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APPLICATION OF AGILE PROJECT MANAGEMENT METHODOLOGY TO STRENGTHENING COMPANY IT IDENTITY SECURITY POSTURE

APLIKACE AGILNÍ METODIKY ŘÍZENÍ PROJEKTŮ PRO POSÍLENÍ BEZPEČNOSTI IT IDENTIT SPOLEČNOSTI

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Abstract

This thesis investigates the integration of a Scrum Master into the Privileged Access Management (PAM) project at NN IT HUB, utilizing PRINCE2 Agile methodology.

The introduction of the Scrum Master role significantly enhanced team dynamics and optimized project execution, leading to improved process efficiency and optimized project execution.

The study confirms that incorporating a Scrum Master offers substantial operational and financial benefits, supporting the organization's strategic objectives and enhancing its security framework.

Keywords

PRINCE2 Agile, Scrum Master, Privileged Access Management (PAM), Team Dynamics, Process Optimization , Agile Techniques.

Abstrakt

Tato práce zkoumá integraci Scrum Master do projektu Privileged Access Management (PAM) v NN IT HUB s využitím metodiky PRINCE2 Agile.

Zavedení role Scrum Master výrazně zlepšilo dynamiku týmu a optimalizovalo provádění projektů, což vedlo ke zlepšení efektivity procesů a optimalizovanému provádění projektů.

Studie potvrzuje, že začlenění Scrum Master nabízí podstatné provozní a finanční výhody, podporuje strategické cíle organizace a zlepšuje její bezpečnostní rámec.

Klíčová slova

PRINCE2 Agile, Scrum Master, Privileged Access Management (PAM), Dynamika týmu, Optimalizace procesů, Agilní řízení projektů , Agilní techniky.

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Affidavit

I declare that the present master project is an original work that I have written myself. I declare that the citations of the sources used are complete, that I have not infringed upon any copyright (pursuant to Act. no 121/2000 Coll.).

Brno dated 12th May 2024

BSc Omar Ahmed Talaat Elsayed

author's signature

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Table of Contents

Introduction.....	11
Goals of thesis and methods.....	12
1- A theoretical review of a problem.....	13
1.1 Traditional project management.....	13
1.2 PRINCE2.....	16
1.3 Agile	20
1.3.1 SCRUM	22
1.3.2 DevOps.....	24
1.3.3 Information radiators	25
1.3.4 User story estimation technique (Planning poker)	27
1.4 PRINCE2 Agile.....	28
1.4.1 Cynefin framework.....	31
1.4.2 Agilometer.....	33
1.5 Privileged Access Management (PAM).....	35
1.6 Agile and OKRs (Objectives and Key Results)	37
1.7 McKinsey 7S Model.....	38
1.8 SWOT analysis	39
1.9 Three-Points Cost Estimating technique	39
1.10 Benefit-Cost Ratio	40
1.11 RACI matrix.....	41
1.12 Balanced Scorecard (BSC)	42
2- Analysis of the contemporary situation	42
2.1 Company Introduction	42

2.1.1 Company Values	43
2.1.2 Company Strategy	43
2.1.3 Organizational structure	45
2.2 Project Introduction	47
2.3 Project Stages.....	48
2.3.1 Starting up & initiating the project stages	48
2.3.2 Directing the project stage.....	52
2.3.3 Managing product delivery & controlling stages	53
2.4 Problem analysis breakdown	54
2.4.1 Agilometer and Cynefin Framework	56
2.4.2 7S Model	57
2.4.3 SWOT Analysis.....	59
2.4.4 Balanced Scorecard (BSC)	61
2.5 Analysis Summary	64
3-Solution proposal	65
3.1 Team structure modification (scrum master)	65
3.1.3 Talent acquisition steps.....	67
3.2 Enhancing Project processes.....	68
3.2.1 Sprint Review and Sprint Retrospective Meetings.....	69
3.2.2 User Story Estimation Technique	71
3.2.3 Burn-Up and Burn-Down Charts	74
3.3 Economic evaluation of proposal.....	75
3.3.1 Cost Estimating Analysis.....	76
3.3.2 Cost-Benefit Analysis.....	77
3.3.3 Financial benefits of proposal to the company.....	79
4-Conclusion	81

5-References	82
List of tables.....	86
List of figures.....	87

Introduction

In the digital age, where security challenges like data breaches and unauthorized access are prevalent, enhancing IT security infrastructure within organizations has become important. This thesis investigates the application of the PRINCE2 Agile framework in implementing a Privileged Access Management (PAM) system at NN IT HUB. Specifically, it explores the integration of a Scrum Master role to optimize project execution and team dynamics within the framework of PRINCE2 Agile, a synergy that promises not only to safeguard IT assets but also to enhance project delivery and team performance.

The need for robust security measures and efficient project management is highlighted by the complexities and high stakes of IT security projects, which require both agility and precise control. This study provides a comprehensive examination of current PAM implementation strategies at NN IT HUB and identifies key areas for improvement. By proposing strategic solutions such as the incorporation of a Scrum Master, the thesis aims to address observed inefficiencies in project processes and to foster a more agile, responsive work environment.

Through an analytical approach, this work assesses the impact of enhanced project management practices on the success of IT security implementations. It delves into theoretical concepts of Agile methodologies, applies them to the practical challenges of PAM projects, and evaluates the outcomes to recommend effective management strategies.

By analyzing the existing project setup and integrating Agile practices, this thesis proposes actionable solutions that aim to streamline project delivery and enhance the overall effectiveness of the PAM system. The final sections of the thesis present a detailed analysis of the financial and operational benefits derived from integrating a Scrum Master, substantiating the role's value beyond traditional project management metrics.

Goals of thesis and methods

The aim of the thesis is to examine the effectiveness of the PRINCE2 Agile project management solution in enhancing team stability and refining work processes for the effective implementation of a Privileged Access Management (PAM) security product. The thesis is structured into three principal segments:

-Theoretical review: This part establishes the necessary theoretical groundwork by discussing traditional project management approaches, such as the waterfall model, and progresses through Agile methodologies, the PRINCE2 framework, and specifically PRINCE2 Agile. Additionally, it includes an in-depth exploration of PAM systems and strategic methodologies utilized in project implementation.

-Analysis of situation: An in-depth analysis of the status of NN IT Hub is conducted in this section. It details the strategic execution and various phases of the project, including the roles and responsibilities of the team members, the technologies employed, and the current events and artifacts used. Cynefin Framework, Agilometer assessment tool, the McKinsey 7S Model, SWOT analysis, and balanced scorecard are applied to evaluate the existing conditions, assess different levels of uncertainty and complexity, identify risk and weaknesses in the current project setup and potential opportunities for improvement.

-Solution Proposal: The final section proposes strategic interventions, including the restructuring of the team to incorporate a Scrum Master also enhancing the project processes by adding new events within the project and usage of tasks effort estimation technique and reporting progress charts. Three-point cost estimation analysis is used to estimate the cost of the proposal and the cost benefit ratio is applied to confirm the financial benefits from the proposal.

This thesis employs a range of methods to evaluate the effectiveness of the PRINCE2 Agile project management methodology in enhancing team stability and refining work processes. Key methods incorporated include the application of theoretical frameworks such as PRINCE2, Agile, and Scrum, complemented by analytical tools like the Cynefin Framework, Agilometer, McKinsey 7S Model, SWOT Analysis, RACI matrix and the balanced scorecard to assess and refine project management processes. Additionally, practical methodologies such as the Three-Point Estimating Technique and Benefit-Cost Ratio analysis are employed to evaluate financial implications.

1- A theoretical review of a problem

This chapter starts with a critical exploration of various project management methodologies, from traditional approaches to contemporary Agile practices, and also covers the importance of Privileged Access Management in protecting critical IT assets. beginning with examining traditional project management strategies, then discussing how Agile and PRINCE2 methods can be combined through the PRINCE2 Agile framework to improve project management in complex environments like IT security.

Subsequently, the chapter delves into the specifics of the Agile methodologies, including SCRUM and its significance in fostering an adaptive project environment. It also introduces the Cynefin framework for tackling project complexity, the Agilometer for assessing project environments, and the application of the McKinsey 7S Model and SWOT analysis to evaluate organizational alignment and strategic planning, RACI matrix to understand the organizational structure. further supporting the thesis argument on methodology efficacy.

Furthermore, specialized techniques such as the Three-Points Estimating technique and Benefit-Cost Ratio analysis are introduced for their utility in effective project decision-making and financial assessments.

1.1 Traditional project management

Project management has played crucial role in major human accomplishments for hundreds of years, as showed by historical achievements such as the Egyptian Pyramids, Great wall of China, and the Human beings landing on the moon. These milestones were reached thanks to leaders who effectively used project management strategies, techniques, and tools. These leaders seized essential skills and applied knowledge to fulfil the expectations of their customers and others impacted by the projects. By the mid-20th century, there was an effort to recognize project management as its own profession. This included outlining the know essential to this field, now known as project management body of knowledge (PMBOK). The project Management institute (PMI) worked to standardize this knowledge, understanding that it was too wide for a single book. Thus, PMI created and released the guide to the project management body of knowledge (PMBOK Guide), defining PMBOK as a collective wisdom of the project management profession, covering both well established and new practices (Project Management Institute, 2021, p.2). The project management body of knowledge encompasses five Project Management

Process Groups, which provide a framework for organizing and managing projects regardless of their complexity or size:

- Initiating Process Group: Defines the project at a high level and establishes its objectives and scope. (Project Management Institute, 2021, p. 23).
- Planning Process Group: Involves detailed planning of the project's path, including schedules, resources, and budgets. (Project Management Institute, 2021, p. 23).
- Executing Process Group: Where plans are put into action and the project's deliverables are developed and completed. (Project Management Institute, 2021, p. 23).
- Monitoring and Controlling Process Group: Involves tracking the project's progress, managing changes, and ensuring that project objectives are met efficiently. (Project Management Institute, 2021, p. 23).
- Closing Process Group: Marks the completion of the project, including the formal acceptance of the deliverables and the release of project resources. (Project Management Institute, 2021, p. 23).

The project management body of knowledge also defined by ten knowledge areas, each focusing on a critical aspect of project management:

- Integration: Ensures all aspects of the project work together towards the same goal and adapt to changes. (Project Management Institute, 2021, p. 23).
- Scope: Outlines the work required and ensures that only necessary work is included. (Project Management Institute, 2021, p. 23).
- Schedule: Manages timelines to ensure project completion within the set timeframe. (Project Management Institute, 2021, p. 24).
- Cost: Oversees project budgeting and expense tracking. (Project Management Institute, 2021, p. 24).
- Quality: Guarantees that the project meets the required standards and objectives. (Project Management Institute, 2021, p. 24).
- Resources: Manages team dynamics and allocates human, physical, and technical resources efficiently. (Project Management Institute, 2021, p. 24).

- Communication: Facilitates effective information exchange among stakeholders. (Project Management Institute, 2021, p. 24).
- Risk: Identifies potential issues that could impact the project and develops strategies to address them. (Project Management Institute, 2021, p. 24).
- Procurement: Manages the acquisition of goods and services from external sources. (Project Management Institute, 2021, p. 24).
- Stakeholders: Focuses on engaging and managing the expectations of those involved or affected by the project. (Project Management Institute, 2021, p. 24).

The project duration of life describes the stages a project goes through from start to finish. This structure is universal, fitting any project type. Stages may follow one another, repeat, or overlap, and can be planned out ahead of time or adjusted along the way. Typically, this cycle includes phases that concentrate on developing the product or service known as the development life cycle. (Project Management Institute, 2021, p. 19).

There are different development life cycles, including predictive, iterative, incremental, adaptive, or a combination of these models. In a predictive life cycle, often called a waterfall life cycle, the project's scope, timing, and costs are determined early on, and any changes are managed with care. This type of life cycle is often referred to as a waterfall life cycle due to its step-by-step progression. In contrast, an iterative life cycle allows for the project scope to be defined early but permits adjustments to time and cost estimates as the team gains a deeper understanding of the product. Through repeated cycles, iterations develop the product, while increments gradually add to the product's features. (Project Management Institute, 2021, p. 19).

In an incremental life cycle, the product is built through a series of iterations that add new functionality within a set timeframe. The final product is deemed complete only after the last iteration, when it has all the necessary and sufficient capabilities. (Project Management Institute, 2021, p. 19). Adaptive life cycles, which include agile, iterative, or incremental approaches, define and approve the detailed scope before the start of each iteration. These life cycles are also known as agile or change-driven life cycles. A hybrid life cycle mixes predictive and adaptive elements, using a predictive approach for clear parts and an adaptive approach for evolving areas. (Project Management Institute, 2021, p. 19).

While the Waterfall model, as a primary example of traditional project management, is acknowledged for its straightforward process, it is not without its drawbacks. Its structured phases must be completed one after the other, making it less suited for projects where requirements are not fully known from the start or are subject to change. This model has faced challenges, particularly in the IT and cybersecurity fields, where the rapid pace of change can make initial requirements outdated by the time the project is finished. (Gallagher, Dunleavy & Reeves, 2019). Consequently, the Waterfall model's limitations in adaptability, integrating customer feedback, and iterative refinement have led to the rise of more flexible, responsive methodologies like Agile. Agile methods, which emphasize adaptability and collaboration with customers, are highly valued in environments that rapidly evolve, such as IT security. The shift from Waterfall to Agile reflects a significant change in project management, with Agile placing a premium on flexibility and responsiveness to changes at any point in the project.

(1)(2)

1.2 PRINCE2

PRINCE was originally published in 1990 with a focus on IT projects. It was revised for general project management and released as PRINCE2 in 1996, significantly updated in the 2009 and 2017 editions. (Schlag, 2021). PRINCE2 (Projects IN Controlled Environments) represents structured project management method, characterized by its systematic division into manageable and controllable stages. The PRINCE2 methodology addresses project management with four integrated elements of principles, themes, process, and the project environment. (Schlag, 2021; AXELOS, 2018, p. 33).

PRINCE2 seven principles serve as foundational mandates ensuring that project aligns with the core of PRINCE2 methodology. Comprising seven key principles, they are essential for a project to be recognized under the PRINCE2 framework and unless all of them are applied, it is not a PRINCE2 project because PRINCE2 is principle based than prescriptive so the principles are universal and for that they can be applied to every project in addition to that the principles are self-validating, having been proven in practice over many years. The principles empower project managers with the ability to influence and tailor the management of the project. (AXELOS, 2018, p. 34).

