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Abstract

This thesis examines the potential for adoption of an Agile methodology in startups outside of software development. These startups face similar challenges to those addressed by Agile principles, practices and tools, while also existing in environments defined by uncertainty. The clear parallels between the intended use case for Agile Methodologies and these startups show great promise for effective implementation. Despite this, the implementation of Agile principles, practices and tools in startups is not sufficiently explored in the entrepreneurship literature.

Through conducting semi-structured interviews in a multiple case study of Norwegian ecommerce startups the thesis seeks to explore the potential for the application of Agile principles, practices and tools in Startups with physical product development. Following a discussion and comparison with extant literature it argues that startups can leverage a flexible hybrid approach of the Scrum and Agile Kanban framework, Scrumban, and build upon some of the unintentionally existing structures of agile within the startup. This could effectively alleviate many of their challenges, while overcoming barriers to adopting the existing Agile methodology.

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1.0 Introduction

In the beginning phases of a new venture, there are several risks and challenges to overcome to avoid becoming one of the 75% of startups that fail (Blank, 2013). The environment surrounding startups is highly uncertain and subject to rapid change (James & James, 2019; Ries, 2011). Tools and practices like Lean Startup have been developed to address these challenges. Lean Startup is well established in entrepreneurship and startup literature. It was first developed for software and IT startups but is now commonly used for startups of all types (Ries, 2011). Although Lean Startup works for these other types of startups (Leoveanu, 2018), as found by York (2020), limitations exist within the method connected to customer discovery, team disagreements, and decision-making in changes.

Like Lean Startup, Agile software development methods were first developed for and by the software and IT industry (Cohen et al., 2004). Throughout this thesis, Agile software development methods will be referred to as Agile and must be distinct from agility or a framework that promotes agility, like Lean Startup. Agile is a standalone method. Agile shares many similarities with Lean Startup, in that the methods are suitable for working environments characterized by frequent changes where product development is complex (Kurtz & Snowden, 2003). Agile methods range from a toolbox to a management method view (González-Cruz et al., 2020). It includes defined practices like Scrum and Agile Kanban, which have seen widespread adoption (Zayat & Senvar, 2020). In addition to focusing on iterative product development in collaboration with the customer (Fowler & Highsmith, 2001), Agile practices like Scrum focuses on facilitating team collaboration and productivity (Alami & Krancher, 2022; Wilson et al., 2013).

While Agile practices like Scrum are easy to implement in other contexts and industries (Srivastava et al., 2017), there is still a dearth of research on implementation in a startup context. This is despite the organizational capacity for adaptability, collaboration, and customer involvement being central to product development in startups, as they are in the software industry. Furthermore, the context is characterized by the same environment of uncertainty and changes (James & James, 2019; Ries, 2011).

The limited research that has been performed on Agile practices in startup environments indicates opportunities for Agile adoption through hybrid frameworks (Conforto et al., 2014). Furthermore, Hannola (2012) found that Agile methods offer startups numerous benefits in improving organizational practices, knowledge transfer, expertise, and comprehension of customer needs.

Considering the potential benefits of an Agile method in a startup context and the limitations of existing practices like Lean Startup, new theoretical constructs are needed to understand if and how the practices can be adapted for use in a startup context. This can be considered a step toward creating an Agile startup framework.

1.1 Problem statement and research questions

Startups in any industry face many of the challenges solved by Agile methodologies. They also operate in environments defined by uncertainty and rapid change, much like the software development industry where Agile was first developed. Despite these parallels, the use of Agile principles, practices, and tools in startups outside of software development is not adequately covered in the literature. The aim of this thesis is to gain an understanding of how startups in other industries can leverage an Agile methodology to mitigate challenges in adaptability, team collaboration, and customer involvement.

To address the problem statement, the thesis investigates small Norwegian e-commerce startup companies providing consumer goods in various industries.

Research question 1 (RQ1)

- How can Norwegian e-commerce startups leverage Agile principles, practices, and tools to mitigate challenges related to adaptability, collaboration, and customer involvement?

To provide a satisfactory answer to RQ1, three sub-questions are formulated, which tackle unknowing use, the relevance of challenges, and barriers to adoption.

RQ1.1: What agile principles, practices, and tools are unknowingly already in place in a Startup?

RQ1.2: What challenges does a startup have that can be solved by leveraging agile principles, practices, and tools?

RQ1.3: What prevents startups from using an agile approach?

2.0 Literature review

2.1 Introduction to the agile method

In recent years, agile methods have been extensively researched in various settings. Agile methods were developed for software and IT development as a reaction to traditional methods like Waterfall (Cohen et al., 2004). However, agile is now a term being used in more industries to describe a flexible and iterative approach to the development of projects. According to Abbas et al. (2008) Agile methods is viewed as an umbrella term, meaning that it is challenging to establish only one set practice or method as "the Agile method", but rather look at it as a philosophy or a set of defined practices. Furthermore, González-Cruz et al. (2020) define Agile methods as a continuum that ranges from a toolbox- to a management method view.

To further clarify the nature of the agile method, one can look to the opposite methods, like Waterfall, and examine the differences. Through a comparative study, Balaji & Murugaiyan (2012) presents a set of characteristics, both for the waterfall model and the Agile method. The waterfall model is first described as a sequential development model, where the next step in the design phase cannot be reached until the complete requirements from the current phase are met. Each phase relies heavily on the former phase without overlapping. In addition, the Waterfall method does not include testing until the "product" is fully developed, which means that the defects, mistakes, and bugs are not found early enough. Secondly, the study tackles the characteristics of the Agile method. Balaji & Murugaiyan (2012) describe Agile as moving quickly and being able to respond to

changing requirements as the development process evolves. The Agile method is more customer-focused, bringing the customer into the process and changing the requirements as the "product" is being developed. In other words, the Agile method allows requirements to change based on testing and customer feedback because the "product" reaches the customer before it is fully developed.

The agile method is based on the agile manifesto, which was created in February of 2001. To highlight the agile method's purpose, two agile manifesto authors, Fowler & Highsmith (2001), created an overview of the value statements in four topics within the agile methods.

Firstly, agile methods value individuals and interactions rather than tools and processes. This statement highlights how skilled individuals interacting with each other is more important than processes and tools. However, Fowler & Highsmith (2001) also recognize the processes and tools as necessary, but to a lesser degree.

The second statement builds upon valuing a working "product" rather than documenting the processes and development. Although documentation is essential, the amount must be tailored and decided by each team so that the delivery of the "product" is the primary focus.

Customer collaboration rather than contract negotiations are the third value statement. Fowler & Highsmith (2001) recognize that contract negotiations are necessary for boundaries within a project; however, collaboration with the customer is of greater importance to ensure that the deliverable is what the customer needs.

The final and fourth statement builds upon responding to change rather than following a plan. This statement confronts the risks connected to following a plan scrupulously. Following a plan to the exact measures makes one blind to change, and the deliverable might not be satisfactory. Being able to respond to the change will set the best prerequisite for a satisfactory deliverable.

2.2 The agile manifesto

The agile manifesto consists of twelve principles created mainly for software development, as stated by the official website created by the agile alliance (*Manifesto for Agile Software Development*, n.d.). "According to the agile principles enunciated in the agile manifesto, motivated and empowered software developers – relying on technical excellence and simple designs – create business value by delivering working software to users at regular short intervals." (Dingsøy et al., 2012). To further understand the agile method and emerging practices, one must examine the prescripts of the twelve principles stated in the agile manifesto (Kiv et al., 2018).

The following twelve principles are collected and quoted from the official website for the agile manifesto (*Manifesto for Agile Software Development*, n.d.):

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.

8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity--the art of maximizing the amount of work not done--is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

According to Fowler & Highsmith (2001), organizations must adopt these twelve principles to practice Agile methods. However, as mentioned by Diebold & Dahlem (2014), earlier studies show that following the Agile methods, as stated by the theoretical literature hereunder the Agile manifesto, does not work well in practice. Due to the difficulty in adopting the principles directly from the literature, several practices like Scrum and Agile Kanban emerged, and it is typical for each project and team to make a hybrid solution and tailor different practices to fit the project (Williams, 2010). In addition to the difficulty in adoption abilities, Conboy & Fitzgerald (2004) suggest that the agile manifesto is not suitable or has taken in account the potential for agility outside the software development industry.

2.3 Agile practices

As mentioned before, the agile manifesto has sparked several agile practices. In this section, I will tackle the Scrum and Agile Kanban practices due to their widespread adoption and proven effectiveness in various industries (Zayat & Senvar, 2020). Scrum's focus on collaboration and Kanban's emphasis on visual management has made them two of the most popular agile practices.

2.3.1 Scrum

According to Srivastava et al. (2017), Scrum is the most manageable Agile framework to implement in software development and other disciplines. Pries &

Quigley (2010) suggested that Scrum should be viewed not only as a tool for software development projects but as a tool for all types of small and medium-sized projects. Scrum provides a structured approach that increases productivity within a defined time frame by focusing on specific activities. By eliminating the need for multitasking in the development process, Scrum enables teams to accomplish more in less time (Pries & Quigley, 2010). Scrum is used to promote collaborative productivity (Wilson et al., 2013). Alami & Krancher (2022) also found that Scrum promotes collaboration, accountability, and transparency to achieve product quality.

"The process of scrum is simple and circular, with a constant element of inspection and adaptation" (Layton, 2015). In their book navigating hybrid Scrum Environments, Verwijis & Russo (2023) highlights the framework's three main components; roles, artifacts, and events, and describes each component's function. The role component is crucial in decision-making by establishing clear accountability. Supporting this decision-making process are the artifacts which provide transparency through relevant information—lastly, the events function as forums that facilitate the decision-making process.

2.3.1.1 roles

The Scrum team is at the core of Scrum (Verwijis & Russo, 2023). The scrum team is made up of three roles, product owner, scrum master, and development team, all with equal management responsibilities (Schwaber, 2004). According to Schwaber (2004), the product owner represents the stakeholders and is responsible for formulating project requirements and ROI objectives and developing release plans. The development team is responsible for turning the requirements into functionality, and they are self-organizing and cross-functional (Schwaber, 2004). Lastly, Schwaber (2004) explains that the scrum master oversees the actual Scrum process. Scrum masters function as servant leaders, which enhances the team's effectiveness (Holtzhausen & de Klerk, 2018).

2.3.1.2 Artifacts

In line with Scrum, the first step in a project is to identify the deliverables (Pries & Quigley, 2010), also known as requirements elaboration (Layton, 2015). The requirements are the foundation for building the product backlog (Pries &

Quigley, 2010), one of the three artifacts. The product backlog is a dynamic, evolving, and prioritized list (Salameh, 2014), and it encompasses all the requirements for the final product, including any necessary changes that arise during the development processes (Gonçalves, 2018). The product backlog does not include due dates; only priorities, and the management and maintenance of the product backlog is entrusted to the product owner (Fowler, 2019).

