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ABSTRACT

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Abstract

The European Union Artificial Intelligence Act (EU AI Act) aims to regulate the use and adoption of AI systems across various sectors, including banking. The EU AI Act introduces compliance requirements and addresses high-risk AI systems to ensure ethical AI usage in organisations. Despite theoretical discussions, there is still a lack of empirical evidence on the effects of the EU AI Act on AI adoption. This raises questions about how Dutch banks can succesfully adopt AI while achieving regulatory compliance. This study investigates the influence of the EU AI Act on the adoption of artificial intelligence (AI) within the Dutch banking sector, through compliance and innovation strategies. The research explores the challenges Dutch banks face in adapting to the EU AI Act. It highlights key areas such as compliance strategies, AI literacy, innovation, and the balance between regulation and innovation. A comprehensive literature review is conducted, followed by thematic analysis of collected data from 12 semi-structured interviews. The study identifies significant themes including varying stakeholder perceptions of the EU AI Act, the importance of AI literacy for compliance and competitive advantage, and innovative practices amid regulatory constraints. To overcome those challenges, the study recommends establishing clear AI literacy initiatives and inventory systems. Moreover, the integration of specialized compliance-focused roles in banks can further support adherence to the EU AI Act. Furthermore, the study provides empirical insights into the EU AI Act's influence, understanding its impact on compliance and innovation strategies in the banking sector. Ultimately, the study highlights the importance to balance compliance with the EU AI Act and stimulate AI innovation for Dutch banks, remaining competitive within the strict regulatory landscape. Future research directions are suggested to explore ongoing developments in AI governance and its impact across different banking sectors and geographical locations.

Key words	EU AI Act, AI systems, Dutch banking sector, compliance strategies, AI adoption, innovation, regulatory challenges

ADAPTING TO REGULATION: THE EU AI ACT'S INFLUENCE ON AI ADOPTION IN DUTCH BANKING

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1 INTRODUCTION

1.1 Background

1.1.1 Artificial Intelligence in the banking sector

The banking sector is a fundament of economic stability and growth (Akims, 2022), and the integration of artificial intelligence (AI) is revolutionizing its operations (Fares et al., 2022). Banks play a pivotal role in economic development by mobilizing savings and allocating resources efficiency, fostering investment and economic growth (Akims, 2022). With the adoption of AI, banks can improve various functions, such as customer service, fraud detection, and risk management, leading to increased efficiency and personalized services (Fares et al., 2022). However, the regulatory landscape of the banking sector is fragmented due to the presence of multiple regulatory bodies, and with the European Union Artificial Intelligence Act (EU AI Act) on the horizon, it has created a complex environment for AI deployment (Dudley, 2024). This study aims to assess how the Dutch banking sector will adapt to these challenges and the upcoming EU AI Act regulations. Understanding how the EU AI Act influences the adoption of AI systems in Dutch banks, particularly regarding compliance and innovation strategies, sets the stage for a detailed exploration of its applications, regulatory challenges, and associated risks (Fares et al., 2022; Dudley, 2024).

Banks are integral to the efficient functioning of the economy (Akims, 2022). Akims (2022) notes that banks mobilize savings and channel them into productive investments, thereby enhancing capital formation and economic efficiency (Achuku, 2016). Additionally, Calice et al. (2018) emphasize that banks contribute to financial stability by managing risks and providing liquidity to the economy. As financial intermediaries, banks reduce transaction costs and improve the availability of information, which supports economic activities (Achuku, 2016). By managing risks and providing liquidity, banks establish the smooth functioning of the economy, highlighting their importance in maintaining financial stability (Calice et al., 2018). Consequently, the multifaceted functions of banks underscore their critical role in the economic development and stability of a country (Calice et al., 2018).

AI applications are already widely used in the banking sector, transforming various aspects of its operations (Van Der Burgt, 2019; DNB, AFM, 2024). AI is being utilized in numerous banking functions, including fraud detection, creditworthiness assessments,

customer service, and risk management (Van Der Burgt, 2019). Additionally, AI-powered chatbots are boosting customer service by providing 24/7 support and personalized interactions (DNB, AFM, 2024). The integration of AI in banking not only streamline processes but also improves decision-making and operational efficiency (Oyeniyi et al., 2024). However, implementing these AI applications can be challenging due to the integration challenges and the need for high-quality AI models (Deloitte, n.d.). Despite these challenges, banks are successfully leveraging AI to enhance their operations and provide better services to their customers (Geetha, 2021).

The adoption of AI applications in the banking sector had to navigate through existing regulations, both AI-specific and general financial regulations (Crisanto et al., 2024). Key regulations included the General Data Protection Regulation (GDPR), which secured responsible handling of customer data (The European Parliament & The Council of the European Union, 2016), the Digital Operational Resilience Act (DORA), aimed at strengthening IT security (European Insurance and Occupational Pensions Authority [EIOPA], 2023); the Anti-Money Laundering Directives (AMLD), which mandated measures to prevent money laundering and terrorist financing (European Banking Authority [EBA], 2015); the Markets in Financial Instruments Directive (MiFID II), enhancing transparency and investor protection (European Union Law, 2014); and Basel III, setting standards for capital adequacy and market liquidity risk (Basel Committee on Banking Supervision, 2017). These regulations collectively ensured the stability, security, and transparency of the banking sector, while also protecting consumers and maintaining market integrity (Nayak, 2021).

Adopting AI in banking can arise several risks, particularly in the context of the regulatory landscape (Adhaen et al., 2024). Adhaen et al. (2024) identify key risks such as the absence of regulatory requirements, data privacy and security concerns, lack of relevant skills and IT infrastructure, technological risks, customer trust issues, and compatibility problems with existing systems. The absence of clear regulations and various technical and trust issues indicate that there is still significant work to be done for successful AI adoption in banking (Sharma et al., 2024). The EU AI Act aims to mitigate these risks by introducing comprehensive regulations and standards for AI applications, ensuring responsible use and enhancing customer trust (European Insurance and Occupational Pensions Authority [EIOPA], n.d.).

1.1.2 The European Union Artificial Intelligence Act

On the 12th of April 2021, the European Commission published a proposal to regulate AI in the European Union (EU) (Historic Timeline | EU Artificial Intelligence Act, n.d.). The European Commission proposed a law named the EU AI Act, to address the risks of all AI systems in Europe (AI Act, 2025). The EU AI Act is accepted by the EU and acts since August 2024 as the first-ever legal framework on AI and will be applicable for the whole EU in August 2026 (AI Act, 2025). The EU AI Act has exceptions that won't be fully applicable until 2026, including prohibitions and AI literacy obligations effective from February 2, 2025, and governance rules for general-purpose AI models applicable from August 2, 2025 (AI Act, 2025). The EU AI Act is a solution for several challenges which have been raised in AI governance, such as failing to meet legal and ethical standards with facial recognition technology (Oxley et al., 2024), or algorithms causing racial profiling and severe consequences for thousands of families (European Parliament, n.d.). Furthermore, ethical and safety concerns were common due to the rapid development of AI technologies (Maphosa, 2024). To conclude, there were no clear guidelines for AI development (Musch et al., 2023). According to Mügge (2024), the EU AI Act emphasizes ethical AI development, risk management, human oversight, transparency, and accountability. It complements GDPR by addressing specific challenges posed by AI technologies (Mügge, 2024). Overall, the EU AI Act presents a significant step towards responsible development of AI technologies (Janssen, 2025).

The EU AI Act introduced a risk-based regulatory framework that is particularly relevant for the banking sector, due to the stringent requirements for AI systems (Novelli et al., 2024). The EU AI Act categorizes AI systems into four risk levels: unacceptable, high, limited, and minimal, with demanding requirements for high-risk systems to safeguard transparency, accountability, and protection of fundamental rights (Novelli et al., 2024). In the banking sector, high-risk AI applications include creditworthiness assessments and the deployment of General-Purpose AI (GPAI) models (Passador, 2024). By classifying AI systems based on their risk levels, the EU AI Act aims to mitigate potential harm and makes sure that AI applications in banking are used responsibly. The EU AI Act's requirements for high-risk systems, such as rigorous risk management and compliance measures, help address the unique challenges posed by AI in financial services (Schuett, 2023). These measures facilitate that AI technologies do not compromise the integrity of financial institutions or the privacy and rights of individuals (Musch et al.,

2023). Therefore, the EU AI Act's risk-based structure is essential for the responsible integration of AI in the banking sector, providing a robust framework that balances innovation with the need for oversight and consumer protection (Novelli et al., 2024).

The EU AI Act positively addresses ethical AI risks by promoting transparency, accountability and fairness in AI deployment (Anderson, 2022). According to Anderson (2022), the EU AI Act builds upon the preparatory work of the High-Level Expert Group on AI (HLEG) which developed ethics guidelines of AI. The guidelines underline that trustworthiness in AI involves more than just following the law (lawful AI); it also entails making sure AI is robust and ethical (High-Level Expert Group on Artificial Intelligence, 2019). By implementing HLEG's ethics guidelines, Anderson (2022) believes that the EU AI Act's emphasis on public consultation further strengthens the ethical foundation, guaranteeing the risks concerning ethics of AI are mitigated. Furthermore, the EU AI Act is creating a standard named "ethical disclosure by default" (Laux et al., 2024). According to Laux et al. (2024), the standard involves setting basic requirements for technical testing and documentation, which shifts ethical decision-making to stakeholders who are best suited to make those decisions. Laux et al. (2024) states that this structured approach from the EU AI act helps mitigate ethical AI risks, thereby promote trust in AI systems (Laux et al., 2024).

1.2 Problem statement and research gap

The EU AI Act introduces significant regulatory challenges for banks (Passador, 2024). The EU AI Act mandates demanding requirements for high-risk AI systems, such as creditworthiness assessments, necessitating rigorous compliance measures (Novelli et al., 2024). Implementing these measures requires that banks allocate resources towards technologies and processes to ensure compliance with transparency, accountability, and fundamental rights protection standards, which can be quite demanding (Passador, 2024). Understanding these regulatory challenges is essential for banks to navigate the EU AI Act effectively and leverage AI technologies responsibly (Musch et al., 2023).

Furthermore, AI adoption in the banking sector faces several inherent obstacles. Key issues include data privacy and security concerns, lack of relevant skills and IT infrastructure, and customer trust issues (Adhaen et al., 2024). These challenges can impede AI implementation, as banks must address data protection, technological risks, and build customer trust to ensure successful AI integration (Sawant et al., 2023). Addressing these

obstacles is crucial for banks to fully realize AI's benefits and maintain customer confidence (Geetha, 2021).

Despite theoretical discussions, there is a lack of empirical studies providing concrete evidence on the EU AI Act's effects on AI adoption in the Dutch banking sector (Fares et al., 2022). Empirical research can offer valuable insights into the practical challenges and opportunities presented by the EU AI Act, aiding Dutch banks and regulators in developing effective AI integration strategies (Sawant et al., 2023). Conducting empirical research is essential to address the existing research gap regarding the impact of the EU AI Act on Dutch banks and their governance strategies in the banking sector (Geetha, 2021).

1.3 Research objective and research question

The goal of the study is to assess how the Dutch banking sector will adapt to the upcoming EU AI Act regulations. Specifically, it aims to understand how the EU AI Act will impact the adoption of AI in the banking sector. This involves examining compliance requirements, identifying challenges, and exploring opportunities that arise from the new regulations in Dutch banks. Therefore, the following research question is formulated:

Research Question (RQ): "How does the EU AI Act influence the adoption of AI systems in Dutch banks through compliance and innovation strategies?"

The RQ will be investigated with the support of answering the formulated Sub Questions (SQ):

SQ1: What specific compliance requirements does the EU AI Act impose on Dutch banks?

SQ2: How does the EU AI Act affect the innovation strategies of Dutch banks?

SQ3: What challenges do Dutch banks anticipate in adopting AI systems under the EU AI Act, and how are they planning to address these challenges?

The banking sector is a critical component of the financial industry, who are reliant on AI for various functions such as risk assessment, fraud detection, and customer service (Musch et al., 2023c; Passador, 2024). Understanding how the EU AI Act will impact banks is crucial for ensuring compliance with strict regulatory requirements (Passador, 2024), adapting innovation strategies to align with new regulations (Musch et al., 2023c), and addressing the challenges in adopting AI systems under the EU AI Act (Adhaen et al., 2024).

1.4 Research context

The following research has been conducted during an internship at a big four firm within its Risk & Regulatory department based in the Netherlands.

The overall goal of this thesis is to assess the preparedness of Dutch banks for the upcoming EU AI Act regulations and understand how these regulations influence the adoption of AI systems, particularly in terms of compliance and innovation strategies.

1.5 Structure

Following this introduction, Chapter two presents a comprehensive literature review, examining topics such as artificial intelligence, the EU AI Act, and AI governance. Chapter three outlines the methodology employed in this study, encompassing research methods, strategy, data collection, and data analysis. Chapter four describes the findings derived from the research and data analysis. Chapter five engages in a thorough discussion, offering recommendations and acknowledging limitations. Finally, Chapter six showcases the conclusion of this research.

2 LITERATURE REVIEW

This chapter provides the literature review addressing the key topics in the RQ and SQs. Paragraph 2.1 focusses on artificial intelligence systems, paragraph 2.2 showcases the banking sector; paragraph 2.3 dives deep into the EU AI Act; paragraph 2.4 elaborates on AI governance; leading up to paragraph 2.5, which provides a conceptual framework with the literature findings. To conclude, paragraph 2.6 states the propositions which will be used for the research.

2.1 Artificial Intelligence systems

The first paragraph of the literature review showcases the context of Artificial Intelligence (AI) systems.

2.1.1 Definition of an AI system

In Article 3 of the EU AI Act, the definition of an AI system is as follows:

"'AI system' means a machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments."

(European Parliament & Council of the European Union, 2024)

This definition highlights the core characteristics of AI systems, including their ability to adapt over time. The definition emphasizes the generating outputs of AI which impact environments with practical applications and societal influence (Russell & Norvig, 2010; Goodfellow, Bengio, & Courville, 2016). Understanding this definition is crucial for comprehending the regulatory framework established by the EU AI Act, as it provides the foundation for identifying and categorizing AI systems within the scope of the legislation (European Parliament & Council of the European Union, 2024).

Comparing the EU AI Act's definition with those from other jurisdictions, such as the US National Institute of Standards and Technology (NIST) and the International Organization for Standardization (ISO), reveals common elements like autonomy and adaptiveness (Raimondo et al., 2023; ISO & IEC, 2021). However, the EU AI Act's definition stands out due to its strong emphasis on ethical considerations, comprehensive regulatory scope, and focus on the practical impact of AI systems (Oecd, 2023). This unique

approach not only aligns with global standards but also sets a precedent for integrating ethical considerations into AI regulation, which is crucial for Dutch banks as they navigate compliance requirements and develop innovative strategies under the new regulations (Musch et al., 2023a).

2.1.2 AI adoption

AI adoption involves integrating AI technologies into organizational frameworks and their broader acceptance by society (Dasgupta & Wendler, 2019; Radhakrishnan & Chattopadhyay, 2020). Dasgupta and Wendler (2019) describe AI adoption as incorporating AI technologies into operational structures, while Radhakrishnan and Chattopadhyay (2020) expand this to include societal acceptance. Successful AI adoption improves organizational efficiency and innovation (Enholm et al., 2021) but faces technical and ethical challenges requiring comprehensive strategies (Rane et al., 2024). Addressing these challenges requires robust technical solutions, ethical guidelines, and continuous workforce training (Rane et al., 2024). Understanding the multifaceted nature of AI adoption is crucial for Dutch banks as they navigate through the complexities of integrating AI technologies under the EU AI Act (Gerlich, 2023).

AI adoption in the banking sector has steadily increased due to its transformative potential. (European Banking Authority [EBA], 2024). Fares et al. (2022) highlight that AI adoption should be strategically aligned with organizational goals. Geetha (2021) emphasizes that AI adoption improves customer support, mitigates risks, reduces costs, and increases revenue. Banks use AI technologies to provide personalized financial services, automate customer support, detect fraud, and optimize marketing strategies (Geetha, 2021). These applications increase customer satisfaction and reduce operational costs (Adhaen et al., 2024). AI-specific legislation and regulation ensure responsible and ethical use of AI in banking, helping banks stay ahead of digital disruptors and meet evolving customer demands (Sawant et al., 2023).

To achieve successful AI adoption, compliance and innovation strategies are vital. X. Wang and Wu (2024) express the need for a harmonized compliance framework and proactive legislation to address AI-adoption risks (X. Wang & Wu, 2024). Similarly, Gama and Magistretti (2023) highlight the importance of digital project governance to manage data privacy and ownership rights. Innovation strategies drive AI development by fostering a culture of experimentation and continuous improvement (Secundo et al., 2024). Secundo et al. (2024) argue that AI-based innovation ecosystems enable

organizations to transform their operating models into more agile and value-driven businesses. Gama and Magistretti (2023) identified the dual role of AI in enabling and enhancing innovation capabilities, suggesting that AI adoption requires foundational competencies and promotes new capabilities. Integrating compliance and innovation strategies is essential for AI adoption (Gama & Magistretti, 2023). Compliance strategies provide a secure and trustworthy framework, while innovation strategies drive organizational growth and competitiveness, both of which are necessary for AI adoption (Secundo et al., 2024).

2.2 The banking sector

Banks are fundamental institutions in the financial system, playing a crucial role in the economy as they provide essential services such as accepting deposits, offering loans, and facilitating transactions (Allen et al., 2014). Banks act as intermediaries, safeguarding assets, providing credit, and supporting economic growth by enabling investments and consumption (Akims, 2022). Banks contribute to economic stability by managing risks, ensuring liquidity, and offering various financial products that help individuals save and invest while enabling businesses to access capital for expansion (Akims, 2022). Moreover, banks are increasingly adopting AI technologies to augment their operations (Fares et al., 2022). AI technologies in the banking include intelligent process automation, fraud detection, and improved customer experience (Garg, 2024). These innovations enable banks to operate more efficiently and offer personalized services, staying competitive in a rapidly evolving market (Adhaen et al., 2024). For Dutch banks, understanding these innovations is crucial as their AI technologies must comply with the compliance requirements by the EU AI Act (Gerlich, 2023). Furthermore, implementing AI technologies is essential for Dutch banks to enhance operational efficiency and customer service while complying with the EU AI Act (European Banking Authority [EBA], 2024).

2.2.1 Regulations

Regulations in the banking sector, such as Basel III and GDPR, have significantly influenced compliance, AI adoption, and innovation over time. These frameworks have necessitated banks to adapt their strategies to meet requirements and foster advancements in technology. With the adapted strategies for different regulations, it seems likely that compliance- and innovation strategies need to be adapted as well with the EU AI Act.

2.2.1.1 Basel III

Basel III is an international regulatory framework designed to strengthen regulation, supervision, and risk management within the banking sector (Basel Committee on Banking Supervision, 2017).

Basel III pressured banks to change their compliance and innovation strategies. Basel III introduced capital and liquidity requirements, such as the Capital-to-Assets Ratio (CAR), the Net Stable Funding Ratio (NSFR), and the Liquidity Coverage Ratio (LCR), which have significantly impacted banks' risk management practices (Giordana & Schumacher, 2017). The regulatory pressures from Basel III have driven banks to innovate in financial modeling and stress testing, leveraging AI to adapt to the new regulatory environment and maintain competitiveness (Gržeta et al., 2023). These regulations led banks to adopt AI technologies to enhance risk management and compliance, as AI can improve predictive accuracy and operational efficiency (Wang, 2014). Consequently, Basel III has not only ensured that banks meet regulatory standards but also spurred technological advancements, particularly in AI, to improve operational efficiency and maintain a competitive edge (Giordana & Schumacher, 2017; Wang, 2014; Gržeta et al., 2023).

