



SCHOOL OF  
ECONOMICS AND  
MANAGEMENT

**Current state of AI Adoption in Swedish Banks:  
Rationales, Challenges, and Lessons Learned**

by

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# Abstract

The field of Artificial Intelligence (AI) continues to revolutionise numerous sectors, and the banking industry is no different. This study investigates the rationales, challenges, and lessons learned from AI incorporation within Sweden's banking system. The research's objective is to elucidate the AI integration process and offer valuable guidance to organisations considering a similar technological transition.

The research methodology is qualitative, primarily using comprehensive interviews with representatives from the banking sector and AI and computational linguistics experts. The study has successfully identified and categorised the reasons behind AI adoption, the primary challenges encountered during the integration process, and key learnings, which could prove beneficial for banks planning to incorporate AI into their operations.

The findings indicate a somewhat paradoxical situation: despite a broad sense of optimism and expectation for AI becoming a core component in banking, the current integration rate is modest. This slow adoption rate can primarily be attributed to challenges such as data security, regulatory constraints, issues with data readiness, and the dynamic nature of AI technology. As a result, banks seem to be exercising caution, avoiding premature or extensive AI adoption.

**Keywords:** Artificial Intelligence (AI), AI Integration, AI Applications, AI Adoption Motivations, AI Integration Challenges, Insights from AI Adoption, AI in Banking, Swedish Banking Sector.

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# List of Abbreviations

AI - Artificial Intelligence

AML - Anti-Money Laundering

API - Application Programming Interface

GDPR - General Data Protection Directive

GPT - General-Purpose Technology

KYC - Know Your Customer

ML - Machine Learning

OECD - Organisation for Economic Co-operation and Development

RISE - Research Institutes of Sweden

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# 1. Introduction

## 1.1. Background

As technology develops, digital innovations in the banking sector become increasingly important. They become necessary for managing competitive pressures and adjusting to customers' rising expectations (Fares, Butt & Lee, 2022). Many new technologies in banks have been driven by Artificial Intelligence (AI) (Dobrescu and Dobrescu, 2018). McKinsey estimates that AI technologies "could potentially deliver up to \$1 trillion of additional value" for global Banking (Biswas, Carson, Chung, Singh & Thomas, 2020).

The concept of AI has been the subject of research and development since the 1950s, leading to a substantial number of research papers examining its potential use and evolution over time. While valuable sources describe its historical development and the phases of evolution, recent developments and patterns of the AI adoption process are of greater interest to this research.

Despite AI not being a new technology, recent developments are so significant that it has become the subject of universal attention. The scope of AI use cases and applications is growing (Dilmegani, 2023). AI is becoming an increasingly important tool in business, allowing companies to analyse vast amounts of data, automate processes, make more informed decisions, and make processes more efficient (McKendrick, 2021).

The existing research primarily examines the overall advancement of AI technology and its implications for the economy and various industries. However, there is a notable lag between industry developments in AI and corresponding academic research. The fast-paced and diverse nature of AI advancements pose challenges for scientific research to keep up with the latest industry trends. The AI Index Report 2023 highlights this gap, ranking "Industry races ahead of academia" as the top takeaway (p. 23). It is crucial to address this gap, particularly in the banking sector, where AI adoption is rapidly transforming daily operations.

Since this technology has many new possible uses, organisations are now realising its value and the need to embrace it. According to Uren & Edwards, the progress of technology, specifically in machine learning (ML) and robotics, along with the widespread availability of

big data and tools to harness it, has fueled optimistic projections (which some may deem as hype) about the economic possibilities of AI (2023).

However, from a broad-scale perspective, this technology is still in its development stage and is likely still in the testing phase in organisations where it has been introduced. Research on the drivers of AI adoption is still scarce and needs to be systematised (Ek. 2021). Despite AI's potential for delivering significant value, McKinsey's report underlines that many banks have struggled "to move from experimentation around select use cases to scaling AI technologies across the organisation" (Biswas, Carson, Chung, Singh & Thomas, 2020). The present body of literature lacks comprehensive research scope and depth or is deficient in the banking industry focus (Fares, Butt & Lee, 2022).

Uren & Edwards also underline that there is a deficiency of information about the adoption process (2023), including the experiences, patterns, challenges, and lessons learned, which could be valuable for companies that are considering or have recently started integrating AI tools into their operations, or even those who have already begun testing AI tools.

Sweden is striving to be one of the front-runner nations in the adoption and utilisation of AI, making it a valuable case study for understanding the practical implications of AI integration. Our interest, therefore, is specifically focused on the integration of AI within Swedish banks to provide a deeper insight into its real-world usage and impact in these institutions. While there are plenty of broad theoretical discussions on AI's potential applications in banking, our aim is to examine and uncover the actual scenario within the Swedish banking sector. This research will illuminate the intensity and extent of AI's use in these establishments, providing invaluable data for future applications and strategies.

Despite a wealth of research on AI's potential in various industries, academic research has been outpaced by recent developments in AI and its adoption in banks, as highlighted in the AI Index Report (2023). The statement implies that AI research and development in academia is not progressing as quickly as that of companies. We've noticed a relative lack of research examining the intersection between current AI technology developments and their application in the banking sector. Specifically, the process of AI adoption in this industry is an area of interest. We will explore the specific capabilities of AI in banking and how this adoption process is currently being carried out in Sweden.



The problem this research intends to address is the significant disparity between the rapid advancements in AI technology and its actual application within the banking sector, notably in Swedish banking institutions. Despite some fragmented information on AI use in Swedish banks, there is a conspicuous lack of comprehensive research examining the dynamics of AI integration, highlighting a substantial research gap that needs to be filled to facilitate effective AI implementation in the sector.

## 1.2. Research Purpose

The purpose of this research is to examine AI adoption in Swedish banks in order to understand the primary motivations, challenges, and lessons learned, thereby addressing the current knowledge gap concerning specific factors driving AI adoption and its practical realisation in the banking sector.

The term "adoption" in this thesis refers to the process by which banks decide whether to adopt AI technology, in addition to the actual integration of AI technology into their daily operations. The challenges and lessons learned that are mentioned here thus apply to this adoption process.

The findings of this study hold the potential to benefit not only the participating banks but also experts, researchers, governments, and other stakeholders involved in the AI ecosystem. By examining the motivations, challenges, and outcomes of AI adoption in Swedish banks, this research will contribute to the knowledge base on AI implementation and inform strategic decision-making at both organisational and industry levels.

## 1.3. Research Question

**What are the rationales, challenges, and lessons learned related to AI adoption in Swedish banks?**

## 2. Literature Review

The literature review defines AI and then addresses its applications in enterprises. It also examines aspects that determine whether a company employs AI and how AI influences company performance.

The analysis emphasises how significantly AI has grown in the banking industry and how it is utilised. However, it also notes that more research on this subject needs to be done.

Then, the review lists the main types of challenges that banks face when they start adopting AI.

After that, the review looks at the situation in Sweden since we wanted to focus mainly on banks in Sweden for this research; an upcoming section will discuss this choice in detail. First, it examines the broad state policies, key players in that area, and how different stakeholders collaborate. This makes the big picture easy to grasp. It then discusses AI in the financial sector, how banks have begun to adopt AI, and the challenges they encounter.

Lastly, the review examines and presents some valuable guidelines provided by consulting firms and researchers that can be useful for banks as they successfully navigate the process of adopting AI.

### 2.1. Artificial Intelligence

#### 2.1.1. Definition of AI

Although numerous definitions of AI have emerged in recent decades, John McCarthy's definition from a 2007 paper is often cited: "It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable" (p. 2). However, the origins of the AI conversation can be traced back to Alan Turing's groundbreaking work, "Computing Machinery and Intelligence", published in 1950. Turing, often considered the "father of computer science", posed the question, "Can machines think?" and proposed what is now famously known as the "Turing Test". In this test, a human interrogator would attempt to discern between a computer's

and a human's responses, thus exploring ideas around linguistics. While the Turing Test has since faced criticism and scrutiny, it remains a significant part of the history of AI and an ongoing concept in philosophy.

We have identified numerous other definitions of AI with rather slight variations. However, a common thread among many of these definitions is the idea that AI refers to the capability of a digital computer or computer-controlled robot to perform tasks typically associated with intelligent beings. Often, AI is used to describe the endeavour of creating systems that possess cognitive abilities similar to humans, such as reasoning, meaning discovery, generalisation, and learning from past experiences (Britannica, 2023; NSTC, 2016; Manning, 2020; Investopedia, 2022; Spiegeleire, Maas & Sweijs, 2017; Accenture, n.d.; Cambridge Dictionary, n.d.; European Commission, 2019; Marriam-Webster, n.d.; VINNOVA, 2018; OECD digital economy papers, 2019).

## 2.1.2. AI Development

### 2.1.2.1. A Brief History of AI

The development of AI and ML can be broadly categorised into several phases that highlight key advancements and breakthroughs. Different sources offer different milestones, so we present a somewhat synthesised development process analysis. In the 1950s, Alan Turing proposed the Turing test, which raised the question of whether machines can think (Turing, 1950). In the same year, Claude Shannon suggested creating a chess-playing machine (Shannon, 1950).

These early developments laid the foundation for AI research, with pioneers such as John McCarthy, Alan Newell, Arthur Samuel, Herbert Simon, and Marvin Minsky conceptualising the principles of AI at the Dartmouth Summer Research Project in 1956 (McCarthy et al. 1955), often considered the birthplace of AI (OECD, 2019).

However, the promises of early AI proved to be overly optimistic, leading to an "AI winter" with reduced funding and interest in the 1970s (OECD, 2019). Nevertheless, interest in AI regained momentum in the 1990s with advancements in computation power. Milestones such as IBM's Deep Blue defeating world chess champion Gary Kasparov in 1997 demonstrated the

potential of AI (Somers, 2013). In 2015, AlphaGo, developed by DeepMind, defeated the world's best Go player using machine learning, marking a major breakthrough (OECD, 2019).

Today, AI is making substantial strides across various domains. As a result, its impact on society and the economy is expected to grow, especially as AI becomes more affordable and higher performing (AI Index Report, 2022). According to a McKinsey & Company report, "the average number of AI capabilities that organisations use, such as natural-language generation and computer vision, has also doubled - from 1.9 in 2018 to 3.8 in 2022" (2022). It once again shows how much the pace of development of AI has become in recent years.

## 2.2. AI in Organisations

### 2.2.1. Essential Factors for AI Adoption: Key Considerations

Ek (2021) argues that AI technology alone is insufficient to drive AI adoption. Instead, the author identifies seven key resources essential for successful AI adoption. These resources are (1) Data: A fundamental requirement for AI adoption, including its characteristics and availability. (2) AI Technology: This includes the necessary infrastructure and algorithms to support AI implementation. (3) AI Skills: Technical and managerial expertise is crucial for effectively managing and utilising AI technologies. (4) Intra and Inter-Firm Coordination: Information sharing within and beyond organisational boundaries is necessary for successful AI adoption. (5) AI Business Model Capabilities: The ability to detect and drive business models centred around AI is critical. (6) AI Innovation Ecosystem: Collaboration with external stakeholders in ecosystems fosters innovation in AI implementation. (7) Coordination Across Organisational Boundaries: Partnerships with external AI companies can significantly influence a firm's ability to adopt AI (Ek, 2021).

