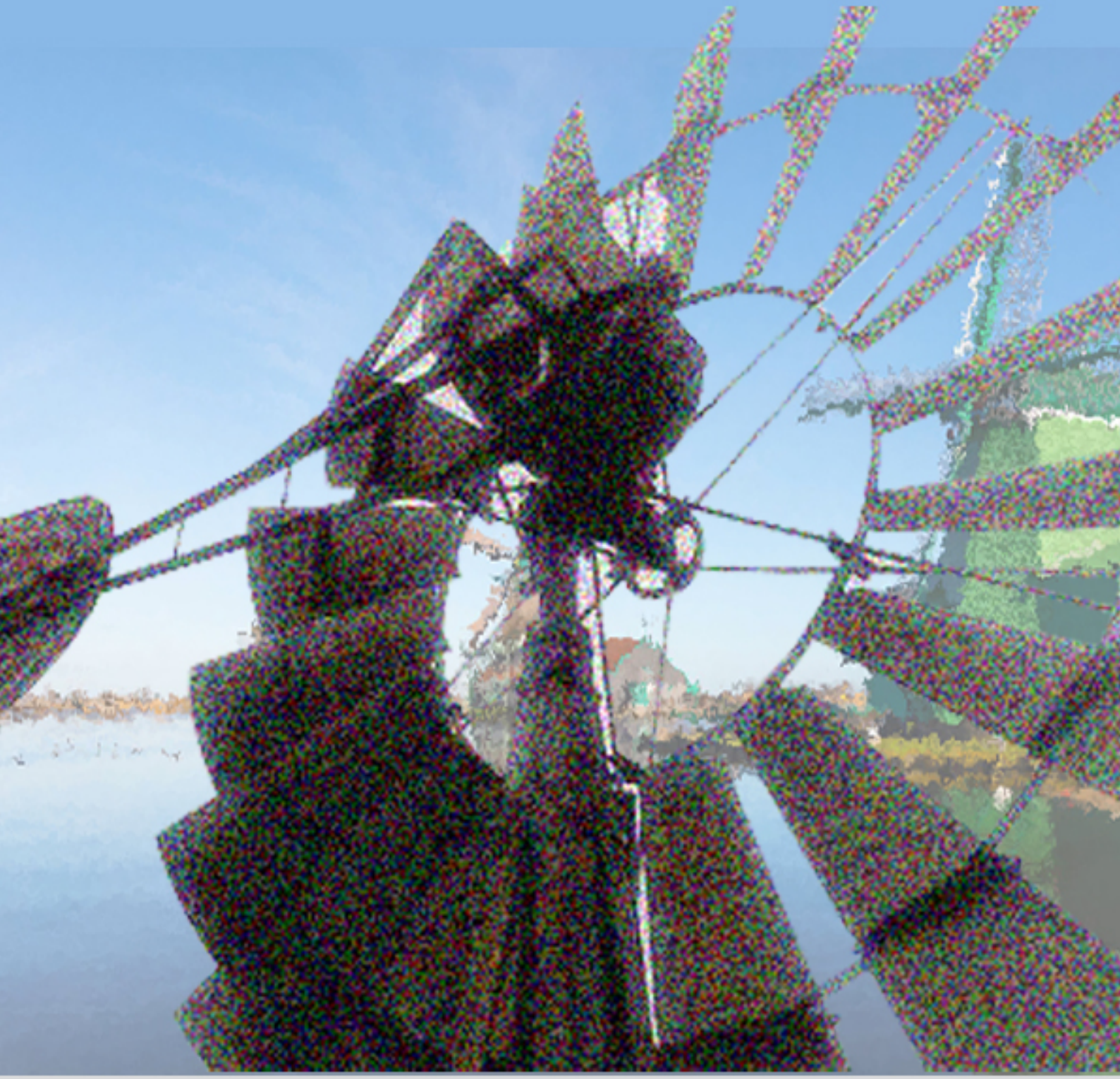
THE AGILE WINDMILL

UNLEASHING PROJECT SUCCESS IN DUTCH ASSET MANAGEMENT



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Executive Summary

The use of Agile methodologies has been steadily growing in popularity in recent years, with many organisations across various industries adopting it to manage their projects. This shift in project management practices has replaced traditional project management styles, and Agile methodologies like Scrum, SAFe, and Kanban are widely used. However, there has been a lack of research into the impact of Agile on project success in the financial industry, specifically in the Netherlands.

This research aims to fill this gap by examining the perceived impact of adopting agile methodologies in technology-driven projects within asset management firms in the Netherlands through a qualitative study using thematic analysis through semi-structured interviews and document analysis. The study aimed to gain insights into the reasons, challenges, benefits, success criteria, and key factors influencing project success in the context of agile implementation.

The research question guiding this study is: "What is the perceived impact of adopting agile methodologies for successfully delivering technology-driven projects in asset management firms?"

Through interviews with experienced agile team members, valuable insights were obtained. It was found that agile methodologies are not the sole cause of project success, as success is influenced by a combination of factors. Agile methodologies empower teams to adapt and respond to changing circumstances, providing a solid foundation for handling challenges and embracing positive change. The research highlights the importance of having the right people with the right mindset and behaviour in key positions within the organisation. Teamwork and acceptance of other contributing factors are at the core of agile methodologies. Agile provides a framework for effective collaboration and flexibility, enabling organisations to leverage its benefits and improve project outcomes. The findings emphasise the need for alignment between the organisation's culture and the principles of agile methodologies. It is crucial to create an environment that fosters teamwork, encourages open communication, and supports continuous improvement.

The research findings reveal that asset management firms adopt Agile methodologies in technology-driven projects for various reasons, such as increased flexibility, faster delivery cycles, improved collaboration, and better adaptation to changing requirements. However, challenges related to resistance to change, stakeholder alignment, and the need for continuous learning and skill development were identified. Despite these challenges, the perceived benefits of Agile were evident, highlighting its ability to enhance project outcomes.

The criteria used to measure project success in technology-driven projects within asset management firms encompass a combination of quantitative and qualitative factors. While meeting project timelines and budgets was important consideration, other success indicators included customer satisfaction, quality of deliverables, stakeholder engagement, and adherence to project goals. This multidimensional approach to measuring success reflects the complex nature of technology-driven projects in the asset management sector.

The research identifies several key factors that influence project success in technology-driven projects within asset management firms. These factors include effective teamwork, strong leadership, clear communication, stakeholder involvement, and the alignment of project goals with organisational objectives. The findings emphasise the critical role of these factors in overcoming challenges and ensuring successful project outcomes in the asset management industry.

The experiences and perspectives of agile team members shed light on their perception of best practices for using agile methodologies in technology-driven projects. The notable best practice from the interview process and document analysis revealed the implementation of a hybrid way of working. Every organisation has a different culture and nature of work, which made it hard for them to implement a single method by the book. This called for the tailoring of agile methodologies and the implementation of relevant aspects. This customisation of the way of working helped organisations maximise the benefits of agile. Other best practices included maintaining clear and transparent communication, a physical portfolio wall, weekly scrum master sessions, agile work sessions and empowering self-organising teams.

The research concludes that agile methodologies, when implemented effectively and supported by the right organisational culture and mindset, can significantly enhance project success in technology-driven projects within asset management firms. It is recommended that organisations invest in developing and nurturing the necessary skills, behaviours, and mindset to fully leverage the potential of agile methodologies.

The study contributes to the existing body of knowledge by providing insights into the perceived impact of agile methodologies in the specific context of asset management firms. The findings can guide organisations in making informed decisions regarding the adoption and implementation of agile methodologies to enhance project outcomes.

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1 Research Introduction

1.1 Overview

"Globalisation has made the world a smaller place, but digitisation has made it a faster one." These processes have led to an increase in the number of projects that companies are taking on. Companies are now taking on projects that span multiple countries and cultures and require the integration of digital technologies such as cloud computing, Big Data, IoT, Artificial Intelligence and Blockchain. Successfully delivering these projects requires a high degree of coordination and collaboration across multiple teams and departments and forces companies to be more agile and responsive to market changes to stay competitive. The success or failure of these complex projects significantly depends on how efficiently a company incorporates new tools and organisational frameworks within its value chain.

The financial sector is a highly dynamic and fast-paced industry that requires constant innovation and adaptation to changing market conditions. The companies working in this industry rely heavily on technology to drive innovation, improve operational efficiency, and stay ahead in a competitive landscape (Gomber, Kauffman, Parker, & Weber, 2018). Projects in this sector are typically complex and require a high degree of coordination and collaboration between multiple teams and stakeholders (Room, 2016). The traditional project management methods, such as the Waterfall model (Mitchell & Seaman, 2009), which relies on a sequential and rigid approach to project delivery, often struggle to accommodate the level of flexibility and adaptability required in this industry. As a result, many financial organisations face challenges in successfully delivering projects within time, budget and quality constraints (Terlizzi, de Souza Meirelles, & de Moraes, 2016). The lack of agility in traditional project management methodologies can make it difficult for organisations in the financial sector to keep up with the rapidly changing business landscape, which can negatively impact their competitiveness and ability to meet customer needs.

In recent years, this industry has witnessed a significant shift in project management practices, with traditional methodologies being replaced by more flexible and adaptive approaches. One such approach gaining prominence is the agile way of working, which emphasises iterative and collaborative development to meet changing project requirements (Dingsøyr, Nerur, Balijepally, & Moe, 2012). This shift towards agility is particularly noteworthy in the asset management segment of the financial industry, where technology-driven projects play a crucial role in deliv-

ering innovative solutions and maintaining a competitive edge. Asset management firms in the Netherlands, known for their dynamic and complex business operations, are increasingly embracing agile methodologies to enhance project success and meet evolving client needs (Nagarajan & Overbeek, 2018). Agile methodologies like SAFe, Kanban and Scrum have also gained significant attention from other industries such as healthcare, manufacturing and construction. However, the financial sector, known for its strict regulatory requirements, complex operations and sophisticated processes, has not yet fully utilised the potential of using Agile to fulfil the need for speed, efficiency, and competitiveness. Although the use of Agile in the financial sector has started to emerge over the past few years, there is limited research on its impact on their implementation and the extent to which they contribute to project success.

The following problem statement can be derived for this thesis:
"Despite the increasing adoption of agile methodologies for delivering technology-driven projects in asset management firms in the Netherlands, a comprehensive understanding of the perceived impact and benefits of this way of working remains limited."

1.2 Research Design

This section outlines the research design. Firstly addressing the research gap, followed by the research aim, objective and questions. Then defining the research scope.

1.2.1 Research Gap

The rapid growth and adoption of agile methodologies in various industries have significantly transformed project management practices, leading to improved project outcomes and organisational success (Balaban & Đurašković, 2021). However, despite the widespread use of agile methodologies, there is a noticeable gap in research focused specifically on the implementation and impact of agile methodologies in technology-driven projects within financial firms. The existing literature primarily explores agile methodologies in a broader context or focuses on specific industries, such as software development or IT services (Coram & Bohner, 2021). The impact of Agile methodologies on project success in the financial sector is still being determined. While some studies suggest that Agile improves project success (Sharma, 2022), others argue that it is not suited to all projects (Serrador & Pinto, 2015). Moreover, the financial sector faces unique challenges, such as meeting regulatory requirements, managing risks, and balancing short-term and long-term goals. Therefore, there is a clear need for research that specifically investigates the application of agile methodologies in the financial sector, which operates in a unique and complex environment with its own set of challenges and requirements.

By addressing this knowledge gap, this study aims to contribute to the existing body of knowledge by providing insights into the perceived impact of adopting agile methodologies in technology-driven projects within asset management firms. By understanding the reasons, challenges, and perceived benefits of adopting agile methodologies in this specific context, this research aims too shed light on the factors influencing project success and offer valuable recommendations for improving project management practices within the firms. Furthermore, exploring the criteria used to measure project success in this domain aims to provide a deeper understanding of how agile methodologies align with the key objectives and outcomes of IT projects in this industry.

Overall, this research will not only bridge the gap in the existing literature but also provide valuable insights for practitioners and organisations in the asset management industry, enabling them to make informed decisions and effectively leverage agile methodologies to drive successful project outcomes.

Due to the lack of literature studies on the abovementioned concerns, there is a need for a comprehensive study that addresses the implementation of agile methodologies in the financial sector and its impact on technology-driven projects.

1.2.2 Research Objective

This research aims to explore the experiences and perspectives of individuals regarding the adoption of agile methodologies for the successful delivery of technology-driven projects within asset management firms in The Netherlands.
The objective of this study is to understand the perceived impact of adopting the agile way of working on the success of technology-driven projects within asset management firms in The Netherlands. The study aims to investigate the reasons, challenges, and perceived benefits of adopting the agile way of working within asset management firms, as well as identify the various success criteria used to measure project deliveries and determine the factors that influence the attainment of project goals. Furthermore, the research seeks to assess employee perceptions and experiences regarding the implementation of agile methodologies in asset management firms. By gaining insights into these areas, the study aims to provide valuable recommendations for improving the adoption and implementation of agile methodologies within asset management firms.

The results of this research aim to provide valuable insights for asset management organisations in the financial sector, helping them make informed decisions about adopting the agile way of working. Moreover, this research aims contribute to the overall knowledge of agile methodologies and project success, providing a foundation for future research and insights into the best practices for Agile adoption in this industry.

1.2.3 Research Questions

To achieve the research objectives mentioned, the following research question and sub-questions have been formulated.

MRQ: "What is the perceived impact of adopting agile methodologies for successfully delivering technology-driven projects in asset management firms?"

The following sub-research questions play a crucial role in understanding the problem and achieving the research objective of this study.

SQ1: What are the reasons, challenges, and perceived benefits of adopting the Agile way of working in technology-driven projects within asset management firms?
By investigating the reasons, challenges, and perceived benefits of adopting the Agile way of working in technology-driven projects within asset management firms, the research aims to gain insights into the motivations behind the adoption of agile methodologies and the potential advantages and obstacles associated with this approach. This understanding is essential for comprehending the perceived impact of agile methodologies on project success.

SQ2: What are the criteria used to measure project success in technology-driven projects within asset management firms?
Exploring the criteria used to measure project success in technology-driven projects within asset management firms provides a comprehensive view of the factors that are considered important for project evaluation. This examination helps in identifying the specific metrics and indicators that determine whether a project is deemed successful within the asset management context.

SQ3: What are the key factors that influence project success in technology-driven projects within asset management firms?
Understanding the key factors that influence project success in technology-driven projects within asset management firms enables the identification of critical elements and variables that play a significant role in achieving successful project outcomes. This knowledge helps in understanding the contextual factors that can impact the effectiveness and implementation of agile methodologies in this specific industry.

SQ4: How do agile team members perceive and recommend best practices for using agile methodologies in technology-driven projects based on their experiences and perspectives?
Gaining insights into how agile team members perceive and recommend best practices for using agile methodologies in technology-driven projects provides valuable first-hand perspectives and experiences. By understanding their viewpoints, the research aims to uncover practical insights, challenges, and effective strategies that can enhance the adoption and implementation of agile methodologies within asset management firms.

1.2.4 Research Scope

Based on the research objective and questions, this research focuses on the perceived impact of adopting agile methodologies for successfully delivering technology-driven projects in asset management firms in the Netherlands. The research will employ a qualitative approach, specifically semi-structured interviews with experts in various roles including scrum masters, product owners, business analysts, and developers. By interviewing individuals from different perspectives, the research aims to gain a comprehensive and holistic view of the problem. Additionally, the study will involve a thorough examination of relevant documentation on different agile methodologies to enhance the understanding of their implementation and recommended practices.

The research scope is centred around asset management firms in the Netherlands, with a focus on exploring the perceived benefits, challenges, and recommendations associated with the adoption of agile methodologies. The findings of this study will contribute to the existing knowledge of project management practices within the asset management sector and provide valuable insights for optimising the adoption and implementation of agile methodologies in technology-driven projects.

1.3 Thesis Outline

The thesis is structured into six chapters, each serving a specific purpose in providing a comprehensive analysis of the research topic.

Chapter 1 is the research introduction, which sets the context for the study. It presents the background information, defines the research scope, and states the research question and aims. This chapter establishes the foundation for the research and highlights its significance in the field of study.

Chapter 2 focuses on the literature review. It critically examines existing scholarly works and relevant theories related to the adoption of agile methodologies in asset management firms. This chapter synthesises the current knowledge and identifies gaps in the literature, providing a theoretical framework for the analysis.

Chapter 3 describes the research methodology employed in the study. It outlines the chosen

qualitative research approach, specifically interviews, and provides a rationale for this selection. This chapter explains the research design, data collection methods, and data analysis techniques used to gather and interpret the empirical data.

In Chapter 4, the research findings are presented. This chapter presents the results obtained from the interviews conducted with agile team members in asset management firms. The findings are analysed and interpreted in relation to the research questions and sub-questions, providing insights into the perceived impact of adopting agile methodologies.

Chapter 5 serves as the conclusion chapter. It addresses the research questions and sub-questions based on the findings. The conclusions drawn from the research are linked back to the research aim, contributing to the overall understanding of the perceived impact of agile methodologies in asset management firms. This chapter also includes a reflection on the relevance of the research to the study program, highlighting the relevant courses that were helpful in conducting the research.

Chapter 6 is the discussion, where the research findings are discussed in light of the existing literature. This chapter provides an opportunity to explore the implications of the research findings, compare them with previous studies, and delve deeper into the topic. The chapter may also address the validity and reliability of the study, discuss any limitations encountered, and suggest directions for future research.

2
Literature Review

2.1 Search Description and Selection Criteria

The design of this literature review aims to evaluate the current body of research on the effectiveness of agile methodologies in managing projects and evaluating their success. The literature review provides an overview of the key findings, gaps and inconsistencies in the existing literature and will be used to identify areas for future research. The literature review is conducted using a systematic approach. It includes primary research studies, such as experiments, case studies and surveys, and secondary research studies, such as literature reviews and content analysis.

In order to perform the review, after the scope was defined, the relevant literature was explored various academic databases such as Scopus and Google Scholar. as well as in the databases of JSTOR and Web of Science. Since the Agile Manifesto was published in 2001, the research on Agile practices has been relatively new. This is why the literature review is limited to studies published within the last 15 years to provide a comprehensive and latest overview of the current state of research in this field. The studies were selected based on predefined inclusion and exclusion criteria to ensure that the literature review is focused on the most relevant and robust studies.

For relevant literature, multiple keyword search combinations and reference snowballing were used. Snowballing was done using Google Scholar. The words used for the review with the respective synonyms can be seen in Table 2.1. A funnel approach is evident from the table, which helped narrow the research topic. The process started with finding agile methodologies; then, it focussed on applications of different methodologies. The process moved towards researching criteria for project success. As Agile has been extensively implemented for software development projects, hence, other industries were explored, and it was found that there has been limited research on the application of Agile methodologies in the banking and financial industry.

Table 2.1: Keywords and Synonyms

Keywords	**Synonyms**
Agile	Agile methodologies, Scrum, Kanban, Lean, Agile Project Management
Lean	Lean Project Management, Lean Six Sigma
Scrum	Scrum Framework, Scrum Methodology
Project Success	Project Performance, Project Outcomes, Project Results
Project Management	Project Governance, Project Planning, Project Execution
Agile Projects	Agile Software Development Projects, Agile Project Delivery
Software Industry	Software Development, Agile Software Development, Agile in Software
Agile Industries	Agile in Construction, Agile in Healthcare, Agile in Banking
Banking Industry	Digital Banking, Fintech and Compliance
Agile Banking Projects	Agile in Banking, Agile in Financial Services

All the searches mentioned above on SCOPUS resulted in overwhelming results. The yielded cumulative 520 results were then further screened. The search was refined by limiting the research areas to Economics, Finance, Business, Social Sciences and Accounting, resulting in 295 results. As the Agile Manifesto was published in 2001, all the studies before 2001 were eliminated. The search results were then filtered for the type of document and included peer-reviewed journal articles, book chapters, conference reviews and papers. Databases considered for this review were IEEE, ResearchGate, ISER, IJPM and EPPM for the relevant studies. When exploring studies for Agile in the Banking sector, it revealed 160 results which were eventually filtered down to 5 articles based on citations and relevance. The citation count was considered to get a better understanding and notability of the papers. Primarily papers with less than 10 citations were not considered for the review; however, some papers have been referred for potential future research on the impact of agile methodologies in the banking industry. The search results were filtered to English, and all other languages were not considered. As a result of the selection and exclusion criteria used, 32 documents (including existing literature on different agile methods) were shortlisted for this literature review. However, only 11 papers were found that were related to agile in the financial industry. Table 2.2 shows criteria included and excluded.

Table 2.2: Inclusion and Exclusion Criteria

Criterion	**Inclusion**	**Exclusion**
Timeframe	Papers from last 15 years (Agile)	Research before 2001 (Agile); No restriction (Project Management Literature)
Language	English	All Other Languages
Sample Size	More than 30 Participants in a quantitative study	Participants who are not representative of the target population
Document Type	Peer-reviewed scientific articles, journals, book chapters, grey literature	Blogs, Patents
Industry	Banking, Finance, Software	Manufacturing, Construction, Healthcare
Relevance	Papers related to project management techniques, the impact of working methods on the success of projects and different agile methodologies	Papers related to non-technical fields, Papers from psychology and sociology studies

2.2 Unpacking Agile Principles and Practices

The research findings looked at the evolution of Agile and the specifications of the different methodologies adopted by organisations. It also sheds light on the challenges faced by organisations in implementing these new techniques.

2.2.1 Evolution of Agile

Agile is an attitude, not a technique with boundaries. An attitude has no boundaries, so we wouldn't ask 'Can I use Agile here,' but rather 'How would I act in the Agile way here,' or 'How Agile can we be, here?' —Alistair Cockburn (Cockburn, 2007)

Project management techniques provide the framework and tools to plan, organise, and execute a project in a structured and efficient manner. Effective project management techniques can help ensure the project is completed on schedule, within budget, and to the customer and stakeholders' satisfaction (Bergmann & Karwowski, 2018). Proper planning and management are critical for project success. Project management methodologies have evolved to address the changing needs of organisations and industries. The earliest known application of these methodologies can be traced back to ancient civilisations, such as the Egyptians, who used project management techniques to construct the pyramids. However, the organisational adoption of these methods only began half a century ago when the defence and space research industries adopted effective project management methodologies for achieving their goals (Lei, Ganjeizadeh, Jayachandran, & Ozcan, 2017).

During the late 19th and early 20th century, the "Gantt Chart" was developed, which was used to visualise and manage the scheduling of tasks and resources (Gantt & Clark, 2015). Gantt charts were widely used in construction, manufacturing and other industries. Later in the 1950s and 1960s, a dominant project management methodology emerged known as the "Waterfall" method, based on a linear, sequential approach to project management (Mitchell & Seaman, 2009). The Waterfall method emphasised strict planning, control, and execution and was well suited for large, complex projects such as construction and engineering. In the 1970s, the "Program Evaluation and Review Technique" (PERT) and "Critical Path Method" (CPM) was developed to help manage large, complex projects. These methodologies emphasised the importance of identifying and managing dependencies and critical paths.

In the 1990s, the Agile methodology was introduced as an alternative to the traditional, sequential approach of the Waterfall method. Agile methodologies have evolved, starting with the Agile Manifesto in 2001 (Dingsøyr et al., 2012) and have gained widespread popularity in recent years as a means of managing projects more efficiently and effectively. The values and principles of the manifesto (as shown in Figure 2.1) led to a shift away from traditional, plan-based methodologies such as Waterfall (Mitchell & Seaman, 2009), which were seen as rigid and inflexible. Agile methodologies like Scrum, Lean, LeSS Kanban and SAFe have been implemented in many industries, including software development, construction, healthcare, and finance, to improve project success. According to the Project Management Institute (PMI), Agile has been the most widely used methodology for software development projects since 2017 (Viturro, 2021). Studies have shown that these techniques can lead to faster time-to-market, improved customer satisfaction, increased flexibility, and reduced risk (Coram & Bohner, 2021). Agile methodologies promote transparency, communication and collaboration within teams, leading to increased productivity and better decision-making. As it is an iterative and incremental approach to project delivery, it helps identify and address issues early on, reducing the potential for delays and cost overruns. Agile is particularly well suited for projects with high uncertainty and change, as they allow for adjustments to be made quickly and efficiently.