2.2.1.2 GDPR

The General Data Protection Regulation (GDPR) governs the collection, processing, and storage of personal data within the European Union compliance (Voigt & Von Dem Bussche, 2017). The implementation of GDPR has led to significant changes in compliance, AI adoption, and innovation within banks.

The GDPR caused pressure in the past for changing compliance and innovation strategies in banks. The GDPR introduced stringent requirements for data protection, including transparency, data minimization, and the rights of data subjects, which compelled banks to redesign their AI models to confirm compliance (Voigt & Von Dem Bussche, 2017). Additionally, banks had to implement privacy-by-design principles and conduct Data Protection Impact Assessments (DPIAs) for AI systems, driving innovation in data handling and risk assessment (Chirra, 2024). These regulatory pressures forced banks to innovate in ways that align with GDPR principles, such as developing AI systems that are both effective and compliant with data protection regulations (Voigt & Von Dem Bussche, 2017; Chirra, 2024). Therefore, the GDPR significantly influenced the

compliance and innovation strategies of banks, ensuring that data protection is at the forefront of AI development (Voigt & Von Dem Bussche, 2017; Chirra, 2024).

2.2.2 Barriers to implement AI in banks

The adoption of AI in the banking sector presents several barriers and facilitators, as indicated in Figure 1. Understanding and addressing these barriers, while leveraging the facilitators, is essential for banks to fully realize the potential of AI technologies.

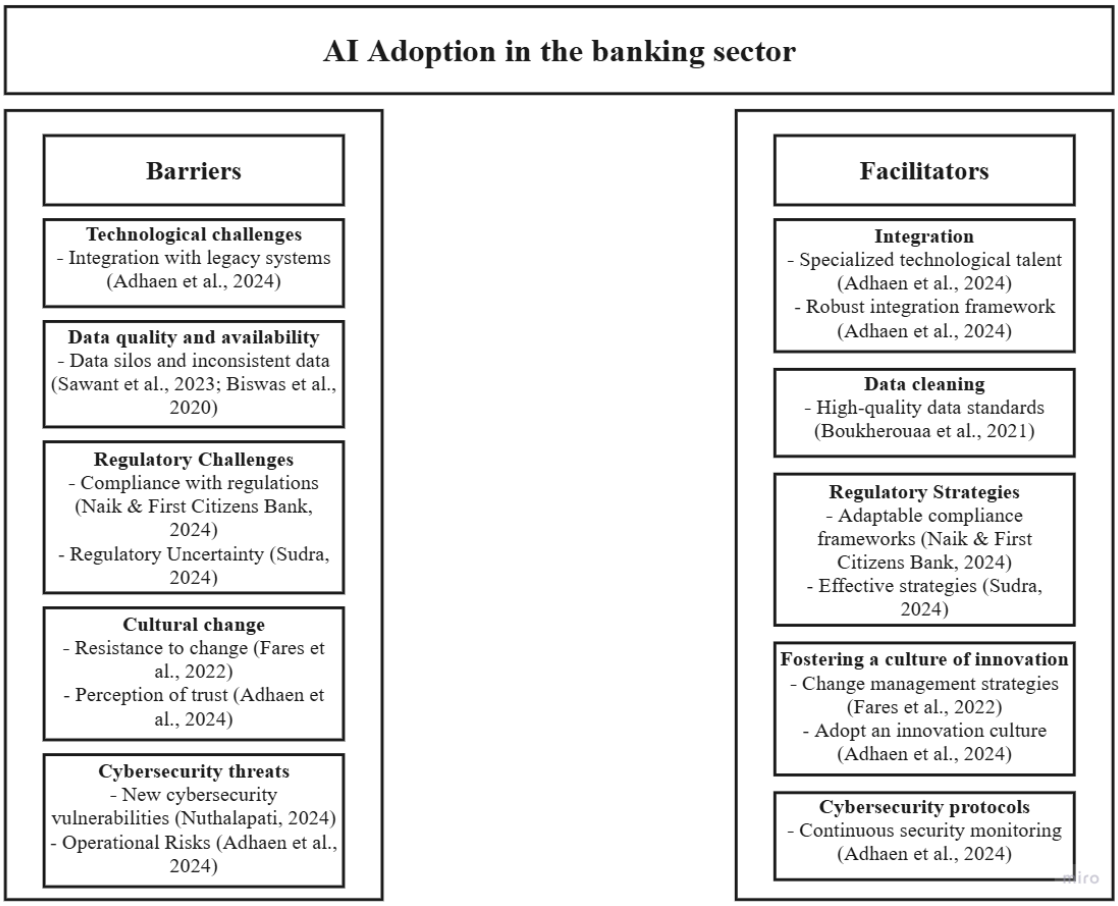

Figure 1: Barriers and facilitators of AI adoption in the banking sector

Integrating AI technologies with existing legacy systems poses significant technical challenges for banks. Banks often struggle with the complexity of securing seamless integration between AI and legacy systems due to outdated architectures and limited flexibility (Adhaen et al., 2024). Specialized technological talent with sufficient knowledge is needed to set up a robust risk management framework as integration challenges arise because legacy systems are often not designed to accommodate modern AI technologies (Adhaen et al., 2024; Fnu et al., 2022). Addressing these technical challenges is crucial

for the successful adoption of AI in the banking sector (Adhaen et al., 2024; Fnu et al., 2022).

Furthermore, data quality and availability are critical issues in AI implementation (Sawant et al., 2023). Banks face challenges related to data silos, inconsistent data formats, and the need for extensive data cleaning and preprocessing (Biswas et al., 2020). Establishing high-quality data is essential for the effective functioning of AI systems, as poor data quality can lead to inaccurate predictions and decisions (Boukherouaa et al., 2021). Overcoming data-related challenges is vital for leveraging the full potential of AI in banking (Boukherouaa et al., 2021).

Navigating through the complex regulatory landscape is another barrier to AI implementation in banks (Crisanto et al., 2024). Banks must comply with regulations such as the EU AI Act, which imposes detailed requirements on AI systems (Naik & First Citizens Bank, 2024). Regulatory frameworks need to adapt to the evolving AI landscape to assure consumer safety, data protection, and market integrity (Sudra, 2024). However, regulatory uncertainty and the need for continuous updates to comply with evolving regulations add to the complexity of AI implementation (Naik & First Citizens Bank, 2024; Sudra, 2024). Effective strategies to navigate regulatory challenges are essential for the successful adoption of AI in the banking sector (Sudra, 2024).

Resistance to change within banking institutions also hinders AI implementation and adoption (Fares et al., 2022). Employees and management may be reluctant to adopt new technologies due to fear of job displacement and disruption of established processes (Fares et al., 2022). Organizational culture plays a significant role in the adoption of AI, with resistance to change being a common barrier (Adhaen et al., 2024). For example, customers of banks are often unwilling to entrust their money in AI systems (Adhaen et al., 2024). To overcome resistance and facilitate AI adoption, change management strategies and fostering a culture of innovation are essential (Fares et al., 2022; Adhaen et al., 2024). Addressing organizational and cultural barriers is key to the successful implementation of AI in banks (Adhaen et al., 2024).

Finally, cybersecurity threats are an operational risk in AI adoption (Adhaen et al., 2024). The increased use of AI in banking introduces new vulnerabilities that require robust security measures (Nuthalapati, 2024). Assuring the security of AI systems is essential to protect against cyber threats and maintain customer trust (Adhaen et al., 2024). Therefore, robust security measures are needed for successful AI adoption (Adhaen et al., 2024).

2.3 European Union Artificial Intelligence Act

The European Union Artificial Intelligence Act (also referred as 'EU AI Act') represents a landmark regulatory framework on AI, which addresses the risks of AI and aims to cherish trustworthy AI in Europe (*AI Act*, 2025). The legislation sets out comprehensive requirements for AI systems to ensure a high level of protection of health, safety and fundamental rights in the Union (European Commission, 2025). By defining clear guidelines and obligations, the EU AI Act seeks to mitigate potential harms while promoting innovation and public trust in AI technologies (*AI Act,* 2025). This section explores into the EU AI Act, its purpose, its risk-based approach and the broader context of the EU AI Act globally.

2.3.1 Risk-based approach

The EU AI Act uses a risk-based approach, with the purpose to improve the functioning of the internal market and promote the uptake human-centric and trustworthy artificial intelligence (AI), while safeguarding a high level of protection of health, safety, fundamental rights (European Parliament & Council of the European Union, 2024). The EU AI Act categorizes four levels of risk for AI systems: unacceptable risk, high risk, limited risk, and minimal risk (*AI Act*, 2025). This approach ensures that regulatory measures are proportionate to the potential risks posed by different AI applications, promoting both safety and innovation within the EU (Schuett, 2023).

2.3.1.1 Unacceptable risk

The EU AI Act defines 'unacceptable risk' as AI practices that are prohibited due to their potential to cause significant harm to individuals and society, violating fundamental rights and European Union values (European Parliament & Council of the European Union, 2024). Systems that involve an unacceptable risk will be prohibited, with the ban what came into force in February 2025 (Autoriteit Persoonsgegevens, n.d.). The EU AI Act identified in Article 5 AI practices which shall be prohibited, such as social scoring, manipulating, or emotion recognition (EU Artificial Intelligence Act, n.d.).

Before the implementation of the EU AI Act, several banks employed AI practices that are now prohibited (Machikape & Oluwadele, 2024; The World Bank Group et al., 2019). For example, some banks used social scoring systems to evaluate customers based on their social behavior and personal traits, leading to discriminatory practices

(Machikape & Oluwadele, 2024). Predictive policing algorithms were also utilized to assess the likelihood of customers committing financial crimes, resulting in unfair profiling (Ferguson, 2017). Additionally, there were instances where banks created facial recognition databases by scraping images from social media without user consent, violating privacy rights (The World Bank Group et al., 2019).

These practices lie in the digitalization and the lack of tight regulatory frameworks that characterized the pre-EU AI Act era (Osei et al., 2023). Banks, in their pursuit of efficiency and competitive advantage, often overlooked the ethical implications of AI deployment (Naik & First Citizens Bank, 2024). The EU AI Act addresses these concerns by explicitly categorizing certain AI practices as posing 'unacceptable risk' (*AI Act,* 2025). The reliance on AI systems for decision-making processes in banks highlighted the critical need for regulatory oversight to prevent misuse and protect citizens from potential harm (Crisanto, 2024).

2.3.1.2 High risk

The EU AI Act defines an AI system as 'high-risk' when both of the following conditions are fulfilled: The AI system is itself a certain type of product, and the AI system is a safety component of a certain type of product, the AI system (European Parliament & Council of the European Union, 2024) A summary of those AI systems is documented in Appendix 2: Referred high-risk AI systems in Article 6 of the EU AI Act. Understanding these definitions is crucial for identifying which AI systems fall under the high-risk category.

Article 8 to 15 outline the specific requirements that high-risk AI systems must meet (European Parliament & Council of the European Union, 2024). These requirements include compliance, risk management, data governance, technical documentation, record-keeping, transparency, human oversight, and ensuring accuracy, robustness, and cybersecurity, which are documented as summary in Appendix 3: Summary of EU AI Act requirements high-risk AI systems.

The EU AI Act's high-risk requirements are well-received by industry stakeholders, providing planning security and fostering a trustworthy corporate image (Wagner et al., 2024). Case studies indicate that companies value the structured approach to assuring the responsible use of AI systems while minimizing potential negative impacts (Wagner et al., 2024). For instance, a case study on a network video solutions company found that existing procedures for design, development, and testing could be further developed to comply with the EU AI Act's requirements (Wagner et al., 2024). Furthermore, the

emphasis on cybersecurity and human oversight is particularly appreciated (Wagner et al., 2024; Bygrave & Schmidt, 2024). These requirements not only mitigate AI-related risks but also promote innovation by setting clear compliance standards (Wagner et al., 2024). The EU AI Act's focus on data quality and governance ensures that AI systems are trained on high-quality, unbiased data, essential for their reliability and fairness (Novelli et al., 2024). Additionally, the requirement for post-market monitoring systems helps continuously assess AI systems' performance and safety, enhancing their long-term reliability (Wagner et al., 2024). Overall, the EU AI Act's high-risk requirements provide a robust framework that addresses AI risks and promotes its responsible and ethical use. This regulatory approach is likely to enhance public trust in AI technologies and encourage their broader adoption across various sectors (Bygrave & Schmidt, 2024; Novelli et al., 2024).

The banking sector employs various AI systems (Singh & SBICRM, 2020) that are classified as 'high-risk', including credit scoring (Sadok et al., 2022), fraud detection (Al-Fatlawi et al., 2023), Anti-Money Laundering (AML) (Tsapa, 2023), and customer profiling (Kasem et al., 2023). These AI systems fall under the high-risk category outlined in Annex III of the EU AI Act, specifically under essential services and benefits (Annex III: High-Risk AI Systems Referred to in Article 6(2) - EU AI Act, n.d.).

Table 1: Financial AI systems categorized as 'high-risk'

AI system	Area	Description	Reference
Credit scoring	Essential services and benefits	Significant impact on financial decisions; potential for bias and discrimination.	(Bahoo et al., (2024) ; Daube, (2024) ; Bhat, (2024))
Fraud detection	Essential services and benefits	High accuracy required to avoid false positives and negatives, privacy and security concerns.	(Fatlawi et al., (2023); (Lin, 2024))
AML	Essential services and benefits	Critical for regulatory compliance; must accurately detect suspicious activities to prevent financial crimes.	(Batool et al., (2025); (Han et al., (2020); Han et al., (2020))
Customer profiling	Essential services and benefits	Potential for misuse and bias; significant impact on personalized services and marketing strategies.	(Ferrer et al., (2020); Cheong, (2024))

Despite the requirements provided by the EU AI Act, there is a significant research gap in understanding the practical challenges and systemic flaws in adopting high-risk AI

systems (Gikay et al., 2023). Studies by Gikay et al. (2023) highlight that the EU AI Act's high-risk classification system has systemic flaws, such as hyper-technical enumeration, which involves defining high-risk AI systems through a rigid and exhaustive list of specific categories and use cases. This approach can exclude AI systems that pose significant risks but do not fit neatly into the predefined categories (Gikay et al., 2023). Additionally, Ebers (2024) argues that the EU AI Act does not fully implement a truly risk-based approach, because the EU AI Act lacks context classification and flexibility. Furthermore, Kuiper et al. (2022) found that the adoption of AI in banks is slow due to the time needed to become familiar with and implement complex models, regulatory uncertainty, and the adequacy of traditional models (Kuiper et al., 2022). Addressing the gap of comprehensive research in the practical challenges is crucial as it impacts the effectiveness of the EU AI Act in mitigating risks associated with high-risk AI systems (Gikay et al., 2023). Without a clear understanding of these challenges, the regulatory framework may fail to balance the risks and benefits of AI technologies, potentially stifling innovation and imposing unnecessary burdens (Kuiper et al., 2022). The slow pace adoption, driven by regulatory implementation timelines and internal hesitation, further compounds the challenges in the banking sector (Kuiper et al., 2022).

2.3.1.3 Limited risk

Limited risk (also named as 'transparency risk') AI systems are defined as specific disclosure obligations to ensure that humans are informed when necessary to preserve trust (European Parliament & Council of the European Union, 2024). Those obligations are made to certify users are informed with AI systems, and that users can make informed decisions (Veale & Frederik, 2021). Article 50 of the EU AI Act state limited risks as:

- AI that interacts with natural persons, e.g., chatbots, when it is not obvious from the circumstances and the context of use is not permitted by law to detect, prevent and investigate criminal offences (*Article 50: Transparency Obligations for Providers and Deployers of Certain AI Systems | EU Artificial Intelligence Act*, n.d.).
- AI that generates or manipulates images, audio, or video to stimulate people, objects, places or other existing entities or events (*Article 50: Transparency Obligations for Providers and Deployers of Certain AI Systems | EU Artificial Intelligence Act*, n.d.).

Limited risks in AI systems are relevant for the banking sector, where transparency and trust are paramount (Passador, 2024). For instance, chatbots and virtual assistants are commonly used to interact with customers, providing information and support (Geetha, 2021; Graham et al., 2025). Clearly informing customers that they are interacting with AI systems supports transparency and trust (Wanner et al., 2022), which the EU AI Act want to accomplish with the obligations (*Article 50 | EU Artificial Intelligence Act*, n.d.).

2.3.1.4 Minimal or no risk

The EU AI Act does not introduce obligations or rules for AI what is classified as minimal or no risk (Novelli et al., 2024). These systems include applications such as AI-enabled video games and spam filters and can be used and developed to the existing legislation without any additional legal obligations (European Commission, 2024).

Linking the risk-based approach to the current banking landscape, there remains a significant research gap concerning the adoption and regulation of AI practices in banks (Adhaen et al., 2024). Despite the EU AI Act's implementation, questions persist about how banks are adjusting to these new regulations and the extent to which they have reformed their AI practices (Musch et al., 2023c). The literature suggests that while some progress has been made, the transition has been uneven, with varying levels of compliance and understanding of the EU AI Act's requirements (Passador, 2024). The gap underscores the necessity for continued research and dialogue to ensure that AI technologies are used responsibly and ethically in the banking sector (Fares et al., 2022), aligning with the principles set forth by the EU AI Act (Musch et al., 2023b).

2.3.2 General Purpose AI

General Purpose AI (GPAI) is a versatile technology that plays a significant role in the EU AI Act, ensuring comprehensive regulatory oversight. A GPAI model is defined as an AI model trained with large amounts of data using self-supervision, capable of performing a wide range of tasks and integrating into various systems (Article 3: Definitions | EU Artificial Intelligence Act, n.d.). The AI Office oversees compliance with the EU AI Act requirements, assuring adherence to ethical standards and regulatory guidelines (European Parliament & Council of the European Union, 2024).

According to Article 53 of the EU AI Act, providers of GPAI models must draw up technical documentation, supply information to downstream providers, establish a policy

respecting the Copyright Directive, and publish a summary of the content used for training the GPAI model (Article 53: | EU Artificial Intelligence Act, n.d.). These obligations aim to ensure GPAI models are safe and trustworthy within the European Union (European Parliament & Council of the European Union, 2024). GPAI models can be categorized as 'systematic risk' if they have high impact capabilities, requiring additional evaluations and cybersecurity protections (Article 55: | EU Artificial Intelligence Act, n.d.). These requirements safeguard rigorous evaluation and monitoring, enabling risk mitigation and enhancing safety (European Parliament & Council of the European Union, 2024).

GPAI models are increasingly utilized in the banking sector for applications such as fraud detection, customer service, and risk management (European Banking Authority [EBA], 2024). However, integrating GPAI models into banking operations poses significant systematic risks, such as increased concentration access problems, potentially destabilizing financial markets (European Banking Authority [EBA], 2024). Additionally, GPAI models can create vulnerabilities in downstream markets due to their role as essential inputs in banking processes (Sevilla, 2024).

2.4 AI governance

Mäntymäki et al., (2022) defined a definition of AI governance:

"AI governance is a system of rules, practices, processes, and technological tools that are employed to ensure an organization's use of AI technologies aligns with the organization's strategies, objectives, and values; fulfills legal requirements; and meets principles of ethical AI followed by the organization"

(Mäntymäki et al., 2022).

AI governance is essential for ensuring that AI is used ethically and safely, particularly in high-stakes sectors like banking (Ridzuan et al., 2024). To achieve safe usage of AI in the banking sector, multiple components are integrated into the frameworks of AI governance, such as compliance and innovation (Batool et al., 2025). Compliance and innovation are important components of AI governance for the banking sector (Ridzuan et al., 2024; Anang et al., 2024). Compliance confirms that AI systems adhere to legal and ethical standards, mitigating risks such as bias and privacy violations (Geetha, 2021). Innovation, on the other hand, drives the development of advanced AI technologies that can enhance operational efficiency and customer experience in banking (BPI, 2024). Together, these components help banks leverage AI responsibly and effectively,

balancing regulatory requirements with the need for technological advancement (Musch et al., 2023b).

