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Compliance by Design for Robo Advisors: A Case Study of SEB Robo Advisor

Master's Thesis (20 ECTS)

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Abstract:

This paper examines the intersection of user-centered design, regulatory compliance, and data privacy in the financial technology sector, with a focus on optimizing the onboarding journey of SEB robo-advisor through compliance-by-design principles by employing a case study methodology to investigate the challenges and opportunities presented by this complex topic. SEB's analysis of robo-advisors serves as an example for broader administrative issues and aims to derive practical insights into theory and practice. Through narrative-driven analysis and stakeholder engagement, the project will contribute to the ongoing debate on user-centered design in financial technology, aiming to improve the user experience while ensuring regulatory compliance.

Keywords:

UX design, Compliance by Design, Investment, Financial Product, MIFID II regulations, Robo Advisors, Privacy by Design, UX design.

CERCS: P170 Computer science, numerical analysis, systems, control.

Robo Advisorsi disaini vastavus: SEB Robo Advisor juhtumiuuring

Lühikokkuvõte: Käesolevas töös vaadeldakse kasutajakeskse disaini, regulatiivse vastavuse ja andmete privaatsuse lõikumist finantstehnoloogia sektoris, keskendudes SEB robonõustaja teekonna optimeerimisele vastavuse põhimõtete kaudu, kasutades juhtumiuuringu metoodikat, et uurida selle keerulise teemaga kaasnevaid väljakutseid ja võimalusi. SEB robonõustajate analüüs on eeskujuks laiematele halldusküsimustele ning selle eesmärk on tuletada praktilisi teadmisi teooriast ja praktikast. Narratiivipõhise analüüsi ja sidusrühmade kaasamise kaudu aitab projekt kaasa käimasolevale arutelule kasutajakeskse disaini üle finantstehnoloogias, mille eesmärk on parandada kasutajakogemust, tagades samal ajal õigusnormide täitmise.

Võtmesõnad: UX-disain, disaini järgimine, investeerimine, finantstoode, MIFID II, Robo Advisors, disainipõhine privaatsus, UX-i disain**.**

CERCS: P170 Arvutiteadus, arvutusmeetodid, süsteemid, juhtimine (automaatjuhtimisteooria).

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Terms and Notations:

Accountability: The principle of taking responsibility for actions, decisions, and outcomes, particularly in the context of data handling and privacy practices.

AI (Artificial Intelligence): The simulation of human intelligence processes by machines, particularly computer systems, including learning, reasoning, problem-solving, perception, and decision-making.

Character User Interface (CUI): A type of user interface that relies on text-based interaction, typically through command-line interfaces or text-based chatbots.

Dark patterns: Manipulative design techniques used in user interfaces to trick or deceive users into taking actions they might not otherwise choose to take, often to the benefit of the designer or a third party.

Data lifecycle: The stages through which data passes from creation to disposal, including collection, storage, processing, analysis, and archiving, with corresponding privacy and security considerations at each stage.

Data management: The process of collecting, storing, organizing, and maintaining data throughout its lifecycle to ensure its availability, reliability, and security for use by authorized users or systems.

Data protection measures: Policies, procedures, and technologies implemented to safeguard the confidentiality, integrity, and availability of data, particularly personal or sensitive information, from unauthorized access, use, or disclosure.

Data utilization: The responsible and ethical use of data for legitimate purposes, including analysis, decision-making, research, and innovation, while respecting privacy rights and data protection principles.

End-to-end security: A comprehensive approach to security that safeguards data and communications across the entire lifecycle, from creation and transmission to storage and disposal.

Fair Information Practices: Principles and guidelines for the fair and responsible handling of personal information, including transparency, choice, data minimization, purpose limitation, integrity, and accountability.

Financial Action Task Force (FATF) Recommendations: International standards and guidelines developed by the Financial Action Task Force (FATF) to combat money laundering, terrorist financing, and other threats to the integrity of the global financial system.

Financial Intelligence Units (FIUs): Government agencies or entities responsible for collecting, analyzing, and disseminating financial intelligence to combat money laundering, terrorist financing, and other financial crimes.

Financial transactions: Activities involving the exchange of money or financial instruments between parties, including purchases, sales, transfers, and investments.

Graphical User Interface (GUI): A type of user interface that utilizes graphical elements, such as icons, windows, and menus, to enable users to interact with software applications or systems.

GUI design (Graphical User Interface design): The process of designing the visual elements and interactive components of a software application or system that users interact with, typically through graphical icons, menus, and buttons.

Identity verification: The process of confirming the identity of an individual or entity through various means, such as identification documents, biometric data, or authentication methods, to prevent fraud and unauthorized access.

ILP approach (Integer Linear Programming approach): A mathematical optimization technique used to solve optimization problems involving linear constraints and integer decision variables.

KYC (Know Your Customer): The process of verifying the identity of customers using various methods to prevent fraud and ensure security.

Mutual accountability: The shared responsibility among stakeholders, including organizations, individuals, and regulators, for upholding privacy rights, complying with regulations, and promoting ethical data practices.

Natural User Interfaces (NUI): User interfaces that enable natural and intuitive interaction with technology through gestures, voice commands, touch, or other sensory inputs.

Onboarding process: The series of steps or procedures that a user undergoes to become familiar with, sign up for, or start using a product, service, or platform, often involving registration, account setup, and orientation.

Operational functionality: The features, capabilities, and processes necessary for a system or organization to perform its intended functions effectively and efficiently.

Police Data Protection Directive: A directive issued by law enforcement agencies or authorities outlining policies, procedures, and safeguards for the handling and protection of personal data collected during law enforcement activities.

Privacy principles: Fundamental concepts and guidelines governing the ethical and responsible handling of personal information, including transparency, consent, purpose limitation, data minimization, and accountability.

Privacy regulations: Laws, rules, and standards governing the collection, use, and protection of personal information, aimed at safeguarding individual privacy rights and promoting responsible data practices.

Privacy risks: Potential threats or vulnerabilities that may result in the unauthorized access, use, or disclosure of personal information, leading to privacy breaches or violations.

Process mining: A data analysis technique used to discover, monitor, and improve real processes by extracting knowledge from event logs, transaction data, or operational records generated during the execution of business processes.

Regulatory compliance: The process of adhering to laws, regulations, and industry standards relevant to a particular business, activity, or industry to ensure legal and ethical conduct.

Regulatory frameworks: Sets of rules, laws, and guidelines established by governments or regulatory bodies to govern and regulate specific industries, activities, or practices, ensuring compliance with legal and ethical standards.

Robo investors: Automated investment platforms that use algorithms and artificial intelligence to manage investment portfolios and make financial decisions on behalf of users, typically with minimal human intervention.

System architectures: The structure, components, and organization of a system, including hardware, software, networks, and data, to support its functionality, performance, and scalability.

Technical and Organizational Measures (TOMs): Measures, controls, and safeguards implemented by organizations to ensure the security, confidentiality, and integrity of personal data, as required by data protection regulations.

Technology sector: The industry encompassing companies and organizations involved in the development, manufacturing, and distribution of technology products and services, including hardware, software, telecommunications, and internet services.

Transparency: The quality of being open, honest, and clear in communication and decision-making, particularly regarding the handling of personal data and privacy practices.

User autonomy: The extent to which users have control over their actions, decisions, and personal data when interacting with a product or service.

User Experience (UX): The overall experience and interaction that users have with a product, service, or system, encompassing aspects such as usability, accessibility, and satisfaction.

User Interface (UI): The visual and interactive elements of a software application or system that users interact with, including menus, buttons, forms, and graphical elements.

User profiling: The process of collecting and analyzing data to create profiles or representations of individual users, including their characteristics, preferences, behaviors, and interests, often used for targeted marketing or personalization.

User research: The systematic study and analysis of user needs, behaviors, preferences, and experiences to inform the design and development of products, services, or systems.

User-centric design: Designing products, services, or systems based on an understanding of the needs, preferences, and behaviors of users, with the goal of enhancing user satisfaction and usability.

Visibility and transparency: The extent to which users and stakeholders have clear and accessible information about the collection, use, and handling of their data, promoting trust and accountability.

1. Introduction

In today's financial landscape, the intersection of user-centric design and regulatory compliance presents a challenge, particularly in the digital sector. User Experience (UX) attempts to create seamless and accessible digital interfaces, increasing satisfaction in navigating websites or apps. However, this pursuit often conflicts with strict regulations prevalent in the financial sector. According to Nelissen, L. et al. (2022) regulations ensure data safety and ethical practices, but can occasionally disrupt the user-friendly nature of digital experiences, impacting customer experience.

For example, according to authors, the demanding rules might necessitate extensive user information, thereby disturbing a smooth user experience. For instance, we can evaluate the procedure of opening a bank account. The rules require a lot of information from users, making the process take longer and requiring more effort. This can make the experience less smooth for users. While getting detailed information is important for following the regulations, it can create challenges for providing the smooth and easy experience that UX wants to achieve, according to Aamer et al. (2023).

In their work, Upchurch (2018) pointed out that striking the right balance becomes the core priority in ensuring both compliance and a positive user experience in the ever-evolving digital financial landscape. In navigating the complexities of financial technology, the challenges arise from the complex relationship between user-centric design and regulatory constraints.

While analyzing these challenges, the concept of Privacy by Design emerges. For example, *Privacy by Design* involves proactively integrating privacy features into system and process design, ensuring data protection is constructive from the starting point. This approach, as outlined in regulatory frameworks like the General Data Protection Regulation (Art. 25 GDPR Data protection by design and by default), prioritizes transparency, user-centric design, and end-to-end security to safeguard personal data. By embedding privacy considerations into regulatory frameworks and digital solutions, Privacy by Design seeks to mitigate privacy risks while maintaining a seamless and user-friendly experience for financial consumers.

In today's financial world, regulations like *MiFID II* ensure investment products comply with strict standards. However, banks face a challenge: how to balance user-friendly digital services with regulatory requirements. This balance becomes crucial as more people turn to digital finance, especially during events like the COVID-19 pandemic, which increased the risk of privacy breaches and scams in many countries. According to Rizzi, A. (2022), these privacy issues not only affect consumer trust but also impact businesses. While new data protection regulations offer stronger safeguards, the fast-paced nature of digital finance often outpaces consumers' understanding, particularly for those with limited financial means.

In this thesis, we consider MIFID II as regulatory framework that shapes our examination of how design can simultaneously adhere to compliance standards and be user-friendly. The intersection between user-friendliness and compliance is a key focus, with Compliance by Design serving as the determinant factor. Hence, we refer to this approach as "Compliance by Design," which entails proactively integrating regulatory requirements into the design process to ensure both compliance and a positive user experience.

The purpose of Compliance by Design is to strike a balance where the digital product complies with regulations while maintaining an exceptional user experience, ensuring that users can navigate the platform seamlessly while their data is protected and regulatory standards are met.

Given these challenges, our study aims to explore how to improve privacy and security in digital banking, focusing on SEB's Robo Advisor as a case study. In this thesis, I am looking into **Compliance by Design** for Robo Advisory.

Zooming into a specific problem area, the application of Compliance by Design principles within robo investment advisors becomes a crucial point. Robo advisors, as smart finance tools, offer users distinct paths, each with its operational framework and costs. The primary investigation revolves around effectively applying Compliance by Design principles to enhance user experiences in robo investors.

The central challenge is to strike the right balance between regulatory compliance, particularly with frameworks like MiFID II, and delivering a seamless user experience by integrating privacy principles from the start. Together with this, UX principles will be analyzed in order to ensure user integrity and satisfaction over the onboarding process. Crucial study part is to ensure accessibility and comprehensiveness for the upcoming user journey.

The research objective is to critically evaluate and optimize the onboarding journey of SEB's Robo Advisor through the lens of Regulations by Design principles. This calls for a comprehensive assessment of alignment with regulatory frameworks, such as MiFID II, and the overall effectiveness of the existing onboarding process.