These principles include:

- Continued business justification, emphasizing the need for ongoing documentable justification at the start and during the project so that decisions can be made with the business value in mind. (AXELOS, 2018, p. 34; Murray, 2020)
- learn from experience, mandating a lesson log to each project that acts as a repository for lessons learned in previous projects to avoid repeating past mistakes. Generally, when doing something in IT it's unlikely to be the first time you've done it. (AXELOS, 2018, p. 34; Murray, 2020)
- Defined rules and responsibilities, in any project people must know what to do and what they can expect from others so there must be clarity in project roles to facilitate smooth execution. (AXELOS, 2018, p. 34; Murray, 2020)
- Manage by stages, this is where managing the process in stages is more effective, managing a deployment as a project which is easier to track, make progress and report to management for approval to move to the next stage and when transitioning between stages the business progress, risk, scope, quality and project plan are all updated. (AXELOS, 2018, p. 34; Murray, 2020)
- Manage by exception, offers a balance between progress project tolerances also it defines how authority is delegated because holding all approvals at the highest level slows down progress. (AXELOS, 2018, p. 34; Murray, 2020)
- Focus on products, states that a product description should be written as soon and as clear as possible in the project, so that all stakeholders will have a clear idea of what to expect. because in IT the product is a working, usable service of connected components. (AXELOS, 2018, p. 34; Murray, 2020)
- Tailor to suit the project, PRINCE2 can be tailored to suit the needs of your organization by scaling it up and down based on project's size, environment, complexity, importance, capability, and risk. (AXELOS, 2018, p. 34; Murray, 2020)

PRINCE2 seven themes describe the aspects of project management that must be addressed continually as the project progresses through its lifecycle. (AXELOS, 2018, p. 35)

These themes include:

- Business case theme, establish decision making criteria to confirm whether the project is and remains desirable, viable and achievable. (Business case theme usually answers the why? question). (AXELOS, 2018, p. 35; Murray, 2020).
- Organization theme, delineating the roles and responsibilities in the PRINCE2 project team and establish the project structure of accountability and responsibility (Organization theme usually answers the Who? question). (AXELOS, 2018, p. 35; Murray, 2020).
- Quality theme where the quality parameters and means defined and implemented by which the project will verify the products that are to purpose (Quality theme usually answers the What? question). (AXELOS, 2018, p. 35; Murray, 2020).
- Plan theme facilitates communication and control by defining the means of delivering the products (Plan theme usually answers the How? How much? When? questions). (AXELOS, 2018, p. 35; Murray, 2020).
- Risk theme to identify, assess and control uncertainty and as result, improve the ability of the project to succeed (Risk theme usually answers What if? question). (AXELOS, 2018, p. 35; Murray, 2020).
- Change theme to identify, assess and control any potential and approved change to the project baseline (Change theme usually answers What is the impact? question). (AXELOS, 2018, p. 35; Murray, 2020).
- Progress theme to establish mechanisms to monitor and compare the actual achievement against those planned besides providing forecast for the project objectives and the project continual viability and control any unacceptable deviations in addition to that the theme addresses the ongoing viability of the plans and explain the decision-making process for approving plans (Progress theme usually answers Where are we now? Where are we going? questions) (AXELOS, 2018, p. 35; Murray, 2020).

PRINCE2 Processes provides a process model for managing a project. The seven processes can easily be tailored to suit the requirements of all types of projects, they consist of a set of activities that are required to direct, manage and deliver a project. (AXELOS 2018) (MURRAY, A 2020)

The processes are:

- Starting up a project: the purpose of this process is to answer the question [Do we have a worthwhile and viable project?], the activities involved in this process are preparing an outline business case and project product description, choose the project approach and accumulate the project brief, choose the people who will do the work to initialize the project and other roles in the project team and last activity is to plan for the initiation stage. (AXELOS, 2018, p. 36; Murray, 2020).
- initiating a project: initiating a project procedure is aimed towards the project manager who performs the maximum job in this process in order to establish the project on a sound foundation, the activities in this step include: preparing the overall project plan , defining the (risk, change , quality , communication and benefits) management approaches for the project, set project controls and assemble the project initiation document and final activity is agreed on tailored needed for the project. (AXELOS, 2018, p. 36; Murray, 2020).
- Directing a project: the purpose of this process is to enable the project board to be accountable for the project by making key decisions, to have overall control and delegate day-to-day management of the project to the project manager. The activities of this process include authorizing initiation and project, authorizing stage or an execution plan, provide ad hoc direction and finally authorize project closure. (AXELOS, 2018, p. 36; Murray, 2020).
- Controlling a stage: This process describes the monitoring and control activities of the project manager who must ensure that a stage stays on track and who must react to unexpected events, the activities in this step include review status of work package, assess and capture issues and risks and take corrective action. (AXELOS, 2018, p. 36; Murray, 2020).
- Managing product delivery: this process addresses the team manager's role in supervising the detailed work of creating the project's products and provides the link between the project manager and the teams undertaking the project work, three major activities in this process are: accepting a work package, perform a work package and send a work package. (AXELOS, 2018, p. 36; Murray, 2020).

- Managing a stage boundary: this process is needed so that a project board may review the success of the present stage and approve the succeeding stage. During this process the project initiation document is updated, and most project documents are confirmed and reviewed. (AXELOS, 2018, p. 36; Murray, 2020).
- Closing a project: describes the closure activity towards the end of the final stage of the project. The project manager leads the process which provides for an orderly decommissioning, including any remaining project acceptance and handover requirements. (AXELOS, 2018, p. 36; Murray, 2020).

The PRINCE2 project environment usually relies on the organizations that often want a consistent approach to managing projects and tailor PRINCE2 to create their own project management method. This method is then embedded into the organization's way of working. (AXELOS, 2018, p. 36; Murray, 2020).

(3)(4)(5)

1.3 Agile

Agile as an idea and approach, appeared in February 2001 when a collective of software development thinkers came together to do brainstorming about an alternative to the heavily documentation driven software development processes. This gathering led to the creation of the Agile Manifesto, which articulated four core values: (Beck and others., 2019)

- individuals and interactions over processes and tools: prioritizing focus on people first and collaborations over processes and tools.
- working software over comprehensive documentation: Agile project need to deliver value and value is about the business need the project aims to deliver, documentation is barely sufficient and is done just in time.
- customer collaboration over contract negotiation: emphasizing cooperation with the customer rather than strict adherence to contract terms. Agile contracts must accommodate change.
- responding to Change Over Following a Plan: Being receptive to changes even late in the development process, over strictly following a pre-defined plan.

These values underscore the preference for the aspects on the left, although there is acknowledged worth in the items on the right. Agile is fundamentally a mindset, informed by these four values and driven by 12 underlying principles. (Beck and others., 2019)

These principles include:

- highest priority on satisfying the customer through early and continuous delivery of valuable software.
- welcome changing requirements.
- constantly delivering working software with a preference to the shorter time scale.
- Business people and developers must work together daily throughout the project.
- building projects around motivated individuals by giving them the environment and the support they need.
- appreciating face-to-face conversation as the most effective method of communication.
- Working software is the primary measure of progress.
- promoting a sustainable development pace.
- continues attention to technical excellence and good design.
- simplifying by maximizing the amount of work not done.
- allowing the best architectures, requirements, and designs to arise from self-organizing teams. regularly reflecting on how to become more effective.

Agile approaches and agile methods are umbrella terms that cover a variety of frameworks like Scrum, Lean, and DevOps. It is characterized by its iterative and incremental life cycles, which combine to adapt to significant changes and deliver project value more frequently. This approach aligns closely with the Agile Manifesto's principles, aiming to boost customer satisfaction through the early and continuous delivery of valuable products. In Agile, the primary measure of progress is the delivery of incremental, functional, and valuable deliverables. (Project Management Institute, 2021, p. 819)

Generally, Agile offers a flexible, responsive, and effective approach to project management, particularly suited to environments where requirements and circumstances are subject to rapid changes. Its focus on collaboration, adaptability, and continual improvement makes it a powerful

methodology in today's dynamic project landscapes. (Project Management Institute, 2021, p. 824)

(1)(6)(7)

1.3.1 SCRUM

Scrum theory is founded on empiricism and lean thinking. Empiricism asserts that knowledge comes from experience and making decisions based on what is observed. Lean thinking reduces waste and focuses on essentials. (Schwaber & Sutherland, 2020, p.3)

Scrum framework is an iterative, incremental and timeboxed approach to product delivery, optimize predictability and to control risk that builds software incrementally from the start of project instead of trying to deliver it all at once near the end by focusing on delivering the highest business value in the shortest time. (Schwaber & Sutherland, 2020, p.3)

Based on empiricism process scrum has three pillars and four values. The first pillar is transparency in which the emergent process and work must be visible to those performing the work as well as those receiving the work, transparency enables inspection and inspection without transparency is misleading and useful. The second pillar is inspection where the scrum artifacts (documents) and progress toward agreed goals must be inspected frequently to early detect issues and problems then to last pillar which is adaption, and it means adjusting the scrum process to mitigate problem or trends then the four values are commitment, focus, openness, respect, and courage. (Schwaber & Sutherland, 2020, p.4)

Scrum team consists of

- scrum masters who are accountable for helping their teams succeed, and that often means offering them assistance in groups or on a one-on-one basis. They may facilitate exercises, give guidance or help people come to conclusions on their own. (Schwaber & Sutherland, 2020, p.6)
- product owners who are accountable for effective product backlog management that include developing and explicitly communicating the product goal, creating and clearly communicating product backlog items, ordering product backlog items and ensuring that

the product backlog is transparent, visible and understood. (Schwaber & Sutherland, 2020, p.5)

- developers who are tasked with formulating a plan for each sprint instilling quality by adhering to a definition of done and adapting their plan each day toward the sprint goal. (Schwaber & Sutherland, 2020, p.5)

Next to the scrum event where the first event is the sprint, and the sprint isn't a meeting. instead, it's the container for all the work that's done by a scrum team to achieve a sprint goal. The daily scrum, sprint planning, sprint review and sprint retrospective event all fall within the sprint. (Schwaber & Sutherland, 2020, p.7)

- sprint planning that marks the beginning of each sprint where the scrum team determines what they plan to accomplish during the sprint, they make this transparent by creating a sprint backlog including the sprint goal, the selected product backlog items and the developers plan for delivering the work. (Schwaber & Sutherland, 2020, p.8)
- daily scrum event and its purpose is to inspect progress toward the sprint goal and adjust the sprint backlog as necessary, modifying the upcoming planned work based on current progress. (Schwaber & Sutherland, 2020, p.9)
- sprint reviews events that focus on evaluating the outcome of the sprint and determine future adaptations. Here as well, the scrum team presents the results of their work to key stakeholders, reviewing progress and outcomes. (Schwaber & Sutherland, 2020, p.9)
- sprint retrospective where the scrum team inspects how the last sprint went with regards to individuals, interactions, processes, tools, and their definition of done and then to plan ways to increase quality and effectiveness. (Schwaber & Sutherland, 2020, p.10)

Scrum framework involves essential three artifacts that are designed to maximize transparency of key information.

- product backlog artifact, which is an emergent, ordered list of what is needed to improve the product. It is the single source of work undertaken by the scrum team, the product backlog is dynamic, it constantly changes to identify what the product needs to be appropriate and useful. (Schwaber & Sutherland, 2020, p.10)

- sprint backlog artifact, which is compromising the sprint goal, the set of product backlog items selected for the sprint as well as an actionable plan for delivering the increment. It is a list of tasks to be completed during the sprint and the list is determined in the sprint planning meeting. (Schwaber & Sutherland, 2020, p.11)
- increment artifact, which is a concrete step toward the product goal, the definition of done is a formal description of the state of the increment when it meets the quality measures required for the product. (Schwaber & Sutherland, 2020, p.11)

(8)

1.3.2 DevOps

DevOps shows an evolutionary movement in the information technology field, bridging the gap between software development and IT operations to promote teamwork, accelerate processes, and enhance the quality of IT services. It boosts the idea of making teams work closely together, sharing responsibilities, and keeping each other informed to make software delivery faster, more reliable, and better aligned with what businesses need. (Kim and others., 2016, p.459)

Looking at the 1980s manufacturing revolution helps us understand DevOps potential. In that era, adopting Lean principles extremely advanced how factories operated, making products faster and with higher quality, which helped companies succeed. Companies that didn't adopt Lean often delayed, lost market shares and sometimes even went out of business. (Kim and others., 2016, p.18).

In today's technological world, it's no longer acceptable to take years to develop and launch new software. Thanks to technological advances and Agile methods, development time has reduced from years to months. But despite of, getting those new features into production still took too long, risking failures. Enter DevOps, which changed the game by making the possibility to develop and deploy software rapidly, even in just hours or minutes. This approach lets companies quickly test out new ideas and deliver valuable features to customers without delay.

Organizations that have embraced DevOps can update software hundreds or thousands of times a day, staying ahead in a market that values speed and innovation. (Kim and others., 2016, p.19).

DevOps is based on three main principles, first is the streamlining of work which is about making sure everything moves smoothly and quickly from the development team to operations and then to the customers. It involves mapping out the work process, keeping tasks small, and using automation to avoid delays. Second is the principle of quick feedback that means setting up short feedback loops to quickly spot and fix problems during the development and deployment process. The principle of feedback is about conducting a regular follow-up on how things are running and making sure quality is part of the process from the beginning. Third principle is the ongoing improvement in which DevOps encourages a culture where trying new things and learning from mistakes is normal. It's about learning by doing and sharing those lessons to keep getting better. (Kim and others., 2016, p.190-236).

Translating DevOps into action means changing how teams work together, use technology, and follow processes. Key practices include automated deployment pipelines by which automation plays a critical role in achieving a seamless flow of work and makes deployments consistent and reliable by handling code integration, testing, and deployment automatically. This helps keep software ready to go live at any time, minimize the risk of human error and ensure consistent deployments across different environments. Boost teamwork and communication is another key practice where DevOps builds a culture where development, operations, and others work closely together. Sharing goals and working as cross-functional teams help break down barriers and align everyone's efforts. Encourage continuous feedback and improvement which means keeping an eye on performance and setting up feedback loops are key for catching and fixing issues early. (Kim and others., 2016, p.190-236).

