

Agile project management methods and techniques and their influence on start-ups

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of Science in International Management

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30/05/2023

Affidavit

I hereby affirm that this Bachelor's Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

The thesis was not submitted in the same or in a substantially similar version, not even partially, to another examination board and was not published elsewhere.

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Abstract

Topic: Agile project management methods and techniques and their influence on start-ups

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Content: The success of a start up company is a complex topic making it often unclear for entrepreneurs what approaches and strategies to choose in order to increase their chances of success. This thesis intended to examine how the use of agile project management affects the success of a start up. Whereas the main aim was to identify whether the use of agile project management methods and tools increases the chance of success for a start up. Qualitative research in the form of structured interviews with experts in the field of project management was conducted. The purpose was to get experience-based insights and comprehensive understanding about agile project management methodologies and their impact on startups. Additionally, a detailed literature review was performed as well. The main finding of this study indicates that, although there is no hard evidence in favor for agile project management contributing to startups success, experts have acknowledged as well as literature that flexibility, adaptability, and customer interaction are the foundation of success for start up companies which inevitably makes agile project management a significantly important factor for start up success. Furthermore, agile project management also contributes with continuous development and effective communication, making start ups better equipped to manage risks and uncertainties. It was also found that measuring success in using agile methodologies is done through customer satisfaction and achievement of set goals. The main and critical factors for successful adoption of APM can be seen as: understanding of the agile mindset, organizational culture, and the right leader who can enforce slowly and gradually the mentality of embracing the change. It became clear that the agile approach values customer feedback encouraging flexibility and adaptability among the team members making it much more beneficial for startups compared to the traditional approach where these features are missing. This thesis affirms the significant positive correlation between the implementation of agile project management methodologies and the success of start ups.

Supervisor: Eva Aileen Jungwirth-Edelmann, MA

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List of Abbreviations

PM: Project Management

APM: Agile Project Management

TPM: Traditional Project Management

WBS: Work Breakdown Structure

PERT: Program Evaluation and Review Technique

CPM: Critical Path Method

PMI: Project Management Institute

DSM: Dependency Structure Matrix

PDM: Procedure Diagramming Method

SS: Start to start

SF: Start to finish

FS: Finish to start

FF: Finish to finish

RAM: Responsibility Assignment Matrix

XP: Extreme Programming

SMBs: Small to medium-sized businesses

CSF: Critical Success Factors

PMTT: Project Management tools and techniques

1 Introduction

This section will explore two well-liked approaches of project management and how they link to startups. Since it assists organizations in adapting to the market, being more organized, and becoming competitive in today's dynamic times, the PM field has drawn considerable interest (Kiznyte et al., 2016; Kuura et al., 2014). It is believed that PM can be of the greatest priority to any organization in times when budgets are tighter, timescales are shorter, resources are fewer, and there have been significant technological advancements (PMI, 2017, p10). So, its use in start-ups will increase productivity, effectiveness, and overall success (Kuura et al., 2014).

1.1 Motivation and Cognitive Interest

The two approaches that this thesis will examine are: traditional and agile project management and their interaction with Start-ups. Traditional PM is considered to be linear since so much emphasis is placed on the project's pre-planning of the project. The project is then divided into smaller parts which are executed individually and subsequently and then brought together to complete the project (Hebert & Deckro, 2011). A wide range of sources confirm that if the tools and methods in PM are used correctly the people carrying out this project will be more proactive and efficient as the successful completion of the project is guaranteed (Mir & Pinnington, 2019; Jugdev et al., 2013; Kostalova & Tetreva, 2014; Shi & Blomquist, 2012). In order to achieve the desired results set at the beginning of the project a huge variety of traditional PM tools and methods can be applied such as for planning, scheduling, cost control, risk management, responsibilities, quality management and resource management. Such methods and tools for example Work Breakdown Structures (WBS), Gantt Charts, Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM) are used in traditional PM due to the great value they provide to a project (Garel, 2013; Jugdev et al., 2013; Milosevic & lewwongcharoen, 2004; Shi & Blomquist, 2012).

Agile project management is a methodology that promotes flexibility, which is lacking in the traditional approach, and is said to perform better in fast-moving, dynamic environments (Conforto & Amaral, 2016). The need to redo a work is eliminated, time

is saved, and employees are better able to understand what is required of them when tasks are broken down into smaller components (Kautz et al., 2014; Ciric et al., 2019). Also, because stakeholders are regularly updated on the project's status, customer satisfaction rises (Serrador & Pinto, 2015). These are a few of the factors contributing to the rising popularity of this approach, which is being utilized by a large number of technological companies (Rasnacis & Berzisa, 2015). Frequent meetings between team members and external stakeholders, clear deadlines, and tasks that are as specific as feasible owing to constant feedback are what make agile better than traditional approach (Rasnacis & Berzisa, 2015, Ciric et al., 2019).

PM techniques and tools are beneficial when engaging in entrepreneurial endeavors (Kuura et al., 2014). Early-stage businesses with low funding that are referred to as "start-ups" aim to create an unique good or service through entrepreneurial activity (Grant, 2021). The planning feature of PM and the development of a thorough business plan aid in the success of startups (Brinckmann et al., 2010). Start-ups are typically divided into three phases, the first of which is the planning phase, during which all uncertainties are handled. The market launch comes in second, while the development one comes in third (Kashyap, 2019). You may think of starting a business as a larger, more complicated project (Kuura et al., 2014). By giving entrepreneurs a clearer perspective of the market condition and enabling them to prepare relevant strategies and a long-term company's vision, planning offers them advantages both internally and externally (Kiznyte et al., 2016). Let's not forget the positive effects of start-ups on the economy development. They include technical advancement because of the new ideas they produce, more jobs, higher quality because each market participant aims to provide better products than the rivals, and more (Fritsch & Schroeter, 2010).

Although PM has been the focus of a lot of research recently, there is still a gap between theory and practical application, particularly when it comes to its interactions with start-ups (Garel, 2013; Kuura et al., 2014; Kiznyte et al., 2016). Considering the majority of these studies concentrate on the advantages and whether they result in overall success for the businesses using PM methods and tools (Jugdev et al., 2013; Milosevic & Iewwongcharoen, 2004). Project management offers a wide range of methods and instruments that can be used by any manager or entrepreneur

at any stage of the project, therefore it is essential to choose the one that is most appropriate for the situation at hand (Jugdev et al., 2013; Kostalova & Tetrevova (2014). Their practical use, particularly in terms of geographic location, organization type, area of operation, project and team size, etc., is still uncertain (Jugdev et al., 2013). Thus, an effort will be made to establish the relationship between entrepreneurial activities and their interaction with the PM area in the literature review.

1.2 Outline of the thesis

This section will discuss the primary objective and secondary objectives of the study, in addition to a number of research questions and hypothesis.

1.2.1 Main aim and secondary aims

This bachelor thesis' major objective is to examine the links between the success of new businesses and the adoption of agile project management techniques. This study's main objective is to determine whether implementing agile project management methodologies enables start ups to succeed. Additionally, the study aims to ascertain whether the development of start ups is positively correlated with the fundamental principles of agile project management, such as adaptability, flexibility, and customer interaction. By examining these correlations while searching for potential connections between both, the research seeks to uncover important insights that could assist entrepreneurs in strengthening their strategies and, as a result, having better success in the competitive start up market.

In addition to achieving our main objective, the purpose of this thesis is to accomplish a number of subsidiary objectives, which are outlined in the following paragraphs:

1. The definition of a project, project management challenges, and benefits will be reviewed to lay the foundation for this research. Additionally, the methods, techniques, and tools of traditional and agile project management will be discussed, as well as their contrasts.

2. The secondary aim will observe the concepts of startups, including their management, the stages of a startup's development, the difficulties they face, and the role of entrepreneurs.
3. The final aim of this study will highlight some benefits of using agile project management for start up. In addition, the position of the project manager will be compared and contrasted with the figure of the entrepreneur.

1.2.2 Research questions and hypothesis

In reference to the theoretical part of the study, the purpose of the thesis is to provide responses to the following research questions:

1. What are the distinguishing characteristics of a project, the measurements defining its success, and the important factors which directly influencing the accomplishment of project goals?
2. How do traditional and Agile project management methodologies differ in their specific techniques, tools, and overall approach?
3. What are the unique characteristics of start up management and specific challenges encountered during their development?
4. What are some tangible benefits for start ups from implementation of agile project management methodologies?

As a result, based on the information presented and the research questions raised, the following hypothesis has been developed:

The implementation of agile project management methodologies in start-up companies is positively correlated with their overall success, as it facilitates adaptability, efficient resource management, and rapid response to challenges while fostering an entrepreneurial mindset in project managers that further contributes to the growth and development of the start-up.

1.3 Limitations

This research will face different limitations, particularly its sample size and timeframes. However, these constraints will be minimized throughout the research process, especially with the support of an exhaustive literature review and qualitative interviews. To begin with the fact that there is an extremely huge set of scientific materials on the topic of project management and agile project management in general but the limited access of existing literature with regard to the interaction of PM with start-ups, such as journal articles or books used as secondary data for the literature review, remains to be a limitation. This specific research gap will be minimized through interviewing experts in the fields of agile project management and its implementation in startups. Due to the impossibility to conduct all interviews live, most of the interviews with experts will be conducted online. The availability of specialists, on the other hand, is a prerequisite for conducting the study, which presents yet another limitation. Additionally, the primary data collection was gathered by conducting interviews with experts in the field of project management, which has limitations because human error must always be considered. However, for the purpose of generalizing the results, the findings will be compared with the established literature. In conclusion, the time frame of the research is limited and that could affect awareness in analyzing and drawing conclusions of collected information.

2 Literature review

The literature on both traditional and agile methods for managing projects is thoroughly reviewed in this study, with a focus on the increasing popularity of APM due to its adaptable and flexible solutions. The paper aims to establish a strong theoretical foundation for future research by outlining key concepts and developments in both approaches and examining how agile methodologies impact start-up success.

2.1 Agile Project Management

An important goal for this study is to gather a comprehensive understanding of agile project management, traditional project management and all concepts associated with these two approaches. In order for this to be accomplished an outline of definition of a project, its characteristics and success metrics will be presented. Then the terms agile will be discussed in detail along with agile management and agile project management as well as the tools and techniques used in traditional and agile approaches. In conclusion, the two approaches will be compared and discussed along with a general discussion of the challenges that PM offers.

2.1.1 Definition of Project

According to the Project Management Institute (PMI, 2017), a project is a task intended to create or enhance a brand-new or already-existing good, service, or process. Projects are crucial for the growth of businesses as well as for the advancement of society and daily life (Kuura et al., 2014). According to Hornstein (2015), a project is any effort with a beginning and an end, specific goals, and a budget for implementation, personnel, and equipment. Companies that prioritize initiatives have a greater likelihood of success—even in challenging circumstances (Hornstein, 2015). Any type of organization must give projects top priority because, with proper execution of the entire process, it can only deliver benefits and foster relationships with clients and stakeholders while adding value (Jugdev et al., 2013; PMI, 2017).

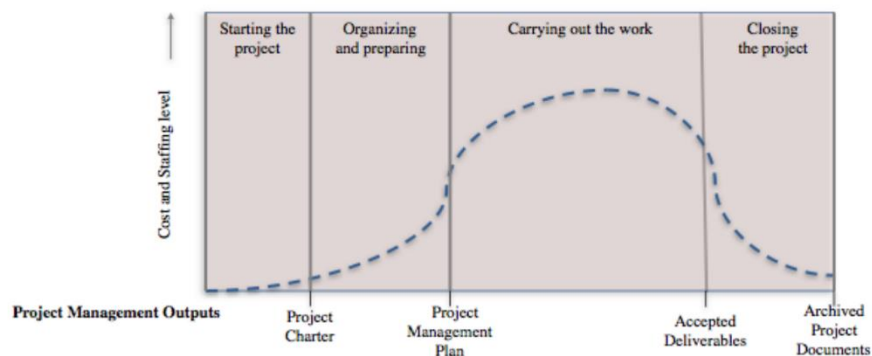


Figure 1: Project Lifecycle

Source: Kiznyte et al., 2016

As was already noted, the project has a beginning and an end also known as project lifecycle that can be observed in Figure 1 (Kiznyte et al., 2016). The entire endeavor entails the organization's allotted human capital, whose talents and resources will be used to fulfill the project's budget and effectively complete its implementation (Jugdev et al., 2013). As a result of the project's ability to create something new, it may be considered an "entrepreneurial act" (Kuura et al., 2014).

2.1.2 Project Success Factors

It is commonly argued about whether a project was successful or not. Byrde (2008) and Muller & Jugdev (2012) both cite the ability to maintain one's financial and schedule limits but still generating a product of sufficient quality as one criterion of success. Despite this, some people believe that success is a lot more complicated and diversified than just adhering to the set timeframe, budget, and quality criteria (Muller & Jugdev 2012; Mir & Pinnington 2019).

It's critical to comprehend the distinction between exceptional project management and excellent project outcomes. Throughout the course of human history, there have been numerous instances in which initiatives have been successful despite being directed by management that was either insufficient or subpar (Orouji, 2016). Effective project management can undoubtedly contribute to a project's success, but it cannot guarantee success (Orouji, 2016). According to Orouji (2016) a model Figure

2 termed "Six Sigma Implementation" is a collection of procedures that guarantees ultimate success.

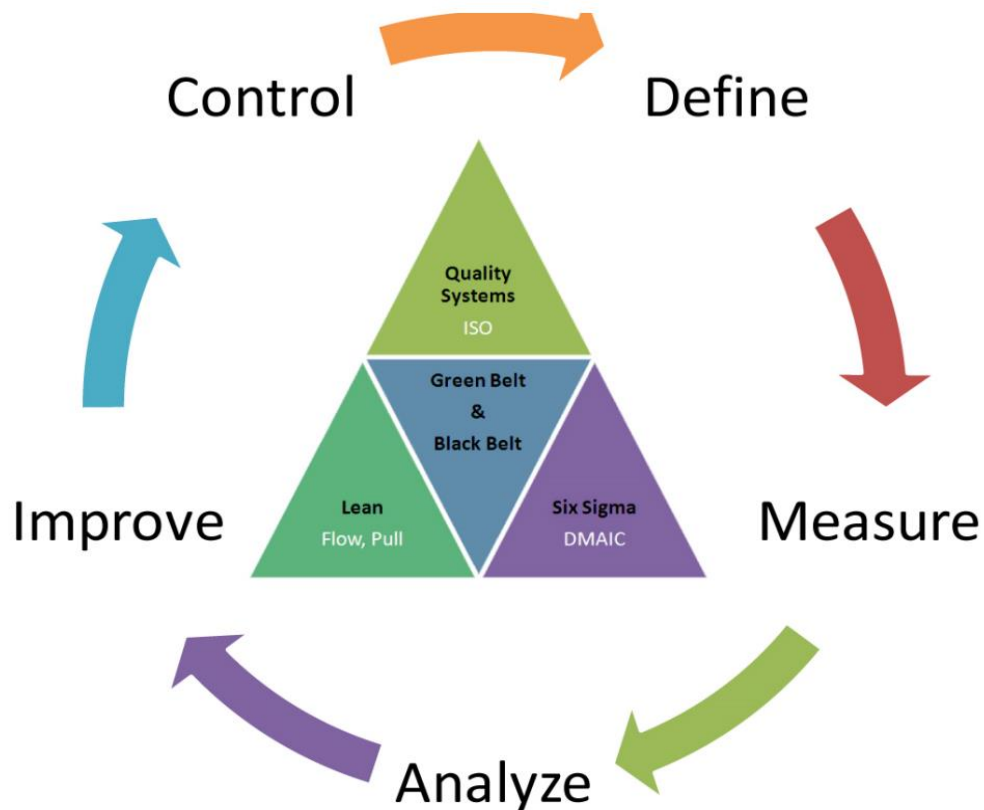


Figure 2: The structure of Six Sigma implementation

Source Oroujii, 2016

Critical success factors (CSF) are the factors, aspects or conditions that can significantly affect the final outcome of a project (Milosevic & Patanakul, 2005). In recent years, the relationship between CSFs and their interaction with outcome and project performance has been observed (Muller & Jugdev, 2012). Figure 3 presents a model which according to Alexandrova & Ivanova (2012), conducts an analysis of the link between all of these essential components involved and the final outcome.

