DESIGNING TRUSTWORTHY AI-SUPPORTED DESIGN PROCESSES

A Framework for Internal AI Tool Integration at ING



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Designing trustworthy AI-Supported design processes

A Framework for Internal AI Tool Integration at ING

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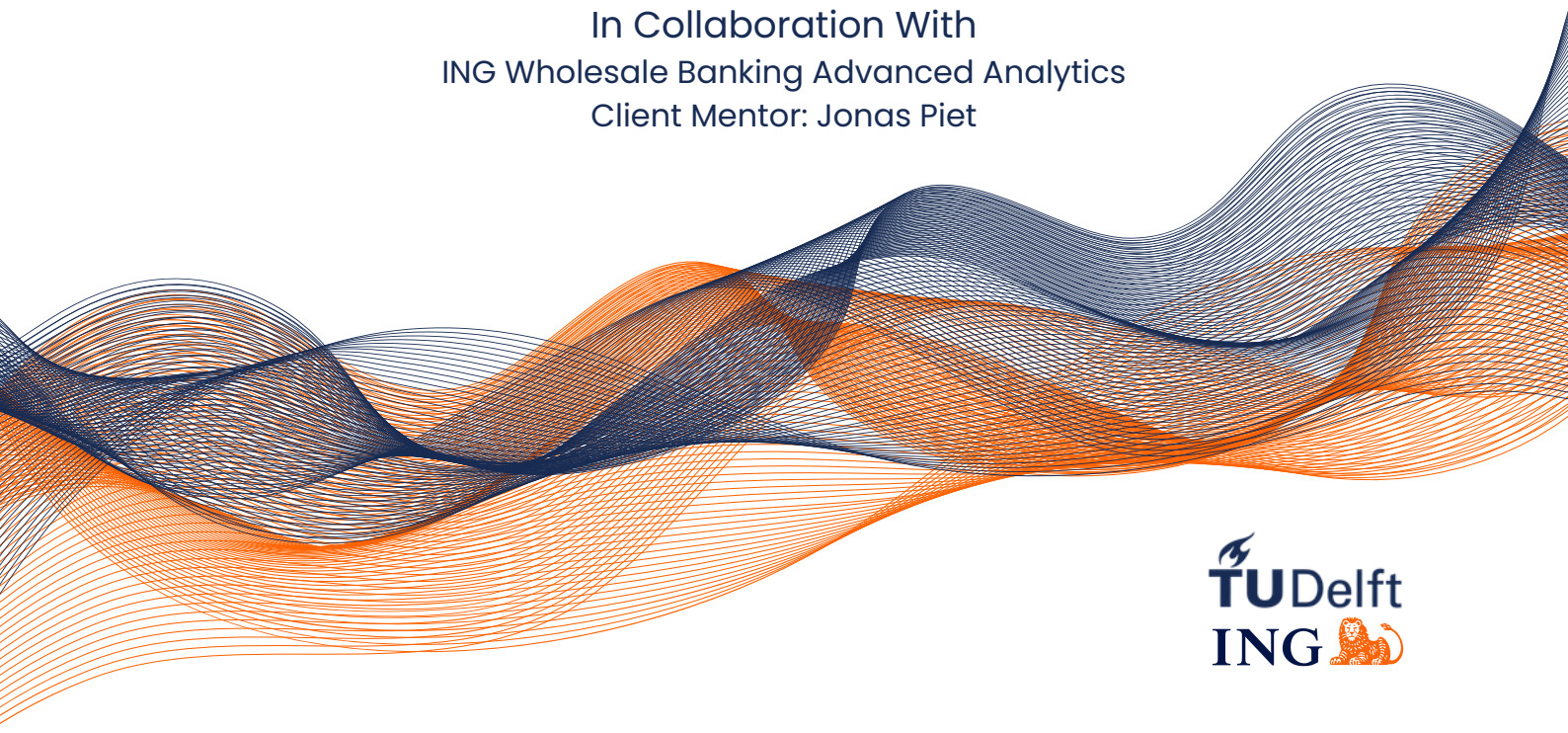

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Preface

This thesis was written as part of the Master's programme Strategic Product Design at Delft University of Technology. It concludes my graduation project, conducted in collaboration with ING Wholesale Banking Advanced Analytics (WBAA), within the UX Research & Design chapter.