### 2.2.2. AI and Firm Performance

According to a recent analysis of the German innovation survey conducted by Rammer et al. (2019), the utilisation of AI has resulted in an impressive 16 billion euros in additional sales from world-first innovations. This remarkable figure represents 18% of the total sales attributed to world-first innovations in the German business sector. The study also reveals that companies that leveraged a combination of in-house resources and external AI providers to develop their AI capabilities achieved notably higher levels of innovation success. Similarly, firms that

implemented AI broadly across their operations and had multiple years of AI implementation experience also demonstrated superior innovation outcomes (Rammer et al., 2019).

Research has consistently shown that AI is typically implemented in conjunction with other advanced digital technologies. In a comprehensive survey of over 3,000 executives worldwide, Brock and von Wangenheim (2019) discovered that companies with stronger digital skills anticipate more significant business impacts from AI adoption than those with weaker digital skills. Remarkably, this finding held across various industries and global regions, suggesting that a firm's digital prowess significantly influences the success of AI initiatives. This notion is further supported by a previous study conducted in Sweden, which found that digital maturity positively correlates with productivity, with digital skills identified as the primary driving factor behind this correlation (Ek, Mattsson, Ouraich, & Li, 2019). These findings collectively highlight the importance of digital skills and maturity in shaping the outcomes of AI implementation efforts.

AI, or Artificial Intelligence, is a powerful technology that offers organisations the potential for significant improvements and new business opportunities. It is considered a general-purpose technology (GPT) because of its ability to learn and adapt across various applications (Iansiti & Lakhani, 2020). As a result, it provides organisations with a distinct competitive edge (Brynjolfsson & McAfee, 2017). However, because of AI's inherent nature as a GPT, potential application scenarios may not always be immediately apparent. Therefore, organisations must deeply understand the technology to make informed decisions about its intended adoption purpose (Jovanovic & Rousseau, 2005).

While there are indications of firms' growing adoption of AI, it may take some time before its full impact becomes evident in productivity metrics. Brynjolfsson et al. (2017) shed light on what they call a modern AI productivity paradox, suggesting that delays in implementation and restructuring are the primary reasons for the lag in productivity gains from AI. The process of adopting AI can be time-consuming and complex. For instance, Chen et al. (2021) conducted a study on implementing AI in the Chinese telecom sector. They found that while some telecom firms have introduced AI initiatives, these efforts are often still conceptual and have yet to generate significant commercial value. These findings highlight the challenges and time delays associated with AI adoption, which may impact the realisation of productivity benefits in the short term.

As AI continues to evolve into a GPT, the economic landscape surrounding it is undergoing significant changes. With its ability to provide cheaper and more accurate predictions, recommendations, and decisions, AI promises to generate productivity gains, enhance well-being, and tackle complex challenges (OECD, 2019). However, harnessing the full potential of AI necessitates complementary investments in data, skills, digitised workflows, and organisational process adjustments. As a result, AI adoption varies among companies and industries (OECD 2019).

### 2.3. AI in Sweden

Sweden has emerged as a prominent player in AI research and innovation, with a robust ecosystem fueled by government support, academic research, and private-sector investment, as highlighted in a report by EY Sweden (2022).

The current state of AI in Sweden is characterised by significant advancements, research collaborations, and strategic initiatives aimed at harnessing the potential of AI for societal and economic benefits. Sweden was selected due to its reputation as a country that is conducive to AI adoption and innovation in various sectors, including banking. Our decision to centre this study within the Swedish context was influenced by Sweden's prominence in AI adoption and research, as well as the availability of respondents from Swedish research organisations. While the focus on Sweden may limit the generalisability of the findings to other countries, it offers an in-depth exploration of a specific context where AI adoption is considered to be advanced. While all of our respondents from the banking sector have experience working in various Swedish banks or Swedish branches of banks, we did not confine our study to these specific institutions. Our interest extended beyond its borders as we aimed to investigate the general adoption of AI in banks.

To draw a more precise picture regarding the general environment in which the banks operate, we present the analysis of the Swedish state and non-state actors involved in AI research and adoption with different roles (funding, research, etc.).

### 2.3.1. National Approach and Current State of AI in Sweden

#### 2.3.1.1. National Approach to Artificial Intelligence

Sweden was among the first in the Nordics to launch a national AI strategy as early as 2018 (EY, 2022). According to Sweden's National Approach to AI documentation, "Although AI is rapidly evolving, this does not mean that the benefits of AI will automatically be realised in Sweden. For AI to best contribute to strengthened Swedish competitiveness and enhanced welfare, Sweden must create the enabling conditions" (2018, p.4). The document says that "the Government's goal is to make Sweden a leader in harnessing the opportunities that the use of AI can offer, with the aim of strengthening Sweden's welfare and competitiveness" (p.5). The document emphasises that for Sweden to capitalise on the advantages of AI fully, it is crucial to engage and involve all sectors of society (p. 5).

The realisation of the potential of AI is contingent upon four key conditions, as highlighted in the National Approach to AI (2018): (1) Education and Training; (2) Research; (3) Innovation and Use; and (4) Framework and Infrastructure.

In Sweden, various organisations are actively working towards realising the dimensions mentioned above. These organisations include state institutions, nonprofit research organisations, and collaborative efforts involving multiple stakeholders such as the government, businesses, and nonprofits. Together, they are dedicated to advancing the objectives associated with these dimensions.

#### 2.3.1.2. Education and Training

In the national approach to AI, the Swedish government recognises the need for Swedish higher education institutions to provide adequate AI education and training, particularly in continuing and further education for professionals with a university degree or equivalent. Furthermore, it emphasises the importance of incorporating AI components into non-technical programs to enable responsible and widespread application of the technology. Additionally, the government underlines the need for strong linkages between research, higher education, and innovation in AI (2018).

#### 2.3.1.3. Research

The Swedish government emphasises the need for both general and applied research in AI to ensure a steady supply of knowledge and skills. The document also highlights the significance of fostering collaborations with leading international AI research environments and promoting collaboration between businesses, the public sector, and AI research. Furthermore, it underlines the need to leverage synergies between civil and defence research from a holistic defence perspective (National Approach to Artificial Intelligence, 2018).

#### 2.3.1.4. Innovation and Use

The document also highlights the importance of establishing pilot projects, testbeds, and development environments for AI applications in the public and private sectors. These initiatives should promote the safe, secure, and responsible evolution of AI use. Additionally, efforts to prevent and manage risks associated with AI should be continued, and partnerships and collaborations with other countries, particularly within the EU, should be fostered. (National Approach to Artificial Intelligence, 2018).

#### 2.3.1.5. Framework and Infrastructure

The Swedish government stresses the need to develop rules, standards, norms, and principles to guide AI's ethical and sustainable use. It also emphasises the need to advocate for Swedish and international standards and regulations that promote the use of AI while mitigating risks. Moreover, a continuous review of the need for digital infrastructure to harness the opportunities presented by AI is necessary. Efforts to make data available as infrastructure for AI use in value-added areas should be continued. Sweden should also play an active role in the EU's efforts to promote digitisation and capitalise on the benefits of AI use (National Approach to Artificial Intelligence, 2018).

Despite Sweden being one of the first Nordics to adopt an AI strategy, EY's report considers the vagueness of this strategy as a challenge that requires immediate attention (The State of Swedish AI and data ecosystem 2022). Furthermore, the same report by EY highlights the need for more clarity and direction in the strategy for both public and private organisations, mainly because public organisations now have a greater degree of independence than their Nordic counterparts (2022).



### 2.3.2. National Actors in AI Research and Adoption in Sweden

According to EY's report "The State of Swedish AI and data ecosystem 2022", many organisations in Sweden have started developing, testing, and piloting AI solutions across the public and private sectors and within academia. In addition, AI Sweden, Vinnova, and the Research Institutes of Sweden (RISE) are national actors supporting AI on a broader scale (EY, 2022). Furthermore, the same report reveals numerous initiatives aimed at various functions or solutions, funded or implemented through diverse collaborations among the public sector, academia, and businesses. These initiatives highlight the multi-faceted efforts of different stakeholders to address various challenges and opportunities in various fields (EY, 2022).

#### 2.3.2.1. Vinnova

The Swedish Agency for Innovation Systems (Vinnova) is responsible for fostering sustainable growth by advancing innovation systems in Sweden in technology, transportation, communication, and the workplace. This is achieved through funding research that addresses specific needs and challenges (Vinnova, 2023). Vinnova's vision is for "Sweden to become a leading global player in research and innovation and a country that is attractive for investment and entrepreneurship" (Vinnova, 2018, p.1). Furthermore, the organisation fosters collaborations among companies, universities, public services, civil society, and other stakeholders, strongly emphasising enhancing international cooperation (Vinnova, 2018).

#### 2.3.2.2. AI Sweden

AI Sweden is a national centre for applied AI in Sweden, funded by the government and over 100 partners from various sectors. It aims to accelerate AI usage for societal benefit, run projects in healthcare, decentralise AI, space, and language models, and provide talent programs and resources for organisational change. In addition, AI Sweden's Data Factory enables data sharing and computing power. It catalyses sustainable AI value generation and is funded by Vinnova and partners, with offices in multiple cities in Sweden and Canada (AI Sweden, n.d.).

#### 2.3.2.3. Research Institutes of Sweden

RISE aims to bolster Sweden's international competitiveness and sustainable growth. This goal is achieved through heightening industry competitiveness, spurring innovation, and augmenting the public sector's capacity to address societal challenges via joint endeavours with the industry (RISE, n.d.). RISE's diverse activities include the execution of top-tier research,

fostering synergistic collaborations among academia, industry, and the public sector, aiding innovative growth in small to medium-sized enterprises, and managing testbeds relevant to industry needs (RISE, n.d.).

In addition to the organisations mentioned, other state and non-state entities like the Agency for Digital Government (DIGG), the Swedish Association of Local Authorities and Regions (SALAR), and Formas are also contributing significantly to parallel objectives.

#### 2.3.2.4. Swedish AI Startups

In 2020, AI Sweden, Ignite Sweden, and RISE joined forces to select the best AI startups that can help accelerate and contribute to the application of AI in Sweden and Europe via "Swedish AI Startup Landscape". The AI startups included in the landscape are private companies founded after 2011, with headquarters or significant development activity in Sweden. They have AI at their core or exhibit a significant usage of AI. Approximately 200 such startup companies are creating many categories of AI tools, from finance to sales, operations, education, marketing, etc. (Swedish AI Startup Landscape, 2023).

#### 2.3.2.5. AI Agenda for Sweden

The collaborative efforts of RISE, academia, business, the public sector, and civil society in shaping the AI Agenda for Sweden have been instrumental in driving effective collaboration and improvements. This agenda has been developed to accelerate the adoption of AI in various domains, including research, education, business, the public sector, the general public, and infrastructure (RISE, 2022). Through strategic initiatives, coordination, and consensus building, the AI Agenda aims to maximise the positive impacts of AI in Swedish society. By fostering a collaborative approach, the AI Agenda for Sweden is poised to promote innovation, drive progress, and unlock the full potential of AI for the benefit of all stakeholders (Lulea University of Technology, 2021).

