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Competitor Analysis for a Commercial Unmanned Aircraft Systems (UAS) Manufacturer

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Abstract

The hype around commercial drones is growing along with the multitude of emerging applications for the products of the industry. Owing to the fast development of the commercial UAS industry, companies participating in the market need to constantly be aware of the trends and practices of other firms to stay on top of their game.

Finland-based Pohjonen Group needs up-to-date information about its rivals in the market in order to benchmark their progress and learn new practices. By conducting a competitor analysis one can learn how rival firms are competing in the market, and observe how they differ or compare to one's own business. This kind of information can be used to forecast future actions of competitors and learn best practices from them.

The qualitative approach to research enabled a more detailed analysis of data, while the theoretical framework helped in analyzing the firms from different points of view. The primary data was collected through a semi-structured interview with a company representative, while the secondary data was retrieved from documents and reports located on the web.

The results show that the companies had similarities in their assumptions about the UAS market and in their strategic focus on R&D. On the other hand, the businesses differed strategically along market segments and product lines. On the firm level, Pohjonen Group differentiated themselves with their two unique products. To further strengthen their market position, the case company could consider company- and university level collaboration, starting a UAS pilot training program and launching a subscription service. The limitations of the study include a lack of primary and secondary data. Future academic research could explore firms in the industry more widely or map out the Finnish market.

Keywords/tags (subjects)

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Tiivistelmä

Markkinat miehittämättömille ilma-aluksille ovat kasvussa, samoin kuin erilaiset sovellukset joihin aluksia voi käyttää. Kaupallisten UAS markkinoiden nopean kehittymisen johdosta yritysten pitää jatkuvasti pysyä ajan tasalla markkinoiden uusista tuulista, jotta he voivat pysyä mukana kehityksessä.

Suomesta lähtöisin oleva Pohjonen Group tarvitsee ajantasaista tietoa kilpailijoistaan UAS markkinoilla verratakseen oman yrityksensä kehitystä heihin, sekä oppiakseen uutta. Tekemällä kilpailija-analyysin voi oppia ymmärtämään miten kilpailija-yritykset kilpailevat markkinoilla, sekä nähdä miltä osin ne eroavat tai ovat samanlaisia oman yrityksen kanssa. Kerättyä tutkimustietoa voidaan käyttää kilpailijoiden liikkeiden ennustamiseen ja datan pohjalta voidaan oppia parhaita yrityskäytäntöjä.

Kvalitatiivinen lähestymistapa mahdollisti yksityiskohtaisen tutkimustiedon analysoinnin, kun taas teoreettinen viitekehys auttoi yritysten analysoinnissa eri näkökannoilta. Tutkimusdata kerättiin haastattelemalla Pohjonen Groupin toimitusjohtajaa sekä keräämällä dokumentaarista tietoa ja raportteja verkosta.

Tutkimuksen tulokset näyttivät että yrityksillä oli yhtäläisyyksiä heidän asennoitumisessaan UAS markkinoihin ja heidän strategisessa keskittymisessään tutkimukseen ja kehitykseen. Toisaalta yritykset erosivat strategisesti markkinasegmenteissään ja tuoteperheissään. Yritystasolla Pohjonen Group erottautui kilpailijoistaan kahdella uniikilla tuotteellaan. Vahvistaakseen markkina-asemaansa, he voisivat harkita yhteistyötä yritysten ja yliopistojen kanssa, UAS pilotinkoulutusohjelman perustamista ja tilauspalvelun lanseeraamista. Työn suurin puute oli kerätyn datan vähyys. Tulevaisuuden tutkimukset voisivat tutkia yrityksiä UAS markkinoilla laajemmin tai kartoittaa Suomen markkinat.

Avainsanat (asiasanat)
Kilpailija-analyysi, UAS Valmistajat, Kaupalliset UAS Markkinat

Muut tiedot

Contents

Figures

Tables

1 Introduction

There is some distinct terminology related to drones that I will now shortly seek to explain to enhance the reader's understanding of the subject field: an Unmanned Aerial Vehicle (UAV) is a remotely piloted aircraft that is flown by a pilot in control. The abbreviation UAV and the word drone mean virtually the same thing, and so can be used almost synonymously. However, the term Unmanned Aerial Systems (UAS) encompasses the UAV itself along with the whole system that accompanies it: typically the ground-based controller and a communication system that integrates the controller with the aircraft. Typically drones have been associated with a more military context in the media, so the general public may have a more negative view of them. However, it should be duly noted that this thesis is focused mainly on civil and commercial UAS, and not on military applications (UAVInsider 2013.)

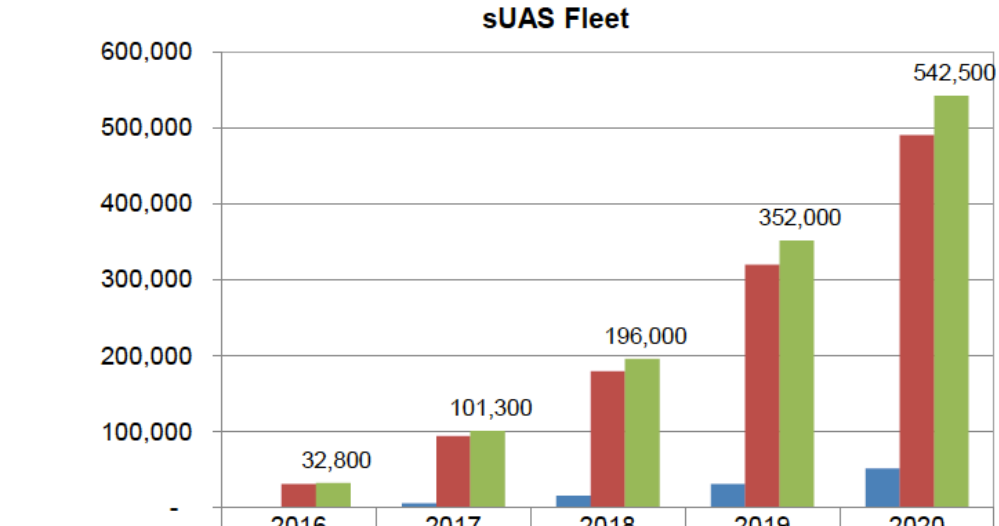
1.1 Background

Nowadays, hardly a day passes by without some news hype about autonomous vehicles such as self-driving cars or drones. Giant companies like Google and Amazon are continually investing in these new technologies in order to be at the forefront of emerging industry development. Self-driving cars in particular seem to be receiving a lot of media attention to the detriment of the still more infant commercial drone industry. However, this relative lack of attention towards drones may well be misplaced, for they might have more potential than driverless cars to shape the future of autonomous navigation. Compared to self-driving cars, drones are more flexible at travelling, infrastructure for them can be built from scratch, their open platform can speed up innovation, and the technology itself is relatively cheap and accessible to users (McNeal 2016).

The humble beginnings of this drone industry are found in the military sphere, when in 1849 Austrians launched what was to be considered the first drone strike using balloons equipped with bombs to raid the city of Venice (CTIE 2003). Ever since those times, the US has been the leader in UAS technology development, using drones al-

ready to a limited degree in both the World Wars, and eventually deploying them for reconnaissance and combat missions in Vietnam for the first time (Congressional Digest 2016, 2). Consequently, it was not until recent years that the civil drone industry began to rapidly outgrow its military counterpart. Driven by increased investment activity, a wide variety of non-military applications and the development of supporting technologies like 3D printing that make the manufacturing of drone components increasingly easier (Canis 2015, 3), the civil UAS sphere has seen a proliferation of companies and events to cater to new industry participants.

Now, Civil UAS is expected to be the highest growing sector of the aerospace industry in the coming decade with production growing from $2.6 billion in 2016 to $10.9 billion in 2025, resulting in a total market of $65 billion by the end of the decade and an annual growth rate of 15.4% (Teal Group 2016). In line with this, the small UAS fleet is expected to rapidly expand in the coming years (see Figure 1), resulting in increased demand for all kinds of non-military UAS.



	2016	2017	2018	2019	2020
Higher end UAS	1,300	6,300	16,000	32,000	52,000
Lower end UAS	31,500	95,000	180,000	320,000	490,500
Total Fleet	32,800	101,300	196,000	352,000	542,500

Figure 1. Small UAS Fleet (Federal Aviation Administration 2016, 32)

Finland-based Pohjonen Group is one such UAS manufacturing company that plans to take advantage of this sprawling market. Although the sector itself is relatively undeveloped in Finland, which houses only a handful of such companies, the business environment along with favorable regulations for drones make the country an attractive place for fostering UAS industry development (Nuutila 2015).

1.2 Motivation for the Research

Due to the civil UAS industry being in its infancy, information about different players operating in this market is relatively hard to come by. Prior academic research on the subject is largely limited to the more technical aspects of drones: flight control systems (Xu & Wang 2016) and UAV imaging (Tonkin & Midgley 2016) for example. Consequently, some commercial parties like Research and Markets (2016) and the Teal Group (2016) have done extensive market research on the subject, but reports such as theirs are often hard to obtain, because they have to be purchased in order to gain access. Furthermore, where research about the drone market is available, as sometimes in sources linked to the government (Congressional Digest 2016), it usually proves to be limited in its scope and may be quite speculative due to the general uncertainty surrounding industry development.

As previously demonstrated, the drone industry has a possibility to radically reshape our future lives. Given this potential, it seems strange that so little attention has been paid to researching this sector. Therefore, this study aims to contribute to this lack of attention to drones at the societal level. Furthermore, governments might use this information to assist in the elaboration of UAV policy and regulation, both of which are desperately needed in order to facilitate industry development. Also, from this research paper other stakeholders in the drone industry can obtain up-to-date information about the main players in the commercial UAV market.

Due to the limited size of the Finnish UAS market, Pohjonen Group wants to start operating in the international arena right from the start. In order to most effectively penetrate this market, they need up-to-date information about their main rivals and what they are doing. Such information then can be used to learn about industry best practices and to forecast the future actions of competitors in order to aid in the development of company-wide strategy.

In the spring of 2016 I took the high tech management module at my university after having heard positive things about it from friends, and in order to immerse myself in an interesting field that I knew nothing about from before. During this high tech module I became more and more interested in emerging technologies and especially their huge opportunities to change everyday life in the future. In fact, to me it seemed that these new inventions had the potential to spark a new way of life akin to the change witnessed in the aftermath of the industrial revolution. Subsequently I developed a particular interest in drones after I chose to write a school assignment about them for the high tech course. My initial enthusiasm for the industry deepened as I gained knowledge about their multiple potential applications in the non-military marketplace.

Based on this curiosity about UAS and in order to gain work experience in the rapidly developing field of high technology I started an internship at Pohjonen Group in Karstula. The work practice started during the summer of 2016 and it was planned to last for about two months, but it finished unexpectedly due to the difficult situation of the firm at the time. Pohjonen Group needed information about competitors for benchmarking purposes and also in order to find potential customers and partners with whom to collaborate. In fact, at work one of my tasks was to find basic information about rivals competing product offerings for the purpose of comparison. Consequently, I enquired about potential thesis topics and eventually chose competitor analysis as my subject. As I had already done market research in the past, I took this as an opportunity to further expand my market research expertise by embarking on the challenging UAS market environment. Additionally, I'm seriously considering

embarking on a career in the drone industry and possibly continuing to work with Pohjonen Group along the way.

Shortly, by conducting a competitor analysis for Pohjonen Group I will enhance my market research capabilities and thus my employability in the job market. Moreover, I will develop valuable knowledge about the emerging drone industry that can be further put to use in working for a UAS company in the future like Pohjonen Group. In the process I can refine my academic writing skills and thus introduce a piece of academic research that may serve to enrich the sphere of civil UAS by providing valuable information for all the stakeholders involved: from the government to individuals who might be considering on starting their own company.

1.3 Research Approach and Problem

To date, not many studies have been conducted about the civil UAS market. The little research that exists is usually hard to obtain and often turns out to be more limited in its scope. As this is the case, my theoretical framework will be derived from the more general body of literature pertaining to competitor analysis and strategy. My aim is to discover how Pohjonen Group and its main competitor's are competing in the UAS market. Owing to this notion, my research approach will be more inductive by nature. Specifically, induction is a more flexible research structure that necessitates a close understanding of the context, and therefore usually involves the study of small samples and the collection of qualitative data (Saunders, Lewis & Thornhill 2009, 126-127).

I will use Porter's framework for competitor analysis to analyze the subsequent research data collected. This theoretical framework consists of four themes: future goals, assumptions, current strategy and capabilities. Under these themes the results of the study will be codified and analyzed pertaining to each UAS firm. Specifically Porter's framework was chosen due to him being one of the most revered scholars of management science who has extensive experience in working with different kinds of companies as a management consultant. In addition to this, his framework was

chosen because it facilitates a broad consideration of all the aspects related to a company, and doesn't just focus on one single viewpoint like business strategy for example.

Research Problem

Pohjonen Group needs information about the civil UAS industry in order to make more informed decisions about its strategy in this market. Competitors can potentially be good sources of such information, because they are in a similar position in the industry as the incumbent firm, and thus have to battle with the same market forces that touch all companies. Furthermore, if we accept the notion that each firm is compelled to pursue its best interests, meaning that it seeks to grow and prosper in the market it is within, then companies that are doing well may serve as examples illustrating strategy and practices that seem to be working in the industry. Consequently, it may be useful to benchmark their practices and learn from them. In addition, it may prove useful to forecast the future strategy and objectives of rivals in order to avoid engaging in potentially damaging strategic moves that may collide with them.

In an ideal situation, such competitor information might be readily obtained by simply visiting the premises of each firm and by conducting an in-depth interview with all the parties involved. However, in practice this is virtually impossible, owing to the nature of the civil UAS industry: it is a highly technology intensive industry that relies heavily on the progress of research and development, and because of this, each firm is incentivized to guard the information that it releases with care. Additionally, the industry is only just emerging, meaning that dominant players and best-in-class practices are not yet established, and so firms are competing fiercely in order to become market leaders. For these reasons, this study will be limited to information about competitors that can be found from the web, along with an in-depth interview with the CEO of Pohjonen Group. Moreover, only a few such competitors will be analyzed, due to the nature of study being only at the bachelor level, and also because an in-

depth analysis that is required can only be done about the biggest players in the commercial UAS market, since they have more information available about them.

Research Question

After consulting Pohjonen Group and reviewing the related literature on competitor analysis and strategy, the following research question was formulated:

- How are Pohjonen Group and its main competitors competing in the commercial UAS market?

2 Literature Review

2.1 Strategy

Strategy is all around us. According to Henderson (1989), its origin can be found in the theory of evolution. In fact, business competition resembles biological competition in every single way, except that in business the rate of evolution is accelerated by the deliberate formulation of strategy, made possible by imagination and logic. (139-140.)

Strategy is an important part of business. It sets direction, focuses effort and defines the organization while providing for consistency (Mintzberg, Ahlstrand & Lampel 2009, 15-17). As Sun Tzu (1988), the author of the first recognized book on strategy explains: “strategy is the great work of the organization. In situations of life or death, it is the Tao of survival or extinction. Its study cannot be neglected.” Next I will explore the many definitions of strategy.

Throughout contemporary business literature strategy has been defined in many ways, but still there has yet to emerge a common definition of what the concept really entails. Mintzberg et. al. (2009) in their research about the different schools of strategy have identified five varying definitions that help to explain strategy. Firstly,

strategy can be seen as the plan of an organization that offers a map into the future. On the other hand, it can also be looked at as consistent actions taken in the past, a pattern. Still another viewpoint is looking at strategy from a strategic perspective and seeing it as the position outside a company where the product meets the customer. In contrast to this, perspective can also be taken into account, meaning that strategy can be epitomized by the unique way people do things inside a company. Finally, strategy may be viewed as a ploy that aims to outsmart competitors by varying methods of signalling or action. (9-15.)