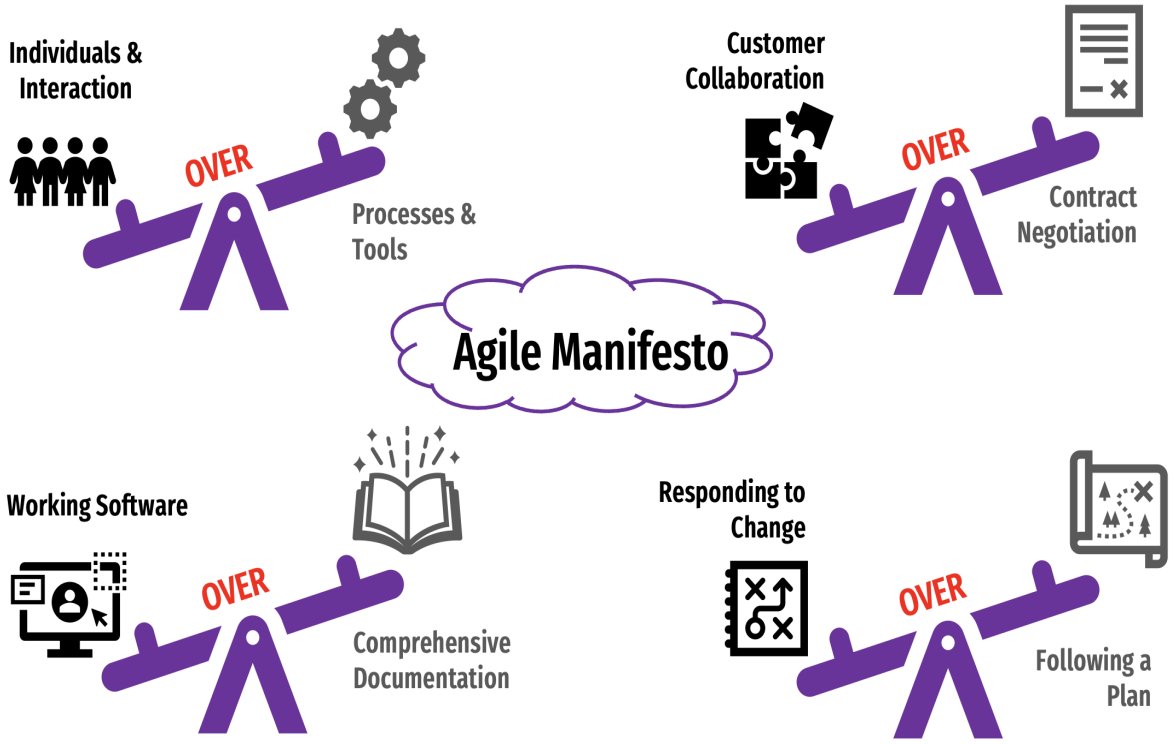


Figure 2.1: Agile Manifesto (own illustration based on Dingsøyr et al., 2012)

2.2.2 Theoretical Background

The theoretical background of Agile methodologies is rooted in several fields of study. These include complexity theory, systems thinking, organisational learning, lean thinking and institutional theory. Each of these areas provides valuable insight into the strengths and limitations of using Agile and how they can be used to enhance project success. Complexity theory suggests that projects are complex adaptive systems and that traditional, plan-based methodologies such as waterfall must be equipped to manage them effectively. Hence, the need for a more flexible and adaptive solution to manage complex projects was imminent (Room, 2016). On the other hand, systems thinking suggests that organisations are interconnected systems and that changes in one part of the system can have a ripple effect across the organisation (Ho, 2018). Agile methodologies, with their focus on cross-functional teams and continuous improvement, align with this perspective by promoting collaboration and communication across the organisation. Similarly, organisational learning theory posits that organisations can improve performance through continuous learning. Agile methodologies, with their focus on customer collaboration and continuous improvement, align with this perspective by encouraging learning and adaptation throughout the project (Pérez-Bustamante, 1999). Lean thinking, in turn, emphasises the elimination of waste and the maximisation of value, with a focus on delivering value to the customer and continuous improvement, aligning with this perspective by encouraging the elimination of unnecessary activities and maximising the value delivered to the customer (Vilkki, 2010). Lastly, institutional theory suggests that organisations tend to conform to the norms, values, and expectations of their environment (Lee & Chen, 2019). Agile methodologies align with this perspective by emphasising the importance of aligning with the values, norms, and expectations of the customer and the organisation.

2.2.3 Assumptions of Agile Methodologies

Agile methodologies explored in this study such as Scrum, SAFe, and Lean, operate based on specific assumptions that are crucial to consider during their implementation. These assumptions play a significant role in the successful adoption and utilisation of agile methodologies in technology-driven projects within asset management firms. One key assumption is that the project team is self-organising and cross-functional. This means that team members possess the necessary skills and expertise to collaborate effectively, make collective decisions, and adapt to changing circumstances. The self-organising nature of the team allows for autonomy and empowers individuals to take ownership of their work. Another important assumption is that requirements are subject to change. Agile methodologies recognise that project requirements evolve, and thus, they prioritise flexibility and responsiveness. Active involvement of the customer or end-user throughout the project is crucial to ensure that evolving needs and priorities are effectively addressed. Agile methodologies assume the presence of an environment that promotes open communication, transparency, and continuous feedback. Regular communication and feedback loops enable teams to identify and resolve issues promptly, make necessary adjustments, and continuously improve project outcomes. Failure to acknowledge and align with these assumptions can hinder the effectiveness of the methodologies. The assumptions align with the philosophical approach of innovation research as discussed by Marc J. de Vries in "Innovation Research in Technology and Engineering Management: A Philosophical Approach." De Vries explores the philosophical underpinnings of technology and innovation management, highlighting the importance of assumptions in guiding research and practice. Understanding and acknowledging these assumptions are essential for asset management firms seeking to implement agile methodologies effectively (de Vries, 2021).

2.2.4 Implementation Challenges

Although Agile has been accepted across industries because of its perceived benefits, its adoption has not come without challenges. The primary challenge that organisations face when implementing any Agile methodology is the need for a cultural shift. This cultural shift is necessary as the way work is organised and managed has to be drastically transformed for the new work style to be effective. Additionally, a high level of commitment and support from all stakeholders, including management, team members, and customers, is vital (Younus & Younis, 2021). Scaling Agile methodologies to large projects and organisations can be challenging. Agile is designed to be flexible and adaptive and is best suited for small to medium-sized projects with a high degree of uncertainty. In large projects and organisations, challenges arise while coordinating, communicating and managing work among multiple teams or stakeholders (Chan & Thong, 2009). The implementation of the Scrum methodology comes with its own set of challenges. One of the major challenges is the resistance to change from team members who are used to traditional project management methods. Scrum requires a major shift in the teams' working methodologies, including increased communication and collaboration, which can be difficult for some team members to embrace (Almeida, Miranda, & Falcão, 2019). Additionally, a lack of understanding and training on the principles of Scrum can lead to incorrect implementation and decreased effectiveness. Another challenge is ensuring that all team members are fully committed to the Scrum process and adhere to the principles, which can be difficult to enforce in larger organisations with multiple teams (Conboy & Carroll, 2019b). Another challenge is finding the right balance between the flexibility and structure of the Scrum methodology. The iterative nature of Scrum can lead to scope creep and a lack of focus on the end goal if not properly managed. Finally, it can be difficult to measure the success of Scrum projects, as the benefits are often intangible and difficult to quantify. These challenges highlight the importance of proper planning, training, and support during the implementation of the Scrum methodology to ensure its success. Table 2.3 shows the challenges found in existing literature.

Table 2.3: Challenges found in existing literature

Research Paper Title	**Reference**	**Agile Challenges**
COOC An Agile Change Management Method	(Grand & Deneckere, 2019)	Poorly defined objectives and scope, time-consuming administration, unwillingness to change, lack of stakeholder involvement
A Novel Framework for Change Requirement Management (CRM) In Agile Software Development (ASD)	(Shehzadi, Azam, Anwar, & Qasim, 2019)	Communication problems, lack of member participation, no version history documentation
The Change in Management Style during the Course of a Project from the Classical to the Agile Approach	(Gablas, , Ruzicky, Ondrouchova, & and, 2018)	No function-specific roles, Hard to control change and scope
An Empirical Investigation on Requirements Change Management Practices in Pakistani Agile Based Industry	(Batool & Inayat, 2019)	Lack of communication, no clear phase in each iteration, unavailability of newer technology to manage change
A supporting tool for requirements change management in distributed agile development	(Lloyd, Moawad, & Kadry, 2017)	No tool for document management, the unpredictability of business, bridging the gap
Understanding the Characteristics, Benefits and Challenges of Agile IT Project Management: A Literature-Based Perspective	(Koi-Akrofi, Henry Matey, & Koi-Akrofi, 2019)	Handover issues, skill gaps, perception about agile, slow feedback loop
Prioritising User Requirements for Agile Software Development	(Sachdeva, Arya, Paigude, Chaudhary, & Idate, 2018)	Planning upfront, estimation issues, stakeholder management, prioritisation of changing requirements
Toward successful agile requirements change management process in global software development: a client–vendor analysis	(Kamal, Zhang, & Akbar, 2020)	Team experience with agile, resistance to change, skill gaps, loss of structure
Agile Challenges and Chances for Open Source: Lessons Learned from Managing a FLOSS Project	(Müller, 2018)	Loss of Control, collaboration with multiple stakeholders, No specific role
Agile development as a change management approach in software projects: Applied case study	(Alawairdhi, 2016)	Communication issues, operational problems, unclear roles, unreasonable change request
Identification and Prioritisation of Agile Requirements Change Management Success Factors in the Domain of Global Software Development	(Kamal, Zhang, Azeem Akbar, et al., 2020)	Low stakeholder participation, teams reluctant to change, poorly defined objectives

2.3 Deconstructing the Literature: A Critical Examination

In this section, we undertake a comprehensive and critical examination of the literature about our research question. We delve deeper into the various studies, papers, and articles published on the impact of agile on projects' success and analyse their key findings, methods, and limitations. By deconstructing the literature, we aim to gain a deeper understanding of the current state of knowledge on our topic and identify any gaps or inconsistencies in the existing research. This in-depth analysis serves as the foundation for our research and guides the direction of our study.

2.3.1 Success Criteria

Project success refers to achieving the goals and objectives set for a project. It measures how well a project has performed in terms of meeting its intended outcomes, timelines, and budget. The criteria for measuring project success have evolved, reflecting changing industry standards and the evolving needs of organisations. The traditional concept of the "Iron Triangle" (Musawir, Serra, Zwikael, & Ali, 2017), which included time, cost and scope has often been referred to as the foundation of project management. Quality is not typically considered one of the core elements of the Iron Triangle. However, quality is often considered a critical aspect of project success and is often measured and managed separately. The Iron Triangle concept illustrates that changes to one constraint may have a ripple effect on the other. The concept helps the managers to understand the trade-offs that need to be made and to make informed decisions that ensure the best possible outcome for the project. Figure 2.2 illustrates the Triple Constraint also known as the Iron Triangle of project management.

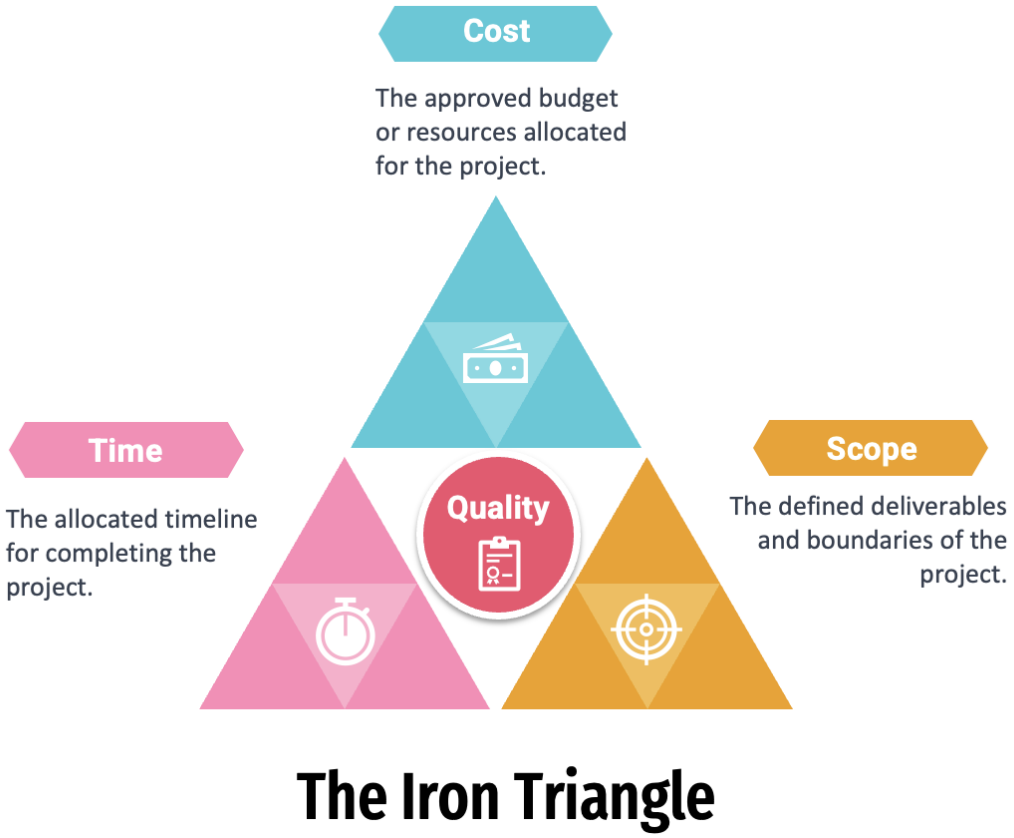


Figure 2.2: The traditional Project Management Iron Triangle (own illustration based on (Musawir, Serra, Zwikael, & Ali, 2017)

However, this method has been criticised as failures related to budget and time are often considered a result of inaccurate estimations and not poor project management (Nelson & Morris, 2014). Also, the method only represents the success of the management of a project and not the project itself (Shenhar, Dvir, Levy, & Maltz, 2001). As organisations have recognised the importance of scope and customer satisfaction with the final result, these criteria have become increasingly important in determining project success.

The Square Root Model by Atkinson (Atkinson, 1999) proposes a redefinition of project success, going beyond the traditional boundaries of the Iron Triangle. Atkinson argues that quality should be considered as a phenomenon rather than a criterion, addressing the misconception that it can be easily defined and achieved. This perspective recognises that focusing solely on time, cost, and scope may lead to failed projects if other critical factors are neglected. Atkinson's model introduces three additional pillars of project success which are benefits to the organisation, benefits to stakeholders, and the information system. These pillars complement the Iron Triangle and provide a more comprehensive framework for evaluating project success.

The organisational benefits refer to the long-term advantages and positive impacts that the project brings to the executing organisation. This could include improved efficiency or effectiveness, increased market share or profits, enhanced reputation, or strategic alignment. While the stakeholders/community benefits consider the positive outcomes for those directly or indirectly affected by the project. This could include improved customer satisfaction, stakeholder engagement, social responsibility, or environmental sustainability. The information system pillar emphasises the importance of having robust and effective communication along with an information management system throughout the project lifecycle. This ensures that relevant information is shared while decisions are made based on accurate data. This helps to facilitate collaboration among project stakeholders. By incorporating these additional pillars, the Square Root Model advocates for a more balanced approach to measuring project success. Figure 2.3 illustrates Atkinson's square root model.

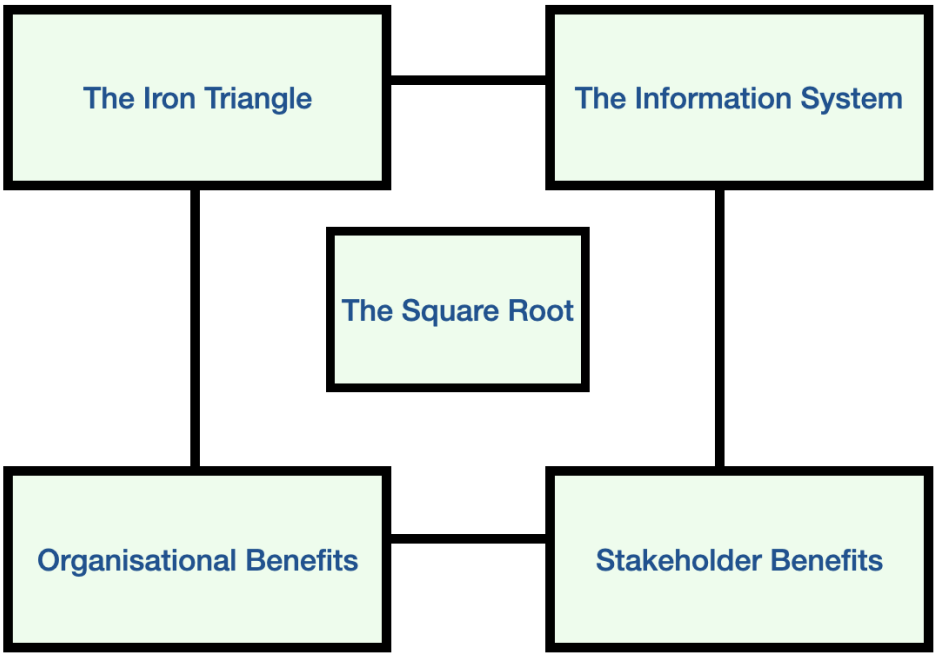


Figure 2.3: The Square Root Model (own illustration based on (Atkinson, 1999)

2.3.2 Factors and Variables Analysed in Existing Literature

Multiple papers implementing qualitative and quantitative strategies were shortlisted for this literature review. They analysed the role of additional factors and variables in combination with agile methodologies to understand the impact on project success. Figure 2.4 shows an overview of all the perceived factors analysed across the literature used for this review.

Qualitative Studies
A study at the Norwegian University of Science and Technology (Sandstø1 & Reme-Ness, 2021) used literature review as a research methodology and concluded a positive impact of these methodologies on the success of a project. However, effects for some of the factors are analysed better (e.g. stand-up meetings) than others as there is a lack of empirical studies on factors like minimal documentation. However, this method is unsuitable for analysing the impact on project success as there is a limited scope, and the research fails to capture emerging trends. The research has been conducted with a specific agenda; hence, the researcher's bias influences the selection and interpretation of the study. The study is flawed as it has been used as a substitute for primary research, not as a compliment.

The study by John F. Tripp, which studied the impact from a contingency view (Tripp, 2012), used the survey method for analysis. The research highlighted the importance of feedback in managing the uncertainty of the development process. The results show that success may vary depending on the specific project and organisational context. The extent to of the agile method uses impacts project success, including project management metrics, product quality, and perceived organisational impacts positively. However, the impact of the extent of agile method use on the project success dimensions was found to be nonlinear, with fast gains from agile methodologies early in the use cycle. However, a slower impact as a complete network of practices is implemented. The study had several limitations, including that it was exploratory, had a sample of only Agile teams and intentional sampling bias, and did not include all the variables identified as important in Agile development. Hence, evaluating the results before using them for further research is important.

Quantitative Studies
A survey study at the Capella University, Minneapolis (Chow & Cao, 2008) of the critical success factors in agile software projects revealed that a high-calibre team with the correct delivery strategy and proper practice of Agile software engineering techniques leads to a successful project. The study used multiple regression analysis on various variables and factors involved. However, the study is unreliable as it fails to find evidence about some assumed prerequisites for the success of projects like executive support, sponsor commitment and project complexity that should be considered critical factors. On the contrary, the study by Asim Riaz (Riaz, 2021) examines the mediating role of project complexity and the moderating role of managerial support. Although the study is well analysed with good sample size, it is only focused on the software industry of Pakistan, and the results cannot be generalised to other industries or countries. Similar to this study, another research uses job fit as the moderating criteria (Wafa et al., 2022) and structural equation modelling (SEM) to analyse the data. However, there is a need for a multi-method approach to generalise the results of this research.

The article on a hybrid style of working from project management journal (Gemino, Reich, & Serrador, 2020) analysed and compared different approaches to see if they had a significant effect on project success and showed that projects using agile, hybrid, or traditional approaches exhibit similar levels of performance based on the traditionally accepted measures of success, budget, time, scope and quality. This was interesting research as it suggested there is no reason to consider one practice over the other. It addressed the concerns of organisations that believe

agile implementation is expensive and requires huge amounts of time. This paper researched one important measure of stakeholder success that most studies failed to capture. The results show that agile and hybrid approaches outperform traditional approaches significantly. Although the study used a good survey design technique to elicit valid data and ensured that the respondents could differentiate among the dimensions of project success, the survey instrument can be further improved. The research focused on the project, not the industry, and had limited global reach as it was completed within North America. The research can be replicated in other domains to test the findings of this research.

The most cited paper used for this review Does agile Work? (Serrador & Pinto, 2015) uses a quantitative analysis method of multiple regression to analyse the relationship. This study considers the missing moderators from other studies used in the review, such as project complexity, team experience, quality of vision and goals. Unlike other studies that found a significant moderation effect of project complexity on the relationship, the paper suggests that neither project complexity nor the experience of the project team has much of an impact. The paper also has limitations and scope for future research as it does not analyse the impact of replanning during the execution of the project. Also, many highly significant relationships reported in this study were relatively small in terms of variance explained. This raised the question of rigour vs relevance on some of the findings from this paper and whether generalisable conclusions can be made based on the study's findings, as the actual predictive effect size for some of the relationships was low.

2.3.3 Banking and Financial Industry

It was found that for agile, limited research was conducted in sectors other than software development. Hence, the literature review explored the healthcare, construction and banking sectors. Healthcare and construction industries have significant concerns about using iterative approaches like agile. As mentioned in the article, this is related to the divide between bits and atoms. When comparing the software industry with construction, the problem is that it is easier to change a piece of work in the digital world rather than in the real world. Atoms have mass and materials and need to be transported. In contrast, bits are weightless and virtual and allow for instant movement.

This was not a concern in the banking industry. Some articles from the banking and finance sector were analysed for this review to understand the current dynamics. The impact in the South African banking industry (Moloto, Harmse, & Zuva, 2021) and agile implementation in the German banking sector (Brühl, 2022) gave insights using both quantitative and qualitative analyses, respectively. The study of the South African banking sector proposed a model to test the theory that agile, with reduced upfront planning, iterative delivery, environmental feedback and technical feedback, improves team efficiency, team performance, software quality and organisational benefits. Although the results showed a positive impact, there was a lack of individual effects of these variables on project success components and net organisational benefits.
On the other hand, the study from the German banking sector shows that all banks and almost all fintechs in the German banking sector apply agile methods in IT projects, with fintechs having relatively more experience with agile methods than banks and using them more intensively. Scrum is the most relevant framework used in practice, while scaled agile frameworks are negligible in the German banking sector. The limited sample size of fintechs and focus on IT projects make the research unreliable.

However, the study opens the door for further research on the use of agile methods in the German banking sector, such as examining if significant differences can be observed between observations when compared with major financial markets inside and outside the EU. It provides

an opportunity to examine the intra-company experiences in banks by comparing projects of different business divisions and between the front and back office departments. Furthermore, the potential benefit of integrating lean management tools with agile methods can be explored, and sector-specific patterns can be observed.