(9)

1.3.3 Information radiators

Information radiators are tools designed to provide an instance understanding of project status and progress. They are especially useful in Agile project management for promoting transparency and facilitating quick decision-making. (AXELOS, 2018, p. 127)

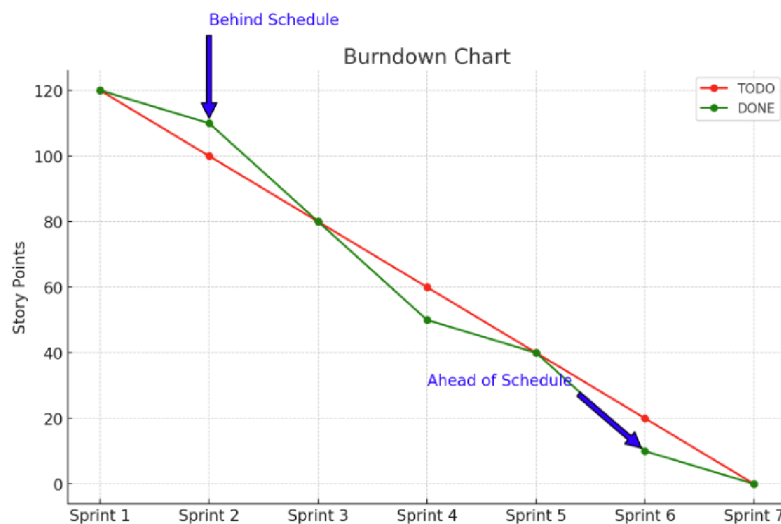
Two well-known examples of information radiators are burn up and burn down charts, each serving distinct purposes in project management. (AXELOS, 2018, p. 124)

Burn charts are graphical representations used to track the amount of work completed over time and forecast future progress. There are two main types of burn charts:

Burn-down Charts: These show the amount of work remaining overtime, providing a clear picture of progress against the planned schedule. A burn-down chart typically has two lines: one representing the ideal rate of progress and another showing the actual work completed. If the actual work line is above the ideal, the project is behind schedule; if it's below, the project is ahead of schedule. (AXELOS, 2018, p. 125)

Figure 1.1: Burndown Chart

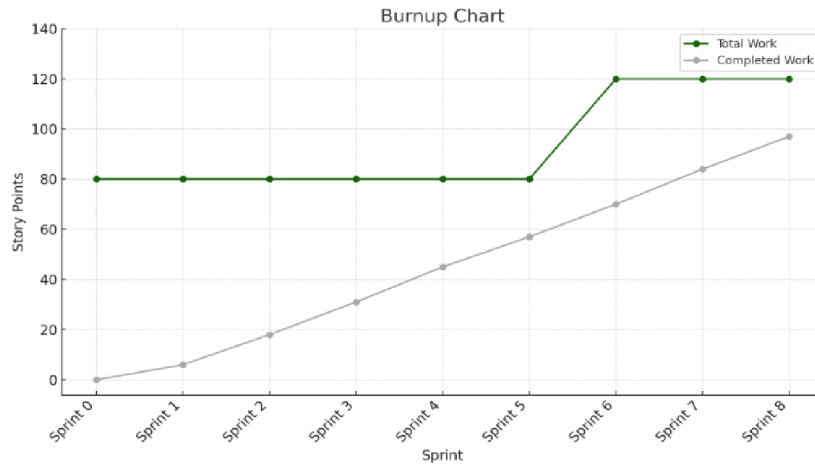
(Source: Own work according to: AXELOS, 2018, p. 125)



Burn-up Charts: More complex than burn-down charts, burn-up charts show both the amount of work completed and the total amount of work overtime. This makes them particularly useful when the scope of the project changes, as they can accurately reflect added or removed work. Burn-up charts help teams understand not just how much work is done, but also how the total workload evolves. (AXELOS, 2018, p. 125)

Figure 1.2: Burnup Chart

(Source: Own work according to: AXELOS, 2018, p. 125)



Both types of burn charts serve as vital tools in Agile environments for monitoring progress, anticipating potential delays, and facilitating timely decision-making. By providing a visual snapshot of where the project stands in relation to its goals, burn charts help teams adjust their efforts accordingly to meet deadlines and deliver value efficiently. (AXELOS, 2021, p. 125)

(3)

1.3.4 User story estimation technique (Planning poker)

User story estimation, particularly through Planning Poker, is a collaborative and consensus-based estimation technique widely utilized in Agile project management. This approach aids teams in estimating the effort involved in achieving user stories and customer-centric units of work. (AXELOS, 2018, p. 104)

Planning Poker combines expert judgment with a gamified consensus technique to make estimation a more engaging and effective process. Each team member is given a set of cards, which represent a series of estimates. These estimates could be in the form of story points, days, or other units that reflect the complexity, time, and effort required for a user story. (Mallidi and Sharma, 2021)

The process begins with a scrum master presenting a user story to the team. Each team member then selects a card that they feel represents the effort required for the story, based on their understanding and experience. Cards are revealed simultaneously, promoting independent thinking and minimizing the influence of colleagues on individual estimations. (AXELOS, 2018, p. 105)

If estimates vary significantly, a discussion ensues to understand the different perspectives. This discussion helps to clarify assumptions, dependencies, and the scope of work, leading to more accurate estimations. The process repeats until consensus is achieved, ensuring that all team members agree on the estimate.

(Sliger 2012) highlights the importance of this technique in Agile environments, noting that it not only improves the accuracy of estimates but also enhances team cohesion and understanding of project scope. Similarly, (Mallidi and Sharma, 2021) observe that Planning Poker effectively addresses common challenges in agile estimations, such as anchoring bias where the first number spoken aloud sets a precedent for subsequent estimates.

In conclusion, Planning Poker serves as a robust tool for user story estimation in Agile projects, fostering a collaborative atmosphere that encourages team engagement and consensus building. It is an integral part of Agile methodologies that helps teams accurately gauge the effort required for project tasks, leading to better planning and resource allocation.

(3)(10)(11)

1.4 PRINCE2 Agile

PRINCE2 Agile represents the strategic integration of PRINCE2 and Agile methodologies, optimizing PRINCE2 for use in conjunction with Agile behaviors, concepts, frameworks and techniques. PRINCE2 Agile integrates these two methodologies by combining the control and governance Aspects of PRINCE2 with the flexibility and responsiveness of Agile. (AXELOS, 2018, p. 19)

For instance, PRINCE2 principles do not conflict with any of the agile principles, they are complementary to the agile way of working, and already some of the PRINCE2 principles could be described as very much agile such as continued business justification, learn from experience, focus on products, and manage by exception (AXELOS, 2018, p. 48).

When it comes to tailoring PRINCE2 theme to fit the PRINCE2 Agile methodology, there are several things to consider.

- In business case theme and when creating a business case, it is essential to have an understanding of how the incremental delivery of a product and the value associated with it could impact project viability and also the ability to achieve the early delivery of some benefits and in addition to that it may be appropriate to explicitly define what would constitute a minimum viable product, as well as some indication of priorities within the overall scope and related quality criteria. (AXELOS, 2018, p. 57).
- In organization theme additional delivery-level roles may need to be added, and the most common agile roles should be mapped appropriately to the roles of the project management team structures (Product owner, Scrum master, Developers) and it's crucial to understand that the role of project manager changed to a servant leader. (AXELOS, 2018, p. 57).
- In quality theme the use of agile concepts and techniques such as the definition of done and the definition of ready can be used to define quality criteria and acceptance criteria. The frequency of quality checking will have a significant impact on how a project is planned and consequently will affect the iterative and incremental delivery of the project product. (AXELOS, 2018, p. 57).
- In plans theme there are many agile techniques and approaches exist in this area that focus on the effort related to features, sprint planning as an example and often appear in an informal, low-tech, visible format such as a simple list or backlog. planning is often done empirically, Agile typically looks at how much can be produced in a fixed timeframe such as a sprint or a release (or how much value can be delivered) this is often shown at the start in the form of a burn chart that can then be tracked. (AXELOS, 2018, p. 57).

- In risk theme many agile techniques address risks, for example daily stand-up meetings, frequent delivery of products, frequent use reviews, customer interaction and empowered teams organizing themselves to deliver the right thing at the right time. (AXELOS, 2018, p. 57).
- In change theme although no changes are needed to this theme, the agile way of working embraces change and responds to it. (AXELOS, 2018, p. 57).
- In progress theme many agile techniques apply in this area where the emphasis is on tracking what is being delivered in a way of things as sprint reviews, lead times or value. Tracking progress will depend on the situation and what people need information on. if it is within a sprint, then burn-up or burn-down charts should be sufficient. If it is across releases, then showing the value accrued and how this relates to the business case may be more appropriate. (AXELOS, 2018, p. 57).

PRINCE2 Agile doesn't add, remove, merge, or split any of the original PRINCE2 processes, but gives a description of how they can be tailored for Agile projects.

- In starting up and initiating process there are common actions for Agile environments such as preparing a simple vision statement for the project and a product road map that includes the needed release and sprints which means project chartering or visioning in addition to defining the strategy of forming the project releases and sprints. (AXELOS, 2018, p. 140).
- In directing a Project is mainly about ensuring the benefits and business value of the project. This is like the responsibility of a Product Owner in Scrum when taking agile into consideration. (AXELOS, 2018, p. 151).
- In controlling stage, it should be noted that PRINCE2 Agile stages, like PRINCE2 stages, are set based on the management perspective rather than the delivery perspective used in releases and increments. That's why stages are not considered the same as any of those concepts. A PRINCE2 Agile stage contains one or more releases, and each release contains one or more iterations (Sprints in Scrum). (AXELOS, 2018, p. 156)
- In managing product delivery process the agile way of working focuses mainly on product delivery and the management of product delivery and when combining PRINCE2 with agile, the managing product delivery process and the use of work packages needs to

be seen as a vital interface and linking process. It is the tunnel that links project management (where PRINCE2 provides lots of guidance) with product delivery (where agile provides lots of guidance). (AXELOS, 2018, p. 167)

- In managing stage boundary process within this process there will be frequent delivery of products in an iterative and incremental style which mean it will be clear how many features have been delivered and their level of quality and this will give a clearer indication of progress. The continual use of inspect and adapt will in turn allow the team to continually and gradually improve how they work with the stage boundary. (AXELOS, 2018, p. 186)
- In closing a project and since there are usually frequent releases in Agile, the amount of work needed for closing a project would be less than a normal predictive project because the product had been put into operation (handed over) multiple times, many approvals have been received, many benefits have been realized and measured. (AXELOS, 2018, p. 192)

PRINCE2 and Agile each have unique strengths, and when combined, they work well together to manage projects effectively in an agile way. PRINCE2 is strong in guiding project direction and management with clear roles and processes but doesn't focus much on how products are delivered. On the other hand, Agile is excellent at delivering products with its flexible and customer-focused approach but lacks detailed project management and direction. Therefore, combining PRINCE2 and Agile is essential to see this integration as a blend and a mixture rather than PRINCE2 and Agile working in parallel (AXELOS, 2018, p. 16).

(3)

1.4.1 Cynefin framework

The Cynefin framework, developed by David Snowden, is a decision-making model designed to help understand and categorize the complexity of various situations or environments. It is particularly useful in the context of PRINCE2 Agile for assessing the complexity faced by projects or potential initiatives. (AXELOS, 2018, p. 144).

The framework categorizes complexity into five distinct domains based on the cause-and-effect relationship of events and interactions. These domains help clarify how to approach different situations:

- Obvious: In this domain, the relationship between cause and effect is clear, and the appropriate response is to apply best practices. (AXELOS, 2018, p. 145).
- Complicated: Here, understanding the cause-and-effect relationship requires analysis or expertise, and the response involves selecting among good practices that may offer multiple solutions. (AXELOS, 2018, p. 145).
- Complex: The cause-and-effect relationship can only be perceived in hindsight, necessitating emergent practices that evolve over time. (AXELOS, 2018, p. 145).
- Chaotic: There is no discernible cause-and-effect relationship, requiring novel responses to manage the situation. (AXELOS, 2018, p. 145).
- Disorder: This domain is characterized by an unclear relationship between cause and effect, necessitating a categorization into one of the other four domains for effective response. (AXELOS, 2018, p. 145).

The Cynefin framework is instrumental during the initial stages of a project, such as during the starting up of a project and initiating a project processes. (AXELOS, 2018, p. 145). It enables an understanding or an attempt to understand the complexity of a project by analyzing:

- The complexity of the final product in terms of its output, outcome, and benefits, such as assessing the innovativeness of the product and the familiarity with its potential market performance. (AXELOS, 2018, p. 145).
- The complexity of the project environment, considering factors like co-location levels, collaboration, and team experience, which may include the involvement of multiple teams across diverse geographical locations. (AXELOS, 2018, p. 145).

By leveraging the Cynefin framework, project managers and teams can better navigate the intricacies of their projects, tailoring their approaches to match the inherent complexity of the work and the environment in which they operate.

(3)

1.4.2 Agilometer

The Agilometer is a pivotal tool within the PRINCE2 Agile framework, designed to assess the agility of project environments. This assessment is critical throughout the project lifecycle, especially during the preparatory and initiation stages. It provides essential insights captured in the project brief and the Project Initiation Documentation (PID), offering the project board valuable information to guide decision-making. (AXELOS, 2018, p. 206).

This includes understanding potential risks and benefits, thus ensuring informed decisions regarding the project's direction and governance. The tool's application helps in determining the suitability of agile methodologies for specific projects by evaluating a range of factors. For instance, it can identify when a project is ideally suited for an agile approach but might require additional governance to mitigate certain risks, such as the risk associated with the customer's capacity for sustained involvement. Alternatively, it may highlight situations where the standard level of formal reporting could undermine the project's viability unless adjustments are made to accommodate more frequent and incremental delivery of benefits. (AXELOS, 2018, p. 206).

The Agilometer assesses six critical areas, each represented by a slider, to check the project's agile readiness and identify areas for improvement. Importantly, it emphasizes evaluating each slider independently rather than averaging scores across all areas, ensuring a deep understanding of the project's strengths and weaknesses in adopting agile practices. (AXELOS, 2018, p. 206).

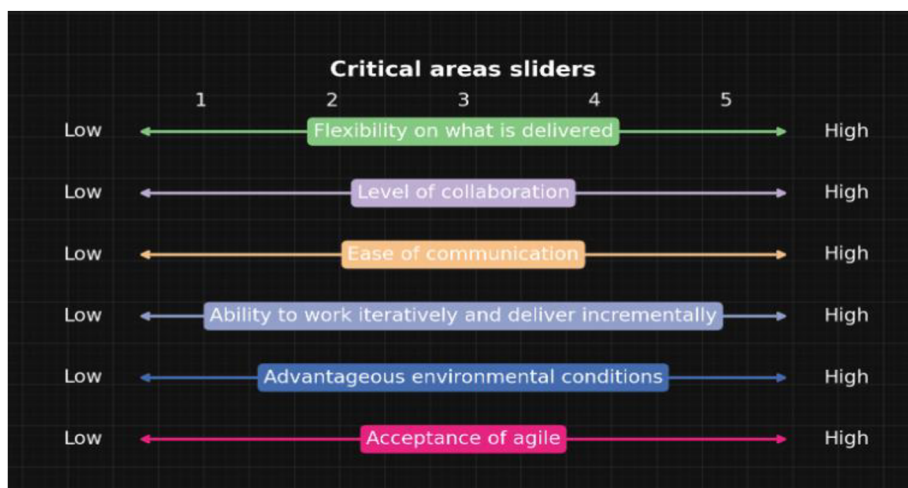
These areas include:

- Flexibility on What is Delivered: Assessing the project's and stakeholders' readiness to adapt the scope of delivery as needed, ensuring that changes can be made efficiently and effectively. (AXELOS, 2018, p. 208).
- Level of Collaboration: Evaluating the degree of cooperation and interaction among project participants, highlighting the importance of breaking down barriers and fostering a collaborative environment. (AXELOS, 2018, p. 208).
- Ease of Communication: Determining the effectiveness of communication channels and practices within the project, emphasizing the value of face-to-face interactions and the use of simple, clear methods for sharing information. (AXELOS, 2018, p. 208).

- **Ability to Work Iteratively and Deliver Incrementally:** Gauging the project's capability to develop and deliver work in small, manageable increments, facilitating early and continuous delivery of value. (AXELOS, 2018, p. 208).
- **Advantageous Environmental Conditions:** Identifying the extent to which the project environment supports agile practices, including the availability of tools, training, and an organizational culture conducive to agile methodologies. (AXELOS, 2018, p. 208).
- **Acceptance of Agile:** Measuring the overall acceptance and understanding of agile practices among project stakeholders, ensuring that there is a shared commitment to agile principles and methods. (AXELOS, 2018, p. 208).

Figure 1.3: The Agilometer

(Source: Own work according to: AXELOS, 2018, p. 207)



By utilizing the Agilometer, project teams can tailor their approach to agile implementation, aligning practices with the specific challenges and opportunities of their project environment. This strategic use of the Agilometer not only enhances the project's agility but also maximizes the effectiveness of the PRINCE2 Agile framework in delivering project value. (AXELOS, 2018, p. 209).