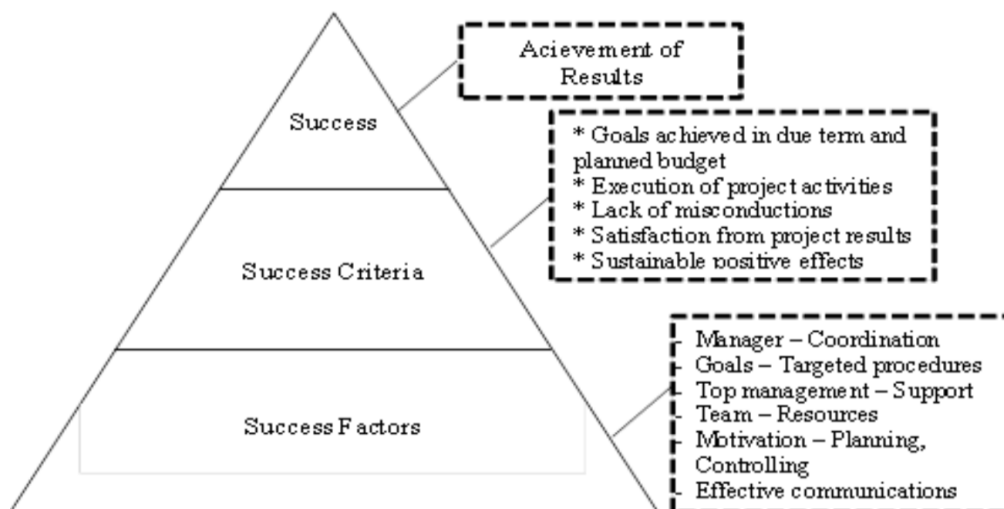


Figure 3: Conceptual model of critical success factors and project success

Source: Alexandrova & Ivanova, 2012

This model divides the relationship into three distinct groups:

1. **Success factors** which include management performance, team motivation, and communication.
2. **Success criteria** which include meeting the budget, achieving goal before deadline and customer satisfaction.
3. **Project success** which include successfully achieving set objectives.

Alexandrova & Ivanova, 2012

On a completely unrelated note, Muller and Jugdev (2012) proposed the concept that the link between the elements contributing to success and the criteria for success can be understood as dependent and independent variables. Success criteria for a project function as a dependent variable that evaluates the project's achievement or failure, (Muller & Jugdev 2012). Contrarily, the success-related aspects are seen as independent variables that affect the project and raise the possibility of success (Alias et al., 2014).

The last model that will be presented illustrates the connection between successful project completion, critical success factors, and project performance. (Alias et al., 2014). Figure 4 illustrates the exact characteristics of this relationship (Alias et al., 2014).

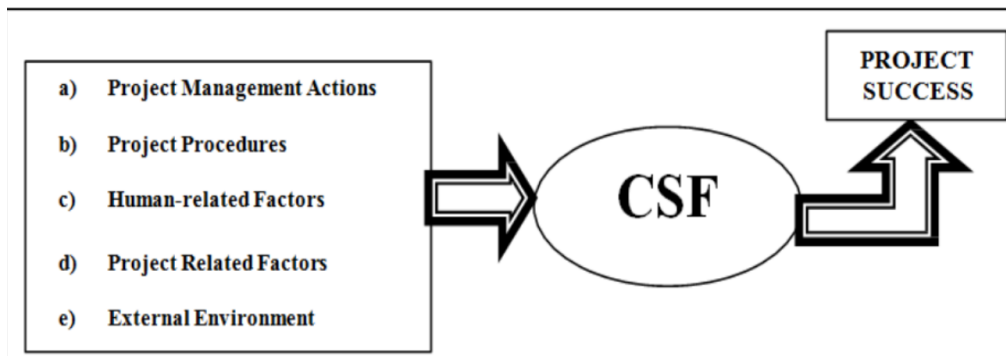


Figure 4: Variables for Project Success

Source: Alias et al., 2014

a) **Project management action** includes control and management over the task, communication with the team and clients, utilization of appropriate strategies and operations, and the establishment of a long-term organizational structure.

b) **Project procedures** is performing the tasks in relation to the phase of the project.

c) **Human aspects** include meeting the expectations of the customer, having a productive work atmosphere, frequent communication.

d) **Project related factors** include its size and complexity, resources, and the field of operations.

e) **External factors:** economic position, political and social environment, technological advancement.

Alias et al., 2014

When researchers examine the relationship between CSFs and their association with project accomplishment, the utilization of such frameworks makes it a lot easier for them to choose the appropriate material to include in their analyses (Muller & Jugdev, 2012). Researchers have attempted to create a universal model that can characterize all the most significant aspects that can have an effect on the successful completion of a project. This is even though projects, for the most part, differ very significantly from one another. (Alias et al., 2014).

2.1.3 Definition of Project Management

According to Kiznyte et al., (2016) project management is the ideal approach through which a company function successfully. PM gives the company the ability to get work done much more easily and to have extremely fast organization and communication between employees throughout the enterprise (Kiznyte et al., 2016). What makes PM really special is the fact that goals become much clearer and easier to accomplish within a fixed time and a specified budget (Kostalova & Tetreva, 2014). PM has a major role in increasing efficiency in interdepartmental working by having major merits in reducing the project time through planning and also reduces the cost of the company (Kuura et al., 2014). Budget management coupled with the creation of a well-functioning team made up of the most diverse individuals to meet deadlines and assess risks is indicative of the need and effectiveness of project management these days (Kiznyte et al., 2016). In the most general terms, the processes of initiating, planning, executing, controlling and closing are at the centre of PM as seen in Figure 5 (Kuura et al., 2014; Kiznyte et al., 2016).

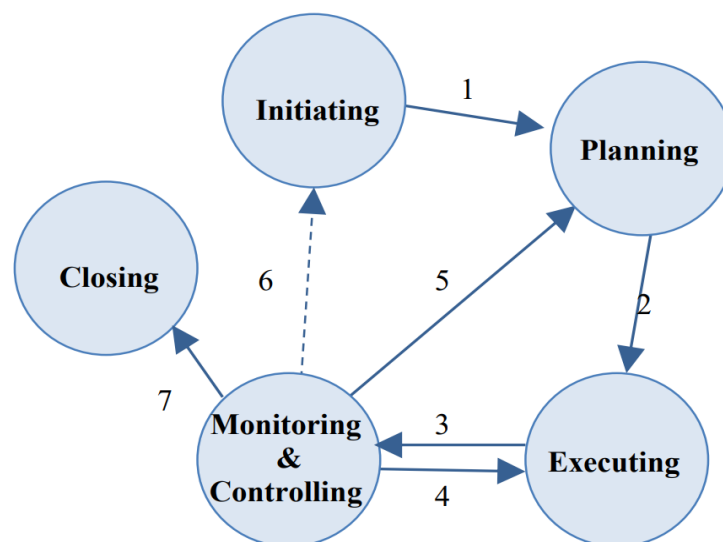


Figure 5: Different Phases of a Project

Source: Mulcahy, 2009, as cited in Kiznyte et al., 2016

Figure 5 illustrates not just all of the project's phases, but also how they relate to one another and how the project's state might suddenly change from virtually complete to the beginning phase (Kiznyte et al., 2016).

Techniques and methods in PM have the main purpose of increasing concentration, dealing with different tasks in a project team, fixing specific goals to be accomplished and are of utmost importance to deal with competition in the market (Milosevic & lewwongcharoen, 2004). One of project management techniques and tools' most crucial functions is its capacity to realize successful initiatives more effectively and efficiently. This is because PMTTs, as depicted in Figure 6, are thought to be a crucial part of the processes involved in project management (Milosevic & lewwongcharoen, 2004).

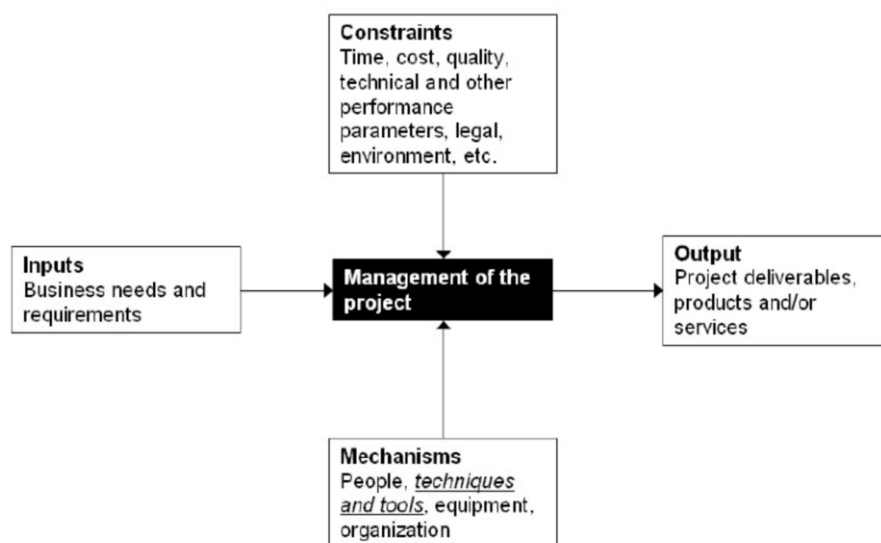


Figure 6: Project management process

Source: Milosevic & lewwongcharoen, 2004

The business environment is becoming increasingly competitive due to the fact that the majority of companies in the market are beginning to execute their strategies in the form of projects that are much more than just statistics, templates, charts and graphs (Kuura et al., 2014; Milosevic & lewwongcharoen, 2004). According to Mir & Pinnington, (2019) PM can be considered as the solution for all company owners which can offer greater success rates and reduce uncertainty. Thus, it also creates value for everyone associated with the organization, increasing efficiency and proactivity. As addition, proper implementation of PM is guaranteed to bring an edge over the competition by satisfying the needs of stakeholders and taking the most out of available resources (Milosevic & lewwongcharoen, 2004). Traditional project management can be defined as "linear" which means that the project has a clear

beginning and end then it is divided into parts and executed one after the other in sequence making it difficult to implement if a problem occurs with any of the parts (Hebert & Deckro, 2011; Weaver, 2007).

2.1.4 Definition of Agile

With the advent of the 20th century came the term agile which first began to be used in software companies. Agile is a set of guidelines and procedures that promote the execution of tasks in an innovative flexible and collaborative manner (Highsmith & Cockburn, 2001). The reason for its emergence is the inability of previous methods and techniques to succeed in meeting the needs of modern and high technology companies (Beck et al., 2001; Highsmiths & Cockburn, 2001).

The Agile Manifesto, which was released in 2001 and contains four underlying fundamental values and twelve principles for managing agile development, is regarded as the major source (Beck et al., 2001). Only the principles that are most pertinent to this study will be presented.

- **Interactions:** Agile approach does not rely heavily on any tools and instead places greater emphasis on communication between all parties in the process.
- **Best solution:** Agile methodology searches for the quickest and most effective way to generate value output for clients.
- **Customer participation:** Agile methodology promotes end-user involvement at every stage of the process. As a result, input is given continuously, and the results are those goods that are most likely to satisfy the needs of the client.
- **Flexible:** Being flexible and adaptable is highly valued by the agile methodology, which makes it possible for project teams to more easily handle any potential unexpected challenges.

Beck et al. 2001

Out of these twelve principles these are those which best suits this topic:

- Flexible and adaptive culture.
- Communication with clients.
- Given opportunity to young leaders to prove themselves
- Monitoring team's performance.

Beck et al., 2001.

2.1.5 Definition of Agile management

Agile management can be characterized as an adaptive, flexible and iterative way of managing projects, teams and organizations (Hoda et al., 2013). The main goal of this management style is to build a continuously improving and adaptive culture in the constraint organization. The idea being to make the team able to cope with uncertainties and new changes more easily (Dingsøyr et al., 2012). Figure 7 shows not only the relationship between the use of agile and the ultimate success of the project but also the potential impact it can make on the so-called moderators (Serrador & Pinto, 2015).

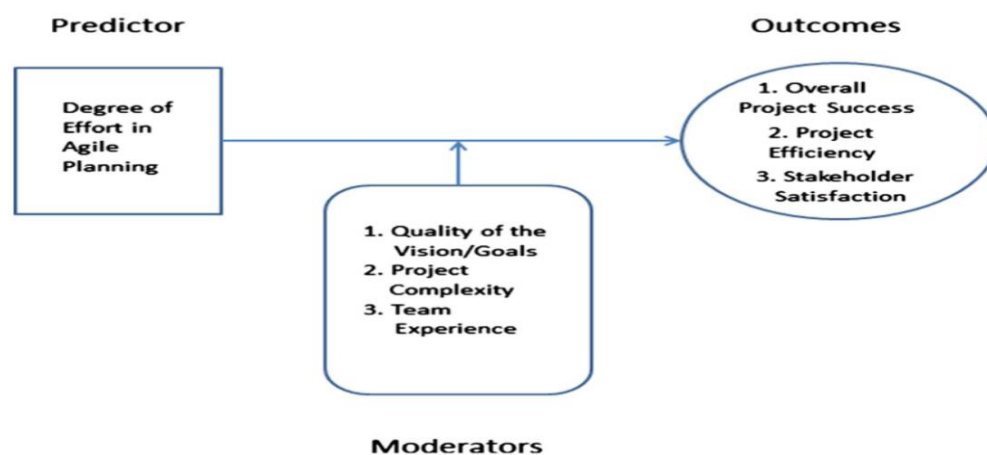


Figure 7: Relation between Agile management and success

Source: Serrador & Pinto, 2015

The main principles of agile management can be summarized as follows (Highsmith & Cockburn, 2001):

- **Self-organization and empowerment** are at the core of agile management. Team members are given more freedom to stimulate their self-confidence to start making independent decisions and accept responsibility for their actions (Moe et al., 2010). People feel more important as a result, which inspires them to work harder and accomplish the set goals. According to Moe et al. (2010), Figure 8 depicts the entire process of communication and learning that occurs within a corporation.