The paper "Applying Agile Methodology to Regulatory Compliance Projects in the Financial Industry: A Case Study Research" (Beerbaum, 2021) explores the implementation of agile methodology, specifically Scrum, in regulatory compliance projects in the financial industry. The research is based on a case study approach, which focuses on the experiences of organisations that have adopted Scrum in their compliance projects. The paper aims to understand the impact of Scrum on project success in the financial industry and the challenges faced by organisations in its implementation. The results of the study suggest that the adoption of Scrum can lead to improved project outcomes, including increased efficiency, better communication and collaboration, and improved stakeholder satisfaction. However, the study has multiple limitations such as biased sampling. The research is limited to 5 interviews conducted within a month's timeframe at an organisation. Contextual limitation exists as the study is specific to the context of the regulatory compliance project of a single financial firm and the findings may not be applicable in other contexts.

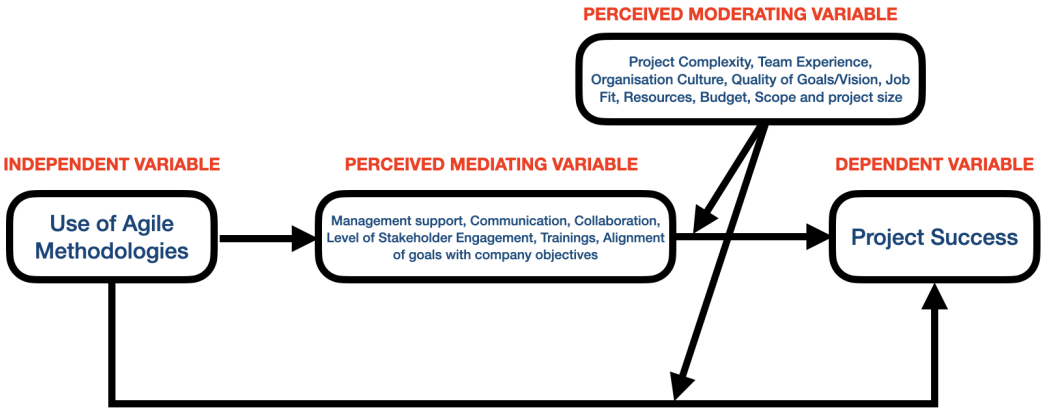


Figure 2.4: Combined Overview of all perceived factors analysed in existing Literature

2.3.4 Commonalities and Differences in Studies

The studies referred to for this literature review had multiple commonalities and differences. Commonalities among the studies include using quantitative research methods, such as surveys or questionnaires, to collect data. Most studies find that agile methodologies positively impact project success, with benefits such as faster time-to-market, improved customer satisfaction, and reduced risk. Most studies use a sample of IT professionals and focus on the software development industry. Many studies use structural equation modelling (SEM) and multiple linear regression analysis to test the proposed models. They are based on a theoretical perspective of contingency theory, which suggests that the relationship between variables depends on the context. Additionally, all the studies focus on the impact of agile methodologies on project success, with many mentioning specific agile frameworks such as Scrum, SAFe, and Kanban. Furthermore, many studies discuss the importance of factors such as team dynamics, communication, and management support in determining project success with agile methodologies. Some studies suggest that agile methodologies can improve project outcomes, such as faster project completion times, cost savings, and increased innovation.

In terms of differences between the studies, it can be observed that while most of the studies have found a positive impact of agile methodologies on project success, some studies have found mixed results or no significant impact. The studies have used different samples and data collection methods, with some focusing on specific industries, such as banking and finance, and others on specific regions, such as Pakistan and South Africa. They have also used different moderating and mediating variables in their proposed models, such as project complexity, managerial support, and job fit, and different theoretical perspectives, with some based on the contingency theory, others based on the resource-based view of the firm, and still others based on the institutional theory. Additionally, some studies investigate specific aspects of agile methodologies such as Scrum, Kanban (Lei et al., 2017) and Scaled Agile Framework (SAFe), while others look at agile methodologies in general. Some studies also suggest that Agile methodologies do not always lead to improved project outcomes and that there are challenges to be addressed, such as lack of proper training, resistance to change and management support.

2.3.5 Knowledge Gaps

Expanding on the knowledge gap mentioned, there is a need for comprehensive research on the effectiveness of agile methodologies compared to other project management approaches. While there have been studies on the immediate benefits of agile, there needs to be more research on its long-term impact and sustainability. Additionally, most research has been focused on the software development industry, and more studies should be conducted in other industries such as construction, healthcare, and particularly the financial sector, including banking. The rise of virtual work environments due to the recent pandemic presents an opportunity for future research. Despite the limited number of studies on agile methodologies in the banking industry, there is potential for further research on the impact of agile on specific banking projects, such as mobile and online banking. Moreover, given the globalisation of the banking industry and the differences in regulations, culture, and business practices across regions, there is a need for further studies in different regions to determine the feasibility of replicating the findings of current studies in other areas.

The knowledge gap for the impact of using agile methodologies in the financial sector lies in the need for more understanding of the various factors that contribute to the success of projects using these methodologies. Despite the widespread adoption of agile methodologies in the software development industry, there needs to be more empirical evidence of their effectiveness in the financial sector. Moreover, the specific challenges and obstacles organisations face while implementing agile methodologies in their projects have not been well documented. These knowledge gaps hinder the ability of organisations in the financial sector to effectively adopt and implement any agile methodology in their projects, leading to suboptimal project outcomes and a missed opportunity to improve project success. While there is a growing body of literature on the benefits and drawbacks of Agile in various industries, there needs to be more research that investigates the unique circumstances and complexities that organisations in the financial sector face when implementing this way of working. The studies do not explicitly study the role of change management and its impact. Factors such as leadership, team experience, organisational diversity and skillset have yet to be considered together with the existing success factors to find a correlation with the successful implementation of Agile methodologies. There is a need for comprehensive and in-depth studies focusing on the challenges, mediating and moderating factors, and organisational structure that affect project success in this particular industry.

3
Research Methodology

The research on the perceived impact of Agile methodology on project success in the financial industry of the Netherlands requires a comprehensive methodology that can extract useful information from the experiences and insights of people implementing Agile methodologies in their day-to-day work. To achieve this, a qualitative research approach was undertaken to gather rich and detailed insights from people working in various technology teams within a financial institution in The Netherlands. Qualitative research is a valuable approach for exploring complex phenomena, such as implementing Agile methodologies in the financial industry, as it enables a deep understanding of the experiences and perspectives of participants (Shenhar et al., 2001). This section will outline the methodology used in this research, including data collection methods, data analysis techniques, sampling strategy, validity and reliability measures, and ethical considerations.

3.1 Data Collection

The data collection for this study employed a combination of two primary methods: semi-structured interviews and document analysis. Semi-structured interviews were conducted with individuals who have extensive experience as product owners, scrum masters, and developers within asset management firms. These interviews were tailored for targeted individuals who have been involved in projects implementing various agile methodologies to explore their first-hand experiences, perspectives, and insights regarding the impact of agile on project deliveries.

In addition to the interviews, document analysis plays a crucial role in the research. This analysis involves a thorough examination of documentation related to different agile methodologies such as Scrum, SAFe, and Kanban, as well as any company-specific hybrid agile models that are in use within asset management firms. By analysing these documents, the study aims to gain a comprehensive understanding of the theoretical foundations, practical implementation guidelines, and recommended practices associated with agile methodologies.

The combination of semi-structured interviews and document analysis provides a rich and multifaceted dataset, allowing for a holistic exploration of the perceived impact of adopting agile methodologies in technology-driven projects within asset management firms. The insights obtained from both data sources will contribute to a comprehensive understanding of the topic and facilitate the formulation of meaningful conclusions and recommendations.

3.1.1 Document Analysis

The document analysis section of this research delves into a comprehensive examination of various types of agile methodologies employed in the asset management firms of the Netherlands. This section aims to provide a deeper understanding of the implementation and recommendations of methods such as Scrum, SAFe (Scaled Agile Framework), LeSS (Large-Scale Scrum) etc. The Agile Mindset and Principles that act as the foundation for these techniques were analysed. By analysing a range of documents, including academic literature and company-specific documentation, this study aims to explore the diverse approaches and best practices within the agile landscape.

Within the realm of agile methodologies, numerous frameworks and approaches exist, each with its own set of principles and practices. However, for the purpose of this document analysis, the focus was primarily on three key methodologies: Scrum, SAFe, and LESS. Scrum has been chosen as it is widely implemented at the team level in many companies adopting agile practices, as confirmed through the interviews conducted for this research. Additionally, some aspects of SAFe were explored, particularly its quarterly planning component (PI Event), which was found to be consistent among technology teams within asset management firms in the Netherlands. The analysis also encompasses certain aspects of LESS, which organisations have utilised to create their own hybrid agile approaches tailored to their specific needs. By examining these methodologies in detail, deductive codes and information were derived, allowing for an in-depth analysis of the interview transcripts. This analysis helped ascertain how the practices and principles outlined in the literature and general principles align with the practical implementation of agile methodologies in the asset management industry.

3.1.2 Semi-Structured Interviews

Semi-structured interviews are advantageous in cases of open-ended topics as they give the opportunity to ask follow-up questions (Adams, 2015). It helps in providing guidance to the interviewees while allowing flexibility for their responses (Flick, von Kardorff, & Steinke, 2004). This allows for the exploration of new paths and the discussion of new topics that may arise during the conversation, which were not previously considered (Saunders, Lewis, Thornhill, & Bristow, 2019). However, a few closed-ended questions during the conversation open up opportunities for further open-ended exploration. For example, the question *'What were the challenges you came across while adopting the agile way of working?'* was followed up by *'Why did this happen?'* or *'How did you overcome this'*. Further information and context were obtained by asking for specific examples.

It is important to consider that conducting semi-structured interviews can be time-consuming, labour-intensive, and require skilled interviewers (Adams, 2015). However, to mitigate this drawback, it is possible to conduct a smaller number of interviews. The information reaches a saturation stage with every interview and no new information is obtained. In this study, the balance and saturation level was reached after 11 interviews. However, a couple of interviews were taken after that to confirm the information received in previous interviews and find new potential insights.

Population of the Study

The population of this study consists of individuals involved in technology-driven projects within asset management firms in the Netherlands. The study targeted agile team members, including project managers, Scrum Masters, developers, and other relevant stakeholders who have experience with agile methodologies in the asset management industry. The selection of participants

was based on their knowledge and involvement in technology-driven projects and their familiarity with the adoption and implementation of agile methodologies. The inclusion of diverse participants from different roles within the asset management firms aimed to provide a comprehensive understanding of the perceived impact of agile methodologies on project success. By gathering insights from this specific population, the study aimed to capture valuable perspectives and experiences related to agile practices in the asset management context.

Sampling Strategy

The selection and sampling strategy for this research involved a combination of purposive sampling and snowball sampling techniques. Initially, purposive sampling was used as a non-probability sampling strategy to identify individuals who possessed relevant experience and knowledge regarding the adoption of agile methodologies in technology-driven projects within asset management firms. Subsequently, snowball sampling was employed to expand the participant pool by asking initial participants for referrals to other individuals who could provide valuable insights.

The purpose of the interviews was to gain a comprehensive understanding of the perspectives of individuals performing different roles in relation to the agile way of working and its impact on IT project deliveries. To ensure a diverse range of insights, the interviews were planned with individuals fulfilling various roles including product owners, scrum masters, developers, and business analysts. Considering the small-scale nature of the research and the need for timely completion, selection criteria were developed to recruit suitable participants for the study. Participants were selected based on their specific roles, experience, and knowledge related to the agile way of working. Additionally, participants were specifically chosen from the technology and operations departments within different asset management firms in the Netherlands, as the research focused on the impact of agile methodologies on technology-driven projects within the sector.

In order to obtain a holistic view of the problem, at least one participant from each role was selected to participate in the interviews. This ensured that the perspectives of product owners, scrum masters, developers, and business analysts were all represented. Furthermore, all selected participants were required to have a minimum of one year of experience working in a scrum team or in a team utilising a different agile methodology. This criterion ensured that the participants had sufficient familiarity with agile practices to provide meaningful insights and reflections on their experiences.

By employing this selection and sampling strategy, the research aimed to gather a diverse range of perspectives and experiences, enabling a comprehensive exploration of the perceived impact of adopting agile methodologies in technology-driven projects within asset management firms.

The Table 3.1 presents the list of participants based on the above-mentioned criteria. For privacy and compliance reasons the participant and company names have been coded.

Table 3.1: Participants Selected for Interviews

Participant Code	Role	Experience	Company Code	Area
P1	Product Owner	12 years	C1	Client Experience Area
P2	Developer	17 years	C1	Client Experience Area
P3	Developer	14 years	C1	Investments Performance Area
P4	Product Owner	16 years	C2	Investments Performance Area
P5	Scrum Master	5 years	C1	Platform & Fit for Purpose Area
P6	Scrum Master	24 years	C4	Platform & Fit for Purpose Area
P7	Scrum Master	25 years	C1	Client Experience Area
P8	Scrum Master	26 years	C1	Investments Performance Area
P9	Product Owner	25 years	C1	Platform & Fit for Purpose Area
P10	Scrum Master	19 years	C2	Client Experience Area
P11	Developer	28 years	C3	Platform & Fit for Purpose Area
P12	Business Analyst	3 years	C1	Client Experience Area
P13	Developer	14 years	C4	Platform & Fit for Purpose Area

Interview Protocol

The interview protocol followed a systematic approach to ensure the collection of comprehensive and reliable data. Prior to the interviews, the interviewees were contacted via email and in person, where they were provided with an invitation that outlined the purpose of the interview and requested their input in scheduling a convenient date and time for the discussion. The interviewees were fully informed about the study's objectives and their role in it, and the procedures prescribed by the Human Research Ethics Committee (HREC) were strictly adhered to in order to safeguard data privacy and interviewee confidentiality.

The interviews were conducted online using Microsoft Teams, a platform approved by the university for its recording and transcription capabilities. The duration of the interviews ranged from 45 to 60 minutes, and explicit consent was obtained from the interviewees prior to recording the sessions. To initiate the interview, a set of general questions were posed to gain an understanding of the interviewee's background. This was followed by specific questions tailored to their respective roles and the topics explored in the research. The questions were designed to encompass the factors and themes identified through the literature review and document anal-

ysis. The interviewees were encouraged to share their personal experiences, perspectives, and recommendations regarding the agile way of working and the best practices they have observed or advocated for achieving optimal outcomes.

Upon completion of the interviews, the transcripts were generated and shared with the interviewees to ensure the accuracy of the captured information and to allow them the opportunity to provide any additional insights they deemed relevant for the study. This member-checking process aimed to validate the findings and ensure that no false conclusions were drawn. The interviewees were encouraged to contribute any missed information or perspectives that could enhance the understanding of the benefits associated with the adoption of agile methodologies. Following confirmation of the transcripts, they were used as the basis for data analysis, enabling the extraction of valuable insights to address the research objectives. Figure 3.1 illustrates the interview protocol.

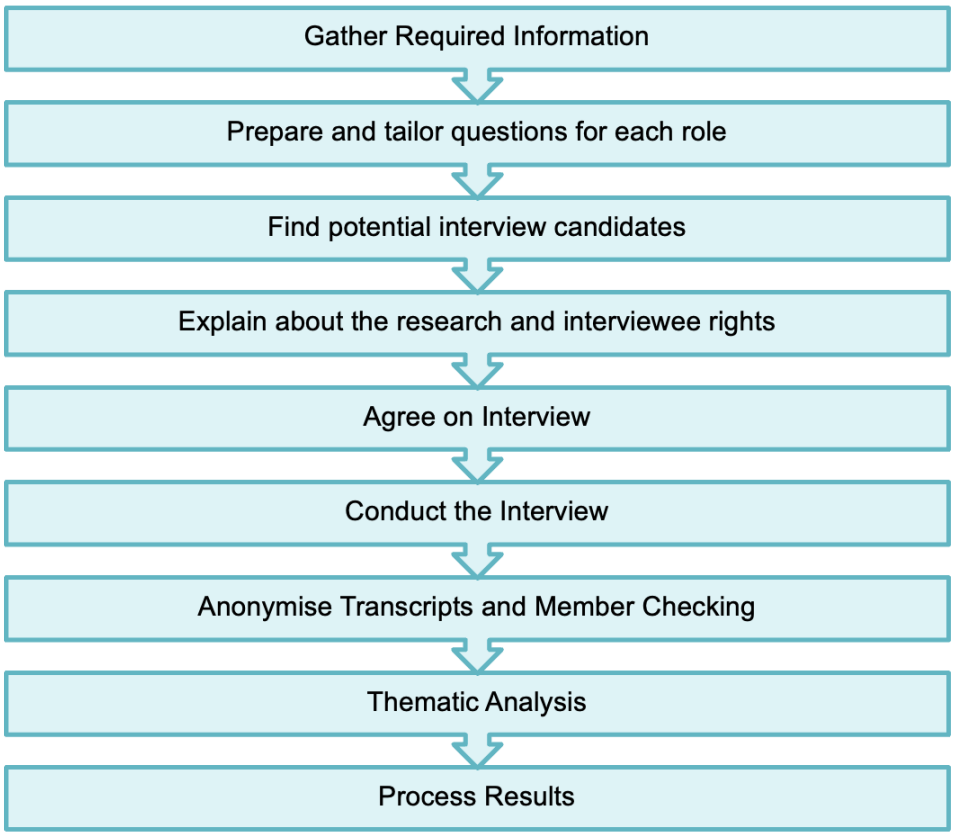


Figure 3.1: The Interview Protocol

3.2 Data Analysis

The data analysis for this research involves the examination and organisation of qualitative textual data obtained from the semi-structured interviews. The interview questions were initially divided into different groups, aligning with the specific research objectives. Additionally, different sets of questions were tailored for each type of interviewee, considering their respective roles and perspectives. The software tool Atlas.ti was utilised to systematically manage and structure the data. Through the software, the data was systematically organised by evaluating and open coding the different pieces of information, establishing their significance, and creating connections between them. Figure 3.2 shows an overview of the documents, quotations and codes for this research. Before delving into the coding process, it is important to establish a clear definition of the term "code" as used in this study. In this context, codes are words or phrases that represent the emerging topics and themes identified within the interview transcripts in a concise and straightforward manner (Chametzky, 2016). These codes serve as a means of transforming raw data into tangible and analysable information.

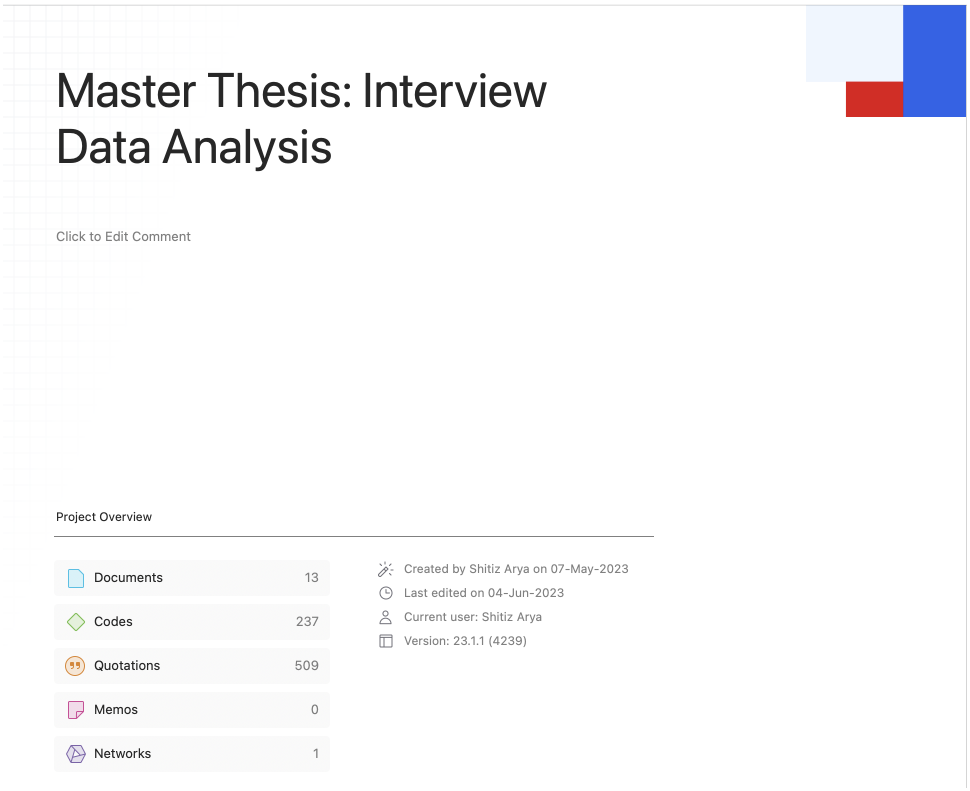


Figure 3.2: Interview Analysis Overview

Once the interviews were conducted and transcribed, the data analysis process commenced by uploading the interview transcripts into the Atlas.ti software and the data was organised by assigning relevant codes using both deductive and inductive coding approaches. Deductive coding involves the application of pre-existing concepts or theories from the literature to create codes, while inductive coding involves an iterative process of reading through the data and allowing new codes to emerge from the information itself (Bingham & Witkowsky, 2021). This combination of deductive and inductive coding ensures a comprehensive and nuanced analysis of the data, capturing both anticipated themes and unexpected insights that may arise from the interviews. From the 13 interviews conducted, a total of 234 codes were generated from the initial round and line-by-line coding. Figure 3.3 shows the list of codes and categories generated in Atlas.ti.

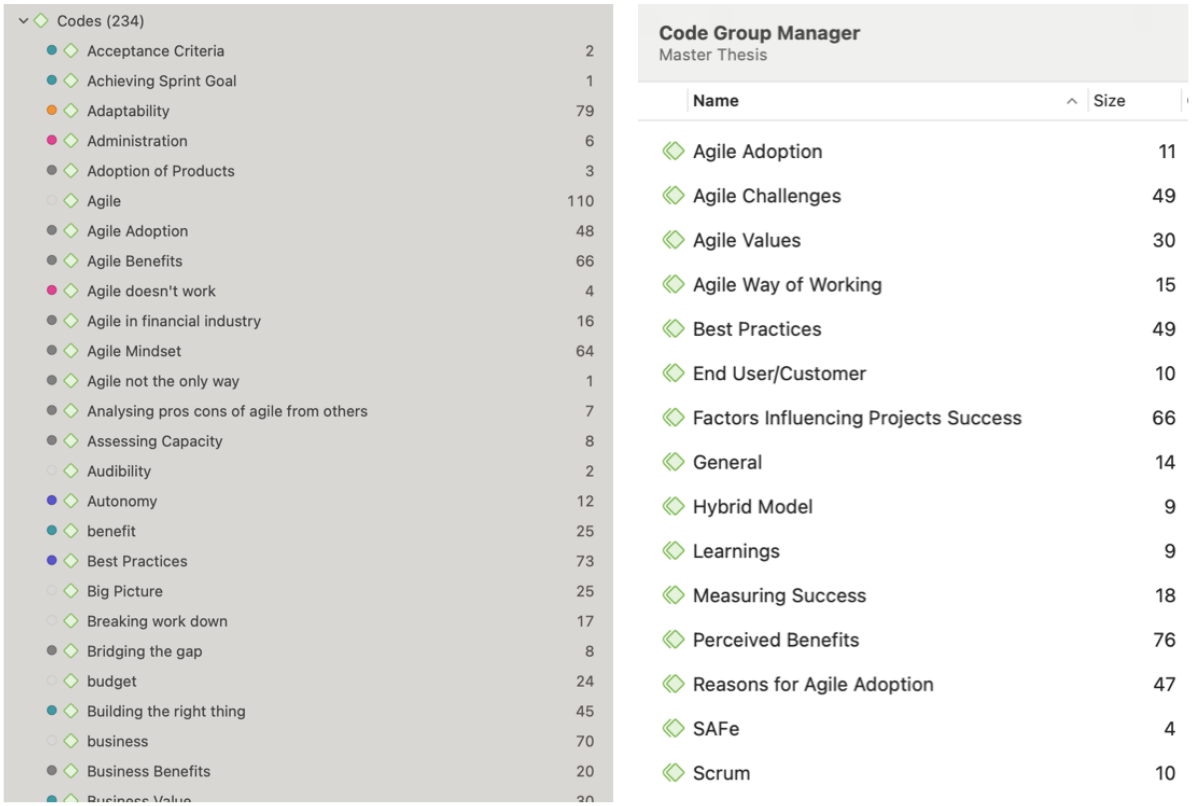


Figure 3.3: Snapshot of codes and categories developed in Atlas.ti

The final list of codes was further analysed and merged to avoid duplication. This resulted in 183 codes that were categorised into 15 different code groups. Figure 3.4 shows different codes merged into a single code group.