These frameworks assure that AI systems are not only compliant with the EU AI Act but also aligned with broader ethical considerations (Batool et al., 2025). Furthermore, they support banks in interpreting and implementing the EU AI Act (Passador, 2024; Prenio et al., 2021). The purpose of AI governance in the EU AI Act is to facilitate the harmonized implementation and enforcement of AI regulations across Member States, promoting ethical AI development and safeguarding fundamental rights while fostering innovation and international cooperation (Musch et al., 2023b; Novelli et al., 2024).

Given the importance of AI governance, it is crucial to explore how compliance and innovation are integral to the governance framework established by the EU AI Act (Batool et al., 2025).

2.4.1 Compliance

Compliance refers to the adherence to laws, regulations, guidelines, and ethical standards set by regulatory authorities (Edwards & Wolfe, 2005). In the context of AI governance, compliance ensures that AI systems operate within legal and ethical boundaries, aligning with both the letter and the spirit of the law (Ramos & Ellul, 2024). This involves not only following explicit rules but also upholding underlying ethical principles, thereby promoting transparency, accountability, and trust in AI applications (Musch et al., 2023b).

Appendix 4: Usage of compliance requirements in the banking sector before the EU AI Act provides a detailed overview of these compliance requirements, explaining how they are currently used in the banking sector and highlighting the challenges banks face in integrating these new regulations.

The banking sector, which relies heavily on AI for risk assessment, fraud detection, and customer service, faces challenges in complying with the EU AI Act's requirements for high-risk AI systems, including accuracy, robustness, and cybersecurity (Musch et al., 2023c; Passador, 2024). These challenges arise due to the complexity of financial data, the dynamic nature of the financial market, and the need for stringent cybersecurity measures to protect sensitive information (Sawant et al., 2023). Securing transparency, effective human oversight, and continuous innovation while maintaining robust cybersecurity measures are critical for banks to meet compliance standards and leverage AI for strategic advantages (Kovačević et al., 2024).

Integrating the new requirements of the EU AI Act into existing risk management systems presents significant challenges for banks. This integration requires harmonizing different regulatory standards and ensuring seamless operation (Soprana, 2024). Implementing data governance frameworks is equally complex due to overlapping laws and the need for secure data sharing mechanisms (Coche et al., 2024). Banks also face difficulties in documenting AI systems, particularly complex models like neural networks and deep learning algorithms, to meet compliance requirements (Königstorfer et al., 2022).

Adapting to Article 12 of the EU AI Act, which mandates record-keeping for high-risk AI systems, poses substantial operational and regulatory challenges (Musch et al., 2023c). While banks strive for transparency in their AI operations by implementing AI-powered fraud detection systems to enhance customer trust (Adhaen et al., 2024), they encounter significant obstacles in meeting the transparency requirements of the EU AI Act, especially due to the "black box" nature of AI algorithms (Passador, 2024; Zednik, 2019).

Ensuring effective human oversight is another critical challenge. Human overseers may lack the necessary competence or be influenced by harmful incentives, which can undermine the effectiveness of oversight and the trustworthiness of AI systems (Laux, 2023). To address this challenge, Laux created a framework of "institutionalized distrust" that proposes six principles—justification, periodic mandates, collective decisions, limited competence of institutions, justiciability and accountability, and transparency—to enhance the effectiveness and trustworthiness of human oversight in AI governance (Laux, 2023). This framework differentiates between first-degree oversight, where human involvement can change AI's output, and second-degree oversight, which involves auditing or reviewing AI decisions retrospectively (Laux, 2023). The framework is more highlighted in Appendix 4: Usage of compliance requirements in the banking sector before the EU AI Act.

The rapid evolution of AI technologies, such as Generative AI, introduces new risks that existing frameworks may not adequately cover, necessitating continuous innovation and robust cybersecurity measures (Al-Dosari, 2022; Oluwu et al., 2024). Ensuring collaboration among model, technology, legal, and compliance teams is essential but challenging (Oluwu et al., 2024). Additionally, banks must continuously innovate while maintaining robust cybersecurity measures to protect against sophisticated cyber threats (Kovačević et al., 2024).

To effectively navigate the evolving landscape of AI risks and guarantee robust protection against emerging threats, banks must adapt by integrating comprehensive compliance strategies that align with the EU AI Act's risk-based approach. Proposition 1 states how the EU AI Act can develop more comprehensive compliance strategies.

Proposition 1 (P1)*: The EU AI Act's risk-based approach and additional compliance requirements for high-risk AI systems will lead Dutch banks to develop more comprehensive compliance strategies.*

This study aims to address the research gap concerning the use of compliance requirements in the banking sector, specifically focusing on Dutch banks. While there is existing literature on how compliance requirements are implemented in the banking sector (Ogbeide et al., 2023; Coche et al., 2024; Königstorfer et al., 2022), there is a notable lack of research on the preparedness of Dutch banks for the EU AI Act. This study will examine compliance requirements, identify challenges, and explore opportunities for innovation within Dutch banks. This aligns directly with Sub Question 1 (SQ1), which focuses on understanding the compliance requirements and the preparations of Dutch banks to meet them.

2.4.2 Innovation

Innovation is a multifaceted concept involving the introduction of new ideas, methods, or products, and the process of realizing these novelties (Mathias et al., 2024). DeJong et al. (2025) distinguish innovation from ordinary change by its nature of expanding the dimensions of a system, fundamentally transforming it. In finance, Addula et al. (2024) describe innovation as integrating advanced technologies like AI and blockchain to enhance efficiency, security, and transparency in financial operations.

AI adoption represents significant innovation in the banking sector, transforming operations and customer interactions (Gyau et al., 2024). AI technologies strengthen efficiency, security, and customer service (Bouteraa et al., 2024). For instance, AI-driven applications like ChatGPT improve customer service and streamline operations through automation (Bouteraa et al., 2024). Additionally, AI positively impacts banks' financial performance by improving return on assets and enhancing risk management practices (Gyau et al., 2024).

The EU AI Act significantly influences innovation strategies in the banking sector, particularly regarding AI technologies (Musch et al., 2023c). A key feature of the EU AI Act is the establishment of regulatory sandboxes, which allow banks to test innovative AI systems under controlled conditions (Plato-Shinar & Godwin, 2025). These sandboxes provide a safe environment for experimentation, balancing innovation with compliance (Papathanassiou, 2024). Regulatory sandboxes foster innovation while ensuring regulatory oversight, optimizing the balance between innovation and regulation (Plato-Shinar & Godwin, 2025). The World Bank (2020) emphasizes the benefits of regulatory sandboxes in promoting financial inclusion, enhancing market competition, and assisting policy-maker decisions. They reduce the time and cost associated with bringing new AI technologies to market by providing a structured yet flexible testing environment (Buocz et al., 2023). Thus, regulatory sandboxes play a crucial role in shaping innovation strategies in the banking sector by providing a balanced approach to experimentation and compliance, emphasizing proactive information-sharing, consultation and mutual assistance, practical measures to encourage coordination, and a coordination body or process (Plato-Shinar and Godwin, 2025).

To effectively align their innovation strategies with regulatory requirements, banks can leverage the EU AI Act's provision for regulatory sandboxes. Proposition 2 highlights how these regulatory sandboxes and accompanying guidelines can stimulate innovation in Dutch banks.

Proposition 2 (P2)*: The introduction of regulatory sandboxes and guidelines in the EU AI Act will foster innovation in Dutch banks.*

Banks must strategically adjust their innovation strategies to comply with the EU AI Act while maintaining progress (Musch et al., 2023c). Implementing the EU AI Act's provisions may require changes in operational practices, including enhanced AI governance and risk management (Crisanto et al., 2024). Integrating compliance into the innovation process allows banks to develop advanced AI technologies while ensuring adherence to the EU AI Act (Crisanto et al., 2024).

By integrating compliance in the innovation processes, banks can promote the adoption of AI with the EU AI Act. Therefore, proposition 3 states that the EU AI Act will promote the adoption of AI systems in Dutch banks.

Proposition 3 (P3)*: The EU AI Act will promote the adoption of AI systems in Dutch banks by addressing key challenges such as data quality, integration with legacy systems, and regulatory compliance.*

To conclude, Dutch banks face significant challenges in balancing innovation with compliance under the EU AI Act. The requirements of the EU AI Act for high-risk AI applications necessitate substantial adjustments in operational practices (European Insurance and Occupational Pensions Authority [EIOPA], n.d.), investments in regulatory technology (Passador, 2024), and the implementation of robust AI governance frameworks (Fares et al., 2022). Addressing these challenges is crucial for banks to sustain innovative progress, maintain a competitive edge, and foster sustainable growth in the evolving financial landscape (Crisanto et al., 2024).

2.5 Conceptual framework

The conceptual framework of this research is based on the literature review, inspired by the research question: *How does the EU AI Act influence the adoption of AI systems in Dutch banks through compliance and innovation strategies?* A conceptual framework is beneficial because it grounds the study in the relevant knowledge bases that lay the foundation for the importance of the problem statement and research questions (Rocco & Plakhotnik, 2009). Figure 2 illustrates the findings of the literature in a conceptual framework.

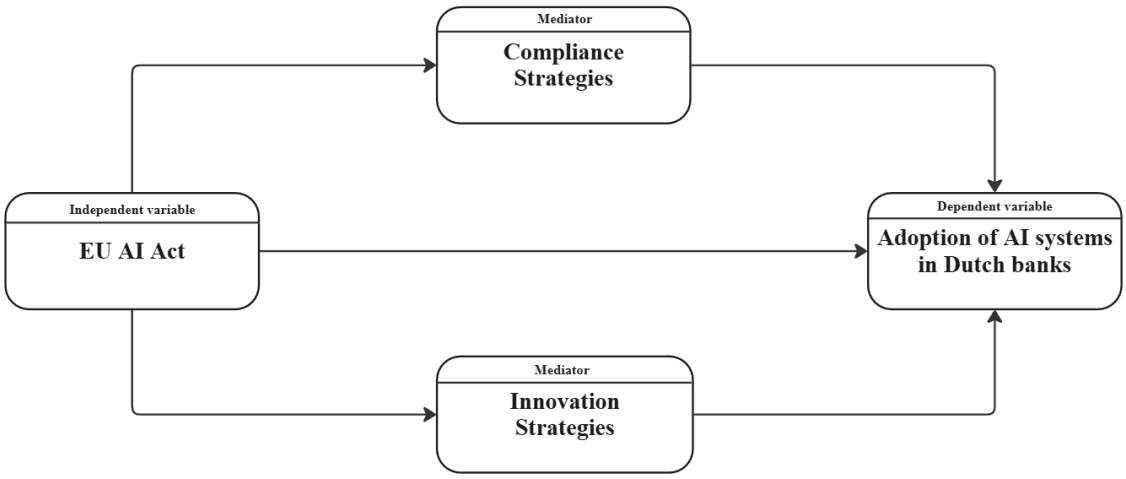

Figure 2: Conceptual framework summarizing literature findings

The risk-based approach of the EU AI Act serves as the independent variable in this research, influencing the adoption of AI systems in Dutch banks, which is the dependent variable. The EU AI Act introduces several requirements and characteristics, including regulatory sandboxes, General Purpose AI (GPAI) models, and a robust regulatory framework (European Parliament & Council of the European Union, 2024). These elements of the EU AI Act necessitate changes in the compliance and innovation strategies of Dutch banks. As banks adapt their compliance and innovation strategies to meet these requirements, the adoption of AI systems is consequently affected (Musch et al., 2023c). Therefore, the changes in compliance and innovation strategies, driven by the EU AI Act, act as mediators in this research, ultimately influencing the adoption of AI systems in Dutch banks.

2.6 Formulating propositions

Based on the analysis of the EU AI Act, AI adoption in Dutch banks, compliance strategies, and innovation strategies, the following propositions were made in the literature review:

Proposition 1 (P1)*: The EU AI Act's risk-based approach and additional compliance requirements for high-risk AI systems will lead Dutch banks to develop more comprehensive compliance strategies.*

This proposition is grounded in the literature that highlights the stringent compliance requirements of the EU AI Act and the need for robust risk management, data governance, and transparency measures (European Parliament & Council of the European Union, 2024). Researching this proposition is essential to understand how banks are practically implementing the compliance requirements of the EU AI Act in their compliance strategies and the challenges they face.

Proposition 2 (P2)*: The introduction of regulatory sandboxes and guidelines in the EU AI Act will foster innovation in Dutch banks.*

This proposition is grounded in the literature that highlights regulatory sandboxes provide controlled environments for testing innovative AI systems, balancing innovation with compliance (Plato-Shinar & Godwin, 2025). Investigating this proposition will help understand the effectiveness of regulatory sandboxes in promoting innovation and the experiences of banks utilizing these environments for their innovation strategies.

Proposition 3 (P3)*: The EU AI Act will promote the adoption of AI systems in Dutch banks by addressing key challenges such as data quality, integration with legacy systems, and regulatory compliance.*

The EU AI Act's emphasis on transparency, human oversight, and robust data governance aims to enhance trust in AI systems and ensure their reliable and ethical use (Musch et al., 2023c). Exploring this proposition will reveal how the EU AI Act's provisions are impacting AI adoption, and the specific obstacles banks are overcoming.

3 METHODOLOGY

This chapter provides the methodological approach in this thesis. The research is based on qualitative research, including semi-constructed interviews, validated by a thematic analysis. Paragraph 3.1 will discuss the research approach, and paragraph 3.2 will discuss the data collection. Paragraph 3.3 discusses the data analysis of this research, followed up by the research quality, discussed in paragraph 3.4.

3.1 Research approach

Based on the literature, three propositions were formulated regarding the impact of the EU AI Act on adopting of AI systems in Dutch banks, focusing on compliance requirements, innovation strategies, and anticipated challenges. The literature suggests that while banks are aware of the compliance requirements of the EU AI Act and potential benefits of AI adoption, there is uncertainty regarding the practical implementation and supervision of the EU AI Act in the banking sector. This gap highlighted the need for empirical research to explore the impact of the EU AI Act on the strategies and AI adoption of banks.

To answer the propositions, qualitative research had been conducted. Qualitative research is effective for understanding complex, context-specific phenomena and for capturing the nuanced perspectives of stakeholders (Leavy, 2014). This made qualitative research well-suited for exploring how the EU AI Act impacts the adoption of AI systems in the banking sector through compliance and innovation strategies, as it allowed for an in-depth examination of the regulatory environment and the diverse experiences of those involved (Leavy, 2014). A visualization of the research can be found in Figure 3, which states how the research had been conducted.

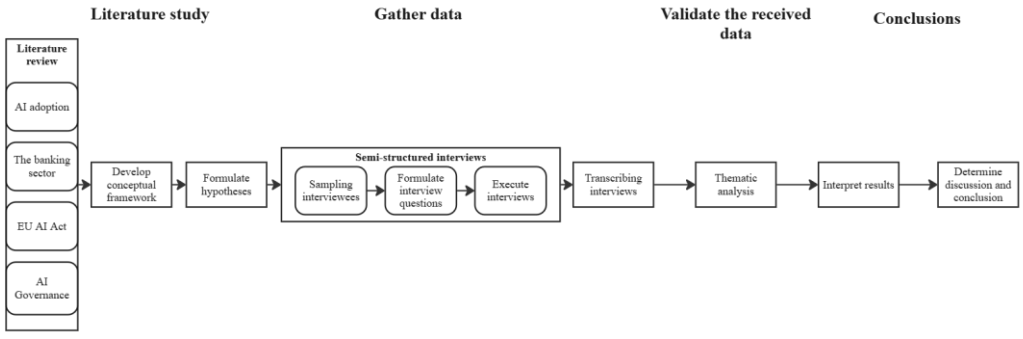

Figure 3: Visualization of the research approach

3.2 Data collection

For the qualitative research, semi-structured interviews were conducted. Document analysis in the form of thematic analysis was performed to validate the data from the interviews to compare with the findings of the literature review in chapter 2.

3.2.1 Literature study

The first part of the research contained the literature review to acknowledge the status of the EU AI Act and of the Dutch banking sector, and to obtain knowledge to structure the semi-structured interviews. The literature review provided an understanding of the EU AI Act and practices in the banking sector, which supported creating relevant and insightful interview questions. While the literature review partially answered the research question and sub-questions, these findings needed to be verified through semi-structured interviews to ensure a comprehensive understanding. Keywords of the literature review research were: *AI adoption, banking sector, EU AI Act, compliance strategies, innovation strategies, regulatory sandboxes and AI systems.*

3.2.2 Semi-structured interviews

Semi-structured interviews were conducted to understand the challenges of AI adoption in the Dutch banking sector and the impact of the EU AI Act in the Dutch banking sector. A semi-structured interview is a conversational method of interviewing that blend closed- and open-ended questions, often accompanied by follow-up questions to delve deeper into the respondent's thoughts and opinions (Adams, 2015). With semi-structured interviews, some questions were prepared beforehand, but there was flexibility to explore other information, questions, or experiences as they arise (Magaldi & Berler, 2020). This method of interview is preferred when the researcher's goal is to gain a deeper understanding of the participant's unique perspective rather than a generalized view of a phenomenon (McGrath et al., 2018). Furthermore, another benefit of semi-structured interviews is that during the interview, new ideas can be explored and brought up (Adeoye-Olatunde & Olenik, 2021).

3.2.2.1 Sampling

To identify the most suitable interviewees, the snowball sampling technique was employed. Snowball sampling, as defined by Goodman (1961), involved selecting a random

sample from a population and asking everyone in the sample to name a specified number of other individuals. The agreeable participants were then asked to recommend other contacts who fit the research criteria and were willing to participate, continuing the process (Parker et al., 2019). This method of finding new participants through networking within the sample can be likened to a snowball, which grows larger as it rolls (Naderifar et al., 2017).

Furthermore, the internal platform of the big four company was used to find employees with the required expertise for the interviews. The internal platform was also used to initiate snowball sampling, identifying effective interviewees until no new information was added or observed in the data, achieving saturation (Galvin, 2015).

3.2.2.2 Interviewees

The interviewees were selected based on their expertise and knowledge of the subject of the research. A total of 12 interviews were conducted (Table 2), which is according to Mwita (2022), conform the number of interviews to reach data saturation. The interviewees were approached by email. For the confidentiality of this research, the names of the interviewees are withheld. The durations of the interviews were between 30 to 60 minutes, conducted remotely by Microsoft Teams. Consent was obtained from each interviewee prior to recording, with the assurance that all information was used for research purposes.

Table 2: List of interviewees with their profession and expertise

Interviewee	Department	Profession	Area(s) of expertise	Date of the interview
A	Assurance: AI Team	Associate	AI Governance, Compliance	15-04-2025
B	Consulting: AI Team	Partner	Banking sector, AI strategy	17-04-2025
C	Risk & Regulation: Regulatory Transformation	Director	Banking Sector Innovation strategy	22-04-2025
D	Assurance: AI Team	Partner	EU AI Act AI lead	23-04-2025
E	Assurance: AI Team	Senior Associate	EU AI Act AI Governance	24-04-2025
F	Risk & Regulation: Financial Services (FS)	Partner	Banking sector, Compliance	24-04-2025
G	Technology Risk consultant	Senior Associate	EU AI Act	25-04-2025

H	Risk & Regulation: Financial Services (FS)	Senior Manager	Compliance Strategy	06-05-2025
I	Risk & Regulatory consultant	Senior Associate	EU AI Act Banking Sector	06-05-2025
J	Tax: Tech, Data and GenAI	Director	EU AI Act	07-05-2025
K	Assurance: AI Team	Associate	Strategy in banks EU AI Act	09-05-2025
L	Business Control Officer ING	Manager	Strategy in banks	12-05-2025

3.2.2.3 Interview structure

As previously mentioned, the interviews were conducted using a semi-structured format to ensure a comprehensive exploration of the topics. The framework outlined by Kallio et al., (2016) was conducted to create semi-structured interview questions. This framework involved several phases to complete a set of semi-structured interview questions (Figure 4).