Bridging the gap between viewing strategy either as a plan or a pattern is the concept of strategy as stretch (Hamel & Prahalad 1993). In this case, the organization has a long-term goal of what it wants to achieve, but it doesn't have a detailed plan to get there. Instead, the goal is realized step-by-step as a series of incremental decisions that have a clear direction toward the objective. Moreover, a gap is created between the goal and the current resources of a firm, thus encouraging innovation and creative resource development. Grant (2013, 22) calls this "strategy as direction," a notion that is distinguished by a future-oriented view of the concept of strategy. Furthermore, strategy as a position (Mintzberg et. al 2009, 12-14) views the concept with an orientation that is grounded in the present (Grant 2013, 22).

Strategy can be seen as being different from rivals in both positioning and activities. This means carving out a unique strategic position in an industry and supporting it with a different set of activities or by performing distinct activities differently from competitors. A sustainable strategy then requires making choices, or tradeoffs, of what to do and what not do. Accordingly then, if you don't make such choices and instead pursue everything, then you don't have a strategy at all. Furthermore, strategy is not just about individual activities, but the whole system of activities that produce value. Therefore, all of the activities of a firm should be consistently integrated together so that they reinforce each other and help in creating the value proposition. Ultimately then, the formulation of a competitive strategy comes down to the concepts of a unique value proposition, a tailored set of activities to accomplish it, mak-

ing distinct tradeoffs, enhancing fit between activities and pursuing the resulting strategy consistently. (Porter 1996.)

At the base line it looks as if Henderson (1989, 140) agrees with Porter (1996) on the importance of being different from rivals, but he (Henderson 1989, 141) further elaborates that business strategy is actually encapsulated in the development of a single competitive advantage through an iterative search for an appropriate plan. For him, the purpose of strategy is to develop a firm's competitive advantage. In contrast, Hamel & Prahalad (2005) see the goal of strategy as being the development multiple competitive advantages, instead of just one.

All in all then it seems that the definition of strategy is shaped by the point of view that one takes on it. Hamel & Prahalad (1993) call this the "managerial frame," a notion that is drawn from the "assumptions, premises and accepted wisdom" of a given company. Therefore, you can look at strategy at the firm level from the inside out or from the outside in. Furthermore, strategy can be imitating others, or being different. Alternatively, you can view strategy from the future or from the past, or maybe as just a function of a predetermined set of steps that you must follow. When seeking to define strategy, perhaps a more broad definition may be in order, so that all the different perspectives on the subject might fit under it. In my view, Grant (2013, 15-16) offers such a definition: "strategy is the means by which individuals or organizations achieve their objectives."

Generic Strategies

Porter (2004) postulates that at the core of any successful strategy is the concept of competitive advantage, of which there are two basic types: low cost and differentiation. Both types of advantage are fundamentally derived from industry structure and how a company combats the forces of competition in an industry. In addition to the concept of the type of advantage there is also the scope in which a firm seeks to achieve the given advantage. Broad scope caters to a range of industry or product

segments while a more narrow scope may focus only on one particular segment. Grant (2013) elaborates even further on these concepts by illustrating how scope is the answer to the question “where are we competing?” Whereas the type of competitive advantage answers the question “how are we competing?” (22.)

When we combine the type of advantage with the scope of advantage we get three generic strategies, which firms can use to successfully compete in an industry: cost leadership, differentiation and focus. Cost leadership entails a common strategy running across the entire organization that seeks cost control and minimization while maintaining proximity in product quality to competitors. Secondly, differentiation is a choice of strategy that aims to create a unique product or service offering that is clearly differentiated from the alternatives of competitors, which provides enough value to the customer in order to offset charging a premium price. Lastly, the focus strategy focuses on serving a specific segment or part of the market in an exceptional manner not possible by the other industry-wide strategies of cost leadership and differentiation. (Porter 1980, 34-40.)

Hamel & Prahalad (2005) argue against the pursuit of a sustainable strategy (Porter 1996) with the same type of competitive advantage (Porter 1985), instead advocating for an approach that is built around creating multiple layers of competitive advantages. In their view, competitive advantages are rarely long lasting and for this reason one must develop many of them in order to consistently stay ahead of competition.

Ovans (2015) points out that Porter’s (1980) view of strategy is too constrained, since it either boils down to imitating rivals in a cheaper way or doing something that cannot be done by others. Ovans (2015) sees that other ideas about strategy have since emerged that can be classified into three broad groups where strategy can be seen either as “doing something new”, “building on what you already do” or “reacting opportunistically to emerging possibilities.” In our subsequent examination of litera-

ture I will explore these groups of strategy in more depth, but now I will continue by introducing another system of grouping strategies by type.

The Strategic Typology

Miles, Snow, Meyer & Coleman (1978) classify the strategic choices that firms can make into four distinct types. Firstly there are the prospectors that can be more simply classified as innovator firms, which actively seek out and pursue new market opportunities consistently. Almost a complete opposite to the prospectors are the defenders, who focus on serving a stable market niche in an efficient manner, striving to defend their achieved position aggressively from competitors. Furthermore, in the middle of the extremes of prospector and defender sits the strategic choice of the analyzer. At heart the analyzer is a fast follower who is risk-averse by nature, meaning that it seeks to maximize profit opportunities while achieving a balance between business stability and pursuing demonstrated product and market opportunities. In contrast to these three successful approaches to strategy there lies a failed strategic alternative called the reactor. Inherently, the reactor has no stable long-term strategy, so it is characterized by short-termism and reacting unsuccessfully to the developments of the external environment. (550-558.)

The generic strategies and the strategic typology frameworks are tools that classify different types of strategies, and as such, are very descriptive in nature. Now, we will go on towards approaches that are not just classifications, but broader approaches that are concerned with strategy formulation.

Resource-Based Approach to Strategy

The foundation of a successful strategy may also be built upon the resources and capabilities of a given company. This approach to strategy formulation is fundamentally based on the resource-based view of the firm first introduced by Prahalad & Hamel (1990), which entails the identification and utilization of a firm's core competencies to achieve competitive advantage. However, Collis & Montgomery (2008,

143) point out that one must continually keep in mind that resources are not to be evaluated in isolation, because their value is ultimately found in the interaction between market forces.

When looking at the external environment from inside a firm it may seem that customer preferences and technology trends are continually changing and so offer little consolation for a sustained strategy relying on the needs of industry customer segments. Consequently then, the stability required for a long-term strategy may more readily be found by harnessing the internal capabilities of a firm. It is this argument that has given birth to the resource-based approach to strategy. The formation of this type of strategy is done in five steps. First, one must analyze the key resources of a company and find out the respective strengths and weaknesses. Then one must seek out the distinct capabilities of a firm compared to its rivals. Next, one must map the profit-generating potential of capabilities, choose an appropriate strategy that best exploits a firm's resources and capabilities, and finally identify and upgrade resource gaps. (Grant 2001, 114-116.)

More specifically, in order to identify which resources to build strategy on, Collis & Montgomery (2008) suggest using a series of tests. These tests then will result in the identification of resources that are hard to imitate, deteriorate slowly, capture value for the company, are hard to substitute, and have superiority to the similar resources of competitors. (140-147.)

It is clear that Porter's (1990, 33-34) approach to choosing a strategy is fundamentally different from the resource-based view, since he puts the external environment into the center stage of choosing an appropriate strategy as opposed to the internal capabilities of a firm: first you must analyze the underlying structure of an industry and then choose a profitable position in it from where to most effectively respond to competition. Porter (1996) also argues against seeing the firm as individual activities

like the core competency view (Prahalad & Hamel, 1990) seems to suggest, and instead highlights viewing the firm as a system of activities.

Vision and Strategic Intent

So far we have covered strategy mainly from the perspective of competing in the present, but now we will take a more future oriented view on the subject. Answering questions such as “What do we want to achieve?” and “How will we get there?” Strategy is seen more as a unifying force of direction (Grant 2013, 22).

The resource-based view of strategy seems to advocate for trimming out a firm’s useless competencies in order to focus on pursuing sustainable core advantages. Most often, strategic fit is pursued between the capabilities of the firm and the industry environment. However, the concept of strategic intent takes the opposite approach illustrating that not fit, but indeed strategic misfit is the notion that results in sustained success for a company. Moreover, firms must set long-term goals and challenges that seem to a degree unattainable, because this accelerates the leveraging of existing resources innovatively and fosters organizational learning in pursuit of the end objective. In effect, management articulates a strategic intent, a vision of company leadership that serves to motivate employees to accomplish more, like Canon wanted to ‘beat Xerox.’ As previously mentioned, strategic intent results in the creation of multiple competitive advantages, or in other words the essence of strategy. (Hamel & Prahalad 2005.)

Collins & Porras (1996) take the thinking behind strategic intent one step further by the means of building a full-fledged a vision that involves not only looking inside the company, but also looking outside to a place beyond: strategy as perspective (Mintzberg et. al. 2009, 12-14).

Essentially, a compelling vision has two complementary parts: the core ideology including the core values and core purpose, and the envisioned future consisting of an ambitious long-term goal that must be described in detail. The core ideology acts as the anchor that holds the organization in place, it is the core identity within the company that does not change with everything else. Ideology is the soul of the firm that creates meaning and inspires people to achieve. On the other hand, the envisioned future is the long-term goal, acting as the finish line that simultaneously stimulates and engages the organization in a focused way. Moreover, the feelings of achieving the goal should be codified into the minds of each employee, kind of like a painting that elicits passion, emotion and commitment. As a whole, this type of strategy seems to engage the minds of the people rather than the bodies, thus being more abstract than concrete by nature. (Collins & Porras 1996, 44-55.)

What both of these approaches to strategy have in common is that they don't have an action plan for goal achievement. Rather, they imply that such measures are relatively useless as the external environment of the firm is constantly changing, which would therefore necessitate a constant shifting of plans. It looks as if strategy is emergent through the perspective the organization takes (Mintzberg et. al. 2009, 11-14).

Blue Ocean Strategy

Kim & Mauborgne (2004) are of the opinion that firms can simultaneously lower costs and achieve differentiation through what they call blue ocean strategy. In this approach to strategy existing market space is seen as 'red oceans' comprised of competitors competing in the same market, or blue oceans, which are market space that have not yet been discovered and thus have no competition. The argument is that instead of playing by the rules of an existing 'red ocean' market one can reconstruct a totally new 'blue' one with uncontested market space and no competition where demand is created rather than fought over. The way to achieve this is either by inventing completely new technologies or by combining existing technologies and practices in order to construct a completely new value creation. (77-84.)

At the base level blue ocean strategy seems to completely contradict with Porter's (1980, 34-40) theory that you have to make a choice between the generic strategies of differentiation and low-cost accompanied by a given scope of activity, because otherwise you might end up "stuck in the middle" without a clear way forward. However, further on Porter (1985) shows that there are in fact some conditions where the simultaneous achievement of low-cost and differentiation may be possible, but only for a given time horizon. Therefore, it seems that eventually competitors will catch up to a company implementing a blue ocean strategy, meaning that such a strategy could only ever be temporary in achieving low-cost and differentiation simultaneously. The challenge of blue ocean strategy then is how to keep continually reinventing an industry field by creating new blue oceans from existing red ones.

Strategy as a Portfolio of Options

As opposed to the common view of strategy as a plan, sits the concept of strategy as emergent, a realized pattern that was not specifically pursued (Mintzberg et. al 2009, 9-15). This kind of approach may more readily address the external environment of the firm by taking into account flexibility in decision-making.

Luehrman (1998) derives such a strategy from the field of financial management and calls it "strategy as a portfolio of real options." In this case, strategy is viewed as a series of options, since strategy execution often relies on making many decisions in a row. The framework allows some decisions to be taken at once and others to be postponed in waiting for better circumstances to develop. This allows a strategy to emerge as a "series of options explicitly designed to affect one another." These bundles of options can then be utilized to illustrate the contingencies in a business.

This kind of strategy may have a greater tendency to incorporate learning into decisions, since some decisions may be postponed to a later time. In this effect, poten-

tially hazardous investments may be successfully avoided because of this. However, such an approach to strategy may be too reliant on the competitive environment and neglect the development of the internal capabilities of a firm as in the resource-based approach. In any case, seeing strategy as a portfolio of real options may give a firm added flexibility, which seems to be needed more often in today's business environment.

10 Schools of Strategy

The examples of strategy formulation illustrated above serve merely as snapshots of a big body of literature. All in all, Mintzberg et. al. (2009) identify ten different schools of strategic thought that can be further divided into three groups, each containing similar approaches to strategy creation (see Figure 2). The first group is characterized by a prescriptive approach concentrating on "how strategies should be formulated" rather than what happens in practice. The second group takes a more practical view by looking at the process of formulating a strategy from different points of view, an approach that is inherently descriptive in nature. Finally, the last group of configuration integrates the other schools of strategy into a series of different stages. (5-6.)

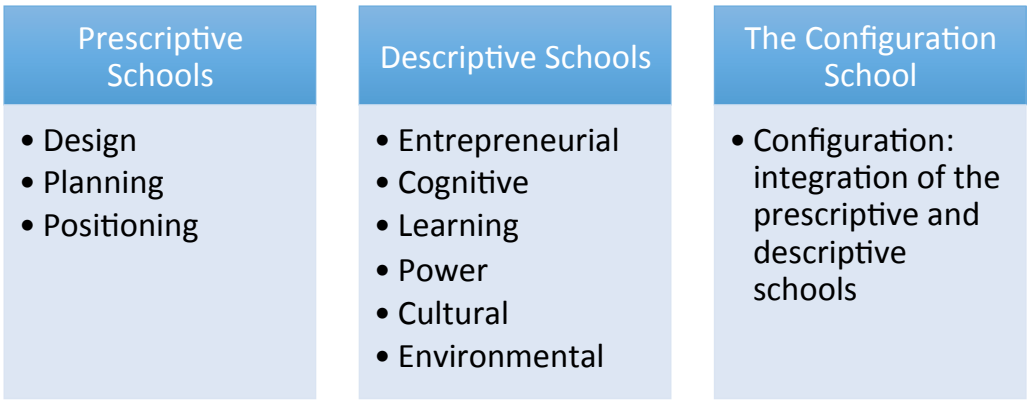


Figure 2. Groups of Strategy (adapted from Mintzberg et. al. 2009, 5-6)

2.2 Competitor Analysis

The importance of analysis in any kind of business venture is largely undisputed. A proficient analysis has the capability to improve the strategic work of a firm in three ways: by providing the foundation for strategy, fostering knowledge of the internal and external environment and by developing the strategic capabilities of employees and a common vision of strategy. (Kamensky 2010, 120.)

The value of competitor analysis has been demonstrated by previous studies on the topic. More focus towards analyzing competitors seems to result in a higher market share among companies (Sorensen 2009, 754). Moreover, a positive relationship has been identified between advanced systems of competitor analysis and a firm's return on assets (ROA) (Subramanian & IsHak 1998, 21).

The need for an orientation towards competitors has been partly facilitated by the view of the market as a zero-sum game, where firms compete for a set number of customers. This perspective results in the measurement of success in relative terms as compared to the competition. Consequently, such questions emerge as: Which competitors are a threat? From whom is it possible to steal market share? How can a firm defend itself from competitors? And how can one gain advantage over competition? (Kelly 1991, 13.)

Competitor analysis seeks to develop a profile of each competitor that encompasses their current strategy and likely strategic alternatives they might pursue, their response capabilities and the likeliness of response to the strategic maneuverings of other firms, and their likely response to changes in the external environment of the firm. (Porter 1980, 47.)

Kelly (1991, 13-14) suggests that the five main goals of competitor analysis are:

1. Keeping market share

2. Gaining market share
3. Finding out the strengths & weaknesses of competitors
4. Preparing for surprises
5. Learning from competitors

As we can see, competitor analysis isn't just about avoiding competition, it is also about learning from them. For instance, competitors might implement new innovations that could disrupt the existing industry. In such cases, knowledge of competitor practices may be instrumental in helping the focal firm to remain competitive in the changed marketplace. Therefore, competitors should be also benchmarked for identifying best practices.

Identifying Competitors

A prequel to any competitor analysis is the process of identifying the specific competitors to analyze. This may be a more challenging task than one might think, since most industries have a plethora of different kinds of firms to choose from. The task might start to seem still more daunting, when one considers that there may be players that have not yet shown themselves in the industry, but are planning to enter a focal firm's market in the future. Practically, Clark & Montgomery (1999, 78) imply that strategic planning may necessitate a more broad range identification of competitors, while for short-term planning the consideration of a more narrow scope of competitors may suffice. In any case, by conducting comprehensive competitor identification one can try to minimize the impact of unforeseen competition appearing.