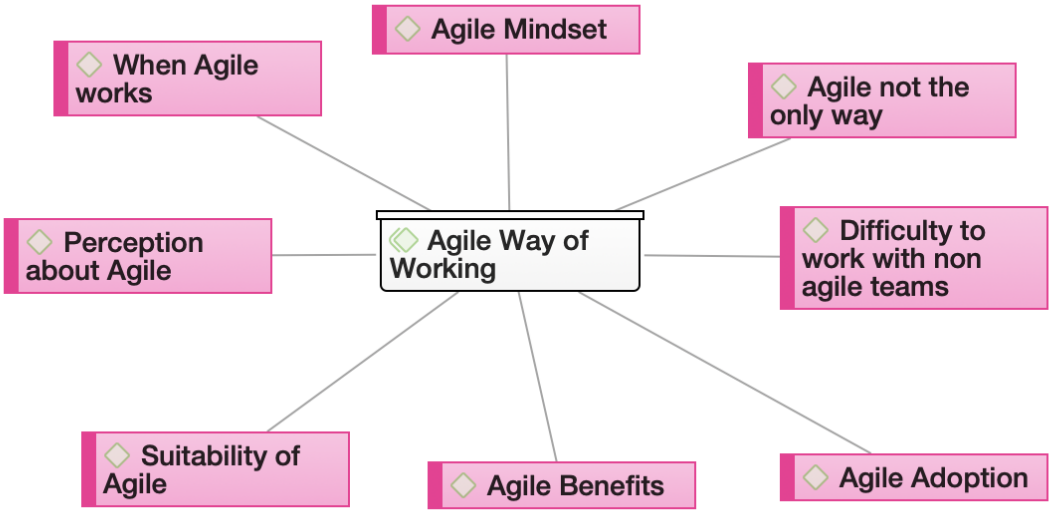


Figure 3.4: Different codes merged into single code group

Following the coding process, the next step involved grouping the codes into different themes based on the research objectives. This process, known as thematic analysis (Braun & Clarke, 2012), aimed to identify patterns, similarities, and connections among the codes. The themes were derived from the shared meanings and concepts that emerged from the coded data. The codes were carefully reviewed along with their respective meanings to identify commonalities and recurring patterns. Through an iterative process, the code groups were clustered into broader themes that represented overarching concepts and ideas relevant to the research questions. Other factors taken into consideration included the frequency, relevance, and depth of each code to ensure the integrity and coherence of the themes. The themes served as organising frameworks that captured the essence of the data, allowing for a more comprehensive understanding of the perceived impact of adopting agile methodologies in technology-driven projects within asset management firms. The code groups were categorised into 4 themes that helped in understanding and answering the research sub-questions. Figure 3.5 shows different code groups categorised under a theme.

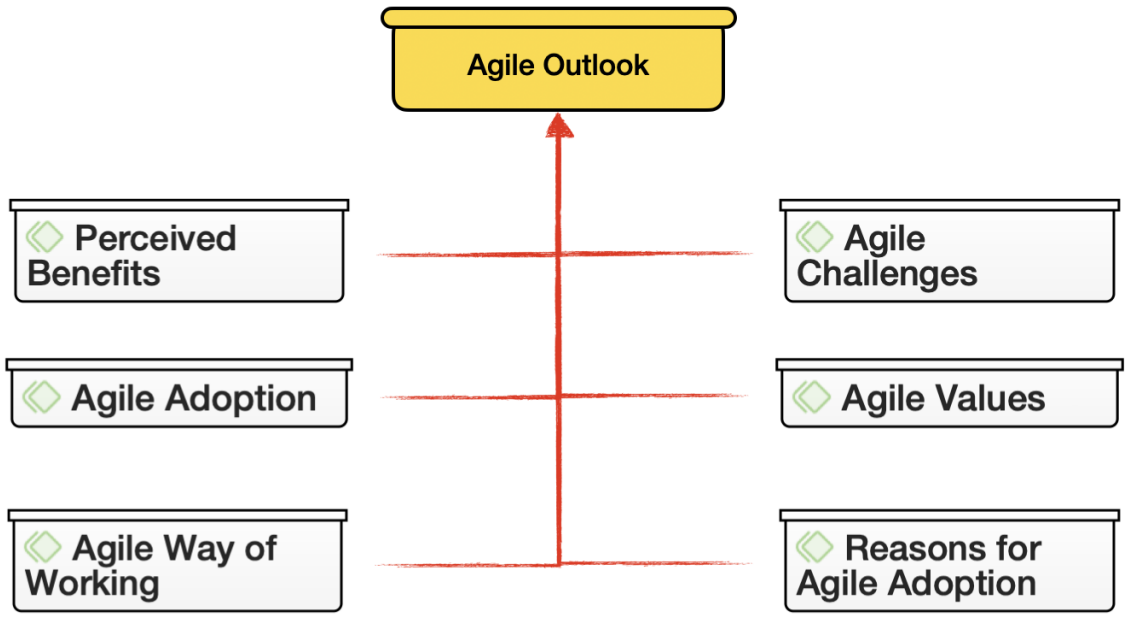


Figure 3.5: Different code groups categorised under a theme

For example, Interviewee P6 mentioned, *"I think at times you need to involve some pilot or friendly customers or someone in clients that comes on the journey with you and then actually see how fun and easy the tool is. This is good because then they can help other users to get on board because they already know how to use it that's I think the trick of it, to involve a small group from the beginning and take that journey with you."* and this was assigned a deductive code from the document analysis 'End User Involvement' which was mentioned in the SAFe framework as customer centricity (Brenner & Wunder, 2015) and as customer collaboration in the Agile Manifesto (Dingsøyr et al., 2012). This code was then placed in the group 'End User/Customer', which in turn was categorised under the theme 'Factors Influencing Project Success'. Similarly the following quote by Interviewee P13, *"It doesn't leave you any room. Like we have a retrospective, we have a mentality issue or a way of working issue and we keep working the way we work. So that's kind of contradicting in that sense, I guess. Like, if you want to change something in the retrospective, just do it. But then again, if the Agile way or scrum way doesn't leave any gap or room for improvements, you get stuck the in your work."* was coded from an inductive approach as 'Scrum stopping Agile' and later grouped under 'Agile Challenges'. This group was then mapped to the 'Agile Outlook' theme. Figure 3.6 illustrates the process

of coding quotes from the interview transcripts. The highlighted text was given two codes and the interviewee talked about Adaptability and the Agile Mindset. The same codes were given to other quotes from different interviewees. This helped in identifying different themes and factors which were needed to answer the sub-questions.

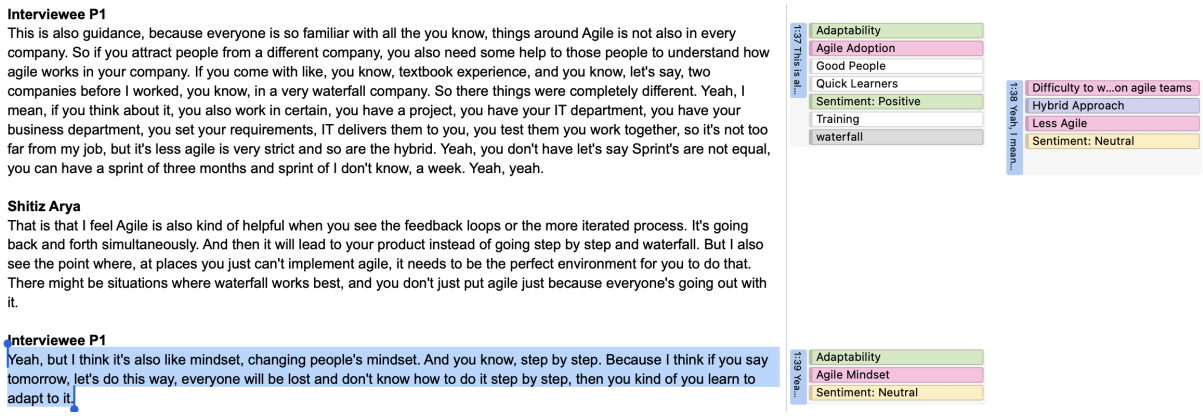


Figure 3.6: Example of quote labelling from interview transcript

3.3 Ethical Considerations

The research adhered to strict ethical considerations throughout the entire process. Prior to commencing data collection, ethical approval was obtained from the Human Research Ethics Committee (HREC) at TU Delft. This approval ensured that all necessary measures are in order to mitigate any possible risks involved during the research. The study also implemented a comprehensive data management plan to safeguard the confidentiality and anonymity of the participants. Measures such as using pseudonyms and other techniques were employed to protect their identities.

Participants were fully informed about the study and their rights as research participants. Respecting the well-being of the participants, the study diligently followed ethical guidelines. One crucial consideration was obtaining informed consent from all participants. Prior to conducting any interviews, participants were provided with a consent form outlining the purpose of the study, their involvement, and any potential risks or harms associated with their participation. They were given the freedom to withdraw from the study at any point without facing any consequences. Additionally, participants were informed that the interviews would be recorded using Microsoft Teams solely for the purpose of transcription. To further ensure privacy and confidentiality, the participants were assured that the recordings would be securely stored and would be deleted upon the completion of the thesis.

To ensure data confidentiality, all information collected from the participants was treated as highly confidential and stored securely in accordance with the Data Management Plan. Before analysis, all personal information was carefully removed to protect the identities of the participants. These rigorous ethical measures were implemented to uphold the integrity of the study and safeguard the well-being and privacy of the participants.

4
Research Findings

This chapter presents the outcomes and insights gathered through the analysis of data collected from interviews and document analysis. The chapter is structured into five sections, one explaining the documents and relevant methodologies addressed in this study and remaining four addressing a sub-research question. The document analysis aids in comprehending the first and third sub-research questions by providing insights into the perceived benefits of organisations and the various factors influencing project delivery. The second sub-research question is addressed through a combination of the literature review and interviews. The interviews, in particular, play a significant role in addressing all four sub-research questions by analysing the individual experiences of the participants. There were four themes generated based on the thematic analysis of the interview transcripts, Agile Outlook, Best Practices, Project Success Criteria, and Factors influencing project success. Each theme helps in answering the sub-research questions for this research.

4.1 Document Analysis

4.1.1 The Scrum Framework

Scrum is a lightweight framework founded on empiricism and lean thinking to help people, teams, and organisations generate value through adaptive solutions for complex problems. It uses an iterative, incremental approach to optimise predictability and control risk. It engages groups of people with collective skills and expertise to do the work while allowing them to share or acquire other skills as needed. Scrum implements the empirical pillars of transparency, inspection, and adaptation and provides a structured process for inspection and adaptation (Schwaber & Sutherland, 2020).

The three pillars of Scrum theory are transparency, inspection, and adaptation. Transparency refers to open and clear communication between the different Scrum team members, ensuring that all stakeholders have the necessary information to make informed decisions. Inspection refers to the regular review and evaluation of the project's progress, allowing for continuous improvement and identifying any potential issues. Adaptation refers to the team's ability to respond and make changes to their processes and practices in response to feedback, ensuring that they are always working towards project success. An overview of the scrum framework can be seen in Figure 4.1.

Scrum Values

Scrum values provide the foundation for the Scrum methodology and the principles that guide its implementation. The five Scrum values are commitment, courage, focus, openness, and respect (Schwaber & Sutherland, 2020). Commitment refers to the team's dedication to delivering a high-quality product and working together to achieve project goals. Courage is the willingness of the team members to embrace change and take risks to improve their work. Focus refers to the team's ability to prioritise their work and stay on track with their project goals. Openness refers to the team's willingness to share information, collaborate, and receive feedback from others. Respect refers to the team's appreciation for the contributions and perspectives of each member and for the diverse skills and experiences they bring to the project.

Scrum Team

The Scrum methodology is based on the Agile values and principles outlined in the Agile Manifesto (Dingsøyr et al., 2012) and is centred around the Scrum Team, responsible for delivering the product. The Scrum Team comprises three key roles: the Scrum Master, the Product Owner and the Development Team. The Scrum Master is responsible for facilitating the Scrum process, ensuring that the team adheres to the Scrum methodology, and removing any obstacles that the team may encounter. The Product Owner is responsible for defining the product backlog, a prioritised list of product requirements, and making decisions about the product. The Development Team is responsible for delivering the product and consists of cross-functional members with the skills and experience necessary to create a potentially deliverable product increment.

Scrum Events

The Scrum methodology consists of events that provide structure and accountability to the process. The scrum events are Sprint, Sprint Planning, Daily Scrum, Sprint Review, and Sprint Retrospective. The Scrum methodology consists of a series of iterations, known as ***Sprints***; each focused on delivering a set of product features. The sprints are time-boxed, usually lasting between one and four weeks, and at the end of each Sprint, the Development Team should deliver a potential product increment. This increment should be of high quality and meet the customer's requirements.

Before each Sprint, the Scrum Team reviews the product backlog and selects a set of items to be delivered in the upcoming Sprint. This is known as ***Sprint Planning***, involving the Product Owner, the Development Team and the Scrum Master. Sprint planning aims to identify what work is required to deliver the product backlog items and determine how the work will be completed. During each Sprint, the Development Team works to deliver the product backlog items that have been selected. The Scrum Master provides guidance and support and helps to remove any obstacles that may arise. During the Sprint, the development team meets regularly for the daily Scrum. The ***Daily Scrum***, also known as the stand-up, is a quick 15-minute meeting held every day to check progress and discuss any obstacles that need to be addressed. At the end of each Sprint, the Scrum Team holds a ***Sprint Review***, during which the Development Team demonstrates the work that has been completed, and the stakeholders provide feedback.

Finally, after each Sprint, the Scrum Team holds a ***Sprint Retrospective***, during which the team reflects on the Sprint that has just ended and identifies any areas for improvement. The sprint retrospective aims to continuously improve the Scrum process and ensure that the team is learning and adapting to the project's needs.

Scrum Artefacts

Scrum artefacts are tangible, physical or digital items representing the work being done in a project. The main scrum artefacts are the *Product Backlog, Sprint Backlog,* and *Increment*. The Product Backlog is a prioritised list of features and requirements the team is working on. The Sprint Backlog is a list of items from the Product Backlog that the team plans to complete in the current Sprint. The increment is a body of work that has been completed and added to the product, representing an improvement in the overall product. These artefacts provide transparency and clarity to the team and stakeholders, ensuring everyone is on the same page and understands the progress being made.

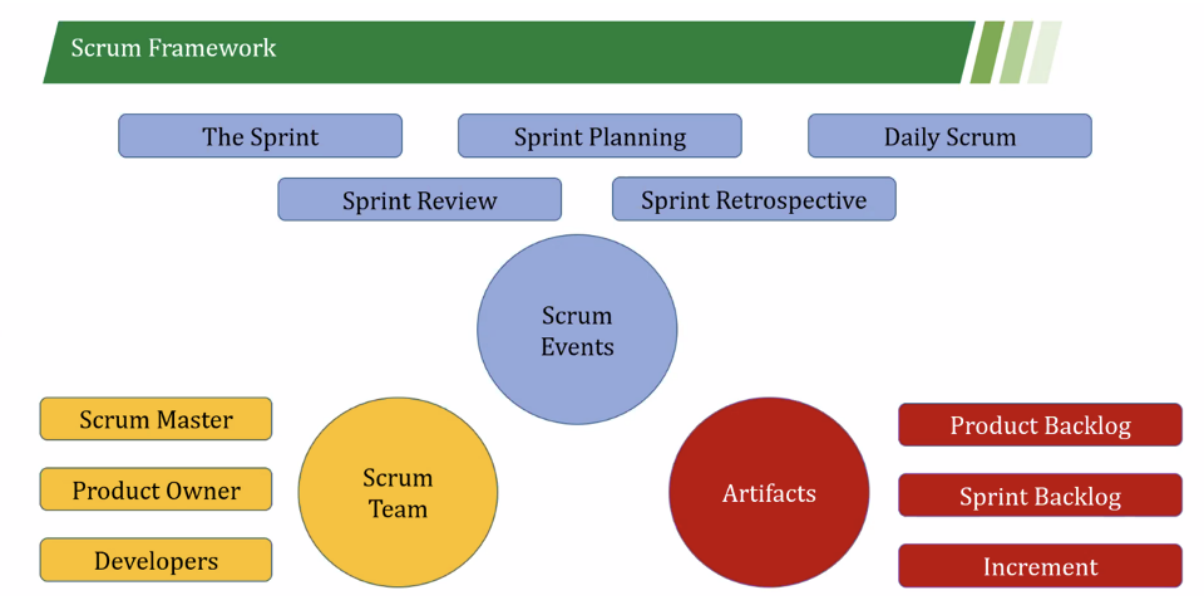


Figure 4.1: An Overview of the Scrum Framework (own illustration based on Schwaber & Sutherland, 2020

4.1.2 Scaled Agile Framework (SAFe)

The Essential Scaled Agile Framework (SAFe) is a comprehensive and widely adopted approach for implementing agile practices at scale. It provides organisations with a structured framework to align and coordinate multiple agile teams which ensures efficient collaboration and effective delivery of complex projects. SAFe incorporates the principles of Lean and Agile methodologies, enabling organisations to achieve business agility and adaptability in a fast-paced and competitive environment. SAFe also emphasises continuous integration and delivery through the use of Agile Release Trains, where teams work on delivering increments of value at regular intervals. This enables organisations to quickly respond to changing market needs and receive feedback from customers early in the development process. The key elements of the Essential SAFe include the Agile Release Train (ART), which serves as a virtual organisation of multiple agile teams working together to deliver valuable solutions. The ART operates on a fixed cadence, known as the Program Increment. DevOps teams are an integral part of the Agile Release Train (ART). They work closely with other teams within the ART to deliver shippable increments of the product during each Program Increment (PI). DevOps teams play a critical role in building and maintaining the product, such as an application, and are an integral part of the agile delivery model. The SAFe framework is shown in Figure 4.2

The Lean-Agile Mindset

"Agility is principally about mindset, not practices" - Jim Highsmith (Highsmith, 2004).

At its core, Lean thinking seeks to eliminate waste and create value by focusing on customer needs, identifying and resolving bottlenecks, and promoting a culture of continuous improvement (Vilkki, 2010). It emphasises the importance of optimising the entire value stream and enabling the fast flow of work, reducing delays, and maximising value delivery.

The Agile Manifesto, on the other hand, outlines the values and principles that underpin Agile methodologies (Dingsøyr et al., 2012). It emphasises individuals and interactions, working software, customer collaboration, and responding to change as shown in Figure 2.1. Agile methodologies promote iterative and incremental development, self-organising teams, and frequent customer feedback to enable quick adaptation and delivery of high-quality products.

The Lean-Agile mindset forms the foundation of the Scaled Agile Framework (SAFe) and is a key element in achieving successful agile transformations. The Lean-Agile mindset represents a set of beliefs, principles, and values that guide individuals and organisations in their adoption of Lean and Agile practices (Mordi & Schoop, 2020). Embracing this mindset is essential for building a culture of continuous improvement, collaboration, and customer-centricity. It promotes the concept of relentless improvement, where individuals and teams continuously seek ways to enhance their processes, products, and services. This mindset encourages a focus on outcomes rather than outputs, encouraging teams to prioritise customer needs and adapt to changing requirements. The mindset encourages individuals to consider the broader context and interdependencies within which they operate. This holistic perspective helps identify and address bottlenecks, optimise workflows, and align the efforts of different teams and stakeholders towards a common goal.

The two most integral components of the Lean-Agile mindset are Transparency and trust. They lead to open and honest communication, fostering a culture where information flows freely and everyone's voice is valued (Mordi & Schoop, 2020). This mindset also promotes collaboration and teamwork, recognising that diverse perspectives and collective intelligence lead to better outcomes. By creating an environment of psychological safety, where individuals are encouraged to take risks, share ideas, and learn from failures, the Lean-Agile mindset enables innovation and learning (Womack & Jones, 1996). Adopting the Lean-Agile mindset requires a shift in thinking and behaviour at both the individual and organisational levels. It involves embracing agile values such as respect for people, a focus on quality, and a willingness to embrace change. Leaders play a crucial role in fostering this mindset by modelling the desired behaviours and creating an environment that supports and reinforces Lean-Agile principles.

Essential SAFe Principles

- **Take an economic view:** Understand the economics of building systems and make decisions in an economic context.
- **Apply systems thinking:** Consider the larger systems within which workers and users operate.
- **Assume variability;** preserve options: Maintain multiple design and requirements options for a longer period to optimise economic outcomes.
- **Build incrementally with fast, integrated learning cycles:** Develop solutions incrementally in short iterations for faster customer feedback and risk mitigation.

- **Base milestones on objective evaluation of working systems:** Evaluate the solution throughout the development life cycle using integration points.
- **Make value flow without interruptions:** Eliminate impediments and optimise the flow of value in the system.
- **Apply cadence, synchronise with cross-domain planning:** Establish development rhythm and synchronise perspectives through cross-domain planning.
- **Unlock the intrinsic motivation of knowledge workers:** Foster employee engagement through autonomy, purpose, and a cooperative environment.
- **Decentralise decision-making:** Empower employees with decentralised decision-making for faster value delivery.
- **Organise around value:** Organise the enterprise around delivering value quickly and efficiently, rather than functional expertise.

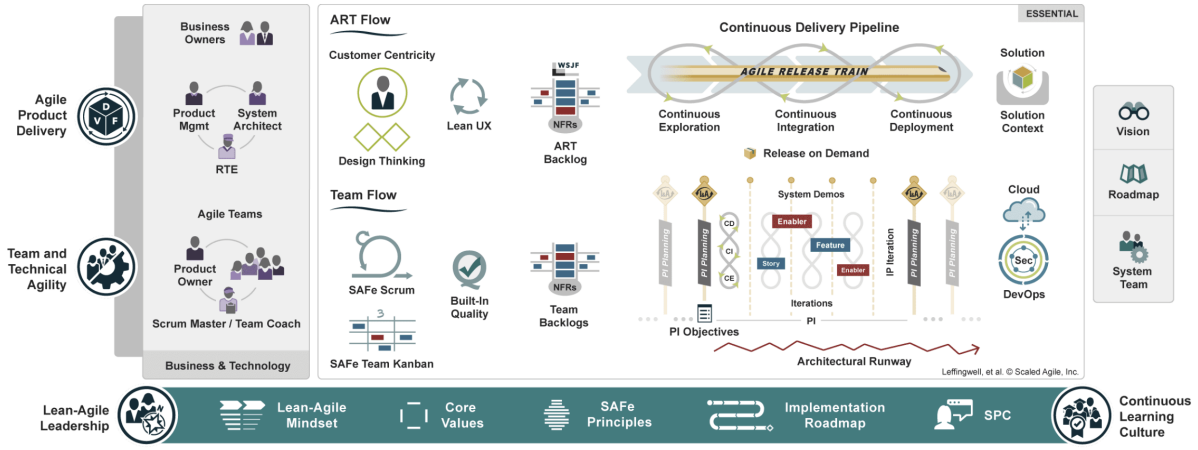


Figure 4.2: Essential SAFe (retrieved from: Knaster, 2023)

Program Increment (PI Event)

The Program Increment is a timeboxed period typically lasting 8-12 weeks, during which multiple teams work together to deliver a set of features and capabilities. PI Planning is a crucial event that kicks off each Program Increment, bringing together all teams involved in a value stream to plan and align their work. During PI Planning, teams collaborate to define the objectives and priorities for the upcoming increment. The Product Owner presents the program backlog, which includes a prioritised list of features and user stories. Teams then break down these features into smaller, actionable tasks and estimate the effort required to complete them. The PI Planning ceremony involves cross-functional collaboration and coordination, with team members from different disciplines working together to create a shared understanding of the work to be done. Dependencies and risks are identified, and mitigation strategies are discussed. Teams also discuss and negotiate their capacity and commitments for the PI.
At the end of PI Planning, all teams have a common understanding of the work ahead and a synchronised plan for the Program Increment. This plan serves as a roadmap for the teams' activities and guides their work throughout the PI. Regular check-ins and synchronisation events, such as Scrum of Scrums, are held throughout the PI to ensure alignment, address any challenges, and track progress.