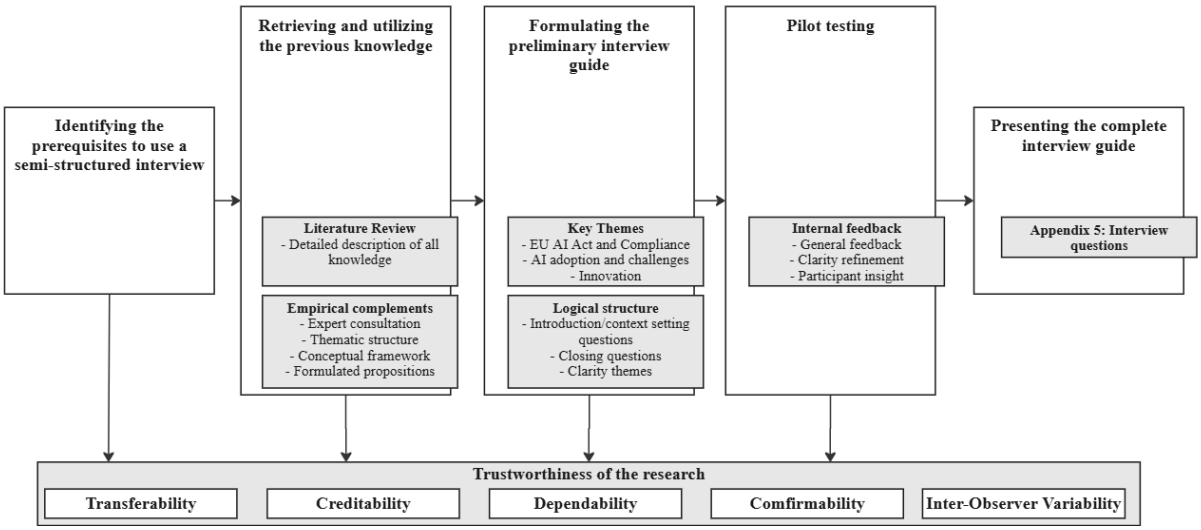

Figure 4: A framework for the development of a qualitative semi-structured interview guide, inspired by Kallio et al., (2016)

The figure demonstrated the systematic progression from the initial identification of research needs to the final presentation of the interview guide. Each step was carefully documented, from the literature review that informed thematic questions to the pilot testing that refined clarity and flow. This approach ensured the guide was comprehensive and adaptable, facilitating meaningful discussions on AI governance, regulatory compliance,

and innovative practices in the banking sector. The complete set of interview questions can be found in Appendix 5: Interview questions.

Before the interviews commenced, the interviewer provided an overview of the context and objectives of the interviews. This was followed by an introductory segment to establish a healthy setting between the interviewer and the interviewee. The discussion then focused on AI adoption and its associated challenges, with detailed inquiries into the EU AI Act and compliance issues. The conversation transitioned to the topic of innovation. Towards the conclusion of the interviews, interviewees were given the opportunity to ask any final questions or offer additional comments. Interviewees were also informed that they could request a transcript of the interview. This structured approach ensured that each interview allowed for a thorough exploration of crucial topics, facilitating rich dialogue and enhancing the quality of the data collected.

3.3 Data analysis

After all data was collected, the data was analysed and showcased in chapter 4; Results. The data from the semi-structured interviews were analysed and validated using thematic analysis to evaluate the findings in the literature review. The semi-structured interviews were transcribed with Copilot in Microsoft Teams by the laptop of the researcher, either if the interview was in person or digitally. The transcription of the semi-structured interviews was used to provide summaries of the interviews, which can be found in Appendix 7: Interview summaries. The summary of the transcription didn't need to be validated, as the interviewee had access to the transcription of the interview.

The semi-structured interviews were coded accordingly for the thematic analysis with the help of the software program Atlas.ti. This software was particularly useful for the coding and categorizing of qualitative data, which helped with interpreting the large amounts of texts. Additionally, Atlas.ti improved the creditability of the research, as it increased transparency and replicability of a research process (Hwang, 2007).

The results of the coding for the thematic analysis can be found in the next chapter, where the identified themes and patterns were discussed in detail.

3.3.1 Thematic analysis

Thematic analysis is a qualitative research method used for identifying, analyzing, and reporting patterns or themes within data (Braun & Clarke, 2006). It is particularly suitable

for analyzing both literature studies and interview data (Braun & Clarke, 2006), making it an ideal choice for this research. According to Braun and Clarke (2006), thematic analysis provides a flexible and accessible approach to qualitative data analysis, allowing researchers to identify themes that are relevant to the research questions (Braun & Clarke, 2006). Thematic analysis was beneficial for this research as it allowed for a comprehensive examination of both the literature and interview data. By systematically coding and categorizing data, thematic analysis helped in uncovering underlying themes that are crucial for understanding the research context (Braun & Clarke, 2006). The steps involved in thematic analysis, as outlined by Braun and Clarke (2006), included familiarizing yourself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. These steps ensured a rigorous and systematic approach to data analysis, improving the reliability and validity of the research findings (Braun & Clarke, 2006). A visual overview of the thematic analysis can be found in Figure 5.

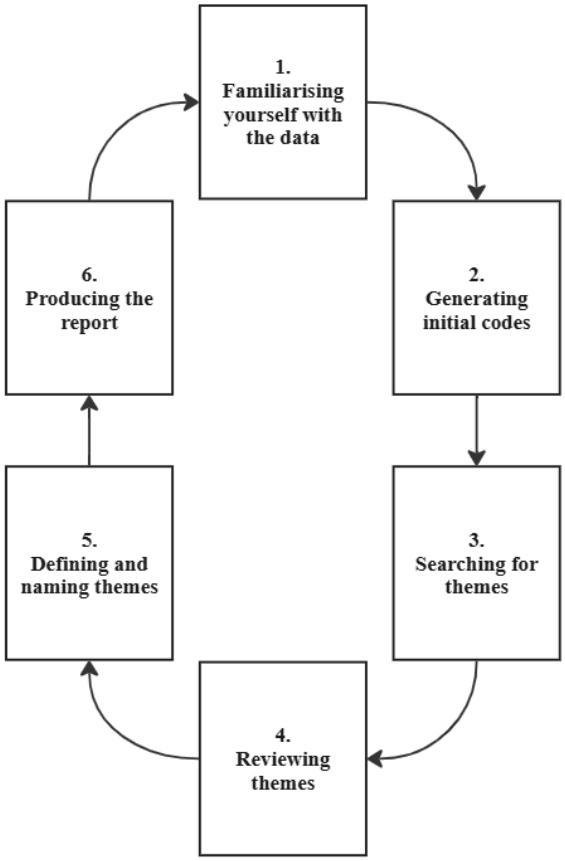

Figure 5: Thematic analysis steps framework, inspired by Braun & Clarke (2006)

A deductive approach of thematic analysis was most suitable to find the most results in this research, which tests propositions derived from existing theories, effective in regulatory studies (Hyde, 2000; Bryman, 2016). This method allowed the research to apply established theories on AI governance to the context of Dutch banking. Using a deductive approach ensured that the research was grounded in established frameworks, facilitating a systematic examination of how the EU AI Act influences AI adoption. Thus, the deductive approach provided a rigorous framework for analyzing the EU AI Act's impact on AI adoption in Dutch banking.

For the deductive approach, predefined themes and labels were defined based on the propositions. These themes and labels can be found in Appendix 6: Interview data.

3.4 Research quality

The quality of the results depended on the quality of the conducted research. To ensure the trustworthiness of qualitative research, terms as transferability, credibility, dependability, and confirmability were used to evaluate the quality of the research.

3.4.1 Transferability

Transferability refers to the extent to which the findings of a study can be applied to other contexts or settings (Korstjens & Moser, 2017). According to Korstjens & Moser (2017), transferability is determined by the readers of the research, who assess the applicability of the findings to their own situations. By offering ‘thick descriptions’, researchers enabled interviewees to describe not only their behavior and experiences, but also their context as well for meaningful information (Korstjens & Moser, 2017).

During the thesis, transferability was addressed by providing detailed descriptions of the Dutch banking sector, the specific regulatory environment, and the unique challenges faced by banks in adopting AI under the EU AI Act. Furthermore, the interviewees within the big four firm were chosen wisely from different projects, each containing a ‘thick description’. This thorough documentation of the interviews enhanced the transferability of this research.

3.4.2 Creditability

Credibility is the confidence in the truth of the study and its findings (Korstjens & Moser, 2017). To ensure credibility of this thesis, a big variety of academic papers, sources and

reports in combination with twelve semi-structured interviews with experts were conducted. Furthermore, validity was reinforced by triangulating data sources with interview findings. The interview questions were intricately based on literature findings and reviewed for relevance to the research topic, ensuring that they accurately represented the phenomena being studied. This careful preparation, alongside supervised reviews of interview summaries, contributed to both credibility and descriptive validity, addressing potential distortion and bias. These methods ensured that the research findings were both credible and valid (Lincoln & Guba, 1985).

3.4.3 Dependability

Dependability refers to the stability of the data over time (Korstjens & Moser, 2017). To enhance the dependability of this research, all data were thoroughly explained and elaborated to ensure a clear understanding of the research process. By adding transparency to the research steps, review sessions became more manageable, allowing for a comprehensive review of the research process and making the study replicable.

3.4.4 Confirmability

Confirmability is the degree to which the findings of the research could be confirmed by other researchers (Korstjens & Moser, 2017). To ensure confirmability, it was essential to conduct the research based on the participants' perspectives rather than the researchers' preferences or biases (Korstjens & Moser, 2017). To achieve this, the insights from the research were presented to multiple relevant supervisors and interviewees, ensuring that the researchers' preferences and biases were filtered out. This process helped to establish that the data and interpretations were clearly derived from the participants' input, enhancing the confirmability of the findings.

3.4.5 Intra-Observer Variability

Intra-observer variability is a critical factor in ensuring consistency in qualitative research findings. In qualitative research, intra-observer variability refers to the variation in data interpretation when the same observer reviews the data multiple times (Sardanelli & Di Leo, 2009). To minimize intra-observer variability in the study, consistent coding practices were implemented throughout data analysis. This approach ensured that interpretations remained stable over time, enhancing the credibility and reliability of the research

findings. By addressing intra-observer variability, the study ensured consistent and dependable results, contributing to stronger and more trustworthy research.

3.4.6 Data Management

In Appendix 8: Research data management plan for students, a data management plan can be found, which shows a template provided by The University of Turku for supporting the research with a planning for data collection and the rights regarding the data collection. The plan showed aspects such as the storage of the data, consent of the usage of data and the types of data gathered, to offer a detailed overview of the research.

4 RESULTS

This chapter presents the results from the semi-structured interviews and thematic analysis to provide findings to answer the formulated RQ and SQs formulated in chapter 1.3. Paragraph 4.1 discusses the themes and patterns identified through semi-structured interviews during the thematic analysis. Paragraph 4.2 focuses on the compliance requirements from the EU AI Act for the Dutch banking sector, aligning with SQ1. Furthermore, paragraph 4.3 discusses the impact of the EU AI Act on innovation in the Dutch banking sector, aligning with SQ2. Finally, paragraph 4.4 discusses the challenges of AI adoption for the banking sector under the EU AI Act, aligning with SQ3.

4.1 Identified themes and patterns

During the coding of the semi-structured interviews, the predefined labels from Table 9 were tracked, and the usage of the codes can be found in Table 10. The key themes and findings will be presented in this paragraph.

4.1.1 Bank characteristics

One significant factor that impacts AI adoption in the Dutch banking sector is individual banks' characteristics, particularly in data governance and risk appetite. Risk appetite is the level of risk an organization is willing to accept to achieve its strategic objectives before action is deemed necessary to reduce that risk. The EU AI Act, while intended to provide a regulatory framework for AI systems, has varying implications for traditional banks compared to neo banks.

Traditional banks in the Netherlands often operate within a well-established regulatory environment characterized by compliance requirements and a cautious approach to risk (Crisanto et al., 2024). Traditional banks have a different vision compared to neo banks, which offer banking services through digital channels (Naysary & Tarazi, 2024), which causes a slower adoption of AI (Interviewee B-8:20; E-9:49; G-14:46; I-30:45).

"It's interesting to note that traditional banks tend to lag behind in AI development. Their approach, influenced by factors like risk appetite and data governance, causes them to proceed cautiously. In contrast, BigTech firms and neo-banks are rapidly advancing in their adoption of AI."

~ Interviewee B (8:20)

Most interviewees stated that traditional banks in the Netherlands are behind in AI adoption, with issues such as unclear data governance or a lack of interest in technological advancements. The interviewees' perspectives aligned with the literature, as the literature stated that banks consist of inconsistent data availability and data governance (Sawant et al., 2023; Fares et al., 2022). Furthermore, Interviewee D addressed another significant issue on why Dutch banks are slow in adopting AI:

"If you look at how much is being invested in AI worldwide, the Netherlands invests smaller amounts compared to all kinds of superpowers that just have incredibly astronomical amounts there. The willingness of organizations to invest in AI has something to do with the investing climate, and regulations are a part of it."

~ Interviewee D (4:14)

The Netherlands lacks AI investment within several sectors, such as the banking sector. Nevertheless, banks try to be as innovative as possible around AI to gain competitive advantages and are willing to take risks, although fines are handed out quickly (A-12:20). However, there are differences between banks' risk appetites. Neo banks tend to have a higher risk appetite than traditional banks, particularly because they are smaller and more agile because of their size. This allows them to rapidly implement changes (J-11:18). Traditional banks may be more cautious due to their established governance structures and regulatory compliance requirements (Interviewee G-5:48; J-14:25). Although the EU AI Act presents long-term AI adoption in banks, it provides facilitation for long-term Ai adoption if banks prioritize AI literacy and strong communication channels to aid compliance strategies (L-16:20).

4.1.2 Differences in perception of the EU AI Act

Interviewees expressed various views and perceptions regarding the impact of the EU AI Act on the banking sector. Some interviewees felt positive, remarking that the EU AI Act helps clarify how to manage AI risks and provides a more transparent framework for compliance. On the other hand, some interviewees expressed worries that strict rules might hold back innovation and make it harder to adopt new AI technologies in banking. These differing views highlight the complex effects of the EU AI Act on AI usage in banking, suggesting that it is important to look deeper into these perspectives. A variety of quotes from the interviewees can be found in Figure 6.

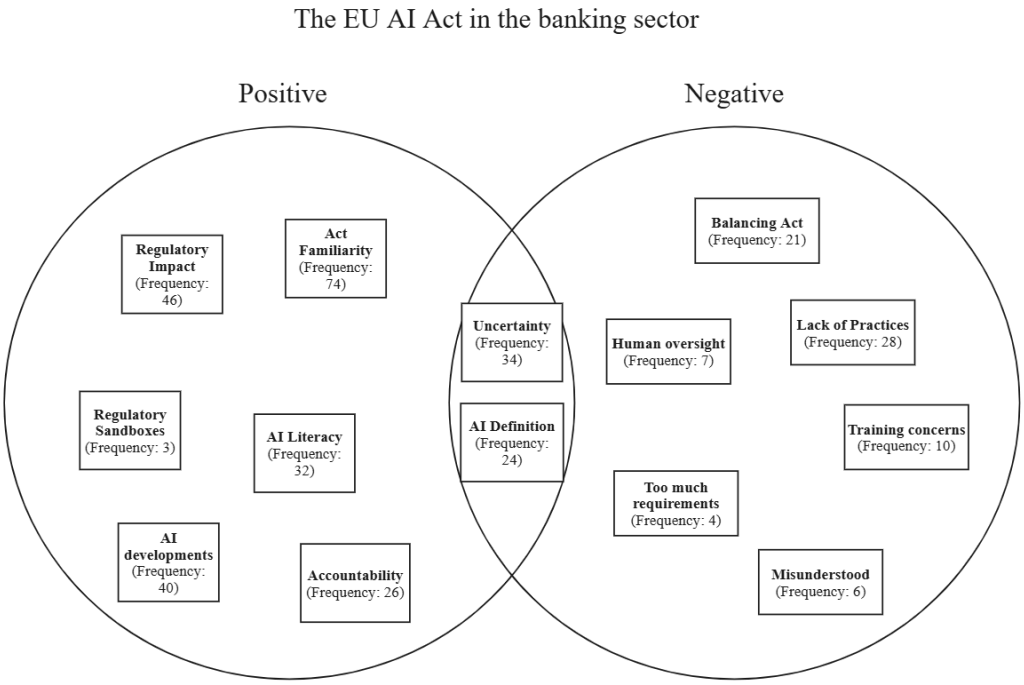

Figure 6: Codes regarding the EU AI Act in the banking sector

Interviewees were enthusiastic about the EU AI Act as it provided necessary AI regulation for the whole industry across the EU. Interviewee G mentioned that a uniform definition of an AI system got the banking sector on the same page regarding how the risks associated with AI are handled (G-14:36). Furthermore, Interviewee E addressed that the EU AI Act's risk-based approach supports mitigating AI risks, as AI systems need to be treated in different ways (E-9:49). Also, Interviewee K mentioned that the EU AI Act brings guidelines on how to comply with the regulation, which supports AI adoption (K-8:52). The enthusiasm for the EU AI Act within the banking sector can be linked to its structured approach, which aligns with the sector's need for standardized AI governance.

However, some interviewees were skeptical of the EU AI Act for the banking sector. Interviewee B addressed that the EU AI Act lacks clarity of the requirements as a significant issue with the EU AI Act, which leads to confusion and misinterpretation, leaving uncertainties on expectations from the employees in the banking sector (B-8:39). Interviewee G supported the finding of Interviewee B, as they stated that banks would like to have clarity on the risks they need to mitigate and how they can innovate in a way which manages those risks (G-14:36). The lack of clarity brings questions to banks on 'how' to comply with the EU AI Act, instead of the possibilities to augment their AI adoption (I-30:15). Overall, there needs to be more clarity on the requirements of the EU AI Act, addressing the issues for aligning regulatory requirements with AI adoption in the banking sector.

4.1.3 Importance of AI literacy

Another finding is the critical role of AI literacy in successfully implementing the EU AI Act and adopting AI in the banking sector. Interviewee J mentioned that people in an organization need to have the skills, knowledge, and understanding of AI systems that are implemented to enhance the successful implementation of the EU AI Act (J-5:22). Furthermore, Interviewee A made it clear that AI literacy is necessary for AI adoption and overcome resistance to use AI.

"In order to have AI adoption, there must be a level of AI literacy. And if there is [a level of AI literacy], then people are also more willing to do and make that adoption for AI."

~Interviewee A (15:52)

The interviewees expressed the importance of AI literacy, as they see that people in the banking sector have insufficient knowledge of how to deal with AI and how to interact with an AI system (A-15:52, 41:33; D-20:11; E-25:15; J-25:52). Although the EU AI Act stated in Article 4 that providers and developers of AI systems should take measures to secure a sufficient level of AI literacy of their staff and employees with the operation and use of AI systems (EU Artificial Intelligence Act. (2025), interviewees find the requirement too vague as banks are uncertain about what level of AI literacy is sufficient (E-21:37; J-28:03; K-21:26). However, banks are aware of the situation and think about how to obtain sufficient knowledge of AI literacy within their organizations (E-21:37, K-27:21).