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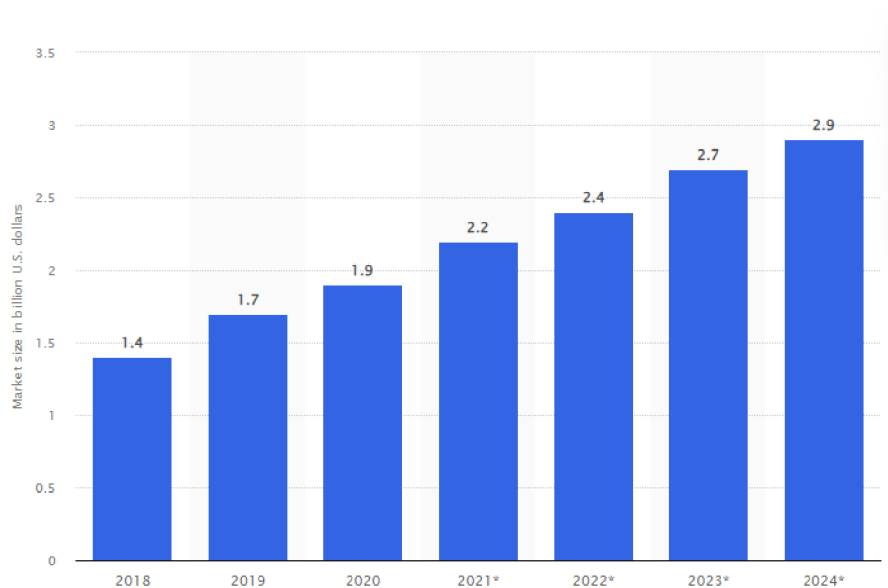
1.5 Privileged Access Management (PAM)

In the technological landscape of today's businesses, safeguarding the keys to the kingdom is critical. This is where Privileged Access Management (PAM) plays a crucial role. Imagine PAM as the procedure of carefully choosing who gets the master keys to a highly secure premises, with these keys allowing access to the most sensitive and critical areas (Carson & Fitzgerald).

The Privileged Access Management (PAM) market has seen substantial growth worldwide. From 2018 to 2024, the size of the PAM market increased significantly, highlighting the growing importance of securing privileged access in organizations. According to data from Statista, the market for PAM grew from 1.4 billion U.S. dollars in 2018 to a projected 2.9 billion U.S. dollars by 2024 (Borgeaud, 2023). This growth underscores the critical need for robust PAM solutions in response to the increasing threat landscape.

Figure 1.4: Size of the privileged access/account management (PAM) market worldwide from 2018 to 2024

(Source: Statista, 2023)



70% of data breaches are linked to privileged account abuse, and 61% involve improper credential management. This situation is further complicated by the fact that almost 90% of security professionals report that their organization's users have more privileged access than necessary to do their work (Esposito, 2023). This alarming data stresses the importance of implementing stringent PAM practices to mitigate these risks.

PAM ensures that only a select few within an organization have this level of access, rigorously managing and monitoring their credentials to prevent unauthorized use. This practice involves securing login information, like digital keys, tracking their use to block unapproved access, and regularly updating these credentials to maintain a high level of security. The goal is clear: to protect the organization's most valuable digital assets from potential security breaches, which can lead to significant financial and reputational damage.

Implementing PAM security involves several key steps, including, Assessing the current state by understanding the existing privileged account landscape and identifying gaps in security second is defining Policies and Procedures by establishing clear guidelines for managing and monitoring privileged access. The third step is selecting a PAM Solution by choosing a PAM tool that fits the organization's needs and integrates well with its IT environment. The fourth step is deploying the solution by implementing the PAM solution in stages, starting with the most critical systems. The last step is training and awareness by educating stakeholders about the importance of PAM and how to use the new tools effectively. (Lang, 2017; Shastri, 2023)

Moreover, adherence to international standards like ISO 27001, which sets out the criteria for an information security management system, highlights the significance of PAM. This standard emphasizes the protection of privileged access as a critical part of an organization's overall strategy to secure sensitive data and ensure that IT security practices are comprehensive and robust. (Worrall, 2015)

Through effective PAM implementation, businesses not only bolster their security posture but also comply with regulatory requirements, showcasing their dedication to protecting sensitive information against both internal and external threats. In essence, PAM stands as a cornerstone of secure IT practices, acting as both the guardian of sensitive systems and information and a facilitator of compliance with key security standards. This careful, structured approach to managing privileged access is essential for any organization looking to secure its digital environment against the evolving landscape of cyber threats (Worrall, 2015; Lang, 2017).

(12)(13)(14)(15)(16)(17)

1.6 Agile and OKRs (Objectives and Key Results)

In the dynamic world of modern business, the method of setting and tracking goals can significantly impact an organization's agility and effectiveness. This is where Objectives and Key Results (OKRs) come into play, offering a framework for goal setting that enhances focus, alignment, and engagement across all levels of an organization. Developed in the 1980s by Andrew Grove, and later popularized by companies like Google, OKRs have been instrumental in driving success for tech giants such as LinkedIn, Twitter, and Microsoft (Kelly, 2021). The framework revolves around setting ambitious, inspirational objectives and pairing them with concrete, measurable key results to track progress and achievement.

Objectives are the aspirational goals set by a team or company, designed to be actionable, significant, and motivational. They encapsulate what the organization aims to achieve in a given timeframe. Key results, on the other hand, are the benchmarks that measure progress towards these objectives. They are specific, time-bound, and quantifiable, providing a clear gauge of success or failure. (McGinnis, 2022)

The integration of OKRs with Agile methodologies presents a powerful synergy for organizations. While Agile emphasizes iterative development, flexibility, and rapid response to change, OKRs offer a structured approach to goal setting and performance measurement. This combination fosters strategic alignment, ensuring that everyone's efforts contribute to the overarching goals of the company. It also enhances transparency, making it easier for individuals and teams to understand their work's value and impact on the organization's mission.

One of the key benefits of adopting OKRs in an Agile environment is the facilitation of goal evaluation through regular cadences, akin to Agile ceremonies. This practice allows for the frequent assessment of objectives, encouraging teams to adapt and iterate on their strategies to achieve better outcomes. Moreover, OKRs support the tracking of progress, helping teams stay focused on their objectives and make necessary adjustments to their approach. (Kelly, 2021)

Implementing OKRs can significantly support an Agile transformation by providing clear, adaptive goals that align with Agile's principles of simplicity and continuous improvement. This strategic alignment between Agile practices and OKRs enhances focus, prioritization, and collaboration, leading to increased performance and a stronger, more adaptive organizational culture. (McGinnis, 2022)

In conclusion, the integration of OKRs and Agile methodologies creates a robust framework for organizations to achieve greater agility, focus, and alignment. This approach not only supports the successful execution of strategies but also cultivates an environment of continuous feedback and improvement, driving significant advancements in business performance and culture.

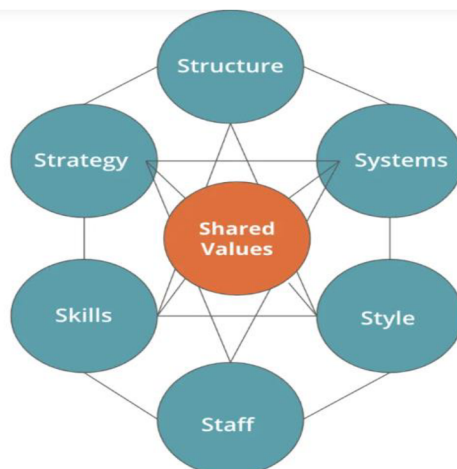
(18)(19)

1.7 McKinsey 7S Model

In the exploration of organizational effectiveness and strategic management within IT project management, the McKinsey 7S Model presents a comprehensive framework for analyzing and improving organizational alignment and performance. This model, developed by consultants at McKinsey & Company, encapsulates seven interdependent factors that are categorized into 'Hard' and 'Soft' elements. These elements are crucial in understanding how organizations can achieve their goals through a balanced and holistic approach. (CFI Team; Kenton, 2022)

Figure 1.5: McKinsey's 7S Model

(Source: McKinsey&Company, 2008)



1-Structure: The framework of the organization, detailing how teams and units are organized.

2-Strategy: The plan developed to achieve competitive advantages and organizational goals.

3-Systems: The internal processes, procedures, and frameworks that define daily operations.

4-Skills: The capabilities and competencies that the organization's staff possess.

5-Staff: The workforce dynamics including recruitment, training, and development.

6-Style: The leadership approach and the general work culture within the organization.

7-Shared Values: The core values and standards that guide employee behavior and organizational decisions.

These elements are highly interdependent; a change in one area often impacts the others, requiring a balanced approach to any strategic organizational change. The model emphasizes alignment across these elements to ensure that the organization's structure, strategy, and systems are coherently supporting its objectives. (CFI Team ; Kenton, 2022)

(20) (21)

1.8 SWOT analysis

SWOT analysis, a strategic planning tool, is widely used to assess the internal and external environments of organizations. It evaluates strengths, weaknesses, opportunities, and threats. key elements that help decision-makers in crafting strategic directions. The theoretical review by (Gürel and Tat , 2017) outlines that the efficiency of SWOT depends largely on the clarity and comprehensiveness of the analysis, emphasizing its utility across various sectors for enhancing organizational performance.

(Kenton, 2023) offers a practical perspective by providing a detailed guide on how to conduct a SWOT analysis effectively, including a structured table format to systematically categorize and assess each element. This approach not only aids in identifying critical factors but also in visualizing the interplay between internal capabilities and external possibilities, which is crucial for strategic alignment and prioritization.

(22)(23)

1.9 Three-Points Cost Estimating technique

The Three-Point cost estimating technique is an essential method in project management for assessing project costs and durations under conditions of uncertainty. This technique utilizes three estimates to form a comprehensive view of what a task might require in terms of time or resources or cost: the optimistic estimate (O), the most likely estimate (M), and the pessimistic estimate (P).

Optimistic estimates assume the scenario where everything proceeds without any major issues, while pessimistic estimates consider the possibility of facing the worst-case scenarios. The most likely estimate, however, is grounded in realism, taking into account typical expected obstacles and opportunities (Thamma Reddi, 2023).

Beta leverages these estimates using a weighted average approach, where the most likely outcome is given more prominence, reflecting its greater probability of occurrence. The typical formula used is $E = O + 4M + P / 6$, emphasizing the most realistic scenario amidst uncertainties (Reshi, 2023).

This technique is particularly valued for its flexibility and the depth of insight it offers into project risks. It enables decision makers to prepare not only for the most probable outcomes but also equips them with strategies to handle potential extremes. (24) (25)

1.10 Benefit-Cost Ratio

The Benefit-Cost Ratio (BCR) is a fundamental financial metric used to evaluate the potential return on investment from a project compared to its cost. It is a straightforward ratio that measures the relative profitability of an investment, indicating whether the economic benefits outweigh the costs involved.

The BCR is calculated by dividing the total expected benefits of a project by the total expected costs. A BCR greater than 1.0 suggests that the project's benefits exceed its costs, making it a potentially viable investment. Conversely, a BCR less than 1.0 indicates that the costs outweigh the benefits, suggesting that the investment may not be economically justified. (Adam, 2022)

According to the Corporate Finance Institute (CFI Team, 2023), the BCR is particularly useful in capital budgeting to assess the financial viability of projects. It provides a quantifiable measure that helps stakeholders understand the economic value of investments relative to their costs.

(Adam, 2022) emphasizes that while the BCR is a valuable tool, it should not be used in isolation. It is crucial to consider other factors such as the project's impact on the organization, potential risks, and how it aligns with strategic goals. This comprehensive approach ensures that decisions are not based solely on financial metrics but are also aligned with broader organizational objectives. In summary, the Benefit-Cost Ratio serves as a critical indicator in

financial decision-making, aiding organizations in assessing whether the financial benefits of a project justify the expenditures.

(26) (27)

1.11 RACI matrix

The RACI matrix is a project management tool that stands for Responsible, Accountable, Consulted, and Informed. It is designed to clarify the roles and responsibilities of individuals or departments in specific tasks or deliverables within a project. This matrix helps in enhancing communication and productivity by clearly defining who is responsible for what and ensuring that all necessary parties are appropriately engaged. (Miranda and Watts , 2022)

- **Responsible:** This refers to the individual(s) who actually complete the task. Every task in a project must have at least one person responsible for its execution.
- **Accountable:** This is typically one individual, often a project manager or team leader, who is accountable for the completion of the task. This person has the final say on whether the task is completed satisfactorily and must sign off on it.
- **Consulted:** These are the people who need to give input before the work can progress. They are often subject matter experts who provide necessary guidance and expertise.
- **Informed:** This group includes individuals who need to be kept up-to-date on progress but do not necessarily contribute to the decision-making process for the task.

(Miranda and Watts, 2022) discuss how utilizing a RACI chart can significantly boost project management effectiveness by providing a clear roadmap of team roles and expectations. This clarity helps in reducing confusion and overlapping duties, which can often lead to inefficiencies or delays.

(Suhanda and Pratami, 2021) provide a practical example in their case study on PT. XYZ, demonstrating how the RACI matrix was effectively employed to manage stakeholders in a large-scale project. Their study illustrates that the RACI matrix not only clarifies roles but also aids in managing expectations and improving stakeholder engagement throughout the project lifecycle. The RACI matrix is an essential tool in the realm of project management, crucial for delineating clear roles and responsibilities. It ensures that all project participants are aligned, which streamlines processes and enhances productivity.

(28) (29)

1.12 Balanced Scorecard (BSC)

The Balanced Scorecard (BSC) is a strategic management framework that helps organizations monitor and manage their performance against strategic goals. It's designed around four perspectives that together provide a balanced view of an organization. (Chelniciuc , 2020)

- **Financial Perspective:** Focuses on measuring organizational financial performance, which is crucial for understanding the economic consequences of actions taken.
- **Customer Perspective:** Assesses customer satisfaction and retention, essential for maintaining competitive advantage.
- **Internal Business Processes:** Evaluates the effectiveness and efficiency of operations that produce value for customers and the organization.
- **Organizational capacity:** Looks at the organization's capacity to innovate and improve, which supports sustainability and growth.

BSC is used not just for performance evaluation but also as a tool for implementing and managing strategy at various levels of an organization. It links day-to-day work with the company's long-term strategy and provides a comprehensive method to track and incentivize performance. (Tarver, 2024)

(30)(31)

2- Analysis of the contemporary situation

This section offers an in-depth exploration of the project's present state, NN IT HUB's establishment, and its operational dynamics. It aims to provide a comprehensive understanding of the current scenario, identifying potential areas of enhancement. The analysis delves into the technological, strategic, and human elements of the organization, examining how they intertwine to shape the company's current posture.

2.1 Company Introduction

The NN IT Hub in Prague boasts a rich history that spans over 12 years, originating from a small regional IT team in Romania. This team initially laid the groundwork for what would become an essential part of the NN Group's global IT infrastructure. The foundation was laid with a data

center in Prague, which became the central hub after the 2010 reorganization, prompting most of the team to relocate there. Over time, the Prague NN IT Hub's role expanded significantly, extending its IT support to the entire NN Group, which operates in 18 countries. Specializing in cybersecurity and global enterprise system implementation, the NN IT Hub has embarked on an impressive journey of growth and innovation.