Common and straightforward ways of identifying competition are by classifying firms either at the broad industry level or at the more narrow market level (Pirttilä 2000, 26). In terms of market level, the degree of contact between two given firms in multiple markets rules how strongly they can be considered direct competitors (Chen 1996, 106). Then, at the industry level competitors are characterized by similar tech-

nology and products, a notion which in fact limits competition to firms in the same industry (Pirttilä 2000, 26). Furthermore, Kelly (1991, 140-142) suggests classifying competitors into specialized and unspecialized firms, because it may help in evaluating their respective strategies and ways of thinking: for example specialized firms may know their market better, while unspecialized firms may have advantage in the efficiency of production and research in their operations.

Broadly, direct competition at the level of industry or market seems to be relatively easy to perceive. Consequently then, one may wonder how the situation is with identifying indirect or potential competitors? Prior research in particular implies that potential competitors should be tracked for strategic purposes (Clark & Montgomery 1999, 79).

Porter (1980) suggests that one can find potential competitors from four distinct groups of firms. Firstly, there are actors outside the relevant industry that could enter by easily overcoming entry barriers. Secondly, there are firms that could exploit clear synergies by entering the industry. Thirdly, there are companies for whom being in the industry would be a logical extension of corporate strategy, and lastly, there are customers or suppliers who have the capabilities of forward or backward integration. In addition to these groups it may prove a worthy effort to try and predict likely mergers or acquisitions that might take place and thus create new prominent players in the industry. (49-50.)

An integrative way of identifying competitors is by looking at the markets a given firm is in and the strategic resources it possesses. Towards this end, Chen (1996, 106-108) classifies competitors into four groups by using his constructs of market commonality and resource similarity, meaning that the more any firm has of both, the more it is a direct competitor. More specifically, Peteraf & Bergen (2001, 160-162) take these constructs of market commonality and resource similarity and modify

their definitions in order to produce three groups of competitors: direct competitors, potential competitors and indirect competitors.

Another method of finding competitors is based on the perspective of customers. For instance, one can ask or observe buyers of a given product to determine what brand or product they would purchase if their usual choice would be out of stock. This is identifying competitors on the grounds of the alternatives to choose from. On the other hand, one can look at the associations related to product use. This can be done by first mapping out all the products that can be used in a given set of contexts, and then by bringing in a group of respondents to evaluate the appropriateness of the products for each use context. (Aaker 1995, 66-67.)

The concept of strategic groups may also be a useful tool for a firm in perceiving the competitive environment. This involves first characterizing the strategies of all the firms in a given industry along strategic dimensions, and then forming strategic groups using companies with similar strategies or strategic dimensions. These groups then illustrate the basic differences in strategy within an industry. One of the implications of this concept is that at the individual level, firms in the same group might respond in a similar way to changes in the external environment. Inherently, the notion of strategic groups takes the identification of competition from the individual level to the group level. (Porter 1980, 126-132.)

Evaluating Competitors

After identifying competitors, one naturally wants to understand them to see how they compare to each other and the focal firm. Toward this end, one can either strive to find all the possible information about a competitor or limit ones search to a few relevant areas of examination. The extent of what to consider in an analysis may well be constrained by time or monetary resources. Thus, one comes to consider the questions of what to analyze and how much to analyze? According to Pirttilä (2000,

73) a balance is sought between the information that is needed in order to achieve the goals of a firm and the demand for information from company personnel.

Owing to the possibly vast amounts of data available it may be wise to try and simplify the process of competitor evaluation by keeping in mind some clear guidelines. In line with this, Kelly (1991, 164) gives some basic advice: think about their respective competitive advantages, identify what is important, guess if you don't know something and try to see the direction in which competitors are going.

Most often companies seek to attain a holistic understanding of their competition along the dimensions of resources, current position, strategy and goals (see Figure 3) (Pirttilä 2000, 74-76). However, Kelly (1991, 238) argues also for the importance of assumptions in shaping competitor strategy, implying that one way or another all of the strategic decisions of a competitor are based on them.

Figure 3. Framework for Competitor Analysis (adapted from Pirttilä 2000, 75)

Aaker (1995) introduces eight dimensions that one should use to evaluate competitors:

1. Size, growth & profitability
2. Image & positioning
3. Objectives & commitment
4. Current & past strategies

5. Organization & culture
6. Cost structure
7. Exit barriers
8. Strengths & weaknesses

Accordingly, he affirms that analysis of a competitor along these dimensions may provide a bigger picture of a firm and the different aspects that influence its actions. The implications of the analysis could be to bring to light opportunities and threats that would demand a response, predicting threats and opportunities in the future, and considering the response of competitors to a firm's emerging strategic moves. (71-76.)

It may be beneficial to consider the strategy of a competitor from different angles. Thinking about has the strategy been consistent over time or whether it has evolved in some way. Does it reflect a short-term orientation or a long-term orientation? Is there a part of operations that the competitor focuses on and channels his efforts to develop? (Kelly 1991, 233-236.)

An untraditional, but wholly unique way of evaluating competitors may be based on the concept of resourcefulness, which essentially means assessing how fast the competition is building new competitive advantages. Hamel & Prahalad (2005) advocate for incorporating this type of approach into analysis, arguing that present practices focus too much on the current resources of well-known competitors.

Benchmarking Competitors

Benchmarking involves a continuous search for companies that are 'best-in-class' in a given process, and systematically implementing these processes in order to foster improvement in one's own firm (Kleiner 1994, 283). Essentially, the goal is to achieve and sustain superior performance (Fong, Cheng & Ho 1998, 408). Before benchmarking can take place, appropriate firms must first be identified and thoroughly evaluat-

ed for the aspects to benchmark against. As a whole, the process can be divided into a series of stages that are planning, analysis, integration, action and maturity (Kleiner 1994, 283).

In the phase of planning, one must ask what to benchmark and who to benchmark against? All the while firm operations and customers should be taken into account to identify improvement needs. Next, analysis involves the processing of the gathered data and calculating the performance difference between the current and desired situation. Further on, integration involves spreading the findings from benchmarking throughout the organization so that additional input can be received, eventually resulting in the formulation of goals for benchmarking. Then, the action stage flows directly from integration and serves to implement action plans based on the formulated goals. Finally, maturity is the final part of the benchmarking process that aims to readjust the final outcomes and learn from them. (Fong et. al. 1998, 413-417.)

Often, competitors are seen as a threat to the incumbent firm; competition is seen as the enemy that should be fought and eliminated rather than learned from (Porter 2004, 201). Benchmarking turns this type of thinking upside down by showing that competitors themselves might be used as 'stepping stones' to achieve performance superiority. In line with this, Fong et. al. (1998, 411) suggest partnering with competitors to foster learning on both sides, because data about rivals is usually hard to find.

Competitive Decision-making

When looking to analyze competitors, an interesting but often neglected point of view is peering into the decision-making processes of relevant competitive actors, and looking more into how they view the prevailing competitive environment.

According to Zajac & Bazerman (1991) the concept of competitive decision-making "requires the focal actor to consider the contingent decisions of competitive actors."

In effect, when making decisions, strategic decision-makers often do not adequately take into account the contingent decisions of competitors, resulting in a series of judgmental mistakes that can also be referred to as blind spots. The specific blind spots identified are winner's curse, nonrational escalation of commitment, overconfidence in judgement and limited perspective and framing of a problem. Accordingly, these blind spots are used to help explain common occurrences in the field of business of such phenomena as industry overcapacity, internal new business entry and new business entry through acquisition. The broad implications of this are that decision-makers should more closely consider their competitors' decisions in relation to their own by seeing the competitive situation from their point of view. Consequently, seeing a situation from other perspectives may also facilitate greater creativity in decision-making and result in better decisions overall for the focal firm. (37-54.)

Another useful theoretical construct that may help in understanding competitive decision-making is the topic of game theory. Essentially, game theory can be described as a set of tools that helps in understanding the interaction between decision-makers. The assumptions of the theory are that the decision-makers are rational and take into account the probable behavior of other actors when making a decision. As of present game theory has not been extensively covered in literature pertaining to competitor analysis, so we will leave our examination of this subject rather short. (Osborne & Rubinstein 1994, 1-2.)

A general assumption of competition is the dependence of each firm on the competitive moves of others, implying that the moves of others in the same industry can be clearly felt by the focal firm (Porter 1980, 88). Therefore, the perspective of competitive decision-making should be taken into account when analyzing competition and deciding on appropriate competitive moves to take.

Competitor Moves & Predicting Rivalry

Porter (1980) states that the ultimate goal in making competitive moves is that one's firm must perform better than competitors while avoiding expensive warfare that would undermine profits for everyone. Moreover, he identifies three types of basic competitive moves and their underlying characteristics: cooperative or nonthreatening moves, threatening moves and defensive moves. Regarding the planning and execution of moves, the most important notion is a firm's degree of commitment to an action. Some benefits of signaling commitment are that it may deter threatening competitor moves such as retaliation and serve as a vehicle for creating trust. (88-105.)

In order to better navigate the complex competitive terrain of different firms, it may prove beneficial to try to forecast the future actions of rivals in order to better prepare and formulate firm-wide strategy. Moreover, by making generalizations about competitors and predicting their likelihood for competitive moves in the future, managers may have an easier time dealing with competition than by simply analyzing competitor moves as they happen in the present.

In the literature of competitive dynamics and predicting rivalry two important constructs emerge that are often used in competitor analysis: market commonality and resource similarity. According to Chen (1996) market commonality can be seen as "the degree of presence that a competitor manifests in the markets it overlaps with the focal firm." On the other hand, resource similarity is characterized by possessing "strategic endowments comparable, in terms of both type and amount, to those of the focal firm" (106-107.). These definitions are repeatedly used and modified in subsequent examination of literature.

In his article Chen (1996) seeks to integrate the subject of competitor analysis with interfirm rivalry. In order to do so, he starts by introducing the concepts of market commonality and resource similarity derived from previous theory on strategy, and he uses these concepts to construct a framework for competitor analysis. Then, by

combining this framework with the topic of interfirm rivalry he demonstrates how both market commonality and resource similarity might predict the prevailing conditions for battle between a pair of competitors by illustrating their likelihood of attack and likelihood of response to each others competitive moves. Furthermore, competitive asymmetry as a concept is brought to light, implying that the strength of a perceived threat between any two firms is usually different. As a whole, the main proposition of the article is that the likelihood of competitor attack and response is influenced by the degree of market commonality and resource similarity shared between a pair of firms. This means that greater market and resource commonality leads to a less likely attack but a more likely response, while smaller market and resource commonality leads to a more likely attack but a less likely response. (100-128.)

Bergen & Peterhaf (2002) build on Chen's (1996) framework by integrating his constructs of market commonality and resource similarity with their definition of resource equivalence to produce a two-staged framework for identifying competitors, analyzing their relationships and predicting rivalry. Specifically, Bergen & Peterhaf (2002) use their own definitions of market commonality and resource similarity to identify and classify competition into a hierarchy of awareness encompassing three distinct groups: direct competitors, potential competitors and indirect competitors. Then, they link this hierarchy of competitor awareness to a newly introduced concept of resource equivalence in order to construct a framework for competitor analysis and predicting rivalry that illustrates competitor awareness on the left side of the matrix, and the balance or imbalance of competitor capabilities on the right side of the matrix. Based on the matrix they form a set of hypotheses for predicting rivalry that illustrate the interplay of competitor awareness with the balance of capabilities between firms. (157-166.)

Whilst Chen (1996) considers competitive moves from a broad perspective, Upson, Ketchen, Connelly & Ranft (2012) in their article focus strictly on the notion of foothold moves. In this case, a foothold is defined as a "small position that a firm intentionally establishes within a market in which it does not yet compete." Considering

foothold moves, both market commonality and resource similarity are negatively related to a foothold attack in their likelihood. Correspondingly, market commonality and resource similarity are also negatively related in likelihood to a foothold withdrawal. Consequently, there is a positive interaction to be found among market commonality and resource similarity, meaning that a foothold attack is more likely when they both are small. Unfortunately though, a clear limitation in the study is the notion that it can't predict which foothold move will take place, an attack or a withdrawal. However, the article implies that even the simple act of keeping a foothold, in spite of its costs, may be to use the position as a competitive deterrent towards other firms. (93-107.)

Essentially Chen's (1996) main contribution to the literature on competitor analysis was bridging the gap between competitor analysis and predicting rivalry. Bergen & Peterhaf (2002) took Chen's (1996) approach as a starting point, and widened its scope by introducing a competitor identification system that classifies firms based on awareness, and also highlights the importance of customer needs as opposed to purely market presence in predicting rivalry. In contrast, Upson et. al. (2012) took Chen's (1996) framework and narrowed its focus to the examination of strictly foothold moves.

Customer-Based Competitive Analysis

As previously demonstrated, competitor analysis often focuses on assessing the capabilities of a given competitor combined with the relevant markets that it serves. However, when approaching the subject from this point of view, the input of other relevant stakeholders like customers may not so often be taken into account, resulting in a one-sided view of the situation from the perspective of the competing firms. Therefore, Clark & Montgomery (1999, 78) suggest that managers should pay more attention to customers in defining competitors.

Smith, Andrews & Blevins (1992) argue that too much focus on analyzing competitor behavior may be detrimental to a firm in the long-run, and therefore suggest a more customer-oriented approach to dealing with this problem that may facilitate the development of a firm towards becoming more market-oriented. Specifically, they introduce a framework for customer-based competitive analysis that uses the evaluations of customers to rank competitors' products based on the value they generate for them. Effectively, one must first identify the key competitors, then measure their respective products' price and benefit spreads, and finally evaluate the products' degrees of competitive advantage. The major implications of the framework are that it may help in improving the positioning of a given firm's product vis-à-vis relevant competitors by identifying dimensions for improvement that would result in added competitive advantage. Additionally, the beauty of this framework is that it can also be modified to take into account the perspectives of other stakeholders as well. (23-35.)

Sources of Competitor Information

Nowadays, information about competitors is more widely available than ever before in history. Specifically, the emergence of the internet as a new source of competitor data may have greatly facilitated this transformation. In addition to the scope of data available, the World Wide Web has also made the retrieval of information increasingly easier with the development of intelligent agents (IA's) and other advanced technologies that can be programmed to search and filter through data around the clock (Sheng, Mykytyn & Litecky 2005, 107-108). Regardless, we now go on to examine the various sources of competitor information that can be used for subsequent competitor analysis.

A potentially beneficial way to distinguish between types and sources of competitive information is by looking at the context of who the information is from. In this respect one can look at what competitors themselves say about their firm in advertisements, recruitment ads, promotional material, technical reports and press releases. Secondly, one can also classify competitor information according to what

other sources apart from the competitors themselves say about them like customers, trade sources and newspapers and magazines. (Hooley, Piercy & Nicoulaud 2012, 124.)

In a study among US companies, Subramanian & IsHak (1998, 18) found that the most essential sources of competitor information ranked in the order of importance are a company's own salespeople, competitor annual reports and customers. In contrast to this, Pirttilä (2000, 96) postulates the best sources to be colleagues outside the firm, colleagues within the firm, and business magazines and news outlets. As conflicting as these results may seem, it may very well be that their stark difference is reflected in the different samples studied. Even so, one can see that there is a varied selection of sources for competitive information available, and depending on the firm in question, their order of importance may vary.

It is surprising to observe that even though the Internet has capabilities of storing vast amounts of all kinds of data, still human contacts remain an essential and important source of competitor information. Pirttilä (2000, 98-100) argues that the preferability of these kinds of oral sources might be due to the fact that they provide information more quickly and offer the opportunity for discussion, which is valuable in the respect that it also brings to light previous experience and context that may aid in decision-making.

Evidently by far the hardest type of information to find about competitors is the respective sales & net income of those which are privately owned. This suggests that companies may want to focus their efforts on working around this problem by consistently striving to obtain information from a variety of sources and seeking to synthesize this retrieved information together in order to form a bigger picture of these competitors. (Subramanian & IsHak 1998, 21.)