To secure sufficient AI literacy for the EU AI Act, banks introduced mandatory training programs among employees. For example, a traditional bank made mandatory training courses in which they discussed what AI is and what they can and cannot do with AI (B-3:18). These training courses were mandatory for all employees who wanted to work with AI, and it was a pragmatic way to solve AI literacy, with half of all employees completing the training course within ten weeks (B-3:18). Furthermore, banks are looking for concrete use cases where AI is used, to apply AI for their own (C-23:44) and obtain a level of knowledge to use AI responsibly (A-41:33). AI literacy training equips employees with essential skills for understanding AI's potential and limitations, creating the possibility for successful AI adoption (B-5:21).

Understanding the difference between providers and deployers in the banking sector is essential for grasping the dynamics of AI adoption. Providers are entities that create and supply AI models, such as OpenAI, while deployers are organizations like banks that implement these models within their systems (A-21:29). This difference in responsibilities affects how banks approach AI adoption. Providers must assure their models meet regulatory standards (L-4:41), while deployers need to understand the implications of the AI systems they implement, including potential biases and compliance issues (L-18:30). With the introduction of the EU AI Act, a deployer of an AI system must meet much fewer requirements than a provider, which makes it more interesting for banks to utilize third-party AI models (A-24:42, 27:09). This means that banks can focus on implementing AI systems without the extensive compliance obligations that come with being a provider. Based on the EU AI Act, banks are more likely to be deployers and focus on the deployer's side of requirements.

The responsibility for risk assessment and adherence to high-risk standards rests mainly with AI model providers, enabling banks to reduce risk exposure while gaining from sophisticated AI systems. Interviewee A noted that the EU AI Act substantially reduces compliance obligations for banks deploying AI systems compared to providers (A-19:51). This transfer of accountability permits banks to concentrate on integrating AI into their operations, improving services, and encouraging innovation. This setup not only aids in adopting AI but also motivates banks to promote AI understanding among their staff, ensuring effective use of these technologies while staying compliant with regulations (A-36:31, E-4:40). By advancing AI knowledge through targeted training and education, banks will be well-prepared to handle compliance complexities while also encouraging innovation. This proactive attitude towards AI education alleviates risk and allows banks to seize emerging opportunities for innovation, ultimately driving growth and competitiveness in the changing financial sector.

4.2 EU AI Act compliance requirements in the banking sector

This section addresses the compliance requirements imposed by the EU AI Act on the Dutch banking sector, focusing on SQ1: *"What specific compliance requirements does the EU AI Act impose on Dutch banks?"* The analysis is guided by P1, which proposes that the EU AI Act's risk-based approach and compliance requirements for high-risk AI systems will develop more comprehensive compliance strategies in Dutch banks.

Through an analysis of literature and interview data, this section aims to comprehensively understand how banks can efficiently adapt to these regulatory demands.

4.2.1 Compliance strategies in banks

The interviewees mentioned that the banking sector is the most regulated sector in the European Union (E-3:20, F-2:41, G-3:04, H-11:16). As stated in the literature review, the banking sector must comply with various regulations, such as Basel III and GDPR. Therefore, banks have formed compliance strategies to guarantee adherence with those regulations. With the EU AI Act's high-risk AI requirements upcoming for August 2026, compliance strategies must be adjusted.

Some banks utilize gap assessments as a key compliance strategy to adapt to new regulatory requirements efficiently. Interviewee F stated that banks begin by conducting gap assessments, where they review legal texts against their current practices to identify discrepancies and areas needing adjustment (F-2:41). Those gap assessments are conducted by banks, with support elsewhere to interpret legal text (F-3:38). Once gaps are identified, banks evaluate the best methods to implement necessary changes, considering compliance and risk factors (F-2:41). Subsequently, the Chief Technology Officer (CTO) and other C-level executives are responsible for implementing the technology-related changes, with risk functions acting as a safeguarding mechanism to support the optimal execution of changes (F-4:51). The collaboration between different functions—compliance, risk management, and technology—facilitates a comprehensive approach to embedding new regulations into the bank's core functions while minimizing operational disruptions. After the findings, policies are revised to comply with several regulations (F-7:45). These structured compliance strategies are crucial for banks to navigate the complex regulatory environments effectively, ensuring that they remain compliant with new regulations like the EU AI Act while safeguarding their operations against unforeseen risks.

Other banks use policymakers to adhere to regulations effectively. Interviewee L describes how policymakers are responsible for translating regulatory frameworks, such as ISO standards and the EU AI Act, into bank-specific policies (L-4:41). They classify risks and maintain structures like information risk policies to standardize compliance across various departments (L-4:41). Despite the crucial role of policymakers, challenges persist, particularly in communication between developers and risk personnel. This lack of effective communication led to gaps in understanding and applying policies consistently across departments (L-11:31). It underscores the importance of having skilled

policymakers who can bridge these gaps, facilitate smoother integration of compliance practices, and ensure that both technological and risk considerations are addressed in policy development (L-12:39). By actively addressing these communication gaps through strategic coordination, banks effectively improve comprehensive compliance strategies, making adapting to regulations easier.

With those compliance strategies, challenges arise in adopting AI and regulations like the EU AI Act. Key challenges to adopting AI in the banking sector include resource allocation and budgeting (B-23:45, D-4:14, F-16:37), a knowledge gap in understanding the regulations (E-25:32, I-15:00), and AI literacy (A-41:33, J-25:52). These challenges hinder the ability to implement the benefits of regulations successfully. By addressing communication gaps and obtaining AI literacy, banks can adapt their robust compliance strategies. This foundation is crucial as the sector anticipates the implementation of the EU AI Act.

4.2.2 Key high-risk requirements for banks

Banks must adhere to their high-risk requirements to ensure compliance and operational safety in response to the EU AI Act. The literature outlined the high-risk requirements of the EU AI Act, which can be found in Appendix 3: Summary of EU AI Act requirements high-risk AI systems. According to the literature review, the most important high-risk requirements were the robust risk management system designed to identify and mitigate risks (European Parliament & Council of the European Union, 2024), implementing data governance to maintain integrity (Novelli et al., 2024), and human oversight to ensure AI systems operate in ethical boundaries and to enhance trust (Wagner et al., 2024; Bygrave & Schmidt, 2024). These requirements reflect the industry's proactive approach to managing the complexities and challenges posed by high-risk AI systems. Embracing these key requirements could present practical solutions to the existing challenges in compliance strategies, advancing the robustness and adaptability of banks in a rapidly evolving regulatory landscape.

Interviewee G agreed with the importance of robust risk management. They believe that the EU AI Act should provide a uniform definition and approach to risk assessments, which could help banks innovate in AI adoption (G-14:36). Additionally, Interviewee I expressed the importance of a risk management framework for successful AI adoption.

"Having a kind of a risk management framework for AI can let you handle AI adoption holistically, so you are already going to be more compliant with the regulation by default."

~Interviewee I (33:00)

Many interviewees believed that having a well-structured risk management framework could improve the risk appetite of banks, which enables banks to be more innovative and make more profit (B-6:38, J-11:18, 33:23).

Furthermore, Interviewee B expressed the importance of human oversight in AI adoption in banks, as they provided an example of how humans control the implementation of GenAI in their applications.

"We have said that for all AI applications, especially in the beginning with GenAI, for example, there is always a human in the loop. There is always a human who overviews all things."

~Interviewee B (5:21)

As the EU AI Act requires human oversight, AI systems need to be designed for humans so they can prevent risks (Art. 14 Human Oversight—EU AI Act, n.d.) and improve decision-making (G-14:36). Human oversight represents a critical dimension of AI adoption, serving to balance technological advancement with ethical responsibility (Laux, 2023). By always having a human in the loop, banks can address potential biases and unforeseen risks that AI systems might overlook.

4.2.3 Preparing for compliance: Challenges and Strategic focus areas

As the banking sector prepares to implement the compliance requirements of the EU AI Act, it confronts several challenges that oblige strategic focus and adaptation. These challenges are rooted in the complexity of the requirements and lack of practice on how to comply with them. During the definition of themes, EU AI Act challenges were coded, which can be found in Table 3.

Table 3: EU AI Act challenges and frequencies

EU AI Act challenge	**Frequency**
AI literacy	32
Lack of AI practices	28
Accountability	26
AI definition	24

Readiness	10
Training concerns	10
Gaps between requirements	7
Human oversight	7
Responsibility	7
Too many requirements	4
Availability	3
Approach	1

From the interview data, AI literacy emerged as the most frequently cited challenge, with several interviewees expressing concerns. Furthermore, other prevalent challenges include issues related to accountability, the clarity of AI definitions, and readiness for the EU AI Act's implementation. These areas indicate gaps in understanding and preparedness that banks must address to align with the EU AI Act's requirements.

One of the indicated gaps was the lack of a clear definition of AI systems in the EU AI Act. The EU AI Act is still seen as very broad, which brings up the question of what is considered an AI system or what is not (A-21:29, D-14:45, F-11:31, 12:54). Therefore, banks find it challenging to scope which systems are considered high-risk AI systems, and which are not (F-11:31, I-16:02), which leads a bank to its implementation of complying with regulations (E-8:55). This ambiguity leads to confusion regarding which systems fall under the EU AI Act's regulations, making it difficult for banks to ensure compliance. The broad and unclear definition creates a gray area where many systems may or may not be classified as AI, complicating risk assessments and compliance efforts (F-13:28).

Interviewees stated that the EU AI Act's broad definition of an AI system made it challenging to create a strategy for how to comply with the EU AI Act (I-17:06). Defining a strategy for AI adoption in banks is difficult as there are various use cases of AI systems (I-17:06), which must be inspected case by case (I-1:05). In addition, Interviewee L mentioned the difficulties of finding the right employees in a traditional bank to create a strategy to comply with the EU AI Act (L-12:39). To overcome this challenge, interviewees highlighted that banks must improve AI literacy among their staff and improve internal communication to effectively implement the EU AI Act (I-33:00, L:12:39). Building robust structures for compliance requires substantial investment in training programs to navigate the grey areas within the regulations (J-35:26). These insights highlight the considerable efforts required by banks to comply with the EU AI Act. By bridging gaps in

understanding and communication and developing comprehensive compliance strategies, banks can meet regulatory demands from the EU AI Act and drive innovation within a controlled framework as they implement AI adoption.

Another important challenge interviewees identified was the lack of accountability for complying with the EU AI Act, which can be looked at from different perspectives. One perspective is the supervision of the EU AI Act in the banking sector, as interviewees stated that it is unclear who will be the regulator of the EU AI Act in the Netherlands (A-47:42, C-8:50, E-4:41, K-15:48). Therefore, banks do not feel the urgency to change their compliance strategies to comply with the EU AI Act (A-31:47). This uncertainty around supervision leads to hesitance within banks, as they are unsure of the specific compliance steps required and who will enforce them. As a result, banks may adopt a freeze policy, where a bank does not enhance AI adoption (J-5:22). Interviewees noted that without a designated regulatory body, there is a heightened risk of banks not prioritizing necessary changes, thereby compromising the full implementation of compliance strategies (B-16:06, G-14:36).

4.3 Innovation in the banking sector

Dutch banks demonstrate a growing willingness to innovate in AI technologies as they recognize the potential benefits for their operations and customer service. Interviews reveal that banks are increasingly investing in AI solutions to enhance efficiency and improve customer experience (B-3:18, G-1:26, I-1:05). Banks see the risk of not investing in AI, as AI can bring competitive advantages in the sector (H-2:53, J-5:22). There are certain types of AI in motion in banks as in chatbots, Know Your Customer (KYC) and fraud detection (I-1:05, L-2:29). However, the EU AI Act may reshape the willingness of innovating AI by introducing requirements that could either facilitate or hinder the pace and direction of AI innovation within banks.

During the thematic analysis, innovation developments influencing the adoption of AI due to the EU AI Act were coded by 'positive influence' or 'negative influence.' Table 4 showcases the frequency of those codes in the semi-structured interviews.

Table 4: Frequency of influences on innovation

EU AI Act on the innovation of AI	Frequency
Positive influence	35
Negative influence	29

Based on Table 4, the interviewees' mixed findings arose around the EU AI Act's impact on AI innovation within banks. These mixed findings reflect the complexity of the EU AI Act's role in shaping innovation strategies. While some interviewees acknowledged the EU AI Act's potential to provide clear frameworks to support innovation, others expressed concerns about the compliance requirements potentially stifling innovative efforts.

4.3.1 Positive influences

Interviewee C came with an interesting perspective on innovation in the banking sector:

> *"We also often say 'regulation leads to innovation,' so in that sense, law and regulation expected to do different things in banks, and that leads to innovation."*
>
> *~Interviewee C (6:10)*

Interviewee C mentioned that banks would gather opportunities and possibilities to operate under new regulations, such as the EU AI Act, looking for ways to innovate using AI. They are convinced that innovation, including AI, can reduce costs and are working on the EU AI Act's framework. The risk-based approach of the EU AI Act allows banks to focus their innovative efforts on less burdensome areas, which is beneficial for adopting AI. These insights highlight how banks can strategically adopt the regulations to drive innovation, enabling them to align with the EU AI Act while pursuing technological advancements.

Interviewee L stated that the EU AI Act will not enhance innovation in AI in banks, as it happens by itself, but it will make AI innovation safer:

> *"The EU AI Act basically does risk control, which is not promoting innovation. Innovation will happen by itself, and regulations such as the EU AI Act make sure that in the basics, AI innovation in banks runs safely."*
>
> *~Interviewee L (27:36)*

The EU AI Act presents safety and compliance frameworks within which banks can operate, making it safer to adopt AI. This allows banks to pursue AI adoption as they operate within legal guidelines. Consequently, the EU AI Act not only encourages innovation but also ensures that it is conducted in a manner that mitigates risks and stimulates customers' trust in banks (G-26:54, L-22:08).

Interviewee H views the EU AI Act as a catalyst for innovation in the banking sector by providing clear frameworks for experimentation:

"If you have clear frameworks and can give freedom to the people who want to innovate within those frameworks, then you are doing it right."
~Interviewee H (22:15)

The EU AI Act defines clear rules that help banks innovate safely without worrying about breaking regulations. Interviewee H pointed out that these guidelines give banks the confidence to try new things, knowing they stay within the rules. This approach helps banks focus on developing AI, especially in areas with less risk, which can lead to practical innovation. Interviewee H's view shows how important clear guidelines are in encouraging innovation. By using the EU AI Act's rules wisely, banks can tap into AI's potential while staying compliant, paving the way for ongoing growth in technology within the banking sector.

4.3.2 Negative influences

Interviewee B stated that the EU AI Act will only hinder innovation, increase complexity, and bring extra costs to the banking sector:

"There is just a lot more administration... everything leads to mountains of administration for entrepreneurs, and also in the case of banks."
~Interviewee B (13:12)

Interviewee B elaborated that the administrative requirements of the EU AI Act associated with compliance lead to delays in AI adoption. This indicates that the complexity of compliance diverts resources and focus away from innovation, focusing more on complying with a regulation instead of developing innovations. Interviewee B emphasized the need for a balanced approach to regulation. Without it, European banks risk falling behind their American counterparts in AI innovation and capabilities (B-25:31).

Interviewee J stated that the EU AI Act hinders AI adoption and innovation due to the ambiguity and the lack of clarity:

"I think there are several ambiguities in the EU AI Act. I sit in front of companies to be able to act properly and understand how it can be enforced or how you can be

compliant with it. The EU AI Act is still very movable in that sense, as things can be adapted. So, I think that is where a bit of innovation can stagnate."

~Interviewee J (19:57)

This highlights companies' confusion in interpreting the regulations, as the EU AI Act is still adaptive in requirements, making it difficult to innovate within boundaries. The vague nature of the EU AI Act creates a risk-averse culture among established banks, as they are hesitant to innovate due to the fear of non-compliance. As a result, banks might postpone implementing AI technologies because they are worried about fines or penalties from vague regulations, hindering their ability to develop new products and compete effectively in the market. Therefore, the lack of clarity in the EU AI Act complicates banks' compliance efforts and fosters a conservative approach to innovation.

Interviewee I mentioned the risk aversion inherent in the EU AI Act is likely to hinder innovation within the banking sector:

"I do think at the beginning it will hinder AI innovation. Why? That is because right now, of course, the focus is on understanding how to comply. So, while we still understand how to comply, the focus is not on how we are going to innovate, AI thinks the focus right now is to look at what we already have and let us see how we can comply with the AI Act, which there are already many questions too."

~Interviewee I (30:15)

This quote highlights that the immediate priority for banks is compliance with the EU AI Act rather than exploring innovative applications of AI. The regulatory burden associated with high-risk AI systems creates a cautious environment where banks may avoid adopting new technologies that could be classified as high risk. This risk-averse approach is particularly pronounced in the financial sector, where the implications of failure can be significant. However, Interviewee I believed that banks would innovate long-term when they understood the requirements of the EU AI Act. Therefore, while the long-term potential for AI in banking remains promising, the current regulatory landscape, as shaped by the EU AI Act, poses challenges that may stifle immediate innovation efforts.

Overall, the data reflects a nuanced landscape regarding the EU AI Act's impact on innovation within the banking sector. While the EU AI Act offers structured frameworks that facilitate innovation under clear guidelines, it also introduces challenges related to compliance and administrative burdens that may hinder immediate innovative efforts. The mixed responses from interviewees underscore the complexity of navigating these

regulatory demands while striving for technological advancement. Balancing compliance and innovation appear essential to leveraging AI's full potential as the banking sector adapts. This balancing act between compliance and innovation is critical as banks seek to align their strategic goals with regulatory requirements, a theme that will be further explored in the subsequent discussion and conclusion sections.

4.4 Challenges of AI adoption under the EU AI Act

Adopting AI systems under the EU AI Act presents numerous complexities for Dutch banks. Interviewees identified several key challenges, including issues related to the lack of AI inventory, integration of knowledge, and cultural misalignment in AI training. While the EU AI Act aims to provide structured guidelines for safe AI utilization, it also imposes additional obstacles that require banks to adapt swiftly. Understanding these challenges is crucial for banks as they prepare strategic plans to mitigate potential complications and ensure successful AI integration within their operations. The findings presented in Table 5 serve as a foundation for developing effective adoption strategies tailored to the unique demands of the EU AI Act.

Table 5: EU AI Act themes influencing the adoption of AI in the banking sector

EU AI Act themes	**Frequency (number of interviews the topic is mentioned)**	**Positive/Negative influence on AI adoption in the banking sector**	**Description**
Risk-based approach	8	Positive	Categorizes AI systems by risk level, helping banks manage risks effectively while promoting responsible innovation.
Requirements for compliance	10	Negative	Establishes specific compliance obligations that may slow down AI adoption due to complexity and cost.
Supervision and oversight	6	Negative	Unclear who will supervise the banking sector to comply with the EU AI Act
Clarity	7	Positive	It aims to provide clear definitions and classifications, helping banks understand their obligations.

Adaptation and Change Management	5	Negative	Requires banks to adapt existing processes, which can divert resources and focus from innovation.
Long-term vision	4	Positive	Encourages sustainable innovation and the ethical use of AI in the banking sector.
Training and Skill development	5	Positive	Necessitates employee training to work with AI technologies, enhancing workforce capabilities effectively.

Furthermore, this subsection explores additional challenges banks encounter in advancing AI adoption within their operations. While these challenges are not explicitly addressed within the scope of the EU AI Act, they emerged as the most frequently mentioned barriers during the interviews.

4.4.1 Lack of AI inventory

Interviewees mentioned that the EU AI Act delays AI adoption in banks due to a lack of AI inventory. A lack of AI inventory is a significant challenge as it hampers the ability to effectively identify, assess, and implement AI developments. Interviewee F stated that banks mostly lack an inventory of where they use AI (F-11:12), which makes interpreting the definition and requirements of the EU AI Act more difficult. Furthermore, Interviewee C mentioned that large financial institutions like banks have issues keeping a central overview of all applications of AI (C-14:20). In summary, the absence of a comprehensive AI inventory not only complicates compliance with regulatory requirements but also significantly hinders the overall adoption of AI technologies in banks.