The following research questions will be discovered in the consequent chapters:

> **Compliance Evaluation:** To what extent does the existing onboarding journey of SEB's Robo Advisor align with Compliance by Design principles?
>
> **Identification of Improvement Opportunities:** How can the onboarding process of SEB's Robo Advisor be optimized with Compliance by Design principles?

To address the research questions, we utilize a case study methodology. In the second option, we expand our scope to consider "Compliance by Design." This involves integrating MiFID II regulations, user experience (UX) principles, and privacy by design concepts into the analysis of Robo solutions and investments. We dig into the onboarding process of investment firms, examining how MiFID II requirements influence the design and functionality of Robo solutions, alongside considerations for user experience and data privacy.

By overlaying MiFID II regulations, Privacy by Design and UX principles, we aim to assess how well these regulations align with user-centric design practices and privacy by design principles within the context of financial services. This expanded scope allows us to explore the broader implications of regulatory compliance and user experience integration in Robo solutions, offering valuable insights for stakeholders involved in financial services design and implementation. The significance of this research extends to various stakeholders, including those involved in designing user experiences, decision-makers shaping financial technology solutions, and individuals responsible for following privacy rules.

Following an in-depth examination of SEB's Robo Advisor, we will proceed to analyze its complexities and discuss their implications for financial technology. Subsequently, we will summarize our findings and explore their potential impact on the future of finance. Our methodological approach consists of several key steps: initially, we will review and adapt Privacy by Design and UX principles, together with MiFID II regulations to our specific context; next, we will assess the current digital onboarding process of the Robo Advisor offered by SEB. Later on, we will redesign this process with a particular emphasis on privacy principles. Finally, we will evaluate the effectiveness of the updated onboarding process, considering both regulatory compliance and improvements to user experience. Through this methodological framework, our objective is to provide valuable insights into refining the design of Robo advisor and aligning it with Privacy by Design principles to improve user experience.

Exploring Compliance by Design principles in robo investors not only increases academic understanding but also provides practical implications for professionals navigating the rapidly evolving landscape of financial technology.

For this thesis, AI software was used in order to elicit terminology for *Terms and Notations* chapter, as well as to make text adjustments, readability improvements and summarizations where applicable, including Chat Open AI, Copilot and Grammarly. AI tools helped to organize the text better, make it more readable as well as to keep the narrative style consistent. However, no general ideas generated solely by AI were used for this paper.

2. Background

In the forthcoming background section, we discuss two key areas critical to contemporary digital design and financial regulation: user-friendly design and privacy by design. User-friendly design, underscored by ethical considerations, emphasizes prioritizing user needs and preferences, as was described by B. Shneiderman (2020). We explore the evolution of interfaces and the challenges in GUI design, alongside the ethical importance of aligning design practices with user autonomy and privacy. Additionally, we dive into Privacy by Design, a proactive framework created and advocated by Cavoukian, which integrates privacy considerations into system design development processes. This section provides a foundational understanding of the principles shaping user-centric design and data protection measures, setting the stage for a deeper exploration into the regulatory frameworks governing financial transactions, such as MiFID II and its intersection with the technology and investments sector.

2.1. Regulations: MiFID II scope, objectives and analysis

Now, this paper will cover the regulatory framework by design according to financial concepts. As explained by Yeoh, P. (2019), the Markets in Financial Instruments Directive (MiFID I), implemented in 2007 in the EU, aimed to create a unified financial market to rival the USA's. However, its shortcomings in addressing EU financial market challenges led to the review of its effectiveness in 2010. This resulted in MiFID II, designed to improve the investor protection and market efficiency by introducing large-scale legislative reforms. Despite facing criticisms and challenges, MiFID II seeks to increase market integrity, reduce systemic risk, and improve financial market efficiency. The directive's wide scope and complex rules have raised concerns, and only 50% of EU member states fully transposed MiFID II by the effective date.

Challenges mentioned above include numerous reporting demands, with smaller firms struggling to invest in the necessary infrastructure, leading to unintended consequences. Critics highlight difficulties in IT adaptation, the potential reduction in the research analysts, and negative impacts on smaller asset management firms, limiting investor choices. Concerns also arise from the requirement that non-European investment firms transact on European platforms, potentially slowing down the cross-border free markets and international trade in financial services.

While MiFID II's intentions are admirable, its complex nature raises the likelihood of unintended consequences, suggesting a need for simplification and greater international cooperation. Prorokowski, L. (2015) in his paper explores the MiFID II, a regulatory framework that came up with a response to vulnerabilities exposed by the global financial crisis. With over 2,000 amendments since its proposal in October 2011, MiFID II produces considerable changes in financial institutions' business and operating models. The study provides practical insights into its impact, focusing on implementation challenges, compliance strategies, and cost reduction directions. MiFID II introduces structural and technological shifts, encouraging a need for dedicated teams to plan these changes.

The paper above also addresses regulatory complexities and links with frameworks like the European Market Infrastructure Regulation, offering practical implications for risk managers and compliance officers across diverse financial institutions. Key aspects covered include compliance costs, transparency requirements, and the dynamics of near real-time regulatory reporting, contributing to the nuanced understanding of MiFID II's role in the contemporary financial landscape.

In addition to the existing regulatory landscape described in the paper, the importance of regulations extends to ensuring fair and ethical practices within the financial sector. Regulations such as MiFID II not only aim to protect consumers but also promote trust and integrity in financial services. By establishing clear guidelines and standards for conduct, regulations contribute to the overall sustainability and credibility of the financial industry. Moreover, following these regulations promotes accountability and transparency, which are essential for maintaining public trust in financial institutions and robo-advisors alike.

Regulations are even more important as it is the main policy tool used in the pursuit of addressing the new threats and challenges arising in the financial industry. Extensive use of computers and the internet made even more variants of financial crime put forth, especially modern ones, Prorokowski, L. (2015) stresses. Equity Trade Directive includes the steps of liquidity demands, minority rights protection, prevention of money laundering, fraud, and unauthorized data access. Agencies which have a forward-looking approach and respond promptly to the evolving tech landscape by updating the laws can help eliminate non-compliance and safeguard the market transparency.

Despite the challenges caused by regulatory compliance, the benefits of a well-regulated financial ecosystem are undeniable. Regulations provide a framework for encouraging innovation while mitigating risks, imposing a delicate balance between promoting market dynamics and ensuring stability. Moreover, by promoting transparency and accountability, regulations strengthen investor confidence and contribute to the long-term sustainability of the financial sector. As such, continued dialogue and collaboration between regulators, industry stakeholders, and policymakers are essential to navigating the evolving regulatory landscape and promoting a resilient and ethical financial ecosystem.

2.2. Design framework: Privacy by Design and UX Design Principles

Privacy by Design, as explained carefully by the concept creator - Cavoukian (2011) in "Privacy by Design: The 7 Foundational Principles Implementation and Mapping of Fair Information Practices," stands as a comprehensive framework advocating a proactive and integrated approach to safeguarding data within system architectures. This conceptual framework fundamentally revolves around fostering a culture of privacy preservation right from the inception of system design and operational processes.

Privacy by Design is described in seven fundamental principles that serve as guiding pillars, crafted to integrate privacy considerations into the core of system development. These principles, founded by Cavoukian in 2009, stress their role in creating a user-centric and privacy-oriented approach to data management. More explicitly these principles are described in the Table 1 below.

Principle	**Description**
Proactive not Reactive	Anticipates and prevents privacy invasive events before they happen, aiming to prevent privacy risks from materializing rather than offering remedies.
Privacy as the Default	Personal data are automatically protected in any system or practice, even without explicit user action, ensuring privacy by default.
Privacy Embedded into Design	Privacy is integral to the core functionality of IT systems and business practices, not added as an afterthought, enhancing privacy without diminishing functionality.

Full Functionality	Seeks to accommodate all legitimate interests and objectives in a positive-sum manner, enabling both privacy and other goals without unnecessary trade-offs.
End-to-End Security	Strong security measures ensure privacy throughout the entire lifecycle of data, from collection to destruction, promoting cradle-to-grave data protection.
Visibility and Transparency	Operations remain visible and transparent to users and providers alike, ensuring accountability and trust, subject to independent verification.
Respect for User Privacy	Keeps user interests by offering strong privacy defaults, appropriate notice, and user-friendly options, empowering individuals in data management.

Table 1: Privacy by Design Principles. Source: Cavoukian (2011)

At its core, Privacy by Design supports a proactive attitude, highlighting the need to examine the privacy considerations during the early stages of system development. This proactive approach acts as a preventative safeguard, averting potential privacy risks and eliminating the necessity for reactive measures post-implementation.

Additionally, the principle of Privacy by Default, fundamental to this paradigm, stresses that systems should prioritize strict privacy related regulations without requiring direct user intervention. This essential tendency towards safeguarding user data increases the effectiveness of data protection measures, ensuring a fundamental state of increased privacy within system functionalities.

According to Cavoukian (2009), striking a balance between operational functionality and severe privacy measures is another fundamental principle, emphasizing systems' capacity to provide comprehensive services while continuously prioritizing user privacy. Privacy by Design also advocates end-to-end security, covering secure data transmission, storage, and processing throughout the data lifecycle. This comprehensive security protocol mitigates vulnerabilities, ensuring strong protection of user data at every stage.

Transparency appears as a central principle, standing for visible and direct operations. Users are actively engaged in understanding the collection, utilization, and management of their data within systems, fostering trust and mutual accountability between users and service providers. Cavoukian's description of these principles highlights the foundational pillars shaping a proactive, user-centric, and privacy-oriented approach to data protection within system architectures (Cavoukian, 2009).

In the changing world of digital design, author mentions, making things user-friendly is crucial, and ethical concerns about how users experience things are on the rise. It encourages designers to set higher standards. Currently, the design plays an important role in product’s popularity and usability. Modern time is a call for designers to put users first, using friendly practices and avoiding strategies that might make users wary. Designers, like software engineers before them, have a big impact, so it's important for them to think ethically when designing things.

Sharma, V., et al. (2021) stress that User Interface and User Experience play a crucial role, encompassing guidelines, workflows, color systems, and design processes, with a focus on optimizing the user's application experience through core concepts related to imagination, visualization, and visual design. Authors state that the user interface facilitates interaction between a user and a device by employing techniques or commands for device operation, data input, and content usage. This interaction connects various devices, from computers and mobile devices to application programs.

The UX interface focuses on system usability, user affinity, and the overall value perceived by the user. User Experience is defined by emotions, thoughts, perceptions, and reactions, evaluating the usability of a product or service. It is a concept widely applied in software, hardware, services, products, processes, and societal and cultural contexts.

UI/UX, as per Sharma, V., et al. (2021), serves as the interface allowing individuals to interact with a system or application in computer and communication environments, containing both software and hardware interfaces. Early interfaces, such as Character User Interface (CUI), used characters, while subsequent interfaces adopted graphical user interfaces (GUI) with icons and menus. The industry's rapid growth led to the development of Natural User Interfaces (NUI), incorporating voice, motion, gesture, and biological signal recognition to intelligently understand human intentions. Ongoing research explores UI advancements in various fields, including mobile, hologram, location-based services, augmented reality, game machines, and automobiles.

Oulasvirta, A. et al. (2020) in their work point out that graphical user interfaces (GUIs) are fundamental for human-computer interactions, exploiting human perceptual and motor capabilities. Traditionally, GUI design involves manual specification of decisions by designers, but the authors emphasize the significance of combinatorial optimization as a computational approach for generating and adapting GUIs. They highlight the challenges in aligning the ill-defined nature of the design process with the explicit inputs required by optimization techniques, noting that recent advances have shown promising applications beyond simple button layouts. The authors conclude by discussing the expanding role of combinatorial optimization in human-computer interaction research, outlining challenges, and emphasizing its potential to assist designers in various aspects of GUI design. Also, the article explores the intricacies of GUI design, emphasizing the significance of layout organization and introducing an ILP approach to address optimization challenges. The focus is on achieving aesthetically pleasing and semantically associated layouts, allowing for multiple near-optimal solutions while ensuring efficient computational performance. The use of grids and ILP presents an all-inclusive strategy for addressing various factors influencing GUI design in a flexible and controllable manner.