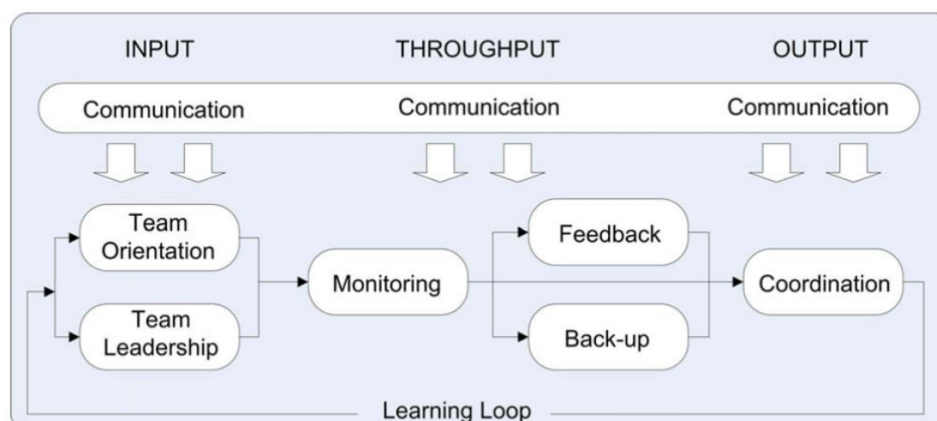


Figure 8: Teamwork model

Moe et al., 2010

- **Iterative and incremental development:** Agile management, according to Cohen, Lindvall, and Costa (2004), emphasizes making small, incremental changes to a product or service rather than striving to give a comprehensive solution all at once. This contrasts with conventional management techniques, which emphasize making significant, all-at-once changes. Teams are able to gather feedback throughout the entire project as a result, reflect on their experiences, learn from them, and make the required adjustments.
- **Continuous advancement:** Agile management encourages the team to continuously review the work to boost productivity. Long-term results are better when teams adopt this philosophy of constant development. Leadership and discipline are needed to achieve this mindset (Hoda et al., 2017).

2.1.6 Definition of Agile Project Management

The APM first came about in Manifesto 2001 and with the help of adaptive methods and tools it has managed to gain immense popularity (Kautz et al., 2014). This is the reason why the relatively new APM approach whose aim was to keep up with the new trends, be able to respond quickly to any situation and work much more efficiently in business endeavors, all things lacking in traditional PM (Boehm & Turner, 2005; Raval & Rathod, 2014). In addition, it is also claimed to rapidly improve the company implementing it as seen in Figure 9 and deal better with competition by concentrating

on efficient time allocation throughout the process and the most optimal use of resources (Raval & Rathod, 2014).

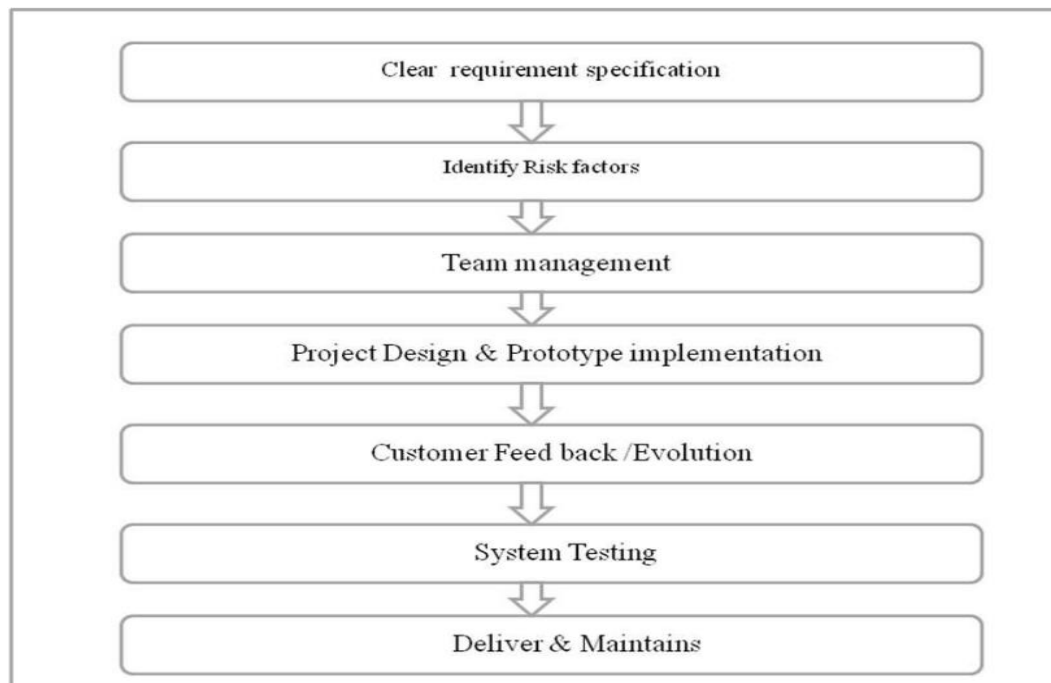


Figure 9: Steps of improvement

Source: Raval & Rathod, 2014

In terms of research in this field (Hoda et al., 2017) claims that the interest has become huge in the last 20 years as it is observed to reach the peak of research conducted in this field in the years between 2014 and 2015. Even though there is a huge interest in the field and thousands of studies done in terms of how social aspect influences APM development, and methods tools and practices yet the field is too young and there is a lot of information to collect (Hoda et al., 2017). The usage of agile methodology seeks to facilitate the assigned tasks, execute them more effectively, and reduce any

superfluous costs in order to improve the success of the organization as a whole as presented in Figure 10 (Conforto & Amaral, 2016; Sheedy and Sankaran, 2013).

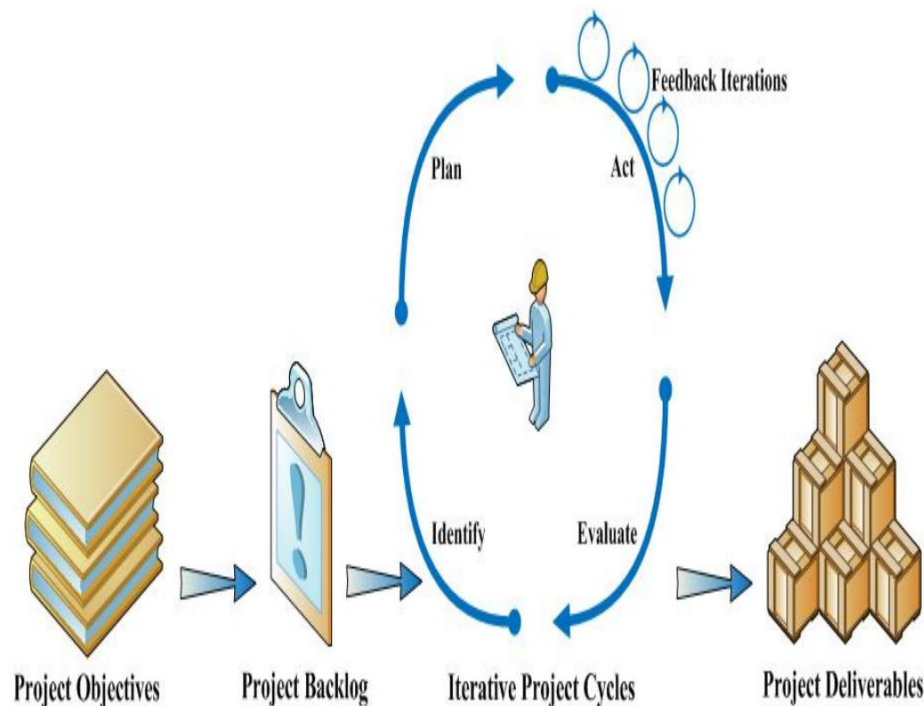


Figure 10: agile project management framework

Source: Sheedy and Sankaran, 2013

The agile method also emphasizes communication both within the team and with external stakeholders to ensure this success (Boehm & Turner, 2005). As everyone will be able to see what stage the project is in thanks to this, it also helps when issues or adjustments are thought to be rapidly fixed (Conforto & Amaral, 2016). The fact that every person involved in the project provides feedback on the procedure and this improves the final output is a huge benefit of frequent communication (Conforto & Amaral, 2016). The purpose of this feedback is to provide the team with the clearest understanding of what the requirements of the clients are (Brenchner, 2015). This is at the heart of the methodology since it allows any ambiguities or errors to be corrected early on, thus not repeating work and saving resources (Conforto & Amaral, 2016).

When tasks are performed, it is typical to break them down into smaller phases, aiming for easier tracking and control of each detail. Inevitably, all this reconstruction

of tasks makes the process lengthier and therefore requires the participants to put more attention and efficiency into doing the work, increasing proactivity (Kautz et al., 2014). The agile approach's organizational structure allows project team members more freedom, but also increases their responsibilities and restricts the project manager's authority (Conforto et al., 2014). In this case, the project manager serves as a coach, and his primary responsibility is to manage stakeholder requests so that duties may be distributed effectively, and team members can concentrate on their primary responsibilities (Conforto et al., 2014). Project status graphs accessible to team members are one way to make this information available to everyone (Conforto et al., 2014). Another even more suitable approach is to hold frequent, brief meetings to discuss the project's status and come up with solutions to any problems that are found (Conforto & Amaral, 2016). Despite the appearance that these methods can consume crucial execution time for the activities, the reality is quite different because they really boost the project's efficiency and productivity by reducing errors and the need to execute the same activity repeatedly (Kautz et al., 2014).

It is essential to select the methodologies that are suitable for the specific project because there are many that are highly distinct from one another (Brechner, 2015). Considered to be the most popular agile methodology is Scrum (Rasnacis & Berzisa, 2015). In addition to Scrum, two additional extensively utilized and well-liked techniques exist: Kanban and Extreme Programming. When agile project management first began, XP predominated, although Kanban has recently acquired prominence (Rasnacis & Berzisa, 2015; Brechner, 2015). It is crucial to choose a method that can satisfy the requirements of the business, its operations, complexity, the size and experience of the project team, as well as the specifics of the project (Rasnacis & Berzisa, 2015). The role and specifics of Scrum, Kanban, and Extreme Programming will be covered in more detail in this section.

- **SCRUM**

The characteristic of scrum is that there are 3 main positions: that of Product Owner, Scrum Master and team members (Henriksen, 2016). Product Owner is the person who wants the project and assigns it to the other participants in the process. The Scrum Master is the one who maintains constant communication with the Project Owner and navigates, controls the whole process in the project team. Project team

members are the individuals who carry out the tasks set by the Scrum Master (Henriksen, 2016).

The scrum style of project management emphasizes the importance of holding daily group meetings in addition to sprints. These so-called sprints have a duration of two to four weeks, which must be determined in advance and must be defined (Henriksen, 2016). Figure 11 illustrates the whole process starting with planning done at the beginning of each sprint, which allocates the tasks from the product backlog. These tasks are then individually assigned to ensure that their completion can be monitored, and the person responsible for the task can be held accountable in the event that deadlines are not met (Conforto & Amaral, 2016).



Figure 11: Scrum process flow

Source: Henriksen, 2016

According to Henriksen (2016), the "product backlog," "sprint backlog," and "product increment" are the most important tools that are utilized throughout the process. The product backlog stores information regarding the requirements that the product owner has outlined for the project team to fulfill in order to successfully complete a future sprint. The project that are currently being worked on can be found in the sprint backlog, and the product increment exemplifies the culmination of all of the labor that was put in throughout the sprint.

- **Kanban**

Kanban is a method that is characterized by the fact that it does not have these constraints and rigid rules as Scrum does, which makes it even more resistant to any changes that may be implemented. Kanban is the ultimate illustration of how even seemingly straightforward practices can yield astonishing outcomes in the workplace (Brechner, 2015). Because there are no sprints in this methodology, working with it is greatly simplified for everyone, and as a result, the other tasks that are necessary to initiate the entire task do not need to be ready. Instead, only this separate part can be ready, and if there is a discrepancy with the project owner's guidelines, it can be quickly fixed (Brechner, 2015). With this method, visual dashboards that are segmented into columns are assembled in order to keep track of the work that is being done. Within each column, the current state of the assigned task as shown in Figure 12. The majority of the time, the boards will highlight what activities still need to be done, the duties that have been begun, and the jobs that have been completed, which is of tremendous assistance to the participants of the project in terms of facilitating their ability to swiftly find their way about (Brechner, 2015; Henriksen, 2016). In contrast to Scrum, the Kanban technique places less emphasis on the roles of product owner and project manager. However, these positions are not eliminated entirely because daily meetings to discuss the current state of the project are held (Brechner, 2015).

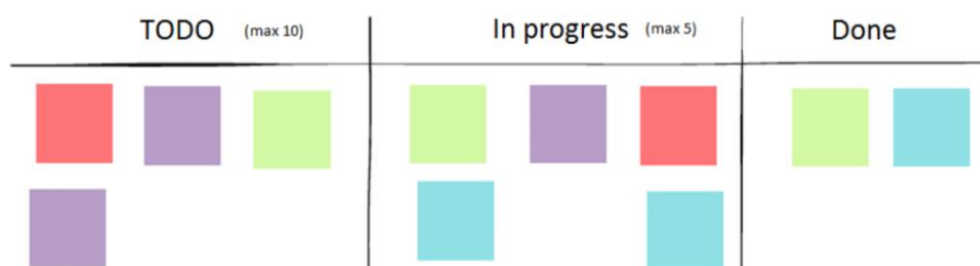


Figure 12: Kanban board example

Source: Henriksen, 2016

- **Extreme Programming**

Since team cohesion has a big impact on an organization's success, extreme programming is mostly used in the software industry. In order to accomplish effective communication, trust, teamwork, customer orientation, and other goals, this strategy must be appropriately implemented (Tolfo & Wazlawick, 2008). Its distinguishing features include feedback and quick work completion. Pair programming, which involves two developers working together on a specific project to achieve the best results as shown in Table 1, is an exciting aspect of this methodology (Tolfo & Wazlawick, 2008).

Favorable and unfavorable aspects for Team Orientation

Dimension	Favorable aspects in relation to XP	Unfavorable aspects in relation to XP
Team Orientation	<ul style="list-style-type: none"> – Team-wise tasks – Team-oriented rewarding system – Team-oriented evaluative system – Team spirit and cohesion – Balanced skills, experiences and personalities among developers 	<ul style="list-style-type: none"> – Individual-oriented tasks – Individual-oriented rewarding system – Individual-oriented evaluative system – Lack of cohesion in the development team – Unbalanced skills, experiences and personalities among developers

Table 1: Favorable and unfavorable aspects for Team Orientation

Source: Tolfo & Wazlawick, 2008

This characteristic entails more interaction with clients to better understand their needs and project objectives, in addition to greater team communication as seen in Table 2. Due to its emphasis on teamwork, communication, and customer

satisfaction, XP is typically a well-liked option for agile project management in software development (Tolfo & Wazlawick, 2008).