When evaluating any source of data, one must always take into account its validity and reliability, and so also with sources pertaining to competitive information. Some competitors may seek to deliberately give false information to a focal firm about its operations. For instance, many firms manage customer information on their websites and use it in digital marketing to better direct products and services to customers. So, what competitor IA's can do is spam a firm's website with false information about user paths, thus obstructing their capabilities to effectively manage their site visitors (Sheng et. al. 2005, 109-110). In general, any piece of competitor information probably has some degree of bias attached to it stemming from the identity and the subsequent goals of the source publishing it.

2.3 Theoretical Framework

Porter's framework for competitor analysis consists of four components: future goals, assumptions, current strategy and capabilities. Drawn together these form the competitor's response profile, which tries to predict the likely response of the competing firm in a given situation (see Figure 4). (Porter 1980, 48.)

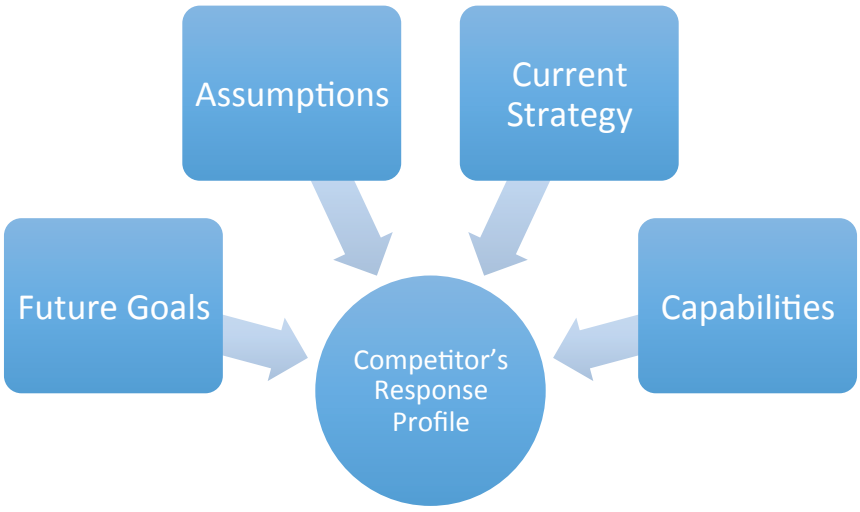


Figure 4. Porter's Framework for Competitor Analysis (adapted from Porter 1980, 49)

Future Goals

Knowing future goals will allow one to predict to what extent given competitors are content with their current positions and business results, allowing one to determine the likelihood of the competitor changing strategy and the probable strength of its reaction to external events or the competitive moves of other firms. Furthermore, the knowledge of goals aids in determining the commitment of the competitor to any strategic move it makes; like how likely it is to retaliate if another firm initiates an attack and whether it will receive the backing of a possible corporate parent company or not in such a case. (Porter 1980, 50-51.)

A comprehensive analysis of a competitor should take into account both quantitative and qualitative types of goals, such as market share and profit, state of technology and social performance. Ideally, the goals should be determined at multiple levels in the organization: corporate goals, business goals and even the goals of specific managers. Now I will present the core dimensions that may help in the diagnosis of goals at the business unit level, which we are inherently most concerned with:

1. Stated and unstated financial goals
2. Attitude towards risk
3. Organizational values and beliefs
4. Organizational structure
5. Control and incentive systems
6. Accounting system
7. Managers and their background
8. Degree of unanimity about future direction
9. Composition of the board
10. Contractual commitments

11. Regulatory, antitrust, and other governmental and social constraints

(Porter 1980, 51-53.)

Assumptions

The operations and behavior of a firm are based on its own assumptions about a given situation. These assumptions can be categorized as assumptions that a firm has about itself and the assumptions it has about the industry and competitors. However, who knows if these assumptions are accurate or not? If they are not, this may provide competitors with added leverage to exploit the situation. Moreover, the examination of assumptions may reveal potential blind spots in the competitor's thinking where he may not perceive the importance of an event, see it in a different way, or be slow at identifying it. As a whole, perceiving the blind spots of competitors will help a firm choose more effective moves with less likely or ineffective retaliation. The following are important aspects to take into account when identifying competitor assumptions:

1. Beliefs about relative cost position
2. Strong historical or emotional identification with certain products or functional policies
3. Cultural, regional and national differences
4. Strongly institutionalized organizational values and canons
5. Beliefs about future demand and significance of industry trends
6. Beliefs about competitor goals and capabilities
7. Belief in industry "conventional wisdom" or rules of thumb
8. Current strategy

(Porter 1980, 58-60.)

In addition to what was mentioned previously, two potentially significant indicators of the goals and assumptions of a competitor are its history, its managers and the managers' backgrounds. Therefore, one should try to look at what the company has

done in the past as well as perform a thorough background check on its managers. (Porter 1980, 61-62.)

Current Strategy

Competitive strategy consists of mapping out how a given business is going to compete on a broad scale, what its goals ought to be, and the needed policies to accomplish the goals. Essentially it is a combination of the policies as means and the goals as the ends. For articulating the key dimensions of a firm's strategy one can use the "wheel of competitive strategy" derived from the classic approach to strategy formulation (see Figure 5). (Porter 1980.)

Figure 5. Wheel of Competitive Strategy (adapted from Porter 1980)

All the components of analysis listed above from the goals to the current strategy have an effect on the competitor's reactions along the dimensions of probability, timing, essence and intensity. (Porter 1980, 63.)

Capabilities

Lastly, one must appraise the capabilities of the competitor realistically in order to identify its strengths and weaknesses, or in other words, its ability to make or respond to competitive moves and subsequently deal with the external environment. The following is a simplified framework about the key business areas from which one can determine the strengths and weaknesses of a competitor:

1. Products
2. Dealer/Distribution
3. Marketing and sales
4. Operations
5. Research and engineering
6. Overall costs
7. Financial strength
8. Organization
9. General managerial ability
10. Corporate portfolio
11. Other: special Treatment from government and personnel turnover

(Porter 1980, 63-65.)

The Competitor Response Profile

After the analysis of the four components of the competitor framework explored above, a competitor response file is formed through asking additional questions pertaining to offensive moves and defensive capabilities. Consequently, we will start with the prediction of probable offensive moves by asking a few questions:

1. Is the competitor satisfied with its current position in comparison with its goals? Is strategic change probable?

2. What are the competitor's likely moves based on its goals, assumptions and capabilities?
3. What is the expected strength and seriousness of these probable moves based on the goals and capabilities of the competitor and the possible gain from these moves?

(Porter 1980, 67-68.)

Assessing the competitor's defensive capabilities can be done by the consideration of three questions:

1. What competitive moves and industry events the competitor would be most vulnerable to?
2. What competitive moves or events could provoke strong competitor retaliation with no regard for financial or operational performance?
3. Are there moves or events that the competitor cannot react to effectively?

(Porter 1980, 68.)

Implementation of the Theoretical Framework

After gathering the data for my study, I implemented the theoretical framework outlined above to identify the research results and analyze them. In practice I used the themes of future goals, assumptions, current strategy and capabilities to codify the data. This meant that whenever I spotted a piece of data corresponding with one of the themes, I marked that piece of data with the corresponding thematic tag. As a guideline for codifying the data under thematic tags I used the points and questions discussed in the theoretical framework above and my own judgments as a researcher. For instance, if an excerpt of data would've read "our goal is to continue doubling our sales every year," then I would've marked this piece of data as pertaining to the theme future goals. On the other hand, if an excerpt of data would've read "we will focus on the commercial UAS markets of public safety and inspection," I would've placed that excerpt of data under the thematic tag of current strategy. Then, once I codified all the relevant data pertaining to the drone manufacturers in the study, I

grouped these results together under each firm and constructed a competitor response profile about each of them.

3 Methodology

3.1 Research Approach

My research approach is qualitative by nature. By definition, qualitative research is "the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem" (Creswell 2007, 37). However, Denzin & Lincoln (2005, 2-10) point out that any definition of such research poses specific issues, owing to the vastness of the associated disciplines it crosses, along with the different concepts that it encompasses, and because it has no distinct theory or paradigm of its own. Relating to these difficulties, Alasuutari (1995, 7-8) suggests that the key point of differentiation separating qualitative from quantitative studies may be the concept of qualitative analysis. Essentially, the qualitative research process is an approach to inquiry that is characterized by emerging questions and ways of action, collecting data in its natural context, inductive data analysis that builds general patterns or themes (see Figure 6), and involves a reflexive researcher who is focused on deriving meaning and interpretations from the data (Creswell 2007, 37).

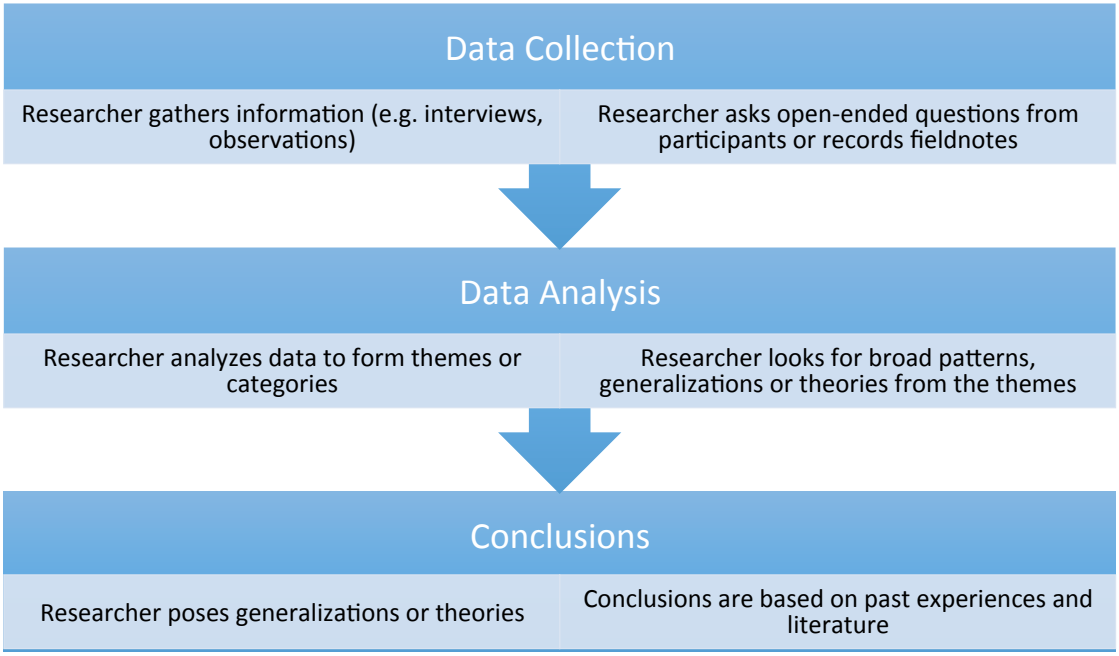


Figure 6. The Inductive Logic of Research in a Qualitative Study (adapted from Creswell 2009, 63)

A qualitative approach can provide any given company with effective tools for research in subjects relating to business and management (Gummesson 2000, 1). According to Silverman (2013, 235), it is the most effective in the exploration of everyday matters that are often taken for granted. Creswell (2007, 39-41) elaborates that qualitative research is conducted when a problem or issue needs to be explored. Indeed, because prior research and data about the drone industry is relatively limited and hard to come by, this study includes some exploratory elements: a review of relevant literature and an interview with an expert in the field (Saunders et. al. 2009, 139-140). As a whole, this piece of research combined aspects of both exploratory and descriptive studies as dictated by the research question.

Lastly, my study is cross-sectional by nature, implying the examination of phenomena at a set point in time. My research is time-constrained due to the requirements relating to my graduation, which dictate that I do not have sufficient time for a longitudinal study. In addition to this, this study is only at the bachelor's level, meaning that spending a great amount of time on longitudinal research would be undesirable from my point of view. (Saunders et. al. 2009, 155.)

3.2 Research Context

The context of the research is set in the commercial UAS market. In brief, the demand for commercial drones is expected to rise once regulations are eased, which will enable UAS operations beyond the visual line of sight. Recently venture capitalist investment has been high due to the multiple potential applications of the technology. Also, big companies like Google and Facebook have made acquisitions to facilitate the development of UAS systems as well (Teal Group 2016). Meanwhile, drone manufacturers are putting their efforts on constructing systems that are tailored to specific segments of the emerging market. In short, UAS are forecasted to be "the most dynamic growth sector within aviation." (FAA 2016, 33.)

In general, UAVs designed for the commercial market have prices starting at around $10,000 (Canis 2015, 5) and ultimately averaging at about $40,000 per unit (FAA 2016, 31). Compared to consumer UAV the commercial ones are often larger, designed to carry a heavier payload and often have a longer battery life (Canis 2015, 5).

Market Forecasts

The estimates concerning the market size of commercial UAS vary widely owing to the uncertainty surrounding the development of high technology, suggesting that any breakthroughs in technology are guarded with care within companies, and also the notion that the market is still in its infancy. For instance, Teal Group (2016) currently values the market at only $387 million while PwC (2016) estimates it at over $127 billion. Regardless, the Teal Group seems to be the industry expert in the forecasting of future UAS market developments, due to their cooperation with the Federal Aviation Administration, the main entity in the USA governing drone regulations (FAA 2016, 31). Consequently, they forecast the market to be worth $6.5 billion in 2025 with a 32.6% annual rate of growth (Teal Group 2016).

Factors facilitating market growth are the widespread availability of supporting technologies like 3D printing, automation and electronic sensors, along with the relatively few parts needed to construct a single UAV (Canis 2015, 2-3). On the other hand, the main issues hampering growth prospects seem to be drone regulations, privacy concerns and the relatively slow development of the sense-and-avoid and airspace management technologies (Congressional Digest 2016). In spite of all this, the broad consensus seems to be that the market has the potential for significant growth in the coming years.

Market Segmentation

It is clear that UAS has numerous applications in the commercial market, which have the potential for further growth as technologies develop and new uses for them are thought of (Phillips 2014). Thus, the commercial UAS market can be further segmented into smaller markets of which the largest ones are industrial inspection, agriculture, insurance, real estate/aerial photography and government (see Figure 7). Next I will shortly explore these main markets.

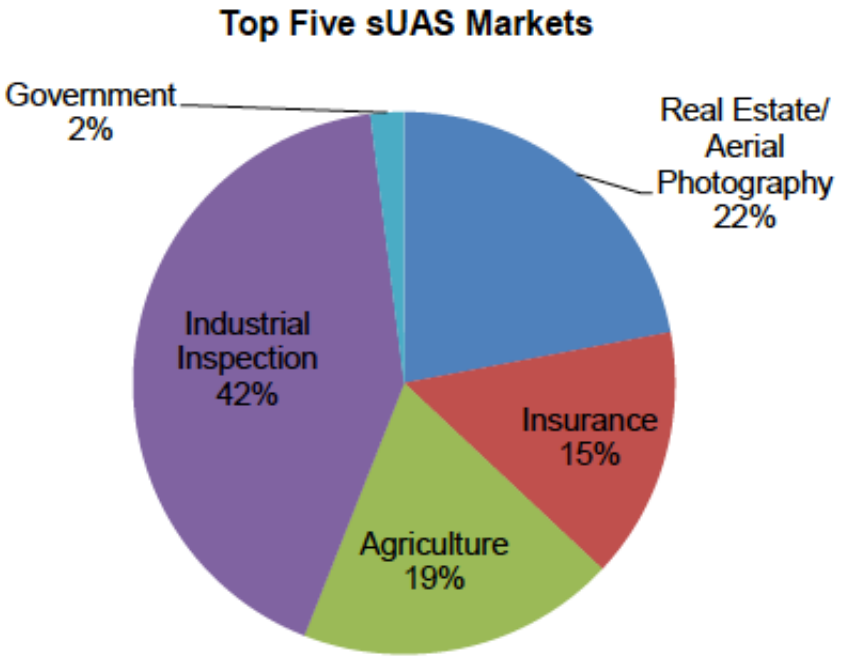


Figure 7. Main Commercial Small UAS Markets (Source: FAA 2016, 33)

The segment of industrial inspection can be further divided into construction and utilities, of which I will now outline the former. Construction will likely be the leading segment in the overall market, since the 10 largest construction companies in the world are either deploying or experimenting with UAS (Teal Group 2016). According to Congressional Digest (2016), the main uses of UAS in construction will likely be for inspection and mapping. More accurate project designs could be facilitated by topographical mapping, which would help to mitigate expensive adjustments in the construction process. UAS adoption could result in the removal of high-elevation inspections, resulting in improved worker safety. They could also record the progress of projects that could later be used to reduce the disputes of contractors and landowners. Eventually, UAS might be used for transporting tools and equipment to where they are needed most. (4.)