According to Narayanan, A., et al. (2020), the critical facet of user-friendly design involves including ethical considerations into the design process. Designers must promote values that align with societal importance, emphasizing user autonomy and privacy over practices that may compromise these principles. Prioritizing user-friendly design requires ongoing internal debate, transparent external communication, and accountability to established values. While chasing the enhanced user experiences, it is important to evaluate design decisions not just in terms of immediate gains but also with a focus on their long-term impact on user trust.

In the work of Bösch, C, et al. (2016), it is described that the landscape of digital design is evolving, and users' trust in online platforms is increasingly delicate. The misuse of design power, including the deployment of dark patterns, as was also confirmed by Mathur, A. et al in their papers from 2019 and 2020, has led to heightened paper and potential regulatory actions. This underscores the importance of privacy by design and regulatory compliance to restore and maintain users' trust. User-friendly design principles must align with privacy regulations and ethical standards to create a digital environment where users feel secure and confident in their online interactions. Prioritizing user-friendly, ethical design leads not only to increased user satisfaction but also contributes to a more trustworthy and resilient digital landscape.

According to Hamidli, N. (2023), and P. Kashfi et al. (2019) User Interface (UI) and User Experience (UX) design are crucial in the digital product development, influencing how users engage with them. UI design focuses on the visual elements, similar to painting a canvas, while UX design arranges the entire user journey, the same way as architectural planning. Principles like simplicity and consistency in UI design make sure that navigation is easy, similar to walking through a well-designed garden, while UX principles like usability and accessibility ensure inclusivity and smooth interaction for all users. Typography, color, and imagery act as visual signals, guiding users through the digital landscape. User research and testing serve as ingredients, helping designers adapt experiences to user preferences.

Throughout the design process, from ideation to testing, designers use tools like wireframing and prototyping, shaping their creations into seamless experiences. Staying side by side of emerging trends, like voice interfaces and AI, ensures designs remain relevant and engaging. Ultimately, UI/UX designers aspire to craft digital experiences, where every interaction brings enjoyment and satisfaction.

2.3. Robo-Advisors within Regulatory and Design Frameworks

In examining the regulatory framework of privacy by design and MiFID II, it's crucial to consider the integration of robo-advisory services within this context. Robo-advisors, according to Philipp Maume (2021) are operating as software facilitated by financial intermediaries, leveraging algorithms to provide online investment services, subject to financial markets regulation. Their efficiency and cost-effectiveness offer potential for higher investor returns, yet inherent challenges arise, including standardized interactions between humans and machines, algorithmic lack of clarity, and concerns regarding flawed algorithms and threats to financial stability. Despite these challenges, the robo-advisor market has seen steady growth, nearing 1 trillion USD under management, even as a fraction of the overall financial markets.

Many modern robo-advisors utilize machine learning to improve algorithms, although the role of complex AI remains limited. Within the regulatory landscape, the Markets in Financial Instruments Directive (MiFID II) applies to robo-advisors, authorizing compliance with additional measures for algorithmic trading under Art. 17 MiFID II. Recommendations include the introduction of mandatory third-party audits and streamlined information mechanisms to ensure compliance and mitigate risks. Moreover, concerns regarding robo-advisors' impact on financial stability are regarded as unwarranted, given their low market spread and risk-mitigating strategies such as diversified asset allocation and exceptional rebalancing, thus underscoring the importance of aligning regulatory frameworks with evolving technological trends in financial services. The rise of robo-advisers is encouraging regulators to extend investor protection rules, as outlined in proposed guidelines for MiFID II, as explained by Scholz, P. (2021). These guidelines, published by the European Securities and Markets Authority (ESMA), emphasize that investment firms must continue to act in their clients' best interests, even when using automated tools like robo-advisers. While robo-advisors offer benefits such as consistency and efficiency, concerns about limited access to information and potential technical flaws have emerged.

ESMA's guidelines focus on three areas:

- the information provided to clients;

- the assessment of suitability;
- organizational arrangements for robo-advice.

As per explained in the book, the firms must ensure clear communication about their automated models and provide suitable information systems to gather necessary client data. The guidelines also require the provision of a suitability report before transactions and stricter consideration of clients' risk tolerance. Firms must address inconsistencies in client responses and minimize risk exposure through written policies and procedures. In the European context, the importance of regulations in ensuring a safe, transparent, and competitive financial market cannot be overstated. However, the challenges these regulations create, particularly for innovative fintech firms and robo-advisors, highlight the need for ongoing dialogue between regulators, industry participants, and other stakeholders to ensure that the regulatory environment supports both consumer protection and innovation.

Despite the challenges, caused by regulatory compliance, the benefits of a well-regulated financial ecosystem are undeniable, according to the book written by Scholz, P. (2021). Regulations provide a framework for encouraging innovation while mitigating risks, imposing a delicate balance between promoting market dynamics and ensuring stability. Moreover, by promoting transparency and accountability, regulations strengthen investor confidence and contribute to the long-term sustainability of the financial sector. As such, continued dialogue and collaboration between regulators, industry stakeholders, and policymakers are essential to navigating the evolving regulatory landscape and promoting a resilient and ethical financial ecosystem.

Robo investors, characterized by their automated investment management systems, operate on algorithmic platforms designed to streamline investment processes and recommendations. The onboarding journey within Robo advisors, according to Scholz P. (2021), includes several key stages:

- User profiling forms the foundational step, involving the comprehensive collection of user data, including financial goals, risk tolerance levels, and investment preferences. This data forms the basis for personalized investment recommendations.
- Tailoring investment portfolios based on user profiles makes sure that recommendations align closely with individual financial situations and risk appetites. These recommendations are tailored to meet specific user objectives.
- Identity verification serves as an important step in the onboarding process, encompassing the collection of necessary documents and strict identity authentication protocols to ensure compliance with regulatory standards.
- Continuous monitoring and adaptation of investment strategies remains a distinctive feature. Robo advisors constantly evaluate and adjust investment portfolios in response to changing market conditions and user preferences, ensuring an agile and responsive approach to investment management.

Understanding the operational nuances of Robo investors' onboarding processes, combined with insights into Privacy by Design principles and regulatory landscapes like MiFID II, forms a comprehensive foundation essential for navigating the ensuing discourse on user-centric design, regulatory compliance, and financial technology. (Cavoukian, 2010)

3. Methodology

In the upcoming section, we will develop a detailed case study steps focusing on SEB's Robo Advisor, an AI-supported investment platform, chosen deliberately for its relevance to our research questions and objectives. Utilizing insights from previous chapters and drawing on established methodologies for case study research, we aim to dive into the real-world context of the financial industry, particularly examining the onboarding process of the Robo Advisor.

Through various data collection methods and analysis techniques, we will assess the current design, identify areas for improvement aligned with Compliance by Design principles and regulatory compliance, and develop recommendations aimed at optimizing user experience and onboarding efficiency. The systematic approach outlined ensures a comprehensive examination of the intersection between user-centric design, regulatory frameworks such as MiFID II, and financial technology solutions, ultimately offering actionable recommendations for improvement.

The focus of this study relies on the onboarding process of the SEB Robo Advisor, not the entire app. Therefore, some of the requirements had to be left out of scope. It will be deeply analyzed and explicitly discussed in the subsequent chapter.

3.1. Research questions

The methodology presented outlines a detailed plan for studying SEB's Robo Advisor, specifically focusing on its onboarding process and how it aligns with regulatory requirements and Compliance by Design principles elicited in the upcoming chapters. The research questions set the direction for the study, aiming to assess the current onboarding journey's compliance with Compliance by Design principles and propose improvements aligned with these principles.

The first research question evaluates how well SEB's Robo Advisor's onboarding process incorporates Compliance by Design principles. This includes looking at whether the platform anticipates and prevents privacy risks, embeds privacy protections into its design, and communicates transparently with users about data collection practices and their privacy rights.

The second research question focuses on analyzing the onboarding process and ensuring its alignment with Compliance by Design principles. This involves proposing changes to improve the platform's design, functionality, and security measures, with the aim of enhancing user experience while ensuring compliance with regulations. The effectiveness of these proposed changes will be evaluated by the SEB Compliance and Design teams to see if they address identified issues and agree on the proposals raised to adhere to Compliance by Design principles.

3.2. Case selection

The selection of SEB's Robo Advisor as the case study subject stems from a need to address existing issues in its onboarding process, such as lengthy procedures and potential user frustration. The methodology draws on established research methods and frameworks to ensure a systematic and thorough investigation. Also, it is crucial for an investment app to comply with regulatory requirements. Since our main concern lies within regulatory compliance based on MiFID II regulations as well as GDPR and Privacy by Design principles represented by it as a concept created

and improved by Ann Cavoukian in her numerous publications, SEB Robo Advisor is an amazing research opportunity. The results of this case study will be applicable to other robo investors in the financial field and will bring positive impact on both user protection, and moreover, market expansion.

By using a combination of qualitative data collection methods, including interviews with app stakeholders, regulation and documentation analysis, the study aims to gain a comprehensive understanding of the challenges and opportunities in improving the onboarding process. The findings will be reported systematically, providing actionable recommendations for enhancing the platform's compliance with Compliance by Design principles. This choice is deliberate and grounded in a thorough assessment of various criteria essential for effectively addressing our research questions and objectives.

The decision to employ a case study methodology in our research is strongly influenced by the insights provided by Hatcher et al. (2018, pp. 274-5) and McCombes (2019). They highlight the value of case studies as narratives that are correspondent with the real-world scenarios, offering a practical avenue for applying theoretical concepts. By adopting this method, as advocated by these scholars, we can examine the onboarding process of SEB's Robo Advisor within the financial technology landscape.

This approach allows for an in-depth exploration of various facets such as user experiences, regulatory compliance, and adherence to Privacy by Design principles. Since case studies offer a detailed examination of specific subjects, like the Robo Advisor's onboarding process, we can gain a nuanced understanding of its complexities and challenges. This qualitative method aligns well with the multidisciplinary nature of our research, spanning technological, regulatory, and user-centric domains. In essence, drawing from the perspectives of Hatcher et al. and McCombes, we recognize the case study methodology as essential for comprehensively improving the onboarding experience for SEB's Robo Advisor potential customers.

SEB's Robo Advisor presents a compelling case study due to its real-world context within the financial industry. Situating our investigation within an actual business setting ensures practical relevance and applicability of our findings. By focusing on a platform actively utilized by investors, we can directly assess the impact of any proposed redesign on user experience and regulatory compliance in a tangible and meaningful manner.

One of the primary motivations behind selecting SEB's Robo Advisor is its identified need for improvement, particularly regarding the onboarding process. As outlined in our research objective, the current onboarding journey is inconvenient because of its excessive length, leading to potential user frustration and attrition. This presents a clear opportunity to apply Compliance by Design principles to improve the onboarding process, making it more efficient and user-friendly without failing to follow the regulatory compliance rules.

Additionally, the case of SEB's Robo Advisor offers significant potential for process mining, a critical aspect of this paper’s research methodology. By analyzing the existing onboarding process, some valuable insights may be uncovered into the underlying workflow, decision points, and potential

bottlenecks. This deeper understanding will inform our redesign analytical efforts, enabling us to identify specific areas for optimization and improvement.

Moreover, SEB provides opportunities for in-depth involvement during this research analytical phase, including interviews with relevant stakeholders, such as Design team and Compliance team. This access is crucial for gaining comprehensive insights into the current challenges and opportunities surrounding the onboarding process. By engaging with designers, developers, and compliance representatives, we can gather diverse perspectives and ensure holistic consideration of all relevant factors in our redesign propositions and ensure full user and compliance compatibility.

In executing the case study, various data collection methods will be employed, as above-mentioned guidance from SEB stakeholders, documentation analysis and feedback analysis. The interview questions will focus on understanding their perspectives on the current onboarding process, challenges faced in integrating Compliance by Design principles, and potential areas for improvement. The feedback from SEB Compliance and Design teams will be highlighted in the Evaluation part of this thesis.