DevOps Teams

DevOps teams are essential in agile frameworks as they build and maintain the product or application. These teams are cross-functional, possessing the necessary expertise to deliver potentially shippable products. They have a high degree of autonomy and accountability, self-organising to achieve their goals (Ebert, Gallardo, Hernantes, & Serrano, 2016). DevOps teams make decisions about the number of items they can build during a sprint and how to accomplish their objectives. Each team member is committed to the team's goals, fostering collaboration and contributing ideas for product improvement. The team members continue to learn and develop skills in different areas, allowing them to adapt and complete tasks outside their expertise. In Scrum, it is important to avoid divided attention and context switching to optimise productivity. DevOps teams maintain a dedicated focus on their work, avoiding distractions and maintaining stability. Larger product groups are divided into smaller teams, known as Feature Teams, focusing on specific customer-centric features (Zorin & Hahn, 2020). The recommended team size ranges from 3 to 9 members, with an optimal range of 5 to 7 members.

4.1.3 Large-Scale Scrum (LeSS)

Large-Scale Scrum (LeSS) is a scaling framework that extends the principles and practices of Scrum to enable agility in larger organisations (Conboy & Carroll, 2019a). It focuses on organisational descaling, emphasising simplicity, transparency, and cross-functional teams. LeSS adopts an agile mindset and promotes collaborative and iterative approaches to product development. The overview and components of LeSS can be seen in Figure 4.3.

One of the key features of LeSS is its emphasis on team structures and agile thinking. It encourages organisations to form self-managing and self-organising teams that are cross-functional and can deliver end-to-end value. By enabling teams to have full ownership of their work, LeSS promotes empowerment and accountability, leading to increased efficiency and effectiveness (Conboy & Carroll, 2019a). In LeSS, there is centralised prioritisation and distributed coordination. The Product Owner's role becomes crucial, as they are the only ones responsible for providing work to the teams. This eliminates the need for project managers and streamlines decision-making, allowing for faster and more focused product development. The role of the Product Owner scales via product areas, ensuring alignment and clear ownership of different aspects of the product.

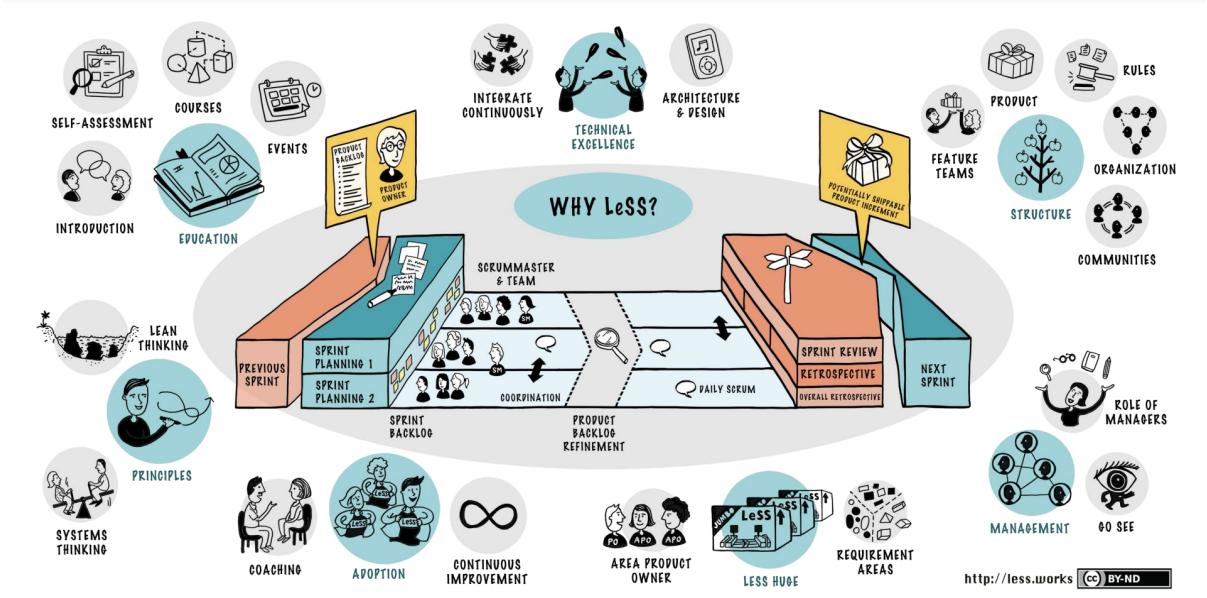


Figure 4.3: Large Scale Scrum Overview (retrieved from LeSS, 2023)

LeSS also enables strong principle alignment throughout the organisation. By promoting the adoption of agile principles and values, LeSS ensures a shared understanding and consistent application of these principles across teams. This alignment creates a cohesive and collaborative work environment, enhancing the effectiveness of the scaling efforts (Gustavsson, 2017). For medium to large organisations, LeSS provides two suggested structures to facilitate scaling. These structures offer guidelines on how to organise teams, define roles, and establish coordination mechanisms. By providing these structures, LeSS helps organisations navigate the complexities of scaling agile practices, ensuring that the agile mindset is effectively applied throughout the organisation.
The overview of values for all methodologies analysed in this study can be seen in Figure 4.4



Figure 4.4: Overview of Agile Values (own illustration based on different methodologies analysed in this study

4.2 The Agile Outlook: Reasons, Benefits and Challenges

The first research sub-question *"What are the reasons, challenges, and perceived benefits of adopting the Agile way of working in technology-driven projects within asset management firms?"* is addressed in this section. This section explores the various aspects of the agile outlook theme. The theme encompasses multiple categories, including the reasons for adopting agile methodologies, challenges encountered, perceived benefits, underlying values of agile practices, and overall agile way of working. By examining these categories, the first sub-research question is addressed, shedding light on the factors that drive organisations to adopt agile methodologies. Through an analysis of participants' perspectives and experiences, this section provides valuable insights into the motivations behind the adoption of agile practices, the challenges faced during implementation, and the perceived benefits derived from embracing an agile mindset.

4.2.1 Reasons for Adopting Agile

Before understanding the benefits and challenges associated with agile methodologies, it is crucial to understand the underlying motivations that drive organisations to choose this approach. The decision to adopt agile is not made in isolation but is influenced by a variety of factors as seen in the document analysis. Some of these include the need for increased flexibility, faster

time-to-market, improved collaboration, and enhanced customer satisfaction. These reasons stem from the recognition that traditional project management approaches such as waterfall may not be able to effectively address the complexities and uncertainties present in today's dynamic business environment. By delving into the reasons behind the adoption of agile, we can gain valuable insights into the specific expectations and objectives organisations have when embracing this way of working.

Many of the factors that were found in the literature and document analysis of different methodologies were further confirmed through the insights shared by the experts during the interviews. These can be seen in Figure 4.5 in yellow highlighted blocks.
Furthermore, the interview process revealed additional reasons beyond those discovered in the document analysis. These insights were gathered during the interviews with experts who have personally witnessed and experienced the transformation of their organisations towards an agile mindset. The inclusion of these additional reasons provides a more comprehensive understanding of the motivations behind the adoption of agile methodologies in different contexts. Some of the main reasons found can be seen in the orange highlighted block in Figure 4.5.

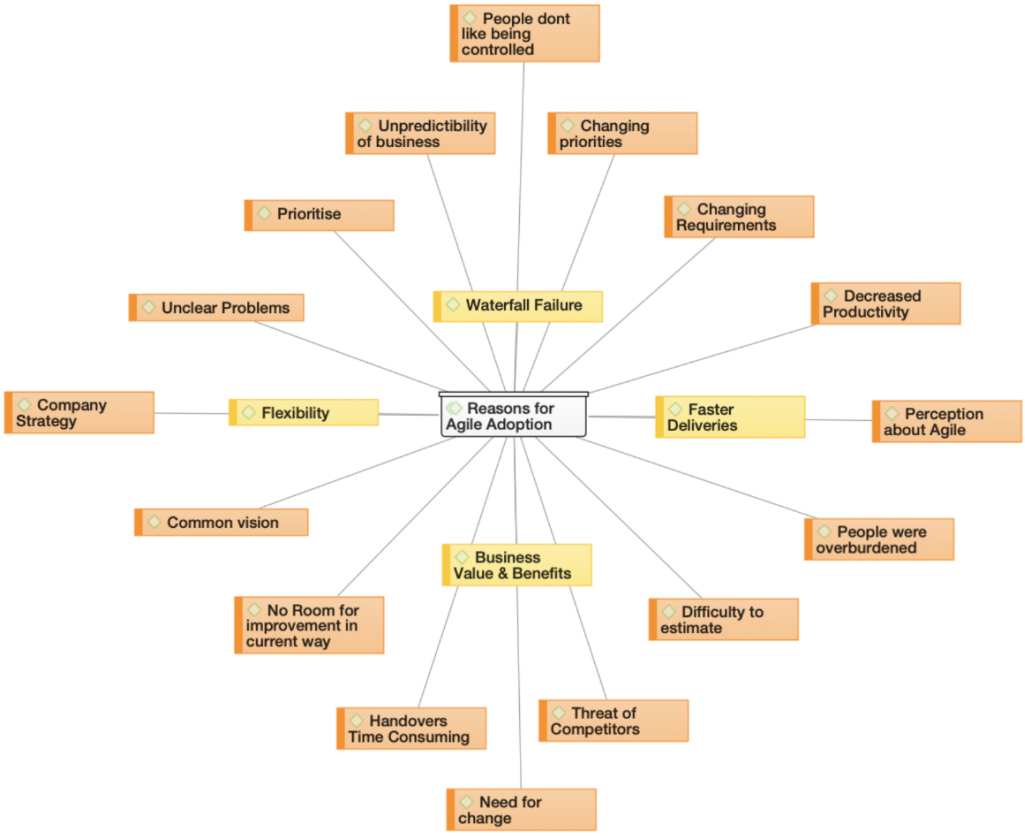


Figure 4.5: Snapshot of codes categorised under reasons for agile adoption

The reasons found in the literature and documentation for adopting agile way of working include Business Value, Flexibility, Faster Deliveries, and Failure of Waterfall methodology. These reasons were also mentioned by participants during the interviews. Figure 4.6 provides an overview of the participants who mentioned these reasons. The numbers just confirm the instances of benefits being mentioned by the participants. Scrum Masters identified Business Value and Faster Deliveries as the main driving factors for adopting agile. One interviewee, P5, emphasised the importance of effective communication channels and the independence offered by agile, leading to faster time-to-market and incremental improvements. According to P5, *"In the traditional*

approach, you would have initiatives and budgets dictating what you can do, limiting your autonomy. However, in the agile approach, you have more independence and can feel empowered to make decisions." On the other hand, Product Owners perceived Flexibility as the most important factor, recognising the unpredictability of the business and aiming to maximise business value. Interviewee P9 stated, *"In our agile approach, we prioritise initiatives that offer clear business value. We break down these initiatives into smaller, manageable parts and focus on delivering them quickly. If priorities change, we have the flexibility to adjust our focus accordingly."* Developers highlighted the limitations of the waterfall approach in delivering technical solutions and emphasised the need for adaptability in an environment with constantly changing requirements. Interviewee P2 mentioned, *"If a company is not agile in today's time and operates with bureaucratic waterfall processes, it may struggle to survive in our vibrant society."*

	Business Value & Benefits	Faster Deliveries	Flexibility	Waterfall
1 Interviewee P1	1	1	3	2
2 Interviewee P2	2	4	1	2
3 Interviewee P3				1
4 Interviewee P4	1	2	1	
5 Interviewee P5	2	2	1	
6 Interviewee P6	2	3	3	
7 Interviewee P7	3	3	2	1
8 Interviewee P8	3	5	1	
9 Interviewee P9	1	1	1	
10 Interviewee P10	3	1		1
11 Interviewee P11	1		1	2
12 Interviewee P12		2		
13 Interviewee P13	1	1		1
Totals	**20**	**25**	**14**	**10**

	Business Value & Benefits	Faster Deliveries	Flexibility	Waterfall
Business Analysts		2		
Developers	4	5	2	6
Product Owners	3	4	5	2
Scrum Masters	13	14	7	2
Totals	**20**	**25**	**14**	**10**

Figure 4.6: Overview of reasons to adopt agile found in literature and confirmed in the interviews

In addition to the reasons found in the literature, the interviews revealed several other factors that drove the adoption of agile way of working. These reasons highlight the range of motivations that led to organisations switching to the agile way of working. While some organisations were prompted to adopt agile due to the growing pressure from competitors, recognising the need for faster and more adaptive approaches to stay competitive in the market. As mentioned by interviewee P8, who also talks about lack of room for improvement in old ways of working, *"My experience with the old way of working, which required a lot of managers pushing, checking, and keeping track of everything to get things done, drove people crazy. We realised that although we were meeting our deliverables, there was no room for further improvement. Meanwhile, we observed the external landscape, often referring to it as the "sharks outside". Competitors and clients were constantly striving to do things better and smarter. We understood that if we didn't adapt and become more agile, these companies, especially those without a traditional financial background like Google, Microsoft, or Apple, could easily enter our market and offer similar ser-*

vices without the burden of legacy systems. Therefore, the need for change became evident. We needed to be more adaptable and faster in order to stay competitive.". Organisations also realised the lack of value being delivered due to ineffective prioritisation and overburdened individuals, which led them to adopt a new style of working where teams could take ownership of their work and collaborate more effectively.

The interviews also shed light on the challenges associated with extensive documentation and the difficulties in accurately estimating project timelines in traditional approaches. Agile offered a way to address these issues by promoting iterative and incremental development, reducing the reliance on comprehensive upfront documentation, and allowing for increased flexibility in adapting to changing requirements. Talking about ownership, Interviewee P9 mentioned, *"So you've got the two sides, which is first business take ownership for what they want, their goal, their motivations, and making sure that proper business cases and prioritise things. Then the people who build it, they build things, build them well, with quality, they own it, and they support it, when it's in production, they feel more like they are in control, they are adding value, those type of things. So I think they're the two aspects of what was being seen to be lacking. And by making that change, the project deliveries improved immensely."*.
Hence, organisations adopted various agile methodologies to gain a competitive advantage in the market and consistently deliver high-quality products in a shorter timeframe.

4.2.2 Perceived Benefits of Agile Way of Working

During the adoption phase of a new style of working such as agile, companies carefully analyse the perceived benefits as a crucial step in determining the most suitable approach for their teams. During the interview process, the participants shared their initial perceptions of various agile methodologies and provided valuable insights into how these benefits were ultimately realised.

The literature and document analysis revealed a range of benefits and values associated with using Agile, some of which were confirmed by the insights shared during the interviews. Moreover, participants shed light on benefits that may not be immediately apparent but exist within the agile framework. As also mentioned by Interviewee P6, *"You may not immediately notice it, as it requires close attention, but the changes brought about by agile methodologies are not always fixed. Nobody is standing on the roof and shouting at is extremely happy with the way things have changed. Instead, you can observe it in people's behaviour. Many of these enhancements may go unnoticed precisely because individuals have become accustomed to them."*

By considering both the anticipated and unforeseen benefits, a comprehensive understanding of the advantages of embracing the agile way of working was gained. Figure 4.7 illustrates the relationships between different values and benefits of the Agile way of working, as perceived by the interview participants. An example of the relationships shown is that the Agile way of working induces Focus which is one of the core values of Scrum (Schwaber & Sutherland, 2020). Focus is associated with commitment which was observed by the participants within their teams and is another value defined in the Scrum Framework. Focus and commitment lead to higher efficiency which increases productivity and leads to successfully delivering products to end users. The Figure shows the different benefits found in the document analysis and interviews, and how these benefits are interconnected. When implementing the agile way of working all benefits directly or indirectly help the team reach the end goal of keeping the customer happy.

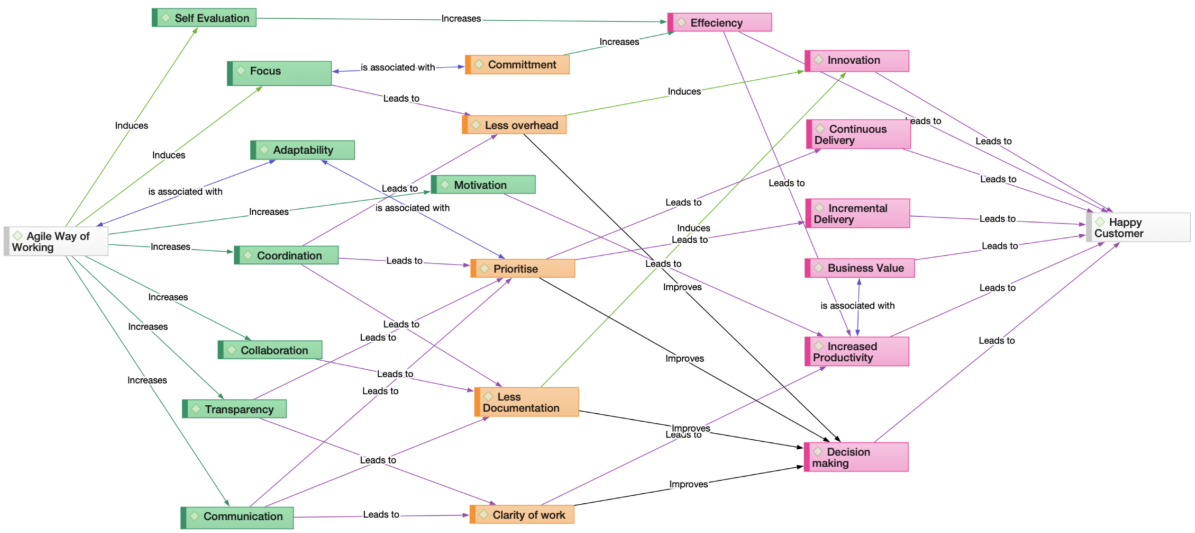


Figure 4.7: Network Diagram showing relationships among codes for benefits of Agile way of working based on interviews

One key finding from the interviews was the benefit of Agile which helps you estimate the predictability of the team. This insight was shared by Interviewee P7, *"You go into any other organisation where they're working waterfall for example. If you ask somebody their plan for the next two years. What percentage of certainty that they will deliver that if they can say 90%, you would snap their arm off. With agile you can do that and you have the evidence right there. This team delivers exactly what they've said 9 sprints out of 10. Evidence is there, it's a very empirical thing".*

Some of the perceived benefits brought to light in the interview process included collaboration, communication, faster time to market, enhanced flexibility, adaptability, self-organising teams, customer satisfaction, continuous improvement and incremental deliveries. Agile methodologies such as Scrum emphasise collaboration and open communication among team members through stand-ups, sprint planning, and retrospectives which leads to better knowledge sharing, increased transparency (Brenner & Wunder, 2015), and improved coordination (Schwaber & Sutherland, 2020). This results in enhanced team productivity and a higher likelihood of project success. The scrum values promote iterative development and continuous feedback. This was also mentioned by Interviewee P10, *"If you have short feedback loops, the risk of working on tasks that do not contribute to the project is significantly reduced. As a result, it decreases the project timelines since you are not wasting time chasing ghosts and performing unproductive activities. Short feedback loops enable you to identify and address issues promptly, ensuring that the project stays on track and progresses efficiently"*. These feedback loops help in incorporating customer feedback early and frequently throughout the development process and helps in ensuring the final product aligns with customers' expectations and meets their evolving needs. This results in an increased level of customer satisfaction and business value.

The Lean concept (Vilkki, 2010) mentions communication being a key value which was also emphasised by the interviewees. It is perceived important as it helps in aligning with multiple teams working on the same product and ensures everyone understands the big picture. This leads to clarity of work and helps increases the productivity of the teams. Interviewee 13 mentioned, *"I believe communication is key in our work. The PI event gives us an overview of what's happening in the company, but there are always hidden details and unforeseen circumstances. Communication is crucial because there are things that happen within the big picture*

that may not be communicated effectively. I think it's important to celebrate accomplishments and be appreciated for the work we do. It motivates us to work harder and keep driving forward".

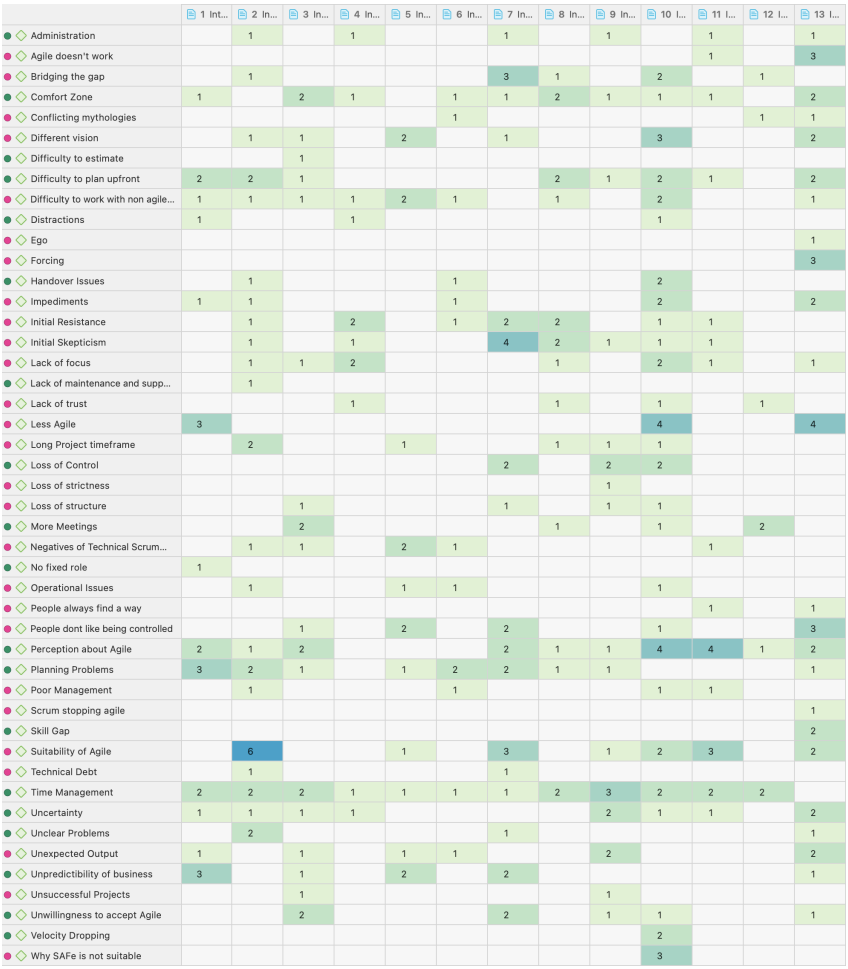
As discussed in the section before, flexibility and adaptability were considered as the primary reasons why organisations adopt this way of working. These factors help them respond quickly to change and adapt to changing market conditions without modifying the entire scope of the project. One of the notable advantages of agile is improved time-to-market. The projects can be broken into smaller manageable increments or sprints (Schwaber & Sutherland, 2020), which enables teams to take an iterative approach with the release and incorporate feedback. These rapid and frequent releases help in facilitating continuous improvements (Conboy & Carroll, 2019a). This focus on continuous improvement allows organisations to evolve and adapt their practices over time, resulting in higher efficiency and productivity.