The sprint backlog is the second artifact, and it is a subset of items selected from the product backlog to be developed within a specific sprint (Pries & Quigley, 2010). The sprint backlog is created before each sprint through negotiations between the product owner and the development team (Fowler, 2019). The development team takes ownership of creating the tasks within the sprint backlog, utilizing their expertise to determine the most effective approach for achieving the sprint goal (Pries & Quigley, 2010).

The third artifact is the sprint increment, which Fowler (2019) defines as "..the difference between the product at the end of a sprint when all necessary work has been completed, and the product at the beginning of that sprint before any sprint work has been done.". The sprint increment serves as the tangible output of the sprint, providing a clear depiction of the project's current stage and serving as a foundation for further adaptations. It offers valuable insights into the progress and is a reference point for making necessary adjustments (Fowler, 2019).

2.3.1.3 Events

The Scrum framework is made up of development iterations known as sprints (Gonçalves, 2018). The sprints are time-boxed, usually between one to four weeks (Layton, 2015). Fowler (2019) explains the sprint as the primary event within which all other events happen. It starts with a sprint planning meeting and ends with a review. Furthermore, Fowler (2019) highlights that the sprint aims to sharpen the team's focus and enable a measurable assessment of the work capacity and velocity. Based on measurements rather than predictions, this approach provides a solid foundation for data-driven decision-making. It empowers teams to make informed choices, leveraging real-time insights from the sprint's progress and achievements. Once the sprint ends, a new one begins (Layton, 2015).

Each sprint consists of the same four events, sprint planning, daily scrums, sprint review, and sprint retrospective (Layton, 2015). The sprint planning meeting aims to establish the sprint's overarching goal, create the sprint backlog, and determine the team's capacity and each backlog item's estimated load (Fowler, 2019). The sprint planning meeting involves the entire scrum team and can span up to one day (Cervone, 2011).

The daily Scrum is an event for the development team to exchange information, and it usually happens at the same time every day (Yilmaz, 2017). The daily Scrum is, like the sprints, time-boxed where the maximum amount of time is 15 minutes not to take away from the development time (Layton, 2015). According to Fowler (2019), the daily scrum meeting has two core purposes. The first purpose is to keep each development team member informed and aligned with what they are doing. The second is to determine if a team member needs help and what can be done to help them in their tasks. The scrum master is responsible for facilitating the daily Scrum.

The sprint review's purpose is to examine the sprint increment, demonstrate it, and discuss it so that the product owner can get a clear picture of the new value of the product (Fowler, 2019). Furthermore, Fowler (2019) highlights that the sprint review might include other stakeholders like customers.

The sprint retrospective provides the scrum team a valuable opportunity to collectively review and enhance their working processes (Schiel, 2011). It is the last event within a sprint, which relies heavily on the scrum master's ability to provoke transparency and openness within the team members, as it is a team-building exercise (Fowler, 2019). According to Layton (2015), the sprint retrospective should result in plans to improve the scrum process for the team.

2.3.1 Agile Kanban

Kanban originated in the manufacturing industry and is a principle of lean and just-in-time production (Corona & Pani, 2013). The introduction of the Kanban concept is credited to Toyota (Alaidaros et al., 2021). Agarwal (2018) describes Kanban as a visual workflow management method for limiting waste and organizing work. In his paper, Esparrago (1988) explains that Kanban is a term for

a signal card or marker. Furthermore, he explains that the card visually represents the work in process and follows a pull system. The Kanban pull system, in manufacturing, is created by holding the product and card at a working facility until the next working facility is available (Esparrago, 1988), minimizing the risk of overstocking (Agarwal, 2018).

According to Anderson (2010), who pioneered the Agile Kanban method, Kanban cards in an Agile software development setting do not signal more work to be pulled but rather work as a representation of a work item. Dingsøy et al. (2012) highlights that the Agile Kanban method differentiates itself from other methods because it does not require a complete reorganization of the teams and processes within a company but rather complements the structures that are already in place. At the core of Agile Kanban is the Kanban board, which aids in the core principles; visualizing work, limiting work in progress, and managing flow (Campbell, 2018). Dalton (2018) describes the Kanban board as a visual representation of work that provides a clear overview of tasks, their status, and progress within a workflow. Furthermore, he explains that the board's top section indicates the work's state, and the cards flow through these stages, indicating where the work item is in the work process. Dalton (2018) also highlights that the most common states are "waiting," "in progress," and "completed," but a team is free to decide for themselves how many states they should divide the board in. In their research, Nakazawa & Tanaka (2016) found that the Kanban board enables developers to manage tasks more efficiently, have a higher quality of communication, and increase the team's motivation.

2.3.3 Scrumban

"Scrumban is an agile integration of Scrum and Kanban frameworks under the shelter of agile manifesto principles and on the base of empiricism" (Bhavsar et al., 2020). In his book, Reddy (2015) describes Scrum as a rigid framework that is hard to implement in its most proper form and that many teams adopt only parts of the Scrum framework, rendering it as inefficient as other project management methods. He recognizes that to implement an agile approach to an organization's specific context; Scrum can be assisted by Agile Kanban, taking parts from Scrum, such as the time-boxed iterations and cross-functional teams, and combining them with Agile Kanban's visual management and flow optimization.

2.4 Agile in Startups

"A startup is a human institution designed to create a new product or service under conditions of extreme uncertainty" (Ries, 2011). Furthermore, a Startup is characterized by and created under an environment of change with resource scarcity (James & James, 2019).

According to Moogk (2012) Startups often follow the established model of researching, developing, and deploying a product in a market where there is believed to be a need. Much like other waterfall methods, startups figure out after the launch that the product or service lacks traction because it is not solving the customer's problems but rather what was thought to be the problem. Furthermore, Moogk (2012) highlights the importance of continuous testing and validation of an unfinished product in the target market due to the risks of launching a fully developed product in an untested market. The concrete learning phase for the Startup comes through experimenting and testing, and doing so early will gain essential market insights. However, Lindgren & Münch (2016) revealed that only a few organizations employ continuous and systematic experimentation, indicating a need for more awareness about these practices.

According to Kurtz & Snowden (2003), Agile methods are particularly suitable for developments that are characterized by frequent change and where the development of a product is complex. Although the Agile Manifesto is tailored to software development, the goal and the purpose of Agile methods enable other industries and disciplines to utilize the principles to speed up a development phase and create a product optimized for the customers. However, assessing the agility of a company's processes is challenging, as it encompasses a broad spectrum ranging from loosely adhering to agile principles to fully embracing and implementing rigorous frameworks (Yau & Murphy, 2013).

In their research, Conforto et al. (2014) found some indicators for agile adaptation opportunities in industries outside of the software development industry, and they suggested that hybrid models could be the solution. Tereso et al. (2019) also found in their study of Portuguese Startups that it appears that Startups embrace a

more agile project management approach, leveraging the inherent flexibility commonly associated with such methodologies. In addition, for the innovation process in a startup, Hannola et al. (2012) found that Agile methods offer numerous enhancements in organizational practices, knowledge transfer, expertise, and comprehension of customer needs.

Although the nature of a startup aligns with the overall problems that Agile methods aim at solving, in that it is a high degree of uncertainty and change, Yau & Murphy (2013) poses the question if the models are too rigorous for a startup and whether that the resources spent facilitating for agility could be better spent elsewhere. Yau & Murphy (2013) point to the fact that agile methods are mostly used by larger organizations to limit the problems related to communication and cooperation. In a startup, the same problems might not even be a reality due to the downscale of operations and the size of a startup team. Yau & Murphy (2013) also found that the agile methods are a satisfactory solution for product development because it limits the budget necessary to produce a quality product for the customers by shortening the feedback loop and involving customers early in the creation phase. However, Agile practices demanded more capital resources and time to maintain the Agile structures within the Startup. In a large Startup, the tradeoff between quality against time and cost was found to be worth it due to the costs being fixed and spread. In smaller Startups, the same mechanics might not be worth it because the fixed resources are spread on a smaller team taking more of the total availability. In conclusion, Yau & Murphy (2013) found that implementing a rigorous Agile framework does not yield sufficient benefits compared to the costs and time involved for a small-scale Startup of fewer than eight members. Furthermore, it is more reasonable to prioritize understanding Agile principles while potentially adopting a more flexible approach.

3.0 Method

This section explains the chosen research methodology. It does so by outlining the research design, data sample, the method of collection and analysis and discussing the data quality and considerations. The study is qualitative and uses a multiple-case theory-building approach. This method focuses on building novel theories by exploring multiple cases, which makes it suitable for research where there is a lack of prior literature. Semi-structured interviews were used to collect the data.

3.1 Research design

Given the scarcity of existing literature on the application of Agile methods within a Startup context, the primary objective of this thesis was to contribute to pioneering a novel theory surrounding the implementation of Agile methods in Startups.

The research design is guided by the research question, as suggested by Thagaard (2018). The research question is the following:

"How can Norwegian e-commerce startups leverage Agile principles, practices, and tools to mitigate challenges related to adaptability, collaboration and customer involvement?"

Due to the exploratory nature of the research question, and sub-questions, a qualitative approach to theory building from multiple case studies, coined "the Eisenhardt method" (Eisenhardt, 2021), was chosen.

Research questions suitable for a theory-building approach are characterized by a lack of prior theory and/or empirical evidence or being an underrepresented perspective in established literature (Eisenhardt, 2021). Agile in Startups is largely unexplored in the entrepreneurship literature. Additionally, it is an underrepresented perspective within Agile theory, making the research question suitable for a theory-building approach. The method has proven especially valuable when addressing "how" questions (Gehman et al., 2018).

An important aspect of the theory-building method is that the aim is not to test the theory but rather to create a new theory (Eisenhardt & Graebner, 2007). Rather than seeking to validate existing Agile principles, practices, or tools, the primary objective was to explore which elements from established methodologies could be effectively transitioned into a startup context.

Theory building from case studies acts as a bridge between qualitative evidence to deductive research, where the theory building gives the foundation for new theory, and deductive testing utilizes data to test the new theories (Eisenhardt & Graebner, 2007). Furthermore, Eisenhardt & Graebner (2007) highlights that building theory from case studies yields rich empirical data that produces accurate and testable theories. By following the theory-building method, I aimed to explore a novel theoretical construct for Agile practices tailored explicitly for Startups that could be tested deductively later.

