LAB University of Applied Sciences

Agile Methodology Approaches European Banks

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Abstract

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Agile Methodology Approaches European Banks

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Abstract

Agile methodology is a project development or management approach that has been adopted in various industries such as information technology, education, manufacturing, and bank and finance. Although the Agile Manifesto has been released to the public since 2001, it was only in the recent decade that the European banking industry approached and applied the Agile methodology to their organizations. In this thesis, three large European banks, including Nordea, Deutsche, and BNP Paribas, are used as the subjects of the study. The paper focuses on gathering information and analyzing the motivation for Agile adoption and how the Agile methodology has been implemented in these banks, thereby showing the influence of Agile as well as the challenges that these banks have encountered.

The research structure of this thesis includes eight parts, and a qualitative case study approach is used. The first part of the research presents an overview of the Agile methodology. Second, the driving forces behind adopting Agile methodologies in these banks are investigated, considering both internal and external factors. The thesis delves into the specific strategies and steps Nordea, BNP Paribas, and Deutsche Bank took during their Agile transformations, highlighting the key milestones and outcomes achieved. The impacts of Agile methodology on these banking organizations' operation and management are analyzed, taking into account factors such as velocity, defect rates, and customer satisfaction. Then, the challenges and limitations of Agile during the implementation are explored. Additionally, insights from interviews conducted with relevant experts are analyzed, providing valuable perspectives on the Agile implementation process. The conclusion section summarizes and discusses the research findings, providing recommendations based on the insights from the case studies and interview analysis.

Keywords

Agile methodology, AM, principles, European banks, Nordea, BNP Paribas, Deutsche

Acknowledgment

My three-year study at LAB UAS almost ends. I would like to express my sincere appreciation to my supervisor Aki Vanio and my language teacher Anneli Rinnevalli. During the thesis process, many unexpected things happened to me that caused the time constraints and conditions to complete my thesis report in the planned time. Aki Vainio listened to my expression and did not hurry me to complete the report. He also gave me some valuable advice to orient my writing way. Besides, I would like to thank my language teacher. Although I sent a late requirement for the language section and she had little time, she still accepted my petition.

I still remember when I started university in August 2020, there were many difficulties due to a postponed semester caused by Covid-19. Although there are a few times I went to LAB-Lahti campus, I will remember all the classrooms I had been to, the library, the game area, and the eating areas. LAB and Lahti gave me a beautiful and memorable time.

I am grateful for all my recollections and memories.

Contents

Acronyms

IT: Information Technology

AM: Agile Methodology

VUCA: Volatile, Uncertain, Complex, Ambiguous

SE: Software Engineer

BA: Business Analyst

ECB: European Central Bank

EBF: European Banking Federation

1 Introduction

1.1 Background

This research paper emerged when the author has been preparing to look for a suitable and future-oriented job after graduation. After the Agile course completion in the university program, realizing that although Agile is a concept that was formed a long time, there are many individuals and organizations that still have a vague view of it. Especially the banking industry - one of the essential sectors of the economy and the sector the author is interested in.

Due to the world's increasingly rapid changes and the development of new technologies, AM has emerged as an engaging alternative solution for enterprises looking to enrich their execution (Dikert et al. 2016). Agile was initially accepted in technology companies, especially in software teams and projects. However, with the performance and advantages Agile brought, larger enterprises with greater projects have paid more attention to it (Dikert et al. 2016).

Below is the graph illustrating the share of frameworks offered and used in different work environments. The online survey was conducted by Statista in Austria, Germany, and Switzerland attracting almost 5000 employed professionals who responded. The result shows that Agile and flexible team structure is in the middle position compared to other frameworks. Although the survey was conducted in only three nations, it still testifies that Agile is gaining popularity and influence in the work environment. (Statista 2018.)

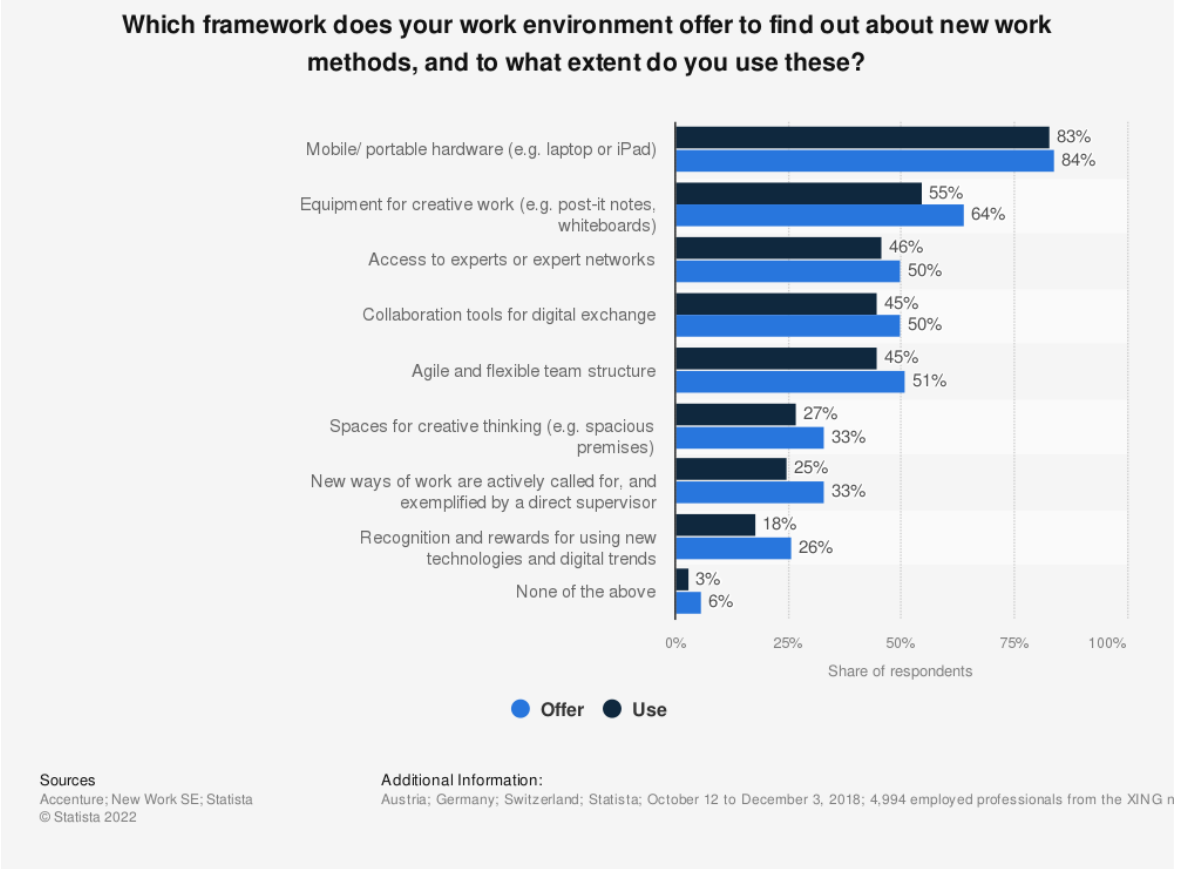


Figure 1. Which framework does your work environment offer to find out about new work methods, and to what extent do you use these? (Statista 2018)

AM today has been more widespread than before; nonetheless, it is still on its way to popularity. Many banking enterprises have yet to approach AM; even among the banks that have implemented AM, many individuals, teams, and departments still need to adopt AM. Some banking organizations still wonder if Agile is a good and appropriate management methodology for their teams and businesses; whether changing and adopting a new project management methodology for the entire company is worth the trade-off. (Brühl 2022; Djurovic 2023.)

In the last decade, the significant development and advancement of IT have led to changes in customers' needs and the demand to optimize enterprises' management and operation processes. Therefore, European banks are no exception. The European banking industry has undergone significant changes recently, with increased competition, changing customer demands, and technological advancements. As a result, the industry has been under pressure to become more agile, flexible, and responsive to change. Meanwhile, Agile methods have emerged as a popular approach to software development, emphasizing iterative development, customer collaboration, and adaptability. The adoption of AM has been

shown to improve speed to market, increase customer satisfaction, and reduce costs. However, adopting AM also presents limitations and challenges, including resistance to change, lack of understanding of Agile principles, and difficulty in scaling Agile methods to large organizations. This study aims to explore the adoption of AM in the European banking industry, using the case studies of Nordea Bank Abp, Deutsche Bank AG, and BNP Paribas Bank. By examining the experiences of these large banks, this study seeks to identify the benefits and challenges of Agile methods in European banking organizations and provide recommendations for the successful implementation of AM in large organizations.

1.2 Thesis Structure

Figure 2. Thesis structure

2 Research Approach

2.1 Research Problems and Objectives

Banking businesses today constantly face rapidly changing customer behavior and requirements. With the explosion of technology, it is easy for people to own hi-tech products like smartphones, tablets, and computers, leading to demands for access to advertising information, balance security, money transfer, and online payment quickly becoming indispensable. Therefore, those companies must rapidly change their products and services according to customers' wishes before switching to competitors' products and services. Quick adapting to change is the top priority goal for organizations. Therefore, enterprises regularly update their products, strategies, advertising campaigns, or user interface and functions in their mobile applications. As a result, to always be flexible to improvise according to changing customer requirements, a new project or software management methodology - Agile methodology was born. This emergence is a significant milestone marking the effective transition from old-fashioned management methods. (Brühl 2022.)

For instance, with traditional software development methods like Waterfall[1], a business analyst (BA) has e the role of meeting customers, requirement collection, and analysis; then, the BA writes down professional business requirements and presents them to the business department for confirmation. The BA and software engineer (SE) will analyze and design the project in the next step. Then SE starts to implement the code. Next, the tester will conduct tests of the types and release the first version. Time later, BA brings the demo product, and dissatisfaction may happen because a new idea pops into customers' heads when they see the actual product. Now, the re-work cycle begins, and everyone works in mutual mistrust, creating an unavoidable delay in product delivery. (Savchenko 2023.)

In contrast, AM will approach faster; the process depends on completing definitions (definition of done - DoD) and sprint goals. AM encourages SE to interact more with customers; the interaction process helps SE empathize with customers' concerns. In addition, business experts and people in charge of technical functions will sit together and interact directly to ensure a common understanding of the requirement and idea and to coordinate to bring ideas to be practical and ready-to-use products. (Chakraborty 2021.)

The following Table 1 is Waterfall in comparison with Agile approaches in project management based on certain criteria, and Table 2 lists the comparison in project development. In

[1] A traditional, rigid, and inflexible methodology is suitable for well-defined and stable requirement projects.

each criterion, the prominent features and specific factors of both compared objects were clarified.

Table 1. Waterfall and Agile methodology in project management (Hoory & Bottorff 2022)

	Waterfall	Agile
Procedure	linear and stepwise	Continuously repeat and streamline.
Requirements	Usually resist changes during the implementation phase.	Accept changes to requirements during project completion.
Progress assessment	Evaluate progress based on expected time and budget.	Evaluate progress based on finished products.
Products	Products are developed based on specific and clear plans.	Products are developed continuously in an iterative process.
Work assignment	Clearly assign tasks to each member.	The development team is self-managed and undertakes the tasks.
Customer interaction	Interact with customers at the request and fulfillment stage.	interact and support customers continuously during the development process.
Task priority	The tasks are done in the correct order in the plan.	Higher priority tasks are developed first.
Quality evaluation	Evaluate the quality after the product is completed.	Continuously evaluate the quality and make appropriate improvements.
Development team	The development team works independently and reports directly to management.	The development team works together and works closely.

Table 2. Waterfall and Agile Methodology in project development (Stober & Hansmann 2009)

	Waterfall	Agile
Main feature	sequential step method, focusing on planning and control.	Flexible method, focusing on interaction and cooperation between project members.
Time	Rigidly distributed and scheduled, longer development phases.	Flexible delivery and scheduling, shorter development phases.
Product	Products are developed and tested only when all steps have been completed, with little opportunity for adjustment after that step has been completed.	Products are developed and improved continuously, evaluated by customers and improved after each cycle.
Customer	Generally not embraced in the development process, only evaluated at the finale of the process.	Normally embraced in the development process, give feedback and request product changes.
Risk	Risks can be difficult to detect and deal with once the stages have been completed.	Risks can be treated and improved continuously.
Team	Demand a high-skilled team and have the ability to work independently.	Require the high-skilled teammates and the ability to cooperate well with each other.
Result evaluation	Projects are evaluated based on completion and compliance with the original plan.	Projects are evaluated based on their ability to adapt to customer requirements.

With the traditional way of managing the software development cycle, the system design ideas depend only on a particular group of people, usually the Software Architect, Business Analyst, Technical Lead, and Team Leader. The role that participates in product design and

development is the SE. However, it seems that the SE role only follows the existing ideas and works like a machine; sometimes, they do not know who their products are for their customers and do not know how the customers experience the product. How is the product? What happens when this very SE team is promoted to key positions in the business shortly? Do businesses take much time and resources to break through their framed thinking? (Koelblen 2019.)

