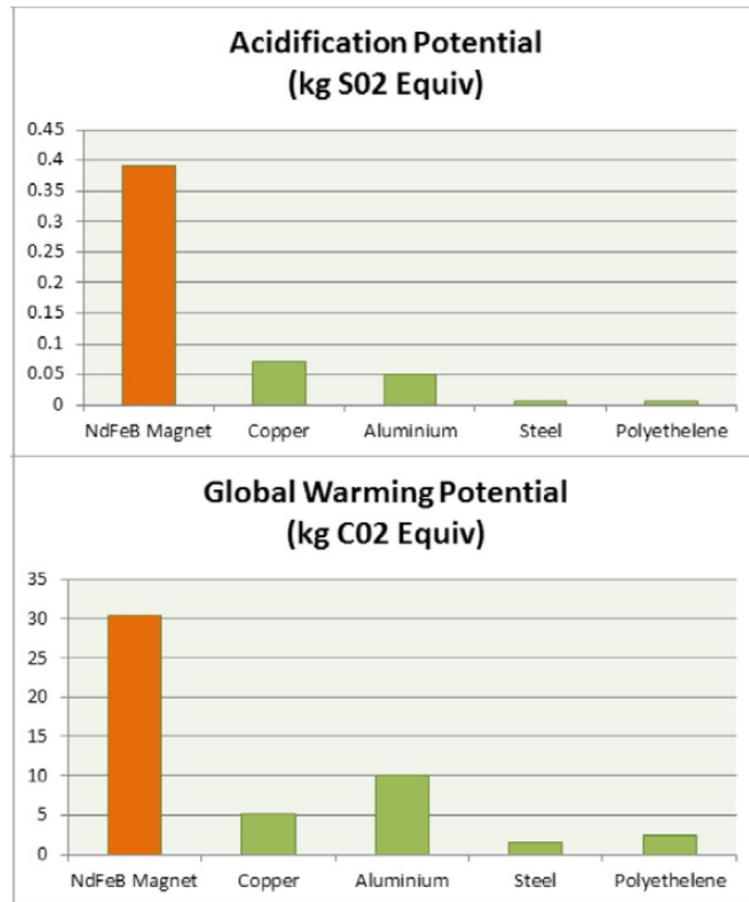


Figure 9 Lifecycle data for production of different electric motor materials (adopted from Widmer et al., 2015)

Besides the environmental effect material procurement is causing, energy consumption is tied closely to the environmental factors as well. The more efficient and the less energy these high-speed motors use the better they will meet the needs of the raising concerns about environmental sustainability. And as it happens, electric high-speed drives are one of the most environmentally friendly compressor drives as there is no oil lubrication system needed and their efficiency is high. (Abebe et al., 2016)

4.2 Industry specific operation environment

Similarly to PESTLE analysis, Porter's Five Forces analysis focuses on the external business environment but it examines the industry or business domain within which an organization operates. It can also identify the business pressures affecting the organization. (Cadle et al., 2010) The possible sources of the pressure are divided into five categories and they can be seen in Figure 10.

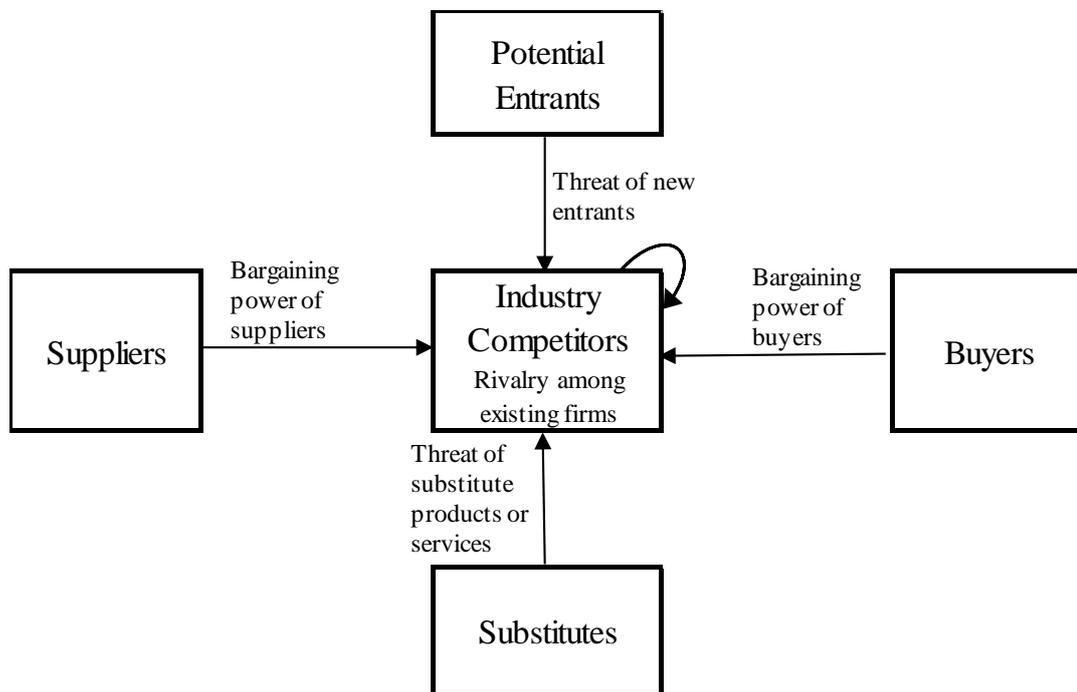


Figure 10 Porter's Five Forces framework (adopted from Cadle, Paul and Turner, 2010)

Below in Table 6 Porter's Five Forces framework analysis can be seen. It has been made of the high-speed machine market based on literature findings.

Table 6 Five forces analysis of high-speed machine market

Potential Entrants: Threat of new entrants	<p>In B2B market loyalty to product supplier can be strong (Gordon et al., 1993)</p> <p>Switching costs can be major (Kleinaltenkamp et al., 2015)</p> <p>Funded research programs (Gerada et al., 2014)</p> <p>Interest in high-speed motor technology R&D raising (Rahman et al., 2004)</p>
Buyers: Bargaining power of buyers	<p>Small number of customers (Gary L., 2016; Keller and Webster, 2004)</p> <p>Large individual transactions (Gary L., 2016; Keller and Webster, 2004)</p> <p>Switching costs can be major (Kleinaltenkamp et al., 2015)</p>
Suppliers: Bargaining power of suppliers	<p>China is the only supplier of specific materials (Widmer et al., 2015)</p> <p>Alternatives to rare earths (Widmer et al., 2015)</p>
Substitutes: Threat of substitute products	<p>Funded research programs (Gerada et al., 2014)</p> <p>Interest in high-speed motor technology R&D raising (Rahman et al., 2004)</p> <p>Switching costs can be major (Kleinaltenkamp et al., 2015)</p>
Industry Competitors: Rivalry among existing competitors	<p>Competitors in different application areas (Abebe et al., 2016)</p> <p>Market predicted to have a positive growth in the next five years (The Jenner News, 2019)</p> <p>As B2B market loyalty to product supplier can be strong (Gordon et al., 1993)</p> <p>Switching costs can be major (Kleinaltenkamp et al., 2015)</p>

As a B2B market, high-speed machine market has quite strong brand or supplier loyalty as it is normal in B2B markets to choose one supplier and then remain with them for a longer period of time (Gordon et al., 1993). The switching costs are usually major too, which strengthens the loyalty to one supplier even more (Kleinaltenkamp et al., 2015). This makes the market less

desirable for new entrants. Different research programs in high-speed area have been funded however in recent years, which will probably increase the amount of potential entrants to the market (Gerada et al., 2014). Generally, the interest towards high-speed motor technology is rising and there is more R&D done, which will again bring more potential entrants to the market (Rahman et al., 2004).

In a B2B market the number of customers is small and they make large individual transactions (Gary L., 2016; Keller and Webster, 2004). This strengthens the bargaining power of buyers, but the large switching costs balance this a bit (Kleinaltenkamp et al., 2015).

In the high-speed machine market China has a really strong position as a supplier of rare earth materials. As the main supplier of the needed materials it has a lot of bargaining power. Some of this power comes also from the size of China as a supplier, when comparing it to companies. The supplier's bargaining power decreases if alternative materials can be used in high-speed motors, or if the amount of rare earths can be reduced in them, and these kind of solutions are already under research. (Widmer et al., 2015)

The threat of substitutes is not extremely high because of the switching costs for a company when they have already committed to one product or supplier (Kleinaltenkamp et al., 2015). As interest towards high-speed machines rises, it is not likely that substitute products are going to enter the market because focus is on the research and development of high-speed technology (Gerada et al., 2014; Rahman et al., 2004). High-speed machines are sometimes even substitutes themselves when they are a more environmental friendly solution (Abebe et al., 2016).

The already existing competition in high-speed machine market is divided in different application areas. These areas are machine tools, power generation, compressors, bearings and other. (Market Research Future, 2019) This will decrease the competition as many of the operators are not actually competing in the same area. The market is also predicted to have a positive growth in the next five years, which will also lessen the rivalry among existing competitors (The Jenner News, 2019). Air compressors specifically is one of the fastest growing market for high-speed motors (Abebe et al., 2016). And again, as in the previous segments, because of the strong loyalty in B2B markets and high switching costs competing with existing

solutions will be harder as customers tend to stick with one supplier (Gordon et al., 1993; Kleinaltenkamp et al., 2015). The market can also be divided by the key industrial applications for high-speed technology, which are electric high-speed drives, air compressors, spindles, turbomolecular pumps (TMP), electrically assisted turbochargers and micro-turbines. Abebe *et al.* (2016) use this classification and they identified some of the key players in each of these application areas. Their identified players in the high-speed industry are collected into Table 7. Some of these players were identified in other literature as well.

Table 7 Some players in high-speed machine market sorted by key application areas (Abebe et al., 2016; Market Research Future, 2019)

Oil & Gas	Siemens-Yaskawa (solid rotor IM)
	MAN (solid rotor IM)
	Sundyne (solid rotor IM)
	GE Power Conversion (laminated rotor IM)
	Toshiba-Mitsubishi (laminated rotor IM)
Air Compressors	K-Turbos (Surface-PM)
	SKF (Surface-PM)
	Sulzer (Surface-PM)
	Corac (Surface-PM)
	CompAir (laminated rotor IM)
	Switch-Yaskawa (solid rotor IM)
	Sundyne (solid rotor IM)
Spindels	Mistubishi Electric (laminated IM)
	Air-Bearings Ltd. (solid IM)
	Servax (laminated IM)
	Siemens (IM and SPM)
Turbomolecular Pumps	Edwards Vacuum (surface PM)
	Pfeiffer Vacuum (surface PM)
	Osaka Vacuum (surface PM)
Electrically Assisted Turbochargers	Cummins (IM inboard, PM outboard)
	Garrett (IM)
	Ecomotors (IM)
	Satcon (IM)
	MHI (PM)
	G+L (PM outboard)
Aeristech (Surface PM)	
Micro-turbines	Capstone (Surface PM)
	Ansaldo (Surface PM)

The other players in high-speed machine market found in literature are summarized in Table 8 below as they were not classified by the industry application. These players are divided into two categories (major players and others).

Table 8 Some current players in high-speed machine market (Market Research Future, 2019; Widmer et al., 2015)

Major players	ABB
	Emerson
	Miedensha
	Hitachi
	Nidec
	Synchrony
	BMW (electric vehicles)
Others	Fuji Electric
	Danfoss Turbocor
	Regal Beloit
	Turbo Power Systems (TPS)
	LTI Motion
	Jing-Jin Electric

Table 8 does not represent all of the biggest players in high-speed machine markets. It is also good to note that BMW is focusing on high-speed technology in electric vehicles, so it is not competing directly in the plain high-speed machine market. What comes to Hitachi it has been involved with the development of solutions with reduced rare earths, mainly with magnets with reduced Dysprosium content (Widmer et al., 2015). In Table 9 the power output and rotational speed of some of the market players' applications are listed.

Table 9 Power-speed nodes for different players' high-speed machines (adopted from Abebe et al., 2016)

	Company	kW	rpm
Air Compressors	K-Turbos	400	65 000
	SKF	150	60 000
		300	30 000
		70	30 000
	Sulzer		50 000
	Corac	150	45 000
	CompAir	300	60 000
	Switch-Yaskawa	300	12 000
	Sundyne	300	60 000
Spindels	Mitsubishi Electric	30	25 000
		22	30 000
		7,5	60 000
	Air-Bearings Ltd.	330 W	350 000
		1,2	80 000
	Servax	60	27 000
		53	30 000
	Siemens	18,5	24 000
Turbomolecular Pumps	Edwards Vacuum		90 000
	Pfeiffer Vacuum		90 000
	Osaka Vacuum		80 000
Electrically Assisted Turbochargers	Cummins	20	120 000
	MHI	2	220 000
	G+L	1,5	160 000
Micro-turbines	Capstone	30	120 000
	Ansaldo	100	70 000

In Table 9 the high-speed applications are PMMs and induction machines (IM) and as can be seen from the table the higher the rotational speed is, the lower is the power output. In these applications the highest power output remains quite low being only 400 kW. The summary of different high-speed electrical machines by Rahman, Chiba and Fukao (2004) has however machines with higher power outputs as can be seen from Table 10. There are machines with as high as 30 000 kW power output and the rotational speeds start from 5250 rpm.

