



Agile practices adoption with Lean in growing entrepreneur companies

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Foreword

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Abstract

There are three popular terms in the software development industry recently, they are Agile, Lean and Entrepreneurs. Agile is an approach in which requirements and solutions for the products evolve through short cycles. Entrepreneur can be defined as the process of designing, launching and running a new business based on potential opportunities and often is a small business. In recent years, entrepreneurs firms follow Lean concepts in Information Technology industry are trying to adopt Agile methodologies because they believe it helps them to avoid failures and grow faster. However, when growing they often face problems to maintain the agility which they have when they were smaller.

The aim of this study is to find out approaches and lessons which can be used to adopt Agile practices in young expanding firms. In addition, those methods were compared to those from large-scale Agile frameworks to give conclusions on adoption approaches.

Three interviews were conducted with the high-level managers of target case companies and two of them based in Oulu, Finland and one located in Hanoi, Vietnam. All of the companies which joined the research are working software development area but each of them has a different pathway and side services. They also share are similar numbers of employees above 9 and smaller than 30, which is the reason that they were chosen. Another reason for this selection is that all of them called themselves a Lean start-up or following core concepts of it. On another hand, large-scale Agile frameworks were introduced as an approach for big organizations to adopt Agile practices. In this research, lessons from those frameworks were proposed as suggestions and a new point of view for maintaining agility.

The results of the research can be concluded that focusing on customer requirements, forming small Agile teams and giving more freedom to members are three practices that companies in the interview are using. Furthermore, from designed frameworks, it showed that having dynamic teams, enhancing the value of each iteration and improving the training process are ways to improve the adoption process in large firms.

Keywords

Agile, Lean, Entrepreneur, Growing, Large-Scale Agile Frameworks, Software development, Management

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1. Introduction

Agile is a group of software development methodologies based on four main principles of individuals and interactions, working software, customer collaboration and responding to changes (Kent Beck & et al., 2001). The advantage of Agile to others development methodologies is its lightweight processes which defining agility as ‘strip away as much of the heaviness, commonly associated with the traditional software development methodologies, as possible to promote quick response to changing environments, changes in user requirements, accelerated project deadlines (Erickson, Lyytinen, & Siau, 2005). This explains for the fact that Agile methods have become popular in software development business, mostly small and medium companies while larger firms starting to look at its benefits. Thus, the mentioned principles have the goal of creating maximum value for the limited available resources (Tuan & Thang, 2013) and it is also the main purposes of adopting practices in entrepreneur companies, which explains the popularity of Agile in young company world – startup world.

There are several definitions of what a startup is and based on the definition from Eric Ries a startup has three main components: institution, innovation and extremely uncertainty (Ries, 2011). These factors came from the fact that most of the technology startup companies are very small at early stages and do not have enough resources to do many tasks at the same time. Before there wasn’t any framework or guideline to adopt Agile for young firms, Blotner suggested that the combination of Agile models and plan-driven models is a good choice for startups (Blotner, 2002) . In 2011, Eric Ries (2011) introduced Lean as a new approach of Agile for entrepreneurs, in which building products iteratively is advocated along with the early delivery to the market. It has proved it advantages impressively when comparing to other approaches which make most of the recent startup are using this method.

Expansion is the nature of a successful startup, it helps new business remain the competitive advantages and establish a firm foothold on the market (Allen, 2011). Unlike medium or large companies, most of the tech startup are not good at management since the founder’s background is from technology, which creates some chaotic actions when the companies starting to grow, and more people come in. Furthermore, Lean is a product-oriented Agile method which suitable for small size team but when growing the number of members will be increased so there is a need to change the development model. On the other hand, several Agile Framework have been for large-scale companies recently, such as Large-Scale Scrum (LeSS), The Scaled Agile Framework (SAFe), Disciplined Agile Delivery (DAD) (Paasivaara, 2017) and Spotify Model (Kniberg & Ivarsson, 2012). There is the fact that all these aforementioned methods are geared toward solving problems in large projects while the differences are in their form of team size, training, certification, and practices adopted (Alqudah & Razali, 2016). This information will contribute to entrepreneurs who want to acquire suitable process for scaling their business’s agility especially in term of Lean startups.

1.1 Motivation and goals

The difficulty of introducing agile methods increases with the organization size especially when there are many dependencies lead to the need for formal documents thus reducing agility (Dikert, Paasivaara, & Lassenius, 2016). In the cases of entrepreneur's company, agility helps them to deliver their products fast and effectively; quickly adapted products to the environment mean there are more chances to be successful in this very competitive field, therefore growing can reduce this strength. Also, agility methods also affect management and business-related functions, therefore keeping this characteristic can be vital to this type of firms. There are suggestions that each large organization should find its own balance of agile and plan-driven methods (Boehm, 2002). The fact that more and more big organizations are adopting different large-scaled Agile frameworks is proving this suggestion.

Keeping the agility is the goal that most growing company which following Agile methods are aiming for however, there are several challenges. Those can come from the uncertainty of growing startup, the unavoidable stuck from customer requirements and scale or inexperience of newcomers when joining a new environment. These problems made the adoption for practices in the mentioned frameworks is not an easy task, those methodologies cannot be brought directly from the textbook but it needs changes to adapt to the new situation. In prior researches, researchers and managers focus on the big companies and neglect firms which are in the growing phase and it explains the motivation for my thesis. The short life cycle and limited resources of small companies can be the main reason for the missing information in this area. No matter what is the reason for that, finding practices and recommendations for an expanding startup can keep its agility while improving maturity structure is lessons which can be learned from big Agile companies' adoption is the aim of the thesis. To achieve those goals, this research analyze the data from the interviews to identify the problems in that phase, then point out solutions from them and large-scale Agile frameworks.

1.2 Research questions and methodology

The research questions are the first main declaration in a research and based on the mentioned discussion above the research questions in my research are:

RQ1: How some Lean startups can keep their agility when growing?

RQ2: Which lessons from large-scaled agile frameworks can be used in entrepreneur firms when expanding?

The research questions are answered by a process of literature review and qualitative interviews. There are several criteria for choosing the suitable documents for reading and the number of sources will depend on the results of queries for key terms. The chosen research method in this thesis the qualitative research and the main data will be gathering through interviews with selective interviewees. There are several reasons for this selection and they will be explained details in the following sections but overall, it seems that it is the good choice for the predefined scope of this thesis.

The number of interviews needs to be defined so that it can fulfill the requirements and can help to answer the research question, and the optimal number at this point is three.

Also, the candidates for the interview cannot be anyone in the company, he/she needs to be in a high position who could understand and have noticeable effects to the management process of his/her firms. Last but not least, the question list is designed in a way which can gather enough data and have capable of describing the company and its current situation without exposing sensitive data.

2. Related works and concepts

In the software development industry, many methods and philosophies were used to boost up the efficiency and reduce cost and they are developed through time. Before the traditional Waterfall scheme, a sequential design and have one direction of development, is dominated and is the most popular among different approaches, however recently approaches of Lean and Agile has gained a lot of attention from developers and managers. Different from the predecessors, Agile and Lean focus on the flexibility of the development process which is closer to real-life scenario than others.

2.1 Agile concept

Agile or Agile software development is an approach to develop software in with high flexibility and improvement while requirements and solution evolve through collaborations of individuals from different teams and their customers. The main concepts of Agile were first stated in the Manifesto for Agile software development by 14 developers in 2001 (Kent Beck & et al., 2001). Since then this concepts had been adopted, praised and became one of the most popular approaches of modern software development aside traditional Waterfall model. It has been developed into different methodologies such as Kanban, Extreme Programming, and the popular Scrum. Each of them has its own strength and weakness but they follow the idea of improving products through incremental process.

2.1.1 Agility in software development

In software development, the term agility is related to Agile and it is referred to rapid changes in the manufacturing process. It can be defined as “the ability to quickly build functionality and quality into software at an early stage” (Ikoma, Ooshima, Tanida, Oba, & Sakai, 2009). There is no doubt about its popularity in this industry with Agile concepts as the most successful example of. The reason behind this trend is the large numbers of failed million-dollars software projects which are lack of end users involvement and flexibility. In a startup scenario, customers often change the requirements frequently and developers should be prepared for that which implies the importance of customizable architecture design (Giardino, Unterkalmsteiner, Paternoster, Gorschek, & Abrahamsson, 2014).