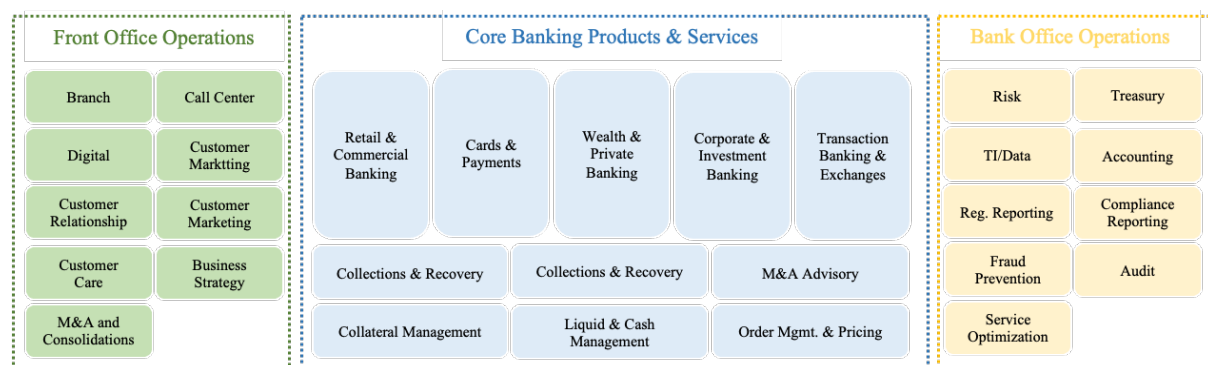
## 2.4. AI in the Financial Sector

The report "Artificial Intelligence in Swedish Business and Society - Analysis of Development and Potential," published by Vinnova in 2018, identifies several important AI application areas that are expected to significantly impact the development of Swedish business and society.

Notably, the report highlights financial services among the most significant areas concerning future competitiveness (p.8).

In the financial sector, there is a growing adoption of AI by both large companies and startups. The financial sector has been one of the early experimenters with AI technologies (Kaya, 2019). For instance, companies such as JPMorgan, Citibank, State Farm, and Liberty Mutual rapidly deploy AI in their operations (OECD, 2019). These companies are utilising various ML practices, including language processing, deep learning, graph theory, and more, to develop AI solutions for decision-making in financial corporations (OECD, 2019). According to OECD's 2019 report "Artificial Intelligence in Society", using AI in the financial sector has significant benefits, including improving customer experience, identifying smart investment opportunities quickly, and potentially offering customers better credit conditions (2019). OECD paper provides an overview of AI applications in the financial sector in general, covering credit scoring, financial technology (FinTech), algorithmic trading, cost reduction in financial services, fraud detection, customer experience, and compliance (2019).

Deloitte's survey found that 86% of financial services AI adopters from IT and line-of-business executives said AI would be critical to their business's success in the next two years (Deloitte, 2021). According to Deloitte's 2021 report "Artificial intelligence: Transforming the future of banking," with the banking sector's established reliance on technology and data, new data-enabled AI technology presents unprecedented opportunities for innovation. AI has the potential to drive advancements at an accelerated pace, enhancing efficiency, supporting growth strategies, enabling differentiation, managing risk and regulatory requirements, and improving overall customer experience (Deloitte, 2021). Deloitte, in 2021, mapped the potential of AI across different areas in banking organisations (Figure 1).



**Figure 1.** The potential of AI across different areas in the banking organisation.

Source: *Artificial intelligence: Transforming the future of banking*, Deloitte, 2021, p.2

As it shows, there are plenty of areas where AI technology can bring value to banks. In parallel to the recent developments in AI technology, we should assume that the number of areas and the quality of AI technology will increase, promising competitive advantages to companies using AI.

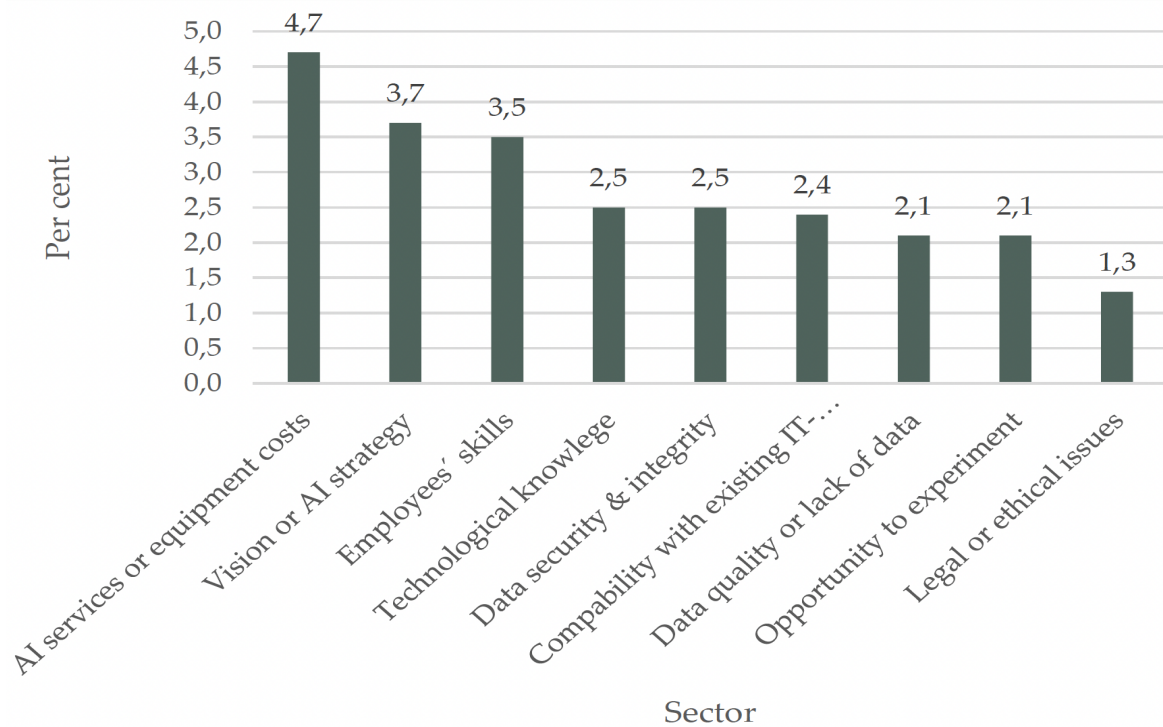
#### 2.4.1. AI Adoption in Swedish Banks

Although we could not find comprehensive research on AI adoption and use by banks in Sweden, there is some fragmented information online regarding the different financial organisations using AI technologies for various purposes. For example, Nordea utilises conversational AI to transform the customer experience (Private banker international, 2022). In addition, Nordea Bank has partnered with Feelingstream, an Estonian startup, to reduce response time for customer queries (NS BANKING, 2017). Sweden's banks, including SEB, Swedbank, and Nordea, embrace AI to increase competitiveness (ComputerWeekly.com, 2018).

### 2.5. Challenges of Adoption and Use of AI

While the adoption of AI in Sweden, including the finance sector, has been growing steadily, several challenges can be seen that need to be addressed for effective and responsible implementation. Although we could not find research specifically on the barriers to adopting AI in banks, we have identified some of the general obstacles to AI adoption in organisations that highly resonate with the Banks. Ek (2021), based on official Swedish statistics, presents the following barriers to the AI adoption process by 2020 (Figure 2.).

As "Figure 2" shows, AI costs, strategy, and skills seem to be significant barriers to the adoption process in 2020. Deloitte's AI survey (2021) of IT and line-of-business executives of companies that have adopted AI technologies found that, from a technology perspective, cost and other barriers to adoption are falling, and it is becoming easier to implement and integrate AI technologies (2021). Therefore, we might assume that the costs will gradually decrease.



**Figure 2.** Barriers to AI adoption in Sweden 2020, as a % of all surveyed firms

*Source: Ek 2021, Drivers of AI Adoption*

*Note: the figure represents firms that responded that it is a large obstacle out of all firms that responded; only 5% of firms use AI*

Regarding the vision or AI strategy as a challenge, it resonates well with Hamm and Kleser's thorough literature review (2021), "Success factors for adoption of AI in organisations", where "Top management support" is identified as one of the top 3 success factors for AI adoption together with technical competence and resources.

The results that employee's skills and technological knowledge hold second and third places as the barriers to AI adoption (from Figure 2) resonates with the results from Vinnova's 2018 report, where the lack of competence is identified as the most significant factor why there is no strategic plan for AI in the organisation (Vinnova, 2018).

It is important to note that despite legal and ethical issues being among the most discussed topics regarding AI, according to Ek (2021), it is presented to be the last in the list of adoption barriers. But, as Ek notes, although it has not yet been empirically explored, barriers to AI adoption, while having commonalities across sectors, may also have some differences (Ek.

2021). As the banking sector is one of the most heavily regulated sectors, the picture in banks would be slightly different, especially from a legal perspective.

This is especially true after the introduction of the General Data Protection Regulation (GDPR), which applies from 25 May 2018. GDPR contains clauses that aim to prevent automated decision-making. This applies to all sectors, not just the financial industry. Article 22 of the GDPR states, "The data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her" (Art. 22, GDPR). This poses a particular challenge for AI tools whose decision-making is entirely automated by definition (Kaya, 2019).

According to Sweden's national approach to AI, as GDPR provides strong privacy protection in personal data processing, "how different stakeholders are able to implement the GDPR in their respective activities will play a major role in how well Sweden is able to manage both benefits and risks of AI" (2018, p.10).

AI ethics is also becoming one of the prominent topics for research and discussion, mainly due to possible biases and challenges in explainability and interpretability (AI index report 2019). According to the AI index report 2022, the field of research on fairness and transparency in AI has witnessed a remarkable surge since 2014, evidenced by a fivefold rise in publications at ethics-focused conferences. As a result, what was once a niche academic pursuit has become a mainstream research area, with algorithmic fairness and bias deeply ingrained and far-reaching ramifications (Stanford Institute for Human-Centred Artificial Intelligence, 2022).

OECD's 2019 report "Artificial Intelligence in Society" also touches upon this topic regarding the financial sector and states that deploying AI in the financial sector "raises important policy questions related to the accuracy, discrimination prevention, and the broader impact of automation on jobs." For example, there are concerns about ensuring the accuracy and fairness of AI algorithms used in credit scoring and compliance processes (OECD, 2019). Additionally, the impact of AI on jobs in the financial services industry is a topic of discussion (OECD, 2019).

Ethical considerations regarding the deployment of AI in the financial sector are also addressed in the OECD's 2019 report titled "Artificial Intelligence in Society". The report highlights

important policy considerations related to accuracy, discrimination prevention, and the broader impact of automation on employment. For instance, concerns are raised regarding the need to ensure the accuracy and fairness of AI algorithms used in credit scoring and compliance processes (OECD, 2019). Furthermore, the impact of AI on employment in the financial services industry is also discussed in the same report.

#### 2.5.1. OECD's AI Principles

AI is still in its early stages, and policymakers are grappling with encouraging its development while addressing risks. The OECD Principles on AI, adopted by OECD member countries and several other nations, aim to promote innovative and trustworthy AI that respects human rights and democratic values. The five principles include ensuring AI benefits people and the planet, designing AI systems that respect the rule of law and include appropriate safeguards, promoting transparency and responsible disclosure, ensuring robust and secure AI systems, and holding organisations and individuals accountable for AI system functioning.

The OECD also provides recommendations to governments, including facilitating investment in research and development, fostering accessible AI ecosystems, creating a policy environment for trustworthy AI deployment, empowering people with AI skills, and promoting international cooperation on responsible AI stewardship (OECD, 2019). It is important to mention that the OECD AI Principles are the first such principles signed by governments (OECD, n.d).

The Swedish national approach to artificial intelligence (2018) aligns with the OECD AI principles, which focus on inclusive growth, sustainable development, and well-being. The Swedish approach emphasises human-centred values and fairness in developing and deploying AI technologies. It also emphasises investing in AI research and development to foster innovation, creating a digital ecosystem that supports AI, and providing an enabling policy environment for AI to thrive. Furthermore, the approach recognises the importance of building human capacity and preparing for the potential labour market transition that may arise due to the increased adoption of AI technologies.