The other segment of the industrial inspection market is called utilities. They are expected to use UAS mainly for the inspection and surveillance of infrastructure such as electrical systems, pipelines and roads (Canis 2015, 10). Specifically, drones enable the monitoring of remote areas, and they may even improve worker safety through the elimination of risky inspection activities formerly performed by workers (Congressional Digest 2016).

Agriculture will be the second largest segment worldwide owing to the huge potential related to spraying crops and imagery that would allow the detection of instances where water, fertilizer or pesticides would need to be used on the crop fields (Teal Group 2016). Moreover, Canis (2015) elaborates that drones could be used as instruments of precision agriculture involving the analysis of data on the different aspects of farm fields in order to increase productivity. This way farmers could respond to crop issues in a precise fashion, thus eliminating the need to treat the field as a whole. In addition to boosting productivity, another benefit of using drones in agriculture is the low risk that they pose toward the people and property on the ground. (10.)

The segment of aerial photography includes smaller markets for real estate and filmmaking of which I will be talking about next. Concerning real estate, brokers already use drones to capture difficult images formerly taken via helicopters. It is probable that UAVs will also be used to photograph large commercial parcels like unused land, offices and shopping malls. Additionally, drones could morph into a trusted tool for property maintenance, used especially for inspection following storms or vandalism. In addition to real estate, some movies have been filmed partly by using UAVs equipped with cameras. (Congressional Digest 2016, 4.)

At present, civil government is likely to be a relatively small segment of the overall market. However, there are a few market forces that enhance its appeal: the EU's conception of a renewed border and coast guard, the UN's plans to expand drone use in peacekeeping and the usage of UAS by agencies of public safety, especially in developing countries (Teal Group 2016). UAS are being used in dangerous situations related to law enforcement, like locating missing persons and communicating with barricaded subjects (Canis 2015, 11). According to Congressional Digest (2016, 4), drones may aid first responders in learning details about a fire, or in the assessment of waste spills that may prove to be hazardous.

UAS Manufacturers

Now I will introduce the UAS manufacturers that I will use in my study. The companies Aeryon Labs Inc. and Microdrones were chosen based on the interests of Pohjonen Group. The company AeroVironment was chosen by the researcher, because they are a large military supplier planning to penetrate the agricultural UAS, and for the reason that more data is available about them since they are a publicly listed company.

Pohjonen Group

Pohjonen Group Ltd. is an UAS provider based in Karstula, Finland. The company was founded in 2013 by the brothers Joona and Teemu Pohjonen. In general, the firm

manufactures fixed-wing and multirotor UAS for commercial and security purposes. In addition, the company also provides training, support and life cycle services. Their current products include a handheld ground control station, a few payloads, a portable ground control station, a multicopter, a universal connector called EMCI and a fixed-wing aircraft. In 2014 they got to the finals of a Finnish start-up competition Kasvu Open. Later, during 2016 they released their first multicopter called Korento C and a universal connector by the name of EMCI, which has the capability of attaching any kind of payload to a UAS. In 2017 they are planning on releasing Sääski 240, their first fixed-wing product. Meanwhile, they are working on a portable airport project.

Aeryon Labs Inc.

Aeryon Labs Inc. is a provider of small UAS based in Waterloo, Canada. The company was founded in 2007 by Dave Kroetsch and Mike Peasgood. Their main product is the multicopter Aeryon SkyRanger. Additionally, they provide a selection of payloads, a joystick controller and UAS management software and analytics. In 2016 they were recognized for a third time as one of Deloitte's technology fast 50 companies. (Aeryon Labs Inc. 2017.)

Microdrones

Microdrones GmbH is a UAS provider based in Germany, which was founded in 2005. Currently they employ 25 people in Germany and over 100 in their staff worldwide. Their objective is to produce VTOL MAV (Vertical Take Off and Landing, Micro Aerial Vehicles) that weigh under 25kg. They launched their first multicopter product md4-200 in 2006. Their latest product is the md4-1000 multicopter. Since 2006 they have sold over 800 md4-200 UAV and over 250 md4-1000 UAV. Their upcoming product is a miniaturized VTOL aircraft called md4-3000, which was supposed to be released in 2016. In addition to aircraft Microdrones also provide UAS management software. (Microdrones 2017.)

AeroVironment

AeroVIronment Inc. is a manufacturer of UAS and provider of commercial information and energy solutions. The company was founded in 1971 by Paul McCready and is currently based in Monrovia, California. They are the largest supplier of small UAS to the Pentagon, and they also have the most popular UAS being used in the world today: RQ-11B Raven. (AeroVironment 2017.)

3.3 Data Collection

Inherently data collection can be seen as a sequence of interconnected activities with the objective of gathering information to answer research questions (see Figure 8). Most often the process begins with the locating of a site or individual. Now I will continue my thesis by outlining the process of data collection. Consequently, I will start this by justifying the need for data collection based on the research problem and related question. (Creswell 2007, 118.)

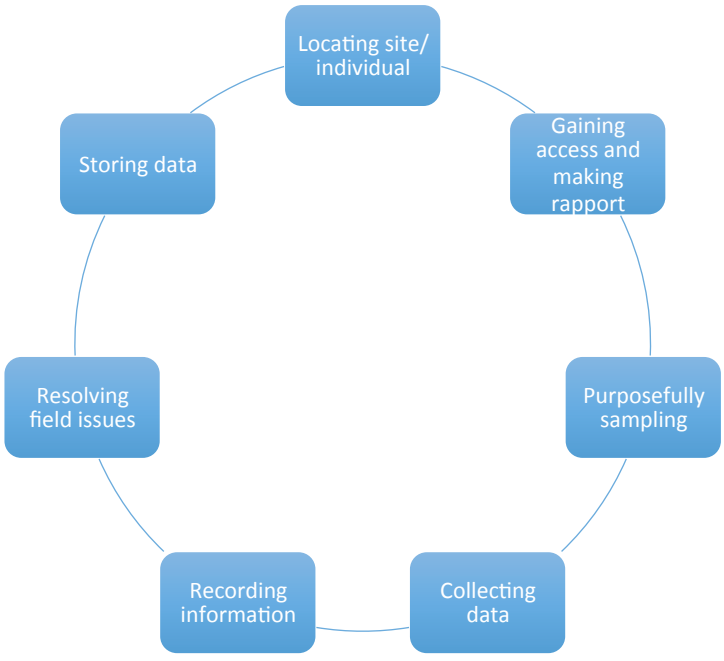


Figure 8. Data Collection Activities (adapted from Creswell 2007, 118)

The Need for Competitor Analysis

Based on the research problem and question Pohjonen Group has a distinct need for a competitor analysis. They are a young start-up who has a short history of operating in the market, implying that they might not yet have learned the most beneficial business practices for operating in the drone field. So by surveying and analyzing other competitors in the UAS market, Pohjonen might gain valuable information on how to improve their operations. Additionally, its business strategy in the market could collide with the business strategies of rival companies. Therefore by collecting information about its competitors, Pohjonen might also better prepare for such an event by fine-tuning their strategic orientation to avert a situation of damaging business warfare. Broadly, benchmarking competitors may help Pohjonen Group improve their ways of doing business and give them tools to better prepare themselves for future events in the UAS market context.

Identifying the Competitors

The competitors to analyze were chosen based on a purposeful sampling strategy, meaning that the companies to study were selected because they have the capability to "purposefully inform an understanding of the research problem" and the phenomena that is being studied. More specifically, the type of purposeful sampling strategy used was combination, meaning that its purpose is to meet multiple interests and needs. (Creswell 2007, 125-128.)

Only a few competitors will be analyzed due to the nature of the research being at the bachelor level, and also because a deeper kind of analysis that is required can only be done about the biggest players in the commercial UAS market since they have enough information available about them. In addition, by restricting the research to the study of only a few competitors, possible time constraints for the study won't become an issue, so more data can be collected about each firm.

Data Collection Methods

The commercial UAS industry is technologically highly intensive, meaning that its progress in closely linked to the success of research and development efforts. Owing to this notion, companies operating in the market are careful about the information they release to the public. On top of this, the industry is still in its growth phase where successful modes of doing business and leading firms are not yet established in the market. For these reasons, gathering information about companies proves to be hard, which is why this study is restricted to gathering secondary data about competitors from the web.

The data about competitors was collected through the internet. The sources of data consisted of the homepages of the respective companies along with related press releases and reports. More specifically, the data was collected from the following webpages: www.avinc.com, www.microdrones.com, www.aeryon.com, www.pohjonengroup.com, www.canadianbusiness.com, www.ca.reuters.com, www.3dvisworld.com, www.resources.esri.com, www.news.communitech.com, www.middlemarketgrowth-digital.com, www.kitchener.ctvnews.com, www.therecord.com, www.suasnews.com, www.kasvuopen.fi, www.karstulanseutu.fi, www.team.finland.fi, www.karstula.fi. Subsequently, this data was copied and recorded on a computer on Microsoft Word.

As a whole, the internet offers access to an environment where the application of other research methods such as interviews and observations would be challenging and ethically displeasing (Silverman 2013, 225). By definition, documentary secondary data comes in many shapes and sizes: annual reports, public or administrative records and magazine articles, to name a few (Saunders et. al. 2009, 258). Furthermore, the advantages of documentary data are that they permit the researcher to collect the participants' language and words and that the data are inherently thoughtful, since the party in question has specifically compiled them (Creswell 2009, 180).

Every method of data collection has some inherent advantages and disadvantages (Gummesson 2000, 126). Even the web context is not without its challenges. Inherently, Denzin & Lincoln (2005, 803) suppose that such contexts of communication make the decisions of researchers more complicated, owing to the notion that text-based environments diminish some of our most important senses, including vision. This will be taken into account by soliciting multiple sources on the web to form a bigger picture of the phenomena, and cross-referencing data where possible. Moreover, in Creswell's (2009) opinion this kind of research involves the issues of finding material and obtaining permission to use it. In this research study, both aspects are taken care of, as the material is conveniently available to the public on the web. Effectively, such data may also be inaccurate or inauthentic. However, this is not very probable, because a large part of the data is collected from the homepages of the companies, and even data obtained elsewhere can be potentially cross-referenced. (180.)

Information was also collected about Pohjonen Group due to them being the commissioning party of the research, and additionally because the research question warranted it. Having previously worked with the company, access was relatively easy to achieve to the relevant gatekeepers. As previously demonstrated, a qualitative approach warrants the gathering of more in-depth information, and a common tool for gathering such information is the interview (Denzin & Lincoln 2005, 698-699). Conventionally, the interview is seen as a kind of conversation that acts as an instrument in the transferring of knowledge (Silverman 1997, 113). Thus, the primary data for this thesis was collected through an in-depth interview with the CEO of Pohjonen Group.

The in-depth interview was conducted face-to-face at the company's headquarters. By definition the interview was semi-structured, which means that it covers a selection of themes and questions that may vary depending on the discretion of the researcher (Saunders et. al. 2009, 320). Specifically, this type of interview was chosen, because it provides more in-depth information for analysis than a structured one, but

less information than an unstructured interview, which is not needed because the study has time constraints and is focused on the study of more factual data relating to strategy. The interview data was recorded on tape using a mobile phone and subsequently transcribed on the computer. During the interview additional notes were also taken by the researcher in order to supplement the transcription and data analysis. It should be duly noted that the interview is never just a neutral process of asking and answering questions, but more like an active effort of collaboration, which leads to the construction of a narrative (Denzin & Lincoln 2005, 696).

Individual face-to-face interviews necessitate choosing subjects who have no reservations in speaking and sharing ideas, and this means finding an environment where such is possible (Creswell 2007, 133). This aspect is taken care of, since the interview was made at the company headquarters with the CEO who is experienced in operating within all kinds of social situations. Consequently, Gummesson (2000, 128-130) argues that a potential drawback of this type of audio-recorded interview is that it leaves out the important aspect of nonverbal communication from the data analysis. However, in this study we won't need to analyze the nonverbal communication, because we are largely concerned with the strategy of Pohjonen Group and not so much the meanings that are attached to it.

Creswell (2009) brings out some further advantages and limitations of interviews: they are beneficial when participants cannot be observed in a direct manner, and when historical information is required. Effectively, this is the situation now, since such direct observation that would be required for analyzing strategy would only be possible in a longitudinal study, and historical information is now needed to construct a full picture of strategy. On the other hand, the responses of the interviewee may be biased by the presence of the researcher and because the information provided is shaped by the views of the participant. (179.) These concerns will be taken care of, since I have some experience in interviewing, and also due to the notion that the interviewee has a vested interest in the results of the study, resulting in the implication that he will probably seek to provide more objective data.

3.4 Data Analysis

When speaking of data analysis one should keep in mind that it is not a process that advances in distinct steps, but rather a spiral of analysis where different activities may happen even simultaneously and in a peculiar order differing from what was originally expected (Creswell 2007, 150). Consequently, this piece of research more or less followed the following process of analyzing data (see Figure 9).

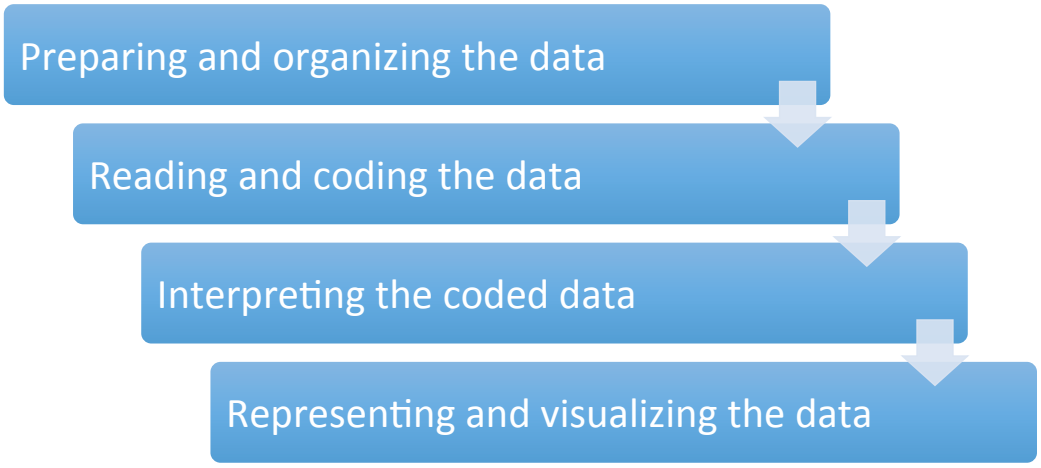


Figure 9. Data Analysis in this Study

Content analysis was chosen as the data analysis technique based on the research problem and objectives. The data analysis focused on the four variables derived from the theoretical framework: future goals, assumptions, current strategy and capabilities. Next I will go on to describe how I analyzed the data in more detail, starting with the stage of data preparation and organization.

First of all, the personal interview was transcribed from the audio recording on a computer in order to make the content analysis easier. The names of the interviewer and interviewee were included in the transcription to ease the identification of speaker. Only the exact words of the interview participants were transcribed, meaning that such sounds as ‘umm’ or ‘er’ were not included due to the notion that a naturalist perspective was used in analyzing the data, meaning that the interviewee’s

answers were taken to describe an external reality encompassing such things as facts and events (Silverman 2013, 237-238). Furthermore, the data collected from the internet was saved in plain text files on a computer. The original headings of the web data were preserved in order to broadly define the topics of text, which subsequently eased the process of coding the data. Finally, after preparing the data collected from the interview and the internet, both types of data were combined together in MS Word in preparation for analysis.