Table 10 Power-speed nodes for high-speed machines found in literature (adopted from Rahman, Chiba and Fukao, 2004)

Machine Type	kW	rpm
Synchronous	30 000	5 250
Synchronous	4 200	4 900
IM	3 500	8 000
IM	6 750	10 000
IM	3 300	11 000
PM	1 000	15 000
IM	556	30 000
PM	70	45 000
SRM	32	48 000
PM	200	60 000
Claw	50	80 000
Claw	31	90 000
Claw	25	100 000
PM	2,6	100 000
IM	10	180 000
IM	1,6	180 000

Figure 11 shows the summary of different high-speed machines with their power-speed nodes from literature and industry both done by Gerada *et al.* (2014). In it the limits of different types of high-speed machines are demonstrated based on the known applications.

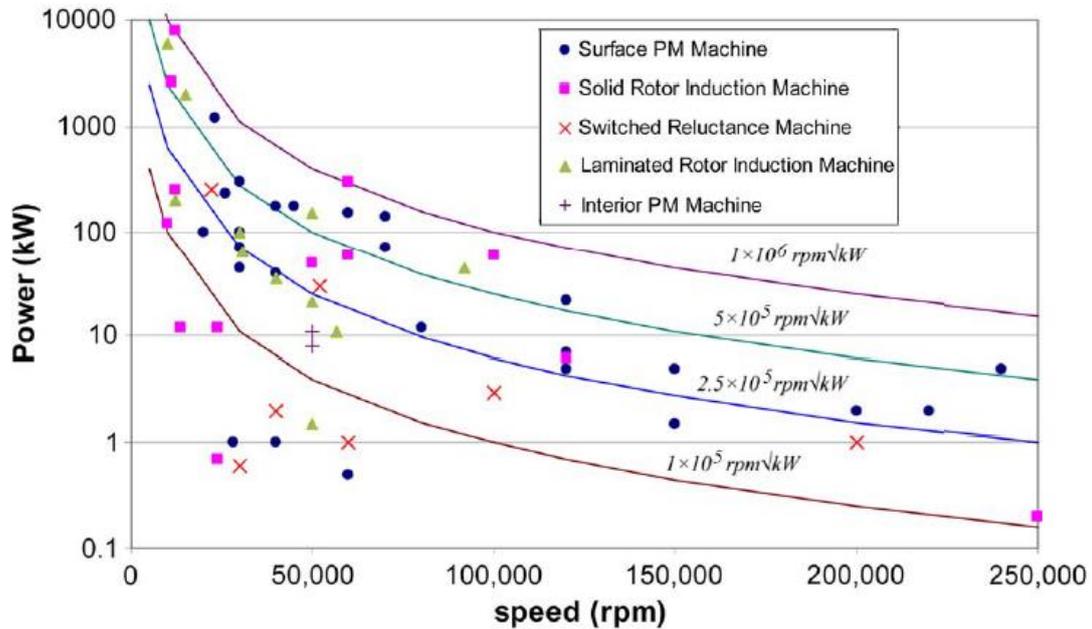


Figure 11 Summary of power-speed nodes of some high-speed machines (adopted from Gerada et al., 2014)

Table 9 and Table 10 are both in accordance with Figure 11. The higher the rotational speed of a machine is, the lower its power will be as can be seen from Figure 11.

All of this information tells how the existing high-speed market is organized overall. The actual competition for a new startup won't consist of all of these different players however, as they are operating inside the market in vastly different areas. The actual competition will consist of the players operating on the specific niche a startup would target. The niche is decided (partly) based on the machine type, rotational speed as well as power output.

5 METHODOLOGY

The aim of this chapter is to provide more information about the overall research design and methods used in this study. First the general research strategy is described, and then the data collection and analysis processes are introduced. Overall this chapter provides the description of the methods used, and the study process starting from theory building, leading to the conclusions made of the results.

5.1 Research design

This thesis is made in context of the ASynRo project, which is a collaboration between LUT University and Saimaa University of Applied Sciences. The thesis contributes to the market research and business planning goals of the project. This is done by furthering the research on ASynRo's market possibilities, if a startup was to be founded after the end of the project. Leading to the aim of this thesis, which is to study the different factors affecting startup survival in B2B markets, in the context of high-speed machine markets. The focus is in startup survival and success factors in B2B markets, and high-speed machine market is only studied in a general level. This means that the thesis does not study any particular high-speed niche markets, only studying the high-speed market as a whole. The study aims to identify the most important factors affecting startup survival, especially in B2B markets, starting with a literature review on the subject. High-speed machine markets are included in the literature review by PESTLE and Porter's Five Forces analyses, made based on literature findings. Then the literature findings are extended and compared to the qualitative data collected in the study.

The data collection uses qualitative method, which is carried out in qualitative interviews as the main research method to get more in depth knowledge on the subject. The aim of the interviews is to extend the knowledge found in the literature review. In qualitative research it is possible to represent the views and perspective of the participants (Saunders et al., 2016). This is one of the reasons why qualitative research was chosen to be used in this study, as getting insight and experiences from the interviewees is one goal of the qualitative data collection. Because interviews allow establishing personal contact to the participants, they were chosen to be used as the qualitative data collection method. The interviews are semi-structured, as it makes them

more flexible and relaxed. It also gives the interviewer the freedom to change the interview structure and questions as needed, during the actual interview. (Saunders et al., 2016) This makes it possible to follow on especially interesting topics appearing during the interview, so previously unknown perspectives can be elaborated on. As Saunders et al. (2016) state, a semi-structured interview is likely to be the best choice if there is a large set of questions, the questions are open ended or complex, and their order may need to be varied. In this study all of these were true, so the nature of the data collection questions supported the choice of a semi-structured interviews as a data collection method.

5.2 Data collection and analysis

The interviews were executed during late September and early October 2019. All the interviews were able to be executed as in-person interviews in Lappeenranta, in the workplaces of the interviewees. One of the interviews was conducted in the premises of LUT University. The interviews were done in Finnish, as it was the native language of the interviewees. The interviewees were chosen from contacts of the ASynRo project team. People experienced with startups in B2B markets were chosen to be interviewed. All of the interviewees have worked with successful startups, and they have been involved with multiple different startups during their careers. The interviewees have worked mostly in B2B markets, and they had little to no experience in B2C markets. The current positions of the interviewees and the interview durations can be seen from Table 11.

Table 11 Summary of the interviews

Summary of Interviews	Interview A	Interview B	Interview C	Interview D
Current Position	Chief Engineer	Chairman of the Board	CEO	Vice President
Duration of the interview	40 min	55 min	45 min	1 h

As can be seen the interview duration was from 40 minutes to an hour. This time was enough with all the interviews to go through all of the topics. The reserved time for the interviews was an hour, but not any of the interviews were needed to be ended in advance. The times present only the recorded times of the interviews, not including introduction of the thesis and the relevance of the interviews to it. Recording was stopped immediately after the answer to the

last question. Many of the interviewees are currently involved with many different projects and companies. Table 11 only presents their main work title.

The interviewees were contacted first by the project team contact person. When the interview was agreed upon, an email was sent to the interviewees to confirm the interview time and to provide the interview themes. (Appendix 2) The interview themes were derived from the actual interview questions. The interviewees didn't get the complete list of interview questions, as the interviews weren't supposed to be too structured. The complete question list could have also led the answers of the interviewees too much in similar directions with each other. The format used in the interviews can be found from Appendix 1. The purpose of the themes was to give the interviewee an idea of the topics, and a chance to prepare for the interview. Because of the interviews were semi-structure, not all of the ready-made interview questions were asked. New ones were even added, as needed during the interviews. All of the interviews were recorded with the permission of the interviewees, for the personal use of the interviewer in this thesis and ASynRo project work. The interviewees were able to specify if they wanted to leave some of their answers out of the thesis, as it is a published work, and to be used only inside the project. A summary based on the recordings was made and sent to the interviewees for review.

The data of the interviews was analyzed from the recordings. The recordings were listened to after the interviews, and a summary of them was made using Microsoft Excel. The findings were sorted by themes. The interviews were not transcribed word-to-word as they were casual in nature. Also, the wording of the interviews was not seen that important to the results. This is because the expressed views and opinions were the focus.

Because the interviewees were selected from the contacts of the project team, it causes limitations to the results. The interviewees can express more similar thoughts than completely randomly selected sample, as they are all from one person's contacts. Thus, the data collected might not be as diverse as it could be, and some factors might be emphasized more and some less, than it would be in a more diverse group. However, interviewees with different backgrounds were tried to be chosen, with their work experience in startups as the connecting factor. The interviewees are all mainly experienced with startups in Finland, although many have done international work. All the interviewees were mainly located in Lappeenranta area,

at the time of the interviews. This context has to be remembered when analyzing the results. The group size causes limitations as it is quite small. Again, some factors and themes might be emphasized more and some less than in a bigger sample.

6 INTERVIEW RESULTS

In this chapter the interview results are going to be introduced. The interviews are going to be gone through separately, to recognize the individual opinions of every interviewee. The aim of this chapter is to present all of the interviews thoroughly to get a good idea of the interviewees' opinions and experiences.

6.1 Startup survival and success in interviews

The main results of the interviews have been collected into Table 12. The findings have been sorted into 15 topics, and as can be seen not all of the topics occurred in all interviews. The interview results are going to be explained in more detail below in the following subchapters.

Table 12 Interview comparison about startups and B2B markets

Startups and B2B markets	Interview A	Interview B	Interview C	Interview D
Team	Commitment, motivation, ability to work with diverse problems	Will, enthusiasm and passion, knowledge of the possibility of failure	Getting along well, ability to work with diverse problems	Sharing the success
Spinoffs	Different, not harder	Possible advantage with good team chemistry	Advantage if group has worked together many years	Quick start, can get stuck in parent company
Location	University	Nowadays no big effect	Shouldn't matter but easier if you are close	Easier if close to investors
Networking	Manufacturers, customers, engineering offices	Hard to receive advice	Customers, don't do what you don't know	Have to increase sales or revenue
Financing	Sufficient, preparation	Depends on the company	Hard to get, if overcome chance at success	Too little, too late
Markets/Market Entry	Patience, more difficult in B2B	Requires face-to-face communication	Timing, in B2B harder to reach target group	Market understanding, financing
Patenting	Protection, value	Part of protection strategy	Value when selling, expensive, sometimes counterproductive	Illusion of ownership, investors value, expensive
Marketing	Done from the start, visibility at fairs etc.	Vision created by marketing not enough	Reputation will not spread automatically	Courage to go and perform
Branding	Reputation		Expensive, fairs and professional events	Needs to evoke emotions, expensive and difficult
Innovation	Customer	Business idea and sales arguments	Customers give free ideas	
Segmentation	Narrow market, niche		Niche in high-speed market	
Management	Customer risk	Competitive and operational environments		
Sales		Better sales arguments needed	Start early on, validity of product	Doesn't usually exist
Starting a Business	Contracts	Team and business idea	Shareholder contract, who is the customer	Financing and team from the start
Motive				Exit not a goal

6.1.1 Interview A about startups

Interviewee A is currently employed as a chief engineer. He has been closely involved with two different startups from their founding stages, the other being a spin-off. Both startups operated in B2B markets, with international activities from the start. Next the interview A results are going to be presented by the recognized themes. The interview summary can be found from Appendix 5, Appendix 6 and Appendix 7.

Interviewee A saw startup survival to be as it is usually presented (one is successful, couple manage and rest fail). Competition is hard and there are so many points, where failure can happen. And all of these points are not about competition. Failure can be caused, for example, by products, processes, funding and customer delay.

In the interview team was mentioned to be one of the critical aspects for a startup, even somewhat more important than financial capital. In the beginning, when teams are small (normally 3-5 people) everyone has to be able to work in all of the areas of the startup. This means that no one can just concentrate and work on one specific task. The team has to be committed and ready to work, as in a small team everyone's contribution is critical. This was one of the things where Interviewee A also felt they had succeeded, when thinking about his experiences. He told they had a committed and a good team. The team understood the company and were ready to work harder, if it was necessary. This was reciprocal, as the company was ready to be flexible towards its employees when necessary. What comes to the specific skills of the team, technology startups need people with technological background, but marketing orientation is still important. Interviewee A also mentioned that it is important for everyone who joins the startup to understand, that it won't grow to be successful fast. You need patience and time.