The above concerns rarely happen if the proper Agile practice methodology is applied. Because Agile promotes SEs to interact more with customers, the interaction process will help them empathize with customers' concerns. Ideas take shape, and they work with the team to develop a solution based on the team's technical and technological strengths. After each product delivery (sprint review), they will give their views to contribute to business people. The SE team is the holder of the soul of the product and the creator of products that bring high value to customers' production and business activities, and those are what leaders always expect from their teams. (Raza 2019.)

In short, applying AM in the banking industry is always a topic worthy of awareness. However, there are few research papers that examine the Agile transformation within Nordea, BNP Paribas, and Deutsche. The three banks are long-established European organizations with different operating environments and different times to the Agile approach. From there, the author provides an insight into the application of AM and, at the same time, has an overview of Agile in the European banking market. In fact, businesses in the industry always face changes in customer behavior and demands and respond promptly to rapid technological advancement. Therefore, the application of AM to management and development projects undoubtedly brings certain results to the banking organization. Meanwhile, there are limitations and challenges confronting the banks.

2.2 Research Method and Research Questions

This study will employ a case study approach, using qualitative data collection methods, including interviews and document analysis, and using deductive and inductive reasoning. The case studies will consist of Nordea Bank, Deutsche Bank, and BNP Paribas Bank, some of the largest banks in Europe that have adopted Agile methods. The qualitative literature on AM in the banking industry highlights the benefits of AM, including improved delivery speed to market, reduced risks, mitigated costs, and increased customer satisfaction. Adopting AM requires a cultural shift, focusing on collaboration, communication, and teamwork. Along with advantages, Agile methodologies had imperfections and limitations. Besides, adopting AM also presents challenges, including resistance to change, lack of understanding of Agile principles, and difficulty scaling Agile methods to large organizations.

The deductive and inductive approaches can be described with the following outlines.

Figure 3. Deductive reasoning approach (adapted from Burney 2008)

Figure 4. Inductive reasoning approach (adapted from Burney 2008)

The deductive reasoning approach starts with general theories or principles and applies them to specific cases or situations (Bhandari 2022). This thesis uses deductive reasoning to establish the foundational concepts and principles of AM. The researcher started by exploring the existing literature and theoretical frameworks related to Agile methodologies in the banking industry. By examining established Agile principles and practices, the researcher then made specific predictions or hypotheses about how these principles apply to the case studies of Nordea, BNP Paribas, and Deutsche Bank.

The inductive reasoning approach involves gathering specific observations or data and then formulating general conclusions or theories based on those observations (Bhandari 2022). In this thesis, inductive reasoning was used to analyze the case studies of Nordea, BNP Paribas, and Deutsche Bank and draw broader conclusions about the application and impact of AM in the European banking industry. By examining the specific experiences, challenges, and outcomes of these banks' Agile transformations, the researcher identified patterns, commonalities, and critical insights contributing to a more comprehensive understanding of Agile methodology in the banking context.

By combining both deductive and inductive reasoning approaches, the thesis can benefit from a balanced research design that incorporates existing theories and knowledge while also capturing the specific nuances and realities of the case studies. This approach allows for a comprehensive examination of the research topic and provides a solid foundation for drawing meaningful conclusions and making relevant recommendations.

The thesis researched the main question:

How did AM adoption influence European banks in operation and management?

The sub-questions:

1. What were the driving forces of the Agile adoption of Nordea, Deutsche, and BNP Paribas banks?
2. How do those banks address AM?
3. What are the challenges and limitations of AM in the project development procedure and recommendations for future Agile adoption?

2.3 Research Limitations

There are several limitations arising when the author was conducting the research. A few limits are predictable in the initial phase of the thesis process. The first obstacle was the impossibility of contacting banks' IT employees to organize the interview. Although the author interviewed another expert on Agile, the IT personnel within the three banks are valuable primary sources to reinforce the practicality of the study. The second obvious obstacle was the limited sample size. The study may focus only on a few banks, such as Nordea, BNP Paribas, and Deutsche Bank. This could limit the generalizability of the findings to other banks in Europe. During the research process, the author found more challenges. Much information from libraries and online books needs to be paid for access; therefore, the author could only pay for a few sources. This led to restricting the depth and accuracy of the analysis. Finally, another challenge that the author met was time constraints. During the thesis research progress, the author found a full-time job; this caused an extension of the study time compared to the initially planned time.

2.4 Data Collection

In this paper, the data was collected from primary and secondary sources. Primary data was collected via interviews with experts who are seniors in AM implementation, including a senior lecturer/project manager at X University of Applied Sciences (UAS), a Nordea SE, a programmer/researcher, and another SE. These personnel were selected based on their involvement in AM. The author used the semi-structured interview approach to allow for flexibility and depth in the responses. Both online and in-person interviews were conducted and recorded for analysis. Secondary data was collected from various sources, such as academic literature, industry reports, and online sources. The literature review aims to iden-

tify the relevant theoretical concepts and previous AM and its implementation in banks. Industry reports were to gather information on the processes, challenges, and trends of Agile adoption in European banking institutions. Online sources such as banks' websites, conferences, press releases, and other sources, such as Ebook, E-Libraries, Google Scholar, Google Books, ResearchGate, ScienceDirect, Lutpub, and Statista were used to study the Agile implementing process in banks.

The data analysis and findings in this thesis were using a qualitative analysis approach for insight into AM adoption. The data analysis was conducted using a rigorous and systematic approach. This stage will be explained in section 9.2. In addition to the analysis of primary and secondary sources, the author also provides opinions and personal insights to discuss and ultimately find the answers to research questions.

3 Agile Methodology Overview

3.1 The Relationship between Agile Manifesto and Agile Methodology

Agile is an idea that was formed a long time ago, but when the group of seventeen software developers created Agile Manifesto in 2001, Agile became more widely known. The group of authors included: Kent Beck, Mike Beedle, Arie van Bennekum, Alistair Cockburn, Ward Cunningham, Martin Fowler, James Grenning, Jim Highsmith, Andrew Hunt, Ron Jeffries, Jon Kern, Brian Marick, Robert C. Martin, Steve Mellor, Ken Schwaber, Jeff Sutherland, Dave Thomas (Highsmith 2001). According to Larry (2015), Agile Manifesto consists of four values and twelve principles that emphasize collaboration, flexibility, customer satisfaction, and continuous improvement. The Agile Manifesto is not a methodology or a set of practices but rather a set of guiding principles that can be applied to any software development or process.

On the other hand, AM is a specific approach to project management that is based on the principles formed in the Agile Manifesto. It is a set of practices and processes designed to be flexible and adaptable, enabling teams to work collaboratively and respond to change quickly. AM typically involves iterative development, regular feedback loops, continuous integration delivery, and close collaboration with customers and stakeholders. It responds to the traditional, linear approach to project management, which often involves detailed planning, fixed timelines, and limited collaboration between team members. Therefore, while Agile Manifesto provides the philosophical foundation for AM, AM delivers the practical framework for implementing those principles in a development project. The Agile Manifesto is essentially the “why” of AM, while AM is the “how”. (Larry 2015.)

3.2 Values and Principles in Agile Manifesto

The below table describes the four key values and their specific features in Agile Manifesto that was followed by many Agile projects.

Table 3. Four critical values in Agile Manifesto (Highsmith 2001)

Value	Feature
Individuals and interactions over process and tools.	Highlight the need to prioritize the need of individuals over rigid processes and tools, and the importance of human interactions and communication. Direct communication

	is the most effective way to promote people in Agile teams to brainstorm ideas and solutions for the projects. (Goebel 2009.)
Working software over the comprehensive documentation.	Raise the significance delivering working software that meet customer needs rather than focusing exessively on documentation or other artifacts that may not be essential to the software functionality.
Customer collaboration over contract negotiation.	Value partnership and collaboration with customers throughout the development above relying sorely on agreements. The customers provide constructive feedback after each stage of the Agile team delivering work results. This helps in timely adjustment and change according customers' satisfaction. (Nee 2012.)
Responding to changes over following a plan.	flexibility and responsiveness in the development process is important. This value encourages teams to be adaptable and responsive to changing requirements and circumstances rather than rigidly adhering to a fixed plan.

The following twelve principles guide the AM:

- Prioritize customer satisfaction via delivering continuously worthwhile software: Agile teams focus on meeting customer needs by delivering working software frequently and adapting to changing requirements and feedback.
- Accept changes to requirements, even in the late phase of the project: Agile teams embrace changes in requirements, recognizing that needs may evolve and that flexibility is important in responding to new insights or changing priorities.
- Convey working software regularly, with a shorter time span as a priority: Agile teams strive to produce usable software in short cycles, often measured in weeks or months, to quickly gather feedback and improve.

- Collaborate closely with customers and stakeholders throughout the project: Agile teams involve them in the development process. Agile teams involve them in the development process. To ensure results meet customer satisfaction, teams need to pursue customers' ideas and feedback.
- Encourage building projects and assist motivated individuals in resources: Those individuals are the crucial factors to project success, and they provide them with the necessary tools, training, and support to do their best work.
- Facing conversation as a priority: Agile teams prioritize direct communication, such as direct meetings, to promote collaboration, understanding, and rapid decision-making.
- Measure progress primarily through working software: the main measure of progress that Agile teams use is working software, valuing tangible results over documentation or other artifacts.
- Maintain a work span for Agile teams sustainably: This principle is encouraged to avoid excessive stress or overtime and to ensure that team members can work effectively over the long term.
- Strive for technical excellence and good design: Agile teams prioritize technical excellence and good design, recognizing that these factors are essential for producing high-quality software that is easy to maintain and evolve.
- Keep things simple and maximize the amount of work not done: Agile teams emphasize simplicity, avoiding unnecessary complexity or over-engineering, and focusing on delivering the most valuable features with the least effort.
- Allow self-organizing teams to make decisions: Agile teams are authorized to make decisions collectively, leveraging the expertise and insights of team members to specify the best way to deliver software.

(Layton 2012, 27-28.)

Reflect regularly on team performance and adjust accordingly: Agile teams regularly reflect on their performance, seeking feedback and making adjustments to improve their effectiveness and efficiency continuously. These principles are intended to guide Agile teams in their project development and management approach, promoting collaboration, flexibility, and delivering valuable outcomes to customers.

3.3 Example of Four Popular Agile Methodologies

In this section, to better understand the role of Agile methods in real projects, the author gives a specific example to clearly describe how those methods work, avoiding giving professional theories as far from the focus of the study.

Scrum

Suppose a software development team is building a mobile app for a new social media platform. The team decides to use Scrum to manage the project. The team consists of a Product Owner, a Scrum Master, and four SEs. The Product Owner is responsible for defining the product vision, then creating backlogs of user stories and value-based features as a priority. The Scrum Master facilitates the Scrum process, addressing any obstacles that may hinder progress and supporting continuous improvement for the team. The SEs are responsible for designing, building, testing, and delivering the product increment at the end of every single sprint. The team decides to perform in two-week sprints. At the first stage of the sprint, they hold a Sprint Planning meeting to review the backlog and agree on the sprint goals and the tasks that must be completed. The team then collaboratively works on the tasks, holding a Daily Scrum meeting each day to confer progress, detect the impediments, and plan the work for the next 24 hours. At the last stage of the sprint, the team conducts a Sprint Review meeting. During this meeting, they demonstrate the functioning software to the Product Owner and other stakeholders, gather feedback, and plan for the next steps. They also start a Sprint Retrospective meeting with the purpose of reviewing the sprint and identifying areas for enhancement. The team repeats this process for several sprints until they have completed the mobile app and it is ready for release to the market. (Surlan et al. 2023.)

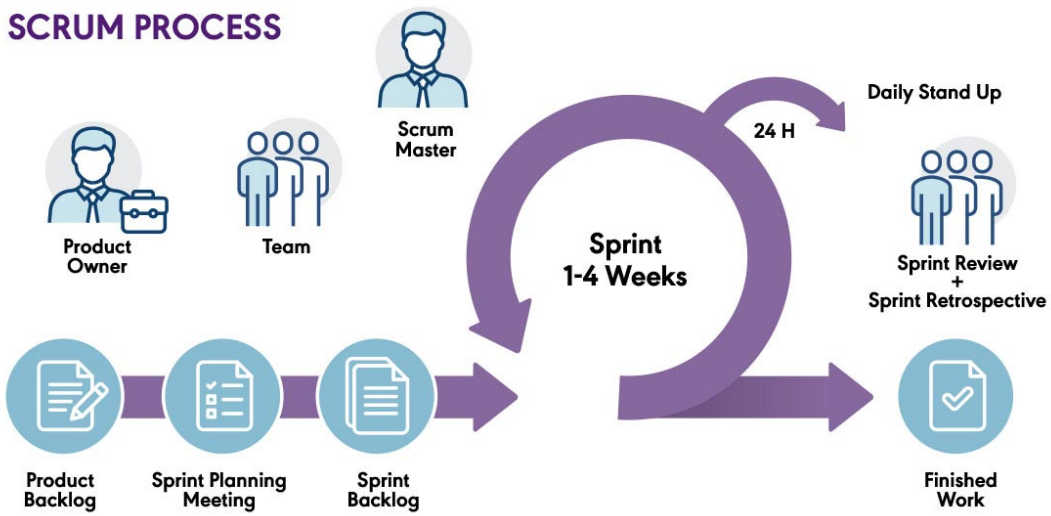


Figure 5. Scrum process (PM-Partners 2021)

Using Scrum, the team could collaborate effectively, deliver working software incrementally, and respond to changing requirements and feedback from stakeholders. They also gained

insights into their processes and continuously improved their work practices, resulting in a successful product that met the customer's needs.