The body of text in Word was read through thoroughly many times in order to grasp the full significance of the data. Next the text was coded based on themes derived from the theoretical framework: future goals, assumptions, current strategy and capabilities. According to Gibbs (2007, 38) "coding is how you define what the data you are analyzing are about." So in practice, when a chunk of text explicitly or implicitly referred to one of the previously mentioned themes, it was coded in Word using the corresponding thematic tag. This coding made the next step of analysis easier where these coded pieces of text were then grouped under the themes from the theoretical framework. After this, a detailed description was made of each of the companies and their respective contexts using the available data.

The contents of the previously grouped themes were then interpreted based on the literature on strategy and competitor analysis, along with the judgments of the researcher. So practically this meant that the future goals, assumptions, current strategy and capabilities of each company were described and compared with each other. By comparing the different aspects of rival companies to Pohjonen Group, one can see how they are similar or different from each other. For instance, similarity between companies may imply that in the future their strategies may conflict with each other as the UAS market gets saturated, thus illustrating the need for strategic preparation. On the other hand, if Pohjonen Group is found to be radically different from all its competitors, this might suggest the need for benchmarking. Subsequently, generalizations were formulated from the interpretations relating to each firm. Final-

ly, the resulting information was visualized in text and associated figures, and conclusions were made for the strategy of Pohjonen Group.

3.5 Verification of the Results

Validity

During the conducting of the study select validation strategies were used to enhance the validity of the research: prolonged engagement with the field of study, triangulation, member checking and the clarification of researcher bias (Creswell 2007, 207-209). The implementation of these strategies will now be elaborated on with greater depth.

Prolonged engagement with the field of study was achieved through the author's practical training at Pohjonen Group, which lasted for about a month, and also through the following of UAS industry developments for a period spanning over a year. More importantly, the practical training at Pohjonen Group acquainted the author with the situation of the company and built trust with all of its employees that in turn facilitated the collection of data for the research. Furthermore, following the UAS industry developments familiarized the author with the research context and its associated trends.

Triangulation in the study was more limited in scope and restricted to the collection of documentary data from different websites. As such, triangulation wasn't achieved through multiple methods of data collection, but in multiple sources of information from the web. Also, since data about the different companies was relatively scarce on the web, triangulation of the sources could not be used for every case of data, but it was implemented where possible.

The validation strategy of 'member checking' was conducted with the participants of the study in Pohjonen Group. During the research stages of data collection, analysis and interpretation they were repeatedly consulted about the emerging results of the

study. In particular, since they were also the commissioning party of the research, the successful implementation of the study was in their interest, implying that the help obtained from them was most likely done in good nature for the further enhancement of research validity.

As the author of this thesis, I acknowledge my personal bias and subjectivity in administering this study. I am no expert in the field of UAS, being only partly involved for a little over a year. Among other things, this means that this research will be biased by my relatively short time being acquainted with the industry: I may overemphasize some aspects and trends in the UAS market and its companies that have only become prominent during my short duration of contact with the industry. In addition, I have work experience with only limited parts of a UAS company: the business functions of marketing and sales to be more exact. Furthermore, before my brief practical training and contact with the drone industry I completed a high tech management module in my university. This may partly affect my judgments concerning the drone industry, because it is also in the high tech sphere. Specifically, this implies that I may make too extensive generalizations or judgments about the UAS market based on previous knowledge about the whole high tech environment, which is a much wider context.

Reliability

At the broader level the reliability of the research findings were enhanced by paying particular attention to the quality of data transcription and coding. Essentially, this meant that the data collected from the internet and the interview were transcribed with care on my behalf. What's more, the researcher's previous experience in transcribing interviews at JAMK University of Applied Sciences partly helped in ensuring quality. Generally when analyzing data, issues may arise in the 'definitional drift' of coding: the potentially differing coding practices used at the start and the end of the data analysis process. This concern was alleviated by constantly checking the data for discrepancies during the coding of data. (Gibbs 2007, 98-99.)

According to Silverman (1997), tape-recorded data such as that which is used in this study has intrinsic strengths like accuracy and public access, but the inclusiveness of such data merit additional consideration. Inherently, some aspects of social interaction may be lost, including longer-term temporal processes, ambulatory events and the effect of other non-conversational methods of action (203-205.). Additionally, attention should be paid to reliability in the quality of tape recordings (Creswell 2007, 209). Next I will explain how I tried to alleviate the issues pertaining to reliability covered in this paragraph.

The concerns over long-term temporal processes are minimized in the research interview, owing to my previous personal contact with Pohjonen Group spanning over a year, and also due to the fact that the company has not been around for so long, meaning that a great many longer term processes may not have taken place. In terms of ambulatory events, this study was not particularly concerned with them owing to the inherent research problem and approach. Furthermore, documents can be considered as one other non-conversational method of action to be taken into account in the context of reliability. However, Pohjonen Group is a relatively small, young company and therefore has limited documentary realities available about them. As a result of this, there are no significant documents within the company to take into account within the context of the interview, apart from technical details relating to drones. Lastly, the quality of the tape-recorded interview was ensured by testing the recording equipment before the actual interview took place and at the same setting.

Regarding the internet data, reliable sources of information were prioritized in data collection: individual company and public sources came first before other ones like the websites of news agencies and consulting companies. Before using data from any of the sources their respective backgrounds were checked in order to ensure their reliability. Additionally, data triangulation was achieved where possible by cross-referencing information from the different web data sources. However, due to the

limited availability of data this was not always feasible, therefore negatively affecting the reliability of findings.

When assessing the reliability and validity of secondary data, adequate attention should also be paid to the data collection methods used (Saunders et. al. 2009, 276). Consequently, assessments pertaining to methodoogy were done in this piece of research where such information was available. Furthermore, Silverman (1997, 47) argues that documentary data are by nature 'social facts' that should be examined in relation to their organizational environment, cultural values and their distinct types and forms. In effect, in this study the context of all the documentary data collected were taken into account in the assessment of reliability and validity.

Generalizability

Broadly, qualitative methods are considered to supply one with more in-depth information, but with poor generalizability (Alasuutari 1995, 143). Furthermore, Gibbs (2007, 100) points out that one must be careful in trying to generalize beyond the cases examined especially in a qualitative research project, because the sample of phenomena studied often isn't randomly selected, and so doesn't resemble the wider population. Accordingly, this piece of research has poor generalizability, because the sample of companies selected to examine is not representable of the wide context that the UAS industry encompasses. The firms merely represent the most prominent and important competitors of Pohjonen Group as dictated by their personnel and the personal judgments of the researcher. On the other had, according to Creswell (2009, 193), Yin (2003) states that the findings in a qualitative study using several cases may be generalized to a broader theory by repeating the results of one case in others. However, in this study this is not possible, because the findings about each company don't correspond with one another and so cannot be generalized.

Generally, qualitative research is epitomized by research carried out in the context of the study; essentially being more concerned with the particular than the general

(Creswell 2009, 193). As it stands, the purpose of this research was not dictated by generalizability, but rather particularity: obtaining knowledge about particular competitors, which are of interest to Pohjonen Group. The emphasis on particularism was dictated by the applied nature of the research done for business decision-making purposes. What's more, Alasuutari (1995, 152) elaborates that qualitative research focuses on explaining rather than proving the existence of phenomena, and in his opinion a local explanation is the most important aspect of such research. This is exactly what this qualitative study is after.

4 Results

Now I will present the results of the study organized under the themes of future goals, assumptions, current strategy and capabilities, which are derived from the theoretical framework. Owing to the notion that the study is focused on the commercial UAS industry, we will not extensively explore data pertaining to other industries. This is especially the case with Aerovironment, who in addition to its UAS operations is, among others, involved in the electric vehicle charging business.

4.1 Future Goals

Table 1. Future Goals of Companies

Aerovironment	Aeryon Labs	Microdrones	Pohjonen Group
Providing actionable intelligence to help customers proceed with certainty Becoming market leader in the UAS commercial market Preserving leadership position in other existing UAS markets Increase international adoption	Using sUAS "to solve real-world problems" 200 percent sales growth in the next couple of years Increase the number of staff to 200 people	Making the "world's most technologically advanced VTOL UAV solutions in their class" Doing work a little better each day Developing an autonomous logistics system Expanding distributor network	Create an unmanned cargo aircraft with automated ground handling Long-term: 1000-kilo aircraft that can travel a distance of 1000 kilometers (km) Short-term: 150-kilo aircraft that can travel a distance of 1000 km

Out of the data for the UAS companies two types of goals could be distinguished: general goals with no specifically defined or achievable end result, and more specific goals with a more detailed definition, from which one can clearly see when the goal has been achieved. For instance, Aerovironment has a generic goal of providing actionable intelligence to help customers proceed with certainty. On the other hand, Aeryon Labs has a more clearly defined goal of 200 percent sales growth in the next couple of years.

In addition to the previously distinguished kinds of goals, we can also divide goals into those for the long-term and for the short-term. For example Pohjonen Group has a long-term goal of developing a 1000-kilo aircraft able to travel 1000 km and a short-term goal of developing a 150-kilo aircraft capable of travelling 1000 km. In Aeryon's case their more short-term goals involve even an approximation of time spent achieving them: "in the next couple of years."

In its more specific goals, Aerovironment is clearly committed to being a market leader in all of the markets that it participates in. In this respect, their goals are more market oriented comparing to the other UAS players, whose goals focus more on their companies. For instance, Microdrones and Pohjonen Group both articulate goals related to their future products and production: Microdrones wants to keep making the "world's most technologically advanced VTOL UAV solutions," while Pohjonen Group wants to create an unmanned cargo aircraft. Another similarity between the goals of Microdrones and Pohjonen Group is that they both seek to develop an autonomous logistics system made for transporting cargo. In contrast to these types of goals related to market and production, Aeryon Labs has goals concentrating on the areas of sales and personnel.

4.2 Assumptions

Shared Assumptions

Table 2. Shared Assumptions of Companies

Commercial UAS Market	UAS Products
• Significant future growth • Consolidation, big players like DJI will dominate • Fragmented with numerous segments • A variety of applications for UAV • Regulatory framework will develop, expanding commercial opportunities	• Easy-to-use solutions • Longer distance UAV • UAS fleets more common

Firstly, all of the drone manufacturers seem to agree that the commercial UAS market has great potential for significant future growth. Generally, this assumption is also accompanied by the belief that the market will become more fragmented with a large variety of different kinds of UAS applications emerging in numerous segments of the commercial market. Taken this into account, it is also no surprise that Aerovironment and Pohjonen Group assume that the regulatory framework will also further develop, permitting more widespread commercial operations. Moreover, these previously mentioned companies also agree on the notion that the market will increasingly develop towards more long-distance operations. In addition to these broad assumptions, Aeryon Labs and Pohjonen Group also believe that DJI Innovations will come to dominate the larger market.

There also exist shared assumptions concerning the particularities of the market. Aerovironment and Aeryon Labs highlight the belief that customers prefer easy-to-use solutions: for instance, Aeryon strives to build drones with “no pilot experience” required. In turn, Aeryon and Pohjonen Group see UAS flying more in the composition of fleets in the future, requiring services of fleet management.

Differing Assumptions

Table 3. Differing Assumptions of Companies

Aerovironment	Aeryon Labs	Microdrones
Military UAS experience translates into success in the commercial market	Huge potential in sectors of oil, gas and infrastructure	Cargo will be shipped by UAS, especially in big cities
Success in the commercial market depends on relationships with multiple stakeholders	Law enforcement need procurement that fits budgets and a complete solution	Most promising uses in logistics: urgent express shipments in crowded megacities and rural deliveries to areas lacking infrastructure
International adoption of their products will increase	Customers prefer quadcopters	Future demand for urban first and last-mile delivery
	Their drones are used in harsh weather	Multicopters promising for the logistics industry
	Aeryon has to move fast to stay in the game	
	Companies will bring drones in-house	
	Dumb to compete with China on hardware	

First of all, Aerovironment assumes they can transfer their extensive experience from the military market to the commercial one. They see the military as the early adopters of drone technology, and broadly picture themselves as serving the innovators from that market. However, they do acknowledge that surviving in the commercial segment requires developing relationships with key stakeholders in the industry. In addition to this market insight, they believe that the international adoption of their products will increasingly grow.

Secondly, Aeryon Labs visualizes huge potential in the market sectors of oil, gas and infrastructure. As such, they seem to assume that these segments of the commercial market will have the most rapid growth. Apart from these, they also believe that the UAS segment of law enforcement needs a complete UAS solution, because people working in this field have a clearly defined procurement budget. Furthermore, relating to the actual product, they assume that their customers prefer quadcopters, since they can take off in confined spaces and hover over a target area. What's more,

the drones of Aeryon are made for harsh conditions, because that's what they're often used in. Also, as a company they assume that they have to be nimble and move fast in the market, so that they wouldn't be left behind. As a future trend they believe that companies will eventually bring drones more in-house, compared to renting services from operators. Lastly, they see it as futile trying to compete on hardware with companies from China, which probably means DJI Innovations.

Thirdly, the assumptions of Microdrones center mainly around the emerging market for logistics and transporting cargo. They expect increasing demand for UAS first and last mile delivery in crowded cities and in more rural areas lacking adequate infrastructure. This means that drones will be used to transport cargo from place to place. Furthermore, they suppose that the most promising vehicle for carrying these deliveries will be the multicopter.

4.3 Current Strategy

Strategic Similarities

Table 4. Strategic Similarities of Companies

Product Characteristics	R&D
• Easy-to-use • Reliable • Weather resistant • Customized/integrated solution	• Strong focus: majority of staff and resources directed at R&D • Customer-centricity: developing products with early adopters and customers

Most of the similarities in strategy between the four companies center around the areas of product characteristics and R&D. Firstly, all of the companies except for Pohjonen Group specifically emphasize that their commercial UAS solutions are simple and easy-to-use. Aerovironment and Aeryon Labs even go as far as to imply that almost anyone having virtually no prior experience with drones can operate their systems from a touchscreen device. Microdrones on the other hand affirms that with about an hour's training their drones can be safely operated by anyone.

Apart from operational simplicity, the companies sell their products as being reliable. In this case, Microdrones proclaims that they "have the most reliable product in the commercial UAS industry." Furthermore, apart from Aerovironment, all the other drone companies emphasize the weather resistance of their drones, which are built to be operated in harsh conditions.

Concerning product characteristics, the UAS companies offer customized solutions according to the specific company needs. This often involves extensive work in order to fit the solution into the wider firm context. However, Aerovironment and Aeryon Labs, more than the others, emphasize that their systems are designed to be total end-to-end solutions.

As a whole, R&D plays a big role in each of the drone manufacturers businesses. It's common for the majority of staff to be working in this area, along with a significant share of resources directed towards it. For instance, Aeryon Labs has approximately 30% of their staff working in the R&D department, and Aerovironment even admits that their strong focus on R&D may hinder their profitability, since not all of their projects end up as revenue-generating innovations.

Lastly, the companies pride themselves as being customer-centric. This means that they develop their UAS by extensively collaborating with their customers in order to find out what they require in a possible solution. Typically this involves working with early adopters who are the most willing to try innovative solutions like drones. After perfecting a drone system with early adopters, the companies can introduce their offerings to the larger market.

Strategic Differences

Table 5. Strategic Differences of Companies

	Aerovironment	Aeryon Labs	Microdrones	Pohjonen Group
Target Markets	1. Defence market 2. Commercial: agriculture, energy transportation, infrastructure, public safety	Military, public safety, energy, high - end	Survey/mapping, agriculture, infrastructure inspection/planning, USA, short distance operations	Security & safety, professional use
Product Line	Many military UAS, Quantix for commercial market, Qube for first response professionals	One multirotor UAS, many payloads, subscription service	4 types of UAS packages differing mainly in size, additional payloads	One multirotor UAS, one fixed-wing UAS, EMCI connector device, upcoming portable airport
Marketing & Sales	Relationship development with key stakeholders, pilot programs	Trade shows, webinars, white papers, case studies	MdAcademy, trade shows, case studies, through distributors	Website, trade shows, network of agents
Collaboration & Partnerships	Component manufacturers, government, universities	Software collaboration, DJI, authorities	Distributors, universities, authorities	Component manufacturers, authorities

The target markets that the companies choose to serve have some similarities, but there are notable differences in how much they focus on each one of them. For instance, Aerovironment lists the defense market as their core business and considers the consumer UAS market as part of their growth portfolio that has yet to materialize into significant profits. However, in the commercial market they have focused more on the agricultural segment, which is evident from their extensive collaboration with universities and farmers in this field. This collaborative effort has in turn helped to shape their commercial market offering: the Quantix system. Like Aerovironment, Aeryon Labs also has a lot of their revenue coming from the defense market. In addition to this, they seem to particularly emphasize the public safety sector, having extensive experience working with public safety professionals like law enforcement. Their dedication to this segment is also epitomized in their recent offering to this market: a subscription-based end-to-end UAS solution.