4.4.2 Integration of knowledge

Another challenge in adopting AI under the EU AI Act is integrating knowledge between AI developers and risk management within a bank. Interviewee L stated this challenge:

"There is often a disconnect between the teams working on AI and those managing risks. Therefore, organizational knowledge and skill governance are a huge challenge in AI adoption."

~Interviewee L (10:31)

Interviewee J further emphasized the importance of skill development and understanding among personnel to ensure proper use and management of AI systems, noting

that this integration is vital for successful adoption and risk mitigation. Without a cohesive understanding of both the technological capabilities and the associated risks of AI and the EU AI Act, banks struggle to comply with the EU AI Act, risking potential penalties and fines. Therefore, addressing the integration of knowledge challenge is crucial for organizations to navigate the complexities of the EU AI Act effectively.

4.4.3 Misunderstanding of the EU AI Act

Interviewee B highlighted how the EU AI Act imposes demands on AI that are not typically required for human employees, causing misunderstanding within European contexts.

> *"I think the intentions behind the AI Act are good, so you want to protect privacy etc. That is all fine. Only we are now starting to make demands on AI that you do not ask the average employee you hire, and of course, that goes too far."*
>
> *~Interviewee B (8:39)*

This discrepancy suggests a fundamental misunderstanding of AI capabilities and privacy needs, potentially leading to inefficient compliance processes. To address these misunderstandings, it is essential to balance regulatory demands with the practical implementation of AI systems.

4.4.4 Cultural Misalignment in AI Training

Interviewee B raised concerns about AI systems being trained on non-European data, potentially misaligning them with European cultural norms. Interviewee B pointed out the absence of a European cultural context when AI is trained with data from America, the Middle East, or Asia.

> *"We all flee to American technology... Europeans are going to work on data from America, the Middle East, and Asia. So, there is no European culture in it or no European norms and values in it."*
>
> *~ (Interviewee B, 8:39)*

This could lead to AI outputs that do not align with European values, posing challenges for AI adoption within European banks, which must adhere to cultural and ethical standards. Ensuring AI systems incorporate European data could enhance their cultural

relevance and effectiveness, supporting smoother adoption in compliance with local norms.

5 DISCUSSION

This chapter covers the discussion and contribution of the findings from chapter 4, evaluating them against existing literature to address the sub-questions and propositions. It also explores the research limitations and outlines future research opportunities. Paragraph 5.1 presents the discussion and interpretation of the results, while paragraph 5.2 emphasizes the practical relevance. Paragraph 5.3 delves into managerial implications, followed by paragraph 5.4, which addresses scientific implications. Paragraph 5.5 presents the limitations, and paragraph 5.6 offers recommendations. Finally, paragraph 5.7 discusses potential directions for future research.

5.1 Interpretation of the results

This section interpreted the key findings derived from the research, providing insights into how the EU AI Act influenced AI adoption within the banking sector. Data collected from semi-structured interviews, supported by a thematic analysis, showcased significant patterns and themes necessary to understand these regulatory impacts. For instance, using predefined themes and labels organized in Table 6 provided a structured approach to data analysis. The analysis investigates how these regulatory measures impact banks' strategies, affecting their innovation and compliance efforts, as seen in the data. This section addresses the sub-questions and propositions by interpreting these findings, providing a framework for understanding AI governance within financial institutions affected by the EU AI Act.

5.1.1 Compliance strategies in the banking sector

SQ1 of this research was as follows: "*What specific compliance requirements does the EU AI Act impose on Dutch banks?"* whereas P1 stated: *The EU AI Act's risk-based approach and additional compliance requirements for high-risk AI systems will lead Dutch banks to develop more comprehensive compliance strategies.* The EU AI Act's risk-based requirements have directly led Dutch banks to augment and improve comprehensive compliance strategies, stimulating banks to adopt AI systems while using AI effectively and safely in their operations. The literature review established a foundational understanding of the compliance requirements under the EU AI Act, as these are explicitly stated within the regulatory texts. Key requirements include a risk-based approach to managing AI systems and guidelines for prohibited and high-risk categories, which Dutch banks must

incorporate into their operational frameworks. Dutch banks have already incorporated the prohibited requirements of the EU AI Act, as those requirements came into effect in February 2025 and are eligible for all AI systems. Furthermore, AI systems of banks must comply with the high-risk requirements by August 2026, which are found in Appendix 3: Summary of EU AI Act requirements high-risk AI systems.

The EU AI Act requires revisions in compliance strategies within the Dutch banking sector to manage high-risk AI systems effectively. While banks in the Netherlands are already accustomed to navigating regulations like Basel III and GDPR, adapting to the specific demands of the EU AI Act requires a more nuanced approach to compliance. The EU AI Act's focus on high-risk AI systems necessitates adjustments beyond existing frameworks. The EU AI Act compels banks to evolve compliance strategies by integrating specific controls and safeguards tailored to AI systems, ensuring these technologies are used responsibly. Adjusting compliance strategies in response to the EU AI Act is essential for Dutch banks to align with regulatory expectations, guaranteeing responsible AI integration and effective risk management.

The finding that the EU AI Act compels banks to evolve compliance strategies with AI-specific controls supports the literature on adaptive regulatory frameworks. Mäntymäki et al. (2022) emphasized adapting compliance strategies to incorporate organizational AI governance. Integrating specific controls and safeguards within compliance strategies required by the EU AI Act aligns with existing literature, highlighting the need for updated frameworks in response to technological innovations such as AI adoption. This reflects Mäntymäki et al. (2022)'s discussion of evolving governance mechanisms. Thus, the literature supports the necessity of evolving compliance frameworks, validating the need for banks to modify their strategies under the EU AI Act.

Effective compliance with the EU AI Act relies on collaboration among various banking functions, including compliance, risk management, and technology departments. Interviewees mentioned the need for coordinated efforts among different departments to implement the EU AI Act effectively. Interviewee F highlighted the role of the Chief Technology Officer and other C-level executives in executing necessary changes, supported by risk management as a safeguarding mechanism (F-4:51). Furthermore, Interviewee L emphasized the importance of policymakers in translating regulatory frameworks into bank-specific policies, underlining communication challenges between developers and risk personnel (L-4:41, 11:31). Collaboration across departments ensures that compliance strategies are holistic, encompassing all facets of an organization's operations

while minimizing disruptions. This interdepartmental synergy is crucial for developing comprehensive compliance strategies that adeptly navigate the complexities introduced by the EU AI Act, ultimately improving a bank's ability to innovate within a controlled regulatory framework.

The literature supports the need for collaboration in effective compliance with the EU AI Act. Oluwu et al. (2024) stated that collaboration among model, technology, legal, and compliance teams is essential. The literature underscores the necessity of coordinated efforts to manage the complexities of integrating AI technologies into banking operations (Oluwu et al., 2024; Adhaen et al., 2024). Cultivating collaboration in banks is one of the key findings to enhance AI governance and comply with the EU AI Act.

AI literacy and ambiguous definitions pose significant challenges for banks in complying with the EU AI Act's requirements. The EU AI Act's broad definition of AI systems leads to uncertainty as banks struggle to determine which systems qualify as high-risk. Additionally, interviewees identified AI literacy as a prominent challenge, indicating the staff's need for expanded understanding. The lack of clarity in AI definitions complicates the scoping of high-risk systems, making compliance efforts more challenging. Improving AI literacy through targeted training programs is important for banks to address these challenges effectively. By bridging gaps in understanding and ensuring clarity, banks can better navigate the grey areas of the regulations, thereby strengthen their compliance capability. Addressing AI literacy and definition ambiguities is fundamental for banks to align with the EU AI Act, empowering them to adopt AI systems ethically and efficiently within their operations.

Uncertainty regarding accountability and regulatory oversight presents a notable challenge for banks preparing to comply with the EU AI Act. Interviewees expressed concerns about the lack of a designated regulatory authority to enforce the EU AI Act in the Netherlands, leading to hesitancy in adopting necessary compliance changes. Without apparent oversight and accountability, banks may deprioritize necessary adjustments, risking non-compliance. The uncertainty surrounding which regulatory body will oversee the EU AI Act's implementation contributes to a cautious approach among banks, hindering progress. Establishing clear accountability measures is essential to encourage banks to prioritize compliance and foster a regulatory culture of adherence and innovation. Clarifying accountability and regulatory roles will motivate banks to adopt the necessary changes, stimulating comprehensive alignment with the EU AI Act and promoting a proactive compliance culture.

The EU AI Act introduces specific compliance requirements for Dutch banks, emphasizing a risk-based approach and additional measures for high-risk AI systems. These requirements call for revisions to existing compliance strategies, compelling banks to integrate AI-specific controls and safeguards. As a result, Dutch banks are developing more comprehensive compliance strategies to align with the EU AI Act's demands. This adaptation goes beyond regulatory frameworks like Basel III and GDPR, focusing on responsible AI integration and effective risk management. Ultimately, the EU AI Act drives banks to foster interdepartmental collaboration, augmenting their ability to innovate while adhering to regulatory standards.

5.1.2 Balancing innovation and regulation in the banking sector

SQ2 of this research was as follows: *"How does the EU AI Act affect the innovation strategies of Dutch banks?"* whereas P2 of this research stated: *"The introduction of regulatory sandboxes and guidelines in the EU AI Act will foster innovation in Dutch banks."* The interview findings stated that the EU AI Act presented a dual impact on banks, offering opportunities and limitations to innovation. This duality means that banks have a perception of the EU AI Act, which provides regulatory encouragement for strategic AI adoption but also restricts progress, depending on how banks utilize the EU AI Act's frameworks. Understanding the perceptions of banks is beneficial in adapting innovation strategies effectively to adopt AI and comply with the EU AI Act.

The interviewees believe that the EU AI Act introduced structured opportunities for innovation in the banking sector. The EU AI Act provided safety in AI innovation (L-27:36), risk-based flexibility (H-22:36), and recognized the stimulation potential through regulation(C-6:10). These elements support banks in adopting AI technologies by offering clear guidelines, focusing efforts on lower-risk areas, and encouraging creative solutions within a safe regulatory environment. Such structured facilitation empowers banks to advance technologically while ensuring compliance, aligning with P2.

The literature suggests that the EU AI Act, through its provision of regulatory sandboxes, offers a framework for banks to test and innovate with AI systems within a secure, controlled environment (Plato-Shinar & Godwin, 2025; Buocz et al., 2023). This aligns with findings from the interviews, which highlight that the EU AI Act facilitates structured opportunities for innovation by providing safety, risk-based flexibility, and clear guidelines (L-27:36, H-22:36, C-6:10). These components of the EU AI Act have the potential to stimulate creative solutions without compromising compliance.

Conversely, the findings also revealed negative perceptions among banks regarding the administrative burdens and risk-averse atmospheres encouraged by the EU AI Act, which are seen as obstacles to innovation (B-13:12, J-19:57, I-30:15). The literature further supports these concerns, noting that regulatory requirements can stifle innovation by imposing additional costs and operational adjustments (Passador, 2024; EIOPA, n.d.; Fares et al., 2022).

Therefore, while the EU AI Act provides regulatory encouragement, the dual impact is evident; innovation is promoted through structured environments yet hindered by increased complexity and resource diversion. This mixed influence highlights the necessity for banks to strategically address the specific gap between the opportunities for AI innovation provided by the EU AI Act and the challenges posed by its complex compliance requirements. Adopting robust AI governance frameworks, as recommended by Crisanto et al. (2024), could mitigate negative effects, allowing banks to optimize their innovation pathways. By aligning strategic responses with the EU AI Act, banks can maintain competitiveness and innovation efficacy despite regulatory constraints.

The EU AI Act presents a complex mix of opportunities and challenges that shape the innovation strategies of Dutch banks. Successful navigation of the regulatory landscape while exploring innovative AI solutions is crucial for these banks. By leveraging the EU AI Act's frameworks, such as regulatory sandboxes, banks can strategically boost their technological capabilities while ensuring compliance. This approach supports the notion that the EU AI Act influences innovation strategies by providing both guidelines and frameworks that can be utilized to stimulate innovation. Understanding the interplay between compliance and innovation allows banks to align their strategic responses with the EU AI Act, ultimately optimizing their innovation pathways and assuring they remain competitive. This insight directly answers SQ2 by illustrating how the EU AI Act impacts banks' innovation strategies.

5.1.3 Anticipated challenges by the EU AI Act in banks

SQ3 of this research was as follows: "*What challenges do Dutch banks anticipate in adopting AI systems under the EU AI Act, and how are they planning to address these challenges?"* whereas P3 stated: "*The EU AI Act will promote the adoption of AI systems in Dutch banks by addressing key challenges such as data quality, integration with legacy systems, and regulatory compliance."* The emphasis on enhanced AI literacy supports Proposition 3 (P3), which suggests that the EU AI Act will facilitate the adoption of AI

systems in Dutch banks by defining compliance requirements that address AI adoption challenges. Interviewees highlighted challenges such as a lack of AI inventory, integration of knowledge, misunderstanding of the EU AI Act, and impairing compliance efforts. These findings underscore the complexities of AI adoption under the EU AI Act, offering a basis for exploring strategic solutions.

The challenges highlighted by the interviewees were primarily due to the complexities of AI adoption in the strictly regulated banking sector. An absence of comprehensive AI inventory (F-11:12) is the base challenge of banks, with other adoption challenges caused such as misunderstanding the EU AI Act (B-8:39) and miscommunications within internal teams to comply with the EU AI Act (L-10:31). These interlinked challenges underscore the need for banks to establish clearer AI inventories and advance inter-team communication and understanding of regulations. This will facilitate smoother adoption of AI systems, ensure compliance with regulatory standards, and minimize operational disruptions. By addressing these foundational challenges through strategic planning and capacity building, banks can better align with the EU AI Act's demands, paving the way for more effective AI integration and innovation.

The literature review supports the challenges identified by interviewees regarding AI adoption complexities under the EU AI Act. Kuiper et al. (2022) stated that AI adoption in banks is slow due to the time needed to familiarize themselves with the requirements of mapping the AI inventory in a bank. Furthermore, Adhaen et al. (2024) expressed the challenge of adopting AI in a bank due to the integration of the EU AI Act with other legacy systems, causing hindrance to AI adoption. Literature corroborates that gaps in AI inventory management and misunderstandings of regulatory requirements can hinder effective AI adoption, reflecting issues Dutch banks face. This supports the need for strategic planning and improved organizational practices to navigate these complexities.

While the EU AI Act introduces initial challenges for AI adoption in banks, it can promote long-term AI integration if banks focus on building AI literacy and developing robust communication channels to support compliance efforts. Interviewees expressed mixed feelings about the EU AI Act's impact, acknowledging standardized AI regulation's complexity and benefits. Skepticism arose due to difficulties with compliance and the need for improved AI literacy within banks. Overcoming initial hurdles, such as the lack of AI literacy and boosting communication regarding compliance, can pave the way for effective AI adoption. Banks can leverage the EU AI Act's structured guidelines to facilitate innovation and integration by improving understanding and aligning internal

strategies. For the EU AI Act to successfully promote AI adoption in banks, institutions must focus on building AI literacy and developing robust communication channels that support compliance efforts. This strategic focus can help banks transform current challenges into opportunities for growth and innovation.

5.2 Practical relevance

This research demonstrates that the need for AI literacy and robust inventory systems in banks can be used to develop comprehensive AI training programs and compliance strategies. These initiatives are essential for promoting AI adoption and aligning with Article 4 of the EU AI Act, offering significant value to banks aiming to innovate with AI systems. Banks can better understand and meet regulatory demands by focusing on AI literacy. This is particularly relevant in the Dutch banking sector, where there is a notable lack of internal communication and sufficient AI knowledge. By developing targeted AI training programs, banks can improve AI literacy among staff, thereby fostering a culture of innovation. While these findings provide practical directions, they are constrained by the vagueness of the EU AI Act's requirements, which creates uncertainty about the level of AI literacy needed for compliance. To mitigate this issue, it is recommended that banks establish clear AI literacy initiatives and inventory systems, which could enhance both AI adoption and compliance with the EU AI Act.

5.3 Managerial implications

The findings point out the critical role of banking managers in securing compliance with the EU AI Act by understanding its requirements and embedding them into operational processes. Cited interview findings that address the necessity of management accountability for effective AI adoption, pointing out that unclear accountability can hinder adjustments to compliance strategies (F-11:12; L-10:31). Managers should establish dedicated roles within their teams focused on ongoing monitoring and interpretation of the EU AI Act regulations. This could involve appointing a regulatory compliance officer or hiring policymakers, specifically assessing updates to the EU AI Act and adapting strategies accordingly. By establishing these dedicated personnel and roles, managers not only stimulate compliance but also create a more dynamic environment for AI adoption. The integration of specialized compliance-focused roles ensures consistency and agility in

adapting to regulatory changes, ultimately supporting banks in leveraging the EU AI Act as a tool for both innovation and regulatory adherence.

5.4 Scientific implications

This research advances the academic understanding of how the EU AI Act specifically impacts the adoption of AI systems in Dutch banks by providing empirical evidence of the EU AI Act's influence on compliance and innovation strategies. It addresses existing gaps in the literature concerning the EU AI Act's effects on the banking sector and provides insights into how banks can effectively manage and adapt to AI integration. The research highlighted compliance requirements introduced by the EU AI Act, addressed AI adoption challenges under the EU AI Act, and looked for the perception of the EU AI Act in the banking sector. Literature by Musch et al. (2023c) supports the need for evolving compliance strategies under adaptive regulatory frameworks. Moreover, existing studies such as Oluwu et al. (2024) and Adhaen et al. (2024) point out the necessity of coordinated efforts in managing the complexities of AI integration in banking operations. Furthermore, previous studies (e.g., Fares et al., 2022) have indicated a lack of empirical data on the EU AI Act's effects on AI adoption within the Dutch banking sector, highlighting the necessity of this research. This study reveals the scientific implications of the compliance requirements under the EU AI Act, emphasizing their role in shaping AI adoption strategies in Dutch banks. By presenting empirical evidence, it helps clarify the adaptive challenges banks face in balancing compliance with innovation, providing a deeper understanding of how regulatory demands influence operational strategies within highly regulated environments. This insight advances theoretical discourse on regulation and technology integration, crucial for scholars and practitioners navigating this evolving landscape. The findings significantly contribute to the scientific literature by enhancing understanding of the complex dynamics between regulation and technological advancement in the banking sector. It addresses previously existing empirical gaps concerning the EU AI Act's influence, presenting novel insights into AI governance and compliance strategies. Ultimately, it offers valuable empirical data to advance theoretical models concerning regulatory impact and strategic adaptation in the financial industry.

5.5 Limitations

The limitations of this research highlight challenges in data collection and analysis, including restricted interviewee selection, potential biases due to evolving perceptions of AI developments, and the constrained timeframe for conducting the study.

The lack of external interviewees was a limitation during the research. Although all interviewees possessed sufficient knowledge about either the EU AI Act or AI adoption in the banking sector, most were not actively working in a bank. However, some interviewees had experience working with banks or had previously worked in a bank with relevant experience. If there had been more time available during the research, more semi-structured interviews with interviewees working in Dutch banks would have been conducted.

One limitation of the research was the potential biases held by interviewees regarding the EU AI Act and AI adoption within banks. As the AI landscape continually evolves, individuals often form perceptions about AI developments, including the EU AI Act. This rapid evolution can lead to biases such as confirmation bias, where interviewees may emphasize information that aligns with their existing beliefs or experiences, and selection bias, where the choice of interviewee backgrounds might skew the representation of perspectives. These biases could have influenced the interview responses, potentially leading to prejudgments about the effects of the EU AI Act. For instance, an interviewee who has faced challenges with regulatory compliance might overstate the difficulties associated with the EU AI Act, while someone with a successful adoption experience might downplay potential issues. Recognizing these biases is essential for interpreting the findings accurately and understanding the full scope of challenges and opportunities related to AI adoption. To mitigate these biases in future research, employing diverse sampling strategies would broaden the range of perspectives, and using clarification questions during interviews could help ensure a more balanced understanding. This approach will enhance the validity and reliability of future studies, allowing for a more comprehensive assessment of the EU AI Act's impact on AI adoption within banks.