When comparing spinoffs to other startups, Interviewee A did not see them to be easier nor harder to get to be successful. With the spinoff he worked with, its idea was to be sold from the start, unlike with the other startup. This brought differences in their operations. The spinoff needed also more financial capital, so investors were part of it from the start, which partially led to the goal of the spinoff's sale.

Concerning location, Interviewee A saw university to have had a huge role in both of the startups, especially in regard to technological know-how. He said, that the startups would not have been as big of a success without the university's presence. The availability of resources concerns the location as well, and according to Interviewee A, it helped a lot when, for example, design expertise was available locally through subcontractors.

Interviewee A told, that their idea was not to manufacture but rather to do the assembly. This meant that networking was important, especially with the manufacturers. Then there were different engineering offices, when there were special needs. Doing even partially customized products, networking and working together with customers is essential.

Financing came up as really important for startup survival and success. It was mentioned to be a critical factor for a startup. Interviewee A said, that you should just have enough capital. Normally the budget is too small, so financing should be sufficient. Especially product development is expensive and there should be enough money to do it properly. Interviewee A thought of financing as critical, especially in the beginning stages of a startup, and again later when a startup starts to grow. Financing was also one of the things interviewee A would do differently now, if founding a startup. Financing should be planned for a longer period of time in advance, and there should be some kind of a buffer for unexpected events.

With markets, again patience is needed, as it won't be ready in a couple of years. Instead five years might be a realistic time to think about having a stable customer base for a new startup. And when comparing market entry in B2B and B2C markets, Interviewee A was of the mind, that B2B market entry is more difficult. In B2B markets you have to start with small customers with special needs for their products, wanting to strengthen their position through your offerings. In B2B markets having a big global operator as a customer would require something really unique. Additionally, a startup would need to convince this operator, of their ability to deliver what has been promised.

Patents are used to protect a startup's technology, in Interviewee A's experience. If they cannot prevent the copying of products completely, at least they would delay and restrict it, when

thinking about competition. Patents are also an asset when selling a company, as they bring value to the table. It is completely another thing how to measure this value.

As said a startup team needs marketing-oriented people, besides the ones who have technological background. Marketing must be done starting from the beginning of the startup, or even earlier if possible. In B2B markets there is however, no need for mass marketing. Marketing is more about being visible at fairs and visiting target companies. You have to bring your company up in different occasions.

Interviewee A saw branding to be close to marketing, but with a bigger perspective. Branding is targeted also to the groups operating around the company, and the company's imago is brought up through branding. When you have a good imago, others find it great to work together with your company. This is something Interviewee A felt had succeeded well, with the startups he worked with. He told they were successful in creating the company's brand, and it had a positive effect in the operating sector. Most of the potential customers know each other and will discuss about their suppliers and experiences. And a customer reference is a good reference. In turn bad reputation will make operations harder.

Customer's need is the driving force guiding a company's operations. This concerns especially product development. You have to listen to the customer closely, when doing R&D. Then the product can be developed to the direction of the customer need.

A startup brings some new product or service to the markets. Typically, it is first targeted to some niche, so the market is narrow at the beginning. A small agile operator can then grow the niche market to other application fields, reaching success through that. This is what happens in B2B markets. Mass markets do not work for B2B startups, as they require a huge amount of financial capital. B2C market is another matter entirely.

On the management side, Interviewee A talked a lot about managing customer risk. It is one of the things he would do differently now, if working with a new startup. He would especially think more about the financial risk concerning customer debts, and the management of it. With customers in B2B markets it might take a really long time for them to order, and in the end,

they might not commit to the order at all. It is also typical that when a first order is made, it takes a long time to manufacture it. After this, the customer might test the product at least for a year, preferably two. Only then, might there be a second order. For a startup to survive this, a good strategy is needed. How a startup will survive this time period, when there is no second order. This is critical for survival. Partially this is handled by having more than one customer, as a company cannot rely on one or two customers. The customer relations should also be in different phases, to make it easier for the startup. This is not of course possible in the beginning of the operations, but the operation should be guided towards this continuity from the start. When a startup's operations grow, the management of processes and growth will become another critical factor for survival. If this is not managed, a startup cannot fulfill the orders and the operations will fail.

When discussing about starting a business, interviewee A talked about the importance of contracts. They should be in order between the owner, investors and, later on, between the company and customers. This should be done well starting from the beginning. There should be open communications in the startup, about where are the goals, what is the situation now and how are the operations going to be developed.

6.1.2 Interview B about startups

Interviewee B is currently working as a chairman of the board in a B2B company. He has been working especially in the energy and electricity markets. He has been involved with multiple different startups in their early stages, seeing both successful as well as failing ones. He has acted, as a business advisor and mentor in different companies.

Interviewee B's opinion about startup survival and success is, that maybe one or two from ten will be successful. Some will manage in between but are not going to reach growth. The rest will die out.

Interview B is presented by themes below. The summary of the interview can be found from Appendix 8, Appendix 9 and Appendix 10.

Interviewee B talked a lot about the mindset and attitude of the team. It should be enthusiastic, passionate and the team should have a strong belief towards the startup. At the same time there should be understanding of the probable setbacks a startup will encounter. The team needs people who can develop the business idea on the technological, as well as on the commercial side. There also should be more people able to do this, in case of one leaving the company. A backup person to develop the innovation is needed as well, so the startup doesn't fail, because of the departure of one person. The technology should not overshadow the commercial development. A commercial developer is then another main team member. Leadership skills are also important, and the leadership should be able to inspire and excite the team. One way to do this is by giving team members shares of the startup, as success then means profits for the team as well. Interviewee B felt, that he has worked in teams that have been formed well, are motivating and stayed together. This has helped a lot with the startups. When everyone has in mind the possibility of success, it drives you forward. But at the same time, the team has to be mentally prepared for failure, and it not being anything shameful. All in all, Interviewee B felt the team to be one of the critical factors for a startup.

When comparing spinoffs to other startups, Interviewee B did not see them to have any disadvantages. On the contrary, he saw it as a possible advantage, if the team chemistry has developed in advance before the actual establishment of the startup. According to Interviewee B, the problem will be to find the business developer, as there is a lack of business makers in Finland. The same problem does not exist with technology developers.

Interviewee B did not see location to have a big effect. Expertise has to be gotten somewhere, but nowadays physical location does not matter much. This is especially the case with specialist organizations, where team location does not matter. There are cases, for example, with subcontracting, where logistics has to be arranged and location matters, but it concerns manufacturing.

Companies are usually stuck in their own ways and it is hard for them to seek advice, for example, from business advisors. This is the case especially in Finland, according to Interviewee B.

Financing depends on the company as, for example, it is easier for software companies to acquire the required funds, even from the startup team, as not that much capital is needed. The situation is completely different with big electrical machines as they need more money, and this cannot be found within the team. In the development and refining stages, Interviewee B felt it is best to get financing from public sources. After this, depending how much is needed, different sources are available, when starting the actual business. Business angels, capital investors and international investors are options, where international investors have the means to provide the biggest funding. When applying for different funds, it is essential to be able to describe the innovation appealingly to the investor. Market suitability, sales arguments, market size, future of the market and team are some important things the investor wants to know, that have to be presented well. Additionally, the sales arguments have to be tested, so it will be believable to the capital investor. It is good to remember however, that investors do also realize, that not all startups will be successful, and they have to be ready for it. Even when funding is received startup has to be prepared for the delay of the positive cash flow point in its operations. Then multiple funding rounds might be needed to survive the classical “valley of death”. It is quite common when searching for funds, that the owners are not willing to give up their share of the startup (or part of it), in order to receive funding. This leads to not receiving the necessary funds for development, and in the end surviving the “valley of death” might be delayed. Interviewee B found financing to be one of the critical factors for startup survival.

Interviewee B brought up, that in B2B markets sales are done face-to-face and you have to engage customers with straight communication. The purchasers are professionals and customers require after sales support, if problems arise with the product. This means that the customer has to believe to the long-term survival of the startup, making trust and credibility essential.

Interviewee B saw patenting as a part of the protection strategy, it being only one element in how a company defends against competition and other things. Protection strategy includes all the activities aiming to protect and prevent information flow to the customers and competitors. Besides patents it can include, for example, NDAs, trademarks and confidentiality. Patenting might not even be included into the protection, as it can be really useful but also completely useless. Patents can protect usually at least something, but it can be avoided or bypassed. The

usefulness of them depends on the business idea as well. For example, on software side patenting is really difficult, but with electrical engines areas exist where patenting can be extremely important. It is then possible for patenting to be significant for protection. This is if it is possible to make patents, that can actually protect the invention. Patenting is more important, when a company makes new innovations and price of manufacturing is not going to be used as a competing tool. In funding stage capital investors will look at patents, meaning their value is not only about protection.

In B2B markets Interviewee B found that customer requires better sales arguments, that are based on the customer benefits. In these markets a vision created by marketing is not enough, as it would in B2C markets.

Business idea was one of the critical factors for startup survival mentioned by Interviewee B. A technical or commercial innovation is needed, as well as a plan on how to sell this innovation. This means testing the sales arguments and story. According to Interviewee B it is typical if there is not even knowledge about the potential customers of the innovation, and this shouldn't be the case.

The startup should know, and be aware, of its competitive environment. It should be followed closely, and you should know how it is now, how can it change and how can you protect the startup from it. The operative environment is another thing to follow, and as the world changes faster every day, you have to be aware of this change and be prepared to change with it, if necessary. The lack of awareness of your environment can, according to Interviewee B, lead to failure of the startup. In Interviewee B's experience it is usual for companies to believe they can do and understand everything, and they cannot understand or recognize what know-how they are lacking. This is connected to companies' inability to receive advice from outside. The sales process and decision can take up to five years, and a startup has to manage this time in regard to, for example, financing and team. It is really challenging, and especially from a startup perspective. Usually a proof-of-concept is bought first, and only after testing can multiple purchases be done.

When thinking about starting a new business, Interviewee B says that if you have a good business idea and a good team you have the basis already in order. The team should be willing and skilled, and the commercial suitability of the product/service should be tested. The problem in Finland is usually, according to Interviewee B, the unwillingness to ask, “would you buy”. An analysis of the operational and competitive environment has to be made. A supporting team has to be in order, and a startup should be ready to enter multiple funding rounds. And to get funding, the owners should be ready to give up their own shares.

6.1.3 Interview C about startups

Interviewee C is currently acting as the CEO of a mainly B2B company. He has worked with the company from the start, being one of its founders. He has also been involved with several other startups in B2B markets during his career. Some of these startups have succeeded and some have died down.

At first a startups journey is quite hard, but if the idea is good it will, hopefully, succeed at some point. Interviewee C sees that the trend is nowadays to decide, already when establishing the startup, that it will be sold after five years with a huge profit. This should not however guide the operations too much.

Interview C is presented below sorted by the themes covered. The summary of the interview can be found from Appendix 11, Appendix 12 and Appendix 13.

When talking about team, Interviewee C found team dynamic to be extremely important, meaning the team has to get along well. You will fight, but if you can fight in good spirit it doesn't matter. The founders have to be mentally and financially prepared, as the beginning is usually quite slow and difficult. And what comes to the team, everyone should know different things, but at the same time, everyone should be able and willing to do everything. This means not too much specializing in different tasks. One person is needed to keep the administrative side in order. This person has to be chosen in the beginning and it has to be one person, as it won't work if it is unclear in any way.

With spinoffs Interviewee C saw that the beginning will depend on what kind of people start the spinoff. This is because not all officials employed in bigger organizations will be good entrepreneurs. However, there is an advantage if a group has developed and worked on something together for many years. In this case there is already a good basis, and the spinoff can get a fast start.

According to Interviewee C location shouldn't matter, but it does. It might be easier to get funding if you are located near investors, and overall it is easier to work with companies located near you. If customers are located far away from the company, it will also make it more difficult requiring time and money from the startup.

Networking is important as you shouldn't do things you cannot do. There is always someone who can do them for you. The matter here is, according to Interviewee C, if a startup can afford these services. Collaboration can be one solution to this, but on the other hand it might take time away from your startup and work. Networking with customers is always good, as customers are good at product development and will gladly talk about it with you. The information they provide is free, and they know what is actually needed.

In Interviewee C's own experience, it is extremely hard to get any kind of funding for a startup. Banks do not provide any kind of "risk money", even if you are experienced and have an amazing idea. When thinking about recently graduated people, it will be even harder for them. Lack of money is a big problem, as the founders don't usually have the funds themselves, and they cannot also live without a salary for years. This affects the timeframe when a startup should become profitable, making it quite short. Yet you have to have funding from the start, and the starting funds are critical for startup survival and success. Financial troubles can affect the team relationships, which were earlier named to be one critical factor as well. Interviewee C brought up however, that if you can manage this lack of money for a while, you might even succeed in the end.