Favorable and unfavorable aspects for Outcomes Orientation

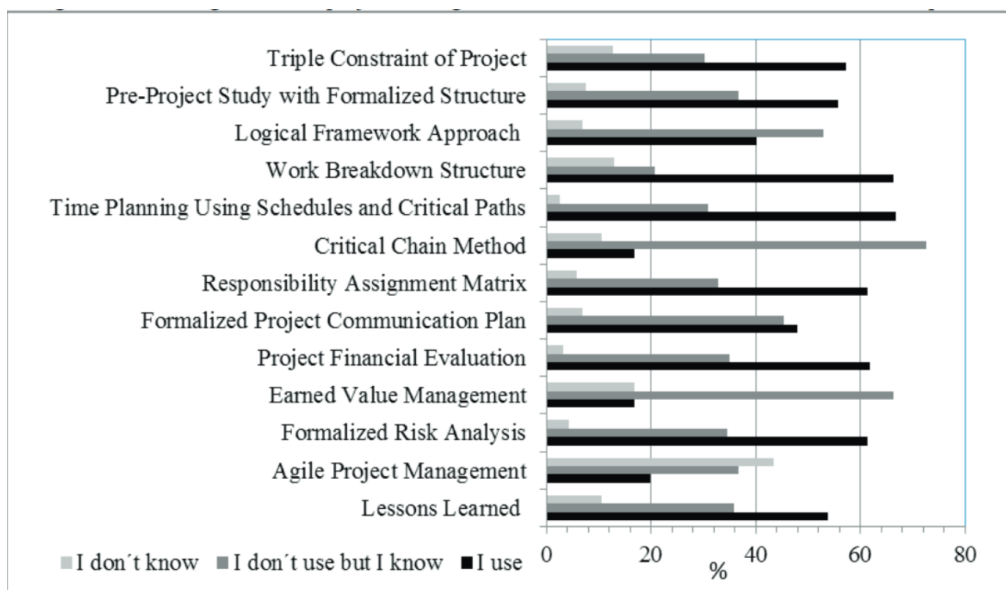
Dimension	Favorable aspects in relation to XP	Unfavorable aspects in relation to XP
Outcomes Orientation	<ul style="list-style-type: none"> – Valuation of employees – Concern with the customer’s satisfaction – Availability of material and intellectual resources to projects 	<ul style="list-style-type: none"> – Strong orientation to profitability and cost reduction in detriment to employees and customers’ valuation – Demand developers’ performance in terms of extra hours

Table 2: Favorable and unfavorable aspects for Outcome Orientation

Source: Tolfo & Wazlawick, 2008

2.1.7 Definition of Techniques and Tools

The history of PM methods dates back to the middle of the last century, and they quickly became a must-have approach for every manager (Garel, 2013). Thus, the famous PMI Institute was formed with the aim of creating a society of PM professionals while creating tools and methods that are used in all business areas as shown in Graph 1 (Garel, 2013; Kostalova & Tetreva, 2014). In one of the most well-known books (PMI, 2017) a wide variety of methods, techniques and tools are shown aiming to visually depict the outcome in every part of the project, examples are: project planning, scope, scheduling, cost control, resource efficiency, risk management, quality assessment and many more.



Graph 1: Project management tools utilization in Czech Republic

Source: Kostalova & Tetreva, 2014

According to Kostalova & Tetreva (2014) and Shi & Blomquist (2012), project management entails cost control, quality assessment, team and time management, and scheduling. In order for the successful outcome of the project, the project manager should pick the best fitting strategies, tools and techniques. To execute a project successfully, a variety of abilities are required (Hornstein, 2015; Jugdev et al., 2013; Milosevic & Iewwongcharoen, 2004). The differences between methods, techniques, and tools will be covered in this study. According to Jugdev et al. (2013), a method and technique is practice, or procedure employed in a project. On the other side, a tool is defined as support for a project's successful completion. Statistics, graphs, templates, charts, and other things are examples of tools (Milosevic &

lewwongcharoen, 2004; Kostalova & Tetreva, 2014). Table 3 gives examples of activities from the project's phases as well as a list of potential PMTTs for each.

	Conceptual	Planning	Execution	Termination
Activities	- Project selection - Team member selection	- Scheduling - Cost Estimating	- Change management	- Postmortem analysis
PMTT	- Scoring model - Decision tree - Analytical Hierarchy Process (AHP) - Project charter - Scope statement - Work Breakdown Structure (WBS)	- Critical Path Method (CPM) - Program Evaluation and Review Technique (PERT) - Scope statement - WBS - Gantt charts - Critical chain - Schedule crashing - Stakeholder analysis	- Change request - Risk log - Scope change control - Earned Value Management - Performance report	- Progress report - Postmortem review

Table 3: Examples of PMTT in different phases of a project life cycle

Source: Milosevic & lewwongcharoen, 2004

Some of the first tools in PM known to modern people are **Program Evaluation and Review Technique (PERT) Critical Path Method (CPM)** (Agyei, 2015; Hebert & Deckro, 2011). **PERT** and **CPM** first started to be used by the military eventually entering engineering projects in conjunction with already known engineering practices (Garel, 2013; Hornstein, 2015). There are now most different tools tailored to work in any phase of a project regardless of the type of project or the size of the enterprise (Fioravanti & Nesi, 2000). The idea of these tools is to gather all the available information and summarize it making it much more accessible to process and make the right decisions (Shi & Blomquist, 2012). Proper use of these tools is guaranteed to increase the efficiency and success of a project (Mir & Pinnington, 2019; Kostalova & Tetreva, 2014; Milosevic & lewwongcharoen, 2004).

- **Tools for Planning & Scheduling**

Traditional project management tools such **critical paths, work breakdown structures (WBS), project financial evaluations, the responsibility matrix, and risk assessments** are widely used (Kostalova and Tetreva, 2014). The **WBS** breaks the project into smaller, easier-to-manage pieces (Jugdev et al., 2013). It is one of the simplest PM

tools, it gives a chart for measuring progress and is widely used (Garel, 2013; Kostalova & Tetreva, 2014). **The Dependency Structure Matrix (DSM)** helps with task scheduling complexity (Shi & Blomquist, 2012). Hebert and Deckro (2011) recommend the **Procedure Diagramming Method (PDM)** for project tracking from start to start (SS), start to finish (SF), finish to finish (FF), and finish to start (FS). **Gantt charts** are used to visualize deadline-driven tasks (PMI, 2017). It forecasts project duration based on resource efficiency and activity relationships (Kostalova & Tetreva, 2014). These PM tools are critical for traditional project management because they efficiently allocate work and track progress across phases (Kostalova & Tetreva, 2014; Jugdev et al., 2013; Milosevic & lewwongcharoen, 2004; Silva et al., 2022).

- **Tools for Controlling cost & Decision making**

The use of an appropriate cost model is of utmost importance to any organization because it allows it to properly allocate its resources by forecasting a project budget and tracking the financial situation through all phases (Goh, 2005). Cost tracking is also a very important goal for tools in traditional PM (Garel, 2013). With regard to the structural viewpoint as seen in Figure 13, the modeling concentrated on constructing the model's outer shell.

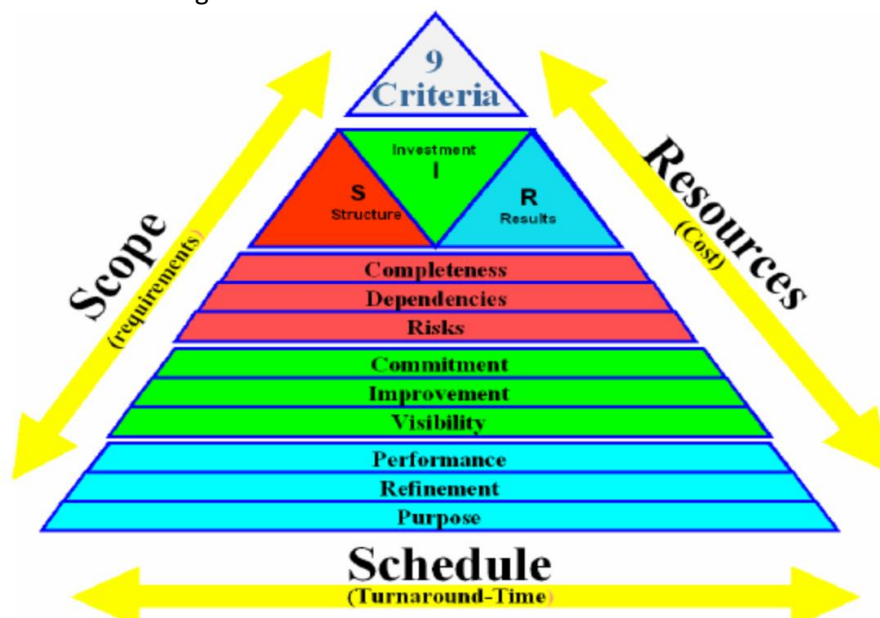


Figure 13: The Nine Criteria of Project Cost Modelling in Three Perspectives

Source: Goh, 2005

These comprise the workflow linkages (of criterion 2), the risk contingency plan (of criterion 3), and the job breakdown structure (of criterion 1) (Goh, 2005). This viewpoint is developed at the beginning of the project, before any of the work activities have been carried out. When seen from an investment point of view, the modeling concentrated on fleshing out the framework of the model with various data components (Goh, 2005). These include the improvement targets from criterion 5, the timesheet from criterion 6, and the planned cost drivers from criterion 4 (Goh, 2005). This viewpoint becomes increasingly significant throughout the course of the project's execution. Assessing the success of the project's cost management was the main goal of the modeling from the perspective of the results. The performance of real cost compared to the budget (of criterion 7), the examination of targets' attainment (of criterion 8), and the overall results (of criterion 9) are some examples of these. This viewpoint is utilized both throughout the process of actually carrying out the project and afterwards, when it is evaluated (Goh, 2005).

A very common tool for estimating risk is the **Risk Breakdown Structure** which details the potential risk into different categories and groups them from most risky to least risky (PMI, 2017). Other risk assessment tools are **probability analysis, life-cycle analysis and reliability analysis** (Jugdev et al., 2013). **Active-based costing** is another tool which provides much better results in project budget prediction than other similar tools (Milosevic & lewwongcharoen, 2004). So called decision making methods such as cost **benefit analysis, decision analysis and sensitivity analysis** aim to evaluate all possible options and choose the most appropriate one thus the project team avoids uncertainty (Jugdev et al., 2013). A tool to track and capture value is **Earn Value Management** (Milosevic & lewwongcharoen, 2004). In the executive phase of any project, it is crucial to have a detailed picture of the project situation. **Earn Value Management** is a tool that tracks the progress of the project in terms of its scope, time schedule and expected costs by comparing the work done with the planned results (Kostalova & Tetreva, 2014).

- **Tools for Implementation & Execution**

Milestones, which highlight the most crucial and significant project events so they may receive extra attention, are common tools and strategies used during the execution and implementation phases (PMI, 2017). **The Monte Carlo Simulator** is a tool that simulates the probable outcomes of a project given risk and adequate planning (Jugdev et al., 2013; PMI, 2017). **The Responsibility Assignment Matrix (RAM)** tool is used for this purpose when it becomes evident which activities should be distributed among the project participants (Kostalova & Tetreanova, 2014). According to Kostalova and Tetreanova (2014), **RAM** is distinguished by a visual representation of each person involved in the project and their roles as they can be: responsible, accountable, consulted, and informed.

There are a myriad of tools for each phase of a project (Kostalova & Tetreanova, 2014; Jugdev et al., 2013) but only their proper use in the right situation and circumstances can ensure success (Jugdev et al., 2013; Milosevic & lewwongcharoen, 2004). In conclusion, plenty of research has been performed in the field of project management, and plenty of knowledge has been uncovered. However, a gap is found between the application of theory to practice especially in its interaction with start-ups (Kiznyte et al., 2016; Garell, 2013; Milosevic & lewwongcharoen, 2004).

2.1.8 Traditional vs Agile Project Management

Table 4 compares the two approaches by grouping each approach's characteristics into a number of areas for simple reading and comprehension (Kashyap, 2018). Due to prior planning, items like budget and timelines cannot be changed, which commonly results in failure to meet deadlines and use the necessary financial resources. This is the most distinctive and undesirable element of the traditional strategy, which is also the reason it has been disregarded in favor of the agile approach (Narasimman, 2023). It has been emphasized on numerous occasions that the two techniques take fundamentally different approaches, and Table 4 outlines their primary distinctions and similarities for clarification. (Kashyap, 2018). In conclusion, the main benefits of traditional project management are well-defined and specific objectives set, easy performance tracking and an organized and detailed plan. On the other hand agile project management is more adaptable to any situation which makes it more suitable for any company (Kashyap, 2018).

<i>Characteristics</i>	<i>Agile approach</i>	<i>Traditional approach</i>
Organizational structure	Iterative	Linear
Scale of projects	Small and medium scale	Large-scale
User requirements	Interactive input	Clearly defined before implementation
Involvement of clients	High	Low
Development model	Evolutionary delivery	Life cycle
Customer involvement	Customers are involved from the time work is being performed	Customers get involved early in the project but not once the execution has started
Escalation management	When problems occur, the entire team works together to resolve it	Escalation to managers when problem arise
Model preference	Agile model favors adaption	Traditional model favors anticipation
Product or process	Less focus on formal and directive processes	More serious about processes than the product
Test documentation	Tests are planned one sprint at a time	Comprehensive test planning
Effort estimation	Scrum master facilitates and the team does the estimation	Project manager provides estimates and gets approval from PO for the entire project
Reviews and approvals	Reviews are done after each iteration	Excessive reviews and approvals by leaders

Table 4: Major differences between the Traditional and Agile project management

Source: Kashyap, 2018.

2.1.9 Challenges in Project Management

In these fast-paced times, project management faces several difficulties. Some major challenges will be identified based on the sources used, which project managers must consider if they wish to increase project success (Ciric et al., 2019).

- According to Ciric et al. (2019), one of the most complex obstacles is choosing the approach that is most appropriate among traditional, agile and other methodologies. There are benefits and drawbacks to each of the two possible courses of action. The traditional approach is most effective when applied by businesses with very clear criteria and objectives since it lays such a strong emphasis on advanced preparation (Ciric et al., 2019). Since the agile approach offers flexibility and adaptability, it may be a good solution for businesses whose requirements and scopes are prone to change over time. Traditional approaches, on the other hand, do not provide these features (Ciric et al., 2019).
- Another challenge is selecting the proper methodologies, strategies, and inputs throughout the project's phases (Jugdev et al., 2013). The best tools and approaches should be chosen, among other things, based on the size, complexity, and preferences of each stakeholder (Milosevic & Iewwongcharoen, 2004; Kostalova & Tetreva, 2014). There are a number of PMTT examples that can be utilized for projects of various sizes, as shown in Table 5.

Small	Medium	Large
- Scope statement	- Project charter	- Scoring model
- Responsibility matrix	- Gantt/milestone chart	- Project charter
- Gantt chart	- Risk response plan	- Stakeholder matrix
- Progress report	- CPM/TAD	- AHP
- -Jogging line	- Earn Value Management	- Monte Carlo
	- Progress report	- Progress report
	- Change request	- Earn Value Management
		- Milestone analysis
		- Risk log
		- Postmortem review

Table 5: Examples of PMTT in different project sizes

Source: Milosevic & Iewwongcharoen, 2004

- Start-ups and large corporations use different methods based on a number of factors such as: organisational culture, availability of resources and

company's objectives (Kuura et al., 2014). Project managers need to impose their philosophy of work and make it symbiotic with that of the organization in order to deliver maximum value (Kuura et al., 2014; Freeman & Engel, 2007).