Throughout my studies, I have developed a strong interest in the intersection of artificial intelligence, design, and trust. During several courses within Strategic Product Design, we explored the role of AI in design from different perspectives. These experiences immediately sparked my curiosity and challenged the way I think as a designer. They showed me both the power of AI as a creative and analytical tool, and the complexity of using it responsibly in real-world contexts. This fascinated me and formed the foundation of this graduation project.

When I started this graduation project, I initially expected to develop a strategic guidebook for ING on how to implement AI tools within the UX workflow. While this direction is highly relevant, the project evolved in a way I had not anticipated. Instead of only analysing and advising, I found myself designing an AI-supported tool concept tailored to the needs of the UX Research & Design team. This shift made the project not only more challenging, but also far more engaging, as it allowed me to translate insights directly into a tangible design outcome.

During my project at ING WBAA, I was given the opportunity to work closely with a team of designers and researchers who work closely with engineers, and other stakeholders. Their openness, expertise, and willingness to share their experiences, provided valuable input for this research. I would therefore like to thank all members of the UX Research & Design chapter who participated in the interviews and co-creation sessions, as well as the broader WBAA team for their support and collaboration.

I would also like to express my sincere gratitude to my supervisory team. First and foremost, I would like to thank my chair, Dr. Shahrokh Nikou, for his continuous support throughout the entire process. His feedback, guidance, and encouragement were invaluable and provided me with the motivation to keep progressing, especially at moments when I needed support or an extra push. I would also like to thank my mentor, Dr. Pan Wang, for her academic guidance and feedback, which helped strengthen the quality of this research. In addition, I am grateful to my client mentor, Jonas Piet, for his insights and for facilitating access to the organisation.

Finally, I would like to thank my friends and family for their support during this project. From sparring with me about ideas, to participating in an ideation session, and simply being there when I needed a break; their encouragement helped me stay motivated and focused throughout the process.

Enjoy reading!



Sam A. Maintz
Amsterdam, July 2026

Abstract

Artificial intelligence (AI) is increasingly shaping the way design work is performed. Within UX research and design teams, AI has the potential to enhance creativity, accelerate workflows, and improve efficiency. At the same time, it introduces risks related to trust, transparency, and reliability, particularly in regulated environments such as banking. As a result, organisations face the challenge of integrating AI into practice.

This thesis explores how AI can be integrated into the UX design workflow at ING Wholesale Banking Advanced Analytics (WBAA), while enhancing designers' efficiency and safeguarding trustworthiness. The research adopts a qualitative single-case study approach, focusing on the UX Research & Design chapter within ING WBAA. The study is structured into three phases: a literature review, semi-structured interviews, and a research through design phase.

The literature review examines four key domains: Human-Centred AI (HCAI), appropriate trust, AI in UX design, and AI in regulated environments. Based on this, a conceptual framework is developed, which connects UX workflow stages, AI opportunity spaces, and conditions for trustworthy AI use.

Empirical data was collected through semi-structured interviews with members of the UX Research & Design team. The findings show that AI is currently used primarily as a supporting tool in early research phases, for tasks such as summarisation and structuring information. Designers perceive AI as valuable for efficiency gains, but express concerns about reliability, transparency, and loss of control. As a result, AI is trusted selectively: it is accepted for low-risk tasks but avoided in decision-critical phases. The analysis identifies several key opportunity areas for AI support across the UX workflow.

These insights are translated into a set of design principles centred around human agency, appropriate trust, transparency, and compliance. Building on these principles, the project develops a concept for an internal AI-supported research tool: Orange Insight. This tool focuses on supporting qualitative interview analysis through a human-in-the-loop approach, where AI assists in structuring and coding data while maintaining full user control and traceability.

The results show that integration of AI in UX design processes within regulated environments requires more than efficiency gains alone. Trustworthiness, transparency, and human oversight must be actively designed into both workflows and tools. The proposed approach contributes to a deeper understanding of how AI can augment, rather than replace humans within design practices in organisational contexts. The findings of this research provide both practical guidance for ING WBAA and broader insights for design teams working with AI in regulated environments.