Interviewee C felt, that with his latest startup, they had a really good timing in market entry. This was, according to him, quite lucky for them, but it is also possible to affect it to an extent. Their timing was enough early, but they were not the first one, which he found to be a good

thing. This is because the first companies have to make the way for others, and it is really hard taking time and resources. Also, if you need to do product development at the same time, you might be stretching your resources as a startup. In the end after your entry work, others can follow you to the market a lot easier. As the first entrant, you have to explain and convince everyone of the superiority of your product/service. When you achieve this, others will follow immediately copying you. Generally, in B2B market it is harder to reach your target group, but Interviewee C told that in their case it was actually easier. This is because there was a clear need in the B2B market for their offerings, and the customers were public organizations, so they were easy to find. With public organizations a lot of information about them is made public. This made starting a business easier for them, as Interviewee C brought up, usually your customers' problems are not talked about in newspapers.

Interviewee C thought patenting to be useful, at least if you are selling a company, because usually buyers will ask about patents, their amount and field, putting value to them. In certain industries it is also possible to actually protect your know-how with patents, but in others it is not possible or sensible. Both options (patenting and not patenting) have their own advantages. Interviewee C told, that they have decided to not patent their core technology. This is because it would be then immediately copied by their competitors, so the patent wouldn't be able to protect it. They do have patented other things, but it is expensive. Especially, when thinking about startups, Interviewee C mentions the cost of patenting. It is expensive to patent and a startup quite often doesn't have the funds or could use the money to something else.

Interviewee C has experienced, that it is harder to gain good reputation and name for yourself in B2B markets. In B2C markets you can use social media, for example, to spread awareness of your startup and it is quite easy. In B2B markets good reputation will not spread on its own, and even getting names on your reference list might be difficult. This is because companies don't want to tell where they are buying from. Generally, it is harder and more expensive to get publicity, and you have to gain your reputation by going from door to door.

Branding is also expensive, and Interviewee C tells, that he has not done it that much in B2B markets. It also, like marketing, is done by visiting different places. You have to visit different

fairs, and other professional events, to build your brand. Then the information will eventually spread. This however takes a lot of time.

When thinking about critical factors for a startup, Interviewee C mentions the product. You have to have something to sell, and then you have to prove its validity. When the validity of the product or service is proven, you can start the sales work. No one will come looking for your products, and even good ones won't sell themselves. And the earlier you can start the sales work, the better. However, the technology developer might not be the best salesman, even if they are usually the most knowledgeable in the product details.

When starting a business Interviewee C says the shareholder contract to be important. When it is done well everything has been agreed beforehand, and when troubles arise, you already have a ready-made agreement on how things are going to be handled. The contract covers, for example, events when the startup doesn't have money to pay salaries. This makes the harder times easier to handle and decreases disagreements between the shareholders. Besides shareholder contract, the startup should know, who the customers are, who is ready to pay, are there enough of them and are they ready to pay enough. In other words, there should be knowledge about the target customers, and you should not become blinded by your own product. This might make the startup forget that they have to sell something, and not only develop it.

6.1.4 Interview D about startups

Interviewee D is currently acting as the vice president of a B2B company. He has worked and been part of the founding of many startups during his career, and he has experienced success as well as failure. He has helped many other startups also as, for example, an advisor. He has worked mostly in B2B markets, having big international companies as customers.

Interviewee D tells startup survival to be quite poor. Software startups are easier, as they don't need as much capital. Other startups spend a lot of money to product development only, and there is no money left for market entry. There is also the legal side in manufacturing, which will be difficult or impossible to fulfill completely. Still at the moment there is more money

than ever, and not one good idea will be left without funding. Even many bad ideas will get funding at the moment. The trend is now for big companies to work with startups, as without you won't be a good big corporation.

The main results of Interview D are presented below. A summary of the interview can be found from Appendix 14, Appendix 15, Appendix 16 and Appendix 17.

Interviewee D kept teams as a vital part of the startup as, according to him, there is nothing without a team. Good people will make success possible, and this success should be shared within the team. This is because people won't work passionately and with low salary, only to be a part of a startup. You will get better and passionate people by sharing your ownership. Based on Interviewee D's experience successful startups have been owned by the team, not only the original founder. This will create a good atmosphere in the team, and everyone will feel like startup founders. They will work with passion and then you can celebrate success together. The usual problem with teams is that startups have technological knowledge, but market and financial knowledge is missing. International sales knowledge isn't found usually either from a team. It is important to have knowledge from all sectors. Interviewee D felt that team is something he has succeeded with, as he has been able to build a team who has made the startup happen. Only the people will make a startup work, not the founder alone.

Spinoffs get support from a big company, and this will make it possible to enter the market immediately. Interviewee D sees this as an advantage of spinoffs, but the more important advantage spinoffs have is the feeling of trust they can inspire in their customers. This feeling of trust comes from the parent company. Building trust is normally not easy, and a spinoff can have it for free and immediately, making it extremely valuable. What Interviewee D saw as a problem are the people in spinoffs. This is if they have the same attitude, when working in the spinoff, as working in the parent company. This is because the work quality and intensity in a bigger company is not the same in a startup. A startup will require more from its workers. The people get often stuck between the spinoff and parent company too. They want to try to be a part of a startup, but they want to keep the feeling of safety by remaining partly in the parent company. University entrepreneurs have the same issue, meaning they do not commit fully to being entrepreneurs, but keep a steady job on the side. There is always someone who is all in

with a startup, and they will always win a part-time entrepreneur. Because of this, spinoffs often die, as they get stuck in the parent company by the people. There might also be an assumption of sales happening the same way, as in the parent company. A parent company has old customers and a working sales process. With a startup, sales are not going to come as easy, and they will need extra work from the team.

According to Interviewee D location is a disadvantage, if you are located a bit out of the way. This is because investors find it easier if a startup is close to them, and they will be more eager to invest as it is easier to follow the startup's progress. For example, if someone comes to Lappeenranta it means they are already really interested. In Finland Slush is an amazing opportunity, as it gathers world's investors to Finland. Interviewee D says however, that in the end you should be where you like to be, and the feelings are high. You can then stand the disadvantages from everything else.

In networking Interviewee D emphasizes the revenue it brings to the startup. He says that a startup has to be sure, that working with other companies increases sales or revenue. Otherwise it will be wasted work and not worth the time it takes. Working with big companies is dangerous, if it doesn't bring you revenue, as it won't sell your product. You have to always sell your product yourself. Big companies want to usually learn and make sure you are not endangering their business. They won't bring you customers or sell your product, as it doesn't increase their revenue. You shouldn't do collaboration at all, if it doesn't increase your revenue. You must have a really good reason, if you do, such as being allowed to use a big corporation brand. This includes a situation where you are being paid for engineering, as you will be wasting your time, if you are not going to be an engineering office.

In case of financing it is usually too little too late, according to Interviewee D, although it is critical for a startup. Financing is arranged for too short of a timeframe, a year usually. This makes it impossible for a startup to concentrate fully on the business development, when you have to think about financing next year's operations. Interviewee D says also, that there is a lot of financing available, contrary to what is always said. According to him good ideas, and even some bad ones, will get financing. If you do not get financing, you have to think about yourself and your idea. At the same time no one's idea is so unique, that it doesn't have competitors. If

you don't have competition, then you don't have a market. The question is, why would you be better than the hundred other similar ideas, and do you know your competitors. To get financing you have to sell and be better than your peer groups in the world, and if you don't know your peer groups you are out. Your pitch has to be done for every single investor separately, evoking emotions through their individual backgrounds, and making them understand the benefits of the idea. You usually lose already in the quality of pitch material (in Finland), so you have to be better in the individualization of the sales speeches. Owning 100% is not the way to succeed, as you should have owners who can finance. Falling in love with your own share percentage will prevent you from having big investors, who can save the startup when facing bigger issues. To get financing you have to understand money and cash flow, as if you don't know anything about money, who wants to give you theirs. You have to know all the financing opportunities available, and if you don't have this knowledge, find someone who does. The legal side has to also be in order to get money. And when seeking for funds, you cannot promise that with a certain amount of money you will succeed.

When talking about B2B markets Interviewee D brings up the cost of manufacturing, which is extremely high. In this sector software firms have it easier, also when adding the legal side, which is really hard or impossible to fulfill for a startup. The market requires a really good management of money flows. In the other hand you have clear customers you can approach, and the sales argument is usually clear. Offering financial value is easily understood by customers. The market is slow and certain industries in it have extremely long cycles, it being challenging especially for a startup. This puts an emphasis to financing and market understanding. To be able to evaluate a startup's chance at building revenue and reliability you have to understand the market, its time cycles and how does it work. Market entry is done by meeting customers personally and showing them your passion towards your work.

Interviewee D has had success in startups with and without patents. Big companies are afraid of patents, respecting them especially in Europe. It creates an illusion of ownership, and you should have them because the market requires it. A patent that nobody can bypass is extremely rare, and big good patent families with good coverage are expensive to make and maintain. A patent is worth as much as it can be afforded to protect, as it won't protect itself. The biggest

value from patents comes from investors, as they see patents as a proof of newness, and put value to them. Interviewee D adds also, that patents should be written by professionals.

Marketing is going to fairs and events, as no one will come looking for you. You have to have the courage to go and perform, when given the chance, especially if customers are present. And when you have recognized the possible customers, you have to contact them until you get an answer. A big company has multiple ways of contact, and you should use them all, not give up if one try doesn't gain what you wanted.

With branding you need to fulfill only the minimal requirements, as every color, shape etc., has been used already. Building an international brand from nothing is extremely expensive and difficult. It is almost impossible to manage a viral brand, and even harder to create one. Branding is professional work, and according to Interviewee D, a brand has to evoke emotions for it to be something. Through this emotion people will commit to the company. Building a brand is nowadays telling a story about one person. This story has to inspire emotions, that are wanted to be associated with the company. The story makes the company relatable and people will make decisions based on emotions, even in B2B markets.

Interviewee D tells that startups are often too concentrated on technology and production, instead of sales and internationalization, this being common in Finland. It is thought that a good product will sell itself, but no one will buy a product they don't know exists. In Finland everyone wants to be an engineer, and they are not the best salespeople. The problem is that usually everything is known about the technological idea, but sales and marketing plan doesn't even exist, there being no knowledge about this.

When starting a business Interviewee D says, that the financing and team should be in order from the start. You have to know your peer group and the situation in the world around you. This includes answers to questions such as; what others are doing, where are they, is the market big enough, and is the idea actually good enough to survive.

Interviewee D talked also about the motive behind the startup. According to him exit should not be a goal, as you have to have some other reason for working. Maybe you want to change,

improve, save or cure something, but if you don't have this motive you won't succeed. Startup for a startup's sake is nothing.

6.2 High-speed machine market in interviews

The main results of the interviews, concerning high-speed machine market, have been collected into Table 13. The findings have been sorted into three different topics; special features, future and startups. The startup category is about startup's challenges and possibilities in the market. These results are going to be explained in more detail below in the following subchapters.

Table 13 Interview comparison about high-speed machine markets

High-Speed machine market	Interview A	Interview B	Interview C	Interview D
Special Features	Challenging technology, no extensive product portfolio offered yet	Challenging field, reaching the end-customer possibly difficult	Competition with traditional as well as other solutions	Reliability and trust, not many operators
Future	Existing possibilities	Environmental solutions and more application areas available	Different applications will multiply	Growing technology and market, no big changes
Startup	Reliability, quality, right subcontractors	Trust towards the technology and the startup	Knowledge of your technology, finding a niche	Technical solution small part, trust from bigger company

6.2.1 Interview A about high-speed machine market

When thinking about the special features of the high-speed machine market, interviewee A brought up the challenging technology. There is also, to his knowledge, no company offering a bigger variety of high-speed motors, only specific products for specific applications. In other words, there are no so-called catalogue products available.

There are possibilities at the market, if there is a product with low enough manufacturing costs. The costs matter so much, because it would need to compete with traditional gearbox machines. Also no one will be interested, if a new product cannot offer financial savings. Investment costs are the driving feature, and higher ones (maybe 10-20%) can be accepted only, if there are other benefits. This depends of course on the specific case. In the market customers think about investment costs the most. Size and efficiency have some effect as well.

For a startup in the high-speed machine market, reliability of the product is important. The monitoring of the quality of manufacturing, is then essential. When a customer invests, they will assume the product to function at least for years, maybe even tens of years. A startup has a huge risk in this reliability, and it can be learned only through trying. Of course, the know-how of the basic technology has to be there. A startup's new technology needs enough testing hours. This means testing a couple of days in a laboratory is not enough. The best option would be, if a customer could test the new product in their own process. The process would need to be such, where disturbances would not be vital. All in all, a startup needs to have extensive knowledge of their product, and how the whole system works. For startups another challenge in this market would be finding the right subcontractors with the right abilities, as well as reasonable prices, as it is quite common that startups are charged more than others.