## 2.6. Organising For Success Within Banks

Deloitte, in 2021, mapped six steps where the banks may need to evolve their process to be successful in their AI adoption:

**Step 1:** Develop an AI strategy. Shift from just using AI capabilities to being an AI firm and addressing the how of execution.

**Step 2:** Define a use case-driven process. Focus on business value-driven use cases and invest in diverse AI capabilities instead of focusing on limited AI solutions.

**Step 3:** Experiment with prototypes. Shift from providing a concept to laying a foundation and preparing for strategic alignment.

**Step 4:** Build with confidence. Move from a reactive mindset to a proactive focus on risks and ethics and explore new partnerships while balancing convergence.

**Step 5:** Scale for enterprise deployment. Change the "nice-to-have" AI talent list to a "must-have" list and shift from rigid to adaptive technology and operating models that introduce nimbleness across the organisation.

**Step 6:** Drive sustainable outcomes. Go beyond only implementing AI to discovering how to enhance capabilities and generate additional business value from deployed applications." (Deloitte, 2021, p.4).

## 2.7. Summary of the Literature Review

The literature review underscores the rising significance of AI adoption in the banking industry, with important players, including national agencies, academia, and enterprises playing an important role in promoting AI research and development. The landscape of AI is defined by multiple initiatives and partnerships between government, academia, and industry to address various issues and possibilities.

While prominent banks have begun employing AI to improve their competitiveness, several obstacles challenge its widespread adoption. Costs that come along with AI, a lack of strategy, shortages of expertise, legal and ethical issues, and the effect of AI on employment in the financial services sector are a few of these.



### **3. Methodology**

The methodology section of this research paper outlines the methods and techniques used to gather and analyse data. This paper describes the methodology used to investigate the "Current State of AI Adoption in Swedish Banks: Rationales, Challenges, and Lessons Learned". The research design, sampling strategy, data collection methods, and data analysis techniques used in the study will be discussed in detail. Furthermore, ethical considerations and a critical overview of our research will be discussed.

#### **3.1. Research Approach**

##### **3.1.1. Qualitative Approach**

In conducting this study, we chose a qualitative approach. This methodology allowed us to delve into the experiences and viewpoints of our participants, specifically concerning the utilisation of AI in the banking sector. As Rahman (2017) suggests, qualitative research is especially appropriate for investigating intricate and subjective matters, as it provides a platform for a profound understanding of attitudes, beliefs, and perceptions that defy straightforward quantification. Given the challenging nature of quantifying these aspects, they are most effectively examined through qualitative data collection techniques such as open-ended interviews and observations. By employing such methods, we obtained rich and detailed data that provided valuable insights into the use of AI in finance from the participants' perspectives.

While qualitative research provides a thorough grasp of the research issue, it does not imply an exhaustive representation of all conceivable viewpoints or experiences, which is a crucial distinction to make. Instead, the aim was to provide a detailed exploration of the specific context of AI adoption in banking, with an emphasis on the opinions and experiences of the participants.

##### **3.1.2. Time Horizon**

This research takes a current-state approach to investigate the current perceptions and attitudes toward the topic while also considering potential future trends and shifts in opinions and acceptance. While the study primarily focuses on the current state of AI adoption, it is important to consider future trends and shifts in opinions and acceptance. Therefore, we also

gathered information on the factors that may influence future adoption, such as changing regulations, the need to remain competitive, or the emergence of new and better AI systems. By considering current and future perspectives, this study aims to provide an improved understanding of the role of AI in finance.

### 3.1.3. Approach to Literature Review

To gather relevant information for our research, we systematically identified and analysed various reputable sources. These sources included a wide range of content, including papers and scientific publications from government agencies, consulting companies, academic institutes, and international organisations.

Several scientific databases, including Scopus, JSTOR, Science Direct, Google Scholar, LUBSearch, and ResearchGate, were used in our thorough search. These databases gave us access to a huge selection of academic writing on the subject of our study. To acquire pertinent data and insights, we also investigated openly accessible sources, including Statistics Sweden, Statista, the World Economic Forum, and the OECD.

We chose the sources based on how well they answered the questions we were trying to answer, and we used keyword filtering to focus the search results. By using precise keywords associated with our research subject, we ensured that the returned material was concentrated and relevant to our study.

This approach was particularly important due to the rapid evolution of AI technology. We prioritised newer sources to obtain the most pertinent and valuable material accessible since we understood the importance of including recent and current insights in our investigation.

Keywords: Artificial Intelligence (AI), AI Adoption, AI Applications, Motivations for AI Adoption, Challenges in AI Adoption, Lessons Learned, AI in Banking, Sweden, Banking Sector, Financial Institutions, Technology Adoption, Machine Learning, Banking Regulations, Digital Transformation, Financial Services, Automation, Data Privacy, Security, Ethical Considerations.

### 3.1.4. Assessment of Possible Research Frameworks for This Study

For the theoretical framework of our research, we identified several theories that could have been useful, such as the Resource-based view, Diffusion of Innovations (DOI), Technological, Organisational, and Environmental (TOE) framework, Social Cognitive Theory (SCT), Unified Theory of Acceptance and Use of Technology (UTAUT), and Technology Acceptance Model (TAM). We also studied variations of mixed methodologies and frameworks to identify our study's best-suited framework(s).

However, as our study progressed and we delved deeper into our research questions and objectives, we found that these theoretical frameworks did not directly align with the specific focus and findings of our study. Rather than incorporating them into our analysis, we used them as sources of inspiration to inform our thinking and approach, in particular TAM.

## 3.2. Data Collection Methods

### 3.2.1. Industry Selection

Due to limitations in time and resources, the decision was made to focus on one industry for the research. This approach allowed for a significant amount of data to be collected and a deeper understanding to be gained compared to attempting to cover all four industries simultaneously.

To select the industry, we first reviewed various reports and studies conducted by reputable institutions, such as Statistics Sweden, the Swedish National Board of Trade, and the Swedish AI Society, to identify those industries in Sweden actively using AI. After this initial screening process, we chose the banking industry due to its high level of AI adoption according to our literature review (Maslej et al., 2023; IBM, 2022; McKinsey & Company, 2022; Allianz Global Investors, 2019; Stefanini, 2022; Deloitte, 2020).

We based our decision to study the banks as a research subject on several factors. To begin with, a 2018 report published by Vinnova recognises financial services as a critical arena for Sweden's future competitiveness, underlining the importance of exploring AI applications within the banking sector as part of broader societal and business evolution. Additionally, there is an escalating trend of AI adoption within the global financial sector. Leading companies, including JPMorgan, Citibank, State Farm, and Liberty Mutual, are actively integrating AI into

their operations (OECD, 2019). These developments underscore the significance and immediacy of researching AI utilisation within the banking industry.

Furthermore, Deloitte's reports (2020; 2021) on AI in banking highlight the unprecedented opportunities for innovation presented by AI technology in areas such as efficiency, growth strategies, risk management, regulatory compliance, and customer experience, underscoring the critical importance of AI for business success in the banking sector. Additionally, limited research on AI adoption and use by banks in Sweden indicates the need for further investigation in this area. Moreover, we had connections within the industry, making it easier to identify and recruit qualified interview candidates for our study. Therefore, a large element of feasibility and practicality influenced our decision to focus on the banking industry.

### 3.2.2. Target Selection

For this study, two main groups of individuals were interviewed: (1) experts in the field of AI and computational linguistics and (2) bank representatives.

**Interviews with experts:** we interviewed three experts within AI and computational linguistics to generate a good picture of the topic and help us create a good outline and guidelines for what to ask the interviewees. Expert interviews, representatives from Swedish AI research and innovation companies, namely: "AI Sweden", "Research Institutes of Sweden" and "The Swedish Agency for Growth Policy Analysis (Growth Analysis)" were interviewed to compare and contrast the experiences and perspectives of our participants with those of experts in the field of AI research and innovation.

**Interviews with bank representatives:** the study focused on employees from the banking sector. For this section, we interviewed bankers with extensive experience working within banks, including Swedish banks. This gives them a deep understanding of the banking industry, the current state of AI adoption, and potential challenges and opportunities.

Nevertheless, considering the frequent movement of professionals within the banking industry, we do not restrict our search to individuals currently employed within Swedish banks since this criterion may be challenging to fulfil. To ensure diverse experiences and perspectives, we interviewed individuals working at different banks. This allowed us to get different opinions,

as different-sized banks and different banks, in general, may have different policies, regulations, and implementation levels of AI.

Our choice to focus on Sweden was driven by the country's promising environment for AI adoption in banking. We gathered empirical data through interviews with professionals who either currently work in Swedish banks or have significant experience within the Swedish banking sector but now operate in different countries. All respondents are of Swedish origin, thereby intimately familiar with the local context. It's crucial to note that they possess up-to-date and relevant knowledge, having worked in several Swedish banks. Fortuitously, some respondents have also worked or are currently working in banks in other countries, such as Luxembourg and Liechtenstein. Their broad experience allowed them to provide a comprehensive overview of the subject matter and contribute valuable empirical information from a wider perspective.

### 3.2.3. Respondents

The table below presents our study's respondents, which involved interviews with experts in the field and experienced bankers. In addition, it provides an overview of those who participated in our study, including their role(s), organisations, interview duration, and date.

A significant feature of our participant selection lies in the extensive experience of our participants, many of whom have served in multiple banks during their careers. These seasoned bankers contribute a rich trove of knowledge to our study. Their expansive networks within the banking industry offer us precious insights not only about the internal operations of the banks they have been associated with but also about practices in other banks, particularly concerning AI usage. While our primary goal is not necessarily to ensure generalizability, this approach does indeed expand the range of our study. This elevates the potential applicability of our findings, helping to formulate conclusions that mirror the wider community of bankers and the implementation of AI within banking more accurately. The cumulative expertise of our interviewees extends across a substantial breadth, covering 13 different banks.

**Table 1.** Respondents

<b>Experts</b>				
<b>Respondent</b>	<b>Role</b>	<b>Organisation</b>	<b>Duration (min.)</b>	<b>Date</b>
E1	Senior researcher (PhD)  Professor of Computational Linguistics	Research Institute of Sweden (RISE)  Uppsala University	55	April 14
E2	Analyst, Author of several research documents on AI adoption in Swedish companies (PhD)	Swedish Agency for Growth Policy Analysis (Tillväxtanalys)	40	April 25
E3	Head of Research, NLU (PhD)	AI Sweden	45	April 28
<b>Bankers</b>				
<b>Respondent</b>	<b>Role</b>	<b>Organisation</b>	<b>Duration (min.)</b>	<b>Date</b>
B1	Private Banker	VP Bank Liechtenstein  Experience at: Banque Havilland UBS Unibank Nordea SEB Enskilda Skandia	50	April 17
B2	Private Banker	VP Bank Liechtenstein  Experience at: Catella Bank	50	April 26
B3	Investment Banker	Pareto Group  Experience at: East Capital	40	April 28
B4	Regional Executive Director and Wealth Management	UBS  Experience at: Nordea Svenska Handelsbanken HQ Sweden	50	May 17

B5	Senior Quant / Technical Analyst	Carnegie Investment Bank  Experience at: Handelsbanken Capital Markets Straumur Investment Bank ABG Sundal Collier Swedish Hedge Fund Founder	30	May 23
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### 3.2.4. Semi-Structured Interviews

We conducted semi-structured interviews using the Zoom platform. In this type of interview, we had a list of topics and questions but did not strictly follow a standardised set of questions. This is distinct from an unstructured interview, as we still wanted to have a general list of questions answered to enable comparison between different respondents.