- According to Conforto et al. (2014), agile approaches, such as scrum, are utilized extensively in today's modern technology businesses. On the other hand, its application in any kind of enterprise and field of work can be characterized as a challenge (Rasnacis & Berzisa, 2015).
- According to Hornstein (2015), integrating project management practices effectively into an organization may be difficult depending on factors including its culture and how quickly it adjusts to changing conditions. Tolfo and Wazlawich (2008) claim that the project manager needs to be aware of the possibility of cultural barriers, have a strategy for managing change, and be able to comprehend how to apply the methods and procedures that are the most appropriate in order to prevent anything like this from happening.

In conclusion, using PM comes with many difficulties such as using the most appropriate methods, techniques and tools (Jugdev et al., 2013; Milosevic & lewwongcharoen, 2004), dealing with cultural differences (Tolfo & Wazlawich, 2008), changing organizational strategy and practices abruptly and quickly (Hornstein, 2015), and communicating effectively with project participants (Bryde, 2008; Schultz et al., 1987). If the organization and the project manager are able to address these challenges then the chance of success and development of the organization increases significantly (Boehm & Turner, 2005).

2.2 Entrepreneurship and Start-ups

The second main element of this literature review is to get a comprehensive understanding of the terms start-ups, entrepreneurship and their relation with agile project management. In order for this to be accomplished, the concept of a startup and entrepreneurship, their characteristics will first be introduced. Then the correlation between project management and especially agile project management will be shown. In the end the most valuable benefits of agile project management for start-ups will be addressed.

2.2.1 Definition of Startup

A startup is a newly established commercial enterprise that is made by a person called an entrepreneur who aims to realize a new innovative idea (Grant, 2021). Startup businesses stand out because of their strong potential for growth and flexibility in responding to market nuances. New businesses typically begin with few resources and confront a variety of difficulties, including difficulties in gaining capital, attracting clients, and navigating the terrain of existing competitors (Shane and Venkataraman 2000). APM often finds its place in start-ups by streamlining processes, enabling adaptation to new challenges, and increasing the chance of success (Ciric et al., 2019; Serrador & Pinto, 2015; Hoda et al., 2017). These techniques emphasize flexibility, collaboration, and continuous improvement. This enables startups to better manage risks and uncertainties (Conforto & Amaral, 2016; Rasnacic & Berzisa, 2015).

2.2.2 Definition of Entrepreneurship

According to Shane & Venkataraman (2000), the definition of entrepreneurship is creating or recognizing an opportunity to develop an innovative good or service. Starting a new firm with the intention of achieving an already established goal is also considered entrepreneurship; nevertheless, this process requires calculated risk, bravery, and numerous hours of labor (Shane & Venkataraman, 2000). The road to starting a profitable business is not simple, though. It necessitates meticulous preparation, resource management, and execution. The first step is determining the goal and potential of the venture, then coming up with a business strategy and correctly allocating the existing resources (Kuratko et al, 2018, p. 63). One needs to be an entrepreneur to have traits like inventiveness, risk-taking, curiosity, and an alternative attitude to spot chances (Cope, 2011).

In conclusion, a strong economy depends on entrepreneurship and new firms. Business owners with the right characteristics and outlook can create cutting-edge projects that considerably enhance economic development, despite the fact that it may be a challenging process. Start-ups are an essential part of every country's corporate landscape, despite the challenges they face because of their undeniable impact on the economy.

2.2.3 Definition of Startup management and Startup phases

Managing a newly established company is incredibly difficult, demanding in terms of time investment, and complicated. According to Kiyzete et al. (2016), effective management requires not only the utilization of pertinent tools and techniques from project management but also a clear vision of action throughout all phases of growth. In addition to this, successful management requires having a crystal clear awareness of the tasks that need to be completed.

These are some key phases of startup management and phases that generally a startup is going through:

1. Ideation and Conceptualization

According to Shane and Venkataraman (2000), the stage of ideation and conceptualization is the initial phase of the start-up management process. During this phase market opportunities will be identified and then research will be done to find out if the ideas identified can be implemented (Freeman & Engel, 2007). According to Cope (2011), entrepreneurs should be aware of all the potential risks surrounding the idea and be ready to implement a set of strategies to address them.

2. Business Planning

The creation of a thorough business plan is the next step in the effective administration of a startup business. When an idea is conceived and research demonstrates that it can be implemented, it is time to begin a thorough plan for doing so (Brinckmann et al., 2010). A plan should include a plan for execution, market analysis, a detailed description of the idea, organizational structure, financial predictions, and market strategy (Kashyap, 2019). As an addition Mollick (2014), says that business plan serves as a map for development and stretch which helps entrepreneurs to present the idea and attract funding.

3. Securing Funding

Following the development of a business plan is the phase of accumulating financial resources which are critical especially for new companies (Grant, 2021). If the start-up company cannot raise the necessary capital no matter how good the business plan or idea is then realizing them becomes impossible. Angel investors, venture capital,

crowdfunding and others are ways to finance startups (Mollick, 2014). According to Fritsch & Schroeter (2010), this phase is crucial for the long-term development of a startup.

4. Execution

The business plan's implementation and related processes come into focus once adequate funding has been secured. The agile methodology aids in the process of creating and launching the product or service during this stage (Ciric et al. 2019). When utilizing the agile approach, it is important to meet the organization's expectations and perceptions as well as the project's level of difficulty, team size, and cultural variances (Tolfo and Wazlawick 2008). Excellent planning, time and resource management, and risk assessment are necessary for successful execution (Silva et al., 2022; Goh, 2005).

5. Growth and Scaling

The next phase focuses on expansion and scaling of the business (Freeman & Engel, 2007). During this phase, the organization updates its operational efficiency leading to new customers and increase in revenue (Henriksen, 2016). In order for a company to scale it has to make various changes in its management style, investment in technology or enter new markets. This phase brings long-term value to the start-up company and increases its chances of success (Rasnacis & Berzisa, 2015).

6. Continuous Improvement and Innovation

Finally, successful start-up management necessitates an unwavering dedication to the pursuit of continual development and innovation (Kuratko et al., 2018). According to Hoda et al. (2017), in order for a start-up business to remain ahead of the competition as it grows and develops, the business must continually reevaluate its strategy and procedures while also embracing new technologies and approaches.

2.2.4 Project Management in Start-ups

Well-executed planning, according to (Brinckmann et al., 2010), boosts the likelihood of a start-long-term up's success. More specifically, planning entails creating a company plan whose goal is to describe the desired results and how they will be attained (Brinckmann et al., 2010). This is by no means a simple task because it frequently requires a sizable investment, a strategy for taking on the competition, and a thorough market analysis (Kiznyte et al., 2016). Planning enables one to anticipate potential outcomes and take all necessary action. Overall, it can also be highly helpful since, when done effectively, it provides the organization with a defined path of action and attracts outside investors, increasing stability for the beginning business and team motivation (Kiznyte et al., 2016). Planning is regarded as a necessary part of any start-up company that seeks for success for these and many other reasons (Brinckmann et al., 2010). The drawback of planning is that occasionally this flexibility can be lacking, making it harder for the organization to change if there are deviations from the plan (Brinckmann et al., 2010; Kiznyte et al., 2016). Overplanning is another drawback because it can prevent an entrepreneur from missing a fantastic chance; as a result, it's critical that the strategy be flexible enough to accommodate changes (Brinckmann et al., 2010).

The relationship of PM with entrepreneurship can also be examined from the perspective of the entrepreneur and the project manager who have many more similarities with each other than one might assume (Kuura et al., 2014). The entrepreneur as well as the project manager are people having a huge responsibility towards their team as they must have strong communication skills, risk taking skills as well as being extremely disciplined and organized (Kiznyte et al., 2016). For this we can conclude that their qualities overlap. According to (Kuura et al., 2014) "when an entrepreneur creates a business plan and implements it he becomes a project manager". They should be a role model for their employees and take care of every phase of a project, from the beginning to the very end (Kuura et al., 2014). These days, the usage of PM methods and technologies is seen, particularly in software businesses that are increasingly sophisticated (Kiznyte et al., 2016). Particularly the techniques and equipment used in the abovementioned agile methodology, which allows for incredibly flexible plan execution (Kiznyte et al., 2016).

2.2.5 Benefits of Agile Project Management in Start-ups

Not all techniques are acceptable for startups. For example, traditional PM is not the best choice because it is strict and inefficient. Given the extremely fluid conditions that a startup company is subject to and a success rate of only 10% (Johnson, 2017), it is abundantly evident that outdated traditional methods need to be replaced with newer and more adaptable ones, such as those in agile project management (APM). It was said quite a few times that APM is a fantastic solution for startups as well as small and medium-sized firms (SMBs) who wish to present new goods or inventions (Sheedy and Sankaran, 2013). This is because APM encourages communication and feedback among participants.

The following subsections will go into more detail on a few of the advantages and development opportunities that SMBs can experience by implementing the strategies and tools of this approach (Novoseltseva, 2018).

- **Project Quality**

Constant testing developing, working on troubleshooting will inevitably lead to the highest quality and desired product (Novoseltseva, 2018). APM ensures this process while keeping in mind the deadlines and budget set by the client. Developing a brand-new product or service is certainly possible within the scope of a project, particularly in the context of newly established businesses (Sheedy and Sankaran, 2013).

- **Customer interaction & satisfaction**

As has already been made obvious, APM facilitates regular communication among all project participants, making it very simple for the project team to carry out the client's wishes. Regular meetings are necessary for this to happen, though (Novoseltseva, 2018).

- **Project Control**

The team that will be selected for the startup company as well as how the responsibilities will be allocated is crucial for the success of a startup company. APM allows this freedom for all participants to work with each other regardless of department or project phase. This will inevitably improve the end result and project control (Novoseltseva, 2018).

- **Minimize risks**

The APM approach provides certainty that protects the whole project from total failure as even if it cannot be completed according to the expectations of the client at least something is realized that resembles the desired (Novoseltseva, 2018). Adaptability and flexibility not only ensure the project will succeed, but also provide a timeframe and budget that can be amended to new unexpected obstacles (Novoseltseva, 2018).

In conclusion, Agile Project Management is a great strategy for startups and small to medium-sized organizations because of its dynamism, adaptability, and client-centered approach (Sheedy & Sankaran, 2013). APM's continual iterative processes ensure high project quality while promoting effective communication, fostering customer satisfaction, and maintaining project control (Novoseltseva, 2018). Moreover, APM's inherent adaptability minimizes risks by providing a safety net, ensuring that some deliverable is realized even when projects do not go exactly as planned (Novoseltseva, 2018). Therefore, the adoption of APM can significantly bolster a startup's chance of success and sustainable development (Johnson, 2017), making it a key strategy in navigating the challenging yet rewarding startup landscape.

3 Methodology

The following part will comprehensively examine the methodology used in this research. The focus will be put on the structure and organization of the thesis. Figure 14 shows the exact parts necessary for its execution.

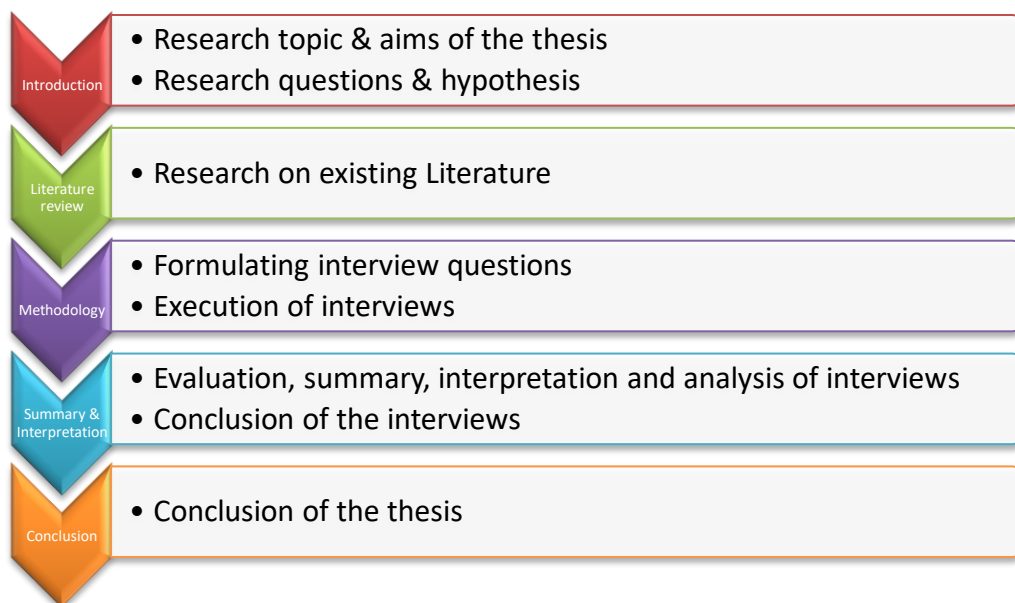


Figure 14: Structure of the thesis

3.1 Aim

This thesis' major goal is to demonstrate how agile project management has influenced the growth and success of companies. In order to help future and current entrepreneurs improve their strategies and stay one step ahead of their competition, the study seeks to establish a causal link between Agile methodology and startup success. Accordingly, several secondary aims were created to support the main objective. Furthermore, it will examine in detail the fundamental concepts of project management, its difficulties, and benefits, also the study provide an analysis between the differences of traditional project management and agile. In addition, the study will show fundamental aspects of start-up companies such as the way they are managed, their stages and the difficulties they go through. Finally, it will look at the benefits that

agile project management gives to start-up companies and compare the role of the entrepreneur and the project manager.

3.2 Research Design

According to Creswell (2014), there are 3 research methods namely qualitative, quantitative, and mixed methods. Research method is understood as a procedure that starts globally until it becomes as specific as possible and the process involves data collection, analysis, and followed by an evaluation and interpretation of the data collected (Creswell, 2014). The 3 methods differ from each other as their characteristics will be explained in detail.

- **Quantitative research** method tracks relationships between individual variables. This method most often uses short closed-ended questions when examining data. The process for collecting data is done through experiments or surveys. Therefore quantitative research method is planned and must be measured through tools that analyze statistical data.
- **Qualitative research** method is used for a deeper analysis of the topic and traces the relationships between individuals and specific social issue. This method focuses on a more complex problem and provides much more value because special attention is given to the participants. Open-ended questions are most often used to obtain information through interviews. Other procedures may be narrative research, phenomenology, grounded theory, ethnographies or case study.
- **Mixed research method** is a combination of the two methods mentioned so far which means that it collects qualitative and quantitative data. This method gives a clearer picture because of the large and varied amount of data it collects. The forms of obtaining such information are most often: convergent, explanatory sequential, transformative or multiphase. The mixed method uses open and closed questions which allows the use of a large number of data analyses also allowing the interpretation of several databases.

(Creswell, 2014)

Of the three possible methods, **Qualitative research method** was selected as the most appropriate for this thesis. Hence the different research designs that can be used in qualitative research method will be discussed in detail.