Today, the NN IT Hub is a modern and vital technology partner for the NN Group. It employs more than 200 professionals who excel in various fields, including cybersecurity, in-house development, application management, data science and AI, cloud and network engineering, identity and access management, data center operations, application monitoring, and global service desk support. The primary client is the Dutch insurance company NN Group, but the hub also serves other business units across different countries, solidifying its reputation as a key player in the Czech IT market. (32)

2.1.1 Company Values

NN's operations are rooted in its core values of care, clarity, and commitment. These values are not just words but are the pillars that uphold every aspect of the company's operations. The emphasis on care reflects NN's dedication to both customer satisfaction and employee welfare, signifying a balance between external service quality and internal team health. Clarity ensures transparent decision-making processes and open communication, fostering trust and ease within the organization. Lastly, the commitment to responsibilities towards customers, the parent company, and each other is the binding force that drives NN's operations, ensuring reliability and mutual trust in all endeavors. These values collectively create a nurturing and efficient work culture at NN, underpinning its success in the financial sector. (32)

2.1.2 Company Strategy

NN's strategy is focused on long-term value creation for all stakeholders. NN puts their resources, expertise and networks to use for the wellbeing of their customers, the advancement of their communities, the preservation of the planet, and the promotion of a stable, inclusive and sustainable economy. NN's strategic execution framework, known as the Compass model, exemplifies a pioneering approach to transforming high-level strategic goals into tangible user stories through the synergistic application of objectives and key results (OKRs) and Agile

methodologies. This model not only clarifies the pathway from strategy to implementation but also ensures alignment, focus, and adaptability across all organizational levels. (Elnahas, 2022)

The Compass model operates on the principle that effective strategy execution requires a clear, adaptable framework that can navigate the complexities of modern business environments. By integrating OKRs with Agile processes, Compass provides a structured yet flexible roadmap for translating strategic objectives into specific, measurable actions. (Elnahas, 2022)

Here are the steps that encapsulate the Compass model's approach to strategy execution:

Step 1: Breaking Down the Company's Strategy into Long-Term Objectives

The Compass model initiates the strategic execution by delineating the company's overarching strategy into a series of Long-Term Objectives. These objectives articulate significant changes or the introduction of new business capabilities. (Elnahas, 2022)

Step 2: Translating the Long-Term Objectives into Annual Objectives

Subsequently, these Long-term objectives are distilled into annual objectives by the management team and product owners. This translation process focuses on what the business unit aims to accomplish within the year, fostering an environment where product teams actively participate in defining and discussing these Annual Objectives. (Elnahas, 2022)

Step 3: Tactical Decisions for Achieving Annual Objectives

Quarterly, the focus shifts to tactical decisions essential for realizing the annual objectives. product teams, in consultation with management, pinpoint the key results achievable in the ensuing quarter, taking ownership of these results. The conclusion of each quarter is marked by a reflective session between Management and Product Teams to evaluate achievements and plan for the next set of key results, ensuring continuous alignment with the Annual Objectives. (Elnahas, 2022)

Step 4: Commitment to Key Results and Implementation

Utilizing Agile methodologies like SCRUM, teams operationalize key results into epics, features, and user stories focusing on deliverables and measure progress towards the key results. (Elnahas, 2022)

The Compass model embodies a holistic approach to strategy execution, bridging the gap between high-level strategic planning and ground-level implementation. By anchoring strategic objectives in OKRs and translating them into actionable user stories through Agile practices, NN ensures that its strategy is not just a static document but a dynamic, living process that evolves in response to internal and external pressures. This approach fosters a culture of alignment, engagement, and continuous improvement, enabling NN to navigate the complexities of the digital age with agility and precision. (Elnahas, 2022)

This innovative model not only enhances NN's ability to execute its strategy effectively but also serves as a blueprint for other organizations seeking to optimize their strategic execution processes in an ever-changing business environment.

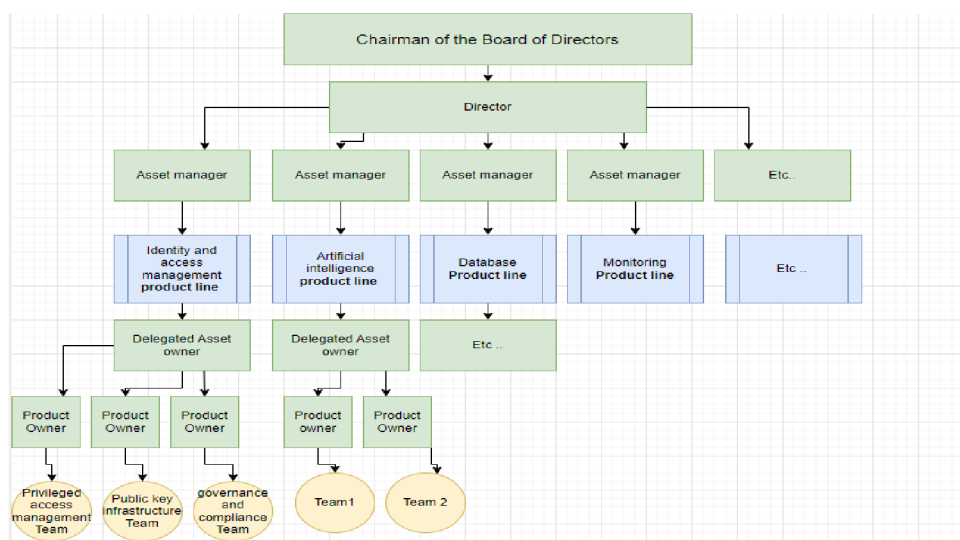
(33)

2.1.3 Organizational structure

The organizational structure of NN IT Hub Prague follows a functional structure. However, unlike traditional functional structures that are organized around typical roles and job functions, NN IT Hub employs a product-based Structure. This approach aligns roles and responsibilities with specific product lines.

Figure 2.1: company organizational structure

(Source: own creation)



At the top of the hierarchy is the **chairman of the board of directors**, who oversees the entire organization. Below the Chairman, the **Director** manages overall operations and strategic direction. The next level shows the **asset managers**, each dedicated to a specific product line. These managers are tasked with ensuring the success and integration of their respective product lines into the broader company objectives. They oversee the strategic planning and resource allocation for their product lines. Supporting the Asset Managers, **Delegated asset owners** handle the operational management of the various teams within each product line. They ensure that the teams are functioning efficiently and are aligned with the product line's goals.

Each specialized team within the product lines is led by a **Product owner**. Product owners are responsible for guiding their teams towards meeting specific objectives and deliverables, maintaining alignment with the overall strategy of their product line. While NN IT Hub Prague comprises numerous product lines, two examples can illustrate the structure:

-Identity and Access Management (IAM) Product Line

- Asset Manager: Oversees the entire IAM product line.
- Delegated Asset Owner: Manages the daily operations of the IAM teams.
- Public Key Infrastructure (PKI) Team: Led by a Product Owner.
- Privileged Access Management (PAM) Team: Led by a Product Owner.
- Governance and Compliance Team: Led by a Product Owner.
- Authentication & Authorization Team: Led by a Product Owner.

-Artificial Intelligence (AI) Product Line

- Asset Manager: Oversees the entire AI product line.
- Delegated Asset Owner: Manages the daily operations of the AI teams.
- Data Management Team: Led by a Product Owner.
- AI Developers Team: Led by a Product Owner.

This hierarchical structure ensures that each product line has dedicated leadership and management, promoting specialization and efficient execution of tasks. The product-based approach allows NN IT Hub Prague to adapt swiftly to the dynamic needs of the technology and IT services sector, ensuring that each product line can innovate and excel in its area of expertise.

2.2 Project Introduction

Within the structured and flexible framework of PRINCE2 Agile, NN IT Hub is set to implement a Privileged Access Management (PAM) project aimed at bolstering its Confidentiality, Integrity, and Availability (CIA) while adhering to ISO 27001 standards. This project is pivotal in enhancing the security infrastructure of NN IT Hub by managing privileged accounts and safeguarding sensitive data through systematic controls and management practices.

The primary objective of this PAM project is to implement three key components that ensure robust security measures for privileged accounts. The first component is a password vaulting component, this component will securely store and manage passwords for privileged accounts, ensuring that only authorized personnel have access. The second component is password rotation component, this component will implement automated password rotation as regular rotation of passwords minimizes the risk of unauthorized access and ensures that password policies are consistently enforced. The third component is a session management component, this component will record and monitor sessions involving privileged accounts, providing an audit trail and ensuring that all activities can be traced and reviewed.

The project is divided into two main phases to ensure a systematic and manageable implementation process:

-Phase One:

1-Implementation of Password Vaulting and Password Rotation: This phase focuses on setting up the foundational components of the PAM system. The password vault will be configured to store privileged account passwords securely. Simultaneously, the password rotation feature will be activated to enforce regular password changes based on predefined policies. This phase aims to secure privileged accounts from unauthorized access and to maintain compliance with security policies.

2-Onboarding Critical Privileged Accounts: During this phase, all critical privileged accounts, such as root and administrator accounts for each application used by NN Group, will be onboarded into the PAM solution. The passwords for these accounts will be managed within the PAM system, ensuring they are rotated according to the established policies. Application

administrators will access the PAM system to retrieve rotated passwords and use them to access applications outside the PAM environment.

-Phase Two:

1-Implementation of Session Management: This phase introduces the session management component. This feature will control and monitor access to applications using privileged accounts, ensuring that all actions are recorded and traceable. By implementing session management, NN IT Hub will restrict access to applications outside the PAM environment, reinforcing the security and accountability of privileged account usage.

2.3 Project Stages

In the implementation of the Privileged Access Management (PAM) project at NN IT Hub, the project is systematically divided into several key stages. These stages ensure that the project is well-organized, that each phase is thoroughly planned and executed, and that the project remains aligned with its strategic goals. The stages of the project are:

-Starting Up the Project & Initiating the Project Stages: This initial phase focuses on defining the project, establishing its objectives, and setting up the necessary groundwork to ensure a successful start. It includes activities such as preparing the business case, identifying project team, and planning the project initiation.

-Directing the Project Stage: In this stage, the Project Board oversees the project's progress from a high level, ensuring that the project remains justified and viable. The board makes critical decisions, authorizes stages, and provides guidance throughout the project.

-Managing Product Delivery & Controlling Stages: This stage involves the detailed planning and execution of project deliverables. It includes managing the development and delivery of products, monitoring progress, and controlling changes to ensure that the project stays on track.

2.3.1 Starting up & initiating the project stages

At the heart of the project initiation is the vision. The vision is supported by an outline business case and a project product description, which together offer a snapshot of the expected benefits, the project scope, and the high-level features of the PAM solution. These documents ensure that

the project objectives are well-defined and aligned with NN's strategic goals and compliance requirements, particularly ISO 27001 standards.

A strategic roadmap supplements the vision by laying out the major milestones and phases the project will undertake. This roadmap together with an initial business case, provides sufficient information to justify the project's necessity and strategic alignment, ensuring all stakeholders are on the same page regarding the project value and path. A well-defined product backlog stands out as a critical component, listing all the features, tasks, and requirements considered necessary for the PAM solution's successful implementation. This backlog is the result of collaborative efforts during sprint zero, also known as the discovery phase, where the project team, through workshops and discussions, identifies the scope of work, technical challenges, and opportunities.

The project team structure is formalized, delegating roles and responsibilities to create a cohesive unit capable of delivering on the project's objectives. This structure is designed to facilitate efficient communication and decision-making within the team. A quality management approach is defined, outlining the standards, methodologies, and criteria that the project will adhere to ensure the deliverables meet NN's high-quality standards. This approach includes the critical step of writing a Definition of 'Done ensuring clarity and consistency in measuring progress and quality throughout the project's lifecycle.

Events and artifacts of the Stage

Events

Project Kickoff: Outline business case, define high-level backlog, assemble the project brief, and a kickoff meeting with all stakeholders to ensure alignment on expectations and roles. This includes a detailed discussion of each stakeholder's role and responsibility during the project.

Artifacts

-Product Backlog: The high-level product backlog includes critical tasks that are foundational for the PAM system setup. A snapshot of the high-level product backlog includes:

Implement PAM Vaulting Component, Implement PAM Password Management Component, Implement PAM Session Management Component , Define PAM Master Policy , Define PAM

Templates or Platform ,PAM Product Integrations with LDAP, SIEM, and Splunk , Onboarding Accounts , Credential Management , Session Management , Implement Automation via Scripting

Definition of Done: Implementation of PAM components, utilization of needed PAM features, and onboarding all privileged accounts for all applications. DoD is added for each user story.

PAM Roadmap

This initial phase is pivotal, setting the project's foundation by validating its viability and establishing a comprehensive framework to support its objectives. It involves a deep dive into the enterprise's existing privilege landscape, including:

1-Discovery: understanding the current state of privileged access within the organization by conducting a comprehensive inventory of assets and privileged accounts across various systems and platforms, the project team identifies potential risks and sets clear priorities for implementation.

2-Evaluating existing polices: Assessing the strength of current controls against defined PAM strategies helps understand the adequacy of governance, policies, and security technology controls in place. This evaluation identifies focus areas for immediate improvement and also aligns with broader compliance requirements and risk management goals.

3-Define critical assets: Identifying assets critical to the organization's mission enables targeted protection efforts. By classifying assets based on their importance and potential impact if compromised, the project can fine-tune controls to safeguard these pivotal resources effectively.

By blending these concepts and technical assessments with strategic planning and Agile principles, the "Starting Up a Project & Initiating the Project" phase sets a solid foundation for NN's PAM project. This comprehensive approach not only ensures the project's strategic alignment but also positions it for effective execution and successful delivery, ultimately enhancing the organization's cybersecurity posture.

Roles and responsibilities of the project

Within the structured framework of the NN IT HUB's PAM project, clear delineation of roles and responsibilities is essential for streamlined execution and accountability. Our project is driven by a dedicated team: a Product Owner based in the Netherlands, a team of four PAM Engineers who

divided between Prague and the Netherlands and asset owner based Prague. The RACI matrix below represents the allocation of responsibilities and tasks among team members, serving as a blueprint for both routine and critical project activities. It ensures clarity and cohesion, facilitating coordination across the diverse and distributed team members.

Table 2.1: RACI matrix showing current roles and responsibilities of the project team according to the tasks within the project.

(Source: Own Creation)

Tasks	Product Owner	Asset Owner	PAM Engineers
Provide vision and goal for the product	A/R	C	I
Run agile ceremonies	A/R	C	I
Track and plan sprint progress	A/R	C	I
Own and prioritize product backlog	A/R	C	I
Sprint Execution	A/R	I	C
Create and manage product roadmaps	R	A	I
User stories creation and approval	A/R	C	I
Leads estimation, planning, and backlog grooming	A/R	C	I
Manage project budget and resources	C	A/R	I
Configuration and development of PAM systems	A	C	R
Managing issues and risks	A/R	I	C
Perform project and business as usual tasks	A	I	R
Day-to-day systems maintenance and troubleshooting	A	I	R
Measurement and monitoring of the team's capacity	A/R	C	I

Tasks	Product Owner	Asset Owner	PAM Engineers
Removal of impediments to progress	A/R	C	I

The above RACI matrix crystallizes the interaction of roles within the PAM project team, underpinning efficient project workflows and reinforcing accountability. It acknowledges the Product Owner's pivotal role as central to maintaining the project's focus, ensuring that the backlog is prioritized according to the most pressing business needs, and acting as a liaison between the project team and its stakeholders, while Asset Managers contribute to strategic direction, overseeing the lifecycle of the project's assets and ensures that all components are used effectively, comply with relevant standards, and are securely maintained throughout the project. PAM Engineers anchor the technical execution, and their expertise is vital for everything from the initial setup to the ongoing management and adaptation of the system.