The case study will focus on the onboarding process of a robo advisor within investment firms, leveraging the existing design as a baseline for evaluation. Subsequently, an improvements opportunities version will be added as a list of most relevant requirements, aiming to enhance user-friendliness, adhere to privacy by design principles, and ensure compliance with MiFID II regulations. The primary objective is to create a superior version of the robo advisor, optimizing convenience, following the latest relevant regulations, and enhancing overall user experience.

The core part of analysis, aside from the regulations, is the existing version of SEB's Robo Advisor, prototype of which was provided by SEB.

In summary, the research questions and methodology outlined in the text reflect a clear motivation to address identified issues in SEB's Robo Advisor's onboarding process and contribute to the academic understanding of financial technology and regulatory compliance.

3.3. Requirements elicitation

The focus of the analysis is centered around evaluating the effectiveness of the existing SEB Robo Advisor design, identifying areas for improvement based on both literature review findings, comprehensive compliance evaluation and SEB stakeholders' feedback, and assessing the extent to which the proposed enhancements align with privacy by design principles and comply with MiFID II regulations. Additionally, the analysis delves into the impact of these improvements on user experience, particularly in terms of convenience, efficiency of the onboarding process, and overall satisfaction, this is why UX design principles were also added to the evaluation scope.

Data analysis involves thematic analysis of observations and regulatory documentation to identify patterns and insights relevant to our research questions. Triangulation will be utilized to ensure the reliability and validity of findings, with data related to the compliance perspective of the investments onboarding process steps in a form of documentation analysis, observations from the UX perspective, and documentation cross-referenced to corroborate key insights from Ann Cavoukian's multiple

publications. Each finding will be substantiated by multiple sources to enhance credibility, with particular emphasis on findings supported by multiple sources for increased validity.

The findings from the case study will be reported systematically, providing a comprehensive analysis of the alignment between SEB's Robo Advisor and Compliance by Design principles. The report will highlight areas of compatibility and divergence, along with actionable recommendations for optimizing the onboarding journey. For the better understanding of the redesign requirements, collected by the regulatory study, several main articles from the MiFID II regulations were summarized in terms of the client perspective to the onboarding process. Important to mention, that only the onboarding related requirements were analyzed, leaving the overall regulatory requirements to the investments firm's backend regulations out of scope for this analysis. These articles are only important for investment companies when bringing in new customers under MiFID II regulations:

- Article 16: Focuses on what investment firms need to do to stay organized, for instance having policies and procedures to follow rules and manage conflicts of interest. This is crucial when they are getting new clients onboarded.
- Article 24: Focuses on making sure investment firms always act in their clients' best interests. They have to give clients clear and fair information, which is really important when they're starting with a new client.
- Article 25: Explains how investment firms have to gather information about their clients' knowledge, experience, money situation, and goals. They need all this to make sure the advice or services they offer are right for the client.
- Article 27: Says that investment firms have to try their best to get the best possible results for their clients when they're making trades. This is something they need to explain to new clients when they're just starting out.
- Article 28: Tells investment firms how they should handle their clients' orders. They have to do it quickly, fairly, and openly, especially when they're just starting to work with a new client.

These articles cover a lot of things needed for the onboarding process, from figuring out if the services are right for the client to making sure everything is done properly when trading. Insights gained from interviews, observations, and documentation analysis will be synthesized to offer a better understanding of the challenges and opportunities in integrating Privacy by Design principles into financial technology solutions.

3.4. Analysis

This analytical process focuses on improving the user experience and ensuring compliance with regulations by aligning the elicited requirements from the SEB Robo Advisor's current version. We begin by thoroughly evaluating the existing onboarding process, taking into account MiFID II regulations, Privacy by Design principles, and UX design principles. This evaluation serves as the foundation for our further analysis. Our redesign process follows an iterative approach, allowing us to refine our design decisions based on close collaboration with SEB Compliance and Design teams and compliance testing outcomes.

For this redesign opportunities initiative, it is important to clarify certain parameters. Firstly, the analysis will rely on qualitative methods. Not all MiFID regulations are relevant to the onboarding

processes for the robo advisors, therefore only those mentioned in section 3.3 will be considered. Secondly, not all pages from the existing Robo Advisor were utilized, as some are repetitive in terms of our elicited set of requirements and therefore not relevant, and some of them are not a part of the onboarding process. For each of the elicited requirements, we will select one or two pages where applicable that aligns perfectly with the requirement for later analysis. A list of 120 screenshots for analysis will be provided by SEB. It will include the entire Robo Advisor interface and will require careful analysis and selection in order to establish a comprehensive scope for outlining the examples for possible improvement strategies.

Our objective in giving improvement recommendations for redesigning the SEB Robo Advisor is twofold: improving user experience and ensuring regulatory compliance. We commence this process by conducting a thorough evaluation of the current onboarding process. This evaluation, based on qualitative methods, includes stakeholders feedback, usability tests, and relevant regulatory standards analysis. It serves as the foundation for our analysis efforts. Each requirement undergoes analysis to determine its compliance status within the current version of the SEB Robo Advisor. This analysis identifies areas of compliance, potential improvements, and instances of non-compliance, guiding our improvement strategy.

In addition to improving user experience, we emphasize integrating Privacy by Design principles into the improvement opportunities. This involves mechanisms for obtaining explicit user consent, ensuring transparency in data collection practices, and strengthening security measures to protect user data. Our focus on privacy underscores our commitment to safeguarding user information and complying with regulations. Given that the scope of this thesis includes only analysis of the SEB Robo Advisor, which is a part of SEB main banking app, it may appear that some of the privacy related requirements were inherited naturally. It will be explored in the Results section after the main analysis.

Throughout this process, we maintain comprehensive documentation of our redesign efforts, including design principles, implementation specifics, and compliance considerations. This documentation serves as a reference for future iterations and ensures transparency in our methodology.

In summary, our systematic approach to redesigning the SEB Robo Advisor's onboarding process aims to create a platform that prioritizes user experience, respects user privacy, and complies with regulations. Leveraging the screenshots from the Robo Advisor provided by the SEB team ensures alignment with current functionalities and design elements, enabling iterative refinement while maintaining transparency and regulatory adherence.

3.5. Evaluation

During the evaluation phase, we establish a baseline by thoroughly analyzing the current design of SEB's Robo Advisor's onboarding process. This includes analyzing stakeholder feedback and relevant regulatory standards, including MiFID II regulations and Privacy by Design principles, in addition to UX design principles. This comprehensive evaluation serves as the foundation for our subsequent analysis.

Furthermore, compliance evaluation tests are carried out to verify that the proposed improvements align with regulatory requirements, particularly those outlined in MiFID II. The comparison between the existing Robo Advisor onboarding version and the improvement opportunities which we will develop involves analyzing metrics such as potential improvements in user experience, alignment with regulatory standards, and any identified risks or challenges. By comparing these metrics between the current state and proposed improvements, we discover the potential benefits of implementing the proposed improvements.

Since Privacy by Design principles are mostly related to the backend side of the SEB Robo Advisor, they will be evaluated as inherited traits from the main SEB banking app. With the baseline set, we introduce the recommendations for the new design, developed based on user-centric principles, regulatory compliance, and best practices in user experience design. The new design integrates enhancements aimed at rectifying the shortcomings identified in the previous design, such as streamlining the onboarding process, enhancing transparency, and security measures.

After the compliance, privacy, and design analysis is completed, with a basic understanding of the existing onboarding process and its associated requirements, we proceed to introduce proposals for improvement opportunities. These proposals will be later evaluated based on close collaboration with SEB Compliance, Product and Design teams, taking into account insights gained from qualitative methods. Our aim is to address the identified shortcomings in the previous design, focusing on improving user experience and ensuring regulatory compliance.

We will organize a meeting with SEB team in Microsoft Teams (two lawyers, one product owner, two business developers for the Robo Advisor solution, and one innovation lead will be attending the meeting) as it is the best option to receive feedback from the diversity of bank's representatives from different offices and countries. This meeting will be recorded in order to better analyze the outcome in the upcoming sections. As MiFID II regulatory framework is the biggest scope of analysis, given its multiple lists of regulations and extra effort needed to identify and outline all possible issues, it was decided that the scope of evaluation from the SEB Compliance and Design teams will be based on the MiFID II regulations which have corresponding to them Privacy by Design principles, and also the UX principles. This way, it is possible to identify the main threads which are common for all three scopes of evaluation and ensure the most efficient results.

SEB Compliance and Design teams will be shown the examples of compliant, compliant with opportunity to improve, and non-compliant screenshots (if any are found) of the Robo Advisor. They will also be given the example of what a fully compliant screenshot looks like, where the improvement strategy can be implemented, where the MiFID II is affected only or vice versa, where the concern lies within privacy related regulations. After the feedback is received, we will evaluate the overall progress.

Overall, the evaluation phase encompasses a comprehensive assessment of both the previous and new designs, enabling us to measure the effectiveness of the redesign and identify areas for further refinement. This methodological framework ensures a systematic approach to investigating the research questions, drawing on diverse data sources and analysis techniques to yield meaningful insights for improving the user experience and regulatory compliance of SEB's Robo Advisor.

4. Results

4.1. Regulatory Framework and Compliance review

This chapter contains the compliance evaluation of SEB's Robo Advisor according to the MiFID II regulations based on the processes client goes through during their onboarding process, the relevant chapters of MiFID II regulations were described and discussed in the Methodology chapter. Regulatory Framework and Compliance Review chapter focuses on SEB's Robo Advisor compliance with these regulations, such as gathering sufficient client information and providing clear explanations, receiving client consent for proceeding with the onboarding, etc. We aim to identify any areas where the Robo Advisor could improve its compliance with MiFID II regulations. This research is essential for understanding the platform's alignment with regulatory standards, benefiting both users and the future studies of the financial sector's future in AI. Later on, the Privacy by Design and UX design principles will be analyzed in the same context.

Based on the regulations from the onboarding related articles of MiFID II, the following requirements for the Robo Advisor's improvements were collected, as per shown in Table 2. To assess whether the onboarding process which is developed at the moment complies with the specified regulatory requirements, each requirement was systematically matched to the relevant parts of the process as outlined in the prototype. The Images to which the requirements refer to can be found in the Appendices part.

The compliance evaluation described in Table 2 results from the related to the research sections, which are: MiFID II regulations, Privacy by Design principles, and UX design principles, are marked with the following criteria:

- *Complies* – an example of the fully compliant requirement, which meets the MiFID II regulatory requirements;
- *Complies, can be improved* – an example of the compliant with MiFID II requirement, which, however, can be improved in a way to make it more user and regulatory friendly;
- *Probably complies* – an example of the requirement which is not explicitly related to the Robo Advisory onboarding process, however is inherited from the overall SEB app privacy settings or regulatory framework.