Kanban

A development team is working on a new feature for a mobile app. The team has identified the following stages in their workflow: “to do”, “in progress”, “testing”, and “done”. To implement Kanban, the team creates a physical board showing each work item's status. The board has four columns representing each stage in the workflow. The team also creates cards or sticky notes to represent each work item. Each card briefly describes the work item and is placed in the "to-do" column of the board. As the team starts working on a new item, they move its card to the "in progress" column. Once they have completed their work on the item, they move its card to the "testing" column. If the item passes testing, they move its card to the "done" column. The team holds regular meetings to review their progress, identify bottlenecks or issues, and adjust their workflow. For example, if the team notices that work is piling up in the "in progress" column, they may decide to limit the work in progress at any given time to improve the workflow through the system. (Sunden & Hammarberg 2014.)

Overall, Kanban provides a simple but effective way for the team to visualize their workflow, manage their work items, and continuously improve their processes.

Extreme Programming (XP)

Suppose a team of developers is working on a new web application for an e-commerce site. They decide to use the XP methodology to guide their development process. First, the team identifies their customer, who owns the e-commerce site. They work closely with the customer to understand their needs and requirements for the new application. They also involve the customer in the development process, regularly seeking feedback and incorporating it into their work. Next, the team practices continuous integration, which means they regularly merge code changes into a shared codebase. This helps to identify and fix issues early on in the development process. The team also practices pair programming, where two developers work together on the same task. This promotes collaboration and knowledge sharing within the team. They also use test-driven development, meaning they write automated tests before writing code. This helps ensure the code works as intended and catches errors early in the development process. Finally, the team practices Agile planning and iterations. They work in short iterations, typically one to two weeks long, and plan their work based on the customer's priorities. At the end of each iteration, they deliver working software that meets the customer's requirements. (Beck & Andres 2004.)

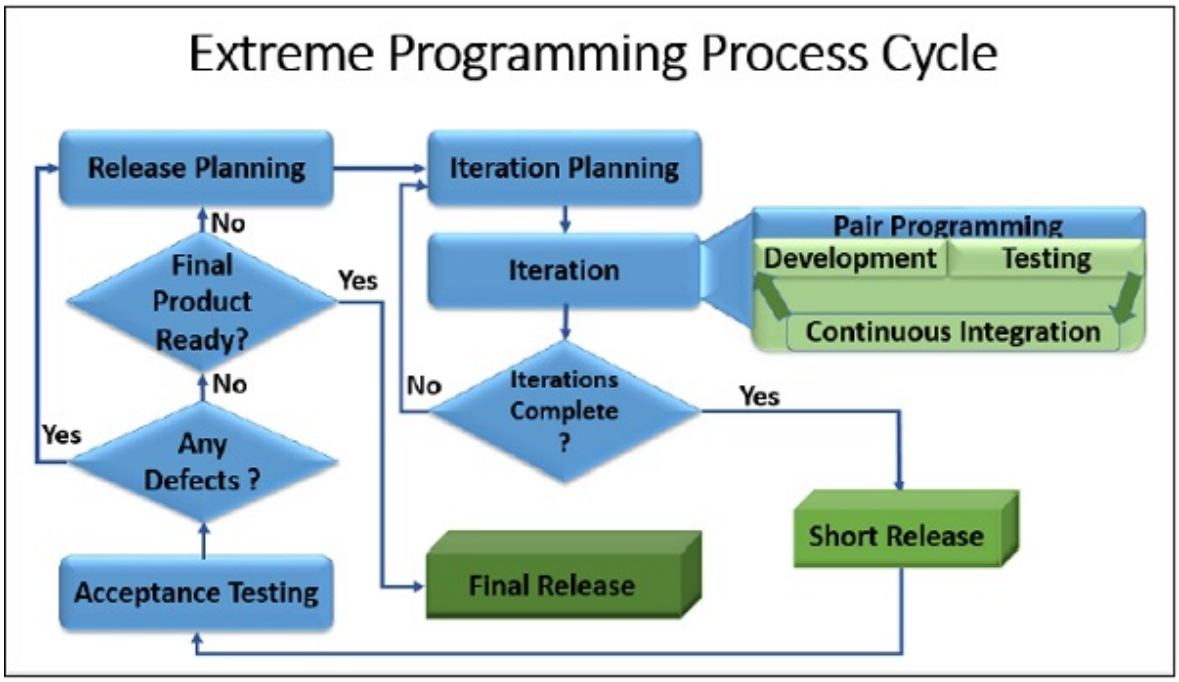


Figure 6. Extreme programming process cycle (Tutorialspoint)

In short, XP methodology helps the team deliver high-quality software quickly and efficiently while focusing on the customer's needs and priorities.

Lean Sofware Development (LSD)

A team of developers is working on a new mobile app for a transportation company. They decide to use LSD principles to guide their development process. In the first step, the team focuses on identifying and eliminating waste in the development process. The team identifies non-value-added activities, such as excessive documentation or unnecessary meetings, and works to eliminate or streamline them. In the next step, the team adopts a continuous delivery approach, where they aim to deliver small, incremental changes to the app as frequently as possible. This approach helps reduce the risk of errors and allows the team to respond quickly to user feedback. The team also uses a visual management system, such as a Kanban board, to track the progress of their work and identify areas where improvements can be made. They also focus on building quality into the product by using techniques such as automated testing and continuous integration. This helps to ensure that the app is reliable and functional. Finally, the team encourages collaboration and communication between team members and stakeholders, such as the transportation company's management and end-users. This helps to ensure that the app meets the needs of all stakeholders and provides value to the transportation company. (Janes & Succi 2014.)

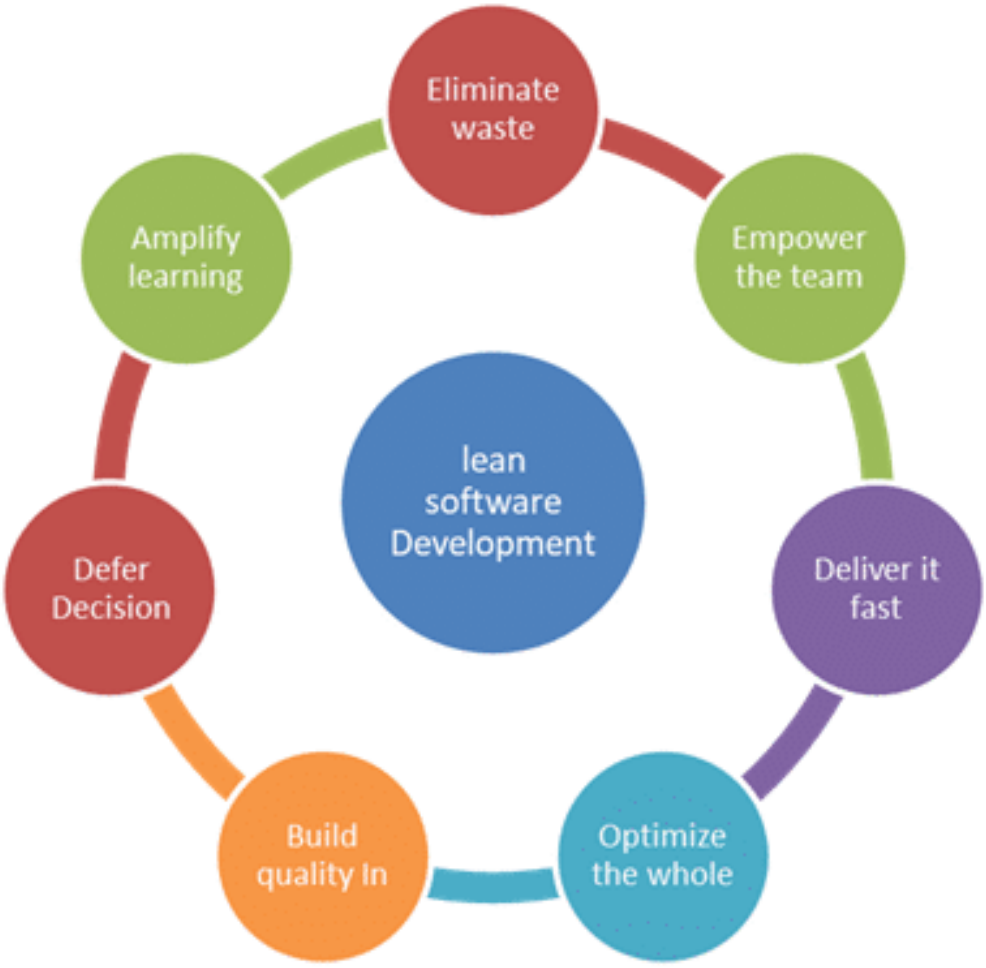


Figure 7. Lean software development (Singh 2021)

In summary, by using Lean software development principles, the team is able to focus on delivering value to the customer while reducing waste and improving efficiency in the development process.

4 European Banking Industry and Case Studies Overview

4.1 European Banking Industry

The banking industry in the European Union (EU) is one of the economy's largest and most important sectors, alongside other major industries such as manufacturing, retail, and services. As of 2021, the amount of total assets under EU banks is up to €40.8 trillion (EBF 2022). The banking industry provides critical financial services, such as lending and investing, that enable businesses and individuals to grow and prosper. In addition, the European banking sector is a significant part of the global financial system, comprising various organizations, comprising central banks, commercial banks, and investment banks. The sector plays a critical role in providing financial services to individuals, businesses, and governments across the continent. The European banking sector is also highly regulated, with multiple regulatory bodies overseeing the sector at national and supranational levels.

Despite the challenges and regulatory burdens, the banking industry remains essential to the EU economy. According to data from the European Banking Federation (2022), the banking industry in the EU employs over 2 million people and contributes approximately €500 billion to the EU economy each year. The industry also plays a crucial role in facilitating international trade and investment, supporting the growth of businesses across the EU. (EBF 2022.)

Compared to other industries, the banking industry is also heavily affected by technological advancements and changes in consumer behavior. The rise of digitalization has led to the emergence of new players in the industry, such as fintech companies, which are disrupting traditional banking models and challenging established players. To remain competitive, banks are increasingly investing in digital transformation and innovation, with a particular focus on improving customer experience and developing new products and services. In order to augment efficiency in project processes and satisfy customers' evolving demands, the EU banking sector continues to undergo structural transformation. Compared to 2020, the number of bank branches has decreased significantly to about 139 000 branches, equivalent to 5.5 %. (EBF 2022.) The EU banking industry also faces some unique challenges, such as low-interest rates and slow economic growth, which have put pressure on banks' profitability. This has led many banks to pursue cost-cutting measures and digital transformation strategies to improve efficiency and remain competitive.

The largest banks in Europe include Deutsche Bank, HSBC, BNP Paribas, Nordea, and Banco Santander, with many other significant players also operating in the market. No exception, those banks with the whole European banking sector has undergone significant

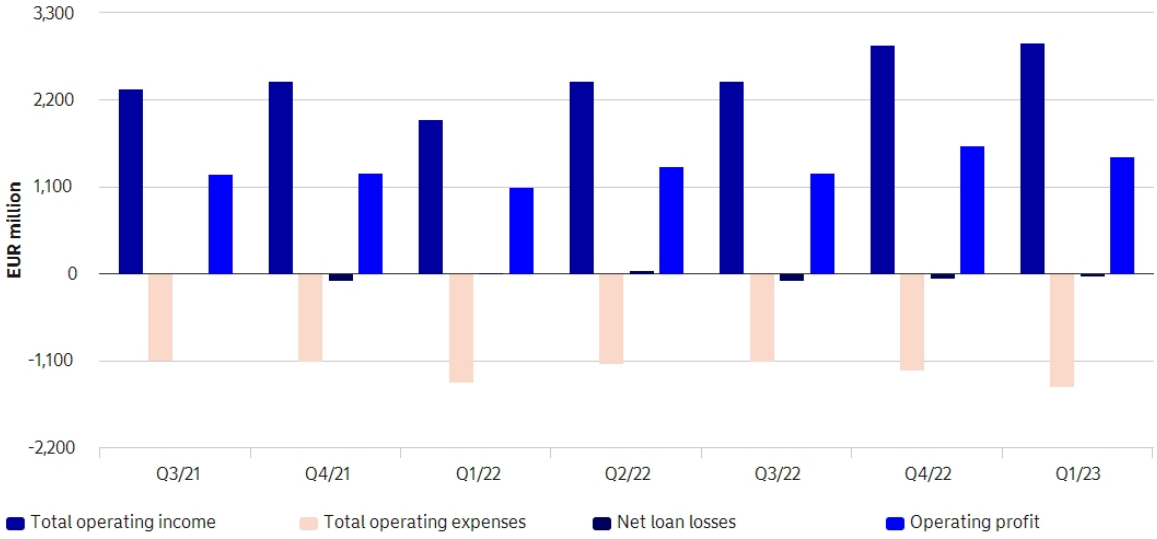
changes in recent years, with increased competition, digitalization, and changing customer demands. As a result, many banks have been implementing digital transformation strategies, with a particular focus on improving customer experience and developing new products and services.