3.2 Data sample

Theory building aims to create a new theory, and due to this, the sample of case selections does not need to be representative of a larger population (Eisenhardt & Graebner, 2007). Theoretical sampling allows cases to be selected based on their suitability in "illuminating and extending relationships and logic among constructs" (Eisenhardt & Graebner, 2007). Following the logic of case selection from theory building and the notion that 4 to 10 cases work well (Eisenhardt, 1989), I chose four cases, all e-commerce startups operating in different industries, where physical product development is a key activity. The cases were chosen because they are Startups that do not work in software development but rather develop physical products. A high likelihood of the phenomena of interest occurring is a prerequisite for selecting cases within the multiple-case theory-building approach (Eisenhardt, 2021). The development of physical products is subject to high degrees of uncertainty and frequent changes. This makes it likely that the challenges solved by Agile methodologies occur and makes these cases an appropriate target for the chosen approach.

In addition to product development, growth stages and team size were selection criteria. The chosen startups were all in the early stages of growth, looking for

early-stage funding, but they were all operational and had tested their product in the market. To investigate issues related to teams, the startups had to have at least two employees. They also had to have fewer than 8 team members to be a small Startup.

The four startups were found by looking into my professional and academic network. Initially, I looked into a Startup hub in Oslo which I was familiar with and found three startups within my sample selection criteria. Upon further searching my professional network, I found one more Startup through an academic contact I had from studying entrepreneurship at the bachelor level. In total, six people participated in the study. The participants were all informed of the purpose of my research. I took care to follow the Norwegian National Research Ethics Committees guidelines (The National Research Ethics Committees, 2023) in order to ensure the integrity of the research.

The following table provides an overview of the cases. Code is the shorthand used to refer to these throughout the thesis. Where there are multiple respondents from the same Startup, these have been given numbers in addition to their code, i.e. EC1.

Code	Product	Company age (years)	Core team size	Stakeholder team size
EC	Coffee pods	2	2	2
NL	E-cigarettes	6	3	5
BB	Golf equipment	<1	3	1
EV	Adventure tickets	2	5	5

Table 1: Case overview

3.3 Data collection

Within theory building with multiple cases, the data can be collected either with a qualitative or quantitative approach or a combination of the two (Eisenhardt, 1989). For this study, a qualitative approach was selected, and semi-structured interviews were conducted for primary data collection. Semi-structured interviews are versatile and flexible (DiCicco-Bloom & Crabtree, 2006). The advantage of

this data collection method is the interviewer's ability to improvise to have the interview subjects elaborate on some topics, pose follow-up questions, and go back and forth in the interview guide (Saunders, 2015). Considering the nature of the research questions, and the volume of questions necessary to capture the challenges and structures within a Startup, combined with the lack of logical order due to the interplay of different challenges, semi-structured interviews were the best fit for this study. The interviews were conducted in person with all the participants. The interviews varied from 45 minutes to 1 hour.

The interview guide, Appendix 1, features a list of themes and key questions following Saunders (2015) recommendations. The Agile Manifesto, Scrum, and Agile Kanban practices form the basis of the interview guide. The interview guide facilitated the exploration of structures and sub-challenges related to collaboration, adaptability, and customer involvement. This approach was helpful because the respondents' answers often intermingled these distinct structures and sub-challenges.

3.4 Data analysis

Central to the theory-building method is finding and developing constructs and measures in the analysis phase (Eisenhardt, 2021). Following the theory-building method, the data was iteratively grouped and organized, processing the raw data to create constructs.

The process began by using the interview notes to compile information about each case in isolation. To organize this data, quotes from each interview were organized in a spreadsheet. The initial structure of this sheet was derived from the interview guide and, subsequently, further refined based on commonalities among sub-challenges that surfaced within larger identified challenges, namely, adaptability, collaboration, and customer involvement. These categories were derived from previous Agile literature, as Eisenhardt (1989) highlighted as a possibility. In addition, indications of agility were collected separately, as well as other findings that seemed irrelevant initially. This methodical categorization served three primary objectives: it created familiarity with each case, began the

process of categorizing the data, and facilitated a smoother cross-comparison analysis between the cases, following the recommendations of Eisenhardt (1989).

After familiarizing myself with the cases and creating initial categories, I began the process of cross-case analysis. I performed the cross-case analysis within the software tool Mural. I started the analysis by grouping and analyzing the indications of Agile principles, practices, and tools within the startups. Furthermore, I displayed the three categories of challenges, adaptability, collaboration, and customer involvement, and searched for codes for each sub-challenge, revealing two new categories of challenges, progress, and additional findings related to perceived challenges while also changing the customer involvement category to product development. While categorizing based on these five overall categories, tentative concepts emerged (Eisenhardt, 1989), hereunder; the need for more structure within different aspects of business operations. I began shaping my hypotheses by comparing the constructs within these categories to the evidence from each case (Eisenhardt, 1989). The concepts I found relate to the Agile principles, practices, and tools existing within a startup, the challenges a Startup faces, and the prevention of using agile in a startup context.

After categorizing and establishing the core concepts I found, I compared them to the literature (Eisenhardt, 1989) on agile principles, Scrum and Kanban, to better understand why and how startups can leverage a more systematic approach to their processes and structures.

3.5 Reliability, validity, and generalization

Within qualitative methods, the replicability of the process and results is referred to as reliability (Leung, 2015). To ensure reliability, I carefully designed the interview guide to promote consistency between all the interviewees and cases. Furthermore, I carefully conducted cross-case searching within the data collected and analyzed multiple times to ensure that not only my initial impressions shaped the theory (Eisenhardt, 1989). The continuous and iterative approach to cross-case comparison enhanced the chances of the accuracy and reliability of my theory. Although measures were taken to ensure reliability, only one researcher was working on this study. None of the interviews were recorded to comply with the

privacy wishes of the interviewees. Considering that only one researcher conducted the interviews and took notes, I recognize that there is a chance that information beyond what was verbally conveyed was missed. Furthermore, as Saunders (2015) explains, I recognize the difficulties in standardizing a semi-structured interview and the reliability issues related to the data collection process replication. Additionally, I can not guarantee that this study is free of common data collection and processing biases, namely, interviewer bias, response bias, and participation bias (Saunders, 2015).

Validity refers to the appropriateness of the study (Leung, 2015). In theory building, it is central to iteratively compare and assess the theory and data to ensure a fit (Eisenhardt, 1989). Furthermore, Eisenhardt (1989) highlights that the fit between theory and data gives an empirically valid theory. To ensure the fit between my data and theory, I have kept an iterative approach to the point where I reached theoretical saturation. I have also kept an iterative approach to my research question and sub-questions to ensure their validity. According to Eisenhardt (1989), within theory building, it is essential to recognize that the research questions are tentative and subject to change as the process unfolds. To ensure validity, I have familiarized myself with the existing theory on Agile and the limited existing theory on Agile in Startups to tie the new theory I propose to the existing literature for validity purposes (Eisenhardt, 1989). Furthermore, I have also included conflicting theories on why startups could be prevented from using Agile.

Generalizability refers to the potential for the results to be generalized from the sample to the entire population (Myers, 2000). Although generalizability in qualitative research is debated (Myers, 2000), I have enhanced the chances of generalizability by using the theory building with multiple cases method (Eisenhardt, 1989) and chose four cases that operate in different markets. However, I acknowledge the lack of generalizability to the larger population. The aim of this study was not to produce a generalizable result, but rather to explore a novel theory that later could be deductively tested and generalized.

3.6 Ethical considerations

Through the data-collecting process, I adhered to the guidelines of the National Research Ethics Committees and requirements from BI Norwegian Business School. No personal data was collected through the study, and the interviewees and the cases are anonymized for confidentiality purposes. All interviewees and cases were informed about the purpose of the study.

4.0 Findings

This chapter consists of my main findings, structured into the overall categories found while processing the data; (1) Product development, (2) Adaptability, (3) Collaboration, (4) Progress and (5) Additional findings related to perceived challenges.

4.1 Product development

4.1.1 Lack of testing

The analysis shows that during product development, most companies do not focus on testing their product with their customers. Instead, they conduct self-testing, making assumptions about what the customer and market want.

“I make the products that I think people want.” - BB

“When we develop our products we test them ourselves.” - EC1

“We get about 9 different versions of the product from the manufacturer and then we test ourselves and pick a few.” - NL2

Despite the self-testing, there is some knowledge about the benefits of testing with the customers to increase efficiency in development.

“We should have done testing a long time ago. It becomes very hypothetical, so you get a lower degree of efficiency than if you had been with the customer all the way.” -EC2

There are also perceived challenges with self-testing and testing on people in their network because the people's judgment is either very harsh or not harsh enough.

“I use available expertise around me, but it is difficult to show people you know, either they are very positively biased or they are unrealistically harsh.” - EC2

Additionally, there is a desire to perform testing on customers and an understanding of the benefits of doing so.

“We are not there yet in terms of a strategy, but it's something I want to do.” - EC2

“We feel that we have a good overview, but perhaps we should have had a more systematic approach to testing.” - NL2

Despite not testing on the customers when developing products, two of the startups do focus on gathering customer feedback after the launch of the finished product.

“We gather customer feedback through word of mouth and market surveys.” NLI

The startups take care to correct errors detected as a result of customer feedback.

“I get a lot of feedback through reviews. I received feedback about a product that the colors faded on the design. One time there was a bad smell, so I got in touch with the manufacturers and fixed it. We send out emails to all customers who have purchased.” -BB

4.1.2 Perceived high risk

The startups report that they experience a high degree of uncertainty due to the lack of testing on customers. After product development is finished and self-tested, their manufacturers demand a specific volume of orders. Because the manufacturers' facilities are not located in Norway, delivery times are long. The process is perceived as uncomfortably risky due to low confidence in their ability

to accurately assess and meet customer demands. They report facing severe economic consequences if they make products that the customers don't want.

"There is a risk in that I have to order a certain amount of the products, and if they don't sell I have an issue." - BB

"A challenge for us is knowing what the customers want. The delivery time for our products is long, which means that we have a lot tied up in them being successful!" - NL2

4.1.3 Testing on customers

One of the four startups performs testing with their customers while developing. They believe that they, as developers and owners of the product, are biased and that risks are connected to assuming what the customer wants or needs. They aim to have a working minimum viable product (MVP) that they can change as they test it on real customers.

"We test on customers before the product is finished. In a group you become very biased towards what we think the customer's needs are. You think you have an answer for everything. It helps to go out and get answers from users." - EV

"We must have an MVP out that is not perfect but that works and that we can change" -EV

4.1.4 Lack of planning for testing

The three companies that do not perform testing on customers find it challenging to plan for the inclusion of the customer early in the process.

"It is too difficult to loop in the customer. It is so early that it is scary to invite them in" - BB

There is a belief that communication with the customer is the reason for the struggle with satisfying customer demands.