This was particularly useful in our situation as it allowed us to ask follow-up questions to individuals who may, for instance, have particular expertise within a particular area (Mashuri et al., 2022). For example, one of our expert interviewees had deep expertise in computational linguistics. Thus, we asked him specific questions regarding AI's ability to read data in different forms.

Furthermore, as our study was qualitative, the semi-structured approach allowed for the interviewee's perspectives, experiences, and attitudes to be expressed in their own words. This approach allowed us to obtain ideas and answers that we may have yet to consider or be aware of, thus providing a better overall understanding of the topic.

We designed separate interview guidelines for the expert and banker interviews to ensure that the questions were tailored to their specific areas of expertise and experience. These can be found in Appendixes A and B.

### 3.2.5. Interview Questions

Our study used a combination of questions from an interview guideline to collect the necessary information. As already mentioned, these questions were formulated based on the literature

review and our research objectives to gain insights into companies' adoption process and the current use of AI.

We decided to have different questions for the experts and participants for several factors. As experts are more knowledgeable about AI and its technical aspects, we asked them more in-depth questions related to the technical aspects of AI adoption, such as state-of-the-art, emerging trends, and the potential for future development. The bankers, on the other hand, were asked more practical questions about their experiences with AI adoption, such as the challenges they faced during the implementation process, the benefits they saw, and the impact on their organisation and industry.

### 3.3. Data Analysis

#### 3.3.1. Audio Recording

As the interviews were conducted through Zoom, we were able to record the interviews using a digital voice recorder, with the participant's prior consent. In addition to recording these interviews using a digital voice recorder through Zoom, we also recorded them, as a backup, using a phone microphone. By using audio recordings, we were able to capture and analyse not only the participants' spoken responses but also their nonverbal cues. Including aspects like tone of voice, pauses, and emphasis placed on specific words or phrases. These nonverbal cues provided valuable insights into the participants' attitudes and perceptions. Additionally, the audio recordings afforded us the opportunity to revisit the interviews and extract pertinent information that may have been overlooked during the initial analysis.

#### 3.3.2. Transcription

We used Whisper, a transcription software OpenAI (2023) designed to make transcription more manageable and accurate. They have trained this open-sourcing neural net to recognise English speech accurately. Inevitably, transcription software may produce some inaccuracies, so we manually reviewed the transcript to eliminate any errors, but we were pleasantly surprised to find very few mistakes. The transcripts generated by Whisper exhibited an impressive level of accuracy.



### 3.3.3. Data Analysis Process

Thematic analysis was used to analyse the interview data. The analysis involved identifying patterns and themes within the data and interpreting the findings concerning the research questions. To analyse the data obtained from interviews, we followed a systematic process. After transcribing the data, we conducted a manual analysis of the interviews by thoroughly reading through them, extracting relevant information through analysis, and categorising it.

The next step was identifying rationales for adoption, use cases, challenges, and lessons learned. We examined the data closely and identified emerging themes that helped us answer the research questions. These themes were then compared and contrasted with the literature we reviewed and the information obtained from the expert interviews. Here, we looked for similarities and differences in the data and used these to conclude the factors that influence the adoption and usage of AI in the banking sector. After this step, we were ready to draw conclusions and answer the research question. We summarised the key findings and presented them clearly and concisely, supported by relevant interview quotes.

## 3.4. Ethical Considerations

The study adheres to ethical principles of research, including informed consent, confidentiality, and anonymity of participants.

**Informed Consent:** According to Sekaran & Bougie, "Any audio or videotaping should always be done only after obtaining the respondent's permission" (2016, p.119); informed consent was, therefore, obtained from all participants before the interviews were conducted. We have also respected their right to withdraw from the study at any time without any consequences if they so wished. They were asked to provide verbal consent before the interviews were conducted.

**Confidentiality:** Sekaran & Bougie underline that the respondents "have the right to privacy and confidentiality" (2016, p. 48). The data collected in this study will be kept confidential and only be accessed for this study. All personal information, including names and contact information, will be kept private.

**Anonymity:** The utilisation of pseudonyms serves to uphold the privacy and confidentiality of the participants. However, the key rationale behind adopting this approach stems from the

specific nature of our study. In our particular context, the research objectives do not demand the inclusion of individual identities. Consequently, the use of pseudonyms offers a simplified means of communication, supporting the clarity and focus of our research.

### 3.5. Research Challenges

One of the significant challenges encountered was the time-consuming process of identifying appropriate experts. Despite reaching out to individuals from various organisations, such as research institutes and state agencies involved in AI-related tasks, the response rate could have been higher. Furthermore, while some respondents provided valuable information regarding AI implementation, use cases, and general challenges, their in-depth understanding of AI in banks was relatively limited. This could have impacted the depth of insights that could be obtained related specifically to AI in banks.

Identifying and meeting with bank employees with the relevant knowledge and experience required for the research also proved challenging. A poor response rate from the bank employees we contacted to participate was one difficulty, as we rightly expected. With this assumption in mind, we deliberately reached out to more people than we had initially anticipated being required for our research.

These challenges highlight the difficulty of conducting research in emerging fields where there may still need to be a well-defined group of experts and where there may be limited understanding of the topic in certain contexts, such as bank employees.

### 3.6. Limitations of the Study

To ensure the reliability of the study, we maintained consistency in the research design, sampling, data collection, and analysis techniques. During the analysis process, we focused on formulating and defining relevant and reliable categories. As an added measure, we utilised the initial interview to evaluate and mitigate any potential sources of error or variability in the study design. This enabled us to identify and address any necessary changes to the study design before conducting subsequent interviews.

Another limitation is the relatively small sample size. Although we performed a qualitative study, where numbers are not as much of an issue as in a quantitative study, having a greater

selection of respondents may have been more informational. While we would have preferred the opportunity to interview more respondents for an even more comprehensive data set, we are nonetheless confident in the depth and breadth of information collected. Our current data, although somewhat limited in quantity, is still reasonably comprehensive and valuable. It provides substantial insights from which we can draw meaningful conclusions.

As our research aimed to identify rationales and study the experiences of AI adoption in banks based on our interviews with the employees of several banks, experts, and literature review, we do believe that, to some extent, it can be generalisable for the entire banking sector. Nonetheless, given the expertise of the bank employees we spoke with and the understanding of AI and computational linguistics that the experts from our interviews possess, we anticipate that the study's findings will provide a reasonably accurate picture of the same process in general for the banking industry.

Furthermore, there were limitations to our interview guideline design and the process itself. The questions we created were our best attempt at creating an open dialogue without pushing a certain direction too much and suggesting specific ideas. We wanted to get the true opinion and thoughts of the person we interviewed, but this remained a risk.

The research does not cover every use case of AI technology by banks nor all conceivable challenges, despite its aim to identify as many use cases, challenges, and lessons learned through the adoption process as possible. This research thus mainly concentrates on the most typical applications and difficulties found during the adoption process.

Ultimately, the banking industry was the only area covered by our study. Therefore, it would be useful to compare the banking sector to other industries since banks could find the knowledge from these areas valuable. However, such a comparison could not be carried out due to the time and resource constraints associated with this study.

#### **4. Findings, Analysis, and Discussion**

In this chapter, we present and categorise the research findings based on the themes and sequence of those themes in the research question. It overviews the rationales of AI adoption in banks, then discusses challenges related to the process of adopting AI tools, and finishes

with the lessons learned from the process. The references (E1, B1, ...) correspond to specific respondents in Table #1.

When quoting the experienced bankers in this study, it is important to note that their insights are based on their cumulative experiences working in multiple banks, both within and outside of Sweden. These individuals possess a vast amount of knowledge and expertise acquired through their diverse banking backgrounds. Nevertheless, it is crucial to acknowledge that their viewpoints are based on their personal experiences and may not necessarily align with the opinions or practices of any particular bank or the banking industry as a whole.

By being transparent about the specific context of these quotes, we aim to present a comprehensive understanding of the intersection between AI and banking while acknowledging the limitations of individual perspectives within the broader banking landscape.

#### 4.1. Applications of AI in Banking: Growing Interest and Current Usage

The interest in AI technology and its possible applications was observable throughout the research process as newer studies and technological advancements were revealed almost daily. The interview process also showed the rising interest in AI technology and its potential applications in the banking industry. All the bank respondents underlined that they are following the news on AI development and are interested in investigating how it works and what benefits it can bring them. While most of our bank respondents stated that they did not use AI extensively in correlation to their work, there is undoubtedly a significant level of interest and attention towards it. There was a general sentiment that the adoption within banks has been slower due to the challenges present within the industries, which will be mentioned later on. It was also observable that all respondents expect that AI technology will eventually become a large part of their work in some way.

Both bank employees and experts underlined several main applications of AI in banking. The focus seems to be chatbots for automating customer support functions (particularly in large retail banks), compliance and fraud detection, data processing, and client service optimisation. All bank respondents see AI technology as a supplement that can increase the productivity of

banks as it can handle administrative aspects of their work (paperwork, emailing, document analysis, compliance checks, etc.) and free up their time to focus on more valuable tasks.

When considering the role of Swedish state agencies in AI research and adoption, as mentioned in the literature review, this study did not find a direct influence of their activities on AI adoption within banks. It is important to mention that this research did not investigate possible indirect connections, such as collaborations between banks and AI startups or organisations that receive support from those government agencies. There could likely be indirect effects in this context that require a separate investigation to explore further.

## 4.2. AI Adoption

### 4.2.1. Rationales Behind AI Adoption in Banks

Through our research, we were able to categorise the rationales driving banks' adoption of AI into the following three groups:

#### 4.2.1.1. **Productivity**

As the reader might logically have assumed, based on the literature review above and the general knowledge about AI, one of the primary reasons mentioned by all respondents for AI adoption is the desire and the need to become more productive. This aligns with Deloitte's survey (2021), stressing the potential of AI to increase efficiency and overall customer experience. As respondents E1, B1, B2, and B4 have underlined, automation enables faster and more cost-effective work. One example where efficiency could be improved is data processing; companies tend to have a plethora of valuable and essential documents; however, without technology like AI, they may lack the ability to automate the extraction of information. In addition to improving the speed of task completion, B4 mentioned that it would also elevate the quality of certain aspects of the tasks, especially in areas such as compliance and document analysis.

B4 postulates that, based on their experience, that investment bankers allocate a considerable portion of their time, around 50%, to activities such as "compliance, chasing clients for documents, follow-up, and control". This shows how significant that fully or partially automating tasks, like these, would save time and improve productivity.

The motivation here is the desire to save money and automate specific tasks within the organisation which seem either complicated or too time-consuming and inefficient to be done manually. This is when the bank has identified business problems that can and needs to be handled by certain types of AI technology.

#### 4.2.1.2. **Competitive Pressure**

Competitive pressure and the need to maintain a competitive edge in the industry were other reasons for AI adoption. All respondents expect AI technology to become an essential component for productivity and overall competitiveness; for that reason, companies in the industry consider assessing and adopting AI as the necessary step to take in the early stages.

These findings also align with the survey results of Deloitte (2019), where 86% of the IT and business executives in financial services considered AI as very or critically important to their business's success in the next two years. In this context, it is worth noting that the industry's pressure to "do something" due to fear of falling behind can prompt decision-makers to act, even if their actions may not always be thoroughly evaluated and calculated, as emphasised by B4. This leads to the next reason for AI adoption: "following the hype."

#### 4.2.1.3. **Hype**

E3 highlighted that some companies tend to "board the hype train" and adopt AI without a clear understanding of their specific business needs and the value that a particular AI tool can bring. In such cases, these organisations may lack the necessary resources and business processes required for successful adoption and reaping the benefits of AI.