Despite its advantages, agility in software development is considered as a risk by certain numbers developers at project level (Tuan & Thang, 2013), setting up in bigger firms agility is facing skeptical thoughts. By this reason, there have been numbers of researchers which the goal of finding a combination between maturity and agility especially in large scaled projects or big companies. An approach is creating frameworks for large-scale software development projects, which can be described in the following part. Another idea is the adaption of agile to standard process while reserving its advantages. There is concrete evidence that show the several maturity

standards like SPI (Software Process Improvement) or CMMI (Capability Maturity Model Integration) are compatible with agile methods, which encourage practitioners should aim for both agility and higher maturity (Tuan & Thang, 2013).

2.1.2 Large-Scale Agile frameworks

As mentioned earlier, Agile methods have become a popular approach for companies to improve their performance and their productivity. However, these methods were initially created for small and medium teams so there has been attempt to scale up these practices for bigger firms. The size is the main feature to determine what large-scale agile is, it can be defined as size in persons or teams, project budget, code base size, and project duration (Dikert et al., 2016). The larger in size means the more difficulty which slows down the organization changes – a key factor of Agile. Furthermore, the number of related documents in big projects reduces the agility in communication between stakeholders. In researches of challenges to adopting large scale agile frameworks, there were several problems pointed out which including resistance to change, lack of investment, the difficulty of implementation of Agile, coordination challenges, differences in approach in a multi-team environment, boundaries of organization's structure, engineering challenges, non-development functions issues. However, the success factors are also discovered in the same research, which suggested more work is needed to improve the success rate of these approaches.

There are several favored framework for large scale Agile adoption have been used and developed in recent years, they can be listed as follows: Disciplined Agile Delivery (DAD), Large Scale Scrum (LESS), Scaled Agile Frameworks (SAFe), Spotify model, Nexus method, Recipes for Agile Governance in the Enterprise (RAGE) (Alqudah & Razali, 2016). It is stated that despite its shared goal of Agile adoption each framework is designed for specific purposes and a manager should know what are the goals, requirements, and characteristics of his/her company to select a suitable framework in the attempt of improving productivity.

2.2 Lean concept

Often known as Lean thinking or simply as Lean is a systematic method for minimizing waste, it had been brought to the IT industry for a decade after proved its influence in producing industry and its values was also showed in this new area. Lean is often used unconsciously with the combination with Agile methodologies.

2.2.1 The history

The traits of Lean manufacturing can be found from the 19th century and continued with documents of the 'father' of scientific management Frederick Winslow Taylor ; however, the foundation of the modern term was from an automobile industrial company Toyota in Japan ("A Brief History of Lean", 2019).

At that time Japanese were impressed with the massive quantity of industrial products, which make Taichii Ohno and Shigeo Shingo began to incorporate Ford into an approach called Just in Time (JIT). In this approach, they saw some disadvantages from the original context of Ford and tried to change when adding more flexibility. There

were two major changes which are reducing setup time and creating almost continuous flow of work; these are the foundation of modern Lean. By using those techniques, Toyota gained many achievements in productivity and quality which help to spread the practices to other Japanese companies. Not until the 1990s, the word Lean is used the first time to refer JIT and related techniques in a book *The Machine That Changed the World* (Womack, Jones, & Roos, 1990). The ultimate of it is to eliminate waste – the non-value-added component – also in this book five key principles of Lean were defined which are:

- Value: is the core of Lean in which processes producing no value need to be removed.
- Value stream: Collection of actions ensuring that each activity provides customer value.
- Flow: Continuous flow in how activities are organized.
- Pull: Producing products when only needed.
- Perfections: Continuous improvement to achieve zero defects

There are two main controversial arguments on this term and the first is that many practitioners may focus on its tools and methodologies rather than its root concepts of philosophy and culture, which creates a fail implementation when using them. Another point is that the managers having trouble to understand the true problem underlying, which need to hire consultants and spend more time on investigation. This against the core values of minimizing waste of Lean and can be considered as a failure in implementation.

Despite those arguments, Lean thinking also known as Lean has been adopted worldwide in not only manufacturing industry but also in other areas which software development is the most popular and it will be described later. From the early days, this concepts has been constantly developed and revised to be used in different situations, which inspiring for many methods in modern management.

2.2.2 Lean startup's

Developed from the old definition, Lean startup is first mentioned by Eric Ries (2011) in a book which has the same name. It is a methodology for developing business and products in which short cycles of product development is the first step to decide if a business model is viable. The main aim is reducing waste like original concepts to create products for usable by customers with limited resources. This can be obtained through adoption of experimentation, iterative product releases, and validated learning (Ries, 2011). The authors mentioned about 5 main focuses for an entrepreneur to follow including entrepreneur are everywhere regardless of size and area, entrepreneurship is management, learning through validating, build-measure-learn loop (Fig.1), and innovation in accounting. Also in the book, the author defined “a startup is a human institution designed to create a new product or service under conditions of extreme uncertainty”.

The philosophy of Lean startup has done great influence to the entrepreneur community since its first published. Along with of wave of entrepreneur, the number of internal startups have risen and the trend still continues and this demonstrates the first concept of Lean startup. Many studies believe that when large or well-established companies created an internal startup, new business divisions that have full responsibility from finding business idea to coming to market, innovation can be nurtured. Even having supports from the main corporation, working under startup manner allows the team to identify what customers perceive values faster than their colleagues working in a normal environment (Edison, Wang, & Abrahamsson, 2015.) Apart from that, in most of startup workplace slogans like “Done is better than perfect” or “move fast and break things” can be seen commonly (Giardino et al., 2014). This fast-moving spirit is embraced with Agile practices which allow a startup to have frequent changes allowing development to adapt to new requirements. Applied Lean, entrepreneurs are able to define riskiest parts to create a minimum viable product for testing and plan modifications. Knowledge from these steps can be transferred to next iterations, creating a cycle of self-improvement and self-steering. Survival is the main focus of this methodology, which come from the fact that most of the companies are failed to survive after several years of existence.

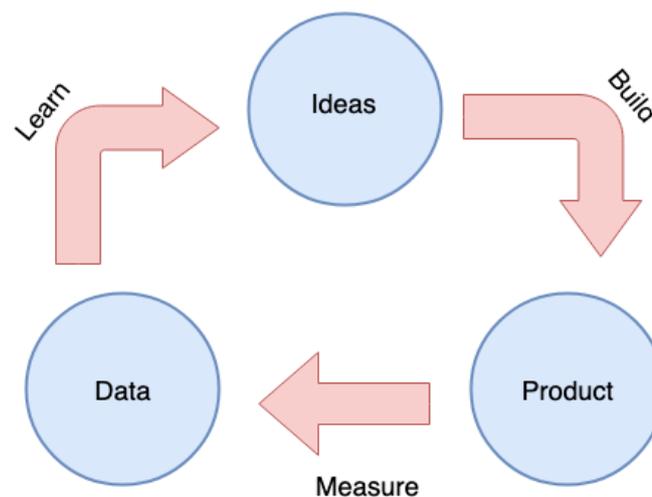


Figure 1. Lean startup cycle (Adapted from Ries, 2011)

Expanding the business is unavoidable to most startup when they have pressure from competitors, investors, and market. As an entrepreneur, the goal is to have the market’s demand for your products become bigger throughout the development of the company. This created a problem to manage growth and which type of growth should be taken care of. It can be a growing in cash-flow or growing in human resources but both of them are ways to achieve sustainable growth which is defined as the fact that new customers come from actions of past customers (Ries, 2011). Growing can also be defined as an increasing number of people involved with the company’s development. In the area of software development, new clients mean new specific requirements and the needs for hiring new developers, which can create major changes in internal management methods. In the entrepreneur community, a large number of firms are using Agile or Lean practices which are not suitable in this stage.

It is true that none of the management processes are strictly followed by startups (Giardino et al., 2014) especially in companies who following the agility style of Lean

and Agile. The shift in numbers of developers in team, the changes in documents and the involvement with different numbers of the customer together can make big confusion to anyone. A reason for this disorientation is the fact that most traditional development frameworks are not suitable for small business for several reasons (Churchill & Lewis, 1983). Firstly, they assume that a company must go through all stages of development or fail followed by the importance of the company's origin and growth is ignored. Last but not least is the scaling metrics are in annual sales while ignoring value added, number of locations, rates of changes, etc. The lack for suitable frameworks is also represented in the book of Lean startup and the author have used the original Lean to fill those gaps.