4.2 Case Studies

4.2.1 Nordea Bank Abp

Nordea Bank Abp is the leading Nordic financial institution that operates in the fields of commercial banking, investment banking, and insurance. The bank has been headquartered in Helsinki, Finland since October 2018 and has offices in 20 countries worldwide. Nordea Bank provides four business areas such as personal banking, business banking, large corporates and institutions, and asset and wealth management. Specifically, Nordea offers various products and services, such as savings accounts, personal banking accounts, credit cards, consumer loans, investment and wealth management, payment solutions, and business banking service products, such as lending, investing, wealth management, and payment solutions. According to Nordea Annual Report 2022, this bank serves more than 11 million people including corporate and household customers and has over 30 000 employees. Despite the economy has gone through a difficult 2-year period of COVID-19 and the conflict between Russia and Ukraine since the beginning of 2022, Nordea has been firmly in the market with great revenue numbers. Specifically, the total income of personal banking, business banking, large corporates and institutions, and asset and wealth management achieved nearly €3.9 million, €3 million, €2.2 million, and €1.3 million, respectively, corresponding to increases of 7%, 15%, 9%, and 2% compared to 2021. Moreover, in the latest report Q1/2023 (Figure 8), via the amount of total operating income, Nordea continues to demonstrate its impressive growth. (Nordea 2022; 2023.)

Income Statement



		Q3/21	Q4/21	Q1/22	Q2/22	Q3/22	Q4/22	Q1/23
Total operating income	EUR million	2,344	2,438	1,954	2,444	2,438	2,897	2,921
Total operating expenses	EUR million	-1,098	-1,101	-1,370	-1,139	-1,101	-1,212	-1,422
Net loan losses	EUR million	-4	-81	12	40	-81	-59	-19
Operating profit	EUR million	1,268	1,281	1,103	1,361	1,281	1,626	1,480

Supplied by © Euroland.com

Figure 8. Nordea Bank's Income Statement Q3/21-Q1/23 (Nordea 2023)

In other respects, Nordea is showing its comprehensive efforts. Nordea Bank is listed on the Nasdaq Nordic stock exchange and is one of the largest banks in Europe with total assets of €594.8 billion. Nordea is also recognized as one of the world's most sustainable banks, with a commitment to building a sustainable financial foundation through innovative environmental, social, and financial policies and actions. The bank is committed to sustainability and aimed to achieve a net-zero-emission bank by 2050 (Nordea 2023). Nordea Bank has also been acknowledged for its efforts in promoting gender equality and has been included in the Bloomberg Gender-Equality Index for several years (Bloomberg 2017).

Along with technological developments and digital transformation, as with other banking businesses, Nordea is constantly increasing its digital operations. Its mobile banking app achieved 100 million logins each month and increase the number of users by up to 6% on an annual basis (Nordea 2023). Nordea is always up-to-date and innovative in applying new technology to improve its operations and provide a better customer experience, from developing mobile apps, using artificial intelligence, and developing new electronic payment services to using blockchain.

4.2.2 BNP Paribas Bank

BNP Paribas is ranked ninth among the largest banks in the world by total assets with over €2.6 trillion, established in 2000 by the merger of Banque Nationale de Paris and Paribas. The bank is headquartered in Paris, France, presenting in 64 nations, and operating globally with about 190,000 employees and over 30 million customers across the financial sectors. BNP Paribas operates three business lines including corporate and institutional banking; commercial, personal banking and services; and investment and protection services. The bank is also one of Europe's largest banks and one with solid global customer relationships. In addition to financial activities, BNP Paribas also commits social and environmental activities. The bank is committed to supporting sustainable and environmentally responsible activities and participates in social programs to help the community and support cultural activities. As a leader in project financing, BNP Paribas contributes to the development of infrastructure, communication, and energy projects in the countries they operate in. Multinational companies benefit from comprehensive corporate and institutional banking services, including working capital financing, cash management, supply chain solutions, and commercial and fixed-income services in both domestic and foreign currencies. With BNP Paribas' strong regional and global presence, local and international exporters benefit from one of the largest networks of malls in the world. (BNP Paribas)

The chart below (Figure 9) illustrates the revenue of BNP Paribas in the period between 2005 and 2022. The chart proved the significant growth of revenue and the great position of BNP Paribas in the banking market.

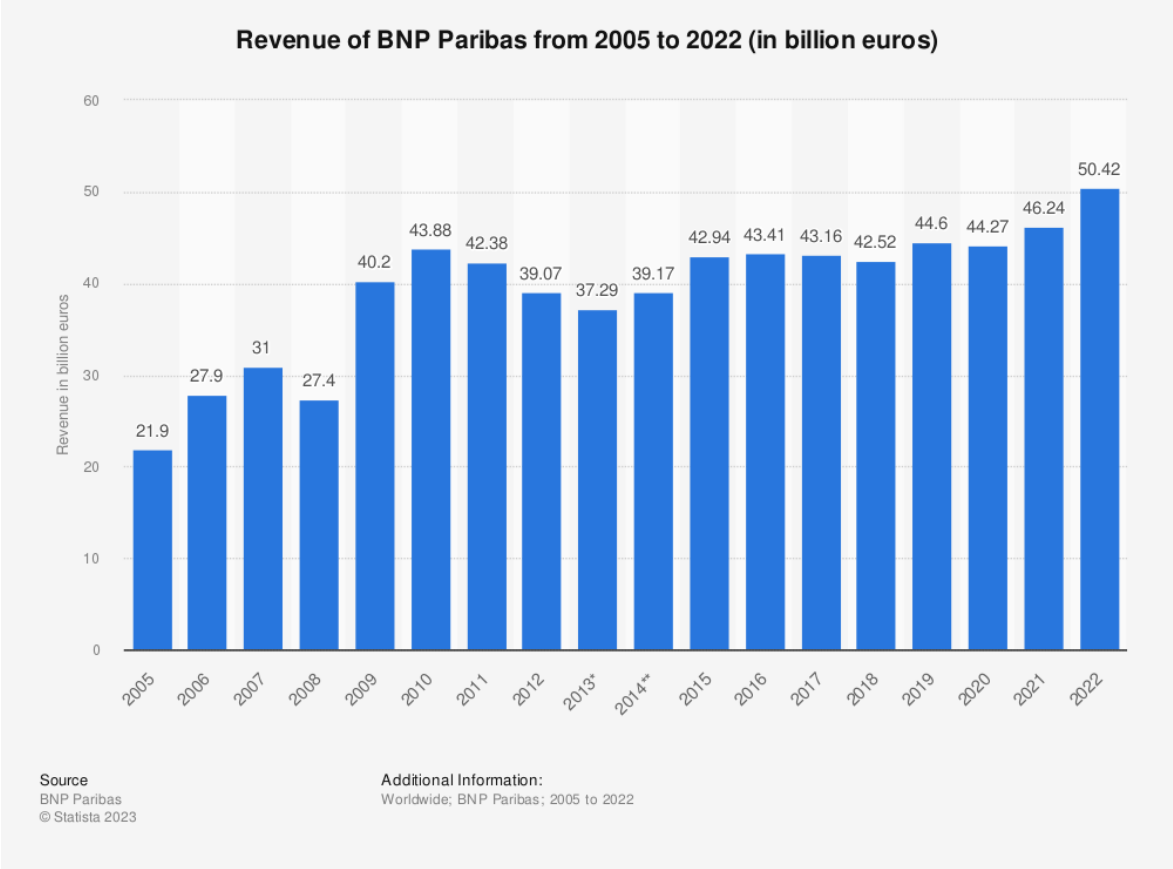


Figure 9. Revenue of BNP Paribas from 2005 to 2022 (in billion euros) (Statista 2023)

4.2.3 Deutsche Bank AG

Deutsche Bank AG[2] (Deutsche) headquartered in Frankfurt is the largest bank in Germany and one of the leading multinational banks in the world. Deutsche's history dates back to 1870 when they were founded in Berlin as Deutsche Bankgesellschaft, which means “German Bank Company”. Deutsche had experienced a long and impressive history with many events occurring in the world, such as World War I and II, the division of Germany, and the global financial crises along with the significant events within the bank itself. Since then, Deutsche Bank has gone through many stages of development and expanded its operations to many countries worldwide. (Plumpe et al. 2020.)

According to the Deutsche Annual Report for the fourth quarter of 2022, the bank operates with 84,930 employees in 58 countries around the world, and total assets reached €1.337 trillion, an increase of about 1% compared to the same period a year earlier. In addition, Deutsche Bank's pre-tax profit increased to €2.2 billion in the same period, nearly doubling year-on-year. Deutsche Bank provides four business divisions, including corporate bank

[2] Deutsche Bank Aktiengesellschaft

and investment bank, private bank, and asset manager DWS services. It operates in the following subdivision: Investment Bank, Corporate Bank, Private Bank, Asset Management, Capital Release Unit, and Corporate and other. Figure 10 below demonstrates the statistics of revenue distribution according to the business division of Deutsche in 2022. To be precise, the Corporate Bank segment, including the global transaction bank and the German corporate banking business, is the greatest value with an increase to €6.3 billion by 23 percent since the business segment division. The Investment Bank segment includes origination, businesses, fixed-income currency sales, and trading businesses with a growth of revenue to €10 billion. The Private Bank segment comprising Private Bank Germany, the international private and corporate client business, and the wealth management business units grew 11 percent to €9.2 billion. The Asset Management segment offering investment solutions for private investors and institutions through the DWS brand had a decrease to €2.6 billion. The Capital Release Unit segment comprises the equity sales and trading business. The Corporate and Other segment includes costs, revenues, and resources held centrally. (Deutsche Bank 2023; Statista 2023.)

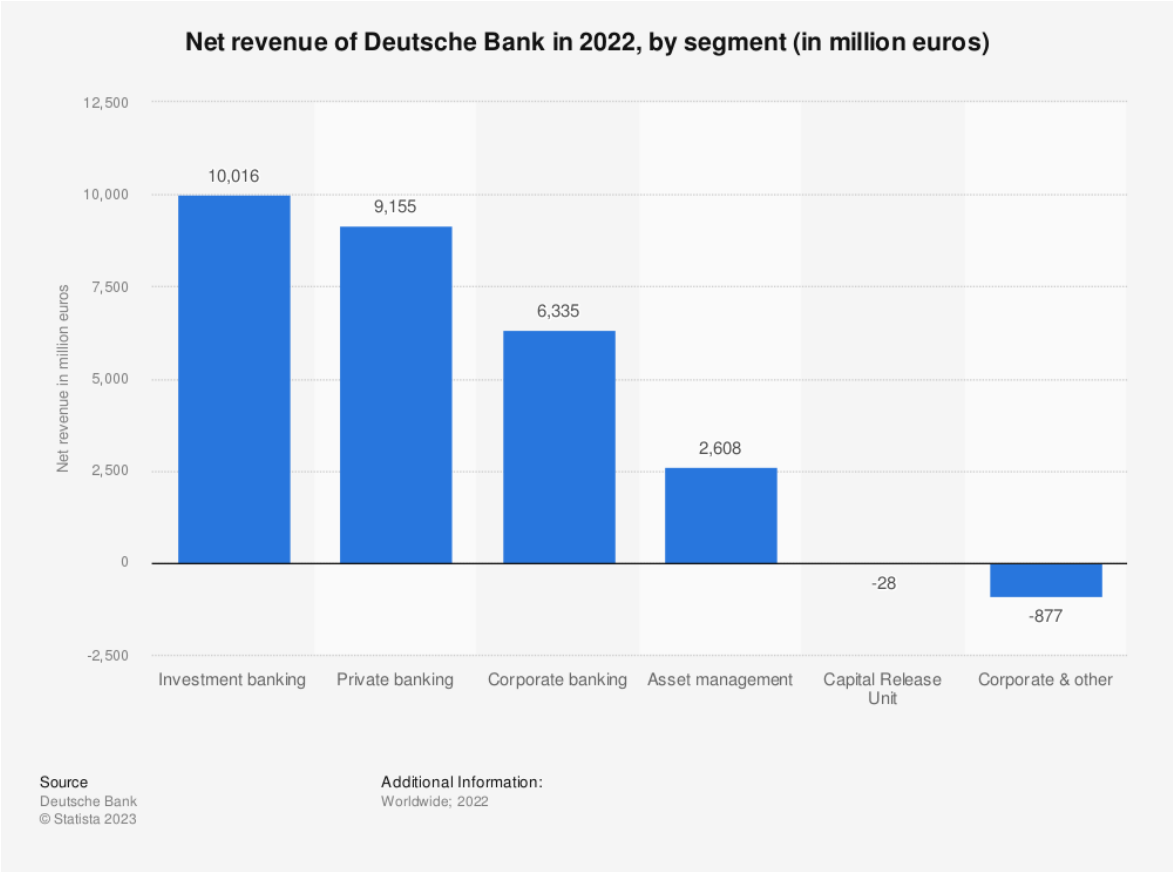


Figure 10. Net revenue of Deutsche Bank in 2022, by segment (in million euros) (Statista 2023)

5 The Driving Forces of The Agile Implementing Decision

5.1 External Forces

Banks in Europe, precisely the three Nordea, BNP Paribas, and Deutsche banks, have different periods of exposure to Agile. However, before deciding to implement Agile, banks all had to undergo a socio-economic upheaval period. These factors have affected the banks' financial, management, and operating activities.