2.3.2 Directing the project stage

In the directing stage, the project board, consisting of the director, asset manager, and delegated asset owner, oversees the project from a high level. They manage by exception, which means they only act when necessary, and they receive regular reports to stay updated on the project's status. The project board exercises control and makes key decisions to ensure the project stays on track and meets its objectives.

The main responsibility of the project board in this stage is to ensure there is continued business justification for the project. They must verify that the project remains viable and aligned with the business case. If at any point the business case is no longer viable, the project board has the authority to shut down the project to prevent the waste of resources.

There are some activities frequently performed by the project board during the directing stage like approving a stage where the project board reviews the current progress and approves to the next stage to begin. If there are significant deviations from the plan, they can approve an exception plan to address these issues and realign the project. another activity like giving intime guidance where the project board provides guidance as needed. This can include offering advice,

making decisions on unforeseen issues, or adjusting the project plan to better align with business objectives.

2.3.3 Managing product delivery & controlling stages

Managing product delivery and controlling stages bridges the structured approach of PRINCE2 with the adaptability and iterative focus of Agile methodologies. Its where strategic oversight meets tactical execution, ensuring that the project's high-level objectives seamlessly translate into actionable, detailed tasks. Those stages are the core parts of the scrum process, where the main activities to deliver the product take place in two weeks sprint.

Events and artifacts of the stages

Events

Sprint Planning: Held bi-weekly, led by the Product Owner attended by the Product Owner, PAM engineers, and the Asset Owner. This session focuses on selecting a sprint goal, planning the sprint's execution, and transitioning high-priority user stories from the product backlog to the sprint backlog.

Daily Stand-Up: A daily online meeting led by the Product Owner and attended by PAM engineers to discuss updates and progress on user stories within the sprint backlog.

Artifacts

Sprint Backlog: Reviewed at the beginning of each sprint and updated during every daily stand-up, detailing user stories in progress. The sprint backlog contains tasks selected for completion in the current sprint. It provides a detailed view of the team's immediate focus.

Product Backlog: Serves as the source for the sprint backlog, hosted in the Azure DevOps portal. A dynamic list of all features, tasks, and enhancements required for the project. This living document is continuously updated and prioritized by the Product Owner.

Executing the PAM Roadmap

The execution of the PAM roadmap is characterized by a series of meticulously planned and executed steps, all aimed at enhancing the organization's security posture through Privileged Access Management:

1. Initial setup: configuring the necessary infrastructure, setting up vaults for secure credential storage, establishing automated rotation protocols, and creating a secure administrative environment. This foundational step is critical for the security and operational integrity of the PAM system.

2. Privilege accounts credential onboarding: With the infrastructure in place, the focus shifts to credential onboarding. Prioritizing credentials based on their sensitivity and access level ensures that the most critical assets are secured first. This process benefits from automation and careful planning to ensure scalability and manageability.

3. Applying policies: Once credentials are onboarded, appropriate security controls are applied. These controls are dynamically adjusted to the project's evolving needs, embodying the principles of continuous assessment and improvement that are central to PAM, such as password rotation period or password complexity.

4. Continuous management: Finally, the implementation and onboarding transition into a state of ongoing operation, automation and management, continuously onboarding new credentials and adjusting controls to maintain a robust security posture. This business-as-usual mode is key to the long-term success and sustainability of the PAM initiative.

2.4 Problem analysis breakdown

The project, expected to be completed by November 2023, experienced a delay of four months, with only the vault and password manager components of the privileged access management (PAM) system fully delivered. Not all privileged accounts were onboarded as planned. This delay and partial delivery were influenced by inefficient work processes and the absence of a Scrum Master, impacting the overall execution and effectiveness of the project lifecycle.

1-Inefficient Work Processes: The project encountered significant inefficiencies in its work processes, primarily due to insufficient agile practice implementations. These are highlighted by:

- Lack of review and adaptation: There was a noticeable lack of periodic review meetings, which are crucial for assessing the progress and effectiveness of each sprint. The absence of separate sprint review meetings hindered the team's ability to inspect outcomes and make necessary adjustments.
- Insufficient retrospective practices: Without dedicated sprint retrospective meetings, the team missed opportunities to discuss what went well, what didn't, and how processes could be improved. This gap limited the team's capacity to learn from past sprints.
- Inadequate estimation techniques: The absence of a robust user story estimation technique led to unrealistic sprint planning, causing tasks to often overrun their time allocations.
- Poor progress reporting: The lack of progress reporting mechanisms such as burn charts contributed to unclear communication regarding the status of tasks within sprints, impacting the project's overall transparency and predictability.

2-Absence of a Scrum Master: The RACI matrix exist in chapter 2.3.1 Starting up & initiating the project stages, shows that without a scrum master, the product owner often assumes many of the communication and facilitation roles that would typically be shared with a scrum master, potentially leading to reduced efficiency and increased workload for the product owner. The absence of a Scrum Master also impacts the asset owner and PAM engineers by increasing their involvement in areas where they might not have primary expertise, such as agile process facilitation and cross-functional communication. The nonexistence of a Scrum Master role significantly impacted the project's dynamics and efficiency:

- Event facilitation and scrum adherence: Without a Scrum Master, the project lacked a central figure to facilitate agile events and ensure adherence to scrum practices, leading to disorganized and inefficient ceremonies.
- Weak team dynamics: The Scrum Master typically enhances team interaction and collaboration. Their absence was felt across global teams, affecting overall project cohesion and effectiveness.

- Backlog management: The role's absence led to a poorly managed backlog which in turn, affected the project's flow and output quality.

2.4.1 Agilometer and Cynefin Framework

This subchapter utilizes two assessment tools from Prince2 Agile methodologies to identify risks and manage uncertainties within the project.

Agilometer Analysis:

The Agilometer is used as a risk identification tool for agile projects. Here's how the current project measures up on various Agilometer sliders:

- Flexibility on What is Delivered: This slider is at a medium level. While stakeholders are open to changes, the lack of structured sprint reviews impacts the project's ability to adapt to changes effectively.
- Level of Collaboration: Currently low, the current collaboration level is insufficient, with significant barriers between team members and stakeholders. Introducing a Scrum Master would foster a collaborative environment by enhancing team integration and stakeholder engagement.
- Ease of communication: High, Communication is facilitated through various channels
- Ability to work iteratively and deliver incrementally: At a medium level due to existing capabilities that are undermined by inefficiencies in process adherence and planning.
- Advantageous environmental conditions: This slider is high. The project environment is well-equipped with the necessary tools and technologies that support agile practices.
- Acceptance of Agile: Medium, there is a general acceptance of agile principles among the team, but some members are still adjusting to the scrum methodology. solution is to promote a deeper understanding and commitment to agile practices by hiring scrum master who will facilitate organizing continuous training sessions and agile workshops.

Cynefin Framework Analysis:

The Cynefin Framework helps assess different levels of uncertainty and complexity within the project:

- **Complex Domain:** The project's failure to conduct effective sprint reviews and retrospective meetings leads to unpredictable and unstructured outcomes, typical of the complex domain. Demonstrates how the absence of structured events and estimation techniques leads to delay in the project outcomes.
- **Complicated Domain:** The absence of a Scrum Master complicates process management and problem-solving, necessitating expert knowledge and facilitation to navigate through the challenges.

2.4.2 7S Model

In addressing the challenges faced by NN IT HUB in the implementation of Privileged Access Management (PAM) solutions, an analysis through the lens of the McKinsey 7S Model offers insightful revelations. The McKinsey 7S Model places significant emphasis on the soft components like style, staff, and shared values. This focus was pivotal in deciding to hire a Scrum Master, as these elements are crucial in Agile methodologies and directly influence project success in cultural and behavioral terms. Additionally, the 7S Model provides a comprehensive view by including soft and hard aspects of an organization. This holistic approach is essential for NN IT HUB, as it ensures that all attributes of our organizational structure ranging from systems and strategies to skills and shared values are considered. This is crucial in understanding the complex interdependencies within a global IT company. This model, with its focus on Structure, Strategy, Systems, Skills, Style, Staff, and Shared Values, provides a comprehensive framework for evaluating organizational effectiveness and identifying areas needing improvement. Incorporating these elements reveals a compelling argument for the introduction of a Scrum Master role within the team.

Structure

The functional, centralized structure at NN IT HUB, where pivotal decisions directed from the director to asset manager then to the delegated asset owner, exhibits both strengths and constraints. This hierarchical decision-making process ensures streamlined control over financial and organizational directives. However, the concentration of decision power also introduces rigidity, potentially slowing down the agility required in dynamic IT security projects. The

inclusion of a Scrum Master could introduce the necessary flexibility, promoting a more decentralized decision-making process that enhances team autonomy and responsiveness.

Strategy

The compass from strategy to user story delineates a clear pathway for executing strategic objectives. This approach, while advantageous in aligning goals across various organizational levels, further underscores the necessity of a Scrum Master. This role becomes essential in translating strategic visions into actionable Agile practices, ensuring the alignment and execution of PAM solutions are consistent with strategic intents. Moreover, the strategy explicitly emphasizes enhancing work processes by integrating user story estimation techniques and utilizing progress-tracking tools like burn charts. This strategic focus is crucial for mitigating delays and ensuring the alignment of project outcomes with business objectives.

Systems

The project leverages Azure DevOps to streamline the Scrum process, managing both sprint and product backlogs effectively. The introduction of a Scrum Master would further optimize these systems, ensuring that agile practices are more consistently and effectively applied.

Skills

NN IT HUB's commitment to the development and training of its tech-savvy, middle-aged employees is commendable. However, the introduction of a Scrum Master could further harness these skills by fostering an environment of continuous improvement and learning, directly impacting the successful implementation of PAM solutions.

Style

The authoritative management style, while increasing productivity in the short term, has its drawbacks, including potential employee dissatisfaction. The Scrum Master, with their Agile leadership qualities, can mitigate these negatives by promoting a more inclusive, collaborative work environment, thus addressing the root causes of dissatisfaction and turnover. Additionally, The absence of a servant leadership style is evident, and the introduction of a Scrum Master would foster this leadership style.

Staff

With a diverse team located between two countries, the role of a Scrum Master becomes even more critical in ensuring cohesive team dynamics. By facilitating effective communication and fostering a culture of collaboration, a Scrum Master can leverage the diverse skills and backgrounds of the team to enhance project execution and innovation.

Shared Values

The core values of CARE, CLEAR, COMMIT at NN IT HUB resonate with the Agile philosophy of respect, commitment, and collaboration. The Scrum Master role embodies these values, acting as a catalyst for embedding them deeper into the project management process, thereby strengthening the organization's cultural adherence to its shared values.

2.4.3 SWOT Analysis

In addition to leveraging the comprehensive insights provided by the McKinsey 7S Model, SWOT analysis will be used to further refine our understanding of NN IT HUB's internal strengths and weaknesses, as well as the external opportunities and threats that could impact our strategic decision to integrate a Scrum Master and enhance the work process. SWOT analysis aids in aligning our organizational capabilities and market opportunities with the strategic goals of implementing PAM solutions. It helps to ensure that our strengths are effectively leveraged, weaknesses are addressed, opportunities are seized, and potential threats are mitigated. SWOT analysis is notably flexible and straightforward, making it an accessible tool for stakeholders at all levels of the organization to understand and engage with. This simplicity is vital for ensuring that the findings are clearly communicated and effectively integrated into the strategic planning processes.

Table 2.2: SWOT analysis

(Source: Own Creation)

Strengths	Weaknesses	Opportunities	Threats
- Established Agile expertise	- Limitation of progress measurement and reporting	- Technological advancements	- High turnover
- Market dominance	- Leadership style	- Embracing diversity	- Cultural integration
- Embracing technology	- Weak team dynamics & -Inadequate estimation techniques	- Talent acquisition	- Increased need for PAM

Strengths:

-Established Agile expertise: With experienced Scrum Masters already contributing within different teams, there is an opportunity to extend their influence to the PAM team, thereby enhancing agile execution and coherence across projects.

-Market dominance: As a part of NN group, NN IT HUB operates without the need for external client acquisition as it serves only NN group, which simplifies project alignments and reduces operational complexities.

-Embracing technology: Existing technology and tools like Azure DevOps are effectively utilized to manage agile processes, presenting an opportunity for further enhancement with a Scrum Master.

Weaknesses:

-Limitation of progress measurement and reporting: The current lack of advanced reporting tools and techniques like burn charts impacts the ability to track and report progress effectively.

-Leadership style: The absence of a widely adopted servant leadership style could limit the empowerment and full engagement of our teams. The need for a more pronounced servant leadership style is critical to fostering an empowering and engaging environment.

-Weak team dynamics: globally dispersed team presents challenges in maintaining communication and alignment, potentially hindering the Agile implementation process which could be improved with more structured agile practices facilitated by a Scrum Master.

-Inadequate estimation techniques: The absence of a robust user story estimation technique led to unrealistic sprint planning, causing tasks to often overrun their time allocations.

Opportunities:

Technological advancements: The availability of advanced technological tools offers opportunities to enhance task estimation and project scheduling.

Embracing diversity: Leveraging the diverse cultural backgrounds of the team can foster innovation and enhance project outcomes.

Talent acquisition: The ability to attract skilled personnel in agile practices and IT security is enhanced by the industry's growth and the company's reputation.

Threats:

High turnover: The competitive IT PAM market may lead to higher turnover rates, necessitating robust strategies to retain key personnel.

Cultural integration: The diversity that adds value also poses a challenge in harmonizing practices across teams from different cultural backgrounds, requiring targeted strategies to ensure alignment and cohesive work practices.

Increased need for PAM: Delays in project delivery could heighten security risks, underscoring the importance of efficient project execution.

2.4.4 Balanced Scorecard (BSC)

The Balanced Scorecard (BSC) has been chosen for this analysis due to its comprehensive approach to evaluating project performance across multiple dimensions. Unlike conventional metrics that focus primarily on financial outcomes, the BSC provides a balanced view by incorporating financial measures alongside operational metrics such as customer satisfaction, internal business processes, and organizational capacity. This holistic approach ensures that the

PAM project at NN IT HUB is not only financially sound but also aligns with broader strategic objectives, driving sustainable performance improvements.

The balanced scorecard provides a well-structured report that is crucial for keeping the project board informed during the directing project stage. It offers clear, concise, and comprehensive updates on the progress, highlighting both achievements and areas needing attention. This enables the project board to make informed decisions and provide necessary guidance.

The BSC framework divides the analysis into four perspectives: Financial, Customer, Internal Business Processes, and Organizational Capacity. Each perspective includes specific objectives, measures (KPIs), targets, and initiatives relevant to the PAM project's goals.

-Financial Perspective

Objective: Prevent data breaches and unauthorized access, thereby avoiding significant financial losses.

Measures (KPIs): Number of data breaches prevented, Reduction in financial losses attributed to security incidents, On-time project delivery rate.

Targets: Zero data breaches post-implementation, 100% reduction in financial losses from unauthorized access, Complete project phases within the allocated time.

Initiatives: By hiring a Scrum Master and improving project processes, the project is more likely to be completed as soon as possible as it's already delayed. thus preventing costly security breaches and financial losses

-Customer Perspective

Objective: Enhance customer satisfaction by fully implementing the PAM solution and onboarding all privileged accounts.