2.2.3 Combination of Lean and Agile

Lean had made a leap to software development field from the early of the 2000s and has gained a lot of attention from developers and companies since then. The first time this term was mentioned was in the book named "Lean software Development: An Agile Toolkit" (Poppendieck & Poppendieck, 2003), in which traditional Lean principles was restated as well as comparisons between its tools to corresponding Agile practices. It still keeps the main goals of its predecessor's but extended to be more suitable with new area. 7 main principles were mentioned in the book and they are eliminating waste, amplify learning, decide as late as possible, deliver as fast as possible, empower the team, build integrity in and optimize the whole. Those ideas created a new way of thinking when approaching to products but not until having the promotion by Agile community did Lean gain attention in the software development in modern industry (Tore & Torgeir, 2008). Agile allows the developers to move faster while staying connected to customer's requirements. On the other hands, Lean in software development help to create learning cycles which improving the qualities of products in a shorter time. They are sharing new visions for software development including importance of flexibility, attitude to waste, values of customer involvement. However, the combination of these concepts is still in fresh and having many questions need to be answered (Rodriguez, Partanen, Kuvaja, & Oivo, Jan 2014). There are several possible strategies to combine these concepts including: combination without intention; using business areas while Agile is used in software development; using Lean to improve Agile process in software development; transforming from Agile to Lean; synchronizing Agile and Lean; and directly using Lean in software development processes to facilitate the adoption of Agile.

Agile adoption is not an easy task for any companies especially for young firms, lack of management support and the uncertainty of plan is the main reason for this problem. In this process, risks can emerge in 3 forms of change risk, resistance risk, and sustainability risk. To solve those problems Lean is presented as a method to overcome the difficulties of changes through learning processes and it helps to bring structure, discipline, and feedback into the process (Hui, Aug 2013). This represented as new elements into the Agile practices such as WIP (Work In Progress) limits, waste-removing Kanban board, collaborative development and most important is creating feedbacks loops (Rodriguez et al., Jan 2014). Another effect of this combination is in the form of large-scaled Agile adoption when Lean has been used in big cooperation for years while Agile is mostly used in small size firms, which is also the main goal for my research. The flexibility of a startup is considered as its advantages and can be kept with this approach.

3. Methodology

Agile is a concept, a way of thinking rather than some specific frameworks or practices which related to human behaviors and by suggestions from supervisor in depth qualitative research is chosen as the main research method. The research had 2 phases in which the first phase carried out as a literature review followed by analysis from interview data. The interviews were conducted by following a prepared guideline of questions to identify related techniques or process in case-companies' management.

3.1 Research methods

The number of references used is heavily affected by the goal of thesis and its academic level, therefore it should be an adequate number. Based on the fact that the researcher came from Vietnam and is operating in Finland, the interview cases are Finnish companies and Vietnamese companies which are accessible to contact in the existed network. Furthermore, the target companies are in different stage of growing phase so that the thesis can have a broad view of startup in this phases rather than a similar stage with a different environment. In the question list there are questions designed to describe the company and its phases status, which can map to its behaviors and problems in the later part as a method of analyzing.

As its purpose of a master thesis, this research will be stored in the University of Oulu database for future usage. Qualitative research is the research method in this study and the selection of this approach was done after reviewing the goal of the research and consulting from the supervisor. It is the type of scientific research method of observation and gathering data cannot represent in numerical forms. This approach proved to be the best for researching why and how questions of human experience (Given, 2008), which related to the above research questions. Furthermore, interviewing is the selected approach for data gathering and it can be defined as a conversation where prepared or unprepared questions are asked to draw out information. The selection of interviewee candidates and the formation of question list will be described in the following parts.

3.2 Research design and questions design

Designing the research process and question list is an important task in this research since there have not been many direct references for this topic but rather than Agile and Lean in other phases of companies. Interview growing company is also hard work because of their uncertainty, therefore the interviewees need to be chosen carefully and the question list should cover the main goals of the research.

3.2.1 Selection of references and usage

Since in the early 2000s, Agile methods have gained attention and trust from developers and managers in the field of software developments. There have been thousands of researches in this topic and most of them are accessible from the university library, which will form the list of references in the first part of this research. The focused documents are related to large-scale Agile frameworks, Lean startup, and methodologies in software development.

The initial search string was the combinations of keywords from based on the research questions, it is “ ‘Lean’ AND ‘Software development’ OR ‘Agility’ AND Lean OR ‘Agile’ AND ‘Large-Scale’ ”. The results from this search string can cover the main goal of the research but they should be filtered by other criteria. Firstly, the list of results was shortened by their origins and published time, only conferences and journal articles were chosen and must after 2001- the first time modern Agile term was defined. Secondly, title help to identify the interesting and related papers among hundreds of results. Finally, abstracts were used to exclude non-related and duplicated papers. Critical and relevant information will be noted and used following the outline of the research plan.

3.2.2 Selection of case companies and interviewee

There are several criteria for choosing the case companies for interviewing and because of the goal of the research is the Agile adoption in growing companies, all companies must be in the growing phase, or preparing to grow. As mentioned above, the term growing has different meanings, however because of this research’s scope as a master thesis and main focus is management effects of Agile practices, only growing in the number of employees is evaluated. It means that it should have more than ten employees working in the case company. The selected companies must also be in the software development industry so that the principles will not be out of context. The final decision for choosing case companies was reported to the supervisor for revision.

For each company, there was one person who can represent its operation was interviewed. As a means to conducting reliable answered the selected interviewee should be at the management level. This position helps to ensure the interviewee have enough management knowledge but also understand the technical requirements, also affected the business goals can be identified through them. Furthermore, only persons who have authority know about the future plan of the company and have rights to inform sensitive information if they have to the research. However, connecting to those persons who are in this level is not a simple task because of the limited network of the researcher.

3.2.3 Questions design

The main data collection method in this research was interviewing and the formation of question list is an important task. There are three main types of question list including: structured, semi-structured and unstructured interview. Among them semi-structure question list is the most suitable when it is open, allowing new ideas to be brought up during the interview as a result of what the interviewee says. The characteristics of

semi-structured suit for one-time-interview for each case because it helps to identify hidden information that has not come until that time.

The length of each interview was around 30 to 40 minutes, which is sufficient in this context and the scope of the research. However, there are main questions which are best to described research questions were prioritized to be asked first. The question list was formed based on the research questions, there are three main parts including clarification questions to describe company's context and interviewee's background, focused questions which created to identify how Agile and Lean methods impact the company, and optional questions based on target answers. After the interview, its record was treated as sensitive information based on the signed agreement between two sides and it will be securely stored in case there is a need for proof.

4. Data analysis and Findings

Interviewing is the data collection methodology in this research because of its advantages of exploring hidden facts and having closer looks into each case. Three interviews had been conducted in for this and the data which came from them is valuable and potential. The interviews were in English in order to have consistent of data and all of them last for 30 to 40 minutes, which is suitable to extract enough information without creating uncomfortable feeling to the interviewee and all of them were happy after the open conversation. It is interesting fact that all of the company saw this research as an opportunity for them to evaluate and improve their internal management process, therefore they are open to all questions and are willing to talk more if they had chances. This experience can claim that young companies would love to learn and improve whenever they have time, which can be seen as an attribute of Lean and Agile approach when taking feedback to allow developers to adapt to the business strategy (Giardino et al., 2014).

4.1 Background

There are similarity and dissimilarities among case companies but the main point for this selection is the fact that their business is expanding. Though three companies (Table.1) being identified in the growing phase, their progress in the phase are different from each other. The first company is in the preparing stage of growing, the second has started to grow recently and the last has been established for longer time and have grown constantly since their beginning. This explains the inequality in the number of employees, the professional processes, and the planning. The selection is well intended because it can describe broad views of entrepreneur companies and the challenges they might face while going through in this phase from the beginning. On the other hand, all of them working in the software development industry, a very competitive market, in which thousands of companies establish and go to bankruptcy every year.

Table1. General information about the company

Company (CP)	Company location	Domain of Expertise	Position of interviewee	Year of established	Number of employees
CP01	Oulu, Finland	IT consultant, education & software development	CEO Co-founder	3 years	26
CP02	Hanoi, Vietnam	Web designing and development	Designer Co-founder	2 years	6 + 3
CP03	Oulu + Helsinki, Finland	Data analyst and software development	CTO	5-6 years	20

CP01 is a young IT company in the Oulu area and their main products are the IT education service and consulting, recently they have a branch of software development in the company. They established the company in 2017 but its business has started in 2016 and during that starting year, its founders including of four people work as part-time employees. They got their first employee by the end of 2017 and since they are keeping to hire more employees because of the expanding in services and customers. Until the interviewed happened, they were having 26 people working in the company. They considered themselves as a Lean company and is affected largely with Scrum which is the most popular Agile method.

CP02 is an outsource web-designing and developing company, which take the requirements from customers to design and build. Their main pools of customers are in Vietnam, the United States and several countries in Europe. At this moment, they have 6 people working in a fulltime position and three part-time interns. Because of the huge demands from customers and the growth in the number of orders, they are having a plan to expanding in next year by hiring more people in development department while training their intern to be the official staffs. Because of the small scale and the lack of professional experience, they have not followed any Agile methodology but their working process is high in agility and affected the Lean. The process has much freedom but it seems that this style is suitable for them at the time of interviewing.