Finally, the time wherein the research was conducted was limited. Due to predefined deadlines, the semi-structured interviews and literature review had to be completed in a limited period. Some of the interviews took shorter than expected due to the limited time and availability of the interviewees and the predefined deadlines. This limited timeframe restricted the depth and breadth of data collection and analysis, potentially affecting the

comprehensiveness of the findings. A more extended research period might have allowed for more extensive interviews or follow-ups, leading to richer data and a more nuanced understanding of the themes surrounding AI adoption under the EU AI Act. Addressing this limitation in future research could improve the study's depth, providing a more thorough exploration of the complex factors influencing AI adoption in the banking sector and allowing for a better assessment of the regulatory impacts.

5.6 Recommendations

Strengthening AI literacy in banks is crucial for effectively addressing compliance challenges posed by the EU AI Act. Interviewees highlighted confusion stemming from ambiguous AI definitions as a significant barrier. Implementing targeted training programs can clarify these definitions, equipping staff with the necessary understanding to navigate regulatory requirements. Enhanced AI literacy enables banks to tackle compliance challenges more confidently, as it bridges the gap between regulatory expectations and actual understanding among staff members. By increasing AI literacy, banks are empowered to integrate AI technologies responsibly, thereby maintaining their competitive edge in the industry. This aligns with the findings that indicate the need for improved AI literacy within banks to meet the EU AI Act requirements effectively.

In addition, developing comprehensive AI inventory systems is vital for banks to track compliance with regulatory standards efficiently. The absence of detailed AI inventories was identified as a complicating factor for adherence to the EU AI Act. Implementing thorough inventories allows banks to monitor AI systems effectively and align them with regulatory demands. Robust inventory systems prepare banks for regulatory changes and enable continued innovation, addressing challenges highlighted in the findings about AI integration complexities. By providing structured oversight of their AI assets, banks can better navigate the rigorous demands of the EU AI Act and sustain competitive advantage in the industry.

Finally, improving interdepartmental collaboration is essential for navigating the complexities of the EU AI Act. Interviewees noted that successful compliance requires coordinated efforts among various departments, stressing the role of collaboration in developing comprehensive compliance strategies. Collaboration confirms that compliance strategies are comprehensive, leveraging diverse expertise within the organization. This synergy supports agile responses to regulatory challenges, as each department contributes its unique perspective and skill set, enhancing both compliance capabilities and

innovation capacity. Effective collaboration improves a bank's ability to integrate innovative solutions within a controlled regulatory framework, addressing challenges highlighted in the findings about interdepartmental coordination. By fostering this collaborative environment, banks can better navigate the rigorous demands of the EU AI Act and maintain their competitive advantage. Effective collaboration enhances both compliance capabilities and the capacity for innovation.

5.7 Future research

Future research should explore how cultural and organizational factors within Dutch banks influence the adoption of AI systems under the EU AI Act. The current research highlighted the need for enhanced AI literacy and improved internal communication to comply with regulatory demands. These findings suggest that a more profound understanding of how internal bank cultures and organizational structures impact AI adoption is required. Understanding cultural and organizational dynamics provides insight into why some banks are more successful in adopting AI. Investigating these factors could reveal barriers or facilitators unique to the banking sector, contributing to more tailored compliance strategies and innovative practices. Future studies might employ qualitative methods, such as case studies or a comparative analysis across different banking institutions, to examine how these internal factors affect AI adoption and how banks can strategically alter their cultures to align with EU AI Act requirements.

There is a need for longitudinal research to assess how Dutch banks adapt their compliance strategies over time in response to the implementation of the EU AI Act. The current research indicated that banks face ongoing challenges with ambiguous definitions and regulatory requirements, which evolve as the EU AI Act takes effect. These findings underline the need for continuous observation of regulatory adaptation. Furthermore, the current research indicated that banks face ongoing challenges with ambiguous definitions and regulatory requirements, which evolve as the EU AI Act takes effect. These findings underline the necessity for continuous observation of regulatory adaptation. Researchers could conduct longitudinal studies on banks to assess changes in compliance frameworks, training, and AI inventories, providing insights into the long-term effects of the EU AI Act on innovation in banking.

6 CONCLUSION

This research aimed to explore how the EU AI Act influences AI adoption in Dutch banks, focusing on compliance and innovation strategies. Since the first AI regulation took effect in February 2025, understanding these influences is vital for Dutch banks dealing with complex regulatory challenges from the EU AI Act. This focus is crucial as it guides banks in navigating evolving regulations that could impact their operational and strategic frameworks. This objective aligns with the need to prepare for significant regulatory changes in the financial sector.

The study utilized qualitative methods, including literature reviews and semi-structured interviews, complemented by a thematic analysis. These methods provided findings of the EU AI Act's implications on AI adoption in the Dutch banking sector. Due to those methods, the research drew nuanced insights into the impact of the EU AI Act on the Dutch banking sector. This approach effectively supported the exploration of compliance and innovation within the context of the EU AI Act.

The main research question, *"How does the EU AI Act influence the adoption of AI systems in Dutch banks through compliance and innovation strategies?"* is addressed through several key findings. The EU AI Act poses both challenges and opportunities. Banks must enhance their compliance, such as data governance and human oversight, to comply with the EU AI Act, which can be challenging for traditional banks. While compliance presents challenges, innovation is driven by the EU AI Act due to presenting guidelines on interpreting AI systems and experimentation with regulatory sandboxes. These dual outcomes highlight the need for agile adaptation to maintain compliance while embracing innovation.

There is a dichotomy in responses to the EU AI Act between traditional and neo banks. Traditional banks take cautious compliance approaches, whereas neo banks quickly seize innovation opportunities. This demonstrates the importance of interdepartmental collaboration and AI literacy in balancing compliance and innovation demands. These insights offer guidance on how banks can strategically comply with EU AI Act requirements. The strategic alignment of compliance and innovation efforts is essential for navigating regulatory landscapes.

The research offers a nuanced understanding of the EU AI Act’s dual impact on AI adoption in Dutch banks. It underscores the need to balance regulatory compliance with fostering innovation in the sector. These insights are crucial for complying with the EU

AI Act and safe AI developments in the future. Future studies could examine the long-term impacts of AI strategies, furthering the discourse on compliance and innovation in banking.

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APPENDICES

Appendix 1: AI usage

While writing the thesis, the author utilized artificial intelligence tools, specifically Co-pilot and ChatGPT, to enhance the efficiency and quality of the academic writing process. ChatGPT was also used for generating academic writing suggestions and Copilot was used for transcribing interviews to improve efficiency.

The author engaged ChatGPT to provide recommendations and to assist in refining the academic tone of the writing. Specific prompts directed to ChatGPT included requests for relevant academic papers, suggestions for rephrasing sentences to achieve a more scholarly tone, and reviews of academic writing for clarity and coherence. Example questions are *"Can you provide my papers which describe...?", "Can you rewrite this sentence more academically?",* and *"Can you provide some synonyms of the word {...}?"*

All outputs generated by Copilot and ChatGPT were reviewed and verified by the author to ensure relevance and relation with the research. This appendix explains per thesis chapter how AI was used.

Introduction:

Occasionally, sentences required to be more fluent, and Copilot reviewed those sentences to improve the fluency of the background and problem statement. Copilot was used to improve the self-written texts from the author. Example questions used in the introduction are:

"*Could you rewrite this sentence more academically?"*

"What are synonyms for the word {...}?"

Furthermore, during the writing of the introduction, the research was not yet defined. Therefore, the author was finetuning the research topic. Additionally, ChatGPT was used to orientate research areas or to present recommendations of keywords to use in the search engines Google Scholar and ScienceDirect. Example questions used for this segment were:

"What are suggested keywords to use for searching regarding {...}?

"What is a good research area under the EU AI Act?"

Literature review:

During the literature review, Copilot was used to search for relevant articles to make the research process more efficient. Copilot provided suggestions for relevant articles based on the given prompt and provided text which never was copied into the thesis. The texts were used to present relevant research papers and use cases to strengthen the context and understanding of the author regarding the topic during the thesis. All the presented information by Copilot was reviewed on relevance and relation to the thesis topic by the author. Example questions used during the literature review were:

"Can you provide academic papers which examinate what the role of AI adoption is in banks?"

"Can you elaborate the topic {...} for my own understanding?"

Furthermore, ChatGPT was used to support the author with writing academic synonyms fluently. Example questions for academic writing were:

"*Could you rewrite this sentence more academically?"*

"What are synonyms for the word {...}?"

Methodology:

During the methodology, Copilot was used in Microsoft Teams to transcribe the interviews live. Afterwards, the transcript was corrected by the researcher while watching the recordings. Furthermore, ChatGPT was used to support the author with writing academic synonyms fluently. Example questions for academic writing were:

"*Could you rewrite this sentence more academically?"*

"What are synonyms for the word {...}?"

Results:

During the results, Atlas.ti was used to keep track of the coding process of the thematic analysis. Atlas.ti made the thematic analysis easier by presenting a clear overview of all codes and quotations. Also, Copilot was used to provide short key takeaways from each interview, to improve the understanding of each interview. Furthermore, ChatGPT was used to support the author with writing academic synonyms fluently. Example questions for academic writing were:

"*Could you rewrite this sentence more academically?"*

"What are synonyms for the word {...}?"

Discussion:

The discussion was supported by Copilot for providing clear suggestions on how to structure the chapter and how to improve sentences to make the flow of the text more academic. Example questions during the discussion were:

"What is included in a discussion chapter of a thesis?"

"*Could you rewrite this sentence more academically?"*

Appendix 2: Referred high-risk AI systems in Article 6 of the EU AI Act

Table 6: High-risk AI systems referred to in Article 6 *(Annex III: EU AI Act, n.d.)*

Area	Description	Related recitals
Biometrics	- Remote biometric identification systems (excluding verification for identity confirmation) - Biometric categorization based on sensitive attributes - Emotion recognition	Recital 54, Recital 159
Critical Infrastructure	AI systems used as safety components in managing critical digital infrastructure, road traffic, or supply of water, gas, heating, or electricity	Recital 55
Education and Vocational Training	- Determining access/admission to educational institutions - Evaluating learning outcomes - Assessing appropriate education levels - Monitoring prohibited behavior during tests	Recital 56
Employers and Workers Management	- Recruitment and selection processes - Decisions affecting work-related relationships - Monitoring and evaluating performance and behavior	Recital 57
Essential services and benefits	- Evaluating eligibility for public assistance benefits - Evaluating creditworthiness - Risk assessment and pricing for life and health insurance - Classifying emergency calls and dispatching services	Recital 58
Law enforcement	- Evaluating eligibility for public assistance benefits - Evaluating creditworthiness - Risk assessment and pricing for life and health insurance - Classifying emergency calls and dispatching services	Recital 59
Migration, asylum, and border control management	- Evaluating eligibility for public assistance benefits - Evaluating creditworthiness - Risk assessment and pricing for life and health insurance - Classifying emergency calls and dispatching services	Recital 60
Administration of Justice and Democratic processes	- Assisting judicial authorities in legal research and interpretation - Influencing election outcomes or voting behavior	Recital 61, Recital 62

Appendix 3: Summary of EU AI Act requirements high-risk AI systems

Table 7: Summary of EU AI Act's high-risk requirements

Name requirement	Summary	Article reference
Compliance with the requirements	High-risk AI systems must comply with the requirements set out in the Act before being placed on the market or put into service. Providers must ensure that their AI systems meet all relevant EU regulations and standards.	(Art. 8 Compliance With The Requirements - EU AI Act, n.d.)
Risk Management System	Providers must establish a risk management system to identify, analyze, and mitigate risks associated with high-risk AI systems throughout their lifecycle.	(Art. 9 Risk Management System - EU AI Act, n.d.)
Data and Data Governance	High-risk AI systems shall ensure the quality and integrity of data, including requirements for data governance and management.	(Art. 10 Data And Data Governance - EU AI Act, n.d.)
Technical Documentation	Providers must create and maintain detailed technical documentation to demonstrate compliance with the Act.	(Art. 11 Technical Documentation - EU AI Act, n.d.)
Record Keeping	Requires providers to keep records of the AI system's performance and any incidents or malfunctions	(Art. 12 Record-Keeping - EU AI Act, n.d.)
Transparency and provision of information to deployers	Providers must ensure that deployers of high-risk AI systems are informed about their capabilities, limitations, and any necessary precautions.	(Art. 13 Transparency And Provision of Information to Deployers - EU AI Act, n.d.)
Human oversight	High-risk AI systems must be designed to allow for effective human oversight to prevent or minimize risks.	(Art. 14 Human Oversight - EU AI Act, n.d.)
Accuracy, robustness and cybersecurity	High-risk AI systems must be accurate, robust, and secure, performing consistently throughout their lifecycle. They should be resilient to errors and faults, and secure against unauthorized access.	(Art. 15 Accuracy, Robustness And Cybersecurity - EU AI Act, n.d.)

Appendix 4: Usage of compliance requirements in the banking sector before the EU AI Act

Risk Management System: Article 9 of the EU AI Act mandates that a risk management system be established, implemented, documented, and maintained for high-risk AI systems. Banks already have risk management systems in place, such as frameworks for AML, including Customer Due Diligence (CDD), transaction monitoring, and reporting suspicious activities to regulatory authorities (Ogbeide et al., 2023). However, integrating the new requirements of the EU AI Act into existing systems can be challenging, as it requires harmonizing different regulatory standards and ensuring seamless operation (Soprana, 2024).

Data Governance: Article 10 of the EU AI Act requires high-risk AI systems to ensure the quality and integrity of data, including requirements for data governance. The banking sector faces complexities in implementing data governance frameworks due to overlapping laws and the need for secure data sharing mechanisms (Coche et al., 2024). Nevertheless, banks use data governance frameworks to comply with regulations, such as the Revised Payment Services Directive (PSD2) (Arner et al., 2022).

Technical Documentation: Article 11 of the EU AI Act mandates that providers of high-risk AI systems create and maintain detailed technical documentation to demonstrate compliance with the EU AI Act. Effective technical documentation practices are essential for managing AI systems and ensuring compliance with regulations (Königstorfer & Thalmann, 2021). Banks often struggle with documenting AI systems, especially complex models like neural networks and deep learning algorithms (Königstorfer et al., 2022).

Record-Keeping: Article 12 of the EU AI Act requires high-risk AI systems to keep records of their performance and any incidents or malfunctions. In the banking sector, record-keeping is already in use, with Management Information Systems (MIS) playing a pivotal role in maintaining accurate records to ensure transparency, accountability, and operational efficiency (Ogra & Ogra, 2024). However, adapting to Article 12 can pose significant operational and regulatory challenges (Musch et al., 2023c).

Transparency: Article 13 of the EU AI Act mandates that high-risk AI systems be transparent, informing deployers about the systems' capabilities, limitations, and precautions. Banks strive for transparency in their AI operations, implementing AI-powered fraud detection systems to enhance customer trust (Adhaen et al., 2024). Despite these

efforts, banks face challenges in meeting the transparency requirements of the EU AI Act, particularly due to the "black box" nature of AI algorithms (Passador, 2024; Zednik, 2019).

Human Oversight: Article 14 of the EU AI Act mandates that high-risk AI systems be designed to allow for effective human oversight to prevent or minimize risks. Human oversight is crucial in AI regulation within the financial sector to prevent economic waste, maintain transparency and accountability, ensure data protection and non-discriminatory outcomes, and mitigate heightened cybersecurity risks (Truby et al., 2020). Several banks have developed frameworks for AI governance, emphasizing human responsibilities to ensure ethical decision-making and prevent discrimination (Prenio et al., 2021). However, challenges remain in ensuring effective oversight, as human overseers may lack competence or be influenced by harmful incentives (Laux, 2023). Laux's framework of "institutionalized distrust" proposes six principles—justification, periodic mandates, collective decisions, limited competence of institutions, justiciability and accountability, and transparency—to enhance the effectiveness and trustworthiness of human oversight in AI governance (Laux, 2023). This framework differentiates between first-degree oversight, where human involvement can change AI's output, and second-degree oversight, which involves auditing or reviewing AI decisions retrospectively (Laux, 2023).

First-Degree Oversight: Involves human overseers who have a direct and counterfactual influence on the decisions made or supported by an AI system (Laux, 2023). This means their involvement can change the AI's output. For example, in the banking sector, credit officers using AI for creditworthiness assessments can decide whether to follow the AI's recommendations, thus directly influencing the final decision (Edunjobi & Odejide, 2024). Similarly, compliance officers may use AI for fraud detection but ultimately make the final decision themselves (Sadok et al., 2022). This type of oversight ensures that human judgment is integral to the decision-making process, maintaining a level of human control and accountability (Laux, 2023).

Second-Degree Oversight: Refers to human overseers who act retrospectively, auditing or reviewing AI decisions without direct influence on the initial output (Laux, 2023). These overseers do not intervene in the decision-making process but instead evaluate the decisions after they have been made. For instance, auditors reviewing AI system logs to ensure compliance with regulatory standards (Li & Goel, 2024) or an oversight board reviewing content moderation decisions made by AI systems (Wong & Floridi, 2022).

This type of oversight is corrective, aiming to identify and rectify any issues or biases in the AI's decisions (Laux, 2023).

Laux's framework of "institutionalized distrust" provides banks with a structured approach to enhance the effectiveness and trustworthiness of human oversight in AI governance. By implementing the six principles—justification, periodic mandates, collective decisions, limited competence of institutions, justiciability and accountability, and transparency—banks can ensure their AI systems are effectively monitored and controlled, aligning with the requirements of Article 14 of the EU AI Act (Laux, 2023).

Table 8: The "institutionalized distrust" framework, inspired by Laux (2023)

Principle	**First-degree oversight/lack of competence**	**Second-degree oversight/lack of competence**	**First-degree oversight/wrong incentives**	**Second-degree oversight/wrong incentives**
Legitimacy	+	+	+	+
Periodical mandates	n/a	-*	n/a	+
Collective decisions	+	+	+	+
Limited competence of institutions	n/a	+*	n/a	+
Justiciability and accountability	+	+	+	+
Transparency	+	+	+	+

In Table 8, a "+" indicates a positive influence, a "-" signifies a negative influence, a "*" denotes an expected high degree of uncertainty in the outcome, and "n/a" means not applicable.

Accuracy, Robustness, and Cybersecurity: Article 15 of the EU AI Act mandates that high-risk AI systems be accurate, robust, and secure, performing consistently throughout their lifecycle. The banking sector prioritizes these aspects in its AI systems (Kovačević et al., 2024). Banks have implemented AI for fraud detection, customer support, and credit scoring, ensuring these systems are accurate and secure (Olowu et al., 2024). Despite these efforts, banks face challenges in complying with Article 15 due to the rapid evolution of AI technologies, such as Generative AI, which introduces new risks that existing frameworks may not cover adequately (Al-Dosari, 2022). Ensuring collaboration among model, technology, legal, and compliance teams is essential but challenging (Oluwu et al., 2024). Additionally, banks must continuously innovate while maintaining

robust cybersecurity measures to protect against sophisticated cyber threats (Kovačević et al., 2024).

Appendix 5: Interview questions

Introduction/context settling:

1. Can you briefly describe your role and involvement with AI systems or regulatory developments in the banking sector?
2. From your perspective, how is AI currently being used in the banking sector?