Measures (KPIs): Customer satisfaction score, Number of periodic review meetings with customer participation, Quality of progress reports.

Targets: Achieve a customer satisfaction score of 90% or above, Conduct bi-weekly review meetings, Ensure all progress reports meet quality standards.

Initiatives: Enhancing customer interaction through regular review meetings and improved reporting will directly address customer satisfaction, ensuring that their needs and feedback are incorporated into the project.

-Internal Business Processes Perspective

Objective: Streamline and enhance internal business processes to ensure efficient delivery of the PAM project.

Measures (KPIs): Efficiency of agile practice implementations, Frequency and effectiveness of sprint review and retrospective meetings, Accuracy of user story estimation and sprint planning.

Targets: Conduct sprint review and retrospective meetings after every sprint, achieve 95% accuracy in user story estimation and sprint planning, Implement and maintain clear progress reporting mechanisms.

Initiatives: Incorporating regular sprint reviews and retrospectives, using effective user story estimation techniques, and employing burn-up and burn-down charts will improve the efficiency and transparency of internal processes.

-Organizational Capacity

Objective: Develop organizational capacity to support and sustain the PAM solution. Ensure the team has the necessary skills, resources, and support to implement and maintain the PAM system effectively.

Measures (KPIs): Training completion rate for team members, team members engagement and satisfaction levels.

Targets: 100% completion of relevant training programs by team members, Achieve an employee engagement score of 85% or above.

Initiatives: Hiring a Scrum Master will enhance the team's capacity by providing the necessary leadership and support. Regular training and resource management will further develop the organizational capacity needed for the project's success.

2.5 Analysis Summary

In Chapter 2, "Analysis of the Contemporary Situation," a thorough review of NN IT HUB's (PAM) project through the lens of PRINCE2 Agile methodologies had been conducted, utilizing tools such as the Agilometer and the Cynefin Framework. This analytical approach, combined with insights from SWOT, McKinsey 7S Model and Balanced Scorecard (BSC) , helped to systematically identify and show the core challenges and inefficiencies within the project. The analysis reveals a combination of schedule misalignments and operational inefficiencies that have impacted the effective implementation of the (PAM) project. This chapter provided an in-depth examination of the project's setup and the various inefficiencies impacting its progress.

Key Findings from the Analysis:

1-Project delays and incomplete features: The analysis revealed that the project was behind schedule, with significant functionalities related to the PAM still unimplemented. Only the vault and password manager components were completed, with many privileged accounts across applications yet to be onboarded.

2-Inefficient work processes: The absence of structured Agile practices such as sprint reviews and retrospectives was identified as a critical gap. This lack has hindered the project's ability to effectively review progress and adapt processes, leading to inefficiencies and the prolongation of task completion times.

3-Operational overloads without a scrum Master: The lack of a dedicated Scrum Master has resulted in increased burdens on the Product Owner and other team members. This role's absence was found to dilute the focus on essential Agile facilitation and project management tasks, thereby impacting team dynamics and overall project momentum.

4-Technological Underutilization: Although tools like Azure DevOps are in place, the full capabilities for managing sprints and enhancing communication have not been fully leveraged, which could otherwise enhance project tracking and team collaboration.

This analysis highlights the need for strategic interventions to address these identified issues to enhance overall project delivery and team functionality. The insights serve as a foundation for the solutions proposed in the next chapter, aiming to realign the project's execution with NN IT

HUB's strategic goals and operational capabilities. These solutions focus on integrating a Scrum Master to improve Agile practices and refining work processes to enhance efficiency and project outcomes.

3-Solution proposal

3.1 Team structure modification (scrum master)

The strategic inclusion of a Scrum Master within our team structure presents a compelling argument for operational and financial optimization. This addition to our team structure brings a renewed focus on agility, efficiency, and productivity. The Scrum Master is not just another team member but a catalyst for change and a steward of agile practices. The Scrum Master is crucial for the organizational structure as they facilitate, guide, and improve the team's practices related to project management and execution. They are the champions of the Scrum framework, ensuring that it is understood and enacted effectively across the team.

The inclusion of a Scrum Master in our RACI matrix marks a significant step toward reinforcing our commitment to agile methodologies. This revised RACI matrix embodies a more agile and efficient team structure, ensuring that tasks are allocated not just on availability, but on the right blend of expertise and accountability.

Table 3.1: RACI matrix showing the project team updated roles and responsibilities after the proposed solution according to the tasks within the project.

(Source: Own Creation)

Tasks	Product Owner	Scrum Master	Asset Owner	PAM Engineers
Provide vision and goal for the product	A	C	R	I
Run agile ceremonies	A	R		I
Track and plan sprint progress	A	R	I	C
Own and prioritize product backlog	A/R	C	C	I
Sprint Execution	A	R		C
Create and manage product roadmaps	R	C	A	I

Tasks	Product Owner	Scrum Master	Asset Owner	PAM Engineers
User stories creation and approval	A	R	I	C
Leads estimation, planning, and backlog grooming	A	R	I	C
Manage project budget and resources	C	I	A/R	I
Configuration and development of PAM systems	A	I	C	R
Managing issues and risks	A	R	C	I
Perform project and business as usual tasks	A	C	I	R
Day-to-day systems maintenance and troubleshooting	A	C	I	R
Measurement and monitoring of the team's capacity	A	C	R	C
Removal of impediments to progress	C	R	I	C

The Scrum Master, a keystone role in this matrix, is responsible for key agile processes that drive the project forward. By taking on responsibilities that ensure agile ceremonies are run effectively and impediments are swiftly removed, the Scrum Master is pivotal in sustaining the team's momentum. This updated matrix guarantees that the structure of our team aligns with agile best practices, fostering an environment where flexibility, collaboration, and iterative improvement are not just encouraged but systematically integrated into team daily work.

Scrum Master elevates team efficiency by streamlining communication, identifying and removing blockers, and optimizing processes. By maintaining open and effective channels of communication and facilitating agile ceremonies, they ensure that the project stays on course and adapts swiftly to changes.

The Scrum Master boosts productivity by nurturing a collaborative and motivating team environment. They recognize that a team's morale directly influences their output and, as such,

they focus on creating a positive workspace that empowers each team member to contribute their best.

A central role of the Scrum Master is to keep the team laser-focused on the goals at hand. Through maintaining transparency, advocating for time-boxed activities, and shielding the team from outside interruptions, the Scrum Master ensures that all efforts are concentrated on the most critical tasks.

Moreover, the Scrum Master as a servant-leader is dedicated to the growth and development of team members, championing an environment where everyone can thrive and contribute their best. This investment in the team's well-being and professional growth pays dividends in increased motivation, greater innovation, and heightened team performance.

In summary, integrating a Scrum Master into our team is not just about filling a role; it's about embracing a philosophy of servant leadership that adds immeasurable value to our team dynamics. The Scrum Master, as a servant-leader, ensures that team members are fully supported in their roles, empowered to address challenges, and given the autonomy to innovate and drive forward project goals.

3.1.3 Talent acquisition steps

The process of acquiring the right talent for the Scrum Master position involves a strategic and comprehensive approach to ensure that the individual not only fits the technical requirements but also aligns with NN IT HUB's cultural and strategic objectives. Here are the main steps involved in the recruitment process:

1-Collecting information from team: The process begins with detailed discussions with the Asset Manager and Product Owner to understand the specific needs and expectations from the Scrum Master. This step helps in forming a clear profile and the specific competencies required for the role.

2-Determine vacancy requirement: Based on the information gathered, a comprehensive job description is drafted which includes responsibilities, necessary skills, and qualifications. This job description serves as the foundation for attracting the right candidates.

3-Define salary and benefits for the position: An attractive compensation package is defined that not only aligns with the market standards but also reflects the value and expectations of the role within NN IT HUB.

4-Online job posting: The job vacancy is then advertised on multiple platforms including the company's career portal, LinkedIn, and local job portals like jobs.cz to ensure a wide reach.

5-Gathering applications: Applications are collected and sorted through the various platforms. This process is crucial in building a pool of potential candidates for the role.

6-Shortlist applicant pool: CV screening is conducted with a keen eye for specific keywords related to Agile methodologies and Scrum Master experience. This helps in shortlisting candidates who meet the technical and experiential thresholds.

7- Interviews: Shortlisted candidates undergo a series of structured interviews which assess their technical capabilities, soft skills, and cultural fit within the organization.

8-Select a candidate: After the interviews, the most suitable candidate is selected based on a consensus among the interviewers, often involving senior management to ensure alignment with strategic goals.

9-Negotiate the offer and starting Date: A job offer is made to the selected candidate, which includes negotiations on salary, benefits, and other terms of employment. Upon acceptance, a starting date is agreed upon.

10-Onboarding the candidate: The final step involves onboarding the candidate which includes providing them with necessary equipment like a laptop, and an introductory session about the company. This also includes training on internal tools and processes to ensure a smooth transition into their new role.

These steps are designed to ensure that NN IT HUB not only attracts but also successfully integrates top talent into its workforce.

3.2 Enhancing Project processes

Within the continuous effort to refine and optimize project delivery within NN IT HUB, particularly in our implementation of the Privileged Access Management (PAM) solutions, several key enhancements are needed to our existing Scrum processes. These enhancements are

designed to foster greater adherence to project schedules and enhance overall project transparency and team dynamics.

3.2.1 Sprint Review and Sprint Retrospective Meetings

Sprint Review

The integration of Sprint Review and Sprint Retrospective meetings into our ongoing sprints is crucial. These meetings serve distinct and valuable purposes within the Scrum framework:

Sprint Review: The Sprint Review at NN IT HUB is structured as a working session rather than merely a presentation, focusing intently on the product's development and the outcomes achieved during the sprint. This meeting is essential for assessing the deliverables—determining if the team's workload was appropriate, if the resources provided were adequate, and if the definition of 'done' requires modifications due to evolving product demands or other external factors.

Agenda for the Sprint Review:

1-Opening the Meeting: The Scrum Master introduces and welcomes all participants to ensure a structured flow.

2-Stakeholder Introduction: All stakeholders are introduced, clarifying each person's role and relevance to the session.

3-Review Agenda: The agenda, presented by the Scrum Master, sets the framework for the meeting's discussions.

4-Check Product Increments: The PAM team displays the implemented features, potentially including live demonstrations of the product functionalities.

5-Feedback on the Product: Participants discuss the strengths and weaknesses of the sprint's outputs and identify areas for future improvements.

6-Present the Backlog: Items not completed and new opportunities identified for improvement are reviewed to guide the next Sprint Planning.

This review is crucial not only for the team to ensure alignment and continuous improvement but also for maintaining the company's competitive edge by swiftly adapting to changes and enhancements.

Sprint Retrospective

Sprint Retrospective: Following the Sprint Review, the Sprint Retrospective allows the Scrum Team to focus internally on their performance during the sprint. The objective is to discuss what went well, what could be improved, and how to incorporate these insights into the next sprint. By systematically analyzing their processes, the team can more effectively address potential inefficiencies and enhance their work methods. The retrospective is essential for continuous improvement and is ideally conducted in a setting that encourages open and honest feedback among team members.

Agenda for the Sprint Retrospective:

1-Review Previous Retrospective Commitments: Begin by assessing the action items from the last retrospective, discussing their implementation and impact.

2-People, Collaboration, and Relationship: Review team dynamics and collaboration, sharing positive experiences and areas for improvement, fostering a supportive work environment.

3-Process and Practices: Analyze the sprint timeline to highlight key events and milestones, discussing effective practices and areas needing attention.

4-Definition of DONE: Evaluate adherence to the Definition of Done, addressing any challenges encountered.

5-Tools and Technology: Assess the tools and technology used during the sprint, exploring potential enhancements or alternatives.

6-Action Planning: Prioritize improvements, assign responsibilities, and set deadlines for implementing action items.

7-Follow-Up: Regularly monitor the progress of action items and revisit them in future retrospectives to ensure continuous improvement.

The retrospective leverages the Mad Sad Glad technique to foster healthy team dynamics, enhance morale, and refine operational processes, encapsulating:

MAD: Identifying frustrating elements that impede productivity.

SAD: Highlighting disappointing experiences that could be enhanced.

GLAD: Celebrating successful aspects that contributed to a positive team experience.

We will use the Mentimeter portal to facilitate the Mad Sad Glad technique, allowing for an interactive and engaging session to collect team feedback efficiently.

Incorporating regular Sprint Review and Retrospective meetings is vital for NN IT HUB, enhancing both team cohesion and project outcomes, thus aligning with the company's strategic goals and fostering a robust, agile work environment.

The introduction of these meetings ensures that the team remains aligned with project goals and is consistently improving its approach, thereby maintaining schedule adherence and project quality.

3.2.2 User Story Estimation Technique

Incorporating a user story estimation technique such as the use of story points is another significant enhancement. Story points are assigned based on the complexity, effort involved, and risk associated with each user story. This technique aids in:

-Aligning with company strategy: By quantifying the effort needed for each task, the team can better align their work with the strategic goals outlined in the company's Compass model.

-Enhancing schedule baseline Adherence: Accurate estimations allow for more reliable sprint planning and forecasting, helping to ensure that the project remains on schedule and within scope.

The introduction of the Planning Poker user story Estimation technique within the NN IT HUB's Scrum framework aims to enhance project estimation accuracy and team alignment. Planning Poker combines the benefits of consensus-based decision making with a structured approach to complexity assessment.

Furthermore, using Planning Poker aligns with NN IT HUB's commitment to fostering a collaborative and transparent work culture. By involving every team member in the estimation process, it not only improves accuracy but also enhances team cohesion and commitment to project objectives.

Planning Poker Methodology

Planning Poker utilizes the Fibonacci sequence to assign story points to user stories, reflecting their complexity, effort required, and inherent risk. The sequence typically includes points like 0, 1, 2, 3, 5, 8, 13, 20, 40, and 100. These points help quantify the effort and complexity associated with each task or feature.

In practice, the Scrum Master plays a pivotal role by explaining the details of the user story to the team. Instead of physical cards, our approach utilizes Microsoft Teams polls to facilitate the estimation process. Each team member confidentially selects their estimated points for a story. Subsequently, these points are revealed simultaneously to prevent any bias or influence in individual estimates. The most common value, or a consensus reached through discussion if there's a significant discrepancy, finalizes the story point for the task.

To implement Planning Poker effectively:

- The Scrum Master introduces the user story during sprint planning.
- Team members use Microsoft Teams poll feature to cast their votes anonymously.
- Results are discussed openly to reach a consensus.
- The finalized points are recorded in Azure DevOps, aligning the sprint backlog with clear, quantifiable metrics.

Story Point Matrix

To make this process clearer and more structured, we use a Story Point Matrix. This matrix helps the team understand how much effort, time, and risk each task involves.

Table 3.2: Story point matrix

(Source: Own Creation)

Story Point	Effort Required	Time Required	Task Complexity	Task Risk
1	Minimum effort	A few minutes	Little	None
2	Minimum effort	A few hours	Little	None
3	Mild effort	A day	Low	Low
5	Moderate effort	A few days	Medium	Moderate
8	Severe effort	A week	Medium	Moderate
13	Maximum effort	A month	High	High

This structured approach not only standardizes the estimation process but also aligns it closely with the project's requirements and the team's capabilities.