Narrative Research	This specific research design is based on humanity studies in which the researcher gathers information about the individual through their life and past experiences. Next, the researcher develops a new story and the collected stories are compared with each other or with the researcher's personal opinion and experience.
Phenomenology	In this research design the researcher gathers information through interviews with professionals in a specific field. The researcher then uses this knowledge to be able to further explain the phenomenon or event.
Grounded Theory	In this research design, the researcher establishes a hypothetical assumption regarding a specific field of interest and intends to analyze it with the assistance of examining conversations among individuals exchanging information about that topic.
Ethnography	In this research design, the researcher observes and tracks human activities or behaviours which are then analysed. If necessary, interviews can be conducted.
Case study	In this research design, the researcher observes a specific action or situation by an individual or group of people. Case studies are time limited. Therefore, the researcher must use their time wisely and use proper data collection techniques.

Table 6: List of qualitative research designs

Source: Creswell, 2014

Since this thesis requires conducting expert interviews, a **phenomenological** research design will be used. In order to gain a greater understanding of their experiences and to compare with existing literature reviews, experts in the fields of project management, agile project management, and entrepreneurship (entrepreneurs) will be interviewed.

3.3 Unit of analysis

The unit of analysis is a key component in conducting research. The main subject that will be analysed serves as the unit of analysis in the study. In our case, the study's analytical unit consists of the individuals whose characteristics will be examined (Dohn, 2020). The literature evaluation functions as the initial analytical unit in this particular thesis, and the experts who will be interviewed serve as the second. There are two subcategories for experts:

- Project Managers
- Entrepreneurs

There is no ideal technique to do research, however it is generally accepted that researchers should look for an analytical unit that preserves the context required to interpret the data (Dohn, 2020). Based on the literature review these questions were made. The role of interviews with experts serves to confirm or deny this theory and the difference with what actually happens in practice. The main purpose is to confirm or reject the importance of agile project management in start-up companies.

3.4 Construction of Questionnaire

In general, interviews are used to learn different viewpoints on specific concepts or initiatives, as well as to provide context for other data in order to create a broader narrative (Bogner et al., 2009). They have benefits and disadvantages with the advantages being clear accurate and detailed information being collected in nice atmosphere while the disadvantages being possible biased response and time consuming (Bogner et al., 2009). According to Hopf (2004) interviews can be

structured in several ways as presented in table 7 and for this research the structured interview model was chosen.

Type	Explanation
Unstructured	No pre-developed questions
Semi-structured	Pre-developed questions with room for changes
Structured	Pre-developed questions with strict execution

Table 7: Types of interviews

Source: (Hopf, 2004)

The questionnaire consist of a total of 24 questions divided into 2 parts: the first part of 7 questions aimed at gathering general statistical data about the participants. The second part of 17 questions is focused on gathering more in-depth information on the topic of project management and entrepreneurship. The questions are fully open-ended with the option of some of them being shortened and specific answer given. The use of these types of questions assists in understanding the participant's perspective without limiting their response (Bogner et al., 2009).

3.4.1 Participant Selection Criteria

An expert's knowledge is said to have an analytical framework and possess the ability to be constructive (Bogner, 2009). Expert interviews are therefore extremely important for the study. Moreover, tremendous care was taken in both choosing the interviewees and conducting the interviews. The five chosen professionals are from distinct nations and have different levels of project management expertise, different approach and viewpoint of this topic, all of which will contribute to the final results being intriguing and varied. Due to the experts' dispersed locations, live interviews cannot be conducted; instead, they are done through an online platform. Additionally, it takes one to two weeks to complete all the interviews.

3.4.2 Reflection concerning Questionnaire

1st Block - Demographics

1. What is your name?
2. What is your gender: male/female/other?
3. How old are you?
4. What is your nationality?
5. What is your occupation?
6. How long have you been working in this field (PM)?
7. What is your current workplace?

By asking these questions the aim is to find out general information about all the participants besides it is a smooth way to start interviewing someone. Moreover, these questions provide information on the background of the participants and their level of expertise.

2nd Block – PM Specific

This second block contains of 17 questions regarding project management and its relationship with startups. All questions are formulated to facilitate the collection of detailed answers for this research.

Can you briefly explain your understanding of traditional and agile project management?

This question aims to test the interviewee's basic knowledge on the topic of traditional and agile project management.

How would you describe some key differences between traditional PM and Agile PM?

Once the basic knowledge of the participants has been tested, the aim of this question is more specific and in-depth knowledge on the topic by mentioning the most important and main features that differentiate the two approaches.

What considerations do you make when choosing between traditional and agile project management for a project?

The purpose of this question is to see which factors the interviewee takes into account when choosing a methodology and to provide insights into their decision-making process.

What advantages do you see for startups in adopting agile project management methodologies?

The purpose of this question is to gain insights of which are these benefits of agile project management for startups from the perspective of the participants.

Can you share an example of a startup that has successfully implemented agile project management methodologies?

This question aims to demonstrate a real-life example of a successful start-up using or has used any agile methodology.

Could you elaborate on the difficulties you ran into when applying agile methodologies in a startup setting?

This question aims to find out what are the obstacles that startups face when adopting agile. This information could help entrepreneurs to review their strategies and overcome these obstacles.

Which methods and tools do you think a startup should employ in implementing agile project management?

The purpose of this question is to show the most important and used tools and methods in agile project management and their proper use throughout the process.

Do you think that a startup's success is mostly dependent on its capacity to adapt and be flexible?

This question seeks to see if the interviewees would find adaptability and flexibility to be important factors for the survival of start-up companies. A positive answer will immensely confirm the importance of APM to the survival and success of startup companies.

How can agile project management solve the typical issues that new businesses face?

This question aims to find out from the interviewees exactly how agile project management can help start-ups deal with day-to-day challenges.

How do you handle project uncertainties when using agile methodologies in a startup?

This question is a bit like the previous one, but what we are trying to understand is how startups deal with things like risk management and unpredictability using agile project management.

Could you elaborate on how agile approaches specifically help companies in various industries?

This question aims to see the perspective of the participants because it is known that agile methodology may not be the best approach for every industry. In addition it aims to see the benefits and application of agile in across various industries.

How crucial do you believe agile project management is to the overall success of companies, on a scale of 1 to 10?

The purpose of this question is to show the opinion of professionals about the importance of agile project management for the success of startups on a scale from 1 to 10.

What relationship exists between project management and entrepreneurial activity?

This question aims at discussing the relationship between the entrepreneur and the project manager. Whether there is one at all and if so what are the similarities and potential benefits that an entrepreneur can derive for the success of his activities.

What are the top qualities a project manager has to possess in order to use agile approaches in a startup?

The goal of this question is to establish a framework of essential competencies or characteristics for a project manager in an agile startup setting. This framework will help future project managers identify and develop the most crucial skills and abilities.

How do you measure success when using agile methodologies in a startup?

This question gives a clear picture of what success means for a startup company from the perspective of the experts interviewed. And it gives a clear idea of exactly how this success is measured and how agile methodologies contribute to it.

What advice would you give to entrepreneurs considering to implement agile project management?

This question aims to provide an experience-based insights of our participants knowledge regarding their practical work with agile and startups which could be beneficial for future business owners.

Based on your experience, what are the main elements that have an impact on the successful adoption of agile project management in startups?

In this question, as well as the one before it, we are looking for advice that is based on experience and can be put into practice to determine which aspects are the most crucial for the effective use of agile principles.

4 Summary and Interpretation of collected Data

4.1 Participant Demographics

This section will illustrate the demographics of the project management experts who decided to participate in the interviews. In addition, all experience-based information collected from the experts will be compared with the literature review.

Question Block 1

Name	Gender	Age	Nationality	Occupation	Work experience	Current workplace
Reinhard Vock	Male	49	Austrian	Senior Lecturer, Project executive	25 years	Modul University Vienna
Tsvetomir Georgiev	Male	32	Bulgarian	Agile Coach, Agile Delivery Manager, Scrum Master	5 years	DXC Technology
Aysegül Tizer	Female	39	Turkish	Senior Project manager, Agile coach	14 years	T-system Austria
Stefan Wurm	Male	43	Austrian	Project manager, Scrum master, Product Owner	15 years	Allianz Technology

Table 8: Participants of Interviews

Table 8 shows four experts in the field of project management. Unfortunately the sample size is relatively small making the information less accurate, but due to various factors and some interview being cancelled last minute, the interviews could not get more experts to participate and share their opinions. Furthermore, the professionals are divided into 3 men and 1 woman making it more in favour of the male point of

view. Regarding their age group it can be noticed that it ranges from early 30s to late 40s aiming to see if there are differences in thinking, trends, and practices in different age groups. Mixed nationalities are noticed with the idea of gathering a more comprehensive picture in the field of project management. All interviews were conducted in english and due to the lack of native english speakers, there is a small probability of some questions being misunderstood. Unfortunately, experts in the field of agile project management who have been involved in entrepreneurial activities to be able to tell from the first person whether their experience in the field of agile project management has helped the development of successful startups could not be found. The picked experts, nevertheless, have a depth of knowledge in the area and will be extremely beneficial for the objectives of this study. Some of them have experience working with startups and will discuss their experiences in the area that follows. Each response will be carefully examined, analysed, and compared with the literature review.

4.2 Summary and Interpretation

Name	Q1: Can you briefly explain your understanding of traditional and agile project management?
Vock	<ul style="list-style-type: none"> • Traditional PM approaches put planning first and try to maintain a large number of planned events. • Agile puts implementation first, with a strong emphasis on learning and efficiency in resource usage and stable group composition.
Georgiev	<ul style="list-style-type: none"> • Traditional pm as a fixed and detailed planned process. • Agile pm where an unexpected approach is rather sought to increase flexibility and client responses.
Tizer	<ul style="list-style-type: none"> • Traditional approach also known as waterfall, is a linear approach where the project starts with initiation, planning, execution, control and closure. • Agile is a changing approach which is based on adaptability and constant improvement.

Wurm	<ul style="list-style-type: none"> • Traditional everything is tried to be defined from scratch and deviations are managed in specific process. • Agile: change embracing, very close to the customer.
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Table 9: Explain traditional and agile project management

All interviewees had the same idea about traditional and agile project management. They emphasized on the characteristic of traditional approach everything to be planned and of agile where it is preferred to "embrace change". Their opinions completely matched when compared with information about both approaches in existing literature. Hence one can say that the established literature and selected experts are fully relevant and will be useful for the purpose of the study.

Name	Q2: How would you describe some key differences between traditional and agile PM?
Vock	Involve and plan first, change never or later --> deliver essentials now and grow from a sound basis.
Georgiev	Traditional approach follows a constant unchanging approach while agile encourages change.
Tizer	Different management and approach to risk, different roles and responsibilities and the lack of customer involvement in traditional and its high importance in agile.
Wurm	Agile – SCRUM – does not really have this role. At the end it's a different mindset concerning change and servant leadership.

Table 10: Key differences between Traditional and Agile PM

Regarding the key differences between the two approaches, the answers somewhat resembled those of the previous question with the emphasis being on Aysegül Tizer's answer where she elaborated in a deeper sense the differences in terms of different roles, duties and most importantly customer involvement. Compared to the literature we can say that it was repeatedly stated that agile values customer feedback very

much. Constant feedback is what makes agile better than traditional (Ciric et al., 2019), so in conclusion the experts have a clear idea of the main differences between the two approaches.

Name	Q3: What considerations do you make when choosing between traditional and agile project management?
Vock	Client expected outcome.
Georgiev	complexity of the project, its specificity, the unknown as well as the preferences of the client.
Tizer	the requirements and difficulty of the project.
Wurm	I'm just bending it towards what I think fits the situation best.

Table 11: Personal considerations between traditional and agile PM

When deciding between the two methods, the expectations and prerequisites of the customer are universally acknowledged as one of the most significant considerations to take into account. The idea of evaluating the issue first before picking a strategy was also highlighted. Some people indicated that they considered the project's difficulty as a factor for choosing an approach. Choosing a method must take into account the needs of the company, its operations, complexity, the size and expertise of the project team, as well as the particulars of the project (Rasnacis & Berzisa, 2015). It is crucial to consider requirements when selecting the best project management strategy.

Name	Q4: What advantages do you see for startups in adopting agile project management methodologies?
Vock	It is more efficient resource usage IF the overall concept supports agile PM approaches.
Georgiev	It provides faster adaptation , also learning from the mistakes, ultimate value to the user.
Tizer	Stronger relationship between client and companies through constant communication. Inevitably lead to a better end product .
Wurm	Producing what the customer wants and increasing the probability of success .

Table 12: Advantages for startups when adopting agile methodologies

Experts see various benefits of using agile project management. These include more efficient use of resources, faster adaptation, learning from mistakes, and most emphasized is the strong relationship that APM creates between the customer and the organization through constant communication and better end product. Compared to the literature, many common points are found. Constant testing developing, working on troubleshooting will inevitably lead to the highest quality and desired product (Novoseltseva, 2018). APM facilitates regular communication among all project participants, making it very simple for the project team to carry out the client's wishes (Novoseltseva, 2018). In conclusion many more benefits can be found than mentioned which makes using APM in startups a good strategy and an excellent advantage over the competition.

Name	Q5: Can you share an example of a startup that has successfully implemented agile project management methodologies?
Vock	Almost any SW relevant Startup Topic today employs agile PM structures.
Georgiev	LEGO has massively used agile practices with the scrum method , and it's brought them huge success.
Tizer	AirBnb who used agile methodologies for their continuous improvement based on customer feedback and flexibility to changing market conditions.
Wurm	EasyBooking (Tyrolean company) did create a new web app for room rentals from scratch SCRUM was chosen and contributed to the successful rollout.

Table 13: Startup implemented agile methodologies

Professionals mention as examples of successful startups some world famous companies and also a general statement that there is no relevant startup company that has not used agile methodologies. It makes an impression that the SCRUM method is the most preferred and used tool among successful startups. According to Conforto et al. (2014), agile approaches, such as scrum, are utilized extensively in today's modern technology businesses. The literature of this thesis does not provide real examples of successful companies but focuses on the importance of scrum which compared to the opinion of experts is indicative of the extreme value that this method bring among startups.

Name	Q6: Could you elaborate on the difficulties you ran into when applying agile methodologies in a startup setting?
Vock	Agile does require a strong adherence to rules and regulations and a very strict and regulated environment within the company.

Georgiev	Understanding the agile mindset and lack of knowledge . However, with proper training and continued coaching this difficulty is overcome.
Tizer	Agile mindset which is simply put embracing change . To deal with this, we need the figure of an agile coach or scrum master to teach and build agile principles in the team.
Wurm	Very good understanding of what the end target initial should look like, define the agile process that shall be used (but be also open here for changes) and follow constantly up on its implementation.

Table 14: Difficulties when applying agile methodologies in startup

Regarding the difficulties that can occur when applying of agile methodologies in startups, experts have relatively similar opinions. Two are adamant that the most important thing to overcome these difficulties is to understand the "agile mindset" and even give suggestions for dealing with this difficulty. The others suggest discipline and clear rules as well as understanding requirements of the client and incremental implementation. Compared to the literature review, project managers need to impose their philosophy of work and make it symbiotic with that of the organization in order to deliver maximum value (Kuura et al., 2014; Freeman & Engel, 2007). Hence one can say that it is important to impose the so-called agile mindset, but it also needs to be properly matched with the organizational culture in the start-up company.