“Customer satisfaction is above all, however our biggest challenge in securing it is communication” -NLI

When the startups do test with customers they experience challenges planning and executing testing. The Startup struggles to put together the information into valuable input, and walk through the designs with the customers.

“It is difficult to achieve because it is difficult to put together and go through the design with the customer.” -EV

4.1.5 Lack of structures for time constraints

Two of the startups do not have a clear overview or a plan for the time it takes to develop or release new products or new versions of products.

“Product development varies a lot, sometimes changes are made in 2 days, other times it takes months” - EC1

“We release products when it is functional, to the extent that it can actually serve the purpose. maybe once every two weeks.” - EC2

“It is a perpetual improvement. We are not completely finished with the product but we test every time we have a new mvp version” -EV

4.1.6 Loose structures for time constraints

Half of the startups have an idea of the time it takes for the product development phase. However, this is derived from practical experience and is not a consciously set time constraint they follow.

“Simple products take about 10 days, we have an average of 2-3 weeks from idea to sample. From idea to design, it takes a week. From sample to production it takes 1 month” -BB

“We release products 2 to 3 times a year, but we develop all the time” - NLI

4.1.7 Deadlines

Two of the startups do not operate with deadlines for the development tasks.

One of the startups believes they should but finds it difficult to agree on deadlines with the board and shareholders. They find the lack of deadlines too unpredictable and leads to a lack of goals, leading to a lack of motivation, culture, and progress.

“We don't set deadlines, we should. It's difficult because the core team agrees and the whole team doesn't get it” -EC1

“It is not predictable, we do not know where we are or the goals or what we are going to achieve. A lack of goals leads to a lack of motivation, culture and progress” - EC2

The other startup finds it difficult to set deadlines and the shared deadlines they have tried to set ends up containing too many tasks and becomes impossible to reach, demotivating the team. Instead, they let the team members decide entirely on their tasks and delivery, putting it all together at a non-defined time.

“It is difficult, you try to keep yourself accountable throughout and set deadlines, but it can be very demotivating and have the opposite effect” - EV

“Too big deadlines become a problem when you work in such a small team. If one side falls, the whole structure falls, so you have to work with things separately and put them together” -EV

4.1.8 Capacity as a mediator for product development and releases

Instead of deadlines, all the startups use the team's capacity to mediate when product development or releases happen. There is no structure to the capacity, rather it is touch and go.

"It really depends on the person, and it depends on work capacity and accuracy"
-EC1

"My head and my capacity, everything else happens at the times they happen" -
BB

4.2 Adaptability

4.2.1 Positive attitude towards changing requirements

Two of the startups believe that having a positive attitude and a willingness to change is the factor that makes them equipped for change. Additionally, a dynamic mindset determines if the startup can pivot quickly and be equipped for change.

"We must have an attitude that is willing to change what we have already created" - EV

"We are equipped because we have the right attitude about it." -EC1

"Personally, I have a dynamic mindset and can move around quickly" -EC2

4.2.2 Discussion-based change communication

All the startups solve changing requirements through in-team discussion. The format in which the discussion takes place varies from startup to startup, but there is no formal structure for the communication.

One of the startups makes sure always to be available and use the phone as a means to handle changing requirements on the go.

"We make sure that we are available 24/7" - NL1

"We are a small organization so we are a phone call away" - NL2

One of the startups relies on email briefing to solve changes.

"We fix changes through having good briefs on email" - BB

One of the startups sits down in person and handles changing requirements.

"We sit down and discuss, and change the material" -EC1

4.2.3 Lack of structure for changes in requirements

All the Startups experience challenges in not having a set structure for handling changing requirements.

One of the Startups that did not mention a positive attitude as being equipped believes that they are not equipped for change despite having learned to expect change.

"You eventually learn and have to expect such things, but we are not equipped for changes" - NLI

Three of the startups state that challenges in the communication framework hinder the handling of changing requirements. The team becomes avoidant to messages and communication about changes, and frustration arises.

"The communication framework is not good enough" - EC2

"It is my responsibility to go around and talk to others, arrange joint meetings and post meeting notes. The challenge is that people start to avoid where the messages are given." -EV

"If there is a change, we use chat to fix it. If it can't be explained via chat, I'll send an email, if it needs to be explained better, I'll make a ppt with arrows. It's frustrating at times." - BB

The lack of structures for handling changing requirements leads to waste of time, misunderstandings and collaboration difficulties.

4.2.4 Issues in time management

One of the startups' experiences hold-up periods because they have to wait for confirmation or input from the shareholders and the board, which are not a part of the core team doing day-to-day operations. The team experiences that they become ineffective and can lose momentum.

"We are dependent on confirmation and input from other levels. A section can halt the entire process, then three weeks pass and there is a contradiction at the very end. Then there is a lot of frustration, people become ineffective" - EC2

"I'm impatient, the team gets impatient then it becomes a challenge to get that momentum with what you're doing" - EC1

One of the startups' structures for handling changing requirements leads to waste of time and misunderstandings.

"The frustrating part is a mix of time and that others don't understand what you mean." - BB

4.2.5 Issues with misunderstanding

One of the startups experiences misunderstandings in interpreting the change requirements and ends up circulating the same problems over and over. They struggle to have a shared understanding of the changes at hand between the core team and the stakeholders, and where to communicate details and where to be less specific. The misunderstandings add up over time and ultimately halt the progress of the changes.

"It is the interpretation of it, the changes are interpreted at different levels and in different ways, we have discussed the same problems a hundred times. It is a challenge to know where to be detailed and where to be specific" - EC1

"The biggest shortcoming is that the core team gets to do sparring, but when you have to bring it up with the whole group, the core team has the same starting point, but the others do not have the same understanding because they are not part of the continuous process. Then we become frustrated that there is no mutual understanding. There are small things that add up over a long period of time" - EC2

The one startup that does testing with their customers experiences a lack of motivation because they don't have a structure for handling changing requirements. The team does not have a shared understanding of the process, and becomes demotivated because they believe the product is finished even if they are looking for changing requirements in the feedback from the customers. As a team, they experience doubt every time there is a change.

"People's motivation stagnates in the long run because you doubt a little every time we think we have a finished product, but we don't" -EV

4.2.6 Issues in coordination

The lack of structure also leads to issues coordinating changing requirements, which again leads to a waste of time. One of the startups has issues coordinating due to the availability and time of all the team members, both the core team and the stakeholders. The core team relies heavily on the confirmation and input from the board and shareholders.

"But it is a challenge to coordinate when you are a team with several people where it is rare that you have time. It makes things go slowly. It takes a long time to confirm agreements and plan changes" - EC2

One startup experiences that the team avoids the channels in which the coordination of tasks and messages happen, which leads to a waste of time.

"The challenge is that people start to avoid where the messages are given" - EV

4.3 Collaboration

4.3.1 Shared decision making

All of the startups have shared decision-making in all parts of the development of the startup. The shared decision-making is a consequence of the size of the startup, in that it is small and has few team members who all have ownership. The startups rely on each team member's internal motivation and sense of responsibility and therefore have no strict decision-making hierarchy.

"We all do a little bit of everything in the core team and can be used where we can, because of this we have shared decision making" - NL2

"We have not created any formal rights of opinion, but we complement each other. Everyone gets the freedom to keep going on their own" -EC2

"Most of the decision making is discussion-based and democratic, at the end of the day it requires each of us to take responsibility" -EV

4.3.2 Decision of order and last say

Two of the startups have one person that ultimately decides the order of the development objectives and if needed, has the final say.

"We have one person who decides the overall order, we have had no problems with someone setting things up". -EV

"There is one who has the last word about the order of business, but the decision-making is decided by the 2 people in the core team." -NL1

4.3.3 Collaboration with stakeholders (board and shareholders)

4.3.3.1 The core team is the board and shareholders

Two of the startups do not have outside stakeholders in terms of a separate board and additional shareholders. Therefore the collaboration only happens within the core team.

"I am the only board member, so that happens every day" -BB

"We do not have any external help or advisors, every team member that is doing the development is a shareholder and a board member" -EV

4.3.3.2 External stakeholders

Two of the startups operate with external stakeholders that are not involved in day-to-day operations. However, they are involved in the product development and progress of the startup.

The startups involve the stakeholder in terms of presenting the new releases and making them test the products before they are launched. The core team uses the board members to validate and give input to help them move forward. One of the startups believes there are too few formally structured channels for communicating with the stakeholders, and it would be beneficial to have more of it. The lack of frequency and structure in reviews leads to difficulty aligning goals and tasks.

"We draw in 2 of the board members for design and taste, but they do not feel that they are in the target group, but the core team gets to value our thoughts and strategies and development process. We call on them to help us." - NL2

"Board meetings once a quarter, where we review what has been achieved and a small update. It's effective because then we gain a lot of expertise. There are too few, we cannot align goals and tasks." -EC2

A team member from one of the startups communicates daily with the stakeholders. However, it is loose talk and does not amount to anything actionable. They believe that the startup has too much involvement of stakeholders that are not customers and that there is too much micromanagement. Additionally, the team member experiences that the stakeholders do not have the startup as a top priority, limiting the time they are willing to sit down and use on updates, alignment and expertise.

"We talk loosely on a daily basis. Most of the time it does not amount to anything and is just talk. Time is the challenge and that it is not the top priority at all times" -EC1

"There is too much involvement of stakeholders who are not customers, and I am not comfortable with that level of micromanagement" -EC1

4.3.4 Lack of structures for daily collaboration

All of the startups lack a formal structure for daily collaboration.

One of the startups has an informal morning touchdown every day by talking to each other, however, the content of the touchdown is not structured and follows the topics in mind at the moment of the touchdown. The content of the discussion is not recorded anywhere.

"Morning touchdown in person, what are the plans, what are we going to do today and review the status and what needs to be done." -EC2

The other three startups have no structure or channels that facilitate daily collaboration with all the team members. Each team member communicates with the others through software like emails, chats, and task cards which are done when there is believed to be a need. One of the startups has a weekly in-person meeting, conveying status and information. Two of the startups experience challenges in that the team members don't follow up on their tasks, and they either have to wait a long period, spend a lot of extra time communicating, or have to push people to do the tasks.

"We use the software slack and other types of chats" -BB

"We communicate through email and teams. We have regular weekly meetings every Friday where status and information is conveyed. Things are not followed up quickly enough however, and you have to wait for a response." -NL1

"Some things gets lost in translation, we spend a lot of unnecessary time on email communication" -NLI

"We use Trello and meeting notes, everyone has their own cards on trello and everyone can go in and see what they need to do, The challenge is that people don't complete the tasks, I often have to call and push and drag people through, because if you don't follow up, they won't do it" -EV

One of the startups experiences a lack of discipline from the team members because they don't have daily collaboration, resulting in tasks not being done and a waste of time in development.