Issue No	Article (Regulation) Summary	Requirements for Redesign	Evaluation Result	Image No
ART16-2	Article 16 (2) - Obtain explicit consent before collecting client data.	Implement mechanisms for obtaining explicit consent from clients prior to collecting any personal data.	Complies	Image 1, Image 7
ART16-3	Article 16 (3) - Maintenance of accurate and up-to-date records of client information.	Establish systems for maintaining accurate and up-to-date records of client information.	Complies, can be improved	Image 2

ART16-7	Article 16 (7) - Provision of transparency to clients regarding data collection and usage.	Develop clear and transparent communication channels to inform clients about data collection practices and usage.	Complies	Image 3, Image 7
ART16-8	Article 16 (8) - Inform clients about their rights regarding personal data, including access and rectification.	Provide clients with information about their rights to access, amend, or delete their personal data held by the firm.	Probably complies	Not applicable
ART16-9	Article 16 (9) - Obtain client consent before sharing data with third parties.	Implement procedures to obtain explicit consent from clients before sharing their data with any third parties.	Complies, can be improved	Image 1, Image 7
ART24-2	Article 24 (2) - Designing financial instruments to meet the needs of identified target markets and ensuring suitability for clients.	Ensure financial instruments are designed to meet the needs of identified target markets and are suitable for clients.	Complies	Image 4
ART24-4	Article 24 (4) - Providing clear, fair, and non-misleading information to clients, including details about services and costs.	Offer clear, comprehensive information to clients about services, financial instruments, and associated costs.	Complies, can be improved	Image 3
ART24-5	Article 24 (5) - Ensuring information provided to clients is comprehensible and allows for informed investment decisions.	Provide information in a clear and understandable format to enable clients to make informed investment decisions.	Complies	Image 3
ART24-7	Article 24 (7) - Assessing a sufficient range of financial instruments available on the market and avoiding conflicts of interest.	Conduct thorough assessments of available financial instruments and avoid conflicts of interest when offering advice.	Complies, can be improved	Image 2, Image 3
ART24-9	Article 24 (9) - Disclosing any fees, commissions, or benefits received from third parties to the client, ensuring transparency.	Clearly disclose any fees, commissions, or benefits received from third parties to clients before providing services.	Complies, can be improved	Image 3
ART25-2	Article 25 (2) - Obtaining necessary information about client's knowledge, experience, financial situation, and investment objectives.	Gather information about client's financial knowledge, experience, risk tolerance, and investment objectives for suitability assessment.	Complies	Image 1, Image 3
ART25-3	Article 25 (3) - Asking clients for information regarding their knowledge and experience to assess	Request information from clients to determine if recommended	Complies	Image 4

	appropriateness of services/products.	services/products are appropriate.		
ART25-6	Article 25 (6) - Providing clients with adequate reports on services provided, including costs associated with transactions and services.	Provide clients with comprehensive reports on services provided, including associated costs.	Complies, can be improved	Not applicable
ART25-8	Article 25 (8) - Empowering the Commission to adopt delegated acts ensuring compliance with the principles of suitability assessment.	Follow guidelines and criteria specified by the Commission for assessing suitability of services and financial instruments.	Complies	Image 4
ART25-10	Article 25 (10) - ESMA to develop guidelines for assessing financial instruments with complex structures or risks.	Comply with guidelines issued by ESMA for assessing complex financial instruments and their associated risks.	Complies, can be improved	Image 1
ART27-1	Article 27 (1) - Requirement for investment firms to take sufficient steps to obtain the best possible result when executing client orders.	Design execution processes to ensure the best possible result for clients.	Complies	Image 3, Image 5
ART27-4	Article 27 (4) - Requirement for investment firms to establish and implement an order execution policy.	Design and implement an order execution policy outlining procedures for executing client orders.	Complies	Image 5
ART27-5	Article 27 (5) - Requirement for investment firms to provide appropriate information to clients on their order execution policy.	Design client communication materials explaining the order execution policy in a clear and understandable manner.	Complies	Image 1
ART27-7	Article 27 (7) - Requirement for investment firms to monitor the effectiveness of their order execution arrangements and execution policy.	Design monitoring processes to regularly assess the effectiveness of order execution arrangements and policies.	Probably Complies	Not applicable
ART27-8	Article 27 (8) - Requirement for investment firms to be able to demonstrate to clients and competent authorities that they have executed orders in accordance with their execution policy.	Design systems for documenting and demonstrating compliance with the execution policy to both clients and competent authorities.	Probably Complies	Not applicable
ART28-1	Article 28 (1) - Requirement for investment firms to implement procedures and arrangements ensuring the	Design and implement procedures and arrangements for the prompt and fair execution of client orders,	Complies	Image 4

	prompt, fair, and expeditious execution of client orders.	prioritizing fairness and efficiency.		
ART28-2	Article 28 (2) - Requirement for investment firms to take measures to facilitate the earliest possible execution of client limit orders if not immediately executed under prevailing market conditions.	Design processes for the immediate and accessible publication of client limit orders to facilitate their earliest possible execution, unless otherwise instructed by the client.	Complies	Not applicable

Table 2: MiFID II: SEB's Robo Advisor's Compliance with the Requirements. Source: MiFID II Regulations, own study.

Since the scope of this thesis relies only on the onboarding process of the Robo Advisor and does not include overall SEB banking application, as was mentioned in the methodology chapter previously, the evaluation result regarding the backend related requirements relies on the feedback of SEB stakeholders and regulatory requirements for bank services operations. The confirmation about "Probably Compliant" requirements will come from the meeting with SEB stakeholders in the upcoming section.

As was mentioned in the Methodology chapter, a set consisting of 120 screenshots from the current SEB Robo Advisor was examined according to compliance with MiFID II regulations, Privacy by Design and UX design principles. It was concluded that some of the screenshots are not relevant as they are repetitive, and some are representing the same type of compliant, compliant with an opportunity to improve, or probably compliant. Moreover, not all the screenshots were related to the onboarding process, and since only the onboarding improvement was a scope for this research, those screenshots appeared as not relevant. Out of those 120 screenshots, I looked at 7 examples that are representative for all the relevant screenshots and are related solely to the onboarding process. Those 7 screenshots are representing the scope of evaluation in the best way and include main details for analysis and further references.

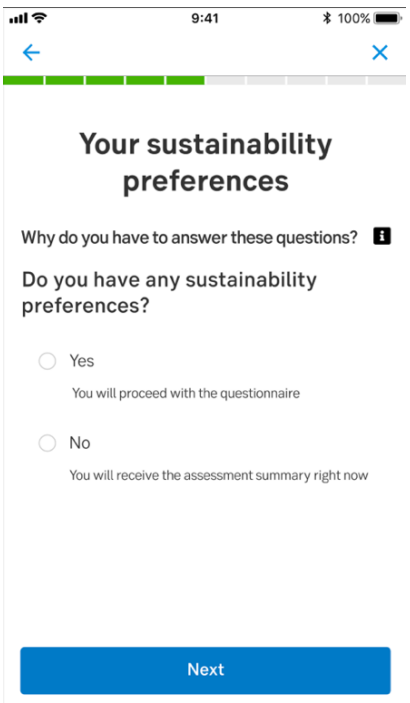

Figure 1: Example of the repetitive and irrelevant screenshot. Source: SEB Robo Advisor.

For example, the type of Figure 1 was decided to be left out of scope, since it shows the same MiFID II and Privacy by Design compliance evaluation scope and does not bring extra value to the analytical process. The steps taken to ensure the most value for the customer, as, for example, in Article 27 (1) of MiFID II regulations, include educational background, investment experience, sustainability preferences, risk preferences, investments objectives, finances of the individual, etc. Therefore, it was concluded that only the examples of more suitable screenshots from the SEB Robo Advisor will be used for representation purposes; in case of Article 27 (1), Image 3 and Image 5 from Figure 2 represent an example of a fully compliant with the MiFID II regulations requirement.

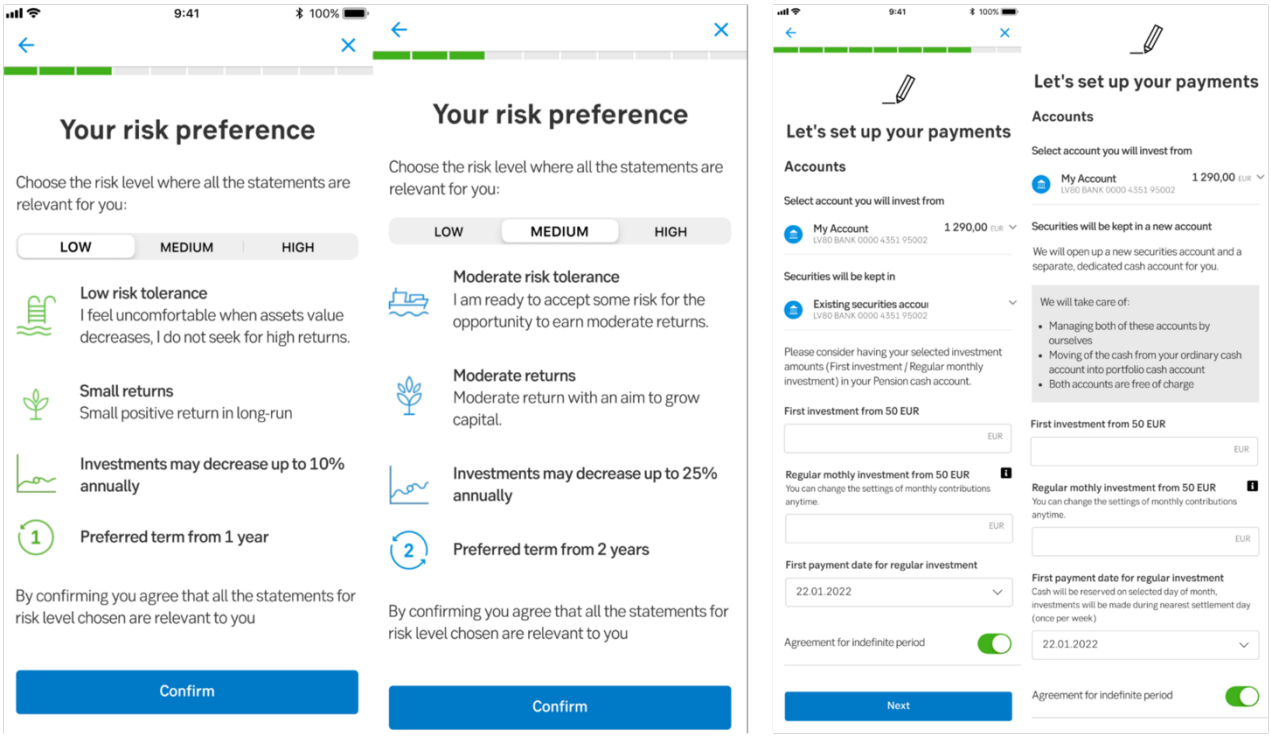

Figure 2. From left to right: Image 3 “Risk Preference”, Image 5 “Setting up Payments”. Source: SEB Robo Advisor.

At the same time, Image 3 from Figure 2 is not perfectly compliant with the Article 24 (9) of MiFID II regulations regarding disclosing any fees, commissions, or benefits received from third parties to the client, ensuring transparency. The client is only informed about the possible decrease in the investments, while it may not seem fully transparent. However, it is also not possible to state that this part is non-compliant, since it follows the general regulatory guidelines. Clearly, there shall be option for further improvement of the Robo Advisor, in order to ensure best possible experience for clients and increase their trust in the product.

The Table 3 below outlines the seven foundational principles of Privacy by Design along with their descriptions and the corresponding requirements for redesigning a system, specifically a Robo Advisor, to adhere to these principles. Each principle emphasizes proactive measures, embedding privacy into the design, ensuring full functionality while maintaining privacy, implementing end-to-end security, ensuring visibility and transparency, and respecting user privacy rights. The requirements for redesign provide actionable steps to integrate these principles into the design and architecture of the Robo Advisor platform, prioritizing user privacy and data protection:

Issue No	Privacy by Design Principle	Interface Requirements	Evaluation Result	Image No
PRIV-1	Proactive not Reactive	Interface should incorporate predictive features that anticipate potential privacy risks and provide proactive measures to prevent them.	Probably Complies	Not applicable
PRIV-2		Implement real-time privacy monitoring and alerts within the interface to notify users of potential privacy threats before they occur.	Probably Complies	Not applicable
PRIV-3	Privacy as the Default	Design the interface with built-in privacy settings that automatically protect user data without requiring manual configuration.	Probably Complies	Not applicable
PRIV-4		Ensure that privacy-enhancing features are enabled by default and prominently displayed within the interface.	Probably Complies	Not applicable
PRIV-5	Privacy Embedded into Design	Integrate privacy controls seamlessly into the user interface, making them an integral part of the user experience.	Complies, can be improved	Image 1, Image 6
PRIV-6		Incorporate privacy features directly into UI components, such as data input forms and user profiles, rather than treating them as separate entities.	Complies, can be improved	Image 1
PRIV-7	Full Functionality	Design the interface to balance privacy protection with the ability to fulfill all user needs and objectives effectively.	Probably Complies	Not applicable
PRIV-8		Avoid sacrificing functionality for the sake of privacy, ensuring that users can achieve their goals without unnecessary trade-offs.	Probably Complies	Not applicable
PRIV-9	End-to-End Security	Implement visible security indicators and controls throughout the interface to reassure users about the protection of their data.	Probably Complies	Not applicable
PRIV-10		Provide clear information about the security measures in place, such as encryption protocols and data handling practices, within the interface.	Probably Complies	Image 1, Image 6, Image 7
PRIV-11	Visibility and Transparency	Ensure that all privacy-related operations and data processing activities are transparently communicated to users through the interface.	Complies, can be improved	Image 1, Image 7
PRIV-12		Provide accessible privacy policies, terms of service, and data handling practices within the interface, allowing users to review and understand them easily.	Complies	Image 1, Image 6, Image 7

PRIV-13	Respect for User Privacy	Design the interface with user-friendly privacy settings and options that empower individuals to control their personal data effectively.	Complies	Image 1
PRIV-14		Offer clear and concise privacy notices and notifications within the interface, providing users with transparent information about data collection and usage practices.	Complies, can be improved	Image 1, Image 6, Image 7

Table 3: Privacy by Design Principles: SEB's Robo Advisor's Compliance with the Requirements. Source: Cavoukian (2011), own study.