Name	Q7: Which methods and tools do you think a startup should employ in implementing agile project management?
Vock	Using Scrum, KanBan or any other mayor flavor does not guarantee success any better than declaring yourself winner before the race.
Georgiev	Jira for task tracking and management, Slack for maintaining communication and Scrum or Kanban depending on the nature of the project.

Tizer	Depend a lot on the specific needs of the startup company; examples can be the most popular Scrum and Kanban boards as well as more unpopular methods like daily standup meeting , retrospectives , and user story mapping .
Wurm	Pick what the team thinks might work best ; Team needs to dare to speak up , as costs of tools is most of the time an issue for startups a free / self-hosted tool (like GitLab).

Table 15: Agile methods and tools for startups

Regarding the methods and tools in agile project management, the experts were able to point out a wide variety of different ones with a wide variety of applications. Again, Scrum and Kanban are the most mentioned, but various others are not unimportant such as: mindset, Jira - a task tracking and management tool, Slack - a communication tool, story mapping and meetings. Compared to the literature most of the mentioned are present as exception makes Jira and Slack which makes harder to understand the importance of these two tools. In conclusion it is clear that APM is not only based on complex methods and tools but also on the simplest things like constant communication and a right mindset.

Name	Q8: Do you think that a startup's success is mostly dependent on its capacity to adapt and be flexible?
Vock	Yes.
Georgiev	Yes, startups rely heavily on adaptability and flexibility.
Tizer	Absolutely

Wurm	Indeed. Most startups are venturing in new areas, and nobody can tell up front what will be needed and desired by (potential) customers.
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Table 16: Are adaptability and flexibility important for startup's success

Absolutely all experts are categorical that flexibility and adaptability are must-haves for the survival and success of a startup. APM often finds its place in start-ups by streamlining processes, enabling adaptation to new challenges, and increasing the chance of success (Ciric et al., 2019; Serrador & Pinto, 2015; Hoda et al., 2017). These techniques emphasize flexibility, collaboration, and continuous improvement. This enables startups to better manage risks and uncertainties (Conforto & Amaral, 2016; Rasnacic & Berzisa, 2015). The established literature also highlights the importance of adaptability and flexibility, making consideration of these two characteristics inevitable.

Name	Q9: How can agile project management solve the typical issues that new businesses face?
Vock	Exactly the same way that classic PM approaches face.
Georgiev	There is a need of an agile framework that focuses on dealing with uncertainties in variable.
Tizer	If agile project management is used properly it can deal with many difficulties like satisfying clients, adapting to market changes, risk and resource management etc.
Wurm	Agile allows to adapt faster on any kind of issues.

Table 17: How APM solve casual issues in startups

The question is asked in a somewhat vague way, which apparently makes the answers of selected professionals in the field unclear. The idea was to discover how APM helps with everyday challenges. However, the experts make some good points by mentioning customer satisfaction as well as quick adaptation to market changes.

Name	Q10: How do you handle project uncertainties when using agile methodologies in a startup?
Vock	Agile management requires all kinds on insights into the ends to achieve; so, without strategic layout and diligent adherence to said strategy uncertainties will become threats.
Georgiev	Agile welcomes uncertainties and dealing with them would take the form of breaking tasks down into small parts to be analyzed to prioritize the most important and constantly learning and building from the whole process.
Tizer	Using APM in a startup company way to deal with uncertainty are learning from mistakes and anticipating them leading to calculated risks and long-term good outcomes .
Wurm	Acknowledge, manage & communicate with them.

Table 18: How agile methodologies handle uncertainties

Experts agree that all kinds of insights are needed to predict and prevent these uncertainties. Other opinions are that agile brings the uncertainties closer and great benefits can be derived from some errors by extracting knowledge from the situation and applying it to the long-term calculation of next risks. According to literature, the main goal of agile management style is to build a continuously improving and adaptive culture in the constraint organization. The idea being to make the team able to cope with uncertainties and new changes more easily (Dingsøyr et al., 2012). In conclusion, it is clear how important continuous learning and team development are at the heart of dealing with uncertainties.

Name	Q11: Could you elaborate on how agile approaches specifically help companies in various industries?
Vock	By default, involve the customer , taking the customer responsible for the outcome from day 1.
Georgiev	I can't say which companies, and which sectors it would help. I can say how it would help in the form of a flexible, customer-centric approach including fast delivery and frequent feedback .
Tizer	agile approach can find its place in most different industries, starting from software development where it actually started. will become more and more popular and preferred approach in healthcare, retail, finance and banking and manufacturing
Wurm	At the end agile increases, the probability of building what's really needed which defines success. Combined with the fail fast approach it can show early whats possible and adjust accordingly – increasing success.

Table 19: Implementation of APM in various industries

Only one of the four experts gives a specific answer for which industries and how an agile approach would help. The others base their answer on the already established features of APM, while Aysegül Tizer gives predictions for the use of agile in areas such as healthcare, banking, retail, and manufacturing. To compare with the literature, it is clear that apart from the technology sector, it is not very clear how other sectors will be able to implement agile. According to Conforto et al. (2014), agile approaches, such as scrum, are utilized extensively in today's modern technology businesses. On the other hand, its application in any kind of enterprise and field of work can be characterized as a challenge (Rasnacis & Berzisa, 2015).

Q12: How crucial do you believe agile project management is to the overall success of companies, on a scale of 1 to 10?

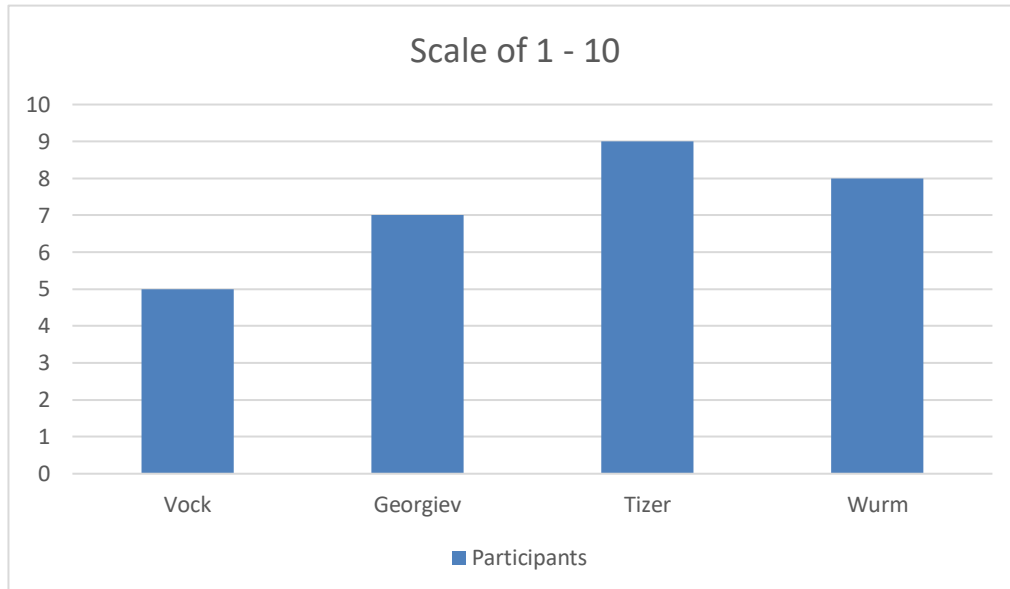


Figure 15: How important is APM for startups on a scale of 1 - 10

Experts' opinions on the importance of APM to a startup's ultimate success are mixed. Some say that there is not enough knowledge about the use of this approach and was also only a small part for the whole complex success of a startup company. On the other hand, there is a strong opinion about the importance of this approach and the strong relationship it makes between the client and the company. The literature defends the side about the importance of APM in startups. Although there is no hard evidence in favor for APM contributing to startups success, experts have acknowledged as well as literature that flexibility, adaptability and customer interaction are the foundation of success for startup companies which inevitably makes agile project management an important factor for startup success.

Name	Q13: What relationship exists between project management and entrepreneurial activity?
Vock	A project client and project delivery one.

Georgiev	Similar characteristics: both organize resources, manage risk and try to ultimately provide some value to the market or their customers.
Tizer	Entrepreneurs to act as project managers. The two roles have similar activities such as leading a team, resource management, and formulating goals and a plan to meet them.
Wurm	I think they are interlinked heavily – especially in a startup context. Each can have a big impact on the other constantly.

Table 20: Relationship between project manager and entrepreneur

Experts strongly believe that there are huge similarities between the role of a project manager and an entrepreneur. They share about the similar elements of their work such as leadership skills, organizing resources, calculating risk and planning and executing a goal. Of course, there are many other similarities between the two roles with a whole section in the literature focusing on the commonalities between the roles. The entrepreneur as well as the project manager are people having a huge responsibility towards their team as they must have strong communication skills, risk taking skills as well as being extremely disciplined and organized (Kiznyte et al., 2016). In conclusion, we can say that the two roles do have a lot in common and most likely there is a high chance that successful entrepreneurs have at least some basic project management knowledge.

Name	Q14: What are the top qualities a project manager has to possess in order to use agile approaches in a startup?
Vock	Curiosity and willingness to learn.
Georgiev	Problem-solving, critical thinking, adaptability, empathy and excellent communication.

Tizer	problem-solving, creativity, leadership, strong communicator
Wurm	Agile mindset, embrace change, communicate heavily, understand challenges.

Table 21: Top qualities project manager has to possess to use agile in startups

The selected experts listed a wide variety of qualities that a project manager should have for his successful use of agile methodologies. They don't appear to be anything exceptional at first, yet these are traits that not everyone is born with and not everyone is able to cultivate. The literature mentions a copious variety of qualities some of which are present others not. We can conclude that since the relationship between project manager and entrepreneur has remained, and just as not everyone is born and can be an entrepreneur, not everyone could perform the duties of a project manager.

Name	Q15: How do you measure success when using agile methodologies in a startup?
Vock	In goals delivered. Any numeric KPI measurement will find its limits sooner than later.
Georgiev	success is measured by the final product if it is what the client expected then the score is very high.
Tizer	An indicator would be customer satisfaction and ability to learn and adapt .
Wurm	Per definition is ' produce working software ' but I prefer: acceptance by customer

Table 22: Measure success in agile methodologies

Absolutely all experts point to whether the goal has been achieved as the most accurate measure of whether agile methodologies have done its job. Also the ability to learn is also highly valued along with customer satisfaction which can be expressed in the acceptance of the product by the customer which means that even if it is not entirely what he expected as long as he accepts it is considered a success. Established literature state that APM's continual iterative processes ensure high project quality while promoting effective communication, fostering customer satisfaction, and maintaining project control (Novoseltseva, 2018). As a conclusion, it is clear that the most accurate measure of whether agile methodologies have supported startup success is customer satisfaction and final outcome.

Name	Q16: What advice would you give to entrepreneurs considering to implement agile project management?
Vock	Just do; control and revise strategy often, analyse the delivery content accordingly and invest heavily into knowledge management .
Georgiev	First familiarize yourself with the agile mindset then take small steps and with constant training of your team things will get better.
Tizer	Be patient with the whole process because this cultural shift takes time .
Wurm	Just do it but take it seriously and don't give up easily.

Table 23: Advice regarding implementation of APM in startups

The main advice the experts give is to simply act and not give up regardless of the difficulties. Other expert opinions include familiarity with the agile mindset and its gradual adaptation into the team and the culture of the organization, also patience because these cultural changes take time. The established literature does not provide advice or suggestions for these insights are of utmost importance. In conclusion to achieve results action is needed.

Name	Q17: Based on your experience, what are the main elements that have an impact on the successful adaption of agile project management in startups?
Vock	Missing knowledge and missing discipline.
Georgiev	Culture in the organization plays a key role as well as the proper understanding of agile principles and methodologies.
Tizer	Right leadership and constant communication to enforce the agile mindset among the team.
Wurm	An open culture to be agile with the agile processes and a strong leader that pushes it relentlessly.

Table 24: Main elements for adoption of APM in startups

The selected experts have similar opinions on what are the elements that have an impact on the successful adoption of APM. Giving lack of knowledge and discipline, proper understanding of agile principles and methodologies , organizational culture and lack of a leader to enforce these principles as main points that stop the adaptation of agile project management in startups. With the right know-how and the willingness to use agile approach, the factors that have an impact on the successful adoption of APM will bring long term benefits to the copmany rather than making any compromises to enforce them.

5 Conclusion

The main purpose of this bachelor thesis was to identify whether the use of agile project management methods and tools increases the chance of success for a start-up company. The study also aimed to determine whether features such as flexibility, adaptability, and customer interaction are valuable and promote start ups development. This study also intended to provide a comprehensive understanding of the project management industry and its advantages for startups so that entrepreneurs and business owners may profit from it, optimize their strategies, and perform better in the challenging startup environment.

The main finding of this study indicates that, although there is no hard evidence in favor for APM contributing to startups success, experts have acknowledged as well as literature that flexibility, adaptability, and customer interaction are the foundation of success for startup companies which inevitably makes agile project management a significantly important factor for startup success. Additionally, agile project management also contributes with continuous development and effective communication, making startups better equipped to manage risks and uncertainties.

Regarding research questions were revealed the main attributes of a project, criteria for measuring its success, and key factors that impact the achievement of project objectives. It was found that measuring success in using agile methodologies is done through customer satisfaction and achievement of set goals. The main and critical factors for successful adoption of APM can be the understanding of the agile mindset, organizational culture, and the right leader who can enforce slowly and gradually the mentality of embracing the change.

The study also revealed the differences between traditional and agile project management approaches. It became clear that the agile approach values customer feedback encouraging flexibility and adaptability among the team members making it much more beneficial for startups compared to the traditional approach where these features are missing. Furthermore, the unique characteristics of start-up management and its challenges also what benefits agile project management provides for start-ups was analyzed. The results showed that the use of agile approach increases the

efficiency of resources and work while also dealing with uncertainties and adaptation to market changes and being able to satisfy the requirements of the client.

Regarding the established hypothesis, the evidence gathered in this research supports the proposition. The implementation of agile methodologies indeed appear to contribute to the success of startup companies. Moreover the relation between entrepreneur mindset, qualities and these of project managers' were compared for any similarities. There was found a great similarity with common qualities such as: leadership skills, organizing resources, calculating risk and planning and executing a goal.

In conclusion, this thesis affirms the significant positive correlation between the implementation of agile project management methodologies and the success of startup companies. The research insights gathered from established literature and the conducted interviews can support entrepreneurs and business owners with a strategic edge over the competition, assist them dealing with challenges that startup face and improve their chance of success. Therefore a recommendation could be made for startups to adopt agile methodologies as fast as possible, not only as a project management tools but also as mindset which encourage culture of constant adaptation, continuous improvement and customer-centric environment. The benefits of implementing this approach as evident throughout the thesis are numerous and enduring.

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Appendices:

Appendix 1 Interview Vock

Viktor: Can you briefly explain your understanding of traditional and agile project management?

Vock: Traditional PM approaches in essential put planning first and try to maintain a large number of planned events and limit deviations from a plan, involving all relevant parties at all stages. Agile puts implementation first, with a strong emphasis on learning and efficiency in resource usage and stable group composition.

Viktor: How would you describe some key differences between traditional PM and Agile PM?