What can be inferred from E3's general observation is that successful AI adoption is contingent upon connecting the AI technology to a concrete business case. This means that organisations need to have a clear understanding of how AI can address their specific business needs and contribute to their strategic objectives. By identifying and defining a well-defined business case, organisations can align their AI adoption efforts with specific goals and outcomes, making the adoption process more purposeful and effective.

Connecting AI technology to a concrete business case entails a thorough analysis of the organisation's operations, challenges, and opportunities. It involves identifying areas where AI can create value, streamline processes, improve efficiency, enhance customer experience, or drive innovation. By establishing a clear link between AI and specific business objectives,

organisations can ensure that tangible goals and expected outcomes drive their AI adoption efforts.

By emphasising the importance of connecting AI technology to a concrete business case, E3 underscores the need for organisations to approach AI adoption strategically. In E3's words, "The distinguishing factor in all of these [successful AI adoption] cases is that you can connect AI technology to a concrete business case."

#### 4.2.2. Diverse AI Needs in Different Types of Banks

Respondents from the banks underlined that different types of banks have different degrees of need to adopt AI tools. While retail banks offer banking services and loans to individuals and small businesses, investment banks organise capital raising for institutional clients that invest in capital markets and companies that seek capital and provide advisory services to them (Investopedia, 2021). All the respondents from the banks emphasised that for the large retail banks, which have a large number of "average" (B1) clients and therefore more communication and customer service needs to be handled, using chatbots has the potential for a more efficient process, both in terms of speed and cost savings. As for such types of banks, the "quantity of transactions" (B2) is more important; they need to process numerous documents, utilising both language models and other types of AI.

In contrast, investment banks typically concentrate on a smaller group of clients. Although private investment banks fall within the financial sector and share similarities in information collection and processing, representatives from investment banks pointed out that their utilisation of artificial intelligence may differ from other types of banks. For example, B2 underlined that, in general, big clients to whom they give investment advice and provide other types of financial services prefer personal communication. They do not see the value of using chatbots for communicating with such types of clients via AI any time soon. As B3 mentioned, "It is important not to underestimate the importance of personal relationships between the client and private banker."

Within investment banking, the consensus of the interviewed bankers is that smaller clients could benefit from implementing chatbots (B1, B2, B3). B2 emphasised that using chatbots would improve investment advice and service for these clients, who may not currently receive

private banking services due to their smaller capital, thus lowering bank profitability. Furthermore, with smaller clients, the potential risks or errors will have less impact on the bank or the client.

Respondents see AI as particularly valuable for investment banks for the operational tasks (B2), such as making organisational processes more efficient (compliance, fraud detection, revealing money laundering risks, emailing, assessing stocks, etc.). However, regarding supporting organisational/administrative functions, respondents believe AI is equally beneficial for different banks.

#### 4.2.3. Challenges in AI Adoption: Major Types and Connections

The experts underlined that the challenges in AI adoption generally depend on the reason the company wants to use it (E1, E3). Moreover, it varies depending on the functions; implementing chatbot functionality would need access to more processing capacity, while using AI for document analysis would require the availability of the necessary data in the correct format.

After analysing the interviews with experts and bank representatives, several significant challenges were identified. It is important to note that some challenges are intertwined and separating them as stand-alone issues is difficult. The following sections will present these challenges and aim to draw connections between them.

##### 4.2.3.1. Security Risks and In-House Options

Most respondents underlined the first challenge is security issues when sharing company data with external providers. As the most capable AI models (e.g. GPT4) available today are not accessible for download, it means that if the company wants access to those models, it has to happen via API, meaning the company has to share its data with AI provider companies via the Internet.

As this involves security risks due to sharing confidential and sensitive information, it might be a tough choice for banks, mainly due to the regulatory requirements and competitive risks as their data could become exposed. B4's observation highlights that banks are often highly resistant to outsourcing, particularly when it comes to sensitive information. The inclination, as expressed by B4, of "we are so capable, we can handle it internally" might be viewed as an



additional reason against sharing information with external entities that are not under their complete control.

One option is to develop in-house AI capabilities. However, respondents emphasise that this decision comes with its own set of challenges. First, building a model that can match the capabilities of the best available models online is nearly impossible due to the significant investment required. Choosing an in-house option means starting with an inferior model (E3). Nevertheless, B4 points out that managers believe developing in-house capabilities eliminates the risk of errors and allows for complete control, even though it may involve substantial sunk costs. He observes that people often continue investing in a potentially bad idea rather than seeking expert advice or halting the project.

Another challenge of choosing an in-house option is the need for computational infrastructure, which comes with high financial costs. Additionally, the model needs continuous improvement, fine-tuning, and customisation for specific business functions. This requires an in-house team and brings significant financial burdens for the company.

One interesting point made by B1 is the ability of banks to "set up separate companies" to implement and experiment with AI capabilities. This approach adds a layer of complexity and challenges to the adoption process. Rather than banks integrating these AI capabilities directly into their organisational structure, they opt for establishing subsidiaries or partnerships, where the bank holds ownership in the AI company. This strategic approach aims to minimise potential legal or reputational risks associated with any unintended negative consequences that may arise from the AI model.

E3 emphasised that the decision between sharing data with an external AI service provider or developing in-house AI capability is "likely one of the primary challenges at present." Our research and E3's insights indicate that Swedish banks have their own AI initiatives, which may involve collaborations with AI startups or organisations focused on enhancing their AI capabilities. However, while there are indications that these banks utilise AI services from external companies, it remains unclear whether such partnerships involve sharing the bank's information with third parties or if the data processing is maintained under the banks' control.

#### 4.2.3.2. **Regulatory and Legal Challenges**

While our literature review acknowledged legal aspects as a potential challenge, the actual magnitude of this issue took us by surprise in reality. The severity of this obstacle proved to be far greater than we had initially anticipated.

All the respondents from the banks emphasised that the banking industry is one of the most heavily regulated, and compliance with the requirements of data collection, analysis, and sharing is a significant factor when considering AI for these purposes. While AI can help banks meet regulatory requirements more efficiently (B2), there are also restrictions and ambiguity surrounding the use of AI technology in these areas. E3 underlined that it is quite unclear from the legal perspective what status the generative models gave about data protection.

To illustrate the magnitude of legal challenges encountered during the development of AI models, we can consider the case of GPT-SW3. GPT-SW3 is a large-scale generative language model for the Swedish language (trained with Nordic languages, primarily Swedish) developed by AI Sweden in collaboration with RISE and WASP WARA Media & Language. Although not as powerful as GPT-4, it is currently "by far the best generative model for the Nordic languages excluding GPT-4", and is currently being tested in several university hospitals and state agencies in Sweden, according to E3. But, due to legal challenges, it is not open source and is currently available only for research purposes, limited to Nordic organisations with specific access permission. The GPT-SW3's example highlights a cautious approach toward potential legal consequences when creating an AI tool that might cause unintended consequences for its creator or user company.

#### 4.2.3.3. **Ethical Challenges**

In the literature on AI adoption and use, ethical challenges of AI technology, such as explainability, transparency, and risks of biases, have been frequently related to the legal aspects of the AI adoption challenges. The respondents also mentioned ethical aspects of AI, especially issues with explainability and potential for biases, as a significant ethical challenge of the technology. This could cause financial and legal risks for the company. E1 and B2 also discussed transparency issues with the AI companies [OpenAI as an example] when there is not enough transparency or even trust regarding how the model is trained and whether those companies can manipulate the model in certain ways.

#### 4.2.3.4. **Challenges of Data Readiness**

Experts E1 and E3 stressed the importance of data readiness for AI adoption and processing of the available information. This means that the right infrastructure needs to be in place, and the data formats need to be suitable for AI analysis. This finding seems similar to Ek's suggestion (2021), as the fundamental element for AI adoption is both availability and data characteristics.

According to E1, "data readiness is a huge problem for many organisations." Respondents E1 and E3 underlined several variations that can be observed in this regard: The first challenge is when the organisation has no data, which is relatively rare. Another, the most frequent case, is when the organisation has the data in a non-machine-readable format. For example, E1 underlined that data in PDF format is difficult for the software to read due to its structure which is not understandable for the machine in a similar way as it is for the human. This means the data quality is low and can not effectively be processed. The third type of challenge is when the company has the data in different formats and locations (E1). For instance, some data is on paper, some electronically in different formats, and it is spread chaotically. It makes data collection and analysis a much bigger challenge (E3). The fourth challenge is "not owning the data" by the organisation that needs to use it. For example, when an outsource data factory owns the organisation's data, and under the contract terms, the company can not use the data for training AI models (E3).

From B4's observation, the format of the data can be seen as one of the problematic parts of the data collection and analysis using AI, as the formats can differ in many ways "from the size of the paper to the language, etc."

As much as such an issue may be perceived as a minor technical problem, it is clear that it can be critical to the decision to adopt AI tools as it needs the data for fine-tuning and refining to become effective for the company.

#### 4.2.3.5. **Challenges in Implementing New Programs and Preventing Clashes within Existing Models**

Implementing AI and technology in the banking sector can be a complex and time-consuming process, as highlighted by B5. B5 emphasised the importance of ensuring that new programs and initiatives do not collide with existing ones, as this can create restrictions and significantly

delay the implementation process. The banking industry typically deals with numerous programs and applications, making it crucial to carefully manage their integration and avoid conflicts.

Confirming a new program in banks can often take many years due to the need for extensive verification by IT teams and stakeholders. This thorough validation process aims to ensure that the new technology aligns with the organisation's existing infrastructure and meets the required security, reliability, and compatibility standards. The complexity of integrating AI and technology into the existing banking systems necessitates meticulous planning and coordination to prevent conflicts and disruptions.

Moreover, the large number of applications and programs within banks adds another layer of complexity to the implementation process. Each application must be carefully evaluated to ensure compatibility and prevent any potential clashes or negative interactions. This evaluation involves assessing the impact on existing systems, data integration, and the overall efficiency of the bank's operations.

#### **4.2.3.6. Company Size and Technical Competence as a Challenge**

B5's observation highlights the prevailing low level of knowledge and efficient utilisation of AI, which poses a significant challenge in the adoption process. This lack of understanding and expertise inhibits the successful integration of AI technology in Swedish banks.

Additionally, E1 pointed out that the size of the organisation and the technical competence of employees can further complicate the adaptation of AI, with larger organisations facing greater difficulties in introducing and effectively implementing new technologies.

However, E3 underlined that there had also been examples of successful AI adoption by large-size companies where the distinguishing factor was the companies' ability to connect AI tools to specific business problems. According to E3, these success stories have consistently started with a clear identification of business problems that can be addressed using AI technology. This assertion is supported by Deloitte (2021), further underscoring the significance of aligning AI adoption with specific business needs.

#### 4.2.3.7. **Trust in AI Technology and Its Challenges for Adoption**

E1 underlined that trust in general towards AI technology and its capabilities could vary; being too suspicious, trusting too much, and imagining that it has other human qualities. According to E1, they might lose out if the companies are too suspicious. But if they are too trusting, they will take risks they don't want to. As E1 mentioned, "Trust depends on knowledge, knowing how the technology works and what you can trust it to do and what you can not trust it to do."

The current state of AI capabilities plays a role in building trust in the technology, which needs to be established between both banks and clients. B4 emphasised the challenge posed by the fact that the quality of AI chatbots today is not yet sufficient to satisfy users – as illustrated by the saying, "You ask about apples and they answer about bananas." While the overall quality is decent and improving, it can still be frustrating at times. This frustration often proves to be an annoyance and can negatively impact the process of gaining trust in AI.