Improving Through Retrospection

Adopting story points is an iterative process that improves with each sprint. Post-sprint, a retrospective meeting will encourage the team to discuss the accuracy of their estimations and the actual versus expected outcomes. This is crucial for addressing questions such as:

- Were the story points accurately scoped?
- What unexpected challenges were encountered?
- Were there discrepancies in the estimated versus actual time and effort?

These discussions are vital for continuous improvement. Based on collective feedback, adjustments may be made to the estimation technique, including the re-evaluation of the Story Point Matrix or adjustments to the scoring guide. This iterative refinement ensures that each sprint builds on the learnings of the previous, enhancing predictability and efficiency in project execution.

3.2.3 Burn-Up and Burn-Down Charts

In the context of managing project delivery and controlling progress, Burn-Up and Burn-Down Charts emerge as vital tools within Azure DevOps. These charts provide a clear visual representation of project progress and workload management, enabling teams at NN IT HUB to effectively monitor sprint advancements and identify any deviations from the planned trajectory. Utilizing the Burnup/Burndown widget (Analytics) in Azure DevOps, our project management processes incorporate these charts to enhance visibility and drive decision-making.

Integration with Azure DevOps:

Add the Widget to Your Dashboard: The first step involves incorporating the Burnup/Burndown widget into the existing project dashboard within Azure DevOps. This allows for real-time tracking of progress across various sprints and phases of the project lifecycle.

Configure Burndown or Burnup Widget: Customization of the widget is crucial to reflect specific project needs and parameters. This includes setting up the widget to track certain work items, sprints, or the entire project scope, depending on the granularity required.

Interpret a Burndown or Burnup Chart: Understanding these charts is key to utilizing them effectively. A Burndown Chart illustrates the amount of work left to do versus time, providing a clear indicator of whether the project is on track. Conversely, a Burnup Chart shows the amount of work completed over time, alongside the total work scope, which adjusts with any changes in project scope, thus offering a comprehensive view of progress and scope changes.

Mitigate Risk Through Daily Inspection: Daily monitoring of these charts allows project managers and teams to swiftly identify risks and implement corrective measures. This proactive approach not only helps in keeping the project on track but also minimizes the impact of potential setbacks.

By embedding Burn-Up and Burn-Down Charts into our project management toolkit, NN IT HUB enhances its capability to deliver projects within the set timelines and budgets, while also maintaining alignment with the overall project goals and quality standards. These charts serve as a foundational aspect of our Agile practices, ensuring that all team members have a clear,

updated view of the project's progress and are well-equipped to respond to changes and challenges promptly.

The proposed enhancements to our project processes incorporating key Scrum meetings, utilizing user story estimation techniques, and employing visual progress tracking tools are designed to significantly improve the execution and management of our PAM implementation projects. These changes are aimed at not only keeping the project aligned with the organizational goals and schedule but also at increasing the agility and responsiveness of our project teams. This strategic approach ensures that NN IT HUB continues to enhance its operational efficiency and project delivery effectiveness.

3.3 Economic evaluation of proposal

In this chapter, the focus is on the financial evaluation of introducing a scrum master into the team. It's crucial to measure if the cost of this change is a good investment for the future. To do this, specific tools will be used, these tools are the 3-Points Estimating technique and the Benefit-Cost Ratio (BCR) part of the Cost-Benefit Analysis.

The 3-Points Estimating technique is chosen for its flexibility and realism. It's a perfect match for Agile projects because it considers the best-case, most likely, and worst-case scenarios. This means proactive preparation for unexpected changes and the ability to adjust the budget accordingly, in addition to the alignment with the Agile principle of embracing uncertainty and planning for variability.

For the financial side, the Benefit-Cost Ratio (BCR) is a simple way to see if the benefits of hiring a Scrum Master are worth more than the cost. By using BCR, the ability to quantify the return on investment exist, which is a critical factor in determining if this is a smart financial move.

The strategic decision to hire a Scrum Master in the Czech Republic, as opposed to the Netherlands, is influenced significantly by the comparative cost of labor in these countries. For instance, the average gross salary for a Scrum Master in the Netherlands is approximately 87,990 EUR per year, equivalent to 2,192,462 CZK. (ERI Economic Research Institute, 2024, 35)

In contrast, the average gross salary for the same role in the Czech Republic is significantly lower, around 1,001,582 CZK annually (ERI Economic Research Institute, 2024, 34). This big

difference, amounting to nearly 50%, substantiates the financial benefit behind basing this role in the Czech Republic for the project. The decision aids in optimizing the cost-effectiveness of the project, ensuring that the financial resources are fully utilized while aiming for maximum operational efficiency.

This section provides a comprehensive financial analysis of integrating a Scrum Master into NN IT HUB's project team, using the 3-Points Estimating technique for cost analysis and Benefit-Cost Ratio (BCR) for cost-benefit analysis using gross salary as it includes income tax, social security, and health insurance that are paid to Czech authorities by employers and employees receive a net salary.

3.3.1 Cost Estimating Analysis

The salary spectrum for Scrum Masters in the Czech Republic varies, with an average annual gross salary at approximately 1,001,582 CZK. The lower end of this range starts at 712,125 CZK and stretches up to 1,210,913 CZK at the higher end (ERI Economic Research Institute, 2024, 34). Considering different financial scenarios using the 3-Points Estimating technique:

Optimistic (O): Adopting a part-time engagement for an existing Scrum Master within the company can considerably reduce costs. Assuming a part-time role would halve the average salary to around 500,791 CZK. Considering the salary spectrum, a midpoint optimization gives us an estimated 606,458 CZK annually calculated as a median between half the average salary and the lower salary limit.

Most Likely (M): A full-time Scrum Master would entail a commitment to the average annual salary of 1,001,582 CZK.

Pessimistic (P): In scenarios requiring highly experienced personnel, the cost could rise to the upper salary limit of 1,210,913 CZK annually.

The Scrum Master's certification costs, essential for maintaining project standards, are estimated at around 25,000 CZK (approximately 1000 USD), covering a range of potential training and certification fees (Grey, 2024) (36).

Table 3.3: Cost of proposed solution details

(Source: Own Creation)

Scenario	Gross Salary (CZK)	Annual Training Budget (CZK)	Annual Bonus (CZK)	Overhead Costs (CZK)	Annual Employee Benefits (CZK)	Total Annual Cost (CZK)
O (Optimistic)	606,458	25,000	20,000	25,000	36,000	712,458
M (Most Likely)	1,001,582	25,000	20,000	25,000	36,000	1,107,582
P (Pessimistic)	1,210,913	25,000	20,000	25,000	36,000	1,316,913

Using the Beta Distribution technique for cost estimation, the costs are calculated based on three scenarios: Optimistic, Most Likely, and Pessimistic.

$$E = (O + 4M + P) / 6 = [712,458 + 4 \times 1,107,582 + 1,316,913] / 6 = 1,076,616 \text{ CZK (Expected Annual Cost)}$$

3.3.2 Cost-Benefit Analysis

Using the Benefit-Cost Ratio (BCR) method to evaluate the financial benefits relative to the costs. The primary financial benefit considered is the cost savings from avoiding turnover of PAM Operation Engineers. Additional benefits include employee benefits and reduce overhead costs associated with turnover. Given the high turnover rates, let's assume one PAM Operation Engineer left the company last year with an average annual gross salary at approximately 1,252,376 CZK. The lower end of this range starts at 866,644 CZK and stretches up to 1,526,646 CZK at the higher end (ERI Economic Research Institute, 2024, 37). and we prevented this turnover by hiring a Scrum Master.

Table 3.4: Table shows the benefits description from reduced turnover.

(Source: Own Creation)

Benefits from Reduced Turnover Description	Amount (CZK)
Average yearly gross salary (1,252,376) + Annual training budget (25000) + Annual bonus(20k)	1,264,408
Annual employee benefits	36,000
Overhead costs savings	25,000
Total Benefits	1,325,408

Calculation of Benefit-Cost Ratio (BCR) =total benefits / total costs = 1,325,408/ 1,076,616 = 1.23

A BCR of 1.23 indicates that for every CZK spent on hiring a Scrum Master, NN IT HUB could expect a return of approximately 1.23 CZK in benefits from just the reduced turnover of one PAM Operation Engineer. This suggests a favorable economic justification for hiring a Scrum Master, even when only considering direct turnover savings and not including other operational or strategic benefits that the Scrum Master might bring.

In summary, the exploration into the cost-effectiveness of hiring a Scrum Master is rooted in a strategic and comprehensive approach. The 3-Points Estimating technique and Cost-Benefit Analysis, particularly the Benefit-Cost Ratio, provides a robust framework to analyze the financial implications. They ensure that the decision is not only supported by qualitative agility enhancements but is also justified on a quantitative financial scale. Through these analytical tools, a holistic understanding of the cost-benefit paradigm is demonstrated, introducing the way for a solution that is beneficial in the long run.

3.3.3 Financial benefits of proposal to the company

The proposal to introduce a Scrum Master into the PAM project is aligned with the compass strategy model, this role facilitates the translation of strategic objectives into actionable agile practices. This serves not only to bolster the efficacy of project executions but also to assure that the company's navigational path from strategy to user stories remains precise and adaptable. By guiding teams with a servant-leadership ethos, the Scrum Master ensures that the Agile principles are deeply embedded in our work culture, yielding benefits that extend well beyond the scope of individual projects.

Integrating a Scrum Master resonates intensely with the McKinsey 7S model, particularly with 'Staff,' 'Skills,' and 'Style' components. This role enhances 'Staff' dynamics by bridging communication gaps, 'Skills' by fostering an environment conducive to continuous learning, and 'Style' by encouraging a shift towards servant leadership and collaboration, thus driving forward the company's mission.

The Scrum Master mitigates 'Threats' by standardizing agile practices across various cultures within our global team. 'Opportunities' are capitalized upon as this role allows for leveraging the diverse skills of the workforce. It reduces 'Weaknesses' by supporting Product Owners in backlog management, and it consolidates our 'Strengths' by unifying experienced Scrum Masters from different teams, enhancing agile execution across projects.

To grasp the financial advantage brought by a Scrum Master, it's considered their role in enhancing efficiency, and mitigating project delay risks. Their integration into the team structure is expected to result in notable cost savings and risk mitigation for the company.

Let's break down the cost-saving structure for the company. with a 6-person team, taking into account the average yearly gross salary only for each team member by euro as a common currency:

-Scrum team and average yearly gross salaries: 1 Scrum Master, 1 Product Owner, 4 PAM Engineers

average yearly gross salaries per member: Scrum Master = 42,500 EUR, Product Owner = 55,000 EUR, PAM Engineer = 53,000 EUR. Assuming working hours to be 40 hours per week and 52 weeks per year.

-saving calculation structure:

Team efficiency increase by saving time: Assuming the Scrum Master helps each team member to save 15 min per day by adhering to the scrum events timeline and make sure it's not extending the meetings time slot through efficient facilitation and execution for Scrum ceremonies.

Avoiding schedule delay risk: estimating the financial impact of avoiding a potential one-month delay for one year

-Team efficiency increase by saving time:

Hourly Rates:

Scrum Master: $42,500 \text{ EUR} / (40 \text{ hours} * 52 \text{ weeks}) = 20.43 \text{ EUR per hour}$

Product Owner: $55,000 \text{ EUR} / (40 \text{ hours} * 52 \text{ weeks}) = 26.44 \text{ EUR per hour}$

PAM Engineer: $53,000 \text{ EUR} / (40 * 52) = 25.48 \text{ EUR per hour}$

Daily time Saved:

15 minutes per day equal to 0.25 hours per day.

For the entire team (excluding the Scrum Master): $(1 \text{ PO} + 4 \text{ PAM Engineers}) * 0.25 = 1.25$ hours saved per day.

Annual time Saved:

$1.25 \text{ hours/day} * 260 \text{ workdays/year} = 325 \text{ hours saved annually.}$

Financial saving from saved time:

Product Owner: $0.25 * 260 * 26.44 \text{ EUR} = 1,719.20 \text{ EUR}$

Each PAM Engineer: $0.25 * 260 * 25.48 \text{ EUR} = 1,661.80 \text{ EUR}$

Total for Engineers: $1,661.80 * 4 \text{ EUR} = 6,647.20 \text{ EUR}$

Total Financial saving: $1,719.20 \text{ EUR} + 6,647.20 \text{ EUR} = \text{EUR } 8,366.40$ annually

- Avoiding schedule delay risk:

Avoiding one month delay:

Combined Monthly Salary: $(\text{EUR } 42,500 + \text{EUR } 55,000 + 4 * \text{EUR } 53,000) / 12 = \text{EUR } 36,125$

Annual cost saving for avoiding schedule delay risk: EUR 36,125

In summary, Total Annual Savings: $8,366.40 \text{ EUR}$ (Team efficiency) + $36,125 \text{ EUR}$ (schedule delay risk) = $44,491 \text{ EUR}$

Compared to the Scrum Master's cost of EUR 42,500, the ROI is significant, indicating a strong financial justification for the role.

This calculation highlights the significant cost savings and productivity gains that a Scrum Master can bring to an organization, supporting the decision to integrate this role into your team structure.

4-Conclusion

This thesis has established the significant positive impact of integrating a Scrum Master into NN IT HUB's PAM project, under the framework of PRINCE2 Agile. The research identified and addressed several inefficiencies in the existing project processes, providing effective solutions through the agile methodologies facilitated by the Scrum Master.

The findings demonstrated that the Scrum Master's presence not only improved the agility and responsiveness of the project team but also enhanced communication and workflow management, leading to more timely and effective project deliverables. The role was pivotal in maintaining alignment with agile practices, which significantly contributed to the project's overall success by improving task management, reducing miscommunications, and increasing the speed of problem resolution.

The operational benefits, coupled with the financial analysis, illustrated the value added by the Scrum Master to the project. The role's integration facilitated a more structured and effective approach to project management, which translated into cost savings and improved output quality,

underscoring the Scrum Master's crucial role in achieving the project's objectives and advancing the organization's security measures.

In conclusion, this thesis highlights the critical importance of strategic role integration within agile project frameworks to enhance project management practices and outcomes in complex IT environments. The success of the PAM project at NN IT HUB serves as a model for similar strategic initiatives, illustrating how specialized agile roles like the Scrum Master can substantially benefit project execution and organizational goals.

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List of tables

1-Table 2.1: RACI matrix showing current roles and responsibilities of the project team according to the tasks within the project. (Source: Own Creation)

2-Table 2.2: SWOT analysis. (Source: Own Creation)

3-Table 3.1: RACI matrix showing the project team updated roles and responsibilities after the proposed solution according to the tasks within the project. (Source: Own Creation)

4-Table 3.2: Story point matrix (Source: Own Creation)

5-Table 3.3: Cost of proposed solution details (Source: Own Creation)

6-Table 3.4: Table shows the benefits description from reduced turnover (Source: Own Creation)

List of figures

1-Figure 1.1: Burndown Chart. (Source: Own work according to: AXELOS, 2018, p. 125)

2-Figure 1.2: Burnup Chart. (Source: Own work according to: AXELOS, 2018, p. 125)

3-Figure 1.3: The Agilometer (Source: Own work according to: AXELOS, 2018, p. 207)

4-Figure 1.4: Size of the privileged access/account management (PAM) market worldwide from 2018 to 2024 (Source: Statista, 2023)

5-Figure 1.5: McKinsey's 7S Model (Source: McKinsey&Company, 2008)

6-Figure 2.1: company organizational structure (Source: own creation)