AI adoption and challenges

3. What are the main challenges you've observed or experienced in the banking sector regarding AI adoption?
4. How do these challenges vary across different types of AI applications (e.g., fraud detection, AML)?
5. How are compliance issues, such as data privacy or ethical considerations, typically addressed in banking AI systems?
6. What strategies have been effective in overcoming resistance to AI adoption within your bank/your client?

EU AI Act and Compliance

7. How familiar are you with the EU AI Act and its proposed requirements?
8. What is your perspective on the EU AI Act's risk-based approach to regulating AI systems?
9. What are your thoughts on the potential benefits and drawbacks of the EU AI Act for the banking industry?
10. How do you think the EU AI Act will impact the adoption of AI in the banking sector?
11. How are banks preparing for these new regulatory requirements in practice?
12. How are banks handling AI risk classification under regulations like the EU AI Act or the GDPR?
13. Do you think the Act will hinder or support innovation in the sector?
14. What challenges do you see for banks in aligning with the EU AI Act?

Innovation

15. How do banks balance AI innovation with regulatory and ethical responsibilities?
16. How has the EU AI Act influenced your bank's innovation strategies?
17. Can you provide examples of how your bank has adapted its compliance strategies in response to the EU AI Act?

Closing

18. Is there anything you feel we haven't discussed that's important regarding AI adoption and regulation in banking?

Appendix 6: Interview data

Interview label and definitions

Table 9 provides a structured overview of interview labels and definitions, organized by thematic areas relevant to the research on the EU AI Act's implications in the banking sector. It categorizes keywords from the propositions to gather insights in the interviews to convert into key themes and labels, each linked to specific propositions to facilitate a focused analysis. Furthermore, Table 10 presents the frequency the labels occurred during the interviews.

Table 9: Interview labels and definition

Theme	*Label*	*Definition*	*Related proposition*
EU AI Act	Act familiarity	Captures the level of familiarity and general viewpoints professionals have about the EU AI Act.	P1, P2
	Perceived sector impact	Focuses on the perceived influence of the EU AI Act in the banking sector, around the compliance and innovation strategies	P1
	Alignment challenges	Addresses the challenges banks anticipate or change when aligning with the EU AI Act's requirements.	P1, P3
Compliance strategies	Regulatory preparation	Identifies the distinct regulatory obligations the EU AI Act imposes on Dutch banks.	P1
	Compliance frameworks	Discusses how banks are altering their compliance strategies to meet the Act's stipulations.	P1
	Compliance Barriers and solutions	Explores the challenges encountered and solutions implemented in meeting compliance standards.	P1
Innovation strategies	Regulatory impact	Examines how the EU AI Act influences or alters innovation strategies within banks.	P2
	Regulatory Flexibility	Highlights the specific changes banks make to their innovation approaches in response to regulatory demands.	P2

	Balancing Act	Looks at the methods banks use to ensure innovation while staying compliant with regulations.	P2
AI adoption in the banking sector	Adoption drivers	Details the strategies used by banks to overcome barriers and resistance to AI adoption.	P3
	Adoption challenges	Captures the key challenges and variations in AI adoption across different applications in banking.	P3
	Future adoption directions	Discusses predicted future developments and ongoing unresolved issues regarding AI adoption.	P3

Table 10: Labels frequency

Theme	*Label*	*Used in total*	*Theme usage*
EU AI Act	Act familiarity	74	212
	Perceived sector impact	43	
	Alignment challenges	95	
Compliance strategies	Regulatory preparation	54	177
	Compliance frameworks	48	
	Compliance Barriers and solutions	75	
Innovation strategies	Regulatory impact	46	85
	Regulatory Flexibility	18	
	Balancing Act	21	
AI adoption in the banking sector	Adoption drivers	55	140
	Adoption challenges	63	
	Future adoption directions	22	

Interview time spent, word count and transcript pages

Each of the interviews was conducted and recorded within Microsoft Teams and transcribed using the Copilot function built into Microsoft Teams. The researcher performed the spelling and grammar checks, which led to variations in the design of the transcripts.

All transcripts were formatted in Segoe UI, 12-point font. Due to anonymization and the inaccuracies of the Copilot tool, sentences were sometimes divided, resulting in an increased number of transcript pages. Nevertheless, the quality of the content wasn't harmed.

Table 11: Interview data - time spent, word count and transcript pages

Interviewee	Time spent in minutes	Number of words	Transcript pages
A	52	7590	20
B	28	3615	10
C	36	3203	10
D	24	3537	7
E	42	6388	17
F	26	3259	13
G	48	6274	22
H	25	4249	13
I	37	5711	17
J	38	5414	16
K	29	5114	17
L	41	6644	21

Appendix 7: Interview summaries

Interviewee A

Interviewee A is a consultant in a big four firm specializing in responsible AI and works on projects around implementing the EU AI Act in Dutch Banks. Their work involves integrating EU AI Act requirements into banking systems, whether internally developed or acquired from third-party providers. They mentioned that the EU AI Act is a pivotal regulatory framework which influences the banking sector more profoundly. One of the biggest challenges for the banking sector regarding the EU AI Act is a lack of practical frameworks for fulfilling compliance requirements, complicating effective supervision. Another challenge which Interviewee A identified is the lack of AI adoption in the banking sector due to the low levels of AI literacy, which also complicates fulfilling innovation and compliance requirements. Conducting training sessions to increase understanding within banks and to comply with Article 4 of the EU AI Act. With a better focus on AI literacy within the banking sector, Interviewee A believes that the EU AI Act could transform how banks approach innovation, as the EU AI Act gives guidelines to structure AI adoption.

Interviewee B

Interviewee B has a history as head of strategy and innovation at a traditional bank, shared critical insights into AI adoption within banks, thereby addressing the challenges introduced by the EU AI Act. While AI can be applied effectively, Interviewee B noted that certain areas present challenges. A pragmatic approach at the traditional bank was to require mandatory training for employees engaging with AI, which helped address minimum requirements set by the EU AI Act and ensure responsible use. Interviewee B expressed concerns over the EU AI Act's impact, highlighting ambiguities and potential delays in the innovation process. They felt that the EU AI Act slows AI adoption in Europe due to its stringent requirements, placing European startups at a disadvantage compared to their American or Asian counterparts. The need for extensive compliance, legal, and risk management frameworks is particularly difficult for smaller companies without significant resources, contrasting with larger tech firms that can more readily absorb such costs. Despite these challenges, Interviewee B pointed out that determined strategic priorities could facilitate AI adoption. They advocated for a clear understanding of risk and compliance, mentioning banks to integrate AI into their strategies robustly, while

complying with the EU AI Act through approaches like ensuring human oversight in AI applications.

Interviewee C

Interviewee C advises financial institutions, such as banks, on laws and regulations affecting their capital and liquidity positions. While banks generally express interest in AI, viewing it as a driver for cost reduction, Interviewee C identifies multiple challenges related to complying with the EU AI Act, which could enhance AI adoption. A major issue is data quality, as banks need to thoroughly understand AI fundamentals to avoid a "garbage in, garbage out" scenario and ensure proper oversight of AI usage. Another significant challenge is maintaining a central overview of all AI applications, given the diverse regulatory requirements across the sector and in various countries. Interviewee C believes the EU AI Act adds complexity to the regulatory landscape, making life more difficult for banks, partly because there is no clarity on how the Act will be supervised.

Interviewee D

Interviewee D, who leads responsible AI services at a big four firm in the Netherlands, offers insights on the EU AI Act, particularly its implications for the banking sector. They view the EU AI Act as a positive framework that balances the potential benefits and risks associated with AI, thus promoting innovation. While the regulation itself is seen as essential, Interviewee D notes that the complexity of compliance requirements poses challenges for banks, potentially slowing AI adoption. The conversation suggests that reluctance to invest in AI within the Netherlands stems more from the broader business climate rather than the EU AI Act itself. Interviewee D believes that clear regulations could serve as an incentive for investment by providing necessary clarity and security. They emphasize the importance of robust risk management frameworks for AI systems and acknowledge that compliance with the Act's requirements, such as data governance and quality assurance, will be as challenging as GDPR compliance continues to be. Looking ahead, Interviewee D expresses optimism that the AI Act could position the EU as a leader in responsible AI, potentially offering a competitive advantage globally by establishing rigorous safety and ethical standards akin to extra security checks for AI applications, particularly in critical sectors like banking.

Interviewee E

Interviewee E is a consultant specializing in responsible AI in various sectors, including banking. Interviewee E notes that AI adoption in banking is still developing, as banks tend to be cautious with implementing high-risk AI applications due to the stringent compliance requirements imposed by the EU AI Act. This caution often leads institutions to prioritize low risk use cases initially. While Interviewee E acknowledged that the EU AI Act could be perceived as a compliance burden that may hinder innovation in the short term, they also emphasized its potential to build trust in AI systems over time. A significant observation from Interviewee E is the knowledge gap in AI literacy among decision-makers, which hampers their ability to assess risks and make informed decisions regarding AI technologies. They highlighted the importance of developing training programs to enhance AI understanding, particularly among management, to create accountability. Interviewee E also pointed out that the regulatory landscape complicates AI integration, as existing regulations may not align well with new AI applications, which could make AI adoption more difficult.

Interviewee F

Interviewee F discussed their role as a partner in risk and regulation practice, focusing on digital resilience and operational risk topics within the banking sector. They explained that banks handle compliance requirements by conducting gap assessments, interpreting legal texts, and updating policies accordingly. Interviewee F mentioned that compliance and risk functions collaborate to ensure regulations are implemented effectively, with the Chief Technology Officer and their team responsible for the actual implementation. They also noted that the broad definition of AI in the EU AI Act can cause delays in AI adoption due to the need for clear risk assessments and compliance procedures. Additionally, Interviewee F highlighted those new regulations can impact innovation by requiring resources and time to implement, which can slow down the adoption of new technologies like AI. Finally, Interviewee F agreed that well-structured compliance strategies can facilitate the adoption of regulations like the EU AI Act but emphasized that it specifically pertains to the adoption of the regulation itself rather than AI in general.

Interviewee G

Interviewee G, a senior associate consultant, specializes in guiding clients on digital technology regulations impacting AI usage. Interviewee G acknowledges that Dutch

banks are exploring AI adoption but highlights several challenges, including a skills gap, lack of AI literacy, and the complexity of the highly regulated sector. Interviewee G believes the EU AI Act is a positive development for the banking sector, as it clarifies AI regulations and supports innovation. However, there are concerns due to the lack of detailed guidance on compliance requirements. Additionally, the broad definition of an AI system poses unintended consequences for the banking sector, such as operational challenges under the EU AI Act. In conclusion, Interviewee G is optimistic about the EU AI Act's support for AI adoption but notes that it is still early days in terms of development, making it a wait-and-see situation.

Interviewee H

Interviewee H, a senior manager who specialized in compliance with DORA, discusses the complexities of adopting the EU AI Act in the banking sector. They highlight the need for a clear risk management framework and the slow decision-making processes typical of large banks, which hinder innovation compared to more agile fintech companies. They express optimism about the EU AI Act, suggesting it could foster innovation by providing clearer frameworks for experimentation within banks. However, they also raise concerns about the lack of detailed guidance on compliance, which can create uncertainty. Furthermore, Interviewee H addresses the importance of strong data governance and record-keeping practices, which are essential for good compliance for both the EU AI Act as other regulations coming up in the future. In conclusion, Interviewee H believes that with the right frameworks and resources, banks can leverage AI to enhance their operations while navigating the complexities of regulatory compliance.

Interviewee I

Interviewee I, a technology risk consultant, discusses the implications of the EU AI Act for the banking sector. They highlight that existing AI systems must be evaluated for compliance with the EU AI Act, which poses a significant challenge in determining whether a system qualifies as AI. Interviewee I believes that while AI regulation is necessary, it is complex and varies on a case-by-case basis, making it difficult to implement. They express concern that the compliance requirements of the EU AI Act are too high-level and broad, leading to uncertainty in implementation. This uncertainty can hinder the adoption of high-risk AI systems, as banks tend to be risk averse. Despite these challenges, Interviewee I is optimistic that once organizations understand compliance

requirements, they can leverage AI for innovation and competitiveness in the banking sector. They emphasize the need for clearer regulatory technical standards to facilitate compliance and ensure that organizations can effectively manage AI risks.

Interviewee J

Interviewee J, who specializes in AI adoption in various sectors, discusses the challenges and opportunities presented by the EU AI Act. They emphasize the need for improved AI literacy among employees, arguing that many organizations fail to invest adequately in this area, which could lead to significant costs in the long run. Interviewee J believes that AI literacy should encompass understanding the biases of AI models and the implications of their outputs. A significant point raised is the stark contrast between traditional banks and neo banks, with the latter being more advanced in risk appetite and data governance. This difference leads to varied interpretations of the EU AI Act and its implications for AI adoption. Interviewee J expresses skepticism about the EU AI Act, viewing it as potentially vague and burdensome, which may hinder innovation rather than promote it. They note that the lack of clarity on specific requirements creates uncertainty in compliance, complicating the adoption process. Additionally, differing interpretations of AI literacy present a substantial challenge. At last, Interviewee J emphasizes the importance of a top-down and bottom-up approach to AI adoption, suggesting that successful companies engage middle management and frontline employees in the process to ensure effective use of AI tools, thereby fostering innovation.

Interviewee K

Interviewee K, who has a background in AI systems within the banking sector, shares insights on the implications of the EU AI Act. They express that while the EU AI Act is beneficial for establishing guidelines, it also introduces additional regulatory hurdles that banks must navigate. Interviewee K notes that the banking sector in the Netherlands is lagging in AI adoption, primarily due to existing regulatory pressures and the perceived risks associated with AI applications. Interviewee K emphasizes the importance of transparency, arguing that the EU AI Act can enhance these aspects by ensuring that banks adhere to strict guidelines. However, they also highlight the challenges posed by vague compliance requirements, which can create uncertainty for banks trying to implement AI responsibly. Interviewee K believes that proactive engagement with AI, despite regulatory challenges, is essential for banks to remain competitive and innovative. Overall,

Interviewee K advocates for a balanced approach that embraces regulation while fostering AI adoption in banking.

Interviewee L

Interviewee L discussed the application of AI within the banking sector, particularly at a traditional bank where three main priorities were identified: fraud detection, Know Your Customer (KYC) processes, and chatbots. The interview highlighted significant challenges in AI adoption, including the need for skilled personnel and effective communication between teams. Interviewee L noted that while there is a push for innovation, the complexity of AI systems and regulatory requirements, such as the EU AI Act, complicate the process. Interviewee L emphasizes the importance of establishing clear boundaries and governance structures to ensure that AI initiatives align with regulatory requirements. They note that the complexity of AI systems necessitates collaboration between technical and risk management teams, which is often lacking. Furthermore, Interviewee L is convinced that the EU AI Act will make AI adoption as innovation safer, as innovation develops by itself.

Appendix 8: Research data management plan for students

UNIVERSITY OF TURKU Library

This document will help you plan how to manage your research data. More detailed instructions for each section are available online in the Research Data Management Guide for Students.

1. Research data

Research data refers to all the material with which the analysis and results of the research can be verified and reproduced. It may be, for example, various measurement results, data from surveys or interviews, recordings or videos, notes, software, source codes, biological samples, text samples, or collection data.

In the table below, list all the research data you use in your research. Note that the data may consist of several different types of data, so please remember to list all the different data types. List both digital and physical research data.

Research data type	**Contains personal details/information***	**I will gather/produce the data myself**	**Someone else has gathered/produced the data**	**Other notes**
Example, Data type 1: *Semi-structured interviews*	x	x		

* Personal details/information are all information based on which a person can be identified directly or indirectly, for example by connecting a specific piece of data to another, which makes identification possible. For more information about what data is considered personal go to the Office of the Finnish Data Protection Ombudsman's website

2. Processing personal data in research

If your data contains personal details/information, you are obliged to comply with the EU's General Data Protection Regulation (GDPR) and the Finnish Data Protection Act. For data that contains personal details, you must prepare a Data Protection Notice for your research participants and determine who is the controller for the research data.

I will prepare a Data Protection Notice** and give it to the research participants before collecting data ☐

The controller** for the personal details is the student themself ☒ the university ☐

My data does not contain any personal data ☐

** More information at the university's intranet page, Data Protection Guideline for Thesis Research

3. Permissions and rights related to the use of data

Find out what permissions and rights are involved in the use of the data. Consult your thesis supervisor, if necessary. Describe the use permissions and rights for each data type. You can add more data types to the list, if necessary.

3.1. Self-collected data

You may need separate permissions to use the data you collect or produce, both in research and in publishing the results. If you are archiving your data, remember to ask the research participants for the necessary permissions for archiving and further use of the data. Also, find out if the repository/archive you have selected requires written permissions from the participants.

Necessary permissions and how they are acquired

Data type 1: Semi-structured interviews

3.2 Data collected by someone else

Do you have the necessary permissions to use the data in your research and to publish the results? Are there copyright or licencing issues involved in the use of the data? Note, for example, that you may need permission to use the images or graphs you have found in publications.

Rights and licences related to the data

4. Storing the data during the research process

Where will you store your data during the research process?

In the university's network drive ☐
In the university-provided Seafile Cloud Service ☐
Other location, please specify: ☒ on the personal laptop of the researcher, and a copy on the personal hard drive of the researcher.

The university's data storage services will take care of data security and backup files automatically. If you choose to store your data somewhere other than in the services provided by the university, please specify how you will ensure data security and file backups. Remember to make sure you know every time where you are saving the edited/modified data.

If you are using a smartphone to record anything, please check in advance where the audio or video will be saved. If you are using commercial cloud services (iCloud, Dropbox, Google Drive, etc.) and your data contains personal data, make sure the information you provide in the Data Protection Notice about data migration matches your device settings. The use of commercial cloud services means the data will be transferred to third countries outside the EU.

5. Documenting the data and metadata

How would you describe your research data so that even an outsider or a person unfamiliar with it will understand what the data is? How would you help yourself recall years later what your data consists of?

5.1 Data documentation

Can you describe what has happened to your research data during the research process? Data documentation is essential when you try to track any changes made to the data.
To document the data, I will use:

A field/research journal ☐

A separate document where I will record the main points of the data, such as changes made, phases of analysis, and significance of variables ☒

A readme file linked to the data that describes the main points of the data ☐

Other, please specify: ☐

5.2 Data arrangement and integrity

How will you keep your data in order and intact, as well as prevent any accidental changes to it?

I will keep the original data files separate from the data I am using in the research process, so that I can always revert back to the original, if need be. ☒

Version control: I will plan before starting the research how I will name the different data versions and I will adhere to the plan consistently. ☒

I recognise the life span of the data from the beginning of the research and am already prepared for situations, where the data can alter unnoticed, for example while recording, transcribing, downloading, or in data conversions from one file format to another, etc. ☒

5.3 Metadata

Metadata is a description of you research data. Based on metadata someone unfamiliar with your data will understand what it consists of. Metadata should include, among others, the file name, location, file size, and information about the producer of the data. Will you require metadata?

I will save my data into an archive or a repository that will take care of the metadata for me. ☐

I will have to create the metadata myself, because the archive/repository where I am uploading the data requires it. ☐

I will not store my data into a public archive/repository, and therefore I will not need to create any metadata. ☒

6. Data after completing the research

You are responsible for the data even after the research process has ended. Make sure you will handle the data according to the agreements you have made. The university recommends a general retention period of five (5) years, with an exception for medical research data, where the retention period is 15 years. Personal data can only be stored as long as it is necessary. If you have agreed to destroy the data after a set time period, you are responsible for destroying the data, even if you no longer are a student at the university. Likewise, when using the university's online storage services, destroying the data is your responsibility.

What happens to your research data, when the research is completed?

I will store all data for 5 years.

If you will store the data, please identify where: on the researcher's personal laptop

Remember to keep the data management plan updated throughout the research project.