"The discipline of people is a challenge, and putting in the work needed to get to the goal. If no one takes responsibility then it collapses, not because the product is bad, but when people don't feel they have to work, then they don't" -EV

4.3.5 Lack of structures for check-ins and alignments

Three of the startups have no structure for check-ins or alignment with the core team.

One of the startups believes that there is a need for it so that they can promote discipline but steer away because they don't want to micromanage each other. Instead they discuss and check in if there is a need for it.

"We check in with each other far too little, it's based on the desire to not be micromanaged. It's not random, but there is a lot of informal talk about what the next step is. We Discuss problems when necessary. I know that it would have been healthy for the discipline to do it formally, because we operate too much alone in a vacuum" -ECI

Two of the startups do not perform check-ins and alignment because they believe that the time is better spent on doing tasks. They are also not doing it because they believe that big meetings are inefficient.

"We have it to some degree, but it's random and only if needed. I hate meetings for the sake of having meetings" -BB

"We used to have it but not anymore, now I call around and talk to the individuals. It feels more efficient, the big meetings are long and have too many things in them. It is not relevant to the whole team. When we have meetings, it is only when something has been done or there is something to be discussed, the meeting time will preferably be spent on tasks" -EV

4.3.6 Task management for collaboration

4.3.6.1 Visual representation of tasks

Three of the startups use a list-based approach for a visual representation of the tasks they need to do.

One of the startups has made their own list system in Excel. The list features priority, time perspective, and the possibility to assign people to a task. The list is used for a long-term view. Despite having the list, they find themselves behind schedule.

"We work in a dashboard, but it's in excel. It works fine. We have priority, weeks and months, and assigned people. We are still behind schedule." -NL2

One of the startups recently started to use to-do lists, and experienced heightened motivation and a clear view of where they were going. However, they still experience uncertainty in the road forward, so there are changes that the list does not account for, making it less flexible.

"We started using to-do lists so we see all the steps and can measure when we can go live, and then it became motivating and you are willing to work a little extra"- EC2

"We have discussed through the order of what things should be done in but it changes frequently so it is hard to keep up" -EC1

One of the startups uses Trello, a kanban style list creator for project management.

"We have a task board in Trello where we can see what needs to be done" -EV

One of the startups does not use any form of visual tools to manage tasks. Instead, they have a mental overview of what needs to be done, and only handle the things that are critical each day. They believe that they will lose their creativity if they work after a set list. However, they acknowledge that they should be more organized to prevent chaos.

"I tackle the tasks that burn the most. You can spend a lot of time setting up a good plan, but I don't like working according to a fixed list because then I lose my creativity. I start each day by thinking about who I need to give a message to in order to get something started. I Should have been better at organizing our tasks as it can be chaotic" -BB

4.3.6.2 Self-organization

Three out of the four startups demonstrate self-organization in their task management processes. These startups employ open discussions as a means to collectively determine task prioritization, followed by reaching a consensus on the allocation of responsibilities. After the discussion, it is up to each person to perform the task the way they want. They have the freedom to exercise their creativity and expertise in carrying out the task according to their own style and approach.

"We have a follow-up meeting every Friday, then we look at what needs to be prioritized and what is important to focus on that week, then we agree upon who does what" NLI

"We prioritize tasks in plenary and choose what gets us where we want to be the fastest. We then describe the tasks clearly and distribute them, you get the opportunity to throw in some thoughts and decide what you want to do." -EC2

"We discuss what we need to complete and do not set any guidelines on how it should be done." -EC1

"Autonomy is very important. You must seek autonomy because you work a lot and closely together and can't depend on anyone telling you what to do" -NL2

The remaining startup does not prioritize self-organization in its task management approach. Instead, they rely on a single individual to delegate tasks. This is accomplished by personally contacting team members one by one and discussing the required actions, after which the person formulates specific tasks for each team member. The underlying rationale behind this approach stems from a perception that team members may lack the ability to hold themselves accountable or identify the necessary tasks independently.

"I mostly hand out the tasks. It's like people don't take responsibility for themselves. People can't find the tasks they have to do themselves, they have to feed them through." -EV

"I call and talk individually to the various team members, one person tells what is going to happen and I do the tasks. I talk to each side individually" -EV

4.3.7 Lack of team reflection on work process

All four startups exhibit a shared absence of a structured framework for evaluating their work processes and fostering collective improvement. Nevertheless, they do recognize the importance of evaluation and sporadically engage in some form of assessment, albeit infrequently and without a defined plan for doing so.

"It is valuable to evaluate how we do the work we do" -NL2

"The dialogue varies from designer to designer, I have to feel on the person what they need, always asking if we are aligned." -BB

"It happens on our own initiative. Things slip in meetings however, and there are periods where it becomes difficult to follow up on the agreed improvements.

The startups' infrequent reflections can be attributed to the time required to engage in such evaluative exercises, as well as the lack of follow-through on agreed-upon improvements.

"Reflections takes up a lot of time" -EC2

"It's ongoing all the time, and if it looks like it's not going so well, we have to. It's a constantly recurring challenge, we agree on something and yet it doesn't turn out well" -NL1

"We try all the way to see new working methods to work more efficiently, what challenges we have now and how we can solve them with new routines. We are constantly looking for the perfect routine. We should have more of it, the problem is that everyone is so busy, but we should have it once a month to get together and find out how we can improve." -EV

4.4 Progress

4.4.1 Lack of structure for measuring progress

None of the startups have an established structure for measuring progress. Progress is perceived as a feeling rather than something measurable.

In one of the startups, the progress is measured based on the different stages within the product development process. However, a notable drawback is the absence of visual or other comprehensive overviews that allow team members to easily track and understand where the product stands at any given moment. The lack of a clear visual representation or tool to provide an overview of the product's development stages hampers effective communication and coordination among team members.

“Progress is when things go painlessly, the best is when it goes by itself. When I've done my part and the next unit does its part. When the product gets to the various stages in development.” -BB

“I often have to ask how things are going, it would be nice if I could see everything and when things are ready. I notice that if it gets bigger and more categories then it becomes chaotic to know where we stand and align everyone.” - BB

In one of the startups, progress is measured based on the completion of the entire product. The startup follows a visual board where the task gets moved straight from to-do to done. However, this approach presents a challenge in terms of gaining a comprehensive overview of the product's development journey from start to finish.

“Everyone has their own cards and until the task is done, it stays on the board. When they are done, they cross it out.” -EV

“Getting things completely finished is progress, people have to finish completely before we say it's progress. You can become a bit square in the way you think when you do bit by bit. Finishing things completely is the way, but sometimes it's hard to see what the whole thing is.” - EV

One of the startups relies on loosely spoken milestones to measure their progress. These milestones are not documented but instead expected to be remembered by each team member. However, they believe this approach has proven to be detrimental to their discipline and impedes their overall progression. The startup recognizes that a lack of structured methods for measuring progress hinders their productivity.

“We use milestones, they are spoken through but not written. It creates bad discipline, it is an obstacle to progress. I could have had periods where I would have spent more time working if there had been structure.” -ECI

“I can only ask about progress, there is no overview. It creates a greater risk of things slipping”-EC1

One of the startups measures progress by milestones in their dashboard list and by the time that passes by. The startup has experienced falling behind with their tasks and credits it to team members forgetting about the milestones because of the lack of follow-up structure, and therefore misunderstandings arise.

“Progress is based on how we set up the dashboard, which milestones are to be reached, within the time frame we have set.” NL2

“Put it now that we have fallen behind, the follow-up in the dashboard and the fact that we are not sitting together all the time is a challenge. It could be that you get everything but forget it, no structure and then misunderstandings arise.” -NL2

4.4.2 Lack of structure for limiting work in progress (WIP)

None of the startups demonstrate a conscious awareness of their workload and work-in-progress limitations. While they do have a certain level of awareness regarding capacity as a means to avoid overloading themselves, they lack a structured approach to regularly review and assess capacity. Instead, they tend to address capacity only when it becomes necessary or when concerns arise.

“If we see that people have not done anything for a long time, we check the capacity, it is worse for some than for others. If things are slow, I have to step in and help restructure” -EV.

“I check the capacity for me and for the designers. They're freelancers, so they can't throw themselves around. There is a lot of gut feeling considering that” -BB

Furthermore, the startups fail to consider the importance of not overestimating their capacity, which could allow for flexibility in accommodating unexpected tasks that may arise.

“When we set up tasks and deadlines, we ask about the capacity of the team. Holistic approach to capacity, then there are things that we have not taken into account that can make it very hectic” -NL2

“We have too many things going on at the same time, and we often spend time on things that are not necessary right now”-NL1

4.4.3 Lack of sustainable progress pace

All startups have issues in keeping a steady pace of progress.

Three of the startups attribute the lack of a sustainable pace to the lack of structures for following up on tasks.

“The pace of development is slow and it is because things are not followed up and carried out”-NL1

One of the startups relies on a single person to monitor and track the pace of progress of each team member, ensuring they stay on track. However, this approach proves to be ineffective as the designated person ends up devoting all their available time to follow-ups, leaving little time for completing their own tasks.

“The follow-up and checking in with people should ensure the pace, but no one takes responsibility and it will slip completely. It requires a lot from me to keep the pace. I spend too much time following up on others. That's almost all I spend time on, following up, talking back and forth and delegating tasks.”-EV

In one startup, maintaining a sustainable pace is hindered by the inability to effectively track the progress of both individual team members and the team as a whole. The lack of visibility into task completion and overall progress creates challenges in managing workload and maintaining a consistent pace. Moreover, the absence of alignment on the approach to achieve their goals further compounds the issue.

“The end goal is clear, but the way there is not clear, so it is difficult to keep a steady pace. It's too fragmented. You can't track each other's progress so that it becomes visible if you don't deliver.”-EC2

4.5 Additional findings

4.5.1 Perceived challenges

4.5.1.1 Progress as the main challenge

Three of the startups perceive progress to be their biggest challenge.

“Progress is our main issue” -EC1

Two of the startups attribute the progress challenges to the lack of low-level task clarity and the randomness of when things are done, and that it complicates the flow of development.

“Everyone has a common goal in mind, but there are different thoughts on how to get there. The sub-goals and low-level how to get there are not clear, ruining the flow and progression”- EC2

“Things are being dealt with on the go, there is no system for when and how” - NLI

One startup attributes discipline in task management to the lack of progress.