Microdrones on the other hand doesn't seem to have such a clear focus on a particular segment of the commercial market. Instead, they settle for listing a range of possible applications for a given UAS package. However, they seem to have taken a more keen interest on penetrating the geographical market of the USA. This has been evident in the creation of partnerships with distributors like Trimble in the USA, and more recently also in the merger with Avyon, a North American UAS provider that introduced the Microdrones brand to the US market a few years ago. In addition to this, Microdrones states that they plan on focusing on short distance UAS operations. Like Microdrones, also Pohjonen Group has a wider approach to the specific market segments it serves, simply stating that they make drones for the security & safety segment in its broad sense, and for professional use.

In terms of product line, Aeryon Labs and Pohjonen Group are similar in the respect that they both provide only one type of multirotor UAS. On the contrary to this, Aerovironment and Microdrones offer multiple UAS multirotor systems with differing characteristics. Pohjonen Group stands out from the bunch to the extent that they sell purely fixed-wing UAV and a payload connector device called EMCI. Additionally, Pohjonen is also developing a portable airport for autonomous logistics, but currently this product is not on offer. It is worth noting that Aeryon not long ago came up with a new kind of subscription service for its UAS, specifically tailored towards law enforcement entities. Notwithstading, all of the companies offer a selection of payloads to go with their solutions.

Marketing & sales-wise the companies naturally had quite a few things in common, since there are only a select number of marketing methods to choose from. For instance, attending trade shows and producing case studies are relatively widespread marketing practices in the drone industry. Relating to strategic differences in this area, Aerovironment stresses the importance of developing relationships with key stakeholders in the UAS market as an important vehicle for marketing & sales. Owing to this emphasis, it is not a big surprise that they use pilot programs as a sales meth-

od as well. Differingly, Aeryon Labs seems to be the only drone company producing webinars. Furthermore, Microdrones has an actual drone pilot training program called mdAcademy that produces certified pilots for the industry. Among other things, these trained pilots can then be good advocates for the Microdrones solutions. Besides this, in the current situation Microdrones is looking for distributors, and to that effect has also partnered with some like Trimble in the USA. This shows that distributors are increasingly becoming one of their avenues for selling products to customers. In a similar vein, Pohjonen Group uses a network of agents as a part of their marketing & sales strategy.

Lastly, almost all of these players in the commercial market seem to be collaborating or partnering with component manufacturers from which they obtain at least some of their parts for the drones they make. In addition, some level of governmental collaboration is also visible with most of the firms. However, this is most pronounced with Aerovironment, who is in fact one of the main suppliers of drones for the US military. Apart from these aspects, specifically Aerovironment and Microdrones have been partnering with universities chiefly for the purposes of R&D. Seemingly, Aeryon Labs seems to be the only drone manufacturer who seeks out opportunities for collaboration with companies in the realm of software development. Most notably they have been collaborating with DJI, the biggest player in the consumer drone industry.

4.4 Capabilities

Strengths

Table 6. Company Strengths

Aerovironment	Aeryon Labs	Microdrones	Pohjonen Group
R&D and innovation, US military collaboration, balance sheet, manufacturing infrastructure, most used UAS hardware, product portfolio, easy-to-use product	Easy-to-use product, industry experience, 3 Deloitte awards for technological leadership, Canada's regulatory environment	Industry experience, EU award for best manufacturer, Trimble partnership, mdAcademy, brand reputation	Agile, flexible organization, EMCI product, fleet control ability, Portable Airport, government support, unrestricted testing areas, small employee turnover

Broadly stated, Aerovironment seems to reap most of its rewards from being an established company with a long history. Owing to this extensive experience they have accumulated a vast arsenal of intellectual property in the form of patents, trademarks and copyrights. This demonstrates that they clearly have capabilities in the field of research and development. The company has been the main supplier of drones to the US military for quite sometime, and so they also enjoy all the perks that would come with this. For instance, this provides the company with stability in their revenue, since they can rely on government procurement. Being a big supplier to the military also means that they have infrastructure in place to produce UAS in mass quantities. Furthermore, their financial profitability seems to be better than their peers in the commercial market, owing to their strong balance sheet. Also they have an extensive portfolio of products. Lastly, their UAS hardware is the most widespread and proven in the industry, and their products are often easy-to-use end-to-end solutions focused on providing actionable information.

Like Aeroviroment, Aeryon Labs UAS is also an easy-to-use total solution that can be integrated into an enterprise's framework. Differing from Aerovironment however, they have extensive experience operating in the UAS commercial market, meaning that they enjoy more clout in that field than Aerovironment currently does. Their technological leadership has been demonstrated by receiving 3 awards in Deloitte's Technology fast 50 awards. In addition, they have stated that Canada's more permissive regulatory environment has given them an advantage compared to their rivals in the USA.

Microdrones enjoys some of the same positive capabilities as Aeryon Labs in the context of their company. For instance, they have operated in the commercial UAS market longer than anyone, introducing the first product geared to the market in 2005. Partly because of this they are also a well-known and reliable brand in the market. And like Aeryon Labs, they too have been awarded for being the best drone manufacturer in the EU drone awards. Apart from these similarities though, they also have some different capabilities compared to other drone firms. One of these is their suc-

cessful partnership with the distributor Trimble in the USA, which has enabled them to penetrate the US market owing to the vast clout that Trimble holds in the sphere of drones. Further on, they have established a pilot training program called mdAcademy that provides professional UAS pilot certifications. In one known case at least, a certified pilot from the program recommended Microdrones' solutions to a dealer and so got them into another US vendor offering UAS solutions.

Pohjonen Group differs from its rivals in the positive capabilities it possesses. First of all, partly due to the small size of their company, their organization seems more agile and flexible from its competitors. Company-wise their personnel turnover is virtually nonexistent, therefore signalling that their employees are very committed to the company. Also their location gives them the opportunity to extensively test their drones in large unrestricted areas away from more populated civilization. Notwithstanding this, they are strongly supported by Tekes, the technology funding vehicle of the Finnish government. Furthermore, concerning products they have the technological know-how to control a fleet of drones up to 250 UAV. More particularly they also possess drone related products that are different from their rivals: an EMCI payload connector device and the still-in-construction Portable Airport that will act as part of an unmanned cargo handling solution.

Weaknesses

Table 7. Company Weaknesses

Aerovironment	Aeryon Labs	Microdrones	Pohjonen Group
US military reliance, concentrated client base, importance of key employees, lack of experience in commercial UAS	One type of drone, no fixed-wing aircraft	Drones require training, lack of focus on specific segments of the market, no fixed-wing aircraft	Small Finnish market, location, poor profitability, limited experience, small-scale production facilities

Aerovironment's previous history largely dictates present weaknesses in their capabilities. For one, they have for a long time been supplying the US military with drones, which has translated into an unhealthy reliance on them for support and

sales. This in turn reflects itself in the relatively concentrated client base it has, providing UAS solutions to a slim list of mainly military customers in foreign governments. Moreover, due to this reliance on the defense market for revenue they have not ventured very far into the commercial sphere. They largely consider commercial UAS as a growth market for the future, and so have not so actively participated in it as of yet. As a result, they lack experience and connections with some of the stakeholders of this emerging industry.

If Aerovironment's weaknesses were largely related to their focus on the military sphere, then Aeryon Labs are more related to their focus on only a specific type of UAV, which may prove a successful or unsuccessful choice in the future. Effectively, in the current situation they are selling only one type of multirotor UAV called the SkyRanger. This also means that they have no fixed-wing aircraft currently on offer, which provide different benefits compared to the now common multirotor UAV: for example, fixed-wing aircraft can travel longer distances compared to their multirotor counterparts, and so they can be more effective in surveying larger land areas. However, only the future can tell if this current focus on only one type of UAV is worthwhile or not.

Similarly to Aeryon Labs, Microdrones also offers only multirotor UAV in the current situation, which might prove a wise or unwise choice depending on future industry developments. In addition to this, their products seem to require more training than those of Aerovironment or Aeryon Labs in order to be operated, since these companies proclaim that you can easily control their UAV even from a touch screen in no time. On the contrary to them, Microdrones have stated that their aircraft require about an hour of training to use. Also, another weakness for Microdrones seems to be that they don't focus on any specific segment of the industry, but instead offer their products more broadly to the whole commercial market. This is most effectively seen when surveying their website, where they list all the manner of possible applications available for their products instead of highlighting or articulating any specific segment.

If the weaknesses of the other companies were in the most part concerned with the market and the products, then Pohjonen Group slightly differs in this respect as its weaknesses are more related to their lack of history as a company. For this reason they don't have as much experience as other firms in operating in the drone market or selling their products to it, and also being a small company they are focusing a lot of their resources on growth, resulting in relatively poor profitability for the firm. In addition, they don't have infrastructure for producing drones on a large scale like Aerovironment does. Notwithstanding, the remaining part of Pohjonen's weaknesses have their roots in their location, seeing as their headquarters are situated far away from major cities, and currently the Finnish market for drones is small and undeveloped.

4.5 Competitor Response Profile

Aerovironment

Taking into account Aerovironment's current position in the drone market compared to its goals, we can say that they seem partly satisfied with their progress so far: the international adoption of their products has increased as they planned, and they have kept their status as market leader in their main area of focus, which is military UAS. However, they have not yet attained market leader status in the commercial UAS market, suggesting that this is a goal that they will probably pursue more vigorously in the future. In terms of strategic change, it is indeed possible that Aerovironment might quit participation in some markets or market segments or penetrate new markets. However, at the current stage quitting the market is unlikely to happen in commercial UAS, seeing as they have judged it as a potentially large long-term growth market, and since they acknowledge that the segment is not yet developed enough in terms of regulation and established rules of conduct to warrant full commercial effort. For these reasons quitting the commercial drone market is not likely at least in the short-term.

Regarding Aerovironment's likely moves based on their goals, assumptions and capabilities, we can say that if military spending on UAS continues decreasing worldwide, then the company will probably focus more on the commercial drone industry, because they assume it to be a very large emerging market with significant prospects in the long-term, and also strive to be a market leader in this area. In addition, they will aspire to develop relationships with key stakeholders in this market, because they see it as an important aspect of their commercial UAS success. Moreover, since they have been extensively working with farmers and universities on the subject of precision agriculture for their Quantix drone, it is probable that they will focus more on this particular segment of the commercial market. Futhermore, since the company has a goal of increasing their international adoption, and also they acknowledge that their reliance on the US defense forces for revenue is a major risk for them, it is likely that they will seek to diversify their sources of revenue more and more.

Seeing that Aerovironment's overarching goal is to achieve market leader status in every market it participates in, and that they have so far kept this promise in markets like military UAS and electric vehicle charging stations, it is likely that their moves toward becoming a market leader in the sphere pf commercial drones will be serious by nature. Seeing also that they consider the market to be fragmented with no established leading players, it would seem that they would enjoy many benefits in terms of awareness and relatively easier customer acquisition if they were to become the UAS commercial market leader.

If we look at which competitive moves or industry events Aerovironment would be most vulnerable to, we can say that a significant drop in global defense spending or the unprofitability of the precision agriculture segment would probably affect the company the most gravely. Furthermore, strong retaliatory moves from the company could be expected if one would try to replace them as the main UAV manufacturer of the US military. Also, due to the relatively large size of their organization they could probably not effectively respond to sudden changes in the UAS market or competitor moves.

Aeryon Labs

If we compare Aeryon Labs to their primarily short-term goals, being 200 percent sales growth and 200 employees, then they seem to be doing alright in their current situation. In particular, reaching 200 employees is a relatively easy goal, given that they not long ago received a 60 million dollar investment in venture capital. On the other hand, in the past their sales have been growing by about 100 percent on a yearly basis, so this would mean that they would have to double their sales growth to reach this goal. However, this seems to be perfectly realistic, seeing as the industry is poised for growth, and just last year the Federal Aviation Administration came out with their landmark regulatory ruling on the industry, which more clearly articulated rules for commercial drone operators in the USA. In terms of strategic change related to these goals, it is not very likely, since these goals are short-term and relatively easy to achieve.

Based on Aeryon's goals, assumption and capabilities, there are a few probable areas that they will likely concentrate their efforts on. First of all, they will probably continue putting their efforts into software development, seeing as they have already extensive collaboration on that front, and also because they assume that they cannot compete with China on hardware. Furthermore, their assumption that customers will increasingly bring easy-to-use drone systems in-house will most likely lead to the development of integrated and company-wide end-to-end solutions. In fact, Aeryon just recently introduced an enterprise-level solution that includes a 7-step workflow process. Consequently, the company seems to be somewhat putting their focus on the market segment of law enforcement, owing to the notion that they proclaim extensive experience working with the law, and because recently they announced a subscription service that was specifically tailored to the segment. The most serious out of these moves seems to be the general focus on software development, taking into account that they have collaborated extensively on this front, and since they have openly declared hardware competition as more futile.

Aeryon Labs would be most vulnerable to a shift of preference among customers from multirotor drones to fixed-wing drones. This is due to the fact that they currently assume that customers prefer multirotor drones, resulting in the notion that they have only ever provided multirotor solutions, meaning that they have seemingly very little experience in producing fixed-wing alternatives. At the same time this is also an occurrence that Aeryon would be the least effective in responding to. Moreover, another event that the company would be vulnerable to would be the emergence of a leading software platform for drones, seeing that they are currently focusing on the development of software at the expense of hardware.

On the prospect of instances when strong retaliation from the company could be possible, one could say that if another firm managed to gain a significant foothold in the geographical markets close to their headquarters, like Canada and USA, this might provoke some kind of retaliation, because these seem to be their closest and thus most important market areas. However, this is relatively unlikely to happen, because currently the commercial market is in its early stages of development, housing a large variety of companies that are competing with each other.

Microdrones

Microdrones, like most of the other manufacturers in this study, seems to be relatively satisfied with its position in relation to its goals. As aimed for, they have already expanded their distributor network especially in the US market, and made strides towards developing an autonomous logistics system through some trials taking place in Northern Germany. In terms of making the "world's most technologically advanced VTOL UAV solutions in their class," it is harder to say, but seeing as they have been operating in the commercial UAS industry longer than anyone else in the field and have a solid brand reputation, this surely couldn't be that far from the truth. On the subject of strategic change, it is not very probable at least in the short-term, seeing as their goal of expanding distributor network is relatively easy, and also owing to the notion that the development of an autonomous logistics system seems far off due to lacking regulation and lacking technological capabilities. However, stra-

tegic change away from the logistics market could be possible in the long-term, because the development and possibilities in this market are relatively uncertain in the long run, since restrictive regulation may come to hinder autonomous operations of drones beyond the line of sight.

Based on its goals, assumptions and capabilities Microdrones will likely continue expanding into the US market via distributors and developing its logistics systems, as long as no restrictive regulations set in to disrupt this progress. Furthermore, as Microdrones frequently lists a wide range of uses for its potential products and does not seem to exclude selling to any segment of the market, it seems that they have the capabilities to pursue any lucrative market opportunity that they would see fit and useful, if such a one would emerge in the future. This means that they seem to keeping their options open on which market segments to concentrate on. However, as they focus mainly on short distance operations and see multicopters as the best type of drone for this purpose, it is likely that they will continue pursuing short distance operations with multicopters, and so won't start developing fixed-wing aircraft. When considering the seriousness of any moves, it is safe to say that they probably won't have any serious focus on any one market segment in the short-term. Notwithstanding, they are likely to be more serious about their focus on multicopters and short distance operations.