First, the Global Financial Crisis of 2008 significantly impacted European banks. According to Gertrude Tumpel-Gugerell, Member of the Executive Board of ECB (2009), European banks had invested heavily in mortgage-backed securities (MBSs) and collateralized debt obligations (CDOs), which were tied to the US housing market. When the value of these securities plummeted, European banks suffered significant losses. Additionally, many European banks had also lent money to US financial institutions, which were also impacted by the crisis. In 2009, Dermot and Lucia stated in the Journal of Common Market Studies that several European banks, including the Royal Bank of Scotland, Lloyds, and Fortis, required government bailouts to survive the crisis. Moreover, the crisis led to the failure of some European banks, such as Iceland's Kaupthing Bank and Germany's Hypo Real Estate. Specially, The New York Times article (2007) stated that BNP Paribas was the first European bank to suspend withdrawals from its investment funds, citing a lack of liquidity and uncertainty over the value of the assets in August 2007. (Christopher et al. 2019.)

Second, Greece’s crisis had a significant impact on Nordea, BNP Paribas, Deutsche Bank, and many other European banks. The crisis in Greece was sparked by a combination of factors, including a high level of public debt, a large budget deficit, and a lack of economic competitiveness. As the crisis deepened, the Greek government was forced to seek financial assistance from the European Union (EU) and the International Monetary Fund (IMF) to avoid defaulting on its debts. This exposed weaknesses in banks' risk management practices and highlighted the interdependence of the European financial system. Moreover, the crisis had a ripple effect across the financial system as banks became more hesitant to lend to each other, causing the credit crunch. This created difficulty for businesses and individuals to access credit, leading to a slowdown in economic activities. In addition, the crisis caused a surge in financial sector regulation, implementing the Basel III regulations[3] and

[3] The Basel Committee on Banking Supervision (BCBS), a global regulatory body of central banks and banking supervisors fostered a set of international banking regulations called Basel III regulations in 2010 (Köffer 2014).

other measures to enrich the transparency and risk management in the European banking industry. In summary, the crisis highlighted the risk associated with complicated financial instruments and the need for greater regulation and risk management in the banking sector. (Christopher et al. 2019.)

Third, Brexit[4] officially became effective at the beginning of 2020; this event considerably influenced European banks, including Nordea, BNP Paribas, and Deutsche. Indeed, Nordea and Deutsche having a presence in the United Kingdom (UK), faced notable consequences due to Brexit. Brexit introduced uncertainties and potential disruptions to the two banks' operations in the UK including regulation changes, passport rights, EU market access, and potential staff and functions relocations. Specifically, Nordea Bank established a subsidiary in Luxembourg to ensure continued access to the EU market and also relocated its headquarters from Sweden to Finland in 2018 (Nordea Bank Abp 2019). As for Deutsche Bank, they also repositioned about a hundred bankers from the UK to the EU and Asia (Deutsche Bank 2022). Meanwhile, BNP Paribas Bank was less directly influenced by the event compared to UK-based banks. However, like other European banks, BNP Paribas had to adapt to the new trading environment and ensure compliance with new rules for operating in the UK and serving UK clients (BNP Paribas 2021).

To sum up, the above major events severely affected the performance of Nordea, BNP Paribas, and Deutsche such as credit, trading, operation, expense management, and risk management. The consequences of the impact were part of the potential reason for later Agile adoption to enhance and optimize operational results.

In addition to the provided socio-economic causes, globalization, digitalization, hi-tech innovation, and changes in customer expectations are considerable factors affecting the banks' Agile implementation decisions. Specifically, first, globalization has expanded the three banks' presence in numerous countries, necessitating effective coordination and collaboration across diverse markets. The Agile implementation enables the banks to foster cross-functional collaboration, enhance communication, and respond swiftly to market dynamics and regulatory, cultural, and operational variations in different regions. Second, digitalization prompted the three banks to invest in digital banking solutions, transforming interactions and internal processes. Applying AM allows Nordea, BNP Paribas and Deutsche to accelerate the delivery of digital solutions, respond to emerging market opportunities, and iterate on their offerings based on real-time customer feedback. Third, the three banks recognized the potential of hi-tech innovations such as artificial intelligence (AI), machine

[4] The United Kingdom's withdrawal from the EU.

learning, automation, cloud computing, and blockchain in optimizing operations and delivering value-added services. Agile practices facilitate the integration of emerging technologies and reduce time-to-market and cutting-edge measures. Finally, along with digitalization, customer expectations shifted towards personalized and convenient banking experiences. AM empowers the banks to engage with customers continuously, gather feedback, and rapidly iterate on their digital products, ensuring a customer-centered approach and delivering appropriate answers with changing expectations.

In short, although affecting European banks, especially Nordea, BNP Paribas, and Deutsche in various ways and shapes, the underlying socioeconomic, political, and technological causes prompted the banks to explore ways to optimize financial and operating results. Thus, approaching Agile is one of the considerable decisions to help the three banks solve those issues.

5.2 Internal Forces

This section clarifies the internal underlying reasons for each of the three banks: Nordea, BNP Paribas, and Deutsche. Although the organizations run in the common banking sector and all operate in the European market, each bank has its own rationale for adopting AM decisions in the era of VUCA.

Nordea

Nordea has always used traditional methods like Waterfall to manage and develop the company's projects for many years ago. Along with the great upheavals in European and world economic history, Nordea experienced a period of strain that lasted for many years within the company. These pressures include sharp increases in operating costs, personnel-related costs, risk management issues, technological obsolescence, and changes in the organization's customer satisfaction. At that time, aiming for Agile was the best solution to the above problems.

Specifically, according to Nordea Transformation Report 2017, the underlying cost pressure is the most significant force exacting changes from the organization. The following Table 4 demonstrates how significant the total expenses are compared to Nordea’s total operating income during the five years from 2012 to 2016. Those results drove Nordea to find every possible measure to optimize the costs. (Nordea Bank Abp 2013; 2015; 2017.)

Table 4. Nordea's net interest income and total expenses 2012-2016 (by million euros)

Year	2012	2013	2014	2015	2016
Total operating income	9998	9891	10241	10140	9927
Staff expenses	-3048	-2978	-3149	-3263	-2926
Other expenses	-1860	-1835	-1635	-1485	-1646
Depreciations	-278	-227	-582	-209	-228
Total expenses	-5186	-5040	-5366	-4957	-4800

As the largest bank in the Nordic region investing in the large business area, Nordea has confronted many risks from all parts of the Nordea Group. Precisely, Nordea stated in the Capital and Risk Management Report 2014 that nearly 85% of risk exposure amount (REA) originated from Wholesale and Retail Banking, and Group Corporate Center held the remaining percentage. Specifically, the bank has confronted risks from many categories like operation, market, credit, individual mortgages, and corporate. Hence, the goal of governance is to control and eliminate potential risks. *Risk management and compliance are more important in the financial industry than ever before. For us, they are also part of building genuine relationships with our customers,* expressed Ari Kaperi- Group Chief Risk Officer. (Nordea Bank Abp 2015.)

Along with hi-tech advancement in the external environment, Nordea is oriented to be up-to-date in digital and IT programs to avoid technological obsolescence. Technology today is a juncture of the company and customers. Nordea recognized that the advancement and adoption of new technologies and methodologies into the company's IT programs bring productivity, agility, and adaptability to respond to customer changes.

Additionally, customer satisfaction is a significant driving force for Nordea in its operation and Agile adoption. Customer-centered orientation in strategies, projects, and technologies helps the banks satisfy customer requirements. Thus, AM, with its focus on iterative development and frequent customer feedback, enables banks to adapt more quickly to changing customer needs and preferences. Vasiljeva and Lukanova claimed that customers in Nordics showed more interest in Fintech in comparison with Baltics (Vasiljeva & Lukanova 2016). Therefore, Nordea had an excessive reason to upgrade its system to orient its customers.

In short, there were many rationales that forced Nordea to make an Agile adoption decision. However, with any reason mentioned, Nordea's aim towards Agile is to optimize efficiency, flexibility, and productivity to be ready to respond rapidly to customer behaviors in today's competitive business era.

BNP Paribas

Similar to Nordea, BNP Paribas had its own driving forces that make it choose to Agile transformation. Marcelina Jukowska - a business process design and optimization specialist at BNP Paribas announced that the transformation process is an endless activity. Basically, the bank considered the emergence of new challenges, initiatives, and strategies are the sources of the transformation. The bank's decision to implement AM stemmed from their belief that the potential of their personnel would be unlocked via this approach. Recognizing that traditional hierarchical structures and rigid processes like Waterfall might limit the creativity and innovation of their employees, the bank sought a more flexible and collaborative framework. They understood that Agile principles would create an environment that fosters collaboration, trust, and share accountability, enabling individuals to unleash their full potential. This driving force fueled the adoption of Agile, as the bank sought to tap into the collective capabilities and expertise of their personnel to drive meaningful outcomes and deliver value to their customers. (BNP Paribas 2022.)

Moreover, according to Frédéric Hoffmann's interview conducted in 2021, the entry of fintech[5] companies into the banking has sparked internal driving within BNP Paribas Bank. With their ability to deliver products and services faster than the bank itself, the fintech's presence has highlighted the need for BNP Paribas to adapt and evolve. While the bank still possesses a significant amount of legacy systems and processes typical of traditional banking institutions, the fintech's Agile approach has demonstrated the potential for increased efficiency and improved customer experiences. For instance, Frédéric Hoffmann pressed BNP Paribas Fortis (Belgium) at that time had around 3000 pending applications, which they must contend with due to their legacy systems. This backlog put them at a disadvantage compared to other organizations without a legacy behind them. This realization has encouraged BNP Paribas to reassess its operational strategies, embrace Agile transformation, and seek innovative solutions to remain competitive in the evolving financial landscape. (Ignite Technology 2022.)

Not only that, but Frédéric Hoffmann also acknowledged that another internal driving force lay in their commitment to putting customers at the center of their operations. By prioritizing

[5] Financial technology

customer-centricity, the bank ensured that both customers and employees are focused on products' values (BNP Paribas 2017, 484). Recognizing its customer obsession, the bank leverages Agile principles to enhance cooperation, transparency, and iterative development. BNP Paribas believed that by embracing Agile, the bank would ensure to deliver exceptional customer experiences and remain responsive to their evolving requirements in the dynamic banking market. (Ignite Technology 2022.)

Deutsche

Similar to Nordea and BNP Paribas, Deutsche is also a long-established bank using Waterfall and other traditional methods within their organization before the Agile transformation. However, a few particular internal driving forces of Deutsche Bank's Agile decision are different from the others.

Specifically, in 2014, Deutsche Bank experienced considerable success and received numerous awards for its projects. However, behind those achievements, they faced significant challenges characterized by chaos, disorder, and a lack of organization. There were eight teams operating separately and independently, becoming disconnected from their stakeholders and lacking visibility into other teams. *We have inconsistent methods of when…not everyone understanding the same thing of where….* Laura Grau (GFT Group) highlighted. (Autentia 2017.)

These circumstances led to management problems by the end of 2014. Despite ample financial resources in Venice, the bank faced difficulties as busy individuals allocated funds to Deutsche Bank teams for various initiatives, resulting in an overwhelming workload and conflicting priorities. It became evident that the organization could not effectively cope with this complex business environment and competing demands. They realized the need for a new approach. (Autentia 2017; according to John Plumpton 2016.)

Over a two-year experimental process, Deutsche Bank achieved notable outcomes. They developed a robust delivery capacity and acquired extensive knowledge in efficient project delivery. However, they did not want to impose a dictatorial management style. Instead, they aimed to foster self-management and self-organization within teams. Also, Deutsche Bank recognized the value of a lean and agile methodology. They understood that reverting to a traditional waterfall or inflexible approach would not suffice. Instead, they sought methodologies that would allow teams to work consistently and share a common vocabulary, promoting collaboration and understanding.