6.2.2 Interview B about high-speed machine market

When talking about high-speed machine markets, Interviewee B brings up the challenging nature of it, and the fact that the customers are often big, international companies. Startup must then handle the buying and legal processes of these companies. In this market customer also expects continuity, and requires guarantees in case of, for example, startup bankruptcy. These guarantees might be rights for patents, technology or something else. The purchasing period is long in this market taking years rather than months, and there might be several operators between the end-user and the customer. This means it can be hard to fulfill the end-user's needs, as the operators between have their own agendas and requirements for the product. You cannot bypass these operators, as they often are your direct customers.

Interviewee B believes there to be even more different application areas found in the future for high-speed technologies. There are also rising possibilities for the technology as it can help, for example, with the environment.

For a startup in this market, Interviewee B sees possibilities, especially if the end-user can be reached. Gaining the trust of the customer is essential, and it requires the suitability of the technology for the specific case. Trust has to be gained towards the startup, as well as its technology.

6.2.3 Interview C about high-speed machine market

Interviewee C's experience with high-speed market is not recent. But he was still willing to share some thought about the market. Interviewee C assumes high-speed applications to be normal industry products nowadays. Previously you had to convince the customers of the feasibility, reliability and durability of these kind of products, as they were something new. Now you will need to compete with other high-speed solutions, as well as with other traditional solutions.

The future will probably see more different applications, as they are becoming more common. This is due to the many good features of high-speed solutions compared to the traditional gearbox equipped ones. Interviewee C tells that, when he was working in this industry, they were called frequently about different possible applications. People were inquiring, if high-speed technology could be used in their applications.

From a startup perspective Interviewee C says, that it is important to know the technology thoroughly. There are companies who have been on the market for long, and they have invested a lot of money to it. Therefore, it is not wise for a startup to compete against them. A startup has to find an application area, where no one is yet. In this area (niche) high-speed technology should not be the mainly used technology yet. The area should be enough big and attractive as well. And it should still use more traditional solutions, even though high-speed technology could be used. This kind of area would be a good place for a startup to begin.

6.2.4 Interview D about high-speed machine market

Immediately when talking about the high-speed machine market, Interviewee D calls it a hi-tech niche. At the same time, it is an old technology and the applications are critical in industry processes, meaning reliability and trust are vital. And according to Interviewee D, there are not many different operators.

Interviewee D sees the high-speed machine market to grow in the future. Smaller machines will become more common, and the technology will be needed. The need for high-speed technology will grow, as in the future, processes have to be faster. It is clear that high-speed machines will be needed, and their share and application areas will grow. But what comes to the market otherwise, Interviewee D does not see any big changes in the future, meaning big companies will be able to develop and keep up with the market quite well.

When thinking about startups in this market Interviewee D is of the mind that, if they don't have a bigger company behind them the customer doesn't want to take the risk. A startup would need to first sell to someone who manufactures. Someone who has the customer's trust and can test the startup's product. This is because no one wants to be responsible (in a big company) of choosing an unknown startup's product, if it fails. In the end, the technical solution has quite little value, as it is only a small part of the whole value. The technical promise would need to be amazingly good, and time for return of investment should be extremely short. The market is difficult for a startup, as you have to manufacture, and it is really expensive. However, possibilities do exist, as there are not many specialized in high-speed motors, but the field is not easy.

7 FINDINGS AND DISCUSSION

In this chapter the findings of the theoretical part, combined with the interview results, are going to be introduced. Then the findings and their implications are going to be discussed. The aim of this chapter is to provide an answer to the research questions.

7.1 Findings

The main findings about startups in B2B markets have been summarized in Table 14 below. Next the findings on startups in B2B markets, are going to be introduced based on the categories shown in Table 14.

Table 14 Findings on startups in B2B markets

Startups and B2B markets			
Team	Knowledge from different sectors, versatile Passion, commitment, motivation Marketing skills Team part owners	Patenting	Sometimes useful, sometimes not Expensive Value for investors
		Marketing	Start as soon as possible Knowledge about customers Take every chance, be active
Spinoffs	Support to credibility Stuck in parent company Technology centered, customers forgotten Team from outside		Branding
		Innovation	Listen to customer Linked to market orientation
Location	Not critical University Resources, funding	Segmentation	Knowledge of market Avoid unnecessary competition
Networking	Customers Has to increase revenue		Management
Financing	Critical Plan early and enough Credibility Selling to investors	Sales	Often lacking Has to start as early as possible Knowledge of existence
		Markets Market Entry	Understanding Time of entry Showing the passion Belief in the survival
Motive	Purpose behind the startup		

Team seems to be an important factor for startup survival and success. The team individuals should have different backgrounds and personalities according to literature. Prior experience in business and project management was seen to have positive effect. Otherwise, what comes to experience from specific areas, the literature had conflicting results. In the interviews, the

importance of having knowledge inside the team from different sectors, was expressed as well. The lack of this knowledge was seen as a hazard for startup survival, both in literature and interviews. The ability to work with different problems, was seen as an important skill for team members. The lack of marketing skills was emphasized, and it was presented as a common problem, as it will hinder the startup's growth and chances at success. Technological knowledge is usually found easily from a team, but market, financial and sales knowledge is lacking. The team's passion, commitment and motivation were emphasized in the interviews. The team should also be mentally prepared for hard times, even failure. Giving shares of the startup to the team, was seen to be a good way to motivate and inspire the team members. These factors were not found in literature.

The literature emphasizes the impact of universities, when talking about spinoffs. This did not happen with the interviews. In literature university spinoffs were seen to have better chances at survival, as they can get credibility from the university. This credibility is usually lacking in startups, being one of their main challenges. One interviewee saw this as the biggest advantage for spinoffs. They can use the parent company's brand for free, instilling the feeling of trust in their customers. The problem with this kind of startups is their concentration to technology. The experts in the team are from a narrow field, and lack training in, for example, marketing, finance and manufacturing. This causes customer needs to be forgotten. The interviewees saw this to be a problem too. They told business makers to be hard to find (in Finland), and as many officials are not good entrepreneurs, one has to be found for a spinoff. Team chemistry and development was seen to be an advantage for spinoffs, as the team has probably worked together already. This was found in the literature as well. The results in previous researches about industry experience raising probability of failure, were supported in the interviews. The problem is, that people are stuck between the spinoff and parent company, and it is easy for them to return to their comfort zone, if everything doesn't go as planned with the spinoff. The same concerns university entrepreneurs. Overall, the interviews saw spinoffs just to be different, not necessarily harder or easier to manage, than other startups.

Location is widely discussed in literature, and its effects for startups have been studied quite a lot. This did not transfer to the interviews. The general mindset was location to matter, but it not to be that important in the end. There was also more diversity in these opinions between the

interviewees. Proximity to a university was seen as a positive, and in the literature this benefit is heavily emphasized along with other clusters. Availability of resources was a common benefit, or a disadvantage, a location seems to have, according to literature as well as the interviews. However, in the interviews it was brought up that nowadays physical location does not matter, when needing expertise. The interviewees just generally thought, that it is easier to be located near the other operators, as it is easier to work with companies close to you. Funding is also easier to get, if an investor is close to you. These disadvantages and benefits don't seem to dictate the location of the startup, as they are not impossible to overcome.

In the interviews, when talking about networking, customers were brought up the most. They can help you with product development for free, and you need their input even with partially customized products. Their importance is also mentioned in the literature, as surviving startups have a more mature customer network. The interviewees' expressed, that a startup shouldn't do something it does not know. The negative effects of collaboration and alliances were brought up, both in literature and in the interviews. Especially Interviewee D's opinion was, that you shouldn't do collaboration, if it doesn't increase your revenue. In literature, it is mentioned that a startup should start networking early on to support growth.

Financing was found to be a critical factor for startup survival in literature, as well as in interviews. Every startup needs sufficient funding, and the interviewees expressed that normally the budget is too small. They also highlighted the timeframe for funding. In their opinion it is important, to have funding for a longer period of time, in order to be able to concentrate on business development. There should also be a buffer in case of unexpected events. What comes to how to get funding, in literature the credibility of the startup is mentioned as one of the biggest issues. This is supported by the interviews. The interviews stress the importance of selling the innovation to the investors. The sales arguments have to be tested, and the pitch has to be individualized for every investor separately. Maybe the biggest issue recognized in the interviews, is the founders' unwillingness to give up their shares of the startup. Funding might not be received at all, if this happens. Public funding was mentioned to be good for the initial development phase, in the literature and this was supported in the interviews. Mature financier relationships were seen as positive, and the knowledge about money and cash flows was mentioned to be essential.

The common result about markets was that you have to understand them. It is important to know, how the market works, what are its time cycles and so on. Especially in slow markets (often B2B), emphasis goes to market understanding and financing. The time of entry affects the chances of survival as well. You have to be enough early, but it is not necessarily good to be the first one. It also depends on the economic situation and market growth. In literature it is said that fragmented markets are better for entry, and a lot of entrants at the same time have a negative effect. Emotional commitment to the startup helps with entry, and business generally. In B2B markets market entry is done by meeting customers personally, and it helps if they see the founder's passion towards the startup. Customers need to believe to the long-term survival of the startup, which can be hard to prove in the beginning. It might be hard to reach the customers in B2B markets, but at the same time, when you do you can have a direct relationship with them.

In literature a broad patent scope was seen to enhance startup survival, especially in fragmented markets. In interviews patents were not seen straightly in beneficial light, because they do not necessarily provide protection against copying. Depending on the situation, the interviewees were of the mind that patents might be useful, but they might be completely useless too. Success was not seen to be depended on patents, and it is possible to leave them out completely. The expenses of patents were regularly brought up, as a startup often doesn't have the funds to get and defend patents. So even if the literature is right about patents being beneficial, a startup might not be able to apply for patents. The value of patents for investors, and in other negotiations, was brought up in literature as well as in the interviews.

Marketing is important in B2B markets, and it has to be done starting from the beginning. It focuses on the relationships with single customers, so you have to know those customers well. Without knowledge about customers, it is also impossible to enhance customer value. So in B2B markets, marketing mix should focus on creating individualized content. The literature and interview results both show that marketing is usually lacking in startups, as the focus is on the technology. It is hard work and expensive to gain reputation in B2B markets. Fairs and events came up in the interviews, as good places to promote a startup. Visiting target companies is also important, and every chance at being able to bring up the startup should be embraced.

It is clear brands bring a lot of benefits, also in B2B markets. They inspire trust in the customers and make gaining and keeping customers easier. They are, however, hard to establish and develop. In the literature, changing customer needs, were given as the reason for this, but in the interviews the costs of branding were brought up as a bigger problem. Besides being expensive, branding takes time, and it is basically impossible to create and manage a viral brand. Nowadays, brands are built around people, as they bring up emotions, and through that emotion people will commit to a company. This is because, even in B2B markets, people make decisions based on emotions.

New product development is important for creating new innovations. It can also, for example, reduce production costs. It has been found to be an important factor also in business performance, and employees' skills in innovation affect the customer satisfaction directly. With innovation and product development the need to listen to the customers was emphasized, especially in the interviews. Through this innovation is also linked with market orientation, as the more you are in touch with your customers, the better you can do innovation.

Different studies show that with good segmentation there is a better chance at success. It also improves marketing and business performance. In B2B markets, a startup should begin operations in a narrow niche. Then competing with operators, that are not your true competitors is avoided. Creating a niche business requires also less funding. At the same time a startup should be aware of its competitive and operative environment, and its possible changes.

Managing customer risk and the slowness of B2B markets, is really important for startup survival. There is a huge financial risk in customer debts and in the time in-between orders. This was highlighted in the interviews. Then when a startup starts to grow, its processes and growth has to be managed. This came up also in literature, as it was mentioned that a startup has to be able to transform during its development in order to be successful.

Sales plan is often ignored or left lacking, according to the interviews. When a startup has something to sell, and has been able to prove its validity, the sales work has to start. Generally, the earlier it starts the better, as no one will buy a product, if they do not know of its existence.

It should be also remembered, that the technology developer might not be the best salesman. According to literature too many employees might hinder the sales, as it can have a negative effect on information gathering and customer knowledge.

In the beginning phases of a new startup, validity of the product is important. Startups get stuck in the development phase of their product, trying to make it perfect, instead of going to the customers and negotiating with them. This was agreed on in all of the interviews. Often startups become blinded by their own products, and do not have any knowledge about the target customers. It is important to know your customers, as well as your competitors. What comes to the communication inside the team, it should be open. Contracts should be made in the beginning of the startup between all the involved parties, to avoid fighting and misunderstandings later on.