CP03 is a software development company in the construction area, which take in the raw data from documents like constructions floor plans and transforms them into visual

models. They are operating in 2 main markets which are Finland and North America and they are having plans to expand the market in the future. There are 20 people working as their employees but only 14 are working in Oulu and Helsinki while the rest are working abroad. The plan for growth is still continue as soon as they finish current projects and have more resources.

As mentioned above in the previous parts, the interviewee of this research should be in a high position who have much influence in the management process and strategic plans of the company. In these interviews, there are 2 founders and 1 CTO have been asked questions from the list, which can ensure the good quality of the answers and their interest in the topic. The representative of CP01 is its CEO and he has worked for 2 years in the IT area and total of 5 years in the field of ICT before founded his companies. In the case of CP02 is also a co-founder of the company who got 2 years this industry before in charge of head of design in her own company. Last but not least, CTO from CP03 joined the company 4 years ago, started as IT expert and manager position. During the interviews, key terms are well understood by representatives however, there were some technical terms need to be explained by the interviewer.

4.2 Data analysis method

All of the interviews were recorded and stored for evaluation before being transcript manually by the interviewer. The data analysis phase has the purpose of illuminate and interpreter gathered data into categories or groups of information (Turner, 2010). This process is content analysis which is commonly used in qualitative research because of its subjective nature of data collected for research. Its main focus is to explain the raw material, so that the surfaced and implicit meaning of the research data can be understood (Brenner, Brown, & Canter, 1985).

Content analysis could help to illustrate the research context and could be either inductive or deductive, depending on the purpose of the research. Inductive content analysis is used to describe a generic view of the phenomenon which helps to move specific data to generic data. On the other hand, deductive content analysis is used to test existed theories, therefore in this type of analyst there is commonly based theory or prior knowledge (Elo & Kyngäs, 2008). The selection of analyst approach needs to be carefully done because of these main differences and in this research the inductive analyst is a suitable method. This work focus on the behaviors and problems of growing startup companies which are affected by Lean and Agile methodologies in the growing phase while mapping them with the solution from large-scale Agile frameworks. The data of each interview is very specific and detailed information, which can be sum up as general traits. By that reason, inductive content analysis will be used as the analysis method in this research.

By addressing the analyst method of inductive content analysis, the process must go through three steps, which includes open coding, categorization, abstraction (Fig.2). Following the description that Elo and Kyngäs (2008) introduced, the researcher should first go through all the materials again to ensure to decent a understanding of each answer. Secondly, all questions should classify groups of data that are rose from the interview answers, which is an action for researcher to have a sense of the research phenomenon. Last but not least, each group will be evaluated individually before

merging similar traits into generic categories or one main category (Elo & Kyngäs, 2008).

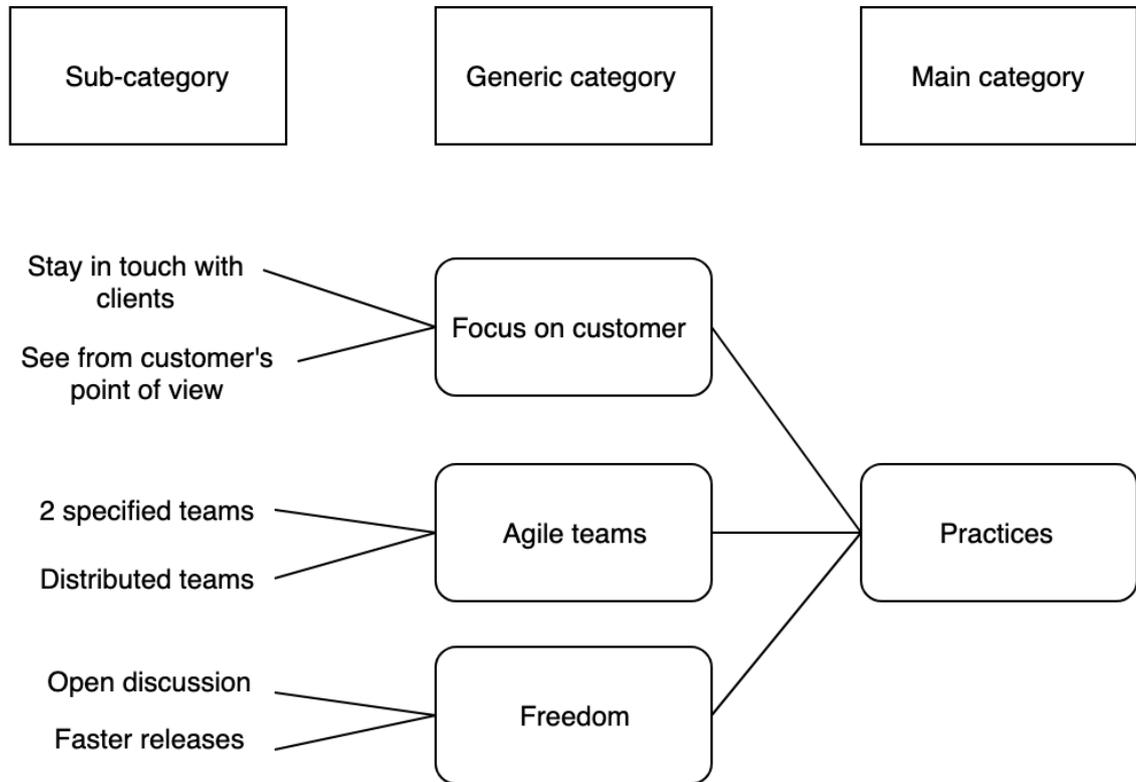


Figure 2. Defining categories (updated from Elo & Kyngäs, 2008)

In the scope of this research, those stages will be followed in a suitable approach to the size of research data. All of the answers are carefully transcript from the records by the interviewer, during this process interesting facts had been discovered and ready for the second steps of analyzing. The transcript process has three rounds of listening, in which the main idea of the answer was written down during the interview. Then in the next round, the context of those ideas will be described further and in the last round, the details information was updated and ready for the second step. The key points of each question are not written down word by word, however, when citing the answer will be rewritten exactly.

In the second step, the work had been reduced significantly since the questions in the question list had been already categorized so their answers for those questions will inherit these. There are three main categories which are the company context clarification, company management process, and situational questions since the interview form is semi-structured. From those categories, the data can be brought up the overview of the phenomenon which is the main focus of this research and will be evaluated in the next steps. In spite of the relationship among each category, they will be evaluated individually but the findings are the overall conclusion.

When answering about the context of the company, the interviewee answer often follows the flow of thinking and told about also the company process of management. This can create overlap ideas on two categories, however, the level of details are

different. Each finding can be supported by multiple answers across all interviews for creating a generic view of the data. On the other hand, with the purpose of serving to answer research questions, the findings will be divided into two sub-groups mapping with each research questions. For the first research question, recommendation and answer of the interviewee will be extracted for value information of their actions to keep the agility in the context as a Lean affected-startup. In the second research question, suggested practices will be drawn out from the problems which have been drawn out from the interview answer. Those practices certainly are advantages for organizations which adopts them especially when there have not many guidelines for scaling Agile methods (Alqudah & Razali, 2016).

4.3 How Lean startup can keep agility while growing?

In the context of software development, agility refers to the effective (rapid and adaptive) response to change, effective communication among all stockholder. The practices to keep these characteristics are identified and being called as Agile practices. With the birth of the Agile manifesto (Beck & et al., 2001), these methods are used more frequently when people saw their advantages, especially under the entrepreneur environment. However, the agility of young firms can be reduced with the growth of dependencies while they are expanding (Dikert et al., 2016) . By interviewing three companies which are in the growing phase, the research has withdrawn several strategies to maintain the flexibility of software development.

4.3.1 Customers oriented process with Lean

As mentioned above the term startup mean a small company exploring new business opportunities working to solve a problem while having the core characteristics are flexibility and quick response to change (Giardino et al., 2014). They are under constant pressure to bring their products to the market with limited resources and find a business model that allows them to survive. Many companies fail to achieve those goals, which is the reason for its shut down after a few years (Gralha, Damian, Wasserman, Goulão, & Araújo, 2018). Because of these reasons, agile methodologies have been considered as the most viable process and allowing development to fit the changing environment by using an iterative and incremental approach. Lean advocates these concepts by identify riskiest parts and provide the minimum viable product as soon as possible and deliver it to customers for early feedbacks. This process is used by all of the target companies in the research.