Overall, the driving forces behind the adoption of Agile in Deutsche Bank were the desire for better coordination, increased adaptability, and the ability to deliver value efficiently in a

complex and demanding business environment. They recognized that Agile methodologies could provide a framework for effective collaboration, address their challenges of chaos and disorganization, and enable teams to respond to changing priorities and constraints. Through Agile, Deutsche Bank aimed to enhance its overall project delivery, improve stakeholder engagement, and achieve greater organizational success.

6 Highlights of The Agile Transformation Journey

6.1 Nordea

Nordea's Agile transformation journey can be summarized into three phases: Ram-up, Execute, and Optimization. These phases represent the progressive stages through which Nordea embarked on its transformational path, aiming to embrace Agile methodologies and principles to drive organizational efficiency, innovation, and continuous improvement.

Koskull, President and Group CEO, and Jørgensen, Group COO and deputy CEO stated in their annual report 2017 that Nordea's Agile journey commenced in 2014, marking the beginning of a transformative period. The first phase, known as "Ram-up", spanned from 2015 to 2017 and involved introducing Agile principles and practices throughout the organization (Koskull & Jørgensen 2017). Specifically, Nordea's Agile transformation involves the implementation of a program increment (PI) planning section, which played a crucial role in aligning teams and driving progress. A Nordea Release Train Engineer (RTE) and an Agile consultant worked expertly together to ensure the sessions stayed on track, focusing on making Nordea self-sufficient in Agile practices. In short, this initial phase aimed to familiarize employees with Agile concepts and establish a solid foundation for subsequent stages. (Ivar Jacobson International SA 2015; Nordea Bank Abp 2018, 34.)

During the second phase of Nordea's Agile transformation, referred to as the "Execute" phase, from 2018-2021, several critical organizational areas underwent significant changes (Koskull & Jørgensen 2017). This phase focused on implementing AM and Agile practices in various domains to drive efficiency, innovation, and customer-centricity. One area that experienced Agile transformation was the Distribution/Channels/Services Models (Koskull & Jørgensen 2017). Nordea recognized the need to adapt its distribution channels and service model to meet the evolving expectations of its customers. By embracing Agile principles, cross-functional teams were formed, combining expertise from different departments such as marketing, customer service, and technology. This collaborative approach enabled the bank to develop and deliver customer-centric more efficiently, enhancing customer satisfaction and engagement. Another domain that experienced AM transformation during the "Execute" stage was Credit Processes and Products (Koskull & Jørgensen 2017). Nordea was streamlining and optimizing its credit processes to foster productivity and reduce time to market. By adopting AM practices, such as iterative development and continuous feedback loops, the bank accelerated the credit product development lifecycle. This enabled quicker response time, better risk management, and augmented customer experiences throughout the credit process. (Koskull & Jørgensen 2017; Nordea Bank Abp 2022, 34.)

Additionally, the IT and Ops (Operations) division and key support functions were also the essential focus areas during the “Execute” phase. By applying Agile frameworks like Scrum and Kanban, the collaboration between business and IT teams enhanced transparency and improved delivery speed (Koskull, C. & Jørgensen, T. 2017). The iterative and incremental approach of Agile methodologies allowed for faster feedback cycles, helping the IT and Ops teams to respond rapidly to changing business needs and deliver high-quality solutions. Besides, the key support functions within the organization played a vital role in supporting the overall operations. Forming Agile teams within support functions such as HR (Human Resources), Finance, Group Risk, and Compliance enabled Nordea to align its activities with the broader Agile initiatives of the organization. The integration of Agile methodologies across support functions helped drive cross-functional collaborations, improve internal processes, and ultimately contribute to the overall success of the Agile transformation. (Koskull & Jørgensen 2017; Nordea Bankk Abp 2023, 44.)

We had a strong deadline of when we needed to be ready with a program vision and features, emphasized Maria Lloyd, the Head of Test & Quality Management in the Nordics at Digital Banking, Nordea (Ivar Jacobson International SA 2015, 3). As Nordea embarked on its Agile transformation journey, Maria, responsible for the quality and testing aspects of the digital banking division, understood the significance of having a well-defined program vision and the necessary features in place. Specifically, the deadline catalyzed the teams to streamline their efforts and work toward common goals. To meet the deadline, Maria and her teams leveraged Agile principles and practices like user story mapping, backlog refinement, and iterative development to break down the program vision into manageable increments. (Ivar Jacobson International SA 2015.)

Nordea's transformation journey entered its third phase, "Optimization", in 2021, with the primary objective of achieving its goals through various strategic initiatives (Koskull & Jørgensen 2017). One key focus area was the development and introduction of a new version of the mobile application, and the bank continued to upgrade its digital products like Nora[6], chatbot, and Nova[7]. The Optimization phase allowed Nordea to leverage Agile methodologies and iterative development to ensure the new version of the mobile application aligned with the evolving needs and expectations of its customers. In fact, Nordea forayed into mobile banking in 2012 by releasing a mobile banking app that utilized different

[6] Nora (Nordea Robo-Advisor) is a digital investment adviser 24/7 launched in 2018 (Nikolova 2018).
[7] Nova is a robot chatbot-virtual assistant released in 2017 and based on artificial intelligence (Kruse 2017).

back-end solutions tailored to specific countries. However, in April 2018, Nordea truly transformed its mobile banking experience with the introduction of Nordea Digital Mobile. Seeking to enhance customer satisfaction, Nordea initiated a redesign project called "Lynx" later in 2018. This endeavor aimed to improve the app's functionality and user interface. In 2022, during the third phase of their Agile transformation, Nordea unveiled the next generation of their mobile banking app to customers worldwide. This advanced app offers more than just basic banking services. It provides users with features like the Insights and Budgeting tabs to empower them to manage their finances effectively and improve their overall financial well-being. (Nordea 2023.)

Another critical aspect of the Optimization phase was the emphasis on fostering collaboration and alignment across united offices. Nordea acknowledged the importance of breaking down organizational silos and promoting cross-functional cooperation. By implementing Agile practices such as cross-functional teams, daily stand-ups, and collaborative tools, Nordea aimed to enhance communication, knowledge sharing, and decision-making across their offices (Koskull & Jørgensen 2017). Besides that, risk management was another area of focus during the Optimization phase. By integrating risk assessment and mitigation strategies into the Agile framework, Nordea aimed to cultivate a proactive risk management culture, ensuring resilience in the face of evolving risks and regulatory requirements. (Nordea Bank Abp 2021; 2023.)

6.2 BNP Paribas

As one of the largest banks in the world, BNP Paribas comprehended the importance of technological transformation in the changing banking sector. The bank has a presence globally and a long-time legacy system. In comparison with Nordea Bank, BNP Paribas commenced an Agile transformation two years later. In 2017, BNP Paribas embarked on an AM transformation journey and aimed to become an Agile organization by the end of 2020 (BNP Paribas 2017, 133). The bank recognized the need for agility to stay competitive in the rapidly changing financial landscape. Thus, they adopted the Agile@Scale approach, which aimed to implement Agile principles and practices across the entire organization (Kenneth 2020).

According to the 2017-2020 plan of the BNP Paribas Report (2017), the Group was implementing an ambitious transformation program across all their operating divisions, and AM played a significant role in driving this initiative. By embracing Agile principles and practices, BNP Paribas aimed to perform new customer journeys, accelerate digital transformation, and improve operational efficiency effectively. To achieve these goals, the Group deployed

five levers throughout the organization. (BNP Paribas 2017, 133.) The first lever was introducing novel customer pathways. Specifically, Agile methodologies, such as Scrum, develop and deliver digitalized, value-added, and personalized customer services and pathways. Notable examples include the release of LyfPay - a global mobile payment solution, the procurement of Compte-Nickel[8], and the progress of the Centric online platform in Corporate and Institutional Banking. The second fever focused on enhancing the operational model. The Group performed to streamline processes, simplify organizations, and advance shared platforms. The launch of BlackRock's Aladdin platform at Asset Management is an example of leveraging Agile practices to enhance the operational model. The third centered around adapting information systems. This comprises integrating new technologies to accelerate digital transformation and encouraging Agile work methodologies. As a part of this effort, Data Hub's emergence is facilitating seamless interaction between banking and digital platforms. The next lever was performed through Agile teams, including data scientists and analysts working collaboratively to leverage data more effectively to serve clients while simultaneously strengthening data storage and analysis capabilities. The procurement of Gambit in the robo-advisory field strengthened the Group's ability to utilize data for client-centric purposes. The fifth and final lever focused on implementing enhanced digital, collaborative, and Agile work methodologies. This was exemplified by the Group's equity investment in Symphony - a secure and automated communication platform utilise in the Global Markets division. (BNP Paribas 2017, 133; 2018, 11; 2019, 51.)

To support this transformation program, the Group intended to allocate €3 billion for the program between 2017 and 2019, resulting in anticipated savings of €3.4 billion during the same period. From 2020 onwards, the program is projected to yield annual recurring savings of €2.7 billion, with contributions from all divisions in a balanced manner. In 2017, transformation costs gradually reached €856 million, while savings generated aligned with the plan, amounting to €533 million. (BNP Paribas 2017, 133.)

To sum up, BNP Paribas's Agile-driven transformation program across the five levers helped the Group to create a more effective and digitally-oriented bank, respond effectively to customer needs, and deliver faster results while generating significant savings in the process.

[8] BNP Paribas acquired Compte-Nickel- an alternative banking service and a French payment method (BNP Paribas 2017).

6.3 Deutsche

In comparison with Nordea and BNP Paribas, Deutsche's Agile journey started earlier. According to John Plumpton (Deutsche Bank) and Laura Grau presenting in CAS[9] Vitoria (2016), Deutsche initially embraced Agile in 2012 but prudently experimented on a small project and small team in the London office. It later adopted Scrum in 2014 and onboarded the Scaled Agile Framework (SAFe) in 2015. To ensure a successful Agile transformation, Deutsche implemented three key actions: decision-making, commitment, and improvement. (Autentia 2017.)

Firstly, Deutsche made several important decisions to guide its Agile journey. It established a collaborative leadership team, recognizing the significance of strong leadership in driving the transformation. This team adopted a collaborative approach, involving stakeholders from different levels of the organization in decision-making processes. Furthermore, Deutsche chose SAFe as the framework for its Agile delivery. SAFe is a comprehensive and widely adopted framework that guides scaling Agile practices across large enterprises. By selecting SAFe, Deutsche aimed to ensure consistency and alignment in Agile implementation across teams and business units, providing a structured framework to support their Agile journey. Another decision made by Deutsche was to prioritize enterprise value in demand management. By placing enterprise value at the forefront of demand management, Deutsche aimed to maximize the impact of its Agile efforts and align them with the overall business objectives. (Autentia 2017.)

In addition to the decisions, Deutsche also made commitments to solidify its Agile transformation. They focused on getting key stakeholders to commit to a framework approach, ensuring their support and involvement in the Agile journey - this commitment aimed to overcome resistance to change and create an environment conducive to Agile practices. Deutsche also committed to moving towards feature teams, transitioning from traditional functional silos. Feature teams are cross-functional teams that collaborate to deliver specific features or components of a product or service. Moreover, Deutsche committed key roles within the organization to become accredited as a SAFe program consultant. This accreditation aimed to ensure expertise in Agile practices and the SAFe framework and provide guidance, mentorship, and support to teams throughout the Agile transformation process. (Autentia 2017.)

To continuously improve their Agile practices, Deutsche focused on specific areas for improvement. It refined the Backlog Grooming process, which involves regularly reviewing,

[9] Agile Spanish Conference

refining, and prioritizing items in the product backlog. Deutsche also undertook a program of international coaching and briefing to guide and support teams in various locations; this initiative aimed to foster consistency, collaboration, and knowledge sharing throughout the organization's Agile journey. Additionally, Deutsche included qualifications as a requirement in vendor contracts to ensure that external partners are aligned with their Agile journey and had the necessary skills and knowledge to effectively support Agile initiatives, maintaining consistency in Agile implementation across the organization. (Autentia 2017.)

7 Agile Methodology Influenced Banking Organizations.

The approach of AM into the European banking sector has profoundly impacted the operation and management of numerous European banks, specifically the research cases Nordea, BNP Paribas, and Deutsche. AM has revolutionized the way these organizations operate by promoting flexibility, collaboration, and adaptive planning. Implementing AM in Nordea, BNP Paribas, and Deutsche Banks enabled them to enhance their competitiveness and resilience in the dynamic and ever-evolving banking industry. However, besides the advantages that Agile has brought, there are negative outcomes that coexist.

During a quarterly results conference, Nordea's CEO, Casper von Koskull, acknowledged that the bank's investments in technology and digital banking have been expensive, leading to increased long-term expenditure. He expressed the need to transition to the next phase of transformation, which would involve a shift in competence among their employees. This statement suggests that Nordea recognizes the importance of adapting to the changing digital landscape and aims to equip its workforce with the necessary skills to drive the transformation forward. In addition to discussing the need for a competence shift, Nordea announced plans to reduce its workforce. He stated *We're changing the way a bank works... It's very exciting, but... it results in the industry needing fewer people* (Haaramo 2017). As a result, approximately 6000 people were laid off. While some of the 6000 job reductions would occur naturally through attrition, it is evident that outright terminations would be unavoidable. By investing in technology and digital banking, including Agile transformation, Nordea has likely aimed to enhance its operational efficiency, improve customer experience, and stay competitive in the evolving banking industry. (Yle 2017.) Similar to Nordea, BNP Paribas decreased its workforce by about 10,000 people from 202,620 employees in 2018 to 193,120 employees in 2022 (Statista). Deutsche Bank had 101,104 workers in 2015 - the first Agile@Scale year and decreased to 84,930 workers in 2022 (Statista 2022). Although the decrease in the number of employees saved companies' costs to focus on technology investment, it caused the pressure of employment to society and governments and at the same time, increased workload and stress on remaining employees.