In the interviews a startup's reason for existence came up. It was said that when thinking about founding a startup, there should be a good reason, motive, behind it. A startup for a startup's sake is nothing, as exit is not a goal. A startup with a purpose behind it, is more likely to succeed.

Table 15 summarized the main findings regarding high-speed machine market. These findings are going to be introduced below.

Table 15 Findings on high-speed machine market

High-speed machine market	Special Features	Trust and reliability Availability of materials
	Future	Growing market More different applications No big changes happening
	Startup	Gaining trust is essential Working with a manufacturer Finding a niche Technical solution small part of value

High-speed technology is really challenging, and the applications are often critical industry processes. This means that reliability and trust are vital. According to the literature analysis, as

well as the interviews, the operators on the market are big international companies, and they have divided into smaller different application areas. Literature is emphasizing the geopolitical uncertainties, concerning the technology. China's monopoly as a supplier, with some of the materials needed in high-speed machines, is presented as a big problem.

In the future high-speed machine market, is predicted to grow. In literature, the environmental trend is named as one of the driving forces behind this growth, and it is said to affect the market positively. Rising energy need, increasing cost of energy, rising environmental concerns, the trend of electrifying future transportation systems and different environmental regulations and restrictions, seem to be driving the development towards high-speed applications. The interviewees were also of the mind, that there is going to be more different applications in the future, and the need for the technology will grow. However, no sudden big changes in the market are to be expected. This makes the situation for a startup harder as a big shift in the market would help a startup in the entry, as it would be able to answer to the changing needs a lot faster than big companies.

From a startup's perspective, the market is really challenging and expensive to start operations in. Here literature and the interviews are also supporting the same opinions, with small differences in their points of view. The customers are loyal to their suppliers, and they might have major switching costs. This loyalty to suppliers is strengthened by the reliability the market requires in the products. Gaining the trust of the customer is essential, and maybe working with a manufacturer could be one way to achieve this. When a trusted manufacturer can test a startup's product, they can verify its validity to the market. Also, it is not that likely a customer will take on a new product, if a bigger company isn't behind it. In the end the technical solution is only a small part of the customer value, and yet it is essential for the startup to know the technology thoroughly. As there are already big companies in the market, a chance for a startup could be to find a small niche. Then competition against the big operators, wouldn't be direct.

7.2 Discussion

Regarding teams, literature and the interviews had similar results. However, in the interviews, giving shares to the team as a way of motivation, was mentioned multiple times. In the literature overall, motivation and passion towards the startup came up only in passing, contrary to the interviews, where it was emphasized. Giving shares to the team, seems to motivate the team well, and better chances at success. There is surely a lot of research on team motivation, but a startup has limited resources, so their situation is not standard. Work in a startup is usually quite demanding, but at the same time the pay is not that high. A startup has to then find ways to motivate its team, with the limited resources it has in its disposal. This might be one factor ignored in the literature.

University spinoffs have been researched quite much, and their chances at survival are seen to be better than those of de novo startups'. In the interviews the advantages of spinoffs were also acknowledged, but with more caution. The literature concentrates on the benefits, while with the interviews the concern of spinoffs getting stuck in the parent company was seen as a bigger problem.

The literature has researched location a lot, but in the interviews, it wasn't seen as that important. Location can make startup's operations easier or harder, but at the same time it isn't critical. The difference, in these varying opinions between literature and interviews, is caused probably by the changing operation environment. Literature has studied location for a long time, and it has had a more important role previously, but nowadays when almost anything can be done through internet and other channels, its importance has changed. The literature hasn't yet just caught up to this development.

Generally, the literature review and interviews had the same results about financing. The difference comes from the fact that, interviews brought up the need to sell the startup idea to investors. This was not talked about in the literature. It might be that this issue is not talked about in startup literature, but more commonly in other publications. The literature didn't also bring up the founders' unwillingness to give up their shares of the startup in exchange for funding. Regardless this seems to be a common problem, but it might not be so outside Finland.

The literature results are mostly from researches done in an international scale and since all of the interviewees had mostly experience in Finland, it is possible this problem is more common in Finland.

In literature patents are seen as an asset and benefit. The interviewees saw them as more complex and sometimes even harmful, and their opinions were based on practicality. Because of their expenses, patents might be completely unrealistic for a startup to get, as the money could be used to something more critical. This was not mentioned in the literature, and it seems to be that the researches focused simply on the effect of patents. There however were not that many researches made from patents in startups, and a startup's inability to get them that easily might be the reason.

It is clear, that industrial brands have a lot of benefits, but literature does not shed that much light into their creation. Industrial branding is not done purposefully that much as it is seen too expensive and complicated. The emotions associated with industry brands were not talked about in literature at all. Literature seems to be lacking in the topic of creation of industrial brands. Branding is a widely covered topic, but not its meaning in B2B and industrial markets. Also, not all of the companies seem to be aware of this topic either that well, or it is not seen as important, if branding is not something a company even considers. This might be the case as startups don't have the funds to do branding properly.

Management of customer risk and the time risk in B2B markets, came up as important for startups in the interviews. This was not covered, however, at all in the literature. The importance of negotiating and talking with the customers, as a part of the sales work, was also lacking in the literature, when comparing to the interviews. And there seems to be no studies regarding success and the motive behind the startup. This was, however mentioned in the interviews.

In the interviews the geopolitical concerns regarding material supply, did not come up at all. It was, however highlighted in the literature as a big concern. The reason to this might be that the interviewees might have not experienced this threat themselves. It is also possible the threat to be so rare, it is not actively on anyone's mind. It was not brought up in the interviews, nor were

specific threats to the high-speed machine market asked. It is then possible that the questions were not leading the interviews into this kind of direction at all.

8 CONCLUSIONS

The world's energy consumption is predicted to grow in the upcoming years (International Energy Agency, 2017) and Industry's part of this is significant. Therefore, if efficiency of electric motors, which are used a lot in industry, could be improved, huge savings could be made. Not to talk about the environmental benefits, in the form of reduction in carbon dioxide emissions. (Gutfleisch et al., 2011; U.S. Energy Information Administration, 2019) As an efficiency improving solution, different high-speed applications could be an answer to this need. ASynRo is one of them, having other benefits also. It doesn't, for example, need rare earth materials, which are mainly produced in China (Widmer et al., 2015). The aim of this thesis is to study ASynRo's potential market and startup's survival in it. Startup survival and success factors in B2B markets were chosen to be studied separately from the high-speed machine market. To fulfill these goals, the following three research questions were formed.

1. What factors affect the survival and success of a new startup in B2B markets?
2. What is the operational and competitive environment in high-speed machine market like?
3. What are the main challenges for a startup when entering high-speed machine market?

The research was able to answer the first two research question, based on literature findings and interviews. The effect team has is significant, and it is important to have a versatile and committed team. Especially lack in marketing skills has a huge negative impact on the startup. The credibility of a startup is a big problem, especially in B2B markets. Spinoffs can at least partially avoid this, as they can get credibility from the parent company. Brands are quite similar. They are beneficial for a startup, but creating a brand is basically impossible for a startup. With a parent company, it is possible to use its brand and gain customers through it. The problem with spinoffs is, that they easily get stuck in the parent company and cannot gain growth on their own. Networking with customers, is important for product development as well as marketing. Sales work has to start as early as possible, as there is a danger of getting stuck in the development phase of an innovation. Customers' opinion is valuable, and it can verify the validity of the product. Financing is a big factor for a startup, and it should be planned in

advance for a longer period of time. Still the financial situation for a startup might be quite tight. Segmentation can then help a startup to enter more suitable market in regards of size and competition.

The third research question was answered, again based on literature and interview results. The importance of trust and reliability is highlighted in the high-speed machine market. This guides the operations and makes market entry for a new operator significantly harder. For a startup, the problem will be to gain the trust of the customers, even if the reliability of the technology can be proven. The high switching costs can also hinder the adoption of new technologies. China's monopoly in regards of the materials could be used as a driver towards this change. As ASynRo doesn't need these materials it is untouched by the threat of China cutting supply. Even though this threat is not common, if realized its impact will be extremely high and trying a new technology might be worth avoiding this risk. The market is growing, and more applications are adopted all the time, which is also good for a startup. On the other hand, no radical changes are likely to happen, so already existing operators are able to respond to the market need. A big shift in the market would help a startup in the entry, as it would be able to answer to the changing need a lot faster than big companies. Because this is not the case, one way of entry would be working with a manufacturer. A startup can gain the trust of the customers through this manufacturer, if the manufacturer will test and verify the reliability of the product. Still because of the market type, a small niche needs to be found for the startup. The market is already divided into different application areas, so the competition would be easier to handle, if it was inside a small niche and not between the whole high-speed machine market.

The limitations of this research come mainly from the interviewees, because they were selected from the contacts of the ASynRo project team. Because of this, the interviewees might emphasize some factors more and some less, than completely randomly selected group would. Also because of the professional experience of the interviewees is mostly from Finnish startups, the results might highlight factors only appearing in Finland, and on the other hand factors common in other countries might be left out completely.

The results of this research give insight for the ASynRo project about startups in the high-speed machine market. Based on the results, the next steps in the market research can be decided. It is recommended to study the found threats for startups in the target market more, and ways to minimize or eliminate these risks. Ways for ASynRo to exploit the different opportunities in the market, should be researched too. This thesis also brought up the limited research regarding startups in B2B markets. There is a clear opportunity for more research on the subject as most of the research done is from startups and B2B markets separately. What comes to the results of this study, because the context of this thesis is the ASynRo project, not all of the findings and recommendations can be generalized.

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APPENDICES

Appendix 1 Interview questions

TAUSTATIEDOT

Haastattelun aika ja paikka:

Haastateltava:

Haastateltavan nykyinen asema:

- 1. Voisitko kertoa ensin omasta taustastasi startupien parissa työskentelystä.**
 - a. Kuinka kauan olet työskennellyt startupien parissa?
 - b. Kuinka monen startupin parissa olet työskennellyt?
- 2. Minkälaisilla markkinoilla olet työskennellyt erityisesti koskien startupeja?**
 - a. Yritys- vai kuluttajamarkkinoilla (B2B vai B2C)?
 - b. Onko startup tarjonnut kulutustavaraa vai palveluja?
 - c. Onko toiminta ollut kansainvälistä?

STARTUPIT

- 3. Mitä mieltä olet startupien selviytymisestä ja menestymisestä?**
- 4. Mitkä ovat mielestäsi kriittisimmät vaiheet startupin selviytymisessä?**
 - a. Yrityksen perustaminen?
 - b. Rahoitus?
 - c. Liiketoiminnan suunnittelu ja käynnistäminen?
 - d. Markkinoille meno?
 - e. Mitenkä näistä pystyttäisiin selviytymään?
- 5. Kun mietit kokemustasi startuppien parissa, pitäisikö jotain erityisen tärkeää huomioida, kun uutta yritystä perustetaan?**
 - a. Jos kyllä, mitä?
- 6. Onko jotain, jonka tekisit toisin kuin aiemmin, jos perustaisit nyt uuden yrityksen?**
 - a. Mietittäessä idean kehittämistä?
 - b. Yrityksen perustamista?

- c. Liiketoiminnan käynnistämistä? / Markkinoille menoa?
- 7. Mikä on onnistunut erityisen hyvin, kun olet ollut mukana startupin alkuvaiheessa? Liittykö se esimerkiksi...**
- a. Työryhmän kokoamiseen?
 - b. Liiketoimintamallin suunnitteluun?
 - c. Markkinoille pääsyyn?
- 8. Kun mietit startupin lähtökohtia, onko mielestäsi hyötyä, jos startup lähtee liikkeelle isommasta yrityksestä tai yliopistosta?**
- a. Entä haittaa?
- 9. Onko startupin sijainnilla suuri merkitys yrityksen perustamisessa?**
- a. Miksi? / Miksi ei?
- 10. Minkälaisen ryhmän kanssa työskentelet mieluiten startupin alkuvaiheessa?**
- a. Minkälaisia ihmisiä haluaisit ryhmäsi jäseniksi?
 - b. Mitenkä aloitat ryhmän kokoamisen?
- 11. Minkälaiset rahoitusvaihtoehdot ovat mielestäsi parhaita startupille?**
- a. Onko rahoituksen saaminen haastavaa? Miksi?
 - b. Miten startup voisi edistää rahoituksen saamista?
- 12. Onko sinulla kokemusta patentoinnista startupeissa?**
- a. Mitä hyötyä patenttien oletettiin tuovan?
 - b. Onnistuiko tämä?
 - c. Onko patentoinnille käytetty jotain vaihtoehtoja?
 - d. Mitä hyötyä tästä odotettiin saavutettavaksi?
- 13. Onko startupin hyödyllistä työskennellä läheisesti muiden yritysten kanssa?**
- a. Onko yhteistyöstä ja kumppanuuksista vain hyötyä vai voiko niistä olla myös haittaa startupille?
 - b. Mitä yhteistyöllä yritetään yleensä tavoitella ja onnistuuko se mielestäsi?
- 14. Mitkä ovat suurimpia ongelmia, jotka startupit mielestäsi kohtaavat?**
- a. Miten näitä ongelmia voisi välttää tai selvittää?
- 15. Mikä on mielestäsi merkittävin asia, jonka olet oppinut startupeista ja niiden parissa työskentelystä?**

B2B MARKKINAT

16. Kun mietit startupeja B2B markkinoilla, mitä tulee mieleesi?

- a. Yrityksen perustamisesta?
- b. Liiketoiminnan käynnistämisestä?
- c. Markkinoille pääsystä?
- d. Markkinoinnista?
- e. Brändäyksestä?