CP01: “We are using Agile and Lean methods, that how we develop our first service for private companies. We started to do that, we interview quite many companies and we created the first version and we went to that and ask would you buy this one. We go directly to the companies and we sent the service and asked would it worth your money. I think this the best method when coming to Agile and Lean, you rapidly created something you take feedback.”

CP02: “We find the customers from our network and online then send them a brief quotation and production of our company. If they agree to talk with us, a quick discussion we will deliver them a demo, of course with watermark, then

taking feedbacks from them to changes the design. In case, everything workout we create an agreement and signing the contract”

CP03: “We communicate a lot with the customers and we do a lot of proof of concepts. Usually, many of them never go to the implementation phase. We get feedback from customers and go iterate over that. We have continuous to finalize products so there will be never a final product, we always grow some direction at the end.”

By following this idea, startups can take advantage of the newest technologies and development tools without having problems with inheritance. This way of thinking can inspire the employees to follow the constant changes when they often prefer those technologies that can quickly adopt new requirements (Giardino et al., 2014). Furthermore, the importance of Lean in the context of limited resources need to be well understood by managers.

CP01: “We are definitely Lean startup. If you are a poor startup you have to be a Lean startup because you need to produce something to show and do not need to be finished.”

CP02: “Initially we don’t have anything, so we add another step when communicating with them. We will try to make the customer feel like we really want to work with them, we created somethings that they expected to see.”

CP03: “Usually when you having plans, we are ready to change that very quickly and test and iterate things. Even outside agile scope to see if the product can work”

The quality of the first product does not need to be flawless but it should be finished and be delivered on time with the requirements of customers. The feedback from real customers is more important than any plan. Because of that reason the involvement and the communication between two sides need to be throughout. Especially with the respecting attitude toward each other and the main goals is to improve the product in the next iteration. An interviewee confirm this by saying.

CP01: “You created something then bring to customers to get feedback to create another version until you sold something. You do not try to create completed whole product and you can try to bring product event it wasn’t finished. Create version 1 as soon as possible and then bring them to the customer.”

CP03: “It good to expose (the product) early because you will have the inputs of what works and what doesn’t work. Because if can be different from your own opinions as well.”

On the other hand, too much focusing points on the customers can be a bottleneck to the management process and decrease the development speed of the company. In the interview CP02, the interviewee said that “Customers can waste our since some customers after working on changes on the demos they just stop to work with us. And those demos can be used in future project but sometimes they are waste of time.” This show the fact that in many cases the quality involvement of the customers make the

products to be customer dependent. Developers and analysts of the company spends a lot of time to communicate with the customer, however, they are not belong to the project itself. Furthermore, in the large projects which is involvement by multiple stakeholders, the development speed is slow down by customer's hierarchical organization structure (Tuan & Thang, Dec 5, 2013).

CP03: "Large enterprise and monolith companies, usually their process is really slow and getting emails back might take weeks."

This reduce the communication rate and its efficient, resulted in poor adaptability to environment. Also, the large number of customers in a project can increase the inputs from clients such as features request and bugs reports, which requires more internal and external documents (Gralha et al., May 27, 2018). Another problem can arose from the customer side is their high expectation, which leads to failures in agreement.

CP02: "Our process depends on the customer, sometimes we spend more time to estimate the functions of the works which they want us to develop."

This prove that the agility of a company is affected heavily by the client, in some cases feedbacks from them help to improve the products and make the young firms move forward. In other cases, those steering requirement puts a lot of pressures on the startups making them less agile. As a suggestion, Lean which focusing on the value and value stream can help to avoid those problem. At the end of each iteration, features and user stories need to be validated from client's perspective, and in that discussion customer's value is emphasized. This actions help everyone to keep in their mind the presence of customer value which increases responsibility (Rodriguez et al., Jan 2014).

4.3.2 Agile specialized team composition

Time pressure and lack of resources is the reason for adopting the loose organizational structure without traditional management hierarchies in a startup. Because of this, employees must have the ability to learn from mistakes and the flexibility to adopt new roles (Giardino et al., 2014). In the growing phase, the increasing number of clients or requirements from the product make young firm motivation to hire new people. The growth in the number of employees can start problems in management for companies which are following Agile methodologies since they are mainly designed for small teams. A straight forward solution for this situation is to divide the team into sub-teams which each has different responsibilities. That is the approach used in the first company.

CP01: "We have 26 people working for us now and 18-19 focusing on IT consulting, software development and they are also taking care of services in that side. Then the rest focus on IT training education side sale development on that side."

The division is not only based on the specialization of each group but also related to the involvement and the experiences of people in that group. In CP02, they do not have many as employees as other firms but in their structure, they started to have functional teams. In the interview, founder of CP02 said that there are several interns work there as part-time employees and they were trained with basic lessons similar to the tasks of the main team before moving to work with the main team. Even with similar training, they found out that the time which requires for each intern to be capable of joining the real

tasks is different and depend on their experience and motivation. Back to CP01, in their IT consulting and development groups, their IT consultants involvement is different from its developer.

CP01: “When you doing IT consulting most people are not here in the office but on customer’s premises so they are not so strongly involved on the company software service development and sale and marketer.

On the other hands, therein lies a problem of keeping workflow continuous and inherited. CP03 they don’t use this method when they having new interns. They started to with training new employees with companies culture then move them to real tasks. They argued that this can make new employees feel being supported and this makes the growth sustainable. Also, they think that this team composition will put more burden on the communication between 2 functions of the companies and reducing it by having developers to talk to customers.

CP03: “We’d like to keep the customer close to development team because it’s important to have direct contact rather through someone else and then you have information lost”

This dividing practice can help the companies to maintain the agility while expanding, and it also helps to bring structure, discipline, and feedback into the company in next iterations. As Agile is a way of thinking rather than practices, letting the team to doing Agile practices is a good way to improve agility (Dikert et al., 2016). This is the main reason for CP01 claimed that they haven’t lost their agility. Furthermore, this is the solid background to adopt large-scale Agile frameworks even when they are not familiar with the company in this phase. But not in all cases this approach can be used, in the distributed company structure like in CP03, information lost can happen quite usually. Furthermore, misunderstanding can occur when clients don’t really understand what they want then the requirements going through mediate steps. Therefore, this practice is not appropriate for all young firms.

4.3.3 Open mind-set to changes and freedom in team

Creativity in doing management is a good characteristic that entrepreneurship should have. Despite originating in the manufactured industry then moved to the software development area, Agile practices can be adopted into other parts. Also, customizing the agile approach and practices was often seen as a necessary step in the agile implementation (Dikert et al., 2016). The managers in CP01 were very innovative when trying to adopt Scrum to the Sale team.

CP01: “We modified the Scrum a little bit especially in Sale, we don’t use timetable but use tools but in SWD we using traditional model. We tried to follow strictly as strict as possible but of course, there are small modifications but they also need to use the original.”

From the interview, it can be seen that some modifications were applied to their management process but not too many. In many cases freedom in working process and experiment can help startups to be more innovated and closer to success (Ries, 2011). They also stated that in each Scrum meeting, people are encouraged to join and promote new ideas to the projects. This makes people in the company understand Scrum and like

to practice it in daily routine, however, they left an open door for trying new methodologies when the interviewees explained the Scaled Agile frameworks for them.

CP01: “We have succeeded in creating a solid base for grow phase by using Agile and Lean method. Creating enthusiastic to people in the company. We will try to see large scale framework and do not stick with Scrum.”

Open internal discussions are also encouraged in other case companies. In the case of CP02, the similar age of employees made communication with each other is easier and they respect others opinions and suggestions. Those will be discussed weekly in team meetings and best ideas will be selected. Although CP02 does not have much understanding of the exact definition of Agile methods they still practice it because they saw its advantages. Their working process is quite linear but they already saw the problems there especially when employees were given too much freedom as they said:

CP02: “Sometimes we have no working rules as long as you can complete tasks in a given time to create comfortable feelings. However, it is not really good when it is a hard time with a lot of work.”

CP02: “Some customers would like to private chat with one of our members to the employee to do something for him or her and he/she doesn’t want our manager to know. It is a waste of time and unprofessional.”

The freedom in CP03 takes one step further when not only having open discussions but also allowing the employees to work in any place. In the company, they have around 10 people are not in the main office in Oulu but rather than Helsinki and abroad. They claimed that give their employee flexibility to the tasks as a characteristic of the Agile concept.

CP03: “We have 3-4 projects going on and we usually let everyone to grow up with every project so they not just focusing on 1 item. Usually, we gain a lot from that because some people can give different points of view and it can also increase company knowledge.”