The second influence of Agile, as highlighted in the context of GFT and Deutsche Bank's adoption of a scaled Agile delivery approach, is the breaking down of operational boundaries between 'the business' and 'IT.' This shift in mindset and collaboration between business and IT teams can significantly positively affect project outcomes (Internaltionbanker 2018). The multinational banks Nordea, BNP Paribas, and Deutsche had disconnected and unorganized teams in the past, but the operational systems became smooth and communicative after AM adoption (Autentia 2017). The boundary removal might increase velocity,

reduce defect rates, and lower cost points. By Agile implementation, business users being embedded in the delivery team allows for a better understanding of business requirements, priorities, and customer needs. Also, when business users actively participate in the development team, the delivered solutions align closely with business requirements, reducing the likelihood of defects and rework. Additionally, Agile's emphasis on close collaboration and continuous feedback loops enables early detection and resolution of issues, reducing the overall development cost. (Internaltionalbanker 2018.)

The third effect that AM has brought is risk mitigation. Risk reduction is a tough problem and also a common goal in not only banking institutions but other industry's organizations and Agile contributes to resolving it. For instance, Kenneth Trickett- CIO Office stated that in 2014, the subsidiary of BNP Paribas in Belgium experienced approximately 30 incidents per month, indicating a need for improvement in its operations (InstitutLeanFrance 2019). By implementing Lean methods, the bank was able to reduce incidents by 18 in 2016. This proved the effectiveness of adopting Agile principles in its management. He also stressed that before AM-Lean, *It was a real patchwork of IT….it had central teams, local teams, many old mainframes, and open systems within the teams but not many people knew what was happening from end-to-end points of view.* This disconnection might lead to timeline delays, product quality decrease, missing features, and customer dissatisfaction. (InstitutLeanFrance 2019.)

As for the financial sector, AM had notably impacted European banks generally and the three mentioned banks. Specifically, AM implementing processes consumed a mass of resources related to employee training and coach costs, team restructuring, and tool and infrastructure expenses. To be precise, Agile adoption often involves providing training and education to employees at different levels within the organization. This includes Agile methodologies, frameworks (e.g., Scrum, Kanban), and related practices. Costs might arise from facilitating regular meetings, workshops, and cross-team coordination activities. For instance, Hoffmann expressed that BNP Paribas Fortis undertook a large-scale Agile transformation effort in 2018; it initiated a "big bang" approach, where around 3000 IT employees were transitioned to Agile practices. The transformation started by introducing backlogs, enabling teams to prioritize and manage their work more iteratively and flexibly. To support this significant organizational shift, BNP Paribas Fortis hired more than 120 coaches who played a crucial role in guiding and facilitating the Agile adoption. (Ignite Technology 2022.) Furthermore, implementing Agile practices might require investing in or upgrading project management tools, collaboration platforms, and software development environments. This includes Agile project management software, communication and collaboration tools, and tools for tracking work progress and metrics. (Moreira 2013.) Although the Agile

transformation progress consumed great resources of the banks, Agile has brought the banks different financial benefits. As Kenneth mentioned previously, Lean-Agile helped BNP Paribas mitigate a significant number of incidents from 30 to 18 incidents per month (InstitutLeanFrance 2019). John Plumpton also admitted that Agile increased their speed in value delivery, reduced the overload of client applications, and helped Deutsche reinforce customer loyalty and satisfaction (Autentia 2017; according to John Plumpton 2016). Meanwhile, Koskull & Jørgensen stated that Nordea saved costs by reducing redundances in personnel and operating expenses thanks to Agile flexibility (Koskull & Jørgensen2017).

8 Challenges and Limitations of Agile during The Implementation

While embracing AM has brought significant benefits, Nordea, BNP Paribas, and Deutsche have faced challenges and obstacles, requiring them to resistance to change. The implementation of AM is a long-term process; thus, experiencing hardships was no exception with the three long-established banks having legacy communication in their cultural structure and using traditional methodologies for a long time.

First, after the financial crisis in 2008, the progressively stringent regulatory landscape hindered the adoption of AM in banking institutions. To be more precise, governments reformed and enhanced measures to ensure financial stability, mitigate risks, and prevent a similar crisis from occurring in the future. This simultaneously means that the banks must respond to higher capital requirements and compliance costs, strengthen their risk management and improve liquidity and funding. Thus, European banks tended to continue traditional methodologies in their systems (Montoya 2016). Adopting a new Agile methodology for the entire organization requires massive restructuring and costs and must be in line with new government regulations.

Along with the rigor of regulations, the size of the organizations and the presences of Nordea, BNP Paribas, and Deutsche in many countries are also significant obstacles to AM implementation. Agile requires coordination among development teams and potential integration with other departments within the companies. Therefore, implementing AM in multinational banks operating in various countries, time zones, and continents become more complex (Montoya 2016).

The third challenge is the legacy processes and systems. Frédéric Hoffmann said in his interview that the cultural legacy is the driving force but also the challenge in Agile transformation progress (Ignite Technology 2022). All BNP Paribas, Deutsche, and Nordea experienced a long history with many operational generations. Although each bank has its own cultural and organizational factors and has a different time approaching Agile, these banks have a common point which is the preparation for the renewal. The reform and renewal of the working way and the thinking system of all employees from traditional frameworks to new Agile frameworks needs a long journey and requires large investment and determination (Paasivaara & Kruchten 2020). Laura Grau (2016) expressed that *we have around forty modules…the transition to feature teams while not every developer has the same working rules, they now have to work all the modules at the same time…it was not easy to cope with that.*

Another rationale that made AM hesitate to approach the banking organizations is the lack of knowledge (Ignite Technology 2022). About a decade ago, Agile was still a new concept in Nordea, BNP Paribas, and Deutsche. This deficiency in understanding and experience with Agile methodologies poses a significant obstacle to successfully adopting Agile practices within these organizations. The transition to Agile requires a shift in mindset, roles, and collaboration patterns, which can be challenging for employees accustomed to traditional working methods. Furthermore, Agile principles and practices, such as iterative development, self-organizing teams, and continuous feedback, might be unfamiliar or unfamiliar to the staff. Overcoming this knowledge gap necessitates investment in training programs, workshops, and coaching to educate and empower employees with the necessary Agile skills and mindset. (Flora 2018.) Only by equipping their staff with a deep understanding of Agile can Nordea, BNP Paribas, and Deutsche Bank successfully navigate the complexities of the Agile transformation process and realize the benefits of AM in their operations.

Additionally, the Covid-19 pandemic was a significant obstacle to the adoption of AM in European banks, specially Nordea, BNP Paribas, and Deutsche cases. AM was designed to enhance coordination and communication within distributed teams, but the sudden shift to remote work posed significant challenges in achieving effective collaboration and communication. The absence of face-to-face interactions and the reliance on virtual tools and platforms created new barriers and complexities for teams to overcome. Moreover, the pandemic-induced stress and instability created an additional hurdle for Agile adoption. During times of crisis, there was often a natural inclination to prioritize short-term stability and risk mitigation over long-term transformation. This mindset might result in resistance to change and a reluctance to embrace the iterative and adaptive nature of AM. Many banks confronted financial constraints, cost-cutting measures, and resource limitations as they navigated the economic fallout of the crisis. Implementing Agile practices and undertaking Agile transformations require dedicated resources, including time, training, and skilled Agile coaches. The financial constraints and resource limitations imposed by the pandemic might have hindered banks' ability to allocate sufficient resources to drive Agile adoption initiatives effectively. (Sharma et al. 2022.)

In summary, although AM has brought significant achievements to organizations, it had limitations and challenges in practice. Agile implementation requires a serious investment in both effort and finance in a long-term procedure. Therefore, European banks, including Nordea, BNP Paribas, and Deutsche, should prepare to encounter and overcome those obstacles to become Agile enterprises.

9 Interview Design, Interview Analysis, and Findings

This chapter covers the interview plan, participants' backgrounds, and in-depth interview analysis by qualitative approach. Then, the author cross-examines primary and secondary data to generalize and conclude the research objectives.

9.1 Interview Design

This research thesis aims to investigate the influences and limitations of AM in European banking institutions. Because the AM includes many complex concepts, the semi-structured interview is the most appropriate choice to broaden knowledge of the topic while keeping the right direction for research findings. The interview can serve as a valuable tool to examine and determine the objectives that were not covered by the research questions fully (Kallio et al. 2016). Thus, in this research, the author conducted thematic-question interviews to support the thesis objective.

The interviews were conducted through six stages:

- Participant selection

The author invited five participants with relevant experience and knowledge in Agile practices. Aiming to diversity in roles, the interviewees have different positions in companies, such as senior lecturer/project manager, programmer, and software engineer, working in various industries and organization sizes.

- Interview guidelines

Interview questions were generated to cover participants' understanding of Agile, their experiences with Agile implementation, challenges faced, benefits observed, and their perceptions of the impact on organizations' culture and performance.

- Conducting the interview

The individual interviews were conducted in 30-45 minutes per interview from April 18th to April 25th, 2023. Due to far distance, the interview with the X UAS's senior lecturer/project manager was scheduled for an online meeting via Microsoft Office Teams app; the rest was carried out through in-person appointments in Helsinki. At the beginning of the interviews, the purpose of the study was explained. The author used the loose structure interview to encourage participants to share their unique insights and experiences. At the same time, the follow-up questions were generated to explore more profound responses and specific examples.

- Data collection

The author took detailed notes during the interview and captured key points and noteworthy quotes. Also, recording the interviews with the participants' consent is necessary.

- Transcribing and analysis

Transcription of the interviews was finished to ensure accuracy and completeness. Then, the interviewer frequently revised the transcripts to identify recurring themes, patterns, and critical insights. The next step is looking for connections, divergences, and overarching narratives to link the previous secondary data.

- Reporting findings

Finally, the interviewer summarized the findings from the interviews, presented the main themes, patterns, and insights, used the participants' quotes and examples to support the finding, and then discussed the implications of the findings and provided a comprehensive account of the interview into the thesis report.

9.2 Interview Analysis and Empirical Findings

Analysis

To maintain the confidentiality and anonymity of participants, the author avoids mentioning their identifying information in this research; instead, they are referred to by job title and number.

Table 5. Interviewee profiles

	Interviewee 1	Interviewee 2	Interviewee 3	Interviewee 4
Job title	Senior lecturer/ Project manger	Senior SE	Senior Programmer	Senior SE
Working Industry	Education	Finance and Banking, Gaming	Online Gambling	Construction, BIM[10]

[10] Building Information Modeling

Agile experience	10 years	10 years	8 years	4 years
Agile frameworks used	Scrum, Kanban, Lean	Scrum, Scrumban, Kanban, Lean, SAFe	Scrum, Scrumban, Kanban, Lean, SAFe	Scrum (Nexus, LeSS[11])

The relevance between each interviewee's job title and the research topic "Agile methodology approach in European Banks," case studies Nordea, BNP Paribas, and Deutsche might be summarized as follows:

Interviewee 1 - Senior IT Lecturer/Project Manager with around ten years of experience in using and teaching Agile to students. This interviewee's expertise in AM and teaching experience can provide insights into the theoretical foundations, best practices, and educational aspects of Agile implementation in the banking sector.

Interviewee 2 - Senior SE used to work in Nordea's Finance and Nordea's One Digital departments with almost ten years of experience in Agile implementation. Being directly involved in Agile implementation within Nordea Bank, this interviewee can provide valuable firsthand insights into the challenges, successes, and practical implications of adopting Agile practices in a banking organization.

Interviewee 3 – Programmer/researcher with eight years of experience in Agile, used to teaching IT in a Finnish college, currently working in an online gambling company: Although not directly in the banking industry, this interviewee's experience with Agile in a different sector can offer a fresh perspective on the applicability and adaptability of Agile methodologies in various organizational contexts.

Interviewee 4 - Senior SE in construction and BIM companies with four years of Agile experience: While not directly in the banking industry, this interviewee's experience in Agile methodologies within the construction and BIM sectors can offer insights into the potential benefits, challenges, and adaptations required when implementing Agile practices in non-traditional industries, which can be relevant to exploring Agile in European banks.

[11] Large-Scale Scrum

Overall, including interviewees from diverse backgrounds and industries adds richness and breadth to the research, allowing for a comprehensive understanding of the AM's application and impact within various organizations including the bank.