“Discipline hinders progression, in the way that the team members find time to do what they have to do, and actually prioritize it.” -EV

4.5.1.2 Resources as a challenge

Two of the startups highlight the size of the team as the main challenge in terms of that various categories of tasks are handled by the same people, and that few

people are responsible for many different tasks. They believe that more people would solve their most pressing challenges.

“At times we are not professional enough. We don't have the resources required to succeed. There are lots of mistakes because we wear too many hats and we are unable to go into the tasks in depth.”-NL1

“If we had a lot of capital we could put more people on it, we would have had meetings and focus groups and project management with times, weekly meetings, I would have managed according to a completely different structure. But it doesn't make practical sense in a small team.” -EC1

5.0 Discussion

In unfolding this discussion, I will reference key theories and principles from the Agile Manifesto and the practices of Scrum and Kanban. The discussion is structured after the research sub-questions and includes a key findings summary at the beginning of each section.

5.1 What Agile principles, practices and tools are unknowingly already in place in a startup

This section explores the unintentional application of Agile principles, practices, and tools within startups. An understanding of the level of tacit knowledge of Agile mechanisms existing in startups can provide valuable insights into their current impact and whether or not it currently serves a function. This is a crucial starting point for evaluating the suitability of an explicit, intentional implementation of Agile principles.

Key finding summary:

Through the lens of the cases studied, startups, despite having little or no knowledge of formal agile methodologies, inadvertently adhere to some core principles and practices.

Five primary categories were identified wherein the startups align with the principles and practices of Agile methodologies: (1) Team, (2) Roles, (3) Customer orientation, (4) Use of tools, and (5) Adaptability.

5.1.1 Team

5.1.1.1 Individuals and interactions over tools and processes

The Agile methodology places emphasis on individuals and interactions over tools and processes (Fowler & Highsmith, 2001) In the Scrum framework, there is an emphasis on shared decision-making by having all the roles within the team have equal management responsibilities. In the cases studied it seems as this emphasis is present.

Firstly, these startups emphasize the value of team members' autonomy, relying heavily on individual motivation to propel their development forward. A strong culture of personal ownership and individual responsibility is attempted to be nurtured, which mirrors the agile emphasis on individual agency. Secondly, these startups diverge from traditional hierarchical structures often employed to drive processes. Instead, they foster an environment conducive to shared decision-making, underscoring the value of collective intelligence and consensus, which resonates with the Agile focus on interactions.

These two elements - emphasis on autonomy and shared decision-making, indicate the presence of the Agile principle and the roles from the Scrum framework, even if not formally recognized or implemented as such.

5.1.1.2 Self-organizing teams

One of the Agile principles states that the best architectures, requirements, and designs emerge from self-organizing teams (*Manifesto for Agile Software Development*, n.d.) The Scrum framework's development team are responsible for creating functionality based on the requirements (Schwaber, 2004)

Most of the Startups inherently function through self-organized core teams. They collectively determine their tasks and allow individual members the freedom to

decide and choose the most effective method for task completion. These self-organized teams reflect the Agile principle of self-organization and cross-functionality. The self-organization in the collective determination of tasks, and individual decision on task completion, reflect the responsibilities of the development team in the roles of the Scrum framework.

5.1.2 Roles

Scrum practice has three key roles: the product owner, the scrum master, and the developers (Schwaber, 2004). While not all of these roles are formally seen in the startups studied, the role similar to a product owner, can be found in some of the startups. The product owner assumes the role of representing the stakeholders and is responsible for formulating, amongst other, project requirements (Schwaber, 2004). The product owner is responsible for the product backlog, a prioritized list of requirements (Fowler, 2019). While all the startups advocate for shared decision-making, in some startups, one person is specifically tasked with prioritizing the development objectives. The person has the final say and manages the list tool they operate with. This role aligns closely with the role of a product owner, indicating the presence of distinct roles tied to product development like those found in the Scrum framework.

5.1.3 Adaptability to change

Agile methodologies are designed to embrace change rather than resist it, as stated in one of the key principles of the Agile Manifesto, "Welcome changing requirements, even late in development." (*Manifesto for Agile Software Development*, n.d.). Most of the startups have an attitude that welcomes change and have learned to accept that changes will happen. The startups have a mindset that does not resist change or changing requirements but embraces it. The positive attitude and mindset for change indicate tacit knowledge of the Agile principle for changing requirements.

5.1.4 Use of tools

Within the Scrum practice, significant importance is placed on maintaining an ordered list of product requirements, initially compiled as a product backlog, and subsequently refined into a sprint backlog (Pries & Quigley, 2010; Salameh, 2014). In Agile Kanban, a considerable emphasis is placed on the visual

representation of work as a critical mechanism to maintain an overarching workflow perspective (Dalton, 2018)

Most of the Startups studied use a visual representation of their work scope, commonly in the form of a list. This list serves as a comprehensive overview of tasks that must be undertaken, though it does not feature any specific deadlines. This method resembles the product backlog found in the scrum framework.

Furthermore, one startup employs Trello, a Kanban-based software, to visually track their tasks and completion status. However, it is worth noting that while they leverage the tool's visualization capabilities, they do not use it to observe how tasks progress through different stages of development. The list of elements and how they are structured indicates the unintentional presence of these Scrum and Kanban practices.

5.2 What challenges does a startup have that can be solved by leveraging Agile principles, practices, and tools?

In this section, I discuss startups' challenges and examine if agile principles, practices, and tools can offer practical solutions. Yau & Murphy (2013) points to the fact that Agile methods are created for larger organizations and therefore pose the question if small-scale startups even face those challenges that Agile can solve. To assess the potential impact of Agile methods on a startup, it is essential to thoroughly explore the existing challenges and determine whether they align with the issues that Agile methods aim to address.

Key finding summary:

The data shows that a common overarching challenge faced by startups is a lack of structure. The absence of a well-defined framework and general lack of organization permeates the development process, giving rise to several sub-challenges.

The analysis identified a lack of structure in 4 categories: (1)Product development, (2)Collaboration, (3)Time management, and (4)Progress.

5.2.1 Agile practices for product development

Most of the startups studied lack structures for testing their products with the customers. Instead they utilize self-testing in order to validate their products. Even in a case where customer testing was frequent they faced challenges in effectively planning for customer inclusion. This overall deficiency in testing practices introduces uncertainty regarding whether the product will meet customer needs, thus posing a risk to the economic aspect of the startup if the product fails to sell.

The Agile methods are designed to incorporate customer feedback early and continuously through the development process, changing requirements if needed and ensuring that the product fits the customer (Balaji & Murugaiyan, 2012). Given that most of the startups do not know how to include customers in product development, and that the Agile methods facilitate continuous customer involvement, there seems to be an indication that startups could benefit from adopting an Agile approach to mitigate these issues.

In the Scrum framework, as described by (Fowler, 2019), a sprint review takes place at the conclusion of each sprint. This essential meeting serves the purpose of engaging stakeholders, and occasionally customers, to present and discuss the sprint increment. By implementing sprint reviews, the startups could become more mindful of when and how testing can take place, leading to increased awareness and improved testing practices with customers. The sprint review would allow the startups to structure the feedback from the customers and bring the feedback into the next sprint. This way, the startups would be better equipped at making sure the product is what the customer wants, and mitigating the economic risks connected to an unsuccessful product launch.

5.2.2 Agile practices for collaboration enhancement

In the cases studied, most of the startups lacked an effective collaboration structure. This deficiency was notable both within the core team members and between the core team and key stakeholders, including the board and other shareholders. Collaborative productivity is one of the things Scrum promotes through a structured approach with set activities (Pries & Quigley, 2010; Wilson et al., 2013). The clear and structured approach that Scrum offers and the lack of

effective collaboration structures in the startups indicates the need for tools like those offered by the Scrum framework.

5.2.2.1 Communication issues

The lack of collaboration structures leads to challenges in communication, and the startups suffer misunderstandings between the core team members about the interpretation of changing requirements and the order of tasks to be solved.

Because there are no structures for daily collaboration to promote communication, the core teams face issues in following up and completing tasks leading to a waste of time and frustration between the team members.

Yau & Murphy (2013) highlight that the use of agile methods effectively can mitigate issues related to communication. Considering that the startups experience communication challenges, and that the agile methods aim at facilitating effective communication, startups could mitigate these challenges by implementing agile practices.

In the scrum framework, as stated by Yilmaz (2017) the daily scrum event aims to facilitate information exchange, and conveying what they are working on, if they need help in their tasks, and additionally what needs to be done to help (Fowler, 2019). By implementing the daily scrum meetings, the startups could frequently raise their concerns, needs and status on tasks in a structured manner, making it easier to follow up on themselves and other team members. Misunderstandings could be easier to pick up and correct because all the team members would be exposed to the status and needs of a task more frequently.

The Kanban board, in the Agile Kanban framework facilitates for higher quality in communication by making it easier for developers to manage their tasks (Nakazawa & Tanaka, 2016), by providing a clear and visual overview of the tasks (Dalton, 2018). By using an Agile Kanban board, and implementing the visual approach within the daily scrums, the startups could experience a better task completion rate and overview of the work to be done, limiting misunderstandings and waste of time.

5.2.2.2 Alignment issues

In the cases studied, the lack of collaboration structures leads to issues in alignment of goals and the shared understanding of the process. Within the core

team, most of the startups steer away from check-ins and alignment because they fear that they will be micromanaged. Both the core team and the stakeholders have limited time available, and the lack of structure makes the coordination between them difficult. Most of the startups rely on confirmation and input from the stakeholders. The startups either have too much daily involvement from the stakeholders, but with limited time each day so the discussions are not productive or complete, or the stakeholders are not available so the startups have to wait longer periods before they get confirmation or input making it difficult to move development forward and the team becomes ineffective. The lack of frequent meetings with the stakeholders leads to difficulties in aligning goals and tasks.

In the scrum framework, as described by Layton (2015), the overarching event is the sprint, which is a timeboxed period with planned work, usually between one to four weeks, and where there can't be added more work within the period. By implementing sprints, the core team would have a clear goal and tasks for a set time, making it easier to be aligned. The core team could become more effective because the stakeholders would not be allowed to add more work or changes in the duration of the sprint.

Within the sprint, there are amongst other, two events; a sprint planning meeting at the beginning and a sprint review at the end of each sprint (Fowler, 2019). Fowler (2019) states that the purpose of the sprint planning meeting is to establish the sprints overarching goals and create the sprint backlog. By implementing the sprint planning meeting, the startups could ensure clearly established goals. Additionally, the sprint planning meeting could facilitate a collaborative approach to determining the goals for the next period, limiting the experienced feeling of micromanaging because the team members themselves would be involved in creating the sprint backlog.