17. Jos sinulla on kokemusta yrityksen perustamisesta B2B markkinoille, millainen kokemuksesi oli?

- a. Millä tavoin startupin toimintatavat muuttuvat yritysmarkkinoilla (B2B) verrattaessa kuluttajamarkkinoihin (B2C)?

18. Mikä tekee B2B markkinan erilaiseksi startupille verrattaessa B2C markkinaan?

- a. Mitä erityispiirteitä B2B markkinoilla on startupin näkökulmasta?

19. Mikä on erilaista B2B markkinalle mentäessä verrattaessa B2C markkinaan?

- a. Onko B2B markkinalle pääsy vaikeampaa?
- b. Miksi? / Miksi ei?

SUURNOPEUSMARKKINAT (Jos haastateltavalla tietoa kyseisestä markkinasta)

20. Kun mietitään erityisesti suurnopeusmoottorimarkkinaa mitä erityispiirteitä sillä on?

21. Minkälaisena näet tämän markkinan tulevaisuuden?

22. Pitäisikö startupin mielestäsi huomioida, jotain erityistä tällä markkinalla?

HAASTATTELUN TEEMAT

- 1. Haastateltavan tausta startupien parissa työskentelystä.**
- 2. Startupien selviytyminen ja menestyminen.**
- 3. Startupin selviytymisen kriittiset vaiheet.**
- 4. Tärkeimmät onnistumiset startupien parissa.**
- 5. Startupin lähtökohdat / Millainen olisi startupin ideaalitalanne alussa?**
- 6. Patentoinnin hyödyt.**
- 7. Omat kokemukset ja niistä opitut asiat. / Mitä tekisit toisin startupien parissa nyt?**
- 8. Startupit B2B -markkinoilla, erityispiirteet.**
- 9. B2B -markkinan erot startupille verrattaessa B2C -markkinaan.**

SUURNOPEUSMARKKINAT (Jos tietoa kyseisestä markkinasta)

- 10. Suurnopeusmarkkinan erityispiirteet.**
- 11. Kyseisen markkinan tulevaisuus.**

Appendix 4 Startup articles summary part 2

Year	Author(s)	Article	Number	Number of founders	Experience of founders	Startup age and size	Spinoffs	Patents	Markets	Networks	Location	Business strategy	Team	Support and financing	Technological radicalness	Innovativeness
2010	Haeussler, Carolin Patzelt, Holger Zahra, Shaker A.	Strategic alliances and product development in high technology new firms: The moderating effect of technological capabilities	12							X		X				
2007	Helm, Roland Mauroner, Oliver	Success of research-based spin-offs. State-of-the-art and guidelines for further research	13		X	X	X		X	X	X	X	X	X		X
2015	Hyytinen, Ari Pajarinen, Mika Rouvinen, Petri	Does innovativeness reduce startup survival rates?	14													X
1991	Kalleberg, Arne L. Leicht, Kevin T.	Gender and organizational performance: Determinants of small business survival and success	15	X	X	X			X							
2016	Löfsten, Hans	New technology-based firms and their survival: The importance of business networks, and entrepreneurial business behaviour and competition	16					X		X		X		X		
1997	Mustar, P.	How French academics create hi-tech companies: the conditions for success or failure	17				X			X		X		X		
2003	Nerkar, Atul Shane, Scott	When do start-ups that exploit patented academic knowledge survive?	18				?	X	X						X	
2006	Niosi, Jorge	Success Factors in Canadian Academic Spin-Offs	19			X	X	X				X		X		
2018	Panagopoulos, Andreas Park, In-Uck	Patents as negotiating assets: Patenting versus secrecy for startups	20					X								
2012	Pe'Er, Aviad Keil, Thomas	Are all startups affected similarly by clusters? Agglomeration, competition, firm heterogeneity, and survival	21								X					
2016	Siepel, Josh Cowling, Marc Coad, Alex	Non-founder human capital and the long-run growth and survival of high-tech ventures	22										X			
2017	Ungerer, Cristina König, Marc Baltes, Guido Maki, Katetaka M.	On the Interconnectedness of Value Network Maturity and New Technology-Based Firm Survival	23				?			X			X	X		

Appendix 5 Interview A summary part 1

Startups and B2B markets - Interviewee A				
Current position	Location	Networking	Branding	Management
Chief Engineer	University has had a huge role in both of the startups, especially with the technological know-how	The idea was not to manufacture but to do the assembly, and then network with manufacturers is important	Branding is kind of like marketing but it has a bigger perspective	Managing the customer risk, customer might not even order or it takes years
Background	Without the university there would be not as big of a success	When doing somewhat customized products networking and working together with customers is essential	It is targeted also to the groups operating around the company	A company cannot rely on one or two customers
Heavily involved with two different startups from their founding stages and acted as a CEO for over 10 years in the other	Resources are important and there has been them especially in the design side which helps a lot	With special needs different engineering offices were needed	The company's imago is brought up through branding and so that others find it great to work together with your company	The customer relations should also be in different phases, which is not possible at first but the operation should be guided towards this continuity from the beginning
Focused in B2B markets with international operations from the start	Innovation	Starting a Business	They were successful in creating the company's brand and it has a positive effect in the operating sector	Typical when first order is made, takes time to manufacture, customer tests 1-2 years, only then makes the second order, this needs a good strategy, and this is critical for survival
	You have to listen to the customer in R&D closely and product is developed to the direction of the customer need	Contracts between owners, investors and later on between company and customers should be well taken care from the beginning	Most of the potential customers know each other after all and a customer reference is a good reference	When the operations grow the management of processes and growth becomes critical for the survival so that the orders can be fulfilled
	Customer's need is the driving force and it guides the company's operations especially in product development	Overall the operations should have open communication about where we are going, are we reaching our goals and how is the operation going to be developed	A bad reputation will make operations harder	Would think more about managing the financial risk in some way concerning customer debts

Appendix 6 Interview A summary part 2

Startups and B2B markets - Interviewee A			
Team	Spinoffs	Financing	Markets / Market Entry
Normally 3-5 people	Did not see a spinoff to be easier or harder	Normally the budget is too small so there should be sufficient financing	Patience is needed as the market is not going to be ready in a couple of years
People who can do many different things and not just concentrate on one specific field/task	With spinoff the idea was to sell from the start compared to the other startup where selling was not a goal	Enough capital to be able to do things	Maybe five years is a realistic time to think about having a stable customer base
Technology startup needs technological background but marketing orientation is still important	The spinoff needed more financial capital so investors were part of it from the start	Especially product development is costly	Market entry: More difficult than in B2C, probably starting with small customers with special needs for their products and want to strengthen their position through this
Somewhat even more important than the financial capital	Segmentation	Critical factor in the beginning, and again when the growth starts	Market entry: To have a global operator as a customer would require something really unique and the challenge would be to convince them of the startup's ability to deliver what has been asked
Committed and ready to work, everyone's contribution is critical in the beginning in a small team	Through a startup some new product or service is brought to markets and it is typically targeted to some niche	Would do some things differently mainly concerning financing, it should be planned for a longer period of time and have some kind of a buffer for unexpected events	Marketing
Critical factor	The market is narrow at the beginning	Patenting	Marketing must be done starting from the first day of the startup or even earlier
The team was really good and committed, in hard time they had motivation and understanding where the company was and it worked other way also for the company was ready to be flexible for the staff	Small agile operator is able to grow the niche market to other application fields and through that reach success	Patents protect and at least delays and restricts the copying of products when thinking of competition	No need for mass marketing, rather visibility at fairs and visiting target companies
Everyone who joins the startup has to understand that there is no success in 6 months	Mass markets do not work as there is not enough financial capital, B2C market is a different matter	When selling a company the IPR matters as it brings value, although how to measure this value is another thing	Bringing your company up in different occasions

Appendix 7 Interview A summary part 3

High-speed machine market - Interviewee A		
Special Features	Future	Startup
Typically a challenging technology, technological challenges big	Possibilities exist	The reliability of the product is important
Don't know that there is a company offering a bigger product family only specific products	The manufacturing costs would be in a level where it is able to compete with traditional gearbox machines	When a customer invests they assume the product is going to function for years (tens of years even)
No "catalogue products" available	Financial savings	A startup has a huge risk in this reliability, and this can be only learned through trying
	Customer thinks about the investment cost, the size and efficiency have some effect	The know-how of the basic technology, having enough testing hours and knowledge how the whole system works
	As the driving feature, investment cost can be a bit (maybe 10-20%) higher if there are other benefits, depending on the specific case	A couple of days in a laboratory testing is not enough, best would be if a customer would test in their own process where a disturbance would not be vital
	High-speed technology has many application possibilities especially in process industry	Finding the right subcontractors with the right abilities and a reasonable price as startups are often charged more
		The quality of manufacturing is essential

Appendix 8 Interview B summary part 1

Startups and B2B markets - Interviewee B			
Current position	Location	Starting a Business	Patenting
Chairman of the Board	Not that big of an effect	If you have a good business idea and a team you have the basis in order	A part of protection strategy
Background	Expertise has to be gotten somewhere but physical location doesn't matter that much	A willing and skilled team	One element in how to defend against competition and other things
Has developed business activities and business in the field of energy and electricity in B2B markets	Subcontracting etc. is a different matter as then logistics has to be arranged and location matters	Commercial suitability of the product/service is tested	Can be really useful or completely useless
In multiple different companies also as a mentor and business advisor	When talking about specialist organization, team location does not matter that much	A Finn never asks "would you buy"	Can protect at least something but it can be avoided or bypassed
Involved with the founding and early stages of multiple companies	Innovation	The analysis of the operational and competitive environment	Depend on the business idea if useful (on software side really difficult, with electrical engines areas exist which can be pivotal to patent)
Has experienced successes as well as bankruptcy with startups	Business idea is critical for startup survival	Supporting team	Can be significant for protection if possible to accomplish and actually protects
	A technical/commercial innovation and how to sell it	Ready to enter multiple funding rounds	In funding stage capital investors look at patents
	Testing of the sales arguments and story	Owners ready to give up their own share to receive funding	More important when making new innovations and price of manufacturing is not competed with
	Typical if there is not even knowledge about the potential customers of the innovation		Protection strategy includes all the activities aiming to protect and prevent information flow to the customers and competitors, including NDAs, trademarks and confidentiality

Appendix 9 Interview B summary part 2

Startups and B2B markets - Interviewee B			
Management	Team	Markets	Financing
Competitive environment has to be followed, how it is, how can it change, how can you be protected from it	The will and enthusiasm to succeed, the team should be passionate	B2B markets require selling face-to-face and engaging the customer with straight communication	At first public financing when refining and developing the idea
The operative environment is changing as the world changes faster every day, you have to follow this change and be ready to change with it	Passion and belief and at the same time understanding that there will be setbacks	Purchasers are professionals	Easier to get, for example for software companies, even from the team
Companies do not usually understand or recognize what know-how they are lacking and believe they can do and understand everything	Persons who are capable to develop the business idea on the technological and/or commercial side, a risk if there is only one who does this if they leave the company	Customers require after sales support, if problems arise with the product. This requires the customer to believe in the long-term survival of the startup so trust and credibility are essential.	Big electrical machines need more money, not found from the team
Purchasing takes time and first usually proof-of-concept is bought and only after testing it, can more volume come from buying	There needs to be a backup person to develop the innovation	Marketing	Business angels can provide maybe 100k, capital investors a couple of millions and international investors more
The purchasing process and decision can take up to five years and how to manage this time (financing, team etc.) is challenging	Commercial developer from the business side is another main member	The customer requires better sales arguments based on the benefit for the customer, a vision created by marketing is not enough	It is essential to be able to describe the commercial and technical innovation for the investor (suitability for market, sales arguments, market size, future of the market etc.)
Networking	Leadership skills are needed, how to inspire and excite the team	Spinoffs	Sales arguments (sale story) have to be tested in the beginning or else it won't be enough believable to the capital investor
It is usually hard for companies to seek advice, for example from business advisors, especially in Finland	Ownership is one way to inspire team members, because there is a possibility to profit from the startup later on	Does not seem to be a hindrance	Prepared for the delay of the positive cash flow point and multiple funding rounds are needed, meaning surviving the classical "valley of death"
	Forming, motivating and keeping the team together has succeeded well	Could be an advantage if team chemistry has developed already in advance	One or more of the owners do not want to give up their share when searching for funding, meaning funding is not received and the development and surviving "the valley of death" might be delayed, this is a common problem
	Everyone has in mind that we might succeed but at the same time you have to be mentally prepared for failure and bankruptcy, and remember it is not something to be ashamed of	The problem will be to find the business developer, technology developer can be found but there is a lack of business makers in Finland	Investors understand that not all startups will be successful and you have to be ready for it
	One of the critical factors for a startup		Critical for startup survival

Appendix 10 Interview B summary part 3

High-speed machine market - Interviewee B		
Special Features	Future	Startup
Challenging field	The technology can help, for example with the environment	Gaining the trust of the customer requires the suitability of the technology for the specific case
Often international and big companies as customers so how a startup handles their buying processes and legal side as well	More different application areas found in the future	Trust is essential, the trust towards the startup as well as towards the technology
Customer expects continuity and will require guarantees, for example rights for patents, technology or something else, if something happens		If you can reach the end-user there are possibilities
Purchasing period is long, taking years rather than months		
There might be operators between the end-user and the customer. Everyone has their own requirements and needs so it is hard to fulfill the end-users actual needs as you cannot bypass the direct customer.		