The interviews with the bank representatives showed that they seem more cautious as the risks of wrong decisions might cause significant financial and reputation losses. This leads us to the next type of challenge identified during the research.

#### 4.2.3.8. **The Tension Between Innovation and Risk-Aversion: Striking the Right Competitive Balance**

All the bank respondents mentioned that the banking industry, despite its innovativeness in many directions, leans towards adopting already-proven technology to avoid the risks of something going "terribly wrong". Especially when AI technology poses significant challenges with explainability, transparency, and biases. B2 underlined that such "undesirable" occurrences would not be beneficial for the utilisation of AI technology in banking in general or for the bank where such events would take place. B1 and B2 have also mentioned that the relatively high average age of the managing boards in banks could be one of the reasons for the relative slowness of adopting new technologies (or openness in general), as some of them are not familiar with new technologies.

We believe that B4's subsequent observation accurately captures the potential reasoning behind bank managers' decisions to adopt artificial intelligence before seeing an urgent need to do so:

Let's say you're a 60 year old CEO, and you know that the bank is pretty profitable. Everything works fine. Why should you take a super bold decision to make a super big change? Either you leave successfully or with a big failure. Why jeopardise ongoing success by taking on a big risk?

Given the competitive pressure in the banking industry, the decision to either stay more conservative in technology adoption or become more AI-driven is becoming an increasingly important factor in gaining or losing a competitive edge.

People often require tangible evidence of successful AI implementations in banks before they are willing to adopt and embrace this technology. E3 noted it is challenging to "take the costs of doing technology shifts before you actually know that there will be a tangible disruption in technology - we are at this point now." E3's comment in this regard matches B2's assessment of AI - "I would assume nobody knows what you can completely utilise this [AI] for." In that notion, B3 had also underlined that "we're talking about this all the time in the office, so there's a hot topic, but I don't think we are there yet. We, the bank, haven't decided yet what to do"; this aligns with the fact that many banks are struggling to move from experimentation to scaling AI across the organisation (McKinsey, 2022). While B4 is an advocate for adopting new technologies, he pointed out that in certain situations, particularly concerning AI, it might be wiser and less risky to "Just sit still, do nothing, and watch the others. And then when you see where the wind is blowing, then you make a kick start." This advice indicates that even managers who are receptive to implementing new technologies and understand their potential seem to prefer adopting a cautious approach and avoiding hasty decisions in order to minimise potential risks until you can be certain that it seems to be working.

#### **4.2.3.9. Loyalty, Trust, and Network Effects in Investment Banks**

Investment banks have certain advantages that allow them to maintain the status quo in adopting new technologies such as AI. However, these advantages also create challenges that can hinder the adoption of AI in investment banking.

The interview process showed that one of the key advantages is their established relationships with clients, who often have long-standing loyalty to the bank and its services. This loyalty can make it difficult for clients to switch to a new bank or technology platform, even if the new

option offers better AI capabilities. Additionally, trust and personal relationships play a significant role in the investment banking industry, with clients often seeking out specific bankers or advisors they trust to handle their financial matters. As respondent B3 said, "My way of working is to talk with clients and build trust long term relationships" and that clients want "good relationships, trust, and communication, even if it means paying a little bit more". This shows the importance of developing and maintaining strong client relationships, particularly in investment banking. B4 also emphasised the significance of the "human touch" in fostering trust with clients, particularly in wealth management and private investment banking. This factor influences the extent of automation a company opts for and the specific purposes it serves.

Furthermore, switching accounts and changing details in the investment banking industry can be complicated and time-consuming, particularly for large clients with complex portfolios (Egarius & Weill, 2016). This can create barriers to entry for new AI providers, as the switching costs can be significant. Investment banks, therefore, have less pressure to explore new AI solutions, as they have a captive client base and switching to new technologies can be cumbersome and risky. These factors make clients more rigid, so swapping banks might be something they must heavily consider before doing so.

### 4.3. Factors Affecting the Perception and Adoption of AI in Banking

The analysis reveals that B1 and B2 both exhibit a higher level of technological literacy, with B1 being particularly comfortable with technology due to their extensive experience using various technological tools in their personal and professional lives. Respondent B3, who is more traditional, reported lower levels of perceived usefulness and ease of use of technology. This may be due to a lack of familiarity with newer technologies, which can lead to frustration and difficulty in using them.

Although there was not much use of AI currently, speaking in a more futuristic and hypothetical manner, there seemed to be a general sense of optimism regarding AI. All the interviewees from banks stated that it would be nice if certain aspects of their jobs could be automated or simplified, as it would free up much-needed time to spend on client relations, for instance.

#### 4.3.1. **User-Friendliness and Ease of Use**

A key factor that greatly matters is the user-friendliness of AI technology. As technology advances, there is an increasing focus on enhancing the ease of use and accessibility of AI. B5 highlights that AI will become easier to use, contributing to increased adoption and utilisation within the banking industry. This involves developing intuitive interfaces and making user-friendly applications. People are more inclined to embrace and implement AI in their banking operations as the technology becomes more approachable and user-friendly. The element of usability influences not only how AI is viewed but also how widely it is used.

#### 4.3.2. **The Influence of Age on AI Adoption**

As Henry & Kloep suggests, younger generations may be more open to using new technologies and may require less training and support to adopt them. This may be because younger people have grown up with technology, thus developing a greater familiarity and being able to learn technologically related things faster (2015). For example, B2 expressed a similar viewpoint, mentioning that "I'm, in general, quite okay with most technology because I've used it quite a lot growing up, and I'm probably 10, 15 years younger than the second youngest guy there, so I guess I'm a little bit more open to changes". B4 highlighted that, based on their experience, older individuals tend to be less open to trusting or adopting new technologies. He emphasised that this pattern also appears to hold true in the banking sector.

On the other hand, B3 said, "looking at the way you use technology today, and some older guys, maybe it takes longer for them to go into a program." As we have heard from these interviews, many individuals are 50+ years old in the investment banking industry. They have a lot of experience working within the branch, have long-term and trusted clients, and have developed a specific working method. If this method works, they may not feel the need to make relatively drastic changes, such as implementing AI in their everyday work. As respondent B3 said, "I'm pretty old school. My way of working is to talk with clients, build trust, and build long relationships. And that's what I've been doing for the last 20 years. And so the phone is my best tool, not the computer." This leads to the next section, resistance to change.

#### 4.3.3. **Resistance to Change**

This refers to the natural tendency of individuals to resist new ideas, processes, or technologies that challenge their existing beliefs or habits (What is status quo bias, 2022). Many factors go into this phenomenon, including fear of the unknown, desire to maintain a status quo, and job



security. For instance, B1 said, "the managing directors are very slow in adapting, sitting in city centres having their bonuses over the last three, five, even ten years and not letting the youngsters come in". This enforces the idea that it may also be due to comfort and job security, showing that they can, over long periods, get nice bonuses regardless of new technology adoptions like AI. They may not want to risk failure for something they do not see a massive value in yet, as banks are against adopting risky and unproven concepts.

Given that banking is not a recent profession, it is understandable that individuals who have dedicated their entire careers to it may become deeply rooted in their established methods. B3 acknowledged this, stating, "I believe it's because when you've been working in a certain manner for around 20 years, you tend to get stuck in that approach. I even notice it in myself." In that regard, B4 thinks that the reluctance to do new things in a new way would be very tough for the employees, especially the older ones.

#### 4.4. Future Use

Despite the limited adoption of AI in banking, the respondents were unanimous about the potential benefits it could bring to the industry. They were all optimistic about this, with B1 highlighting the potential for AI to be used in customer service, compliance checks, and digitisation efforts. B2 and B4 were also confident that AI could be useful in automating small tasks and making quick decisions based on frameworks like AML and KYC, these being Anti-Money Laundering and Know Your Customer. KYC and AML are aspects of compliance, covering different facets of a bank's efforts to comply with laws and regulations governing money laundering and counter-terrorist financing (KYC vs AML, 2023).

Respondent B1 is highly optimistic, reciting the fact that there has been a great increase in chatbots to answer customer questions and concerns, especially within retail banking. Furthermore, they believe that AI will play a more significant role in private banking as the needs of clients become more complex with new emerging technologies like online banking, cryptocurrencies, etc.

## 4.5. Lessons Learned: Key Insights for Navigating AI Adoption Success

The study has carefully charted several key lessons, each providing valuable insights drawn from the varied experiences of adopting and utilising AI. These lessons can serve as a guide for financial institutions, helping them navigate the complexities of AI implementation.

They can also aid in addressing the challenges and concerns that may arise when adopting AI technology. These lessons are informative and illuminating, offering valuable knowledge that financial institutions can leverage to optimise their use of AI. Notably, some of the insights gathered align with Ek's (2021) research findings, presented in the literature review, on crucial factors for AI adoption. This includes the importance of data and the need for expertise within the organisation.

From understanding the potential risks and rewards to anticipating the unexpected, these lessons can prove valuable as banks continue their journey in the rapidly evolving landscape of AI technology.

The following is a list of the specific lessons learned that can guide financial institutions in their AI adoption journey:

**AI applications vary across the banking industry:** Different types of banks have experienced diverse degrees of success with AI adoption, highlighting the importance of tailoring AI tools to each institution's unique needs and goals.

**Aligning AI with clear business problems is important:** Success in AI adoption hinges on identifying specific business challenges and opportunities that AI can address, requiring both top-down and bottom-up competence to integrate AI solutions with well-developed strategies that deliver tangible business value.

**Security risks and in-house options pose dilemmas:** AI adopters are navigating the trade-offs between sharing sensitive data with external AI providers and developing in-house AI capabilities, weighing the potential risks and benefits of each option.

**Regulatory and legal challenges require constant attention:** AI adoption faces uncertainty and constraints in the heavily regulated industry, underscoring the need to stay updated on evolving guidelines and standards.

**Data readiness challenges impact AI effectiveness:** Companies must address data readiness issues such as availability, quality, organisation, and machine-readability to ensure successful AI implementation.

**Risk management and ethical considerations are important:** Companies and experts emphasise the importance of addressing potential risks and ethical challenges in AI adoption, balancing AI-driven efficiency with responsible AI solutions.

**Trust in AI technology and competitive balance are important:** Understanding AI capabilities and limitations is critical for gaining trust in AI technology. Striking the right balance between innovation and risk aversion helps banks maintain or gain a competitive edge.

**Financial and expertise requirements can be demanding:** Developing in-house AI models or partnering with external providers entails substantial financial resources and expertise, with potential limitations for smaller banks.

**Company size and technical competence can be barriers:** Larger organisations may experience greater difficulty in adopting new technologies. Ensuring employees possess the technical competence to work with AI is essential for successful implementation.

**Learning from unproven use cases informs AI adoption decisions:** The lack of proven successful AI use cases in the banking industry highlights the need for thorough research and evaluations, learning from others' experiences to avoid potential pitfalls and maximise return on investment.

## 5. Conclusion

Throughout our study, our intention was to examine the application of AI in Swedish banks, driven by the notion that Sweden is a country known for its strong emphasis on AI adoption in the banking sector. Our initial expectations for the state of AI in Sweden, particularly its adoption and utilisation in Swedish banks, were quite high. This was primarily due to Sweden's reputation as a leading innovator and early adopter of AI strategy and technology in general. With the participation of current bankers and individuals with substantial banking experience, we sought to shed light on the intersection of AI and banking practices in Sweden. However, the findings of our research have revealed a surprising and disappointing reality: the underutilisation of AI in Swedish banks.