Fowler (2019) states that the purpose of the sprint review is to include the stakeholders in the status of the products, and it is an opportunity to discuss and demonstrate the product and the way forward. By implementing the sprint review the core teams could be assisted in obtaining quality input and confirmation from the stakeholders, while providing a channel to check and align with new goals. The sprint review could make the process of input, confirmation, and goal formation more predictable since it is cyclical at the end of each sprint. The

stakeholders could better anticipate when they are needed, which is suitable for their limited time to interact with the startups.

5.2.2.3 Evaluation issues

In the cases studied, the lack of collaboration structures leads to limited opportunities to evaluate the core team's process of working. Most of the startups only perform evaluation sporadically and if needed, which leads to a low degree of following up on the changes in work process.

In scrum, the sprint retrospective, as described by Schiel (2011), provides the scrum team with a valuable opportunity to collectively review and enhance their working processes.

Considering that the startups struggle to evaluate and implement changes in their work process, an implementation of the sprint retrospective could facilitate for a frequent and systematic evaluation channel and additionally work as a way for the startups to ensure that the changes will be followed up on. If the changes in the work process are not implemented after the sprint retrospective, since it is cyclical, the next sprint retrospective will reveal this and make the team accountable.

5.2.3. *Agile practices for time management*

In the cases studied, most of the startups lack the structure for task time management and product release. Most startups do not operate with deadlines for tasks, creating an unpredictable environment where completion of tasks and setting goals is difficult. If they try to set deadlines, they end up being too large and containing too many tasks, which leads to demotivation and an absence of task completion. The lack of deadlines affects the overall progress of the startup negatively.

Scrum as described by Pries & Quigley (2010), allows for increased productivity within a defined time frame by focusing on a specific set of activities. Given that the startups encounter difficulties in completing tasks, setting clear goals, and achieving overall progression, the Scrum framework offers a potential solution by giving the startups set timeframes for when tasks should be finished, and goals should be reached. As described by Layton (2015) the sprints are time-boxed and

the workload within the sprint is limited to what is established in the sprint backlog. By using a sprint backlog to limit and define tasks, the startups could use the sprint's end as a deadline for completing the agreed upon tasks. This could create a more predictable and productive environment, which could lead to a higher degree of progress and less waste of time.

5.2.4 Agile practices for progress

In the cases studied, most of the startups struggle to keep track of their progress due to a lack of structure for defining progress. They find it hard to see how a product develops from start to finish. Because they don't set clear goals or limit their work, they often fall behind and are not as productive as they could be. They also overestimate what they can do, which leads to more problems when unexpected things happen. Lastly, they have trouble keeping track of small tasks, which also slows down their progress.

In Scrum, the sprint increment, as defined by Fowler (2019), represents the tangible output at the end of each sprint and is examined in the sprint review event. By dividing the work into smaller, manageable chunks and focusing on completing these increments within a specific time frame, the startups could set clear goals and track their progress more effectively. This approach allows them to visualize the development of their product from sprint to sprint, providing a clear understanding of the work accomplished and the remaining tasks. Additionally, it could provide a shared understanding of the metrics in which progress is measured by, making it easier for the startups to establish when there has been progress.

The Agile Kanban board, as described by Dalton (2018), serves as a visual representation of work and aids in visualizing tasks, their status, and progress within a workflow. The startups could use the Agile Kanban board to address the challenge of keeping track of small tasks and managing flow. By dividing the board into different states, such as "waiting," "in progress," and "completed," startups would clearly see the status of each task and the overall workflow. This promotes transparency, and helps identify bottlenecks or areas where work is piling up so they don't fall behind. Additionally, by implementing the practice of limiting work in progress, as stated by Campbell (2018), the startups could be

protected from taking on more tasks than they can handle, enhancing focus and productivity.

5.3 What prevents startups from using an agile approach

In this section, I explore what factors that are preventing the startups from using an Agile methodology. It is necessary to explore what factors might prevent startups from using and gaining benefits from the Agile methodology. This is crucial to gain a better understanding of why startups do not, or can not, use agile methodologies, despite the common environment of uncertainty and change between software development and startups (Yau & Murphy, 2013).

Key finding summary:

I found indications that lack of awareness contributes to why the startups in the cases studied do not use agile methodologies. Additionally, I found indications that agile practices are too rigorous and resource intensive for the startups to adopt.

5.3.1 Lack of awareness

None of the startups in the cases studied know about agile principles, practices and tools. One of the startups uses a kanban board, however, they are not aware of the Kanban practice and are unable to reap the full benefits.

The lack of awareness could be supported by Conboy & Fitzgerald (2004) who states that the agile manifesto has not taken agility outside software development into account. The startups lack of awareness could be a result of not being exposed to the methodology because most of the research and literature is limited to the software development industry, and none of the startups in the cases studied operates in that industry.

5.3.2 Agile practices are too rigorous and resource intensive

Yau & Murphy (2013) found that the agile practices might be too rigorous for startups in terms that the resources spent on facilitating it could be spent elsewhere. In the cases studied, most of the startups reported that they do not like having too many meetings because they need the time for developing and solving tasks. The event section of the scrum framework, as described by Fowler (2019) includes many meetings to promote adaptability, collaboration and quality in products. Although the meetings are time-boxed, the rigorous frequency might not be suitable for the startups because they have a small team and the time resource is already limited. Additionally, the scrum framework would pose a full restructure of the development process for the startup, and as Reddy (2015) describes, the scrum framework is rigid and hard to implement. The startups might end up spending an extensive amount of time in the implementation phase, and as the startups already struggle with time management and progress, they might not be willing to spend the necessary time and resources to succeed, preventing them from using the framework. This correlates with Yau & Murphys (2013) findings that the benefits of using agile in a small startup can't compare to the cost and time involved in implementing and maintaining the structures.

Conforto et al. (2014) suggests that there are adoption opportunities for agile in startups, and that a hybrid solution is the way to go. To mitigate the risks of agile being too rigorous and resource intensive, the startups could implement a hybrid version between Scrum and Kanban. Reddy (2015) supports this approach and highlights that Scrumban, the hybrid version between Scrum and Agile Kanban, provides a more flexible approach that can be tailored to the specific context of an organization. By taking the events and artifacts from the Scrum framework, and leaving the more rigorous view of roles, the startups could enhance their progress, collaboration and customer involvement. Additionally, Kanban as described by Dingsoeyr et al. (2019) does not require a full reorganization of teams and processes, and by implementing the Agile Kanban board in the selected parts of the Scrum framework, could create a Scrumban hybrid that fits the startups and mitigates both the risk of agile being too rigorous and creating a more desirable structure for the startups resource allocation.

6.0 Implications

My findings and discussion indicates that there is a presence of Agile principles and practices within the startups, without the startups knowledge. Furthermore, there are indications that the startups could benefit from an Agile approach to solve their challenges in adaptability, collaboration and customer involvement, leveraging it for progress. Lastly, there exist some factors that might prevent startups from adopting an agile methodology, however those factors could be mitigated by implementing a more flexible hybrid version of Scrum and Kanban. These indications yield practical implications for (1) startups and (2) startup supporters, and research implications for (3) further research.

6.1 Recommendations for startups

A small startup that struggles with progress, collaboration, customer involvement, adaptability, or a combination of these challenges, could benefit from adopting an agile methodology. Startups that are able to handle these challenges might have to assess the cost versus benefit of adopting Agile since the practices are resource intensive. However, it might be beneficial in the long run because challenges like the ones mentioned might show up at a later stage, and have adopted an agile methodology at a previous stage could make the startup more equipped to handle those challenges.

Before adopting an Agile methodology, small startups should look for principles, practices, and tools that unknowingly exist in their startup. If they find a presence of such, the startups should evaluate if the principles, practices and tools add value to their processes, and secondly, look for challenges within them to see if they can build upon existing structures or if they need to restructure to implement.

Startups should adopt and implement a flexible Scrumban practice, taking the events and artifacts from Scrum, and the visual Kanban board from the Kanban framework. The events and artifacts the startups should implement from Scrum are; Sprint planning, Sprints, Daily Scrum, Sprint Review, Sprint retrospective, Product backlog, Sprint backlog, and Sprint increment.

Startups should use the product backlog to manage their products' overall requirements. Additionally, it can be used for business objectives or other tasks they need to drive the Startup's growth. In Scrum, the product owner is the one in charge of prioritizing the product backlog (Fowler, 2019); however in a small startup, both the core team and other stakeholders like board members and additional shareholders should have access to the product backlog. By providing the stakeholders with access to the product backlog, they will have a concrete list to place their ideas and opinions about development without overwhelming the team with frequent inquiries, and overloading their work in progress.

Startups should use the sprint planning meeting to create the sprint backlog. The stakeholders should not be included in this meeting to ensure that the core team gets a collaborative environment for task clarity, and where they can self-organize and actively be involved in the creation of next steps for development. The core team can experience more motivation and freedom from micromanaging by not including the stakeholders.

By implementing the overarching Scrum event, the sprints, the startups would experience more defined timeframes for development, facilitating a higher degree of task completion. Additionally, the startups could become more equipped to handle the changes, either coming from the stakeholders (board and shareholders) or the customers. The startups should also implement the daily Scrum to make it easier for the core team members to follow up and manage their tasks, while also creating a space in which they can ask and provide help. The startups could limit misunderstandings and promote alignment and task completion.

By implementing the Kanban board, and using it in the daily scrums, the startups can visualize their work items, and keep track while they move through different development stages. The startups should minimum have the development stages "waiting", "in progress" and "completed", to promote clarity on the work in progress. By using a Kanban Board, the startups would also be better equipped at limiting work in progress, getting sheltered from work piling up and bottlenecks being undetected.

The startups should implement the sprint review to structure customer testing. The sprint review should be used to ensure that customer feedback is captured, and placing the feedback in the product backlog would ensure that it is used to improve the product.

The sprint review should also be used to receive feedback from other stakeholders to ensure the alignment on goals and way forward.

The startups should implement a sprint retrospective to review their working process, however, it might not be necessary to have it at the conclusion of every sprint due to the team members' time limitations. It is still necessary to keep the retrospectives cyclical and defined to ensure that the improvements agreed upon gets followed up on.

6.2 Recommendations for startup supporters

Startup accelerators, venture capitalists, and angel investors should acquaint themselves with the Agile practices and use agile methods as a resource to support their startups.

When they acquire a new startup to support, they should evaluate the Startup's challenges and identify whether agile practices would be a suitable fit to mitigate these challenges. If the Startup faces challenges in progress, collaboration, customer involvement, adaptability or a combination, the supporters should introduce a hybrid practice like Scrumban. By introducing the practice, they provide structure to the Startup's workflow and actively engage themselves in the process.