Appendix 11 Interview C summary part 1

Startups and B2B markets - Interviewee C				
Current position	Location	Market Entry	Sales	Team
CEO	Maybe it is easier to get funding where the investors are	Was done in a good time, enough early but not the first one	Below some critical factors	Founders have to be mentally and financially prepared, as the start is usually quite slow and difficult
Background	It shouldn't matter but it does	The timing was a bit lucky for them but you can affect it yourself to an extent	You have to have something to sell	Getting along well is extremely important as in the end you will fight but if you can fight in a good spirit it doesn't matter
Has been involved with several startups	It is easier to work with a company who is located close	The first companies have to make the way for others and it is really hard, taking time and resources (not to talk if product development is done at the same time) and in the end others following can copy and imitate your business/product	When you can prove your product's or service's validity then you have to just start the sales work	Should know a bit different things
Some grew to be bigger and successful, some died down	If customers are far away it will be more difficult and takes time and money from the startup	Being the first you have to explain and convince everyone of the superiority of your product/service and immediately when you achieve this other will arrive to the market	(Even) Good products don't sell themselves	Everyone still should be able and willing to do everything, not too much specializing
		In B2B market it is harder to reach your target group	The earlier you can start the raw sales work the better	One person who keeps the administrative side in order, and this should be decided on in the beginning
		For them personally B2B markets were easier to enter as there was a clear need and the customers were public organizations, meaning they were easy to find as the information was public and they were talked about in the newspapers. This made starting the business easier.	The technology developer might not be the best salesman	

Appendix 12 Interview C summary part 2

Startups and B2B markets - Interviewee C			
Networking	Spinoffs	Financing	Branding
You shouldn't do things you cannot do as there is always someone who can, another matter is if a startup can afford them	Depends what kind of people start the spinoff as all officials will not be good entrepreneurs	Really hard or impossible to get	Branding is expensive, they have not done it that much
Collaboration can be one solution to this, but on the other hand it might take time away from your startup and work	There is an advantage if a group has developed and worked on something together for many years, meaning there is already a good basis	Banks do not provide even if you are experienced, not to talk about recently graduated	It comes from doing and going, you have to visit different fairs and other professional events, and the information will eventually spread
Networking with customers is always good, they are good at product development and they give information for free	Patenting	Lack of money usually a big problem	Marketing
Starting a Business	At least a benefit when it comes to the selling of the company, usually buyers will ask about patents, their amount and field	Usually founders' don't have the needed money themselves and they cannot also live without salary for years, this affecting the timeframe when a startup should be profitable (this being usually quite short)	In B2B markets it is harder to gain a good reputation and name for yourself, in B2C you can use social media for example and it is quite easy
A good shareholder contract should be made	In certain industries it is possible to actually protect your know-how with patents but in others it is not possible or sensible	Financial troubles can affect the team relations	Good reputation will not spread on its own and even getting names on your reference list might be difficult
The shareholder contract should include all the actions made if for example the startup cannot pay salary to everyone, it is an agreement where everything is already decided beforehand in case of disagreements between the shareholders	They have not patented (and it would not be beneficial) their own (main)technology as then anyone could copy it, but other things they have patented	If you can handle the lack of money for a while you might even succeed in the end	You have to gain your reputation going from "door to door"
Who are the customers, who is ready to pay, are there enough of them, are they ready to pay enough	Patenting and not patenting have both their own advantages	You have to have funding from the beginning, the starting funds are critical	It is harder and more expensive to get publicity
Do not become blinded by your own product/work so much that it is forgotten that you have to sell something	It is really expensive and a startup does not necessarily have the funds for it, or it wouldn't be sensible to use the money on it		

Appendix 13 Interview C summary part 3

High-speed machine market - Interviewee C		
Special Features	Future	Startup
Probably nowadays a normal industry product	Different applications will become more common as it has so many good features compared to the traditional gearbox equipped solutions	The technology has to be known thoroughly
Previously you had to convince the cutomers of the feasibility, reliability and durability of these kind of products	They were called frequently about different appliactions if high-speed technology could be used (at that time at least)	As there are companies who have been on the market for long investing a lot of money to it you have to find an application area where no one is yet
Thinking that now you have to compete with traditional as well as other high-speed solutions		An area where high-speed technology could be used and where more traditional solutions are still in use
		Enough big and attractive application area

Appendix 14 Interview D summary part 1

Startups and B2B markets - Interviewee D			
Current position	Location	Networking	Branding
Vice President	Easier if the investor is close and they will be more eager to invest also as it is easier to follow the startup's progress	Be sure that working with other companies increases your sales or revenue	You need to fulfill the minimal requirements
Background	If someone, for example comes to Lappeenranta they have to be already really interested	Everything else is going to be wasted work	Every color, shape etc. has been used already
Has established and been involved in five or six different startups	A disadvantage if you are located a bit out of the way	Working with big companies is dangerous if it doesn't bring you money or sales, as it won't suddenly sell your product. You have to sell it yourself	Building an international brand from nothing is extremely expensive and difficult, almost impossible to manage a viral brand, impossible to create one
Couple bankruptcies, couple become stagnant and couple succeeded and were sold to big international companies	In Finland Slush is an amazing opportunity	Big companies want to usually learn and makes sure that you are not endangering their business, they won't bring you customers, or sell your product as it doesn't increase their revenue	Coverage costs
Helped quite many startups as an advisor and part-owner	In the end be where you like to be and feelings are high, and suffer from everything else	Collaboration should increase your revenue if it doesn't, do it only if there is a really good reason, such as being allowed to use a big corporation brand	Building a brand is telling a story about one person. This story should inspire emotions that are wanted to be associated with the company.
Mostly in B2B markets, big international companies as customers	Motive	Even if you were paid for engineering job don't collaborate if you don't plan to be an engineering office, as you would be using your time wrong	This story makes the company relatable and people (even in B2B markets) make decisions based on emotions
	Exit is not a goal, you have to have some other reason for doing, want to change, improve, save or cure something to be able to succeed		If you want your brand to be something it has to evoke emotions, and though that people will commit to the company
	Startup for a startup's sake is nothing		Branding is professional work

Appendix 15 Interview D summary part 2

Startups and B2B markets - Interviewee D			
Sales	Spinoffs	Financing	Financing
Too concentrated on technology and product instead of sales and internationalization (common in Finland)	You get the support of a big company and can enter market immediately because of it	Owning 100% is not the way to success, you have to have people who can finance	To get financing you have to sell and be better than your peer group in the world and if you don't know your peer group you are out
Thinking that a good product will sell itself, but no one will buy if they do not know the product exists	You get the feeling of trust for your customers from the parent company for free and it is extremely valuable as you can't build it quickly nor with money	If you have big investors involved there is someone who can save the startup, falling in love with your own share percentage is a mistake	You have to make the pitch for every investor separately, evoking emotions through their individual backgrounds and making them understand why the idea is good
Everyone wants to be an engineer and they are not the best salespeople, at least in Finland this needs to improve	The problem is usually that people have the same attitude than in the parent company and that same work is not enough	Too little, too late	(In Finland) You usually lose already in the making of the material, so you have to be better in the individualization of the sales speeches for investors
You know everything about the technological idea but sales and marketing plan doesn't exist and there is no knowledge about it	Spinoffs die often because they get stuck in the parent company, thinking sales are going to happen the same way as before and when you are a startup it doesn't work like that	Financing is arranged for too short of a timeframe, for example a year. You cannot concentrate on the business development if you have to think about next years financing.	Financing is a critical because without it you will go bankrupt
Starting a Business	Problem if everyone in the team is from the parent company	It is always said there is no financing available but not one good project will be left without it	Understanding money and cash flow is extremely important as if you don't know anything about money who wants to give you theirs
Financing and team in order from the start	People who have worked long in a corporation like security and a spinoff is a way for them to try to be this hyped startup but you shouldn't be still stuck in the parent company	If the idea is actually good you will get financing, if not then you have to think about yourself and your idea	You have to know all the financing opportunities and if you don't know them yourself then find someone who does
Know your peer group and the situation in the world around you, what are others doing, where are they, is the market big enough, is this actually so good of an idea that it can survive	University entrepreneurs have the same problem of taking security in their position at the university and trying to be entrepreneurs at the same time, there is always someone who is all in with a startup and they will win	No ones idea is so unique that they don't have competitors and if you don't then it won't be financed because it doesn't have a market	You don't get money if you don't have the legal side in order
Extremely hard to be enough honest with yourself, so ask someone else's (who knows the market) opinion of the possibility of success		The question is why would you be better than those hundred other ideas offering the same, and do you know the others	You cannot promise that with a certain amount of money you will succeed

Appendix 16 Interview D summary part 3

Startups and B2B markets - Interviewee D		
Team	Patenting	Marketing
Without a team there is nothing	Big companies are afraid of patents and they respect them, especially in Europe	Visiting fairs etc., nobody will come looking for you from Finland
Good people will always make success possible	Creates an illusion of ownership	You have to always have the courage to go and perform when given the chance, especially when customers are present
Usually you have technological knowledge but market and financial knowledge is missing (as well as international sales knowledge)	You should have them because the market requires it	You have to recognize the possible best customers and contact them until you get an answer. A big company has a hundred ways how you can gain notice, use them
You should remember to have knowledge from all sectors	A patent that nobody can bypass is extremely rare and unlikely	Markets / Market entry
Sharing the success in the team, people won't work passionately with low salary only to be part of a startup	Big good patent families, with good coverage are expensive to make and maintain	Manufacturing is extremely expensive especially trying to follow at least part of the legal requirements, softwares are easier
You will get more good and passionate people by sharing the ownership of the startup	A patent is worth as much as you can afford to protect it, it won't protect itself	B2B markets require really good management of money flows
Based on personal experience successful startups have been owned by the team and not only by one original founder, then the team has a good atmosphere and everyone feels like a startup founder and celebrating success together	Biggest value from investors as they see them as a proof of newness and put value to them	Clear customers who have to be approached, sales argument is usually clear and if you can offer financial value customers can understand it
Has succeeded to build a team who has made the startup happen as only the people will make it work not yourself alone	In own experience has had success as well as failure with and without patents	Slow to do anything, certain industries have extremely long cycles and this is especially challenging for a startup, this puts an emphasis to financing and market understanding
	Have to be written by professionals	Understand your market, the time cycles, how it works and though that you can evaluate the startup's chance at building revenue and reliability
		Market entry is done by meeting customers personally and showing them your passion towards your work

Appendix 17 Interview D summary part 4

High-speed machine market - Interviewee D		
Special Features	Future	Startup
A technical niche, hi-tech	Market will grow	If you don't have a bigger company behind you customers don't want to take the risk
At the same time old technology, applications that are critical in industry processes, so reliability and trust is vital	Smaller machines will become more common, technology will be needed	You have to first sell to someone who manufactures, who has the customers' trust, someone who can test your product
Not many different operators exist	In the future processes have to be faster, need for technology will grow	The technical solution has quite little value in the end, it is only small part of the whole value
	It is clear that high-speed machines will be needed and their share and application areas will grow	Nobody wants to be the responsible one in the big company, of choosing the unknown startup, in case of problems occurring
	There aren't any big changes to be seen in the future in this market, meaning big companies are able to develop and keep up quite well	The technical promise would need to be amazingly good and return of investment time should be really superior
		Difficult market as you have to manufacture and it is extremely expensive
		Not many specialized in the technology so possibilities exist but not an easy field