Agile emphasises empowerment and engagement of teams. The focus on self-organising teams enables individuals to take ownership of their work and make decisions. This leads to increased employee engagement, creativity, and motivation which helps in fostering teamwork and innovation. By implementing this way of working across the organisation, it is easier to identify potential risks and mitigate them. By addressing issues promptly, teams can minimise the impact on the project and enhance overall success rates. This proactive approach contributes to effective risk management and ensures that projects stay on track. The Lean-Agile mindset (Mordi & Schoop, 2020) helps in avoiding waste and focusing on delivering high-value features. Knowledge transfer within teams facilitates smooth work transitions, preventing project delays. As mentioned by Interviewee P1, *"I see a lot of benefits of working in a scrum team. One of the things I find particularly valuable is the emphasis on team delivery. There is a lot of knowledge sharing and cross-training happening naturally because you don't have any swim lanes where you just work on one thing, but the idea is that anyone can fill in for everyone else more or less. This flexibility and efficiency prevent any setbacks caused by absences, such as vacations or sick leaves, as the work seamlessly continues.".*

The interviewees also mentioned additional benefits that demonstrate the significance of agile methodologies in fostering discipline, establishing a rhythmic workflow, providing structural support, and ensuring the delivery of high-quality outcomes. Adopting agile practices enables teams to take ownership of their work, fostering a mindset that encourages collaboration, accountability, and a focus on building the right thing in the right way.

4.2.3 Challenges along the way

Embracing a new way of working and transforming organisational culture is a journey that cannot be accomplished overnight. It requires dedicated time, effort, ongoing practice, and a persistent commitment to change. Throughout this process, various challenges are encountered, which were revealed through insightful discussions with professionals occupying diverse roles within the organisation. These challenges manifest not only during the initial adoption phase but also during the subsequent implementation phase, even when teams have gained considerable experience in this new way of working. These challenges serve as important milestones in the agile transformation journey, highlighting the complexities and hurdles that need to be overcome to fully embrace and sustain the agile mindset. By recognising and understanding these challenges, organisations can proactively address them, leading to smoother and more successful agile implementations. A list of challenges that were discovered (pink) and confirmed (green) during the interview process can be seen in Figure 4.8.



	1 Int...	2 In...	3 In...	4 In...	5 In...	6 In...	7 In...	8 In...	9 In...	10 I...	11 I...	12 I...	13 I...
Administration		1		1			1		1		1		1
Agile doesn't work											1		3
Bridging the gap		1					3	1		2		1	
Comfort Zone	1		2	1		1	1	2	1	1	1		2
Conflicting mythologies						1						1	1
Different vision		1	1		2		1			3			2
Difficulty to estimate			1										
Difficulty to plan upfront	2	2	1					2	1	2	1		2
Difficulty to work with non agile...	1	1	1	1	2	1		1		2			1
Distractions	1			1						1			
Ego													1
Forcing													3
Handover Issues		1				1				2			
Impediments	1	1				1				2			2
Initial Resistance		1		2		1	2	2		1	1		
Initial Skepticism		1		1			4	2	1	1	1		
Lack of focus		1	1	2				1		2	1		1
Lack of maintenance and supp...		1											
Lack of trust				1				1		1		1	
Less Agile	3									4			4
Long Project timeframe		2			1			1	1	1			
Loss of Control							2		2	2			
Loss of strictness									1				
Loss of structure			1				1		1	1			
More Meetings			2					1		1		2	
Negatives of Technical Scrum...		1	1		2	1					1		
No fixed role	1												
Operational Issues		1			1	1				1			
People always find a way											1		1
People dont like being controlled			1		2		2			1			3
Perception about Agile	2	1	2				2	1	1	4	4	1	2
Planning Problems	3	2	1		1	2	2	1	1				1
Poor Management		1				1				1	1		
Scrum stopping agile													1
Skill Gap													2
Suitability of Agile		6			1		3		1	2	3		2
Technical Debt		1					1						
Time Management	2	2	2	1	1	1	1	2	3	2	2	2	
Uncertainty	1	1	1	1					2	1	1		2
Unclear Problems		2					1						1
Unexpected Output	1		1		1	1			2				2
Unpredictibility of business	3		1		2		2						1
Unsuccessful Projects			1						1				
Unwillingness to accept Agile			2				2		1	1			1
Velocity Dropping										2			
Why SAFe is not suitable										3			

Figure 4.8: List of challenges and code occurrences per Interview

While agile offers numerous benefits, it is important to acknowledge the hurdles organisations may face during the adoption process. During the interview process, several challenges identified in the literature review section 2.2.4 were confirmed by the participants. These challenges included such as inadequate maintenance and support, time-consuming bureaucratic processes, lack of focus, undefined roles within teams, business unpredictability, resistance to agile adoption, skill gaps, poorly defined objectives and scope, limited agile training, and insufficient stakeholder involvement. As mentioned by Interviewee P1, *"Everyone is doing everything. You can get distracted and spend a lot of time on handovers. If someone is working on one topic in one sprint, and then someone else needs to pick up and work on that topic in the next sprint, there is a knowledge transfer process that takes time. So it could slow down the result being achieved".*

Although several challenges mentioned in previous literature were confirmed, additional challenges emerged through the interviews. One notable challenge identified during the interviews was the difficulty for agile teams to collaborate effectively with non-agile teams within the organisation. The contrast in work approaches and methodologies between these teams often resulted in misalignment and communication barriers. An example of this was provided by Interviewee P13, who talked about how their iterative and incremental approach faced challenges when trying to coordinate with a finance team that followed a traditional and linear approach. The Interviewee said, *"When it comes to the duration of iterations in agile, it can vary depending on the company. Some companies go with two weeks, three weeks, or four weeks. What's interesting is that finance departments, for example, are very strict on monthly deadlines. So there can*

be waiting periods in between sprints. You may have a three-week deadline, but finance might have a one-week deadline. It doesn't always align with the entire organisation because they have different non-agile-based deadlines."

When adopting a new way of working there are always challenges in the initial period. One such challenge mentioned was the resistance to change that impeded the adoption of agile. Not everyone was willing to embrace a new way of working, particularly because they were comfortable with established processes. This resistance stemmed possibly from a fear of the unknown, concerns about potential disruptions and reluctance to let go of familiar methods. One participant also mentioned the increased number of meetings or scrum events which were perceived as time-consuming and a drain on productivity, especially if managed inefficiently. Interviewee P8 mentioned, *"To market even more meetings, we already have so many. So there was a lot of resistance to this. Another trick, another new thing to try out, and why would it work this time? So people also shoot back to their old behaviour when things get tougher. They say, 'Oh, then I'll do it the old way because I know the old way'"*.

Teams also face the challenge of estimating work using Story Points or other techniques. It is difficult to plan and estimate work upfront when requirements are constantly changing. Training and skill gaps emerged as significant challenges. In an agile environment, teams are expected to know the specific methodologies implemented by the company to be effective. The experience of the team with Agile practices plays a crucial role, as the learning process may not be as quick as described in books. Skill gaps within the teams can hinder agile adoption. Agile methodologies rely on cross-functional teams with a diverse range of skills. If there is a lack of expertise or knowledge in certain areas, transferring that knowledge to another team member may take time, reducing overall team efficiency. Talking about skill gaps and communication issues Interviewee P13 mentioned, *"I think the main challenge I observe is the presence of skill gaps within teams. The effectiveness of the development process often depends on the individuals you collaborate with and their communication skills. In agile environments, with smaller teams and less communication, there is a risk of missing out on valuable knowledge as individuals may not be aware of what others are working on."*

In conclusion, the exploration of various aspects such as reasons for adoption, benefits and challenges associated with the agile way of working provided valuable insights into the overall effectiveness of this methodology. The project outlook theme helped in answering the first seb-research question *"What are the reasons, challenges, and perceived benefits of adopting the Agile way of working in technology-driven projects within asset management firms?"*. Regarding the reasons for adopting Agile, the study revealed that asset management firms embraced Agile methodologies primarily to enhance flexibility, adaptability, and responsiveness in managing complex projects. Agile provided a solution to the limitations of traditional plan-based methodologies, allowing teams to dynamically adjust their plans and strategies in response to changing project requirements and market conditions. However, the adoption of Agile in asset management firms also posed several challenges. The study identified resistance to change, lack of understanding and awareness about Agile, and difficulties in transitioning from traditional approaches as key challenges. Overcoming these challenges required organizational commitment, investment in training and education, and creating a supportive culture that encourages collaboration, experimentation, and continuous improvement. Despite these challenges, the perceived benefits of adopting Agile in asset management firms were significant. The study found that Agile methodologies resulted in improved project outcomes, including enhanced product quality, increased customer satisfaction, and faster time to market. Agile also promoted better team collaboration, communication, and stakeholder engagement, which contributed to higher levels of team morale and motivation.

4.3 Project Success Criteria

The second sub-research question *"What are the criteria used to measure project success in technology-driven projects within asset management firms?"* is addressed in this section. The theme Success Criteria provided valuable insights into how teams and organisations measure success in the context of agile methodologies. While the literature review highlighted the traditional iron triangle and the square root model, the discussions with experts shed light on additional criteria that go beyond the traditional metrics. These criteria, such as acceptance criteria and the definition of done, emerged as important factors during the analysis of documents and resonated with the findings from the interviews. By exploring these expanded criteria, we gain a deeper understanding of the multifaceted nature of success in agile projects and how it aligns with both established practices and emerging considerations in the field. Figure 4.10 illustrates the frequency of different success criteria codes used across interviews.

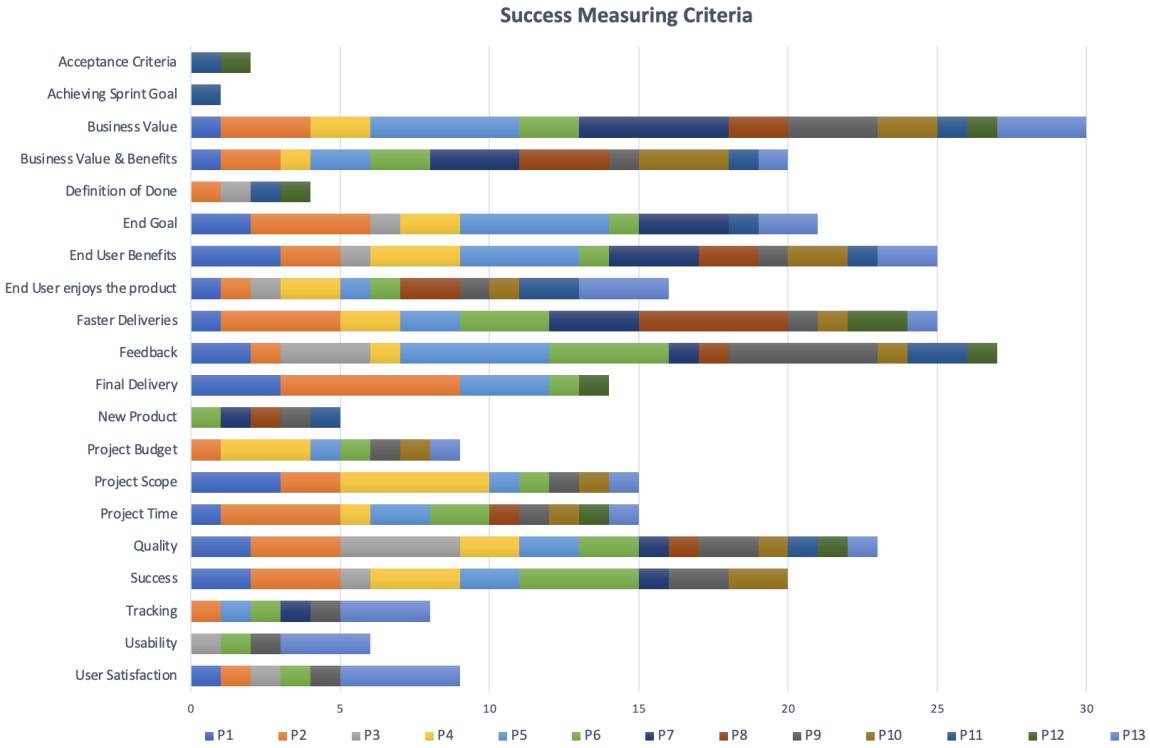


Figure 4.9: Distribution of Success Criteria Codes across Interviews

The interviews provided insights into the diverse approaches to measuring success across various teams and domains within the company. While the Iron Triangle is predominantly employed by the business teams to evaluate success, the IT teams take other criteria into account. Although the business teams do not tend to work Agile, play a crucial role as a stakeholder in understanding the market demand and facilitating the technical teams in delivering the right product or solution. As mentioned by Interviewee P5, *"Usually, business teams tend to look at project deliveries from the perspective of time, budget, scope and quality as they are the ones collaborating directly with the end customer and trying to keep them happy"*.

Even though the tech and ops teams may not perceive time, cost and scope as their primary criteria for building products, these criteria indirectly impact their work as they are driven by the requirements of the business teams. However, quality is a shared criterion among all teams as they consider delivering high-quality products as highly significant. Signifying the importance of quality, Interviewee P4 said, *"Quality is like the devil's diamond. We can meet deadlines,*

budgets, and scope requirements, but if the end product is riddled with errors and incomplete data, it reflects poorly on the overall quality. So, ensuring quality should always be a priority."

The developers place significant importance on specific criteria such as the Sprint Goal, End Goal, Definition of Done, and Acceptance Criteria. As outlined in section 4.2.4 of the literature review, these criteria align with the scrum artefacts, which accurately represent the work being delivered. The Product Backlog, Sprint Backlog and Product Increment are measured by the End Goal, Sprint Goal, and Definition of Done, respectively. These reflect the progress and completion of tasks. On the other hand, acceptance criteria serve as a vital tool for checking the completeness and behaviour of the increment functionality. Sharing their view as a developer, Interviewee P3 mentioned, *"In general, when you see the individual features come down even to stories, you need to have acceptance criteria or at least a definition of done. Every team needs it to make sure you deliver what you promised and it works."*

The significance of end-user impact and the measurement of success through the end goal were evident in the findings. It was intriguing to observe that regardless of individuals' roles within the team, everyone recognised the importance of end-user benefits alongside business value. This aligns with the Square Root model, which goes beyond the traditional Iron Triangle factors by considering both the output and outcome perspectives. Interviewee P5 mentioned, *"As the business teams have the final say most of the time, we only focus on the output perspective, overlooking the outcome, which I consider to be one of our current weaknesses. When we start working on a feature, it's crucial to clarify why it is necessary and ensure everyone understands its purpose. Starting without proper consideration and understanding can lead to confusion and a lack of business value."* Figure 4.10 illustrates the timeline of a project highlighting the point of outcome and benefits.

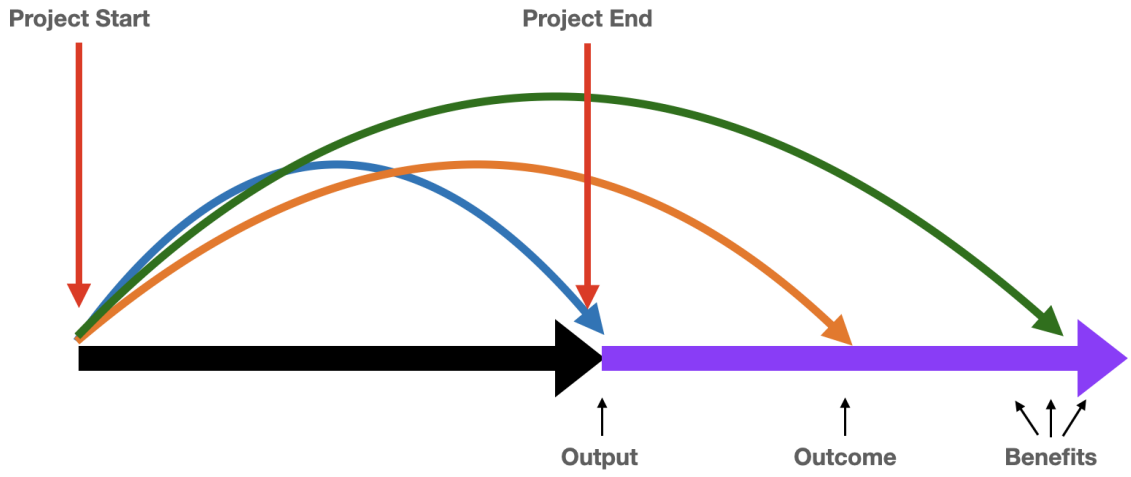


Figure 4.10: Project Value Timeline

The interviews further confirmed that teams beyond the business side also acknowledged the importance of organisational benefits such as waste reduction and increased efficiency. For these teams, the primary focus was on end-user benefits and product usability, as they sought the satisfaction of delivering the right solution, which was deemed essential. Interviewee P6 said, *"The only real success is happy customers, happy users enjoying your product. So the result when you deliver something and the feedback you get on your deliverable. That is something you should work towards"*. This highlights the importance of having multiple criteria to evaluate the team's work, but ultimately, the satisfaction of the end user with the final delivery is the ultimate measure of success. By keeping the end user's perspective at the forefront of their work, the team can prioritise and align their efforts to deliver a product that truly adds value and meets the customer's requirements, leading to a successful outcome.

The discussions reveal that eventually, it all comes down to the adoption rate of the product. Higher the adoption rate of the product, the more successful it is. Interviewee P13 also mentioned, *"Our focus lies on the business process rather than the adoption itself. People are motivated when someone ends up using what they built. There's a growing importance of adoption rates, which will eventually lead to saving us time and money."*. It was perceived by the participants that the usability of the product is the final test of any product. Interviewee P3 mentioned a simple phrase to define the usability success criteria, *"I think the best compliment is if they use it, and I don't get any questions. If that happens, then it was successful."*

In conclusion, the second sub-research question *"What are the criteria used to measure project success in technology-driven projects within asset management firms?"* was answered in this study. The findings revealed that the evaluation of project success criteria extended beyond traditional measures to encompass a broader perspective of outcomes and benefits. Scrums teams, following Agile methodologies, incorporated additional criteria such as Sprint Goals, End Goals, Definition of Done, and Acceptance Criteria. This comprehensive understanding underscores the significance of balancing different success criteria to achieve project success. By considering both the traditional and Agile approaches, organisations can effectively evaluate and optimise their project outcomes. The incorporation of Agile criteria allows for a more flexible and adaptive assessment of project success, taking into account iterative development and customer collaboration. Overall, this research emphasises the importance of adopting a holistic and context-specific approach when measuring project success in technology-driven projects within asset management firms.

4.4 Factors influencing Project Deliveries

The third theme, "Factors Influencing Project Deliveries," plays a crucial role in addressing the third sub-research question, *"What are the key factors that influence project success in technology-driven projects within asset management firms?"*. Through the literature review, numerous factors were identified that exerted both positive and negative influences on project deliveries. Some factors were perceived to mediate project outcomes, while others were perceived as moderating factors. The insights gained from the interviews provided valuable perspectives on these factors and also revealed new ones that were previously unexplored.

Moreover, the interviews played a significant role in unravelling the underlying reasons for project failures or deviations from the intended outcomes. By examining these aspects, a comprehensive understanding of the multifaceted dynamics impacting project deliveries is achieved. This analysis not only encompasses the known factors from the literature but also incorporates fresh insights and real-world experiences shared by the experts.

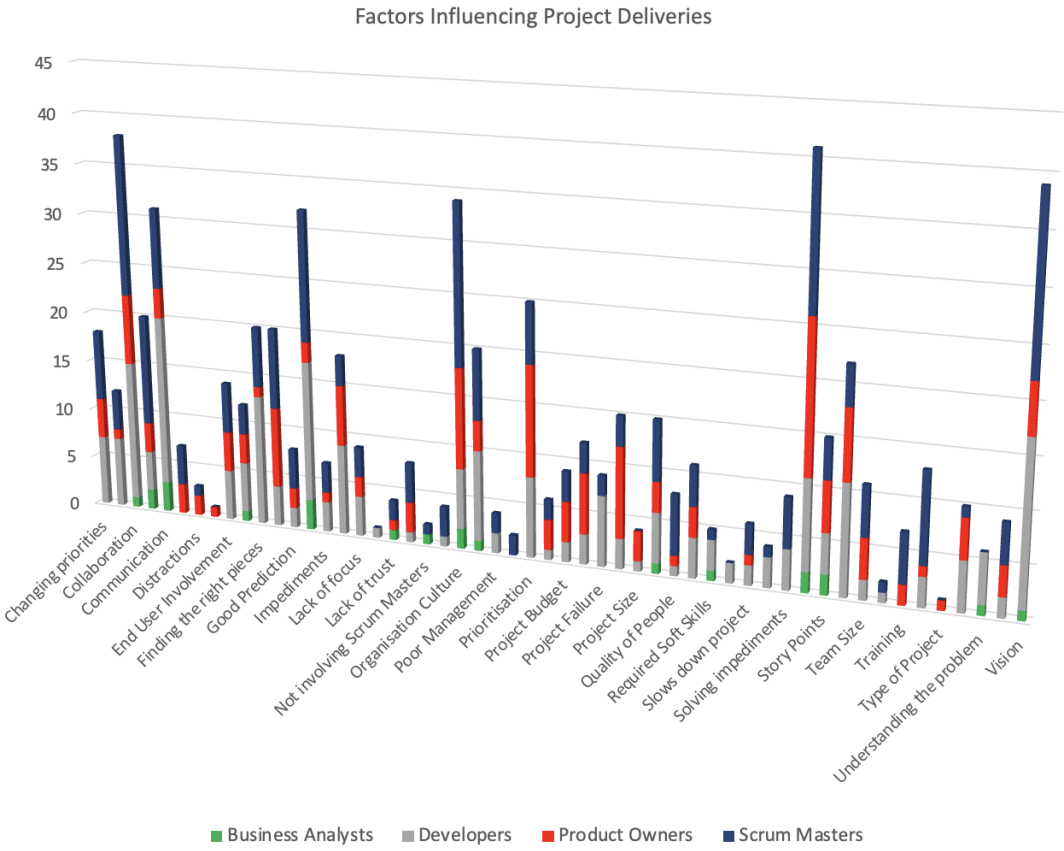


Figure 4.11: Frequency of Factor Codes per Job Function

Through the interview process, the findings from the literature review regarding the impact of various mediating and moderating variables on project success were confirmed and reinforced. Moderating factors, such as project complexity, team size, team experience, and organisational culture, emerged as key determinants that shape the overall outcome of projects. These variables act as influential forces that can either facilitate or hinder project success. Talking about project complexity and team experience with the agile way of working, Interviewee P11 mentioned, *"One of the major factors is the complexity of projects we work on. When you start implementing tasks, interdependencies do come up and that can delay the delivery. At the same time, you need a team that can tackle such setbacks and breathe the same rhythm. So it is*

important to get everyone trained on your way of working and instil a similar mindset". Organisational culture plays a pivotal role in the successful implementation of Agile methodologies. There is a need to have a long-term vision when adopting a new style of working. The culture that enables agile values such as collaboration, transparency, and open communication fosters an environment where Agile principles can thrive. It encourages individuals to embrace change, take ownership of their work, and promote cross-functional teamwork. A supportive culture enables teams to adapt quickly, share knowledge effectively, and make informed decisions, leading to improved project outcomes and overall success. Interviewee P1 mentioned, *"I think the key factor is A. the common vision that all people are working on the same initiatives at the same time and B. the helpful organisation culture. Like, those ceremonies and scrum events enable people to focus. You won't go away for weeks doing your own thing. So those to me are major contributing factors".*

Another significant moderating factor confirmed was the team size. The scrum framework recommends a maximum of 10 people in a scrum team including the Product Owner and the Scrum Master (Lei et al., 2017). The primary reason behind this idea is that increase in the number of team members leads to communication and collaboration issues which can reduce the team's velocity and efficiency. When sharing insights about how resource changing within a team can lead to velocity dropping, Interviewee P10 mentioned, *"I've been working there for five years as a scrum master. And almost all the time I had two teams. It was almost always management involvement, where a team change was made. So people pulled out of the team or just pushed into the team, without consultation, which resulted in the reduction of the velocity of the team and one team became so big that it had more than 13 people in it. Velocity just drops to 10% of what it was. It was very clear that it was not very productive and effective.".* Figure 4.11 illustrates the frequency of impacting factor codes per job function.