The supporters should include themselves in the stakeholder group, and attend the sprint reviews and additionally the sprint retrospectives. The sprint reviews would ensure alignment and transparency, and would be a beneficial tool for supporters that have invested with capital in the Startup. For those supporters who have invested with non-capital resources, it could be beneficial to attend the sprint retrospectives to ensure and observe progress. Attending the sprint retrospectives

would give both the startups and the supporters an opportunity to assess their contributions to the work process or other business objectives.

6.3 Recommendations for further research

Considering the limited research that has previously been done on agile in startups, my research scope initiates an exploration into the potential impact of agile in a startup context. As a preliminary investigation, my research scope is limited to how agile methods can be used to mitigate some of the challenges small Startups face. It is therefore crucial to regard this work as a foundation for future research rather than a conclusive examination. The exploratory nature of the study suggests that further research should focus on validating, refining, and expanding upon these initial findings

First, startups are complex with several variables within different industries. The industries might vary significantly in terms of market dynamics, customer behavior, regulatory constraints, and other factors, which could influence how well agile methodologies work in practice. Further research should validate if their challenges could be solved by an agile approach within their specific industry context.

Secondly, while my findings support that there are benefits of using agile methods in a startup context, more rigorous experimental research, ideally in the form of longitudinal studies, would be beneficial. These studies could track the performance of startups over time after implementing Agile methodologies, providing deeper insights into the long-term impacts and potential challenges that may emerge.

Thirdly, my research scope covers how agile methods impact adaptability, collaboration and customer involvement, without taking into account other factors like finance, growth, and success. Further research should explore agile methodologies in relation to the other business objectives to gain a better understanding of the consequences of implementation.

Lastly, my research scope does not compare other methods to agile, and further research should compare the effectiveness of Agile methodologies versus traditional project management techniques in startups. This could highlight the

contexts or scenarios where Agile methodologies may be more (or less) beneficial. This could also contribute to exploring the factors that prevent startups from using agile.

7.0 Conclusion

My thesis aimed to gain an understanding of (RQ1) How Norwegian ecommerce startups can leverage Agile principles, practices, and tools to mitigate challenges related to adaptability, collaboration, and customer involvement. By conducting an exploratory study, I found that startups can leverage a flexible hybrid approach of the Scrum and Kanban framework, Scrumban, and build upon some of the unintentionally existing structures of agile within the startup, to mitigate the above mentioned challenges, and the barriers of using an Agile Methodology for Startups.

RQ1.1: What agile principles, practices and tools are unknowingly already in place in a startup

The first research sub-question was designed to uncover the innate Agile mechanisms present within a startup, with the aim of assessing whether these mechanisms could be harnessed to establish a more structured Agile framework. My study revealed that startups inherently embody a degree of Agile principles and practices, thus providing a foundation upon which a more structured Agile framework could be constructed.

RQ1.2: What challenges does a startup have that can be solved by leveraging agile principles, practices and tools?

The second research sub-question aimed to delve into the intricacies of the challenges, subsidiary difficulties, issues, and risks faced by startups, with the goal of evaluating the potential efficacy of Agile methodologies in resolving these concerns. My study revealed that a startup's challenges in adaptability, collaboration and customer involvement can be mitigated by loosely adhering to

the agile principles, and implementing the events and artifacts from Scrum, and the Kanban board from the Kanban Practice.

RQ1.3: What prevents startups from using an agile approach.

The third research sub-question was designed to uncover potential factors that prevent startups from implementing an agile methodology. My study revealed that lack of awareness and the constraints of time and financial resources can prevent the startups from implementing Scrum and Kanban rigorously. However, the resource constraints can be mitigated if a startup implements the more flexible approach, Scrumban.

My study initiates an exploratory journey into the potential implementation of Agile methodologies within a startup environment. Its contributions should be perceived as a stepping stone, setting the groundwork for more exhaustive research in the future, rather than a definitive conclusion on the subject. The hope is that this study will stimulate further scholarly interest, encouraging more comprehensive exploration of Agile practices within the context of Startups.

7.1 Limitations

I recognize that this study is subject to several limitations. First, the qualitative research method poses limitations in reliability, validity and generalizability as explained in section 3. The geographical location and selection criterias in terms of team size, ecommerce sector, market, lack of knowledge of agile, and growth stage limited the sample size and interviews conducted, impacting the generalizability of the study. Furthermore, I have not taken other practices than agile into account when analyzing the findings, I recognize that there might be other methods that are equally or more suitable for mitigating the challenges found in the startups.

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Appendix

Appendix 1 – Interview guide

1.Introduction

1.1 Can you provide a brief overview of your startup, including its mission, vision, and core values?

1.2 What specific industry or market does your startup operate in?

1.3 Could you describe the products or services your startup offers to customers?

1.4 Who is your target market or customer base? Are there any specific segments or demographics that you focus on?

1.5 How long has your startup been in operation, and what stage of growth would you consider it to be in currently?

1.6 Can you provide an estimate of the number of team members in your startup?
Stakeholders

1.7 What are the different roles and responsibilities within your team, especially in relation to project management and product/service development?

2.0 Challenges

What are the major challenges your startup encounters when it comes to project management and product/service development?

How do you currently handle changing requirements or customer needs during the development process? Are there any specific challenges you face in this regard?

What obstacles do you encounter when it comes to maintaining a consistent pace of work and ensuring sustainable development within your startup?

How do you manage collaboration and communication among team members, especially when working on complex projects or tight timelines? What challenges arise in this area?

Can you identify any difficulties related to managing and prioritizing work tasks or projects within your startup?

What challenges, if any, have you experienced in terms of ensuring a high level of customer satisfaction and delivering valuable products/services in a timely manner?

Have you encountered any issues regarding transparency, visibility, or tracking progress in your projects? If so, how have these challenges impacted your startup?

What challenges, if any, do you face in terms of effectively managing and utilizing the available resources, including time, talent, and budget?

Have you encountered any difficulties in aligning the business goals or objectives with the technical or development aspects of your startup?

3.0 Agile principles – follow up questions

2.1 Our highest priority is to satisfy the customer through early and continuous delivery of valuable products or services.

a. How does your startup prioritize and ensure customer satisfaction in the development and delivery of your e-commerce products?

What challenges arise in this area?

b. Can you describe any specific practices or strategies you employ to ensure early and continuous delivery of value to your customers?

c. How do you gather customer feedback and incorporate it into your product/service development process?

- What challenges arise in this area?

2.2 Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.

a. How does your startup approach changing requirements or customer needs during the development of your e-commerce products?

- What challenges arise in this area?

b. Can you provide examples of instances where you have embraced changing requirements to provide a competitive advantage to your customers?

c. How do you ensure effective communication and coordination when changes occur late in the development process?

- What challenges arise in this area?

2.3 Deliver working products/services frequently, from a couple of weeks to a couple of months, with a preference for shorter timescales.

a. How frequently does your startup release updates or new products?

- What challenges arise in this area?

- b. What factors influence the decision regarding the release frequency?
- c. How do you manage the development process to ensure timely delivery while maintaining quality standards?

2.4 Business people and developers must work together daily throughout the project.

- Can you describe the typical roles and responsibilities within your startup when it comes to project management and product development?
- a. How do business stakeholders and the team collaborate in your startup to ensure alignment and shared understanding of project goals?
- What challenges arise in this area?
 - How do you organize and distribute tasks among team members when working on projects?
 - How do you manage and prioritize the backlog of work items or tasks within your startup?
- b. Can you describe any specific practices or channels of communication that facilitate daily collaboration?
- Do you have any regular meetings or check-ins to discuss project progress, address challenges, or plan upcoming work?
- c. How do you ensure that business requirements and technical considerations are effectively integrated into your e-commerce projects?
- Can you describe any recurring events or rituals that take place during the course of a project's lifecycle?

2.5 Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.

- a. How does your startup foster a culture of motivation and empowerment among your team members working?
- What challenges arise in this area?
- b. What measures or initiatives are in place to provide the necessary support and resources for individuals to excel in their roles?

c. Can you provide examples of instances where trust and empowerment have positively influenced the outcomes of your projects?

2.6 The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.

a. How does your startup facilitate effective communication within the core team?

- What challenges arise in this area?

b. In what ways do you encourage face-to-face interactions among team members to exchange information, share knowledge, and address challenges?

c. Have you found any specific benefits or challenges related to face-to-face communication?

2.7 Working products/services are the primary measure of progress.

a. How does your startup measure progress and success in the development of your e-commerce products?

- What challenges arise in this area?
- Are there any specific individuals or team members who take on the role of coordinating or overseeing the progress of projects?

b. Can you describe any specific metrics or indicators you use to evaluate the effectiveness and quality of your working products/services?

c. How do you ensure that the progress of your e-commerce projects is visible and transparent to both the internal team and external stakeholders?

- How do you visualize and manage the flow of work within your startup? Do you have any visual boards or tools to track and monitor work items?
- Can you describe how tasks or work items move through different stages or steps within your startup's workflow?
- Are there any specific limits or constraints that you set on the number of tasks or work items in progress at any given time?

2.8 Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.

a. How does your startup promote sustainability and balance in the development?

b. Can you describe any practices or strategies you employ to prevent burnout and ensure a constant pace of work for the team members?

c. Have you noticed any long-term benefits or challenges related to maintaining a sustainable development pace in your startup?

2.9 Continuous attention to technical excellence and good design enhances agility.

a. How does your startup prioritize and ensure technical excellence and good design in the development of your e-commerce products?

- What challenges arise in this area?

b. Can you provide examples of specific practices or initiatives you undertake to promote technical excellence and good design?

c. How do you balance the need for technical excellence and good design with the time and resource constraints of your e-commerce projects?

2.10 Simplicity—the art of maximizing the amount of work not done—is essential.

a. How does your startup approach simplicity in the development of your e-commerce products/services?

b. Can you describe any specific instances where you have intentionally simplified or streamlined processes, features, or user experiences to maximize efficiency and effectiveness?

c. How do you ensure that the pursuit of simplicity does not compromise the quality or functionality of your e-commerce products?

2.11 The best architectures, requirements, and designs emerge from self-organizing teams.

a. How does your startup foster self-organization within the teams working on e-commerce projects?

- What challenges arise in this area?

b. Can you provide examples of instances where self-organizing teams have contributed to the emergence of effective requirements, or designs?

c. What measures or support systems are in place to encourage collaboration, knowledge sharing, and decision-making within self-organizing teams?

2.12 At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

a. How does your startup facilitate regular reflection and improvement within the development teams working on e-commerce projects?

- What challenges arise in this area?

b. Can you describe any specific practices or rituals you engage in to encourage team reflection and learning?

c. Have you observed any tangible benefits or improvements resulting from the team's reflection and adjustment processes within your e-commerce projects?