Most of the Privacy by Design requirements are related, as was stated previously, to the back stage of the service. It means, that while bank is compliant with such regulations, it cannot be visually proven by the SEB Robo Advisor user interface. However, for example, the requirement PRIV-10, as represented by the Images 1, 6, 7 from Figure 3, is probably compliant with the requirement, since there exists an option for the client to retrieve explicit information about encryption protocols and data handling practices.

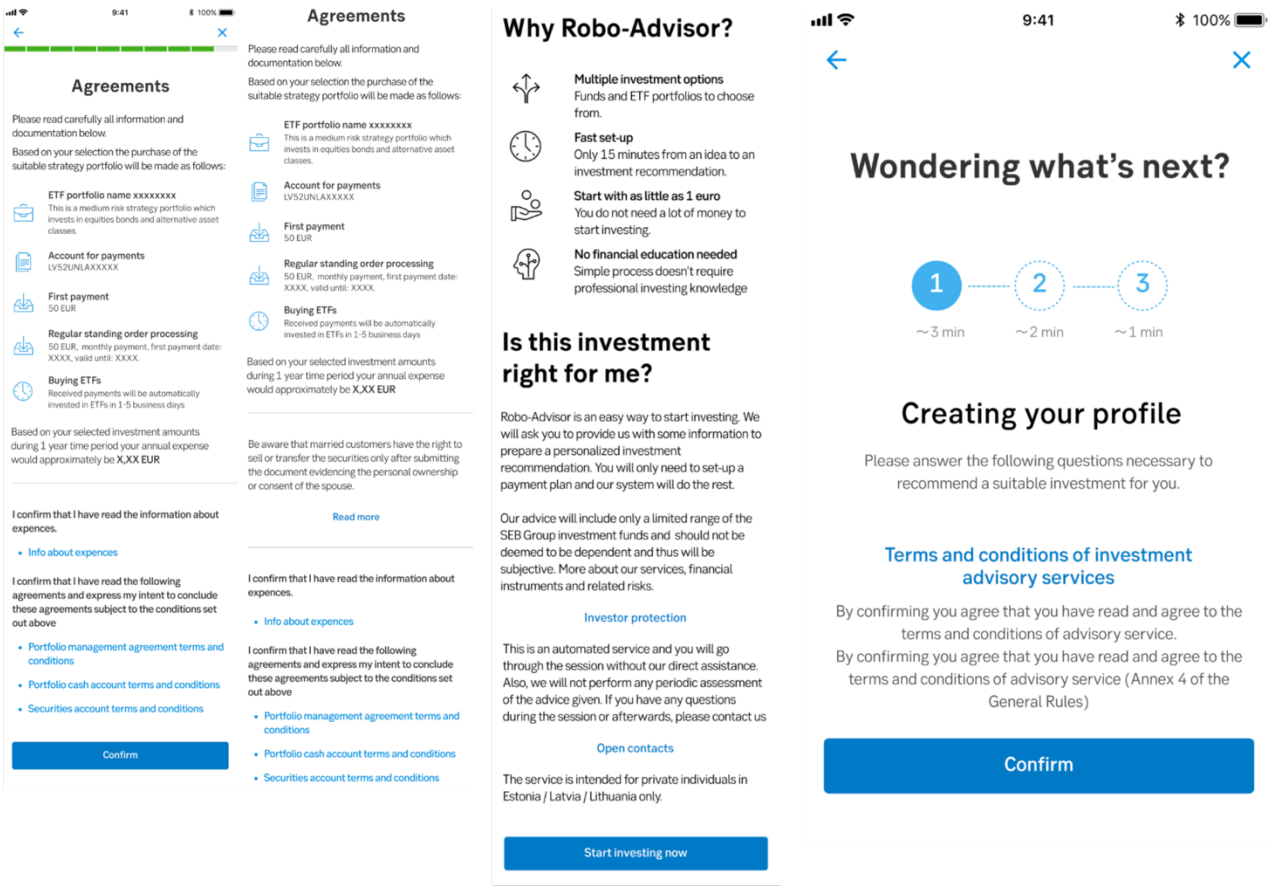

Figure 3. From left to right: Image 7 "Agreements", Image 6 "Why Robo Advisor", Image 1 "Creating Profile". Source: SEB Robo Advisor.

As in this thesis we only focus on the Robo Advisor, the SEB bank app is not evaluated. However, it is reasonable to assume that the mobile app, being a part of a banking service, already includes privacy settings as a standard feature. These privacy settings are likely designed to comply with regulations such as those mandated by the EU, ensuring that user data is protected, and privacy preferences are

respected. Given that the Robo Advisor is integrated into the existing mobile app, it would inherit these privacy settings by default. This means that the same privacy controls and mechanisms implemented for the app as a whole would also apply to the Robo Advisor as a part of the entire app interface. For example, users may have the option to manage their data sharing preferences, control access permissions, and configure privacy settings within the app settings menu. These settings would extend to all functionalities of the app, including the Robo Advisor.

The UX principles from Table 4, outlined in the recent publication of B. Paneru, et al. (2024), are focusing on the relevant requirements from the UX app interface for seamless user experience. The evaluation results indicate whether the current interface complies with each UX principle and highlight areas that could be enhanced for better user experience. The principles cover various aspects such as accessibility, user-friendliness, responsiveness, information organization, feedback mechanisms, interactivity, performance, consistency, branding, security, privacy, adaptability, and personalization. From the Image 1 and Image 6 from Figure 3, we can see that, for example, requirement related to the issue UX-9 is compliant. However, since the link to the privacy related agreement lies outside of the onboarding process and leads to the main banking site, it cannot be confirmed just by looking at Robo Advisor's interface.

Issue No	**Principle**	**Interface Requirements**	**Evaluation Result**	**Image No**
UX-1	Availability	Ensure accessibility for users with diverse abilities and disabilities.	Complies, can be improved	All images
UX-2	UX-focused design	Prioritize user-friendliness and intuitive interface design.	Complies	All images
UX-3	Designing with responsiveness	Ensure smooth adaptation to various screen sizes and devices.	Complies	All Images
UX-4	Information Architecture	Organize information to support effective navigation and content discovery.	Complies	All Images
UX-5	Feedback Mechanisms	Provide timely and meaningful feedback to users on their interactions and progress.	Complies	All Images
UX-6	Interactivity and Engagement	Foster learner engagement through interactive elements and immersive experiences.	Complies	All Images
UX-7	Performance and Speed	Optimize performance to prevent user frustration.	Complies	All images
UX-8	Consistency and Branding	Maintain visual and functional consistency for user familiarity.	Complies	All images
UX-9	Security and Privacy	Safeguard user data and privacy.	Probably complies	Image 1, Image 6
UX-10	Adaptability and Personalization	Allow adaptability to different learning styles through personalized experiences.	Complies	All images

Table 4: UX Principles. Source: B. Paneru, et al. (2024), own study.

In this chapter, we evaluated the compliance of SEB's Robo Advisor with relevant MiFID II regulations, UX Design principles and Privacy by Design principles. Our analysis revealed a mixed picture regarding compliance with regulatory requirements. While the Robo Advisor largely complies with certain aspects of MiFID II, such as obtaining explicit consent, maintaining accurate records, and providing transparent information to clients, it falls short in other areas, particularly in maintaining accurate client records, fee disclosure, and providing comprehensive reports on services. This assessment underscores the importance of addressing these non-compliant points to ensure that the onboarding process of SEB's Robo Advisor aligns with regulatory standards and privacy principles.

In the next chapter, we will propose improvements to the SEB Robo Advisor, focusing on improving these partly compliant areas while enhancing overall compliance with MiFID II regulations, UX design and Privacy by Design principles. These enhancements are important for fostering trust among users, safeguarding their privacy, and promoting transparency and accountability within the financial technology sector.

4.2. Improvement Opportunities

This chapter revolves around refining the SEB's Robo Advisor by addressing regulatory compliance requirements highlighted in the preceding chapter. It also aims to optimize elements of the Robo Advisor that, while generally compliant, could be further improved for better performance. By pinpointing areas of partial compliance and opportunities for enhancement, this chapter attempts to strengthen the functionality, transparency, and security of the Robo Advisor while ensuring alignment with regulatory guidelines.

Table 5 presents the compliance assessment of the SEB Robo Advisor with MiFID II regulations, along with proposed improvement strategies. It identifies specific requirements for redesign and outlines the corresponding improvement strategies to address them effectively.

Open Issue No	Requirements for Redesign	Improvement Strategy
ART16-3	Establish systems for maintaining accurate and up-to-date records of client information.	Implement periodic reminders for clients to update their information – client must be informed of this requirement beforehand.
ART16-9	Implement procedures to obtain explicit consent from clients before sharing their data with any third parties.	Clearly state if data will be shared, with whom, and require explicit consent for this.
ART24-4	Offer clear, comprehensive information to clients about services, financial instruments, and associated costs.	Provide more detailed breakdowns of costs and potential returns under various scenarios. It can include adding average returns based on data from previous time periods.
ART24-7	Conduct thorough assessments of available financial instruments and avoid conflicts of interest when offering advice.	Disclose why only SEB Group funds are offered and whether this limits investment options.
ART24-9	Clearly disclose any fees, commissions, or benefits received from third parties to clients before providing services.	Provide a detailed disclosure of all potential fees and commissions before service agreement.
ART25-6	Provide clients with comprehensive reports on services provided, including associated costs.	Implement a feature for clients to access ongoing reports through their account.
ART25-10	Comply with guidelines issued by ESMA for assessing complex financial instruments and their associated risks.	Enhance the transparency of how these assessments are conducted.
ART27-7	Design monitoring processes to regularly assess the effectiveness of order execution arrangements and policies.	Set up an independent review process to assess execution effectiveness periodically.
ART27-8	Design systems for documenting and demonstrating compliance with the execution policy to both clients and competent authorities.	Implement a more detailed documentation system accessible to clients and authorities.

ART28-2	Design processes for the immediate and accessible publication of client limit orders to facilitate their earliest possible execution, unless otherwise instructed by the client.	Implement a real-time update feature on client dashboards for tracking limits on orders.

Table 5: SEB's Robo Advisor's Compliance with the Requirements; Improvement Strategies. Source: MiFID II, own study.

Table 6 presents the implementation strategy for incorporating Privacy by Design principles into the SEB's Robo Advisor. While the current version of the Robo Advisor is largely compliant with MiFID II regulations, there are some possible issues with privacy protections outlined by Privacy by Design principles. As a result, a comprehensive list of changes is proposed to improve the privacy measures and better protect clients' data. These proposed changes aim to elevate the SEB's Robo Advisor by aligning it with Privacy by Design principles, thereby concluding the recommendations for better client data protection and privacy.