In addition to the moderating variables identified in the existing literature, several other factors emerged as significant during the research. These included changing requirements and priorities, quality of people involved, leadership, employee age, the right environment and end-user involvement. These variables can have a substantial impact on project outcomes and success. Changing requirements and priorities introduce complexity during the projects. This calls for the need for adaptability which is the essence of agile way of working. However, effective management of these changes and prioritisation is crucial to successful project deliveries. Hence, there is a need for strong leadership that can help and guide the team in the right direction. This helps in creating a supportive environment where the team has a sense of belonging and function effectively to deliver quality products. Interviewee P9 shared some insights regarding this. He said, *"We see a lot of last-minute changes and shifting priorities, at times unforeseen requests from upper management. These often disrupt project work and impact deliveries. This is where leadership is required from initiative owners and product owners to shield the development team from these disruptions. If the teams fail to adapt to these changing circumstances, it can result in projects that do not meet stakeholders' needs and expectations"*. To keep the end goal intact and deliver an expected outcome, it is necessary to keep the end user involved throughout the project lifecycle. This helps in incorporating their feedback continuously. Interviewee P1 mentioned, *"I think involving end users for some pilot or taking them along on the journey with you will help them understand the tool better. This can help increase the adoption of the product as some of them already know how to use it which I think is the trick of it. Their involvement gets you feedback and helps you understand the pain points, So these people can be your advocate."*

One common factor found during the study was the quality of people involved. This includes their skills, experience and mindset which influences the ability of the team to handle challenges and deliver high-quality work. This observation aligns with findings from the document analysis

stage, which revealed similar insights within the context of DevOps practices. Interviewee P6 mentioned, *"Ultimately, regardless of which mode you're in, it all comes down to people, and bad people in any mode will not deliver a lot and good people in any mode will deliver a lot If you have the right people in on your boat, then regardless of the methodology we use, if it's agile, if it's a zillion other things, people will make it work."*. An interesting insight factor discovered was the employee age, which was only mentioned by one interviewee. They said, *"My whole team started as interns. I feel young employees are more suited for Agile environments as they possess strong motivation, adaptability and the ability to absorb information quickly. Experiences individuals find it challenging to adapt and I have seen the resistance to agile practices from them as they have worked differently previously"*. Figure 4.12 illustrates the updated framework of perceived mediating and moderating variables discovered and analysed in the research.

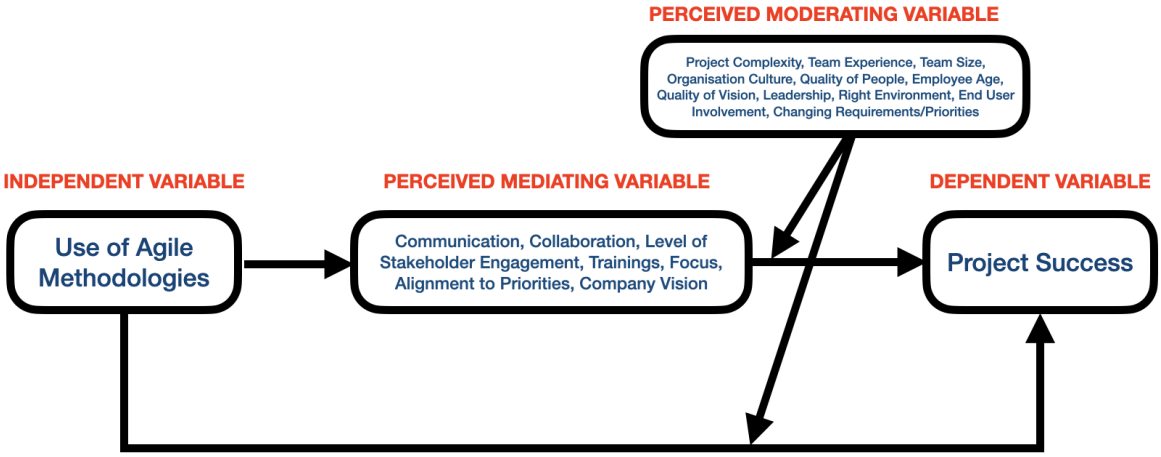


Figure 4.12: Updated Overview for all perceived factors discovered during the Research

Apart from the moderating variables, the interviews also highlighted the significance of mediating variables in project deliveries. Mediating variables help in explaining the relationship between the independent and dependent variables. Multiple variables found in the literature were confirmed during the interviews. These include communication, collaboration, level of stakeholder involvement and employee training. Effective communication and collaboration among team members are considered critical elements that contribute to project success. They are considered as core scrum values (Schwaber & Sutherland, 2020). Team members need to exchange information, share ideas and work together to achieve the common goal. Interviewee P5 mentioned, *"I see most complex projects tend to overrun due to the underestimation of effort. In such projects, it is essential to centralise communication while increasing coordination and collaboration between teams as well as within teams. It doesn't mean restricting teams' autonomy but providing clear direction when they are unsure of what to do"*.

The importance of training and skill development within teams was confirmed as a mediating factor. Equipping team members with the necessary knowledge and expertise on the agile way of working enhances their ability to execute tasks effectively and deliver high-quality results. *"I believe guidance is required because not everyone is familiar with Agile practices in every company. If you hire individuals from different companies, they may need assistance in understanding how Agile works within your specific company. For instance, someone with only textbook experience who previously worked in a waterfall company may find that practices are completely different here."*. Another variable which is significant in this style of working is the level of stakeholder engagement. When organisations work agile it is important to align with the demand and build the right thing. This is where a stakeholder's role is of the utmost importance as they help

and guide the team in the right direction. Active participation and feedback from stakeholders throughout the project lifecycle contribute to alignment, transparency, and the delivery of solutions that meet their needs and expectations. Interviewee P10 mentioned, *"As we work in iterations, every few weeks as a stakeholder you may notice that the project is heading in the wrong direction. However, the earlier you can identify this, the better. It minimises waste."*. Additional mediating factors discovered during the interview process included Focus, Common Vision and Alignment to Priorities. Focus refers to the ability of the team to maintain a clear and concentrated direction throughout the project. This involves staying on track, avoiding distractions, and prioritising tasks effectively. It is one of the core values of all agile methodologies. Agile enables teams to focus on deliverables by breaking huge pieces of work into achievable chunks. Interviewee P8 mentioned, *"I think the main factor is the focus. When teams are spread across multiple initiatives, progress becomes scattered. Then when a struggling initiative receives dedicated focus, several teams collaborate and complete it within a few months"*. This brought up an interesting insight about prioritisation and how teams need to ensure the balance by focusing on one initiative but at the same time keeping other initiatives' customers happy. They also said, *"It's both fascinating and daunting because choosing one initiative means saying no to others' initiatives temporarily. It is essential to gain and continue to keep the trust of customers in this process. By prioritising and finishing one task at a time instead of juggling all at once. This helps in avoiding delays. Focus is the key element that influences project delays."*. When organisations adopt a new style of working it is important to have a long-term common vision which can help teams understand the big picture. This common vision acts as a mediating variable when implementing Agile to deliver projects successfully. A shared vision makes it easier for teams to collaborate and make decisions to reach a common objective. Interviewee P4 mentioned, *"During the initial days there was a defined vision but the transition phase took time to get over the initial resistance from teams. Once people saw results coming there was rhythm within the teams which quickly picked up pace. It was quite successful in a quick time frame as they understood the big picture"*. Another important aspect was the alignment of priorities. This helps in ensuring that the team's efforts and resources are directed towards the most important tasks and objectives. By aligning the work with the project's priorities, teams can optimise their effort and maximise the overall impact of their work. Interviewee P12 mentioned, *"In the current organisation I see clear awareness of the most important initiatives. Everybody knows this is the priority. There's a lot of alignment between different stakeholders because, in these big projects, you need each other. So alignment between the bigger organisation is very important. I think it's a success factor."*

In conclusion, the third sub-research question *"What are the key factors that influence project success in technology-driven projects within asset management firms?"* was addressed by identifying and confirming key factors that influence project success in technology-driven projects. The findings revealed several important factors that play a crucial role in determining project success. Firstly, effective project management and leadership were identified as critical factors, encompassing aspects such as clear communication, stakeholder engagement, and competent project teams. Secondly, the alignment between project objectives and organisational strategy was found to be essential for success, highlighting the importance of a strategic approach to project management. Thirdly, adequate resources and technology infrastructure were identified as influential factors, enabling smooth project execution and facilitating collaboration among team members. Moreover, the study highlighted the significance of comprehensive risk management and the ability to adapt to changing circumstances, emphasising the importance of flexibility and agility in project delivery. Finally, the study found that organisational culture, including factors such as innovation, collaboration, and continuous learning, significantly impacted project success. Overall, understanding and effectively managing these key factors can greatly enhance the success of technology-driven projects within asset management firms.

4.5 Perceived Best Practices

The fourth sub-research question *"How do agile team members perceive and recommend best practices for using agile methodologies in technology-driven projects based on their experiences and perspectives?"* is addressed in this section. The theme of best practices explores the diverse array of practices and techniques employed by specific teams to maximise the potential of the agile way of working. While document analysis reveals how different methodologies offer guidance and strategies for implementing agile, it is crucial to recognise that theory does not always align precisely with real-world practice. Understanding how teams and organisations navigate the practical implementation of agile becomes paramount. Figure 4.14 displays a list of codes that were formed based on different best practices discovered during this research. The table highlights the occurrence of different best practice methods and insights that were shared by participants performing different roles in the company.

During the interviews, participants provided invaluable insights into the nuances between theory and practice, shedding light on the practices they have adopted within their teams to optimise project outcomes. Each team is unique and individual perspectives contribute to the customisation of their approach. By embracing these individual perceptions, teams can tailor their way of working to suit their specific needs and enhance their overall effectiveness. The interviewees shared the lessons learnt during the adoption phase of Agile within their organisations and how they currently implement it to get the best out of it. Most organisations use the hybrid way of working instead of implementing a particular agile methodology to the book. The hybrid way of agile working refers to the adoption and integration of multiple agile methodologies, frameworks, and practices within an organisation (Papadakis & Tsironis, 2018). It acknowledges that teams, projects or contexts require unique approaches to implement agile. This enables organisations to combine the best elements of various methods to create a customised version that is suitable to their specific need and help them maximise the benefits of agile.

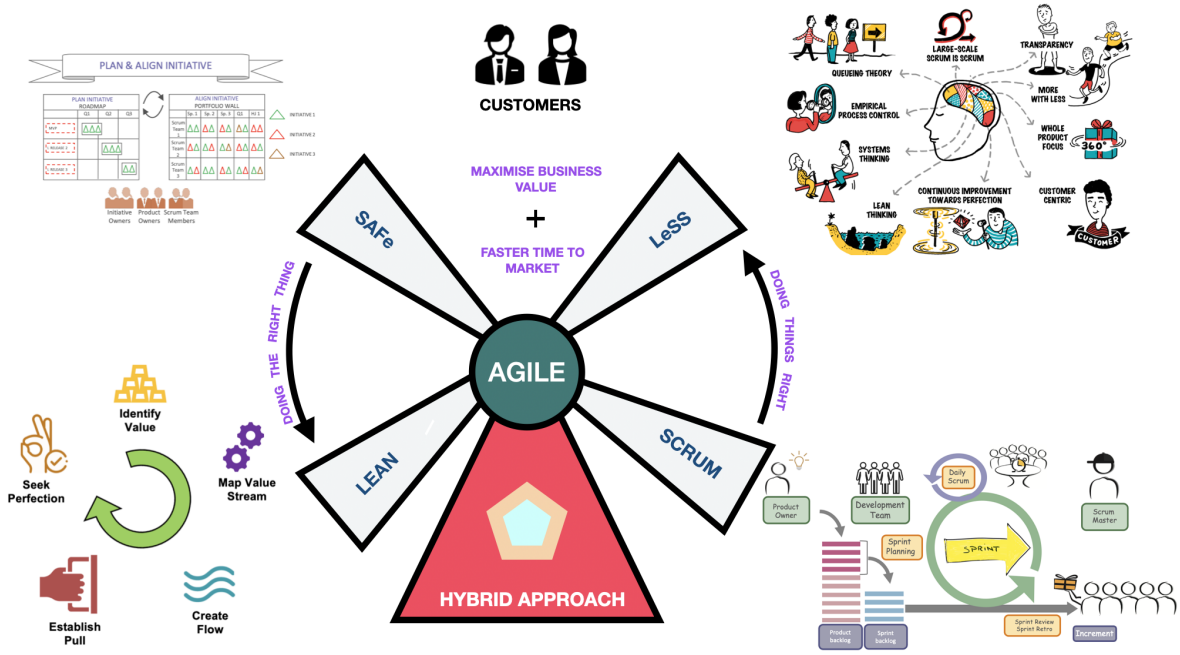


Figure 4.13: The Agile Windmill (own illustration of the hybrid way of working based on methods analysed in this research. LeSS mindset retrieved from LeSS,2023)

Figure 4.13 shows the Agile windmill that was developed based on the insights from the interviews. It reflects the different methodologies used by organisations that were part of this research to build their hybrid way of working. This hybrid way of working allows organisations to leverage the strengths of different agile methodologies while mitigating their limitations. This provides them with the flexibility to move specific agile elements around and use them differently than recommended. An agile way of working may not be a one-size-fits-all solution as it depends on various factors such as type of projects, teams and organisational culture. Hence, the hybrid way can help incorporate some old elements from the traditional way of working alongside the new agile techniques. Talking about the hybrid approach Interviewee P4 said, *"Agile is not something that can be copied or imposed by a company. It is a cultural shift that needs to evolve organically. It starts small, with a department or a group of teams, and gradually expands while facilitating its growth. Each company will have its unique journey, with some practices working well while others may not. It is important to keep it requires long-term commitment and continuous effort."*

This approach encourages teams to continuously improve and experiment. Experimentation leads to mistakes and more importantly, learnings that will help the teams grow. Agile encourages mistakes as it helps the team understand the reason behind failures and avoid the same mistake in future leading to increased efficiency. The adoption of agile itself could be an experiment at first. Interviewee P8 mentioned, *"The important thing was to start and give it one sprint of two weeks. If you didn't like it, the worst thing that could happen was you lost two weeks. Many people started doing it and instantly they saw the benefit of predicting and having a clear focus on what they wanted to deliver."*

The interviews helped in understanding how organisations in the asset management sector of The Netherlands have tailored their way of working to suit this fast-paced industry. Interviewee P7 stated, *We didn't just want to know what was going on, we wanted to empower the teams to dictate what gets delivered. This was a deliberate approach taken at both the local and organisational levels. Once you go beyond scrum teams, you are already looking at SAFe. We explored elements of LeSS to bridge the gap and enable the organisation to work in an agile manner.*

The common factor found on the team's level was the adoption of Scrum. Organisations operate using scrum as it enables them to work with multiple self-organising cross-functional teams. Next, to scale agile practice and maintain a cohesive approach across the organisation, Large Scale Scrum (LeSS) was implemented. LeSS provides a framework for scaling Scrum by applying the same principles and values to multiple teams working on a shared product or product line (Conboy & Carroll, 2019a).

To facilitate coordination and alignment across multiple scrum teams, elements of the Scaled Agile Framework (SAFe) were implemented. The Program Increment (PI) was used for the planning process that was done on a quarterly basis. This helped in bringing all the scrum teams together to work on a particular release. The PI Planning event helped teams collaborate, plan the next quarter, solve impediments, discuss interdependencies and establish a shared understanding of the upcoming work. One major benefit of the PI event was that it helped the teams celebrate success for the past quarter as well which keeps the members motivated and feel proud of the work they delivered in the previous quarter. Interviewee P13 said, *"I like the PI event in that sense, it helps me to take in all the things that are happening currently in my company. Even if there are certain things I don't fully understand. This knowledge can come in handy if those topics ever arise in the future. I find it beneficial to have dedicated time to recharge, gather new energy, and generate innovative ideas. It's a great opportunity to get everyone aligned and engaged."*

To further enhance the effectiveness of the hybrid approach, Lean principles were employed. The focus was on identifying and eliminating waste while optimising processes and creating value for the customer. The organisations aimed to streamline their workflows and align the work being done with customer requirements. This approach helped in changing the mindset and the way of thinking itself. Interviewee P8 gave a good example here, *"If you are thirsty, you want your first sip to be soothing. What do you want? You want a bottle right? You don't necessarily need a bottle, you just want something to drink. And it could be a bottle, it could be a can or could be a bucket depending on what you want. And so and that also changed the way of thinking. It was minimal viable thinking. You pick something up, do a proof of concept, deliver in a quick time frame, get feedback, and move to the next step."*

Best Practice	Business Analysts	Developers	Product Owners	Scrum Masters
Agile Mindset	•	•	•	•
Assessing Capacity		•		•
Autonomy	•	•		•
Best Practices	•	•	•	•
Bridging the gap	•	•		•
Celebrating achievements		•		•
Customisation of process		•	•	•
DevOps		•		•
Editable		•		
Experimentation		•	•	•
Finding the right pieces		•	•	•
Forcing		•		
Habit	•	•	•	•
Help the team learn	•	•	•	•
Hybrid Approach	•	•	•	•
Identifying things that dont work				•
Initiative		•	•	•
Innovation		•	•	•
Jira Tickets			•	
Kanban		•		•
Knowledge sharing/transfer	•	•	•	•
LeSS				•
Lessons learnt		•	•	•
Minimal Viable Thinking		•		•
Move together		•	•	•
MVP		•		•
Ongoing learning	•	•		•
PI Event	•	•	•	•
Predictability of Team				•
Quick Learners		•	•	•
Remove alternative options			•	
Right Environment	•	•	•	•
Routine	•	•	•	•
SAFe		•	•	•
Scrum	•	•	•	•
ScrumBan				•
Setting Standards		•		•
Spotify		•		•
Stakeholder Involvement	•	•	•	•
Story Points	•	•	•	•
Team Member involvement in planning	•	•	•	•
Translation		•		
Way of thinking		•		•
When Agile works	•	•	•	•

Figure 4.14: List of codes identified under the Best Practices Theme

Multiple best practices were also seen being used within the teams. For instance, while some teams transitioned from daily to bi-weekly stand-up meetings, others chose not to conduct demos after every sprint. These adaptations highlight the flexibility and customisation of practices to optimise team performance. While talking about the importance of a daily stand-up, Interviewee P3 mentioned, *"In our profession, verbalising and explaining your work brings a different perspective compared to keeping it in your mind When you talk about what you're doing, it helps you gain a deeper understanding and often leads to problem-solving. There's something powerful about talking it out loud, which is why I'm always against cancelling a standup meeting"*. The importance of mindset and individual behaviours became evident through the discussions. Consistent practice and continuous improvement were emphasised as essential elements for success. Talking about how human nature itself is not Agile, Interviewee P13 said, *"Our default behaviour is to go against this one, so probably that is why we need to be taught the same thing again. It could be a similar reason why people go to church every Sunday because it's the same thing that people are taught every Sunday, but we still have to be reminded of them"*. The participants also emphasised the importance of translating the information correctly for other members and teams. This is important to ensure everyone understands the big picture. Interviewee P12 mentioned, *"If you say I saw a dog yesterday, you have an image of a dog, and I have an image of a dog, and it probably doesn't match at all. So again, communication in explaining the concept is very, very hard. I think you need to be able to talk to everybody on the same level"*

Several best practices were identified through thorough observations during the extensive engagement at an asset management firm, validating their effectiveness. Notably, the organisation retained certain elements from the previous Spotify model, including functional chapters like engineering and way of working. The Agile Practices chapter emerged as a key component, facilitating the successful implementation of new working methodologies and emphasising their significance. Weekly scrum master sessions were instrumental in promoting alignment and knowledge sharing among scrum masters, enabling them to adopt innovative techniques for their teams. Bi-weekly agile work sessions proved valuable for the agile practices team, allowing them to address bottlenecks, resolve interdependencies, and enhance transparency. Another interesting best practice is seen as a physical portfolio wall that was established after PI planning, enabling real-time tracking of quarterly progress and facilitating regular discussions among product owners to address interdependencies. These practices collectively contribute to a culture of continuous improvement and ensure the effective adoption of agile principles.

This section concludes the fourth sub-research question *"How do agile team members perceive and recommend best practices for using agile methodologies in technology-driven projects based on their experiences and perspectives?"*. Based on the experiences and perspectives of agile team members, it can be concluded that they perceive and recommend several best practices for using agile methodologies in technology-driven projects. Agile team members emphasised the importance of regular and transparent communication within the team and with stakeholders, as well as the need for cross-functional collaboration and knowledge sharing. They also highlighted the value of embracing key principles from popular frameworks such as Scrum, SAFe, LeSS, and Lean, while tailoring practices to specific goals and projects. The study emphasised that mindset and behaviours are crucial in successful agile adoption, and fostering a collaborative and open environment is essential for overcoming challenges, optimising processes, and driving project success. The findings highlighted the significance of iterative development, continuous feedback, and frequent adaptation in agile projects. Agile team members emphasised the benefits of short iterations, regular retrospectives, and continuous improvement to enhance project outcomes. The participants emphasised on the importance of empowering and self-organising teams, allowing team members to make decisions and take ownership of their work.

5 Discussion

5.1 Results Discussion

The discussion chapter aims to provide a comprehensive analysis and interpretation of the findings obtained from the research on the impact of implementing agile methodologies on IT project success in asset management firms of the Netherlands using qualitative research methods of interviews over a period of 5 months. This chapter will summarise the main findings and their relevance to the existing literature.

The theoretical background of Agile methodologies was strongly supported and confirmed by the findings of the study. The study confirmed the principles of complexity theory. The iterative and incremental nature of Agile methodologies allowed project teams to navigate and manage complex projects more effectively, adapting their plans and strategies dynamically. Systems thinking, which emphasises that organisations are interconnected systems, was also evident from the document analysis and the interviews. Agile methodologies fostered cross-functional collaboration and communication, breaking down silos and enabling teams to coordinate their efforts cohesively. The study findings also supported organisational learning theory, demonstrating how Agile methodologies enabled a learning-oriented culture within organisations. Through practices such as retrospectives and feedback loops, teams continuously reflected on their performance, identified areas for improvement, and adapted their processes and practices accordingly. This continuous learning and adaptation contributed to enhanced project outcomes and organisational effectiveness. Lastly, the study findings confirmed the perspective of institutional theory, which suggests that organisations conform to the norms, values, and expectations of their environment. Agile methodologies emphasised the importance of aligning with customer expectations and organisational goals. By involving stakeholders throughout the project and incorporating their feedback, Agile teams ensured that the final product aligned with customer needs and preferences.