Vock: Involve and plan first, change never or later --> deliver essentials now and grow from a sound basis.

Viktor: What considerations do you make when choosing between traditional and agile project management for a project?

Vock: What the expected outcome is like to be.

Viktor: What advantages do you see for startups in adopting agile project management methodologies?

Vock: As in all lean methodologies, it is more efficient resource usage IF the overall concept supports agile PM approaches; up to date, no one ever built an agile bridge.

Viktor: Can you share an example of a startup that has successfully implemented agile project management methodologies?

Vock: Almost any SW relevant Startup Topic today employs agile PM structures.

Viktor: Could you elaborate on the difficulties you ran into when applying agile methodologies in a startup setting?

Vock: Mostly in areas of expectation and know how. Agile does require a strong adherence to rules and regulations and a very strict and regulated environment within the company / startup. Most problems stem from the expectation that “we do as we like and change when we like” which is simply not true.

Viktor: Which methods and tools do you think a startup should employ in implementing agile project management?

Vock: A question that is not to be answered in an apodictic way; using Scrum, KanBan oder any other mayor flavour does not guarantee success any better than declaring yourself winner before the race. It all depends on the existing know how within the team, the structure of the project and the involvement of customers / product executives.

Viktor: Do you think that a startup's success is mostly dependent on its capacity to adapt and be flexible?

Vock: Yes

Viktor: How can agile project management solve the typical issues that new businesses face?

Vock: Exactly the same way that classic PM approaches face: by employing continuous communication, diligent planning (top down in classic, bottom up in agile) and adherence to established structures and processes.

Viktor: How do you handle project uncertainties when using agile methodologies in a startup?

Vock: Again, apodictic. Agile management requires all kinds on insights into the ends to achieve; so without strategic layout and diligent adherence to said strategy uncertainties will become threats. Even so, reaction within classic PM can be as rapid as within agile; with the added value that one might not loose the “sprint” results.

Viktor: Could you elaborate on how agile approaches specifically help companies in various industries?

Vock: Because they by default involve the customer, taking the customer responsible for the outcome from day 1.

Viktor: How crucial do you believe agile project management is to the overall success of companies, on a scale of 1 to 10?

Vock: About 5; while being very prominent on the discussion boards and training schedules, we have not seen the end of classic PM work. Also, one can deliver everything using classic PM techniques but only about 50% of all industries could use agile PM today.

Viktor: What relationship exists between project management and entrepreneurial activity?

Vock: A project client and project delivery one.

Viktor: What are the top qualities a project manager has to possess in order to use agile approaches in a startup?

Vock: Curiosity and the willingness to learn.

Viktor: How do you measure success when using agile methodologies in a startup?

Vock: In goals delivered, same as everywhere else. Any numeric KPI measurement will find its limits sooner than later.

Viktor: What advice would you give to entrepreneurs considering to implement agile project management?

Vock: Just do; control and revise strategy often, if needs be, analyse the delivery content accordingly and invest heavily into knowledge management and don't believe in the superiority or importance of the chosen PM methodology.

Viktor: Based on your experience, what are the main elements that have an impact on the successful adoption of agile project management in startups?

Vock: Missing knowledge and missing discipline.

Appendix 2: Interview Georgiev

Viktor: Can you briefly explain your understanding of traditional and agile project management?

Georgiev: I would define traditional pm as a fixed and detailed planned process which differs entirely from agile pm where an unexpected approach is rather sought to increase flexibility and client responses.

Viktor: How would you describe some key differences between traditional PM and Agile PM?

Georgiev: The biggest difference is as mentioned the traditional approach follows a constant unchanging approach while agile encourages change.

Viktor: What considerations do you make when choosing between traditional and agile project management for a project?

Georgiev: In my opinion the complexity of the project, its specificity, the unknown as well as the preferences of the client are the factors that would make me choose between traditional and agile project management.

Viktor: What advantages do you see for startups in adopting agile project management methodologies?

Georgiev: The advantages that agile gives to startups start from the fact that it provides faster adaptation, also learning from the mistakes made and gives ultimate value to the user with his constant involvement all the time.

Viktor: Can you share an example of a startup that has successfully implemented agile project management methodologies?

Georgiev: I'm not entirely sure, but I think the LEGO company has massively used agile practices with the scrum method and it's brought them huge success.

Viktor: Could you elaborate on the difficulties you ran into when applying agile methodologies in a startup setting?

Georgiev: The main obstacle I have faced is dealing with understanding the agile mindset and lack of knowledge. However with proper training and continued coaching this difficulty is overcome.

Viktor: Which methods and tools do you think a startup should employ in implementing agile project management?

Georgiev: There are many different methods and tools, but for a startup company I would recommend Jira for task tracking and management, Slack for maintaining communication and Scrum or Kanban depending on the nature of the project.

Viktor: Do you think that a startup's success is mostly dependent on its capacity to adapt and be flexible?

Georgiev: I would say yes startups rely heavily on adaptability and flexibility.

Viktor: How can agile project management solve the typical issues that new businesses face?

Georgiev: There is a need of a agile framework that focuses on dealing with uncertainties in variable.

Viktor: How do you handle project uncertainties when using agile methodologies in a startup?

Georgiev: I would say that agile welcomes uncertainties and dealing with them would take the form of breaking tasks down into small parts to be analyzed to prioritize the most important and constantly learning and building from the whole process.

Viktor: Could you elaborate on how agile approaches specifically help companies in various industries?

Georgiev: I can't say which companies, and which sectors it would help, but I can say how it would help in the form of a flexible, customer-centric approach including fast delivery and frequent feedback.

Viktor: How crucial do you believe agile project management is to the overall success of companies, on a scale of 1 to 10?

Georgiev: I would say around 7 because it is not the only success factor, but it certainly helps startups deal with new difficulties and deliver value faster.

Viktor: What relationship exists between project management and entrepreneurial activity?

Georgiev: Their similar characteristics in my opinion are the fact that they both organize resources, handle and manage risk and try to ultimately provide some value to the market or their customers.

Viktor: What are the top qualities a project manager has to possess in order to use agile approaches in a startup?

Georgiev: Qualities such as problem-solving, critical thinking, adaptability, empathy and excellent communication are the foundation for a successful agile project manager.

Viktor: How do you measure success when using agile methodologies in a startup?

Georgiev: I would say that success is measured by the final product if it is what the client expected then the score is very high.

Viktor: What advice would you give to entrepreneurs considering to implement agile project management?

Vock: My advice is to first familiarize yourself with the agile mindset then take small steps and with constant training of your team things will get better.

Viktor: Based on your experience, what are the main elements that have an impact on the successful adoption of agile project management in startups?

Vock: I think the culture in the organization plays a key role as well as the proper understanding of agile principles and methodologies.

Appendix 3: Interview Tizer

Viktor: Can you briefly explain your understanding of traditional and agile project management?

Tizer: The traditional approach also known as waterfall, is a linear approach where the project starts with initiation, planning, execution, control and closure, while agile is a changing approach which is based on adaptability and constant improvement.

Viktor: How would you describe some key differences between traditional PM and Agile PM?

Tizer: Traditional everything is planned, agile is flexible. Different management and approach to risk, different roles and responsibilities and the lack of customer involvement in traditional and its high importance in agile.

Viktor: What considerations do you make when choosing between traditional and agile project management for a project?

Tizer: For me a lot depends on the requirements and difficulty of the project. If it requires an adaptive plan that responds to changes then agile is my go-to approach.

Viktor: What advantages do you see for startups in adopting agile project management methodologies?

Tizer: In my opinion, agile helps by making the relationship between client and companies stronger through constant communication. This will also inevitably lead to a better end product.

Viktor: Can you share an example of a startup that has successfully implemented agile project management methodologies?

Tizer: I see as a very good example AirBnb who used agile methodologies for their continuous improvement based on customer feedback and flexibility to changing market conditions.

Viktor: Could you elaborate on the difficulties you ran into when applying agile methodologies in a startup setting?

Tizer: The hardest thing is to have an agile mindset which is simply put embracing change. In order to deal with this, we need the figure of an agile coach or scrum master to teach and build agile principles in the team.

Viktor: Which methods and tools do you think a startup should employ in implementing agile project management?

Tizer: The techniques and methods that will be used depend a lot on the specific needs of the startup company. Otherwise examples can be the most popular Scrum and Kanban boards as well as more unpopular methods like daily standup meeting, retrospectives and user story mapping.

Viktor: Do you think that a startup's success is mostly dependent on its capacity to adapt and be flexible?

Tizer: Absolutely

Viktor: How can agile project management solve the typical issues that new businesses face?

Tizer: In my opinion if agile project management is used properly it can deal with many difficulties like satisfying clients, adapting to market changes, risk and resource management etc.

Viktor: How do you handle project uncertainties when using agile methodologies in a startup?

Tizer: When using APM in a startup company way to deal with uncertainty are learning from mistakes and anticipating them leading to calculated risks and long-term good outcomes.

Viktor: Could you elaborate on how agile approaches specifically help companies in various industries?

Tizer: In my opinion, the agile approach can find its place in most different industries, starting from software development where it actually started. Going forward I think it will become more and more popular and preferred approach in healthcare, retail, of course finance and banking and last but not least manufacturing.

Viktor: How crucial do you believe agile project management is to the overall success of companies, on a scale of 1 to 10?

Tizer: I would say 9 in my opinion it is insane not to use agile methodologies because it brings so much value for your good but also build an astonishing relationship with customers.

Viktor: What relationship exists between project management and entrepreneurial activity?

Tizer: I would say it is common for entrepreneurs to act as project managers. The two roles have similar activities such as leading a team, resource management, and formulating goals and a plan to meet them.

Viktor: What are the top qualities a project manager has to possess in order to use agile approaches in a startup?

Tizer: In my opinion undoubtedly a project manager has to have seemingly simple qualities but extremely important such as problem-solving, creativity, leadership, strong communicator and etc.

Viktor: How do you measure success when using agile methodologies in a startup?

Tizer: I don't think there is a formula to measure success, but I would say an indicator would be customer satisfaction and ability to learn and adapt.

Viktor: What advice would you give to entrepreneurs considering to implement agile project management?

Tizer: As an agile coach I would advise them to be patient with the whole process because this cultural shift takes time.

Viktor: Based on your experience, what are the main elements that have an impact on the successful adoption of agile project management in startups?

Tizer: Based on my experience to successfully implement agile you need the right leadership and constant communication to enforce the agile mindset among the team.

Appendix 4 Interview Wurm

Viktor: Can you briefly explain your understanding of traditional and agile project management?

Wurm: Predictive / traditional / waterfall: change averse, everything is tried to be defined from scratch and deviations are managed in specific process that have a certain overhead. Agile: change embracing, very close to the customer / end user / business that the project is done for to react quickly on those changes.

Viktor: How would you describe some key differences between traditional PM and Agile PM?

Wurm: Agile – SCRUM – does not really have this role. At the end it's a different mindset concerning change and servant leadership.

Viktor: What considerations do you make when choosing between traditional and agile project management for a project?

Wurm: Generally a PM needs to follow the parent organization and processes. If certain KPIs are requested from Mgmt then only a certain approach can be chosen. I was never choosing that so far. I'm just bending it towards what I think fits the situation best which is not always easy. E.g. see differences in SCRUM and KANBAN alone. In general as being an IT PM Agile is the one to go, currently everybody is scared of predictive.

Viktor: What advantages do you see for startups in adopting agile project management methodologies?

Wurm: Producing what the customer wants and increasing the probability of success.

Viktor: Can you share an example of a startup that has successfully implemented agile project management methodologies?

Wurm: When EasyBooking (Tyrolean company) did create a new web app for room rentals from scratch SCRUM was chosen and contributed to the successful rollout. Especially when you cant define all specs up front agile is the only way forward anyway.

Viktor: Could you elaborate on the difficulties you ran into when applying agile methodologies in a startup setting?

Wurm: You still need to have a very good understanding of what the end target initial should look like as when you plan to build a skyscraper you cant start with a dog hut and take it from there in an agile way. Rolled wave planning also needs a big picture target from scratch. And then just try not to fall back to predictive planning clearly define the agile process that shall be used (but be also open here for changes) and follow constantly up on its implementation.

Viktor: Which methods and tools do you think a startup should employ in implementing agile project management?

Wurm: As there are multiple agile approaches it would be good to revisit them and pick what the team thinks might work best for them and take it from there (adapt as needed / as they go). Team needs to dare to speak up when something is not working, does stress the people or not yield desired output also short term. As costs of tools is most of the time an issue for startups a free / self hosted tool (like GitLab) might help. The tool should allow flexibility to define the dev process the team has chosen to work with. Also, clear definition of DoR & DoD helps allot as upfront clarity on how the Software is tested, hotfix process, etc – so think it thru already into production from scratch.

Viktor: Do you think that a startup's success is mostly dependent on its capacity to adapt and be flexible?

Wurm: Indeed. Most startups are venturing in new areas and nobody can tell up front what will be needed and desired by (potential) customers.

Viktor: How can agile project management solve the typical issues that new businesses face?

Wurm: In general I'd say that agile allows to adapt faster on any kind of issues. and even when agile manifesto states 'people over processes' I think processes are essential here as 'agile' at the end is a process that should be followed by the team in sync and not everybody does what she/he wants. As this overhead is not manageable. Focus on managing the 20% exception and let 80% cover by processes is what I do successfully so far.

Viktor: How do you handle project uncertainties when using agile methodologies in a startup?

Wurm: Acknowledge, manage & communicate with them. Don't try to solve them from scratch as you fall back into predictive PM. Resolve them only when you get closer to them to be needed. And make decisions as late as possible (while failing fast – take complex / uncertain stuff up first). But easier said than done, as normally you need to keep a sponsor happy and he wants to see stuff fast... mockups (wireframe, click thru dummy, you name it) can help here a great deal. And a high level product roadmap with a focus on MVP that everybody agrees on.

Viktor: Could you elaborate on how agile approaches specifically help companies in various industries?

Wurm: At the end agile increases the probability of building what's really needed which defines success. Combined with the fail fast approach it can show early what's possible and adjust accordingly – increasing success.

Viktor: How crucial do you believe agile project management is to the overall success of companies, on a scale of 1 to 10?

Wurm: 8

Viktor: What relationship exists between project management and entrepreneurial activity?

Wurm: I think they are interlinked heavily – especially in a startup context. Each can have a big impact on the other constantly.

Viktor: What are the top qualities a project manager has to possess in order to use agile approaches in a startup?

Wurm: Agile mindset, embrace change, communicate heavily Understand challenges / details / final product. At the end a PM should be able to help the team to do its work (kind of SM here) in alignment with constantly changing details.

Viktor: How do you measure success when using agile methodologies in a startup?

Wurm: Per definition is ‘produce working software’ but I prefer: acceptance by customer (as working software is nice but if its not what the customer needs...). This is not only happening late at the end of the project but throughout.

Viktor: What advice would you give to entrepreneurs considering to implement agile project management?

Wurm: Just do it but take it seriously and don’t give up easily.

Viktor: Based on your experience, what are the main elements that have an impact on the successful adoption of agile project management in startups?

Wurm: An open culture to be agile with the agile processes (to be able to raise concerns, discuss issues / potential improvements) and a strong leader that pushes it relentlessly.