Changes to Agile practices when applying to a specific company are unavoidable (Dikert et al., 2016). By having distributed team and to achieving goals in shorter time, CP03 hold a weekly meeting which focuses more on how to make employees feel that they are attached to the company, especially for distant members. Furthermore, the speed of each development cycle was pushed up much faster from 2 weeks to several days and they gave up traditional tracking board to use issues based tracking system. Another advantage from them is that people who responsible for other parts can well understand the new features after a development cycle.

CP03: ‘Everything is tracked with issues. The employees are very happy with those changes because everything was automated and this made more doing and less tracking. It can help marketing and manager people deal with high-level concepts.’

The approach to adopt agile practices can affect how change resistance will show (Dikert et al., 2016). For growing firms like case companies, adjustment in the working process is unavoidable and they have different techniques to minimize the unpleasant of employees to those changes. In all companies, they confirmed that members are pleased

with working rules and this can be explained by the freedom which is given to employees. The open in discussion, the creativity in adopting agile practices and pay attention to social connection is their answer. However, there are still some drawbacks and problems that haven't been solved. CP01 are saying about the unbalance workload among members in the same team while CP02 having trouble with informal communication channels with customers. These issues will be pointed out more details and will be mapped to practices from large scale Agile framework as suggestions.

4.4 Lessons from large-scale Agile Framework

Large-Scale Agile framework is the new term which has been grown recently which the trend of adopting Agile practices in big companies. The main reason for their development is the fact that the birth of hybrid methodologies combining from different techniques. Working with multiples teams having different methods and organizations is the motivation for the creation. Current approaches for scaling agile is blending Agile and Lean practices to match real industry needs (Ebert & Paasivaara, 2017). They are developed from the real case of growing traditional companies, and it is not much different in the startup scene.

From the above findings, it is proved that young firms often developed their own practices and this can help them to adopt more complex structures in the future. However, there are challenges when scaling Agile with those 'self-developed' technique and by comparing them to practices in large-scale agile frameworks, lessons can be learned to overcome those problems. This part of the research will identify those points based on previous findings and documents of different frameworks. The targets of reviewing will be the main frameworks include Discipline Agile Delivery (DAD), Large Scale Scrum (LeSS), Scaled Agile Framework (SAFe) and Spotify (Alqudah & Razali, 2016). The reason for this selection is the availability of documents in these frameworks and their popularity in the Agile community.

4.4.1 Dynamic teams composition

Large-Scale Agile frameworks are getting more and more popular due to the fact that they have good combinations of multiple development practices. Moving from classic functional team to small, cross-functional teams is the first approach that is mentioned in most of the frameworks. In the interviews with CP01 and CP02, these companies are using similar techniques team when breaking the core team into smaller teams. Small teams compositions help them to keep their agility in the growing phase, which is the crucial goal for in this state. However, both of them phase a problem with tasks dividing. Some employee who has more work than the others because they are feeling more attached to the firm.

CP01: "I think the biggest challenge that we are going to face is how we are going to get other people to involve in the development of the company. Some people are left out while others were deeply involved."

The solution to this problem can be seen in the Spotify model. Because of the business scale and market they have 30 teams over 3 cities and to keep coordination between teams, the Spotify model was developed. They keep 5 to 9 members and 1 product

owner in a small Scrum and self-organizing team called squad. In each squad, it is designed as a mini startup and has long-term missions while several related squads in 1 area will form a tribe. To solve the problems of involvement and different experience, Spotify introduced chapters and guilds. The chapter is our small family of people in the same tribe having similar skills and working the same general competency area. A guild is a group of people that want to share knowledge, tools, code and practices across multiple tribes (Kniberg & Ivarsson, Oct 2012). In this model, staffs have the freedom to choose the appropriate working process in their team and the group of product owners in all team will have the responsibility to steer the big project. Each tribe can be considered as an internal startup and this structure can help its member to be dedicated to the projects and keep innovating (Edison et al., 2015). Furthermore, with the formation of chapters and guilds, challenges in area of expertise can be overcome must faster with regular discussion and new comers have a better understanding of the technologies in the project.

On the other hand, not all young firms had multiple teams but rather a core team like the company in the third interview. CP03 claimed that they haven't faced any problem with the team composition but lessons from DAD can also be reviewed for future purpose. In DAD, Scrum life cycle is extended with Lean and Kanban methodologies. The process consists of 3 phases including inception, construction and transition phase. In each phase, different goals were set and were executed with a series of practices from a different approach. One main characteristic of DAD which can be used as an example is that it is not a prescribed method which is a goal driven process (Scott & Lines, 2016). Because of this mechanism, the core team is able to choose the process as they see fit (Alqudah & Razali, 2016). This is proved with the changes in how CP03 attitude new tasks:

CP03: "Behind everything is business needs. We always evaluate tasks from business point of views to see if it is worth doing it."

4.4.2 Enhance life cycle for continuous development

Improvement through short iterations is the main basic practices which almost all companies used when want to be Agile and Lean. In each iteration, there are experiments which have the main goal is to help discover how to build a sustainable business around the company's vision (Ries, 2011). In order to increase the information can be gathered after each experiment, some practices are introduced to improve the value of each life cycle. The CTO from the third interview answered that their companies encourage to keep track of work by issues on GitHub so that manager can steer the project follow the company's vision in high-level concepts.

CP03: "We made our cycle faster so we will usually work with small things and carry them out almost immediately."

CP03: "We pushed more items out to get feedbacks"

With the same intention to increase the amount of knowledge earned after each project, people in CP02 keep close communication with previous customers and offer them minor changes or advise free of charge. This action not only helps them to gain respect from customers but also earn experience through products which are running.

CP02: “In order to take care of the customers, after their payment, we always try a way to support them with some simple changes.”

In the scene of frameworks, creating frequent synchronization points is the techniques that they are doing (Ebert & Paasivaara, 2017). SAFe utilizes an Agile Release Train (ART) for continuous development. An ART consists of four two-week development iterations followed by three-week iterations for improvement, and this is the standard process for every team in SAFe frameworks. The outputs for each ART will be synchronized to creating harmony across multiple teams in the project. This process has several advantages is that it has a clear structure to be adopted and provide higher productivity (Alqudah & Razali, 2016). On the other hand, LeSS hold an inter-team meeting weekly with the attention of 2 representatives from each team and 1 overall Product Owners (PO). In the meeting which has duration less from 5% of a sprint duration, the PO will decide which requirements will be executed and will refine backlog items. Being developed from traditional Scrum, LeSS showed good coordination among multiple teams while maintaining fast improvement after a sprint.

By increasing the value of information gathered after each iteration, young companies have more data to steer the product to achieve their vision. There are several practices to increase that like communicating with old customers, releasing issues faster understand or having a weekly meeting for representatives from multiple teams. Regardless of which methods are being used, lessons from small changes could prevent a tremendous amount of waste down the road without compromising companies vision (Ries, 2011).

4.4.3 Well-designed training to new comers

One of the biggest challenge when scaling agile practices is the lack of training to both old and new members of the team. This situation can happen by several causes which can be a misunderstanding in agile concepts, lack of guidance or poorly customized practices (Dikert et al., 2016). The training quality can be affected by new employees attitude toward the process and their previous experience. This fact is confirmed with the interview with CP02 and they have not found a better way for that.

CP02: “The lessons are quite simple and basic so that interns can get to work as soon as possible. However some interns are very lazy, they don’t really willing to learn company process.”

Helping new people to understand and respect the value of changes and working style of the company is an approach that can improve perception for new practices. This method is used in the third company when they focus on teaching the company’s culture before giving them technical lessons. Each member can have chances to learn from their own ideas and learn from mistakes.

CP03: “We try to get them to know company culture because everything will start from there. We do not define what to do strictly and we also give people who have ideas to try them out. After each sprint, we will discuss what implementation could be used and can continue”

Trying to have better Agile adoption through training is a goal which all large-scale frameworks have. Contrast to the nature of Agile of, SAFe has a well-designed management structure that please managers and executives. Their requirements will be

fulfilled as soon as possible in a prescribed process, making the adoption of the framework requires trainers or certificated coaches (Aditya & Sapna, 2014). In LeSS, practitioners use techniques from different methodologies simultaneously in order to adopt the framework smoothly. Rigorous training is not required since this framework is extended from Scrum, however, this way of adopting will require a deep understanding of the framework for suitable usage. Therefore, there are only several companies that are recommended to provide aid on LeSS adoption around the world (Alqudah & Razali, 2016). On the other hand, Spotify framework has a more comfortable approach for training. Each squad, the smallest unit of an agile team in Spotify model, can choose their own working method that they prefer. Also with the implementing of other functional groups, developers are allowed to gain experience and to understand the company's goals sustainably and gradually. But the lack of proper training and less technical practices made it is not a perfect method for growing companies.