The research findings revealed several important insights regarding the implementation of agile methodologies in asset management firms. One notable finding was the observation of a hybrid approach to agile working within organisations. This hybrid approach combined elements from different agile frameworks, such as Scrum, SAFe (Scaled Agile Framework), LeSS (Large-Scale Scrum), and Lean. This was done to create a tailored agile working environment. This finding resonates with the literature (Gemino et al., 2020) which argues that a hybrid way of working re-

sults in a higher number of successful deliveries concerning the traditional measures (cost, time, scope) of project success when compared to the implementation of a single agile methodology.

The research findings demonstrate a shift in the traditional measurement of project success based solely on cost, time, and scope. The study reveals that additional factors, such as end-user benefits and organisational benefits, have emerged as crucial elements in determining project success. While business teams still tend to focus on the Iron Triangle of success, the IT teams strive to ensure the right things are being built and built correctly. Through close collaboration with stakeholders and end users, the teams prioritise usability and strive to maximise the benefits for end users.

Moreover, the research highlights the importance of considering long-term benefits when developing products, ensuring that the necessity of building them is validated. These findings signify the evolving understanding of project success, encompassing not only the traditional project constraints but also the value delivered to end users and the organisation as a whole. By embracing a broader perspective, asset management firms can enhance their project outcomes and achieve greater alignment between business objectives and technological implementations.

The study revealed numerous perceived benefits associated with agile methodologies. While some of these benefits align with existing literature, others were found to be specific to the organisations involved in this research. The ultimate objective of achieving customer satisfaction was identified as the primary driver behind adopting agile methodologies. All other benefits directly or indirectly contribute to this end goal. Among the benefits mentioned by participants and highlighted in the literature, increased focus, communication, collaboration, and transparency stood out as core values. These perceived and tangible benefits played a significant role in facilitating the overall transformation of the organisations' working practices and the successful adoption of agile methodologies.

One significant finding of this research is the diverse perception of agile among individuals, which can hinder its successful adoption in the initial phase. This factor was confirmed by multiple participants and also observed in practice. The lack of awareness and training on the agile mindset may contribute to these perceptions. The literature emphasises the need for employee training when adopting agile methodologies to ensure proper utilisation of the relevant principles. Agile may not be suitable for every project or organisation. Its iterative and incremental nature may not align with projects that require strict adherence to a predetermined plan or that have highly regulated environments. It is important to assess the project's characteristics and context to determine the suitability of agile methodologies.

Discussions with developers revealed an interesting aspect regarding the potential hindrance of scrum to the agile mindset. Developers expressed that adhering strictly to scrum events prevented them from being truly agile, contradicting the principles. For instance, if a sprint retrospective identifies issues with the current way of working but no changes are implemented in the subsequent sprint, the agile approach is compromised. This suggests a possible lack of understanding or implementation of time-boxed scrum events.

Stakeholder engagement was identified as crucial in the agile way of working, aligning with the literature. Agile's iterative nature and continuous deliveries allow stakeholders to remain involved and provide feedback regularly, ensuring the team stays on track and delivers the expected end product. This contrasts with traditional project management approaches, where stakeholders share their ideas and the product is built accordingly, often leading to misalignment with expectations. right track and ensure the end product turns out to be as expected.

One of the core values of agile is flexibility which was also mentioned by every participant in the study and also confirmed in the literature. However, the observation revealed that teams often planned upcoming quarters based on a fixed plan, contradicting the concept of flexibility. This highlights the contradictory nature of agile, where flexibility is present in incorporating changes during projects but not always in the implementation of agile itself.

The findings related to the implementation of Scrum, PI planning, LeSS, and Lean reinforce the literature's emphasis on the importance of structured planning, scaling mechanisms, collaboration, and waste reduction in agile project management. The observed practices serve as practical examples that confirm the theoretical underpinnings of agile methodologies. Moreover, the findings highlight the interplay between agile methodologies and organisational culture. The successful implementation of agile practices was facilitated by a culture that promotes open communication, collaboration, and empowerment. Similar emphasis was found in the literature where the significance of organisational culture in supporting and sustaining agile transformations was seen as important.
It is important to acknowledge that methods alone do not guarantee automatic success. The effectiveness of any methodology, including agile methodologies, relies on several factors, including the suitability of the assumptions underlying the methods. As discussed earlier, agile methodologies operate based on specific assumptions such as self-organising teams, changing requirements, and open communication. It is crucial for organisations to critically evaluate these assumptions and ensure their alignment with the project context and organisational culture. Implementing agile methodologies without considering the suitability of these assumptions may hinder the expected benefits and lead to suboptimal outcomes. Therefore, organisations should carefully assess the applicability of the assumptions of the chosen methodology and make necessary adjustments to ensure its suitability for their specific project and organisational environment.

5.2 Validity and Reliability

Validity is a crucial aspect of any research study as it ensures that the findings accurately represent the phenomenon being investigated (Terrell, 2016). Several strategies were employed to enhance the validity of this research.

Triangulation is the use of multiple data sources and data collection methods to develop a holistic understanding of the problem (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). To achieve this, semi-structured interviews were conducted with agile experts in the asset management domain, including product owners, scrum masters, and developers. This provided rich insights into the individual experiences and best practices when adopting the agile way of working. Additionally, document analysis of various agile methodologies was performed which added depth to the understanding of the topic. To establish the credibility of the findings from the interviews and analysing existing literature, prolonged engagement was undertaken in an agile practices chapter at an asset management firm in the Netherlands. This helped in providing real-world context and practical observations. Persistent observations were made in different contexts to capture a range of perspectives and practices (Terrell, 2016). Agile methodologies were observed in various situations, such as urgent project scenarios or when best practices were emphasised. By observing agile practices over a longer period, a holistic understanding of the contextual factors influencing project success and the application of agile methodologies was achieved.

Prolonged engagement was also undertaken with the research material to establish a deep understanding of the research context (Leung, 2015). This involved spending a significant amount

of time with the data, including transcribing interviews, immersing completely in the literature, and thoroughly analysing the collected documents. This prolonged engagement allowed for a comprehensive exploration of the data and ensured a thorough understanding of the research topic. Member checking was employed as a means of ensuring the accuracy and credibility of the findings. The interview transcripts and interpretations were shared with participants, allowing them to provide feedback and confirm the accuracy of their responses (Adler, 2022). This process helped validate the findings and ensure an accurate representation of participant perspectives.

Reliability is a critical element in research, ensuring consistency, stability, and reproducibility of findings (Terrell, 2016). To enhance the reliability of this study, various measures were implemented throughout the research process.

A standardised interview protocol was developed and consistently followed during all interviews. This protocol provided a structured framework, employing similar questions and prompts for each participant. This approach aimed to minimise variability in data collection, thus increasing the reliability of the gathered information (Brink, 1993). After completing the interviews, thorough reviews of the interview transcripts were conducted to identify any errors or omissions. This meticulous process aimed to enhance data reliability by ensuring the accuracy of transcribed information.
In seeking multiple perspectives, interviews were conducted with individuals holding various roles, such as product owners, scrum masters, and developers, within asset management firms. This comprehensive approach facilitated a more robust understanding of the perceived impact of adopting agile methodologies, further increasing the reliability of the study (Healy & Perry, 2000). While the study focused on explaining the perceived impact of adopting agile methodologies through in-depth interviews and document analysis, it also provided a descriptive account of the participants' experiences and perspectives (Brink, 1993). This dual emphasis on explanation and description contributed to the reliability of the study by offering a comprehensive and nuanced understanding of the research topic.

To further strengthen the reliability of the research, necessary steps were taken to minimise threats related to participant error, participant bias, researcher error, and researcher bias (Cypress, 2017). To address participant error, careful attention was given to the scheduling and conduct of the interviews. The timing of the interviews was meticulously planned to provide a conducive environment for participants that are free from distractions or time-related pressures. This approach aimed to create a comfortable and focused interview setting, thereby reducing the likelihood of errors arising from timing or external factors.
To mitigate participant bias, precautions were implemented to establish a suitable atmosphere that encouraged participants to provide honest and authentic responses. All interviews were conducted with the participant alone in the room, ensuring that they felt at ease and were not influenced by concerns related to social desirability or the presence of others (Cypress, 2017). By creating such a setting, participants were able to freely express their perspectives without being conscious of their surroundings, minimising the risk of biased or false responses.

Regarding researcher error, steps were taken to ensure consistency and accuracy in the interpretation and analysis of the collected data (Brink, 1993). The interviews were spread out over a period of four weeks, with a maximum of two interviews conducted on any given day. This approach aimed to maintain a fresh perspective for each interview, reducing the potential for fatigue or mental exhaustion that could compromise the interpretation of data. Additionally, detailed notes were diligently taken during the interviews to capture key points accurately, and the interview recordings were carefully reviewed to verify the precision of transcriptions and interpretations. Finally, researcher bias was minimised by making a conscious effort to maintain

objectivity throughout the research process. The interviews were approached with an open mind, actively listening to participants' responses without imposing any preconceived notions or personal biases. The primary focus was on gathering the participants' perspectives and experiences by prioritising their narratives over shaping their responses to fit a predetermined narrative.

5.3 Limitations of the Study

This section addresses the limitations of this study.

- Sample Size: The research focused specifically on asset management firms in the Netherlands. While this provided valuable insights into the impact of implementing agile methodologies in this particular context, the findings may not be generalisable to other industries or geographical locations. Future studies could consider expanding the sample size to include a broader range of firms and industries to enhance the applicability of the findings.
- Research Scope: The research focused on the impact of agile methodologies on IT project success. However, project success is influenced by numerous factors beyond agile methodologies. Therefore, the study's scope may limit a comprehensive understanding of all the factors influencing project success in asset management firms.
- Time Constraints: The research was conducted within a specific timeframe of five months, which may have restricted the depth and breadth of data collection and analysis. A more extensive study with a longer duration could provide a more comprehensive understanding of the long-term effects of implementing agile methodologies on IT project success.
- Self-Reported Data: The data collected for this research heavily relied on self-reported information provided by the participants. This introduces the potential for bias or inaccuracies in the responses. Future studies could consider incorporating objective measures like quantitative or mixed-method approaches to validate and complement self-reported data.
- External Factors: The implementation of agile methodologies in asset management firms can be influenced by external factors, such as changes in regulations, market conditions, or technological advancements. These external factors may impact the outcomes and generalisability of the findings and thus should be taken into consideration in future research.

5.4 Future Research

The following areas are recommended for further investigation:

1. While this research focused on qualitative interviews, future research could incorporate quantitative methods such as surveys or statistical analysis to quantify the impact of agile methodologies on project success. This would provide a broader understanding of the relationship between agile practices and project outcomes.
2. Conducting longitudinal studies over an extended period would help in observing the long-term effects of agile implementation on project success in asset management firms. By tracking projects and their outcomes over time, deeper insights can be gained into the sustainability and evolution of agile practices.
3. Comparing the impact of agile methodologies across different industries or countries would help determine if the findings from asset management firms in the Netherlands apply and are generalisable to other contexts. Comparative studies could identify industry-specific challenges and opportunities in adopting agile approaches.

4. Investigating the factors that influence the successful adoption of agile methodologies in asset management firms would provide practical insights for organisations. Understanding the organisational, cultural, and managerial factors that facilitate or hinder the adoption of agile practices would be valuable for implementing agile transformations effectively.

5. Future research could explore the development of robust metrics to evaluate the success of agile projects in the context of asset management firms. Establishing measurable indicators that align with agile principles and project objectives would enable more objective assessments of project success and facilitate benchmarking across organisations.

6. Examining the impact of agile methodologies on different stakeholders, such as end-users, customers, and project teams, would shed light on the broader implications of agile adoption. Understanding how agile practices influence stakeholder satisfaction, collaboration, and overall project outcomes would contribute to a comprehensive understanding of project success.

7. Future research could focus on identifying best practices and lessons learned from successful agile implementations in asset management firms. Exploring real-world case studies and analysing success stories would provide practical insights for organisations embarking on agile transformations.

8. One area for future research could be to study the actual impact of implementing agile methodologies in asset management firms. While the current study focused on the perceived impact as reported by participants, further research could involve collecting objective data on project outcomes, such as project duration, cost savings, customer satisfaction, and team productivity.

6 Conclusion

6.1 Research Conclusion

This research aimed to explore the perceived impact of adopting agile methodologies for successfully delivering technology-driven projects in asset management firms. By addressing the research questions and sub-questions, we have gained valuable insights into the perceptions and recommendations of agile experts regarding the adoption of agile practices in this industry.

The study revealed that asset management firms in The Netherlands have embraced agile methodologies because of the fast-paced constantly changing nature of the financial industry. There was a need for flexibility, faster time-to-market, and improved collaboration between involved stakeholders. These perceived benefits were consistent with existing literature on agile adoption in other industries. The primary goal for all teams was found to have a happy customer no matter how the delivery was done, while the teams believed it was of utmost importance to build and deliver projects in the right environment. However, just like the adoption of any other methodology, Agile adoption brings its share of challenges. Participants identified factors such as changing requirements, shifting priorities, and initial resistance to change as significant hurdles to overcome. It was also evident from the discussions that the existing skill gap and lack of knowledge on the way of working also affected the successful delivery of technology-driven projects and should be carefully addressed to mitigate their impact.

The study also identified different criteria used by asset management firms to evaluate the success of their projects. Although the traditional measures of cost, time and scope were still prevalent on the business side of the companies, the technological teams also perceived stakeholder/customer satisfaction as highly significant. The square root model reflected this perception. Agile methodologies were perceived to contribute positively to these success criteria by promoting iterative development, continuous feedback, and frequent stakeholder involvement.

The key factors influencing the deliveries of projects were also uncovered during the research. The initial framework of moderating and mediating variables from the literature was partially confirmed and also updated based on additional factors revealed by the interviews. These factors included effective communication and collaboration, strong leadership, team members' experience with the agile, alignment of priorities with organisation goals and quality of people. Based on the experiences and perspectives of agile team members, the study also shed light

on the lessons learnt during the adoption and implementation phase of the agile way of working. Best practices used within organisations and recommendations from participants were also incorporated into the research. The notable best practice from the interview process and document analysis revealed the implementation of a hybrid way of working. Every organisation has a different culture and nature of work, which made it hard for them to implement a single method by the book. This called for the tailoring of agile methodologies and the implementation of relevant aspects. This customisation of the way of working helped organisations maximise the benefits of agile. Other best practices included maintaining clear and transparent communication, a physical portfolio wall, weekly scrum master sessions, agile work sessions and empowering self-organising teams.

It is important to acknowledge that the research focused on the perceived impact rather than the actual outcomes of agile adoption. Future research could include an examination of objective project outcomes and a comparative analysis of the perceived impact across different industries and organisational contexts. By better understanding the perceptions and recommendations of experienced agile team members, asset management firms can make informed decisions and effectively leverage agile methodologies to enhance project success and deliver value to their stakeholders.

This research has provided valuable insights into the perceived impact of adopting agile methodologies in technology-driven projects within asset management firms in the Netherlands. It is concluded that agile is not the sole determinant of project success. No single factor can be attributed as the sole cause. At the heart of Agile are teamwork and the acknowledgement of other contributing factors. Agile empowers teams to adapt and navigate through various circumstances, strengthening their ability to handle challenges and uncertainties. It fosters a mindset to embrace positive change. While agile methodology plays a significant role, it is ultimately the people involved, their mindset, behaviour, and placement within the organisation, that truly drive success.

6.2 Recommendations

1. Tailoring Agile Methodologies: Every organisation is different and every team within the organisation has its own unique characteristics. This makes it important for organisations to assess their teams and determine the suitable agile methodology that can optimise their potential. The nature of projects should also be taken into account as projects that require strict adherence to predefined plans or operate in highly regulated environments may not be suitable for agile.

2. Develop Agile Champions: Designate individuals within the organisation as Agile Champions who can serve as advocates for agile methodologies. These champions should have deep knowledge and expertise in agile practices and can provide guidance and support to teams during the adoption and implementation process.

3. Foster Cross-Functional Collaboration: Encourage collaboration and knowledge-sharing across different teams and departments. This can be achieved by organising cross-functional workshops, promoting interdisciplinary project teams, and creating spaces for open communication and idea exchange.

4. Emphasise Continuous Learning and Development: Establish a culture of continuous learning and development by providing opportunities for training, workshops, and knowledge-sharing sessions. Encourage team members to explore new tools, techniques, and emerging trends in agile practices to stay updated and enhance their skills.

5. Foster a Safe-to-Fail Environment: Create an environment where experimentation and learning from failures are encouraged. Encourage teams to take calculated risks, learn from their mistakes, and continuously improve their processes and practices.

6. Awareness and Training: To address the different perceptions about agile, it is crucial to raise awareness among employees about the agile mindset and its principles. Training programs should be implemented to educate employees on different agile methodologies and how they benefit the organisation. This will help create a common understanding and facilitate smoother adoption.

7. Promote Collaboration with Customers and End-Users: Actively involve customers and end-users throughout the project lifecycle to gather feedback, validate assumptions, and ensure the final product meets their needs. Engaging customers in collaborative discussions and user testing sessions can significantly enhance the success of agile projects.

8. Collaborate with Agile Communities: Engage with external agile communities and networks to learn from their experiences, best practices, and success stories. Participating in conferences, meetups, and online forums can provide valuable insights and help organisations stay abreast of the latest developments in agile methodologies.

9. Implement Agile Metrics: Define and track relevant metrics to assess the impact and effectiveness of agile methodologies. These metrics can include cycle time, team velocity, customer satisfaction, and stakeholder engagement. Regularly review and analyse these metrics to identify areas for improvement and to monitor the progress of agile implementation.

10. Identify Mediating and Moderating Factors: Conduct further research to identify the mediating and moderating factors that influence the relationship between agile methodologies and project success. Understanding these factors will provide organisations with insights on how to optimise their implementation strategies and maximise the benefits derived from agile practices.

6.3 Relevance to MOT Program

The study on the impact of implementing agile methodologies on IT project success in asset management firms of the Netherlands using qualitative research methods holds significant relevance to the MSc Management of Technology program at TU Delft. The program aims to equip students with a deep understanding of managing technology-driven organisations, and this research aligns with the program's core objectives. The program's curriculum, particularly the courses Preparation for the Master Thesis, Research Methods, Emerging and Breakthrough Technologies and Digital Business Process Management provided essential knowledge and skills that were instrumental in conducting this research. The research Methods course enabled me to design and conduct in-depth interviews with participants and also helped in interpreting and analysing the qualitative data collected during the research process. The Thesis Prep course equipped me with the necessary tools and frameworks to develop a well-structured research proposal and identify the research objectives. Emerging and Breakthrough Technologies offered insights into the latest technological advancements and their impact on different industries. The course provides a broader context for exploring the potential benefits and challenges associated with implementing agile practices in this specific industry. Digital Business Process Management was relevant in examining the role of agile methodologies in optimising project delivery and improving overall business performance. The course explained the scrum framework and also helped us practically work in a scrum team to deliver our project. This research was useful in deepening the knowledge and gaining practical insights into managing technology-driven

organisations, enhancing their abilities to tackle complex challenges in the field of technology management.

6.4 Personal Reflection

Throughout the course of this research, I have undergone a significant personal reflection on my understanding of project methodologies, particularly Agile. Initially, I held the belief that implementing methodologies exactly as prescribed in the literature would guarantee project success. However, the findings from this thesis have challenged this perspective and led me to a profound realisation.

The research journey has exposed me to the multifaceted nature of project management and the need for flexibility in adopting methodologies. I have come to understand that there is no one-size-fits-all solution to project challenges, and a rigid adherence to a single methodology may hinder rather than enhance project outcomes. The thesis findings have emphasised the importance of a hybrid approach, where organisations customise their way of working to best suit their specific context and project requirements.

This understanding has sparked a shift in my mindset, as I now appreciate the value of embracing adaptability and tailoring Agile methodologies to meet the unique needs of asset management firms. I have learned that Agile is not a strict set of rules, but rather a mindset that encourages teamwork, collaboration, and continuous improvement. It provides a solid foundation that allows organisations to navigate the complexities and uncertainties inherent in technology-driven projects.

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A

Informed Consent

You are invited to participate in a research study entitled "Impact of Scrum Implementation on Project Success in the Financial Industry of the Netherlands." This study is being conducted by Shitiz Arya, a graduate student at TU Delft, as part of their master's thesis. The purpose of the study is to explore the relationship between the use of scrum and technical projects success in the financial industry.

Your participation in this study will involve a semi-structured interview conducted in person or via Teams call. The interview will be recorded and later transcribed for analysis. The recordings are solely for the purpose of data analysis and will be anonymised to protect your identity. The recordings and data collected will be used for this research project only and will be deleted at the end of the project.

Participation in this study is entirely voluntary. You may choose not to participate or to withdraw from the study at any time without penalty. Your decision to participate or not participate will not affect your relationship with the researcher. All information collected will be kept confidential and anonymous, and the data will be stored securely. The audio recordings and transcriptions will be destroyed after the study is completed. Summaries of interviews will be reviewed by participants for accuracy and compliance. If approved, some of these summaries may be made public along with the thesis.

If you have any questions or concerns about this study, please feel free to contact the researcher at s.arya@student.tudelft.nl. If you have any questions or concerns about your rights as a research participant, you may contact the researcher or the TU Delft's research ethics committee. I have read and understood the study information stated above, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.

B
Interview Questions

The following questions were prepared and tailored for each interviewee based on their job function.

B.1 Product Owners/Business Analysts

1. Could you please describe me your previous work experience and current role?
2. What has been your experience with Agile methodologies in technology driven projects?
3. Could you share your experience on projects prior to adopting agile and how was success measured in those projects?
4. What was the motivation or perceived benefits when your team adopted the agile way of working?
5. How has the adoption of agile methodologies impacted the way you manage projects?
6. How has the use of agile methodologies affected team morale and motivation?
7. Have you noticed any changes in team productivity since adopting agile methodologies?
8. In your opinion when is a project considered successful? Are there any other criteria apart from time and cost which are taken into consideration?
9. What factors do you feel influence the completion and success of a project?
10. How were the adopted methodologies tailored to the needs of your department and what factors were considered for this modification?
11. Were you involved in any projects that weren't as successful as planned? If so, what were the main factors that you think led to this failure?
12. What recommendations do you have for improving the adoption and implementation of Scrum methodology in technical projects?
13. Are there any specific areas where you think more support or resources are needed?
14. Is there anything you would like to add that might be helpful for this research?

B.2 Scrum Masters

1. Could you please describe me your previous work experience and current role?
2. What has been your experience with Agile methodologies in technology driven projects?
3. What was the motivation or perceived benefits when your team adopted the agile way of working?
4. Have you encountered any resistance or challenges from team members during the adoption process?
5. How has the use of agile methodologies affected team morale and motivation?
6. Have you noticed any changes in team productivity since adopting agile methodologies? If yes, how would explain these changes?
7. What factors according to you influence the completion and success of a project?
8. Were there any practices which you found to be more effective than others when adopting for example the scrum framework or SAFe?
9. How were the adopted methodologies tailored to the needs of the department and what factors were considered for this modification?
10. What have been some of the best practices that you or the teams have identified for effectively implementing agile in your daily work?
11. Could you share your experience on projects prior to adopting agile and how was success measured in those projects?
12. Were you involved in any projects that were considered a failure? If so, what were the main factors that you think led to this failure?
13. Is there anything you would like to add that might be help in this research?

B.3 Developers

1. Could you please describe me your previous work experience and current role?
2. What has been your experience with Agile methodologies in technology driven projects?
3. How has the use of agile methodologies affected team morale and motivation?
4. What factors do you feel influence the completion and success of a project?
5. How has the adoption of agile methodologies impacted your daily work as a developer?
6. Have you noticed any changes in the quality of your work since adopting agile methodologies?
7. How has the use of agile methodologies affected your communication and collaboration with other team members? Maybe also your performance?
8. In your opinion, what are the key factors that contribute to project success in asset management firms from a developer's perspective?
9. Is there anything you would like to add that might be help in this research?