Issue No	Requirements for Redesign	Improvement Strategy
PRIV-5	Integrate privacy controls seamlessly into the user interface, making them an integral part of the user experience.	While privacy controls seem to be part of the design, they could be better integrated into the user interface components, making them more intuitive and less segregated from the primary user interactions in the main app.
PRIV-6	Incorporate privacy features directly into UI components, such as data input forms and user profiles, rather than treating them as separate entities.	
PRIV-11	Ensure that all privacy-related operations and data processing activities are transparently communicated to users through the interface.	The Robo Advisor includes visible security measures and provides information about data protection practices, which are well-integrated into the interface. However, improvements can be made in making all operations more transparent, especially regarding real-time processes.
PRIV-14	Offer clear and concise privacy notices and notifications within the interface, providing users with transparent information about data collection and usage practices.	There is some level of user control over privacy settings, and there are privacy notices, but these could be more detailed and visible to enhance user empowerment and understanding. Some of the control has to be mentioned in the Robo Advisor itself to ensure that clients are aware of their privacy measures.

Table 6: Privacy by Design Improvements: Implementation Strategy. Source: Cavoukian (2011), own study.

User experience design plays a crucial role in the success of digital platforms all around the financial technology industry. Strategies for improving UX design within the Robo Advisor are outlined to prioritize accessibility and user-friendliness, which, as a result, will bring in more customers from different user segments. The proposed improvement aims to create a seamless and inclusive digital environment, enhancing user satisfaction and engagement.

As issues with banking services often appear in the society with a diverse abilities, improving the accessibility within the design of the onboarding process with help to expand the business and attract more customers, as proposed in the Table 7.

Open Issue No	Requirements for Redesign	Improvement Strategy
UX-1	Ensure accessibility for users with diverse abilities and disabilities.	Integrate more accessibility features such as screen readers, high contrast modes, and keyboard navigation options for users with diverse abilities.

Table 7: UX Design Improvements: Implementation Strategy. Source: B. Paneru, et al. (2024), own study.

This chapter outlines the significance of improving the existing version of the SEB's Robo Advisor onboarding process in order to meet regulatory standards and user expectations. The proposed improvement strategies aim to optimize aspects of the Robo Advisor that are typically compliant but could be refined for better performance. Through addressing both partly compliant issues and areas with potential for improvement for other aspects of our analysis, this chapter aims to increase the overall quality, transparency, and security of the SEB Robo Advisor, ultimately enhancing the user experience and ensuring adherence to regulatory norms.

5. Evaluation

In this section, we focus on the evaluation phase of our thesis, which is based on the careful analysis of requirements derived from UX design principles, Privacy by Design principles, and MiFID II regulations. These requirements were carefully selected from the previous chapter, focusing specifically on areas that can be improved within the onboarding process of SEB's Robo Advisor.

The evaluation process begins by examining the correspondence between MiFID II regulations and Privacy by Design principles. In Table 8, we analyze each requirement, identifying whether the MiFID II regulations, since they are the biggest scope for this analysis, correlate with some of the Privacy by Design principles. Through this analysis, we aim to uncover synergies and discrepancies between these regulatory and privacy frameworks, focusing on the areas where regulatory standards intersect with principles of privacy.

Requirements	MiFID II Regulations	Privacy by Design Principles	Images
Explicit consent before collecting client data	Article 16 (2)	Proactive not Reactive	Image 1 / Not applicable
			Probably Compliant
Maintenance of accurate and up-to-date records of client information	Article 16 (3)	Privacy Embedded into Design	Image 1 / Image 1 & Image 6
			Can be improved
Provision of transparency to clients regarding data collection and usage	Article 16 (7)	Visibility and Transparency	Image 3 / Image 1 & Image 6
			Compliant
Informing clients about their rights regarding personal data, including access and rectification	Article 16 (8)	Respect for User Privacy	Probably complies
Obtaining client consent before sharing data with third parties	Article 16 (9)	Respect for User Privacy	Can be improved
Disclosing any fees, commissions, or benefits received from third parties to the client, ensuring transparency	Article 24 (9)	Visibility and Transparency	Image 3 / Image 1 & Image 6
			Can be improved
Requirement for investment firms to take sufficient steps to obtain the best possible result when executing client orders	Article 27 (1)	Proactive not Reactive	Image 3, Image 5
			Complies
Requirement for investment firms to establish and implement an order execution policy	Article 27 (4)	Privacy Embedded into Design	Image 5
			Can be improved
Requirement for investment firms to provide appropriate information to clients on their order execution policy	Article 27 (5)	Visibility and Transparency	Image 1 / Image 1 & Image 6
			Complies
Requirement for investment firms to monitor the effectiveness of their order execution arrangements and execution policy	Article 27 (7)	Visibility and Transparency	Not applicable / Image 1 & Image 6
			Probably Complies

Requirement for investment firms to be able to demonstrate to clients and competent authorities that they have executed orders in accordance with their execution policy	Article 27 (8)	Visibility and Transparency	Not applicable / Image 1 & Image 6
			Probably Complies

Table 8: Correspondence of MiFID II Regulations and Privacy by Design Principles.

In the Table 9, we look at UX design principles together with MiFID II regulations and Privacy by Design principles. The requirements correlated with which section in the analytical scope help to narrow the list of the requirements for changes while gaining the most out of the proposed improvement strategies. This approach helps us to thoroughly check each requirement against these three sets of standards. We aim to find both similarities and differences, which can show us how to improve the Robo Advisor's onboarding process to meet user needs and follow the rules.

This assessment will provide important insights into how we can make the Robo Advisor better match user needs, privacy rules, and legal requirements. Our goal is to improve user trust and satisfaction while making sure we follow the law. While connecting all the requirements in scope, it becomes easier and more convenient to classify them. The classification will ensure that the improvements proposed will be more time and cost efficient, since they will cover many improvement opportunities together.

Requirements	**MiFID II Regulations**	**Privacy by Design Principles**	**UX Design Principles**
Maintenance of accurate and up-to-date records of client information	Article 16 (3) *Can be improved*	Privacy Embedded into Design *Can be improved*	Information Architecture *Complies*
Informing clients about their rights regarding personal data, including access and rectification	Article 16 (8) *Complies*	Respect for User Privacy *Complies*	Feedback Mechanisms *Complies*
Obtaining client consent before sharing data with third parties	Article 16 (9) *Can be improved*	Respect for User Privacy *Complies*	Feedback Mechanisms *Complies*
Requirement for investment firms to take sufficient steps to obtain the best possible result when executing client orders	Article 27 (1) *Complies*	Proactive not Reactive *Complies*	Performance and Speed *Complies*
Requirement for investment firms to establish and implement an order execution policy	Article 27 (4) *Complies*	Privacy Embedded into Design *Can be improved*	Information Architecture *Complies*

Table 9: Correspondence of MiFID II Regulations, Privacy by Design Principles and UX Design Principles.

To collect data from the screenshots, we categorized them into compliant and compliant, but can be improved, based on how well they met the requirements from MiFID II, Privacy by Design, and UX design principles. For example, a fully compliant "*Requirement for investment firms to take sufficient steps to obtain the best possible result when executing client orders*", that can be checked in Figure 2: Image 3 and Image 5 and Figure 4: Image 4, clearly displayed that information provided in the given images proves that the best possible solution will be offered to the client based on the decisions they make during the onboarding process. The app suggests lower risk level investments for the

people who do not have enough experience or knowledge of financial products, and therefore may face a high risk of making the wrong decision. It was presented to SEB lawyers, product owner, business developers and innovation lead as an ideal way to interconnect design, privacy and regulatory requirements.

The requirements like "*Informing clients about their rights regarding personal data, including access and rectification*" (Figure 3: Image 1) was introduced to SEB as probably compliant, since they are representing the inherited traits from the main SEB banking app, while Robo Advisor's onboarding process is a part of it. SEB Compliance team representatives confirmed this statement, therefore the assumptions regarding the inherited traits were confirmed as correct officially.

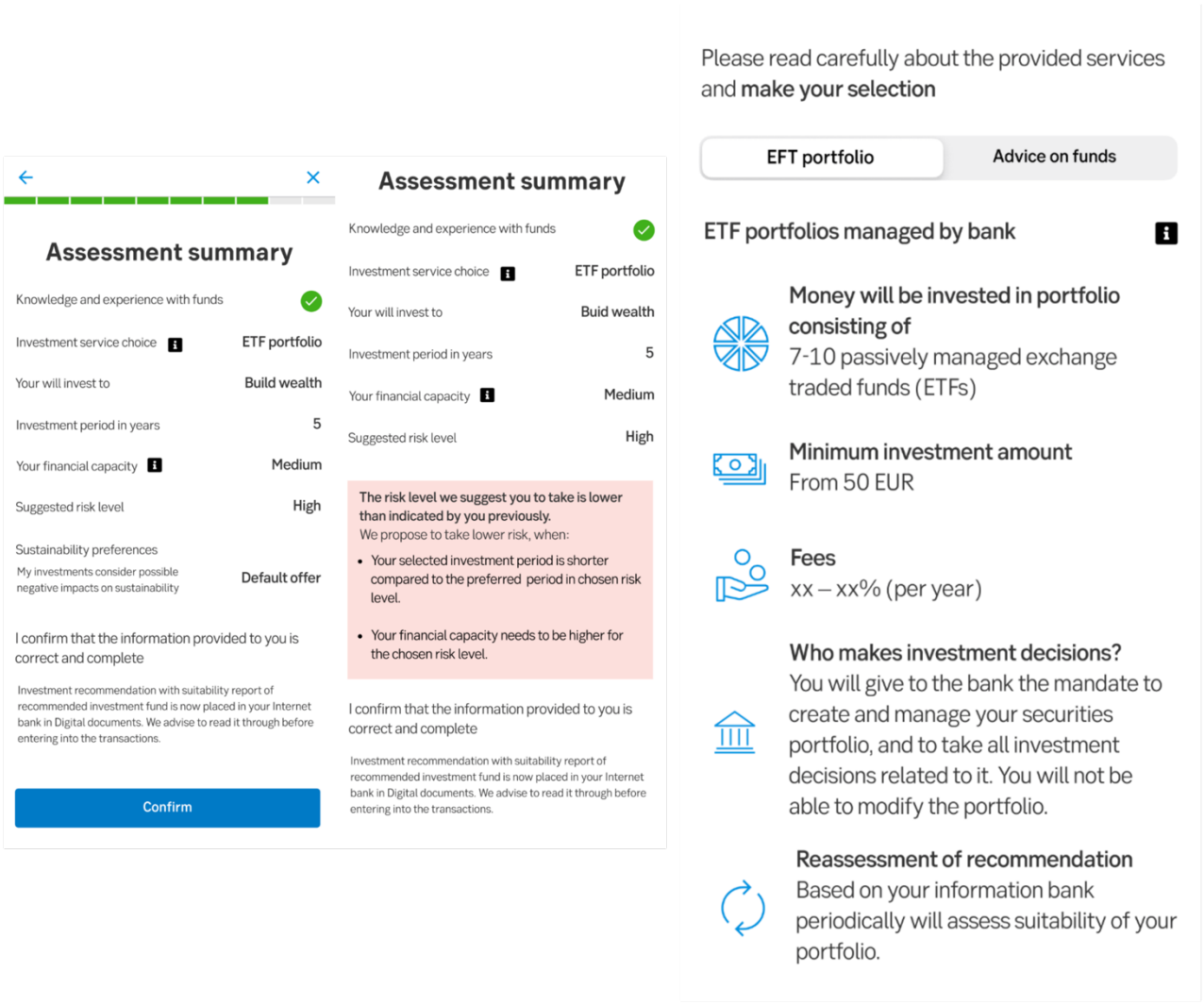

Figure 4. From left to right: Image 4 "Assessment Summary", Image 2 "Service Selection". Source: SEB Robo Advisor.

Additionally, we showcased examples of other requirements that belong to the scope of all three components of this research, which were: regulations, privacy and design, and provided examples where compliance with the requirements from above was only achieved in specific areas. As the main study objective is finding an interconnection between the MiFID II regulatory framework, Privacy by Design Principles, and UX design principles, the best possible solution was to ensure that all three frameworks work together efficiently.