Like Aeryon Labs, Microdrones would be most vulnerable to customer preference changes toward more fixed-wing drone solutions, since they don't have experience in making these types of aircraft, and also because they are concentrating on more short distance operations with drones that don't require long travelling distances. On the other hand, strong retaliation from them could be provoked by establishing a strong presence in the markets that they are close to or focusing on: Germany and USA. Again however, this is relatively unlikely to happen, because currently the commercial market is in its early stages of development housing a large variety of companies that are competing with each other. Lastly, similarly to Aeryon Labs they

would also struggle in responding effectively to a shift in market preferences towards using fixed-wing UAV.

Pohjonen Group

When looking at Pohjonen Group, it is hard to tell whether they are satisfied with their current position in comparison with their goals. Seeing as their main goals center around creating an autonomous logistics system with 1000-kilo UAVs having the ability to travel a distance of 1000 km, it is uncertain how close they are to achieving this or the goal of a 150-kilo aircraft in the short-term. The reason for this is that it is not known whether they already can produce a flying 150-kilo drone capable of travelling 1000km. Regardless, they seem to be going towards this goal, since they are developing a portable unmanned airport that will act as an integral part of the autonomous logistics system, and also due to them already having the capability of controlling up to 250 UAVs. In the short-term, strategic change is not very probable in this respect, because the market segment of UAV logistics is still very much in its infancy. However, if the market would prove unprofitable in the long-term, Pohjonen might decide to change their strategic orientation. Therefore, based on their goals, assumptions and capabilities, Pohjonen Group is most likely to continue in the direction of their stated goals. In addition, it is to be expected that this pursuit of their goals will be relatively strong and serious by nature, especially if we consider that Pohjonen has already invested resources into developing a portable airport, and also since these are the company's only goals.

Considering the vulnerabilities of Pohjonen Group, it is evident that if the market for autonomous drone logistics would for some reason become unprofitable or suffer setbacks like prohibitive regulation, then the firm would suffer gravely in the light of its goals and strategy. In terms of competitive retaliation, the company might react strongly if a rival company were to achieve their main goals of 1000-kilos and 1000km before them, if this was accompanied by an autonomous logistics system. The reason for this is that such an action might demotivate them in achieving their goal, particularly if they would be far from achieving it. Additionally, Pohjonen as a

company would be least effective at responding to a situation in which they would be required to produce UAV on a large scale, for the reason they don't have any mass production capabilities.

5 Discussion

This study was conducted on the behalf of Pohjonen group to understand how their competitors are competing in the commercial UAS market, and how do they compare to them. As such, the main objectives of the research study were threefold: To find out how the competitors compare to Pohjonen Group, what are their probable future actions, and what can be learned from them.

Broadly speaking the drone manufacturers shared similar assumptions about the development of the UAS commercial market and product characteristics. Concerning the market, all of the firms expect significant future growth along with the emergence of a wide variety of applications for different UAV. Furthermore, some of the companies agreed that a fragmentation into numerous segments will take place, coupled with the emergence of a few key players.

Another major finding of the study was that the majority of companies possessed strategic similarities along the lines of product characteristics and R&D. Product-wise, the companies proclaimed to have easy-to-use, reliable, weather resistant and customizable solutions. Furthermore, the drone manufacturers had a strong focus on R&D, with the majority of resources and staff directed at the function.

The study also showed that the UAS companies differ the most from each other strategically, along market segments and product lines. This suggests that the firms have different nonverbalized assumptions about how they think the applications for UAS will develop, and what kind of importance or profitability each commercial segment will possess. For instance, Aerovironment is focusing on the agricultural segment of the commercial market. Therefore, they might believe that segment to be the most

profitable in the future. Furthermore, the differing product lines of the companies are most likely due to the firms targeting different market segments, since the product offerings of each company seem to correspond with the needs of their target segments: for example Aerovironment publicly states that they have manufactured the Quantix drone for the commercial market and the Qube for first response professionals.

Company-Level Conclusions

First of all, it seems that Aerovironment wants to become the leading company in the commercial UAS market, because of their goal of being market leader in each new market they pursue, and their positive valuation of the potential of this market in the long-term. In the short-term they seem to be concentrating on the market segments of precision agriculture and first response professionals, since they have produced a tailored drone for both segments. The company's main strength is found in R&D, since they have extensive experience with innovations and have a vast collection of intellectual property. However, their lack of experience and connections may hinder their progress in the commercial drone market.

Secondly, Aeryon Labs is presently focusing on growing their business, seeing as their goals center around increasing revenue and hiring new people. In the commercial market, they seem to be focusing on the segments of energy and public safety: they state that there is a lot of potential in the sectors of oil and gas, and they have worked a lot with public safety entities. In addition, Aeryon is concentrating on making end-to-end solutions for companies, a fact that they often emphasize in their marketing messaging and press releases. They are currently prioritizing their software at the expense of hardware, seeing as they have publicly stated that it is not worthwhile to compete with China on hardware, and since they have recently started collaborating on software with other companies. Aeryon Labs main strengths seem to be their easy-to-use UAV solution and industry experience: they claim that their systems are operational for everyone using a touch screen, and they are one of the longest serving companies in the commercial UAS market. However, their main

weaknesses are that they provide only one type of drone and that they don't make fixed-wing aircraft. These choices may prove fatal due to the uncertainty surrounding market development.

Thirdly, Microdrones is focusing on achieving two main goals: expanding their distributor network and developing an autonomous logistics system. The expansion of the distributor network is visible on their website were they ask for distributors to contact them, and also from the notion that they have recently secured some agreements for distribution in the USA, most notably with Trimble. Concerning the development of an autonomous logistics system, they believe that logistics will become a big market opportunity in the future, and so have already conducted trials related with such a system in some cities. However, in contrary to other companies, Microdrones doesn't seem to be focusing on any one segment of the commercial market: on their website they list all the possible applications for drones and they even offer 4 types of different UAS. However, they do state that they are focusing more on short distance operations. Their main strength is their UAS commercial market experience and brand awareness, since according to their site they were the first firm operating in the sphere. Contrarily, their main weakness seems to be that they don't manufacture fixed-wing aircraft, which may prove to be more popular in the future depending on industry development.

Lastly, compared to its competitors Pohjonen Group has a lot less experience in operating in the drone industry at large, due to being established later than the others. Despite of this, Pohjonen differentiates itself positively from its peers. They have clearly defined goals with a distinct focus on the logistics segment and longer distance operations. In addition, they have two unique products that their competitors seemingly haven't developed or aren't developing: the EMCI connector and the Portable Airport.

5.1 Managerial Implications

Pohjonen Group should consider the possibility of collaborating with companies and universities in R&D. Making software in-house is useful for preserving intellectual property know-how, but it also restricts the possibility to learn new practices from others. Collaboration with relatively well-known companies could also boost brand awareness and generate more sales for Pohjonen. In addition to companies, collaboration on research could be pursued with universities as well. Such institutions house the work talent of tomorrow, and so can help bring needed skills to the company. For instance, an agreement on traineeships could be established with a technical university, from which they could periodically send students on traineeships to work in the company.

Marketing-wise they could learn from Microdrones and its partnerships with distributors to penetrate the North American market. Therefore, if Pohjonen were to consider establishing itself in a specific country market, it may be advisable for them to pursue parnerships with distributors who are acquainted with the drone market. Furthermore, like Microdrones, they might also think about establishing a drone pilot training programme chiefly for marketing purposes. Certified drone pilots trained by Pohjonen could then become good advocates for the company and its products.

Pohjonen could consider implementing a subscription service like Aeryon Labs. The reason for this is that since the commercial market is only emerging, many companies and people know little about the benefits of using drones in their companies. In short, companies need to be educated about the benefits of using drones. Therefore a subscription or even a trial method of payment could alleviate the unfamiliarity and lack of trust that manifest themselves in the implementation of an UAS, not least because such a system possesses a high one-time cost.

The company should continue focusing on their unique products of EMCI and Portable Airport in order to to stand out in the crowded commercial UAS market. For in-

stance, they could start marketing EMCI more vigorously to generate cash flow for the business. In terms of Portable Aiport, they should continue developing it as much as is permitted while keeping an eye on company profitability. If they could come out with such a transport system before their competitors, they might gain a first-mover advantage in the drone logistics market.

Lastly, it might be advisable for the company to keep an eye on Microdrones, who is also pursuing the development of an autonomous transportation system. In effect, the two companies strategies may collide in the future to some extent, which is why Pohjonen should prepare themselves in advance for such an event.

5.2 Assessment of the Results in the Light of the Literature

The literature pertaining to the drone industry is notably nonexistent, since only a handful of prior studies have been carried out on the subject. What little research exists is often commercial by nature, which means that it is off-limits to the general public. For these reasons this serves as a pioneering academic study into the commercial UAS market.

However, some of the results of this study can be assessed in the light of prior business literature on strategy. In relation to Porter's (1980, 34-40) generic strategies, all of the companies exhibited some form of focus or differentiation strategy, with none pursuing the cost leadership alternative. This suggests that the companies do not compete on price, but rather on the product and service features.

5.3 Limitations of the Research

This study is not without its limitations. First of all, there were limitations regarding access to primary data, since interviews were not granted with the representatives of other drone companies. This led to an interview being conducted only with the commissioning company Pohjonen Group, while relying on purely secondary data for

analyzing its competitors. In addition, the secondary data was also relatively limited in its scope for the companies of Aeryon Labs and Microdrones, owing to the notion that these companies are currently privately owned, which means that no annual reports or comprehensive information for investors are available for them.

Regarding internal validity, the validation strategies of prolonged engagement, triangulation, member checking and clarification of the researcher bias (Creswell 2007, 207-209) were pursued to enhance the validity of the research. However, the application of these strategies had some difficulties. For instance, prolonged engagement was achieved through being acquainted with the company and drone industry for more than a year, but the intensity of engagement was not strong during this time. In regards to triangulation, primary data from the Pohjonen interview was triangulated with the secondary information on the internet, but the other companies' documentary data from the web could not be triangulated with data from other research methods. This meant that the data was only triangulated with other secondary data when possible, which affected the validity negatively. Concerning member checking, Pohjonen Group was repeatedly consulted during the research process and implementation. The success of the study was in their interest, since they were the commissioning party, meaning that they most likely provided help to further strengthen research validity.

Alasuutari (1995, 143) argues that qualitative methods provide more in-depth understanding of a phenomena, but with poor generalizability. Therefore, one must be cautious when generalizing any piece of qualitative research, because the sample of cases isn't usually randomly selected, meaning that it doesn't represent the whole population (Gibbs 2007, 100). Moreover, the purpose of this research was not to generalize, but rather to find differences and similarities in the examined UAS companies. As such, the findings of the research cannot and should not be generalized outside the specific companies.

As previously mentioned, the data used in the study was collected through a personal inteview with Pohjonen Group, along with documentary data found from the web. Pohjonen, being the commissioning party of the research, has an intrinsic benefit from the successful completion of the study. This implies that they probably presented reliable data in order to obtain some kind of benefit from the final research results. Furthermore, my previous experience working in the firm means that I have already some level of trust with the people working in the company, making it more likely for them to provide me with reliable information. However, there is a risk that the company presented themselves in a more positive or negative way, so as to appear stronger or weaker compared to their competitors, and so discourage any possible competitive moves from their behalf.

The documentary data from the internet was mostly collected from company websites and UAS industry news reports. Generally, firms have somewhat of an incentive to present reliable data of themselves on their websites to possible customers, because when unreliable information is found out, it may have a negative impact on their brand awareness and future sales. In spite of this, companies might still present unreliable data about themselves, in order to give a certain perception of themselves to anyone who lands on their site. In terms of reliability, the data regarding Aerovironment may be more reliable than those of its peers, since they are a public company, and so have to disclose more information about their business. Furthermore, other documentary data collected from news sites may also differ in their reliability according to the ultimate goals of each publishing website. For example, a site may leave out some information while prioritizing other particularly 'less important' parts of data for the purposes of attracting more readers. This tendency was minimized were possible by cross-referencing documentary data from different websites to achieve triangulation.

The objectivity of the study might be adversely impacted by the fact that I had a previous working relationship with the host company. Thus my judgements about Pohjonen Group relative to its competitors might be biased, and I may present the firm

in a better light than what is reality, because I hope for their future success in the very competitive drone market. Furthermore, my relatively limited experience with the drone industry may lead to me over- or underemphasizing certain aspects of the research data in its analysis.

5.4 Recommendations for Future Research

As this is a pioneering study into the commercial drone market, there is ample room for further studies to confirm and expand on themes covered in this piece of research. For instance, we found that all the companies seemed to focus on R&D the most out of all their business processes. Therefore, this hypothesis could be examined in a wider context of companies to produce statistically more generalizable data.

Furthermore, since another major finding of the study was that the drone companies tend to differ from each other strategically, a wider selection of firms could be examined to find out about the possibile construction of a strategic typology that could be applied to the majority of company strategies in the market.

The Finnish drone industry could also be more closely examined in subsequent studies. For instance, a broad market research study could be made about this market, mapping out the demand and development of UAS. More particularly, a competitive analysis could be made of the companies in this market to find out their differences and similarities. Further on, the research data generated from the Finnish market could be contrasted with companies operating more internationally or in other countries.

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Appendices

Appendix 1. Interview Discussion Guide

Mikä on yrityksenne strategia? Miten kilpailette kaupallisilla UAS markkinoilla?

- Mihin markkinasegmentteihin keskitytte UAS markkinoilla?
- Ketkä ovat olleet pääasiakkaitanne? Mitä olette heille myyneet?
- Miten hankitte uusia asiakkaita? Mikä on markkinointi ja myynti – strategianne? Miten jakelu on järjestetty?
- Miten tuotanto on järjestetty? Mikä on tuotanto strategianne?
- Teettekö yhteistyötä toisien yritysten kanssa? Onko teillä kumppanuuksia?
- Minkälainen rooli on tutkimuksella ja kehityksellä organisaatiossanne?

Mitkä ovat yrityksenne tulevaisuuden tavoitteet?

- Pitkällä ja lyhyellä aikavälillä?
- Tavoitteet osa-alueittain? Rahoitus, markkinointi, henkilöstö, myynti etc.?

Mitkä ovat yrityksenne valmiudet?

Arvostele seuraavat yritysvalmiudet 1-5 (1 huonoin 5 paras) yrityksenne osalta:

1. Tuotteet
2. Jakelija/Jakelu
3. Markkinointi ja myynti
4. Toiminnot
5. Tutkimus ja insinööritaito
6. Kokonaiskustannukset

7. Taloudellinen vahvuus
8. Organisaatio
9. Yleinen johtamiskyky
10. Yritysportfolio
11. Valtion avustus
12. Henkilöstön vaihtuvuus

Mitkä ovat yrityksenne ydinkyvyt? Missä olette parhaimpia? Missä olette huonoimpia/Missä on kehitettävää? Miten eroatte kilpailijoistanne?

Mitkä ovat olettamuksenne kaupallisista UAS markkinoista ja miten oletatte niiden kehittyvän? Mitkä ovat olettamuksenne kilpailijoistanne ja heidän tulevista toimista markkinoilla?

Translated Discussion Guide

What is your company's strategy? How are you competing in the UAS commercial market?

- Which UAS market segments do you target?
- Who are your main customers? What have you sold them?
- How do you acquire new customers? What is your marketing & sales strategy? How is distribution organized?
- How is the production organized? What is your production strategy?
- Do you collaborate with other companies? Do you have partnerships?
- What role does R&D play in your organization?

What are your company's future goals?

- Long term & short-term?
- Goals by department? Finance, marketing, personnel, sales etc.?

What are your company's main capabilities?

Rate the following capability-areas concerning your company from 1-5 (1 is worst and 5 best):

1. Products
2. Dealer/Distribution
3. Marketing & Sales
4. Operations
5. Research & Engineering
6. Overall Costs
7. Financial Strength
8. Organization
9. General Managerial Ability
10. Corporate Portfolio
11. Special Treatment from Government
12. Personnel Turnover

What are your company's core capabilities? What are you best at doing? What are you worst at?/Where is their room for improvement? How do you differ from your competitors?

What are your assumptions about the commercial UAS market and its development? What are your assumptions about your competitors and their future actions in the market?