Empirical Findings

As mentioned before, the empirical findings are summarized in thematic analysis based on the answers to interview questions and linked to research questions. The first theme is experience and knowledge in driving forces of Agile implementation in various companies. The second theme describes the challenges and limitations of Agile in the companies' performance. Last, the suggestions for future Agile applications.

- Driving forces and benefits of Agile adoption

The interviewees identified driving forces for Agile adoption in European banks, including enhancing flexibility and efficiency, responding to market demands, improving customer satisfaction, and increasing collaboration between business and IT teams.

Interviewee 1 mentioned that *Agile methodologies do not follow strict rules*. *With Agile, you do not need to follow the rigid project structure anymore.* To highlight the value of AM, he compared it to the Waterfall model. *If you finished something, you get more requirements, no one can be happy with it because, with Waterfall, it costs a lot of effort and money*, said interviewee 1. Meanwhile, interviewee 2 admitted that *actually when I started working at Nordea Bank, the banks already applied SAFe for the whole IT department and were on the way to expanding to all departments*. *So I based on my now Agile experiences here, I think the growth of fintech companies and customer changes motivated our team and Nordea to apply it.* In another aspect, *our main goal of Agile application is enhancing value and productivity,* expressed interviewee 3. Additionally, he explained that b*ecause in my company, some of the projects have overlapping nature, it is essential to collaborate and interact with other team members as well as other teams…so…Agile is the best solution.* Similar to interviewee 3, interviewee 4 recognized the effectiveness of AM. He said that *from the Agile application, the speed of our delivery is improved; at the same time, the finished models were more satisfied with our clients than before. If Agile is used appropriately, it is quite suitable for various operational systems.*

Through the answers to interview questions combined with the previous research of the case studies, it might be concluded that although being implemented in various companies and industries, the advantages of AM are also the motivations for organizations embracing it. Simultaneously, Agile has positive influences on development teams and companies based on its values and principles.

- Challenges and limitations of AM in project development

Interviewees provided the diversity responses when being asked about the challenges and limits of Agile. The senior lecturer confirmed that as for his experiences, *Agile did not have limits but challenges. It's hard to trust and create trust among team members as well as the development team and customers; when you collaborate with someone you didn't know on complex projects, you have to trust each other..but sometimes, trust also brings to you the disadvantages and failure.* Furthermore, he supposed that Agile is hard to fit with large-scale projects and organizations. *It is a real challenge.* He added that *there are not so many organizations that really do pure Agile because the problem is that you don't know what's going to cost…also as I mentioned before, trust is really important…if you are a customer collaborate with an unscrupulous company to design a project, there will be unexpected accrued costs.* On the contrary, the remaining interviewees stated that Agile should not be embraced in small companies and microprojects. All three people said that if applying Agile mechanically to small projects, the work will become rigid instead of flexible. It lasts the project completion time and causes an increase in expenses. Thus, there is a lack of trust between development teams and the Product Owner as well as between the client and the company. *At this point, Waterfall is the right solution,* confirmed Interviewee 3. Moreover, the programmer admitted that *not many members really understand Agile principles, so it's easy to misunderstand the common goals. In a multinational company like Nordea, lack of communication skills, culture, and language barriers will be big obstacles in embracing Agile,* highlighted interviewee 2.

Generally speaking, although the success of Agile, the limitations are undeniable. Those ideas are summarized that is the versatility in company size and project size, the trust among co-workers and company and customers according to the Agile principle nature, and also challenges on lack of knowledge and communication barriers.

- Recommendations for future Agile adoption

As for suggestions, the senior lecturer reminded the trust. He recommended company should make a clear contract with what they will receive after a certain period and certain costs. Additionally, he supposed that Lean-Agile should be known more in organizations; *this methodology helps companies eliminate waste* and enhance efficiency. Interviewees 2 and 4 referred that due to AI exploration, the company should consider and combine AM with AI in the most appropriate way to avoid confronting the old-fashioned in some stages of AM. Besides that, interviewee 3 said that Agile should be invested in training and educating all teams to enhance Agile project development.

10 Conclusion, Discussion, and Recommendations

10.1 Validity and Reliability

In this qualitative thesis research on “Agile methodology approaches European Banks,” incorporating case studies of Nordea, BNP Paribas, and Deutsche Bank, both secondary and primary data sources were utilized. The primary data was collected through interviews conducted with a senior lecturer/project manager, a programmer, and two SEs. The validity and reliability of the research are essential considerations to ensure the credibility and trustworthiness of the findings (Leung 2015).

Validity:

Internal Validity: Internal validity refers to the extent to which the research accurately captures the phenomenon under investigation. To enhance internal validity, the study employed a well-defined research design, including clear research questions and objectives. (Cuncic 2022.) The selection of interview participants, including a senior lecturer/project manager and software developers with relevant experience in Agile methodologies, aimed to provide diverse perspectives and insights. The interview questions were carefully designed to address the research objectives and capture relevant information about adopting Agile in organizations.

External Validity: External validity refers to the generalizability of the research findings beyond the study’s specific context (Cuncic 2022). While the case studies focused on Nordea, BNP Paribas, and Deutsche Bank, efforts were made to ensure the results could apply to other European banks implementing Agile methodologies. The research provided a comprehensive analysis of the topic, drawing on multiple case studies and considering various factors influencing Agile adoption in the banking industry. This increases the potential for external validity and allows for broader insights and implications.

Reliability:

The primary data collected through interviews was carefully planned and conducted to ensure reliability. The interview questions were developed based on established research objectives and were designed to elicit relevant and reliable information from the participants. Consistency was maintained in the interview process, including standardized procedures, interview protocols, and recording methods. Probing techniques were utilized to ensure comprehensive responses, and follow-up interviews were conducted when necessary. A systematic approach was employed to ensure reliability in data analysis. Transcripts of the

interviews were thoroughly reviewed and coded to identify key themes and patterns. Additionally, the study incorporated primary and secondary data sources to enhance reliability. Secondary data, such as case studies and industry reports, served as a means of triangulation to validate and corroborate the findings obtained from the interviews. This triangulation of data sources strengthens the overall reliability of the research.

By considering validity and reliability throughout the research process, including data collection and analysis, this thesis aims to provide credible and trustworthy insights into the Agile methodology approaches in European banks.

10.2 Answers to The Research Questions

This thesis has explored the adoption of AM in European banking banks, focusing on three specific banks: Nordea, BNP Paribas, and Deutsche Bank. Through literature review, case studies combined with interviews with Agile-adopting experts found that AM has become increasingly widespread in the banking sector and other industries due to its ability and advantages to enhance collaboration, flexibility, and delivery speed. Case studies of Nordea, BNP Paribas, and Deutsche afforded valuable insights into the specific benefits and challenges of implementing AM in the banking environment. While there are differences in their approaches, all three banks attained significant improvements in productivity and customer satisfaction by adopting agile practices. Nonetheless, it should be noted that AM is not a one-size-fits-all solution. Its success in the banks depends on various factors, including organizational culture, leadership buy-in, and the ability to adapt to change.

- How did AM adoption influence European banks in operation and management?

The Agile transformation has influenced European banks in both positive and negative ways. It consumed the banks' many expenses for large-scale training, coaching, and upgrading tools and technologies. However, Agile adoption has brought advantages to the banks by removing team boundaries, enhancing collaboration, decreasing risks, and reducing project processing costs.

- What were the driving forces of the Agile adoption of Nordea, BNP Paribas, and Deutsche Bank?

External and internal driving forces are investigated in the three banks' Agile decisions. Precisely, external factors include the consequences of financial crises, regulation rigor, Brexit, and hi-tech advancements. Internal factors consist of cost pressure, disconnected and unorganized teams, personnel's power encouragement, and peer competition.

- How do those banks address Agile?

The Nordea bank performed Agile transformation in three phases, “Ram-up,” “ Execute,” and “Optimization” from 2015. Meanwhile, BNP Paribas implemented Agile in 2017. This bank embraced Agile by deploying five levers, including new customer pathway releases, operating model enhancement, information system adaptation, data storage and analyzing capabilities strengthening, and digital and Agile improvement. The last bank, Deutsche, established a leadership team to drive Agile implementation, committed their transformation to key stakeholders, then focused on particular areas for Agile improvement.

- What are the challenges and limitations of AM in the project development procedure and recommendations for future Agile implementation?

The researched banks and other Agile-applied companies have encountered challenges and limitations of Agile during the implementation. Specifically, the progressively stringent regulations and the size of projects and organizations require the companies to understand, adjust, and apply Agile appropriately and flexibly. Additionally, a lack of knowledge and hesitance to be Agile are also big barriers. An unexpected issue like the Covid-19 pandemic caused a significant obstacle in Agile application because Agile nature requires interactive collaboration to optimize its benefits. The recommendations for other organizations applying Agile are conducting a practical survey for preparation, examining small projects in small teams before expansion, investing in Agile training and coaching, fostering trust, collaboration, and interaction, and then tracking and evaluating Agile projects frequently.

Overall, the thesis contributes to the growing literature on AM in the banking industry and advances favorable knowledge for other banks considering adopting agile practices. The findings suggest that while there are challenges to implementing AM, the benefits are significant, making it a worthwhile investment for banks looking to augment their competitiveness in an increasingly dynamic and customer-driven industry.

10.3 Discussion

The adoption of AM in the banking industry is still in its early stages, and further exploration is necessary to understand its impact fully. While the case studies of Nordea, BNP Paribas, and Deutsche support valuable insights, more case studies are needed to provide a more comprehensive understanding of how AM can be applied in various banking environments.

Moreover, the potential challenges and obstacles in banks need to be researched. While the case studies of Nordea, BNP Paribas, and Deutsche Bank demonstrate the benefits of agile methodology, it is crucial to consider the potential risks and challenges associated with its adoption, such as resistance to change and the need for significant investment in training and resources. In addition, the impact of AM in the broader banking industry should

also be considered. While the implementation of AM has the potential to improve project success rates and customer satisfaction, it is vital to consider its effect on the broader industry, including its potential impact on employment and the need for new skill sets among banking professionals.

In conclusion, this thesis has demonstrated that AM has the potential to significantly improve project delivery, customer satisfaction, and overall competitiveness in the industry. At the same time, a need to understand more about the influence of AM and address potential challenges and drawbacks exists.

10.4 Recommendation

Based on the findings and exploration of this thesis, the following recommendations are suggested for banks consideration adopting AM:

- Conduct the feasibility study: Banks must conduct a practicability study before implementing Agile to assess their preparation for agile adoption. This study should consider the organizational culture, leadership buy-in, and the ability to adapt to change.
- Start smaller projects: Banks should begin with small pilot projects before scaling up agile implementation. This will allow banks to identify potential challenges and areas for advancement before committing to large-scale adoption.
- Invest in training and resources: AM requires significant investment in training and resources to ensure banks' employees have essential skills to work in the agile environment. Additionally, banks should allocate resources to reinforce the implementation of AM, such as software tools and infrastructure.
- Foster a culture of collaboration: Agile emphasizes collaboration among team members. Banks should encourage open communication, team-building exercises, and establishing cross-functional teams.
- Monitor and evaluate progress: Banks must regularly monitor and assess their progress in agile adoption. This helps banks to determine the problem areas for adjustments to ensure the success of applying Agile.

11 Summary

This thesis paper explores the application of AM in European banks, focusing on Nordea, BNP Paribas, and Deutsche Bank case studies. The study follows a structured approach, beginning with an introduction that sets the context for the research. It then outlines the research approach, including data collection and analysis methods.

An overview of AM is provided, explaining its principles, practices, and benefits. The European banking industry is discussed, providing insights into its current landscape and the specific case studies of Nordea, BNP Paribas, and Deutsche Bank. The paper examines the internal and external driving forces that led to the decision to implement Agile methodologies in these banks. It explores organizations' motivations and challenges in adopting Agile practices and transforming operations.

The Agile transformation journey of Nordea, BNP Paribas, and Deutsche Bank is highlighted, shedding light on the strategies and steps taken during their transitions. The impacts of AM on these banking organizations' operational and financial aspects are analyzed, considering factors such as velocity, defect rates, cost savings, and customer satisfaction.

The outstanding challenges encountered while adopting AM are discussed, acknowledging the complexities and hurdles the banks face during their transformation journeys. The thesis also includes an analysis of interviews conducted with relevant experts, providing additional insights and perspectives on the Agile implementation process.

In the conclusion section, the research findings are summarized and discussed. Recommendations are provided based on the insights from the case studies and interview analysis, offering guidance for other banks considering Agile adoption. The paper concludes by reflecting on the overall implications of AM in the European banking industry and suggests areas for further research and exploration.

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Appendix 1. Interview Questions

1. Briefly describe your background (job title, working experiences, company)
2. How long have you approached Agile frameworks?
3. What frameworks do you use?
4. What factors did make you embrace Agile?
5. How do your company and your team address Agile in project development?
6. How did Agile adoption impact your outcomes? Give specific examples.
7. What are the differences between Waterfall and Agile in your practices?
8. During applying Agile methodology, what challenges and limitations have you realized?
9. What recommendations can you give for future Agile adoption?