Given the prevailing narrative of Sweden's inclination towards embracing AI technologies, we expected to uncover a significant integration of AI within the banking sector. Our sample of current bankers and experts provided us with firsthand insights into the state of AI adoption within banks, drawing upon their diverse backgrounds and exposures to different banking institutions in and outside of Sweden. This enabled us to gain an understanding of the challenges and opportunities surrounding AI implementation in the Swedish banking landscape.

### 5.1. Main Findings

In conclusion, this study examined the AI adoption process in banks, aiming to address the research question regarding the rationales, challenges, and lessons learned associated with AI adoption in the banking sector. The research findings contribute to filling the gap in structured research on this topic and provide valuable insights for organisations seeking to leverage the benefits of AI adoption while understanding the associated opportunities and challenges.

The study identified three primary aspects: Rationales, Challenges, and Lessons Learned. These aspects, although presented separately for clarity, are interrelated, collectively forming a comprehensive answer to our research question.

### **Rationales for AI Adoption within Banking:**

The study indicates three primary reasons for banks to adopt AI: (1) Enhancing productivity, the most frequently cited factor; (2) Responding to competitive pressure; and (3) Conforming to industry trends. These factors aren't mutually exclusive, and banks often experience a mix, making it challenging to draw distinct boundaries in real-world applications. Before adopting AI, banks should ascertain which of the primary reasons resonates most with their intent. Furthermore, they should evaluate whether merely following the trend without clearly understanding its value will be beneficial.

The research shows that AI adoption varies among banks based on their specific needs. Potential AI applications, such as fraud detection, personal financial management, credit scoring, and service optimisation, are numerous, but respondents primarily mentioned chatbots and data analysis. All respondents anticipate incorporating AI into their operations in some way, albeit the precise applications and advantages may seem unclear due to rapid technological development and the lack of specific successful use cases.

### **Challenges in Adopting AI Technologies in Banking:**

The research exposed the multi-layered challenges of AI integration in banking. Prominent among these are data security risks, triggering debates over in-house or subsidiary AI providers. Legal and regulatory issues due to the rapid evolution of AI and the slower development of corresponding legal frameworks are significant, leading to potential litigation risks.

Ethical considerations around transparency, fairness, and accountability underscore the need for stringent ethical guidelines in AI use. An unexpected challenge was the importance of data readiness; having data in the correct format is as essential as having data. AI's effectiveness heavily relies on the quality and diversity of data available, highlighting the need for a robust data infrastructure.

Factors such as company size and technical competence also impact AI adoption. Trust issues, fuelled by AI's perceived complexity among employees and customers, emphasise the need for transparency and clear communication about AI's potential and limitations. A careful balance between the need for innovation and risk aversion is necessary, and the study highlighted a knowledge gap about AI among bank staff, signalling the need for ongoing education and training.

### **Lessons Learned and Key Insights for AI Adoption in Banks:**

The study gleaned several valuable lessons for banks embarking on AI adoption. It might be advantageous for banks to recognise the varied uses of AI across the industry and customise these tools to their specific needs and goals. Striking a balance between AI-driven efficiency, ethical considerations, and potential risks could significantly enhance their journey towards successful AI integration.

Overcoming organisational challenges and resistance to change could involve committing to infrastructure upgrades, staff training, and developing strategic change management plans. Evaluating security risks and in-house options is crucial. Banks should weigh the pros and cons of sharing sensitive data with external AI providers against cultivating their AI capabilities.

Given the heavily regulated nature of the banking landscape, addressing regulatory and legal challenges is crucial. Building trust in AI technology and establishing a balanced competitive approach is key to successful AI adoption. Prioritising data readiness and focusing on data availability, quality, and organisation might significantly enhance the effectiveness of AI.

The resources required, both financial and expertise, can be substantial. Banks should carefully consider the resources they can allocate for in-house AI development or if partnering with external providers might be more suitable. Technical and size-related challenges need to be addressed, particularly for larger organisations.

## **5.2. Practical Implications**

This study can serve a variety of practical purposes. In the first place, it offers information about how bankers currently perceive and understand AI. This can benefit companies trying to integrate AI technologies into their operations. Additionally, it could help these businesses effectively tailor their AI adoption approach to match employee needs and expectations.

Second, the study illuminates the factors affecting how emerging technologies, like AI, are adopted by the banking sector. Managers and decision-makers wishing to implement new technology inside their organisation may find this information useful as it allows them to evaluate potential adoption barriers and challenges, allowing for well-thought-out approaches.

Finally, the study can contribute to the conversation on AI's potential applications in the banking industry, notably in risk management, fraud detection, and client relations. The research findings can contribute to the development of regulatory frameworks and best practices for the responsible application of AI technology while also promoting discussions about the ethical and social implications of AI usage in the banking sector.

### 5.3. Future Research

While this study provides valuable insights into the challenges and lessons learned during the adoption of AI technology in banks, we believe that additional factors might influence the way banks are presently adopting AI. Consequently, we recommend these topics as potential avenues for exploration in future research.

This study primarily focused on providing an overview of AI adoption in the banking sector. However, it became evident that there are significant differences across various types of banking institutions, each with its unique needs. For instance, retail banks, asset managers, and investment banks might encounter different challenges and experiences in their journey towards AI integration. As a result, there's an intriguing opportunity for future research to delve into these unique needs and challenges specific to each bank type, offering a more nuanced understanding of AI adoption across the diverse banking landscape.

Secondly, this study mainly explored the adoption of AI technology in banks in developed countries. However, emerging markets may present unique challenges and opportunities for AI adoption, and future research could investigate these aspects.

Thirdly, this study focused on the adoption process of AI technology but did not examine the impact of AI on the long-term performance of banks. Future research could investigate how AI adoption impacts banks' profitability, efficiency, and overall performance.

Another intriguing avenue for future research lies in examining the impact of state policy frameworks, strategies, and the role of relevant government agencies on AI adoption by private entities, including banks. This investigation could extend to both direct and indirect effects, such as how state initiatives stimulate AI adoption, assist in overcoming challenges, and

provide informational or expert support. Such an exploration would enrich our understanding of the interplay between policy and technology adoption and equip policymakers with valuable insights into which strategies are effective and which may require reconsideration or improvement.

One repeating theme that we got from interviews was that age seems to be an important factor when it comes to AI adoption. Exploring how age shapes attitudes, perceptions, and experiences, alongside further variables such as gender and culture could prove interesting.

Finally, as AI technology continues to evolve and new applications emerge, future research could investigate the challenges and opportunities presented by these new developments and their impact on the investment banking industry.



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## 7. Appendixes

### Appendix A \_ Interview Guideline for Respondents from Banks

#### **Introduction:**

I will provide a brief overview of our research, its purpose, and the significance of studying this subject. I will also offer a short introduction about AI, its current developments, and the realised & expected development of this disruptive technology.

#### **Objective:**

The aim of this interview is to examine the present and prospective applications of AI in both general contexts and the finance industry. Your participation will aid in obtaining valuable insights into AI's transformative effects on industries and contribute to our understanding of its potential impacts on businesses and society at large.

#### **Part 1: AI, Main Developments, and Influence on the Financial Industry**

1. How do you see the general development of AI technology and its use in various fields, particularly finance?
2. How do you see the role of AI tools in your work evolving?

#### **Part 2: AI Tools Utilized, Adoption Process, Challenges, and Lessons Learned**

3. What kind of AI tools are you using, and for what purposes?
  - 3.1. Tell us about the process of adopting certain AI tools and the reasons behind their adoption, such as competition, efficiency, and the balance between bank and personal benefits.
  - 3.2. What kinds of challenges/barriers have you experienced in adopting and using AI tools in your organisation?
  - 3.3. Have you ever encountered ethical or legal issues related to the use of AI in banking? What is your opinion on this in general?
  - 3.4. How did/do you overcome those challenges? What strategies have you employed?

- 3.5. What are your main lessons learned from adopting and using AI tools?
- 3.6. What do you see as the main challenges of AI itself as of today? Do you/your organisation plan to use AI tools more extensively in the future? If yes, for what purposes? Do you already have some ideas or plans? What kinds of risks do you think are associated with using (not using) AI today both technical and competitive?
- 3.7. Did you have/received any training or education on AI tools and their use in banking, or specifically your duties?
4. What do you think, what influence AI has and will have for this industry and your work?
  - 4.1. Do you think that AI has the potential to disrupt the banking industry? Why or why not?

### **Part 3: Perceived Usefulness**

#### Control and Speed

- Does using AI give you greater control over your work and organisation?
- Does AI help you accomplish your tasks more quickly?

#### Job Support and Performance

- Does AI support critical aspects of your job? (Is it integral in your work, could you do without it?)
- Has using AI improved your job performance? Quality of work?
- Has using AI increased your productivity (allowed you to accomplish more work than would otherwise be possible?)
- What is your impression? Has using AI made it easier to do your job?

#### Overall Assessment:

- Overall, how useful do you find AI in your job?

### **Part 4: Ease of Use**

#### Ease of Use:

- Do you find AI cumbersome/impractical/frustrating to use?
- Or is it clear and understandable?
- Do you find it easy to learn to operate AI?
- Do you find it easy to get the AI system to do what you want it to do?
- Is it easy to remember how to perform tasks using the AI system?

### Overall Assessment:

- Overall, how easy do you find AI to use?

## Appendix B \_ Interview Guideline for the Experts

### **Introduction:**

I will provide a brief overview of our research, its purpose, and the significance of studying this subject. I will also offer a short introduction about AI, its current developments, and the realised & expected development of this disruptive technology.

### **Objective:**

The aim of this interview is to explore the current and potential applications of AI in both general contexts and in the finance industry. We are interested in understanding how AI is currently being used in these areas, what benefits and challenges it presents, and what future developments we can expect to see. We understand that finance might not be your main focus, but we want to get insights into your overall observations, knowledge, and expertise within the field of AI.

### **Part 1: Reasons and Types of AI Adoption:**

1. In your experience, what are some of the most common reasons why companies (in general) in finance adopt AI technologies?
2. Briefly, what are some of the main types and purposes of AI tools that companies use currently?

### **Part 2: Challenges and Factors for Successful AI Adoption:**

3. What are some of the key challenges that companies face in adopting and integrating AI technologies into their operations?
  - 3.1. What influences the receptiveness or resistance of companies adopting AI?
  - 3.2. What are some of the key factors that determine the success or failure of AI implementations in companies?
4. How important is it for companies to have a dedicated AI strategy, and what should that strategy entail?
5. In your opinion, what are some potential differences in AI adoption between large and small companies?

- 5.1. Are there any unique challenges or advantages that smaller or bigger companies face when it comes to integrating AI into their operations?
6. What would you say are the main patterns and lessons learned from AI development and adoption?

**Part 3: Evolution of AI in Industries and Sectors:**

7. What do you think, is the current level of AI adoption in companies driven by hype or trend?
8. Briefly, how do you see the use of AI technologies evolving in different industries and sectors in the next 5-10 years?

**Part 4: State Agencies and the Importance of Collaboration for AI Adoption:**

9. What is or should be the role of state agencies in the AI adoption process for private companies?
10. How can state agencies, private companies, and academia work together to ensure that AI adoption is done in a way that is safe, responsible, and beneficial for society as a whole?

**Part 5: Ethical and Legal Implications of AI Adoption and Use:**

11. What are the ethical or legal implications that companies need to consider when adopting AI technologies, and how can they ensure compliance with the law?
12. How can companies ensure that their AI systems are transparent, explainable, and accountable?