We showed our exploration with the examples where both the MiFID II regulatory compliance and Privacy by Design can be improved in "*Maintenance of accurate and up-to-date records of client information*" requirement, while UX design was fully compliant. In this case, the example from Figure 2: Image 1, Image 6, Image 7, it was proposed to SEB Compliance representatives to ensure that there will be the methods to implement the privacy information updates over some period of time, since some of the required field tend to change over time. This proposal would ensure the compliant and effective execution of the Robo Advisor actions. The lawyer from SEB commented that the privacy related requirements are updated within the SEB system once a year as a part of KYC process, when clients receive an instruction to update their data, therefore there is a possibility to add Robo Advisor's related updates to the scope of the existing data update collection process. Asking privacy related data several times a year for different SEB products was mentioned to be not the most compliant and secure approach during our discussion, therefore combining every compliance related requirement into one data update request is the best possible solution.

Additionally, we outlined the examples where, even though the Privacy by Design and UX principles were perfectly compliant, some regulatory improvements were needed, such as in "*Obtaining client consent before sharing data with third parties*" requirement. In this case, it is visible in the Figure 4: Image 2, and Figure 2: Image 1 and Image 7, that there is no specific concent form implemented for data sharing. The discussion included the doubts from the Compliance team side, stating that most customers will not read the explicit conditions and privacy related statements included in the onboarding process, as potentially it will prolong the experience and may cause user frustration.

From our side, it was still recommended to include such information to the onboarding process as a link to the webpage that fully describes customers rights and conditions regarding their privacy settings or to add a reminder that they can update their privacy settings during the onboarding process so that we can ensure that clients are fully aware of their rights. As probably most of the app users have been using the banking services for quite some time before deciding to try the investment service, it was outlined that they have possibly forgot their initial privacy settings, that were inherited to the Robo Advisor from the main app. Therefore, clients need to be able to update their setting and be reminded about their rights regarding their data.

The last presented requirement was "*Requirement for investment firms to establish and implement an order execution policy*", where only Privacy be Design principle required further improvements. We received confirmation that order execution policy is described in the main SEB website which can be accessed through the main app, therefore the requirement is fulfilled. However, from the design perspective, we have proposed to make privacy controls better integrated into the user interface components, making them more intuitive and less segregated from the primary user interactions in the main app or webpage.

Since investments is a sensitive topic for many people, including people with diverse abilities, from the part of our research it was recommended to still add the privacy related improvements to the onboarding scope. As was discussed with SEB representatives, it will potentially increase customers' trust in the service and will promote the Robo Advisory services to a bigger customer segment. However, it is important to keep the onboarding process easy and accessible for customers, as in some cases the complexity of the process may have the opposite effect.

6. Discussion

This chapter explores the areas of discussion surrounding the findings derived from the analysis of the SEB Robo Advisor's compliance with regulatory standards, particularly those outlined in MiFID II. Through the examination of various regulatory aspects, this chapter sheds light on the levels of compliance achieved across different areas, highlighting both strengths and areas needing improvement. Additionally, it explores the implications of integrating the Robo Advisor into a larger banking application versus its existence as a standalone platform, offering insights into the complexities and considerations inherent in each scenario. Also, this chapter analyzes the implications of the Robo Advisor's integration into a larger banking application versus its standalone existence. Drawing on related literature and industry insights, it elucidates the advantages and challenges associated with each approach, informing strategic decision-making and compliance efforts. Finally, the chapter acknowledges limitations in the evaluation process, highlighting the need for ongoing research and iterative evaluation to address compliance and user experience challenges effectively in financial technology solutions

6.1. Findings

The findings presented in this chapter categorize the compliance assessment into three main areas: fully compliant and compliant with opportunity to improve. Within each category, specific regulatory requirements are scrutinized, providing a nuanced understanding of the Robo Advisor's adherence to regulatory standards. These insights offer valuable guidance for stakeholders, including the SEB Compliance and Design teams, enabling them to prioritize areas for enhancement and ensure regulatory alignment while optimizing user experience and transparency.

Fully Compliant Areas:

- Explicit Consent: The Robo Advisor ensures obtaining explicit client consent before collecting any personal data, aligning with Article 16(2) of MiFID II.
- Accurate Records: Systems are in place for maintaining accurate and up-to-date records of client information, though with room for enhancement.
- Transparency in Data Collection: Clients are informed about data collection practices and usage, complying with Article 16(7).

Compliant Areas with Improvement Opportunities:

- Client Information Rights: Information about client rights to access, amend, or delete their data is provided but could be more prominently featured to improve user awareness (Article 16(8)). Robo Advisor is inheritably compliant with this regulation; however, it is suggested to add such section to the interface of the onboarding process.
- Sharing Data with Third Parties: Procedures for obtaining explicit consent before sharing data with third parties are in place but could benefit from clearer communication (Article 16(9)).
- Fee Disclosure: The disclosure of fees, commissions, or benefits from third parties needs improvement to ensure full transparency (Article 24(9)).
- Order Execution Policies: The monitoring and documentation of order execution policies require more detailed procedures (Articles 27(7) and 27(8)).

These findings indicate that while the SEB Robo Advisor onboarding process meets most of the compliance requirements, there are areas needing attention to fully align with MiFID II regulations and enhance user experience and transparency.

When considering the compliance of a Robo Advisor integrated into a larger application versus a standalone platform, several factors come into play that are worth considering and exploring further. For a *Robo Advisor integrated into a larger application*, there are notable advantages. According to the RapidCents Team recent research (Company blog, 2023), it can inherit existing compliance measures established within the broader SEB banking app. By leveraging these pre-existing frameworks, the integrated Robo Advisor can streamline its compliance efforts, ensuring uniformity in data protection practices across all services offered. Additionally, users benefit from a consistent user experience when transitioning between the Robo Advisor and other banking services within the same application. This seamless integration fosters trust and satisfaction among users, enhancing their overall experience.

Conversely, a standalone Robo Advisor necessitates dedicated compliance efforts. RSI Concepts team (Company blog, 2022) suggests that this approach allows for more tailored and specific compliance solutions, it may also entail increased resource requirements. However, the standalone nature of the Robo Advisor offers unique advantages, particularly in terms of flexibility and innovation. Operating independently from the broader app's infrastructure grants the freedom to explore and implement cutting-edge compliance technologies, such as artificial intelligence and blockchain, without constraints. This autonomy fosters a conducive environment for innovation and adaptation to emerging regulatory requirements, ultimately contributing to the evolution of compliance practices within the financial technology landscape.

6.2. Implications

The study's findings bear significant implications for further research and industry in total. Firstly, it underscores the pressing need for forthcoming research initiatives to center on the always changing regulatory environment, characterized by its dynamism and complexity. Researchers should focus on comprehending how the concept of Compliance by Design can effectively adapt to these shifting regulations, ensuring that financial technology solutions remain aligned with legal requirements. Additionally, there is a call to explore the integration of emerging technologies such as AI and blockchain into compliance frameworks, aiming to automate and strengthen the efficacy of compliance measures. This avenue of inquiry holds promise for streamlining regulatory adherence while fostering innovation in compliance strategies.

Furthermore, the research highlights the critical importance of transitioning towards user-centric compliance approaches within the financial technology sector. Investigating how user feedback and participatory design processes can inform compliance solutions becomes paramount. By prioritizing the user experience in compliance efforts, researchers can contribute to the development of more intuitive and user-friendly financial technologies, thereby enhancing overall user satisfaction and engagement. This approach can be further studied and applied in the industry in order to increase trust, encouragement and positive approach towards customers.

In terms of industry implications, financial institutions continuously cope with the ongoing challenge of adapting to regulatory changes in a rapidly evolving regulatory landscape. The findings emphasize

the necessity for these institutions to maintain carefulness and flexibility in monitoring and responding to regulatory updates. To navigate this terrain successfully, financial institutions must invest in scalable and adaptable compliance systems capable of accommodating new regulations while ensuring operational efficiency.

Moreover, there lies a strategic opportunity for banks and fintech companies to enhance user trust and gain a competitive edge by prioritizing user experience and transparency in compliance initiatives. By fostering a culture of transparency and user-centric design, these entities can cultivate stronger relationships with customers, bolstering trust and satisfaction levels. Ultimately, this customer-centric approach not only enhances the reputation and competitiveness of financial institutions but also contributes to the broader goal of fostering trust and confidence in the fintech ecosystem.

6.3. Limitations

In terms of regulatory coverage, it is important to note that our study mainly looked at rules related to how users join the Robo Advisor, hence the onboarding process. While this focus let us explore the compliance matters during the initial stages of client interaction with the platform, we might have missed out on checking other important parts of how the Robo Advisor works. To get a full picture, future research should expand its view to consider a broader range of services provided by SEB app and Robo Advisor. This way, researchers can give a more complete and detailed assessment of how well the Robo Advisor follows the regulations across all its functions.

Similarly, our study only looked at how users sign up for the Robo Advisor, leaving out other key aspects like managing accounts and processing transactions. While signing up is crucial, ignoring other parts could mean we are not seeing the whole picture of how easy and compliant the app is to use, and some of the important privacy related measures are left undefined. Future studies should take a broader view, covering all the ways users interact with the Robo Advisor and how well the SEB app compiles with the regulations from the backend side. By doing this, researchers can uncover any compliance or usability issues that might pop up at different points along the way, helping us understand things better.

These limitations show why it is so important to keep researching and evaluating financial technology solutions. We need to keep looking into compliance and user experience challenges, refining our methods along the way. By recognizing and dealing with these limitations, researchers can improve their approaches and help create financial technology that is more effective and user-friendly.

Conclusions

This thesis has investigated the application of Compliance by Design principles within SEB's Robo Advisor, highlighting how regulatory compliance and user experience can be synergistically improved. The detailed exploration and assessment have yielded key findings in response to the research questions posed in the Introduction:

RQ1: Compliance Evaluation: The analysis confirmed that SEB's Robo Advisor largely adheres to the Compliance by Design principles. It effectively integrates these principles by embedding privacy and user-focused features within the onboarding journey. This alignment not only fulfills regulatory requirements, particularly under MiFID II, but also establishes a robust framework for protecting user data and ensuring transparency.

RQ2: Identification of Improvement Opportunities: The evaluation phase identified specific areas where the onboarding process could be optimized. Key suggestions include simplifying the user interface to reduce cognitive load, enhancing interactive elements to promote user engagement, and refining information delivery to ensure clarity and comprehensiveness. These improvements aim to streamline the user's experience while enhancing their understanding and control over the investment process. The results from the thesis clearly demonstrate that while the current implementation meets many of the desired standards, there are several opportunities to elevate the experience and compliance further. These findings underscore the thesis's contribution to advancing practical strategies that harmonize strict compliance measures with an improved user experience.

A comprehensive review was conducted on how SEB's Robo Advisor aligns with established regulatory standards and user experience best practices. The evaluation revealed that the platform proficiently manages to balance regulatory demands with user-centric design, particularly in how it handles user data and privacy. For instance, the Robo Advisor was found to effectively communicate its data usage policies and obtained user consents clearly and transparently, fulfilling key compliance aspects under MiFID II. However, the evaluation also highlighted several areas needing improvements.

Looking forward, this thesis opens up several options for further development. One promising area is the integration of more sophisticated artificial intelligence algorithms to enhance personalization features within Robo Advisors. Such advancements could lead to more detailed user profiling, which would not only improve investment advice but also align more closely with individual user preferences and regulatory changes. Additionally, the dynamic nature of financial regulations like MiFID II suggests a continuous need for updates and adjustments in compliance strategies. Future work could explore the development of modular Compliance by Design frameworks that can easily adapt to these changes, thereby maintaining regulatory adherence without compromising on user engagement and satisfaction.

In conclusion, this thesis not only contributes to the academic and practical understanding of applying Compliance by Design in financial technologies but also sets the stage for future innovations in regulatory compliance and user experience optimization.

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