The similarities and differences between self-developed practices and practices from designed frameworks showed us the development of scaling agile in the software development industry. It is evolving from a way of thinking for small teams and small people into a standard for most companies which want to achieve more with same or fewer efforts.

5. Discussion

The main purpose of this thesis is to find practices that growing startup companies are using to maintain their agility. Additionally, the research also tried to find lessons from large-scale agile frameworks that can be applied in the expanding phase of young firms. In this chapter, the findings of the research are presented and discussed further along with the limitations of the research. Underlying attitude toward Lean and Agile methodologies by managers will be also discussed.

5.1 Answer to research questions

RQ1: “How LEAN startups can keep their agility when growing?”

For answering this question, the history of Lean and Lean startup concept were reviewed based on the work of Eric Ries (2011). Following with interviews with companies which defined themselves followed or inspired by the term. To achieve maximum values while having limited resources, there are 3 practices that have been found through gathered data, and they are demonstrated how keys elements of Lean is applied in real-life companies.

The first practice is always aware of the customer when developing or designing any products and give them to customers as soon as possible for having feedback to improve in next iterations. This gives them enough knowledge and information to steer the company while keeping initial vision by evaluating the assumptions which the previous version of the product based on. The second is forming agile teams based on purposes while encouraging discussion and communication. This is also a lesson that Ebert and Paasivaara (2017) stated after a review of several Agile frameworks. Furthermore, this can contribute as a success factor for the adoption of this practice in the larger scale (Dikert et al., 2016). Last but not least, openness for improvements after each iteration and having freedom in the team is the important elements to keep agility. With limited resources, it is almost impossible to deliver the perfect product for the first time but rather than change the product based on new knowledge from feedback. With an open attitude to changes and having freedom in the team, it can be self-organize and members can contribute more feeling more attached, which is also a success factor for adopting Agile practices (Dikert et al., 2016). The findings showed two main goals of recent approaches to adopt Agile in entrepreneur’s companies. The first is that reducing wastes need to be done and members have responsibility and capability to make changes to achieve that, which showed in its original concept in manufacturing industry then move to software development with combination with Agile (Rodriguez et al., 2014). The next is that the product should be developed in a customer-oriented way so that lessons can be learned during the improvement process and the commercial product can match the market’s expectations.

RQ2: “Which practices from large-scaled agile frameworks can be adopted for entrepreneur firm when expanding?”

Data from the same interview analyzing process is used to answer this question. Because of the scope of the research and with the purpose to map approach from large-scale frameworks to findings from the first research question, there are 3 practices that were concluded.

Maintaining dynamic when forming teams is the first method that many frameworks are using. This can be seen that the extension for the first practice in the answer of the previous research question when it can bring several advantages. It can help to manage the tasks in multiple distributed teams like the cases from Spotify and the third company from the interview. Members can have even more freedom along with the responsibility to have impacts on the organization business. Also, learning and innovation are promoted through sharing and communication with people sharing motivation. This can be linked to the second technique which is trying to enhance the quality of life cycle in continuous development. As one of the most important parts of the Agile structure, working through multiple iterations can help both managers and employees to visualize their ideas at a very fast pace. New assumptions are tested continuously with a valuation from many points of view to create a better version of work after every phase. However, to have a smooth working process across the whole system will require good preparation and training for everyone which is involving. A good design training actions are the final finding for the second research questions in this research. Resistance can be a challenge in adopting new practices but with by having a clear understanding of changes member will find it easier to accept that (Dikert et al., 2016), which can be done through proper training. In each team, there should be an expert in Agile who can help other members get through the transition phase and this team structure can be achieved with the idea in the mentioned finding.

Connections among findings can draw a picture about adopting Agile with a combination of practices rather than a single method is more practical in real life scenario. Practitioners need to define a set of rules which is the most suitable for their situation and can inspire other members in the organization. In order to do that, they need to see Agile as a way of thinking instead of some fixed practices or rules like in other traditional methods and help to educate the ideas to the company.

5.2 Attitude toward Lean and Agile

The terms Agile and Lean gained more interest and are more and more popular in the modern software development industry. They proved to improve the efficiency of functions in companies which apply them. In the era of digital transformation, Agile has a link with an effective transformation when it allows to enhance customer's satisfaction with quickly and smoothly launch. Furthermore, an Agile mindset can remove organization barriers to create high transparency of workflow but it will create a painful experience of transformation in big organizations (Daniel Pallozzi, 2018).

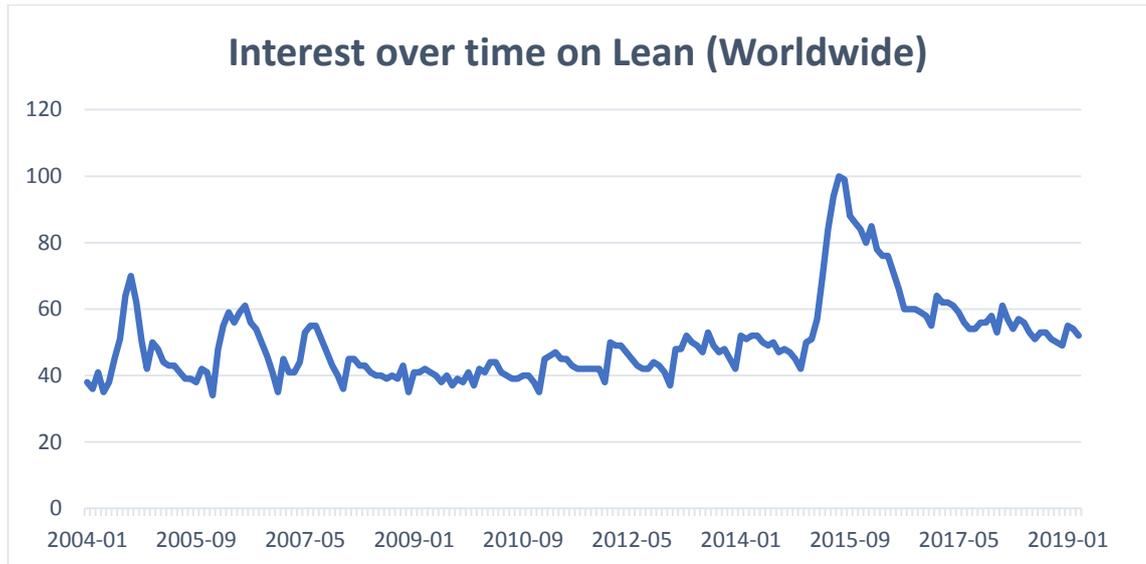


Figure 3. Search volume of “Lean” via Google Trends (Retrieved 3/2019)

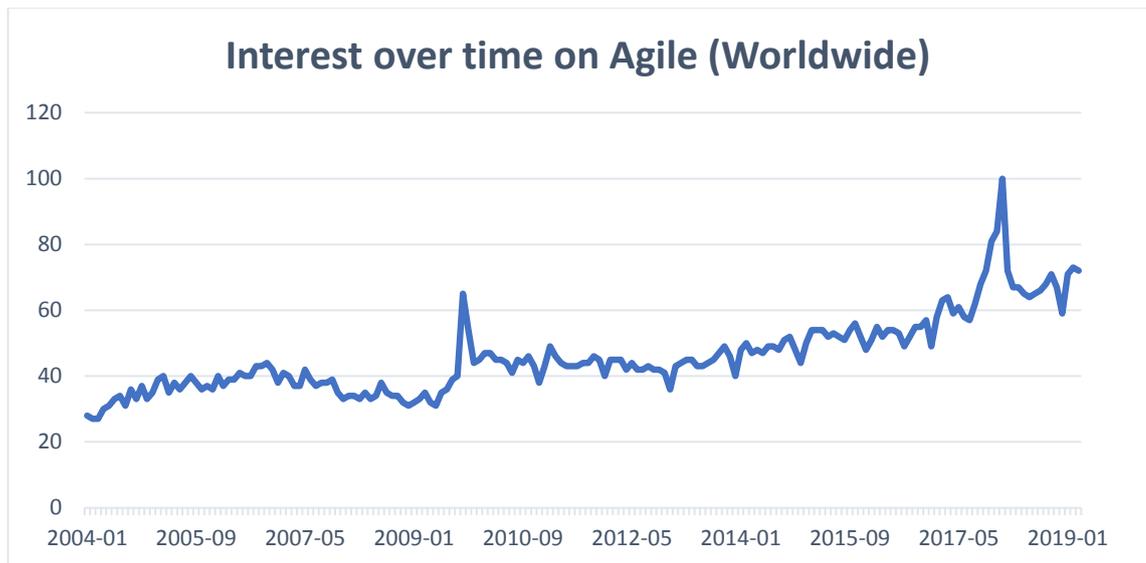


Figure 4. Search volume of “Agile” via Google Trends (Retrieved 3/2019)

On the other hand, young companies in the IT field love this idea because it suggests that a great product can be delivered without requires many resources. Even adopting Agile practices can be considered as the most viable process for startups (Giardino et al., 2014). From the interview in the research, we can deduce that all case companies are trying to do that with different approaches which depend on the company’s vision. However, reach to expanding phase keeping agility is a different story. Management process needs to be changed at that time to adapt to new requirements while original Agile practices cannot follow.

Combining new LEAN and Agile concepts, several large-scale Agile frameworks were designed with a set of practices. They offer guidelines, recommendations, and lessons for companies to bring agility into their traditional working process. These frameworks are quite popular recently because of the trend for digital transformation and customer-oriented products. But there are arguments on those frameworks and that trend based on

the initial concepts of Agile. It is defined as a way of thinking and working rather than rules and tools. Organizations do not want to do it in the hard way, they believe in courses and training to become Agile, which created the term fake Agile. This phenomenon of adopting practices only ceremonially without actually implementing them called loose coupling in institutional theory (Meyer & Rowan, 1977). Even those 'doing Agile' and 'being Agile', which means developing a new mindset, can both produce benefits but the latter is the form that great innovations and customer's satisfaction originate. In order to avoid the mistake of the wrong adoption, Pallozzi (2018) suggested that managers need to remove their traditional mindset for management and put more efforts in fulfilling technical requirements.

An unexpected finding is that not many startups have aware of the term large-scale frameworks or having serious research on that. In all 3 interviews, only people from CP03 have heard about them but all of them have not used any practices or concepts of them. When they realized that their management process can have problems while the expanding process they try to find solutions. But those well-designed frameworks is not their choice, instead, they prefer to develop their own 'in-house' practices which bring several disadvantages as mentioned above. Surprisingly, there are many similarities between these practices and those from frameworks, which can be a possible topic for future researches.

Another finding can be mentioned is the effects of working culture background in different countries to the agility of companies. Cultural factors can be seen as critical issues that influence how the teams work (MacGregor, Hsieh, & Kruchten, 2005). In this research, it can be illustrated by with the difference in problems from customer's factors between CP02 and the others. CP02 located in Vietnam and they set that their biggest challenge to keep agility is balancing between old and new customer requirements. Their customers often ask them to modify and do them 'small' favors even after the project is closed and they find it hard to refuse to those. On the other hands, none of the other companies in Finland faced similar problems but they have their own problems with employee commitment to the work or hierarchy structure. This argument indicates there will be more work to be done in a broader approach in different cultures.

5.3 Limitations

During the research, there were several limitations were identified and will be discussed in paragraphs below.

Firstly, the number of interviews and the scope of the interview was quite small to draw a big picture for answering research questions. 3 companies joined the research are software development company in web and mobile application so the information cannot describe practices of other types of company in the Information Technology industry like hardware manufacturing and services designer. Furthermore, 2 companies in Finland are located in Oulu, which is a small city, it can affect the working style and create differences in practices to other companies located in larger cities. Also the length of interviews was limited due to schedule of high level manager in those companies.

Secondly, the background of each companies have not been validated carefully. The main target to be the interviewee is companies which follow LEAN start-up guidelines, however, among 3 companies there was only 1 firm is truly follow LEAN while the rest failed to adopt it or do not have deep understanding. This might create misunderstanding for the interview questions or incorrect data, which will lead to different results and alter the outputs of the research.

Last but not least, culture differences were not considered as major factors for differences in Agile practices adoption. There are several references in this thesis mentioned about this problem, however, in the research questions related to that have not been raised to interviewee. Thus, the generation gap between experienced and young developers can also be an element making diversity in approaches.

Since this thesis have gave several suggestion and lessons for young companies in Information Technology area to maintain their agility, future work can extend the research by multiple ways. To begin, the scope of the interview can be extended quantitatively and qualitatively as interviews can be implemented with lower level managers and employees in a larger number set of firms. Next, the background of interviewees can be treated as an analysing aspect for the research. Finally, new point of view to criticise the effects of Agile need to be developed for having unbiased conclusion.

6. Conclusion

Agile, Lean and Entrepreneur are the hot terms in recent years in the software development industry. Agile and Lean describe a set of approaches which can be adopted to improve the effectiveness of development, while Entrepreneur can be understood as the formation of young firms. As mentioned above, in the growing phase manager of new companies often face challenges in maintaining agility; and this research has a goal to find out how companies are doing to solve and which lessons can be learned from designed frameworks.

There are two research questions in this research and after literature review and analyzing the interviews process they were answered. In the first questions, it asks how Lean start-up can keep their agility in the expanding phase. The results are three practices including having customer oriented lean mindset, creating Agile specialized teams, and having an open mindset and maintaining freedom in teams. These practices are adopted in three interviewed companies in different forms but they proved that young companies have their own techniques to deal with the problem. However, they still showed some disadvantages such as lack of documents, inappropriate tasks dividing, and problem in customers relationship; which is one of the main reason to have the second research question.

In the next question, it wants to know which lessons from designed large-scaled Agile frameworks can be used in the entrepreneur environment. These frameworks are designed for large organizations can have hundreds or thousands of employees and they are becoming more and more popular. Three lessons were withdrawn which are having dynamic teams composition, enhancing values of each development cycle and forming better training period. By combining these methods, young and small organizations can have more choices to deal with problems in expanding time.

However, there are arguments against these approaches when many practitioners consider Agile as a way of thinking rather than tools or set of practices. Furthermore, during the research culture differences is a factor is neglected but it can contribute to further works. Overall, the thesis delivered new perspective for solutions for keeping agility as advantages in start-ups by combining Agile and Lean, also with the references from well-designed frameworks.

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Appendix A. Questions outline in interview

Company context clarify

1. Can you describe yourself and your company and self-evaluation about the company operation ?
 - a. Year of experience in this field? Working time for this company
 - b. How long have the company operated? How many people who are working full-time in the company? Will the company have gain more customers or develop more products or hire more new people in near future?
 - c. What is the products of the company? Which stage are you think your company are in? (R&D or Growing phase).
 - d. Will the company have gain more customers or develop more products or hire more new people in near future?
2. Can you tell me your own experience with Agile and LEAN methodologies before? Can you describe them in a short sentences ?
 - a. Can you give me a short description of Agile and LEAN based on your understanding? Have you heard about the term of LEAN start-up ? Do you think it is the original idea of Agile and LEAN?
 - b. Can you tell me about your opinion toward LEAN and Agile in software development?
 - c. Do you think they will be popular methodologies in recent years and that is the reason?
 - d. How long have the company started to use these Agile and LEAN, how it start ?

Company management process

1. In which aspect do you think your company can compare to a LEAN start-up
 - a. Base on your own experience, can you described about how LEAN start-up?
 - b. Can you tell me about the similarity and differences if your company is not that type of company?
 - c. What is the practices that your company are using? Why they are used?
 - d. When the company started to use them?
 - e. Can you give me your idea about agility in software development?
2. How do you think about your company agility? How did your company stay agile ?
 - a. How did you do to keep agility of the company while growing and what is the difficult and challenges?
 - b. Do you have any breakthrough with this adoption and your comments?
 - c. What have to be changed and what need to be kept ?
3. How are you and your colleague using Agile practices? Which Agile framework or methodologies have you use?

- a. Can you describe it ? Is it a large-scale Agile framework ?
 - b. Are they doing exactly as the company guidelines? Can you describe their modifications to the original rules if have ?
 - c. Did it take long time for your colleague to get use to Agile practices?
 - d. How are the results in short term and your expectation?
 - e. If there was changes in methodologies what is the reason ?
4. Can you describe the opinion of your colleague when using them
- a. What are the advantages and disadvantages of Agile which they often think about? Are they having trouble to use them
 - b. Did they have any suggestion for that ?
5. Do you think they are helpful for your company ?
- a. Your own experience in using these practices
 - b. Do you want to have any suggestion?
 - c. What should be kept and what should be removed ?

Situational questions outline

1. Can you verify what you mean when you are saying ... ?
2. How did you do when you want to ... ?
3. What is ... from your opinions ? Is it effective ? What are the drawbacks ?
4. Do you want to ask me anything more about ... ?
5. Can I ask about the company's future plan for software engineering management strategy?