Glossary

AI - Artificial Intelligence

ML - Machine Learning

DL - Deep Learning

UX - User Experience

UI - User Interface

WBAA - Wholesale Banking Advanced Analytics

CX - Customer Experience

KYC - Know Your Customer

FCP - Financial Crime Prevention

CLT - Customer Loyalty Teams

TS - Transaction Services

BG - Bank Guarantees

HCAI - Human-Centred Artificial Intelligence

HCI - Human-Computer Interaction

SE - Software Engineering

HCD - Human-Centred design

GenAI - Generative Artificial Intelligence

GD - Generative Design

FinTech - Financial Technology

XAI - Explainable AI

LLM - Large Language Model

BERT - Bidirectional Encoder Representations from Transformers

NLP - Natural Language Processing

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Chapter 1

Introduction

1.1 Background
1.2 ING WBAA: a Case of Internal AI Adoption
1.3 Current AI Use
1.4 Design Goal and Approach

This chapter introduces the research context of the project. It outlines the fast development of artificial intelligence, which has become deeply embedded in everyday technologies and work practices, including the UX and UI design practices. The chapter highlights both its benefits and risks. It introduces multiple key concepts such as machine learning, human-centred AI, and appropriate trust, and present the context of the research, i.e. ING Wholesale Banking Advanced Analytics. It concludes by defining the design goal, research question, and overall research approach that guides the project.

1.1 Background

Artificial intelligence (AI) is a term that many of us encounter daily. It is commonly understood as an overarching concept for machines that can perceive, synthesise, and infer information (Thoring et al., 2023). Over the past years, AI has developed rapidly. Whereas widely adopted AI tools initially supported relatively simple tasks such as text enhancement, they can now perform complex activities and generate entirely new content, including images, videos, code, and music (van der Maden et al., 2024). As a result, AI has become deeply embedded in everyday technologies and work practices.

Machine learning (ML) is a subfield of AI in which algorithms are trained on examples to make predictions or classifications. Early ML models were primarily used for regression and classification tasks. Although the underlying ideas date back several decades, the required computing power was initially too expensive or not widely available, which limited the complexity of these early systems. As affordable hardware became more accessible, more complex ML models emerged. This development enabled the rise of deep learning (DL), which refers to artificial neural networks with multiple layers that in some ways mimic the structure of the human brain (Thoring et al., 2023). Today, such models are used across many disciplines, including the design sector, where they increasingly influence professional practices. The integration of AI-driven systems in design processes is therefore becoming ever more important.

This also holds for User Experience (UX) and User Interface (UI) design, which have changed substantially due to AI-driven tools. As Lu et al. (2022) describe, UX and UI have become essential elements of contemporary product development. UX/UI design contributes not only to the aesthetics of a product, but also to a company's branding and visual language. Well-designed, intuitive interfaces can significantly improve the user experience, for example by making products and services more accessible. In this context, AI can support UX/UI designers in multiple ways. It can speed up the ideation process through tools that assist in creating design variations, and it can help to make interfaces and interactions more intuitive and responsive (Xu et al., 2024). Moreover, AI can automate repetitive tasks and identify patterns in data that human designers might overlook. Together, these capabilities make AI a potentially powerful assistant in UX/UI practice.

At the same time, the use of AI also introduces important risks. One key challenge is that people may either over-trust or under-trust an AI tool, which can lead to poor decisions based on inappropriate reliance on AI outputs. It is therefore crucial that users of AI systems understand the system's performance characteristics and know when it can be relied upon and when it cannot. This alignment between users' trust and the actual trustworthiness of the system is often referred to as appropriate trust (Degachi et al., 2024). In addition to issues of

trust, other risks include bias, lack of transparency, hallucinations, misuse, and broader societal impacts (Zhu et al., 2024). Interestingly, Ramaswamy et al. (2024) note that in some cases hallucinations may not only be seen as a flaw, but can also be a source of creativity, particularly in image generation. However, in high-stakes domains such as finance, unintentional hallucinations still pose serious risks that must be carefully managed.

Against this backdrop, Human-Centred Artificial Intelligence (HCAI) offers a promising direction for future AI research and practice. HCAI is situated at the intersection of AI and Human-Computer Interaction (HCI). It emphasises usability, safety, trustworthiness, and ethical considerations in order to design and develop robust AI systems with reduced risks (Desolda et al., 2025; Shneiderman, 2021). A central idea in HCAI is that autonomous machines cannot replace or surpass humans in crucial aspects such as intelligence, creativity, and responsibility. Instead, AI should be seen as an augmentation of human capabilities rather than a replacement. This perspective resonates with the view that AI systems ought to empower human decision-makers and maintain human agency and accountability (Shneiderman, 2021).

1.2 ING WBAA: a Case of Internal AI Adoption

These insights are particularly relevant for the UX Research & Design team within ING Wholesale Banking Advanced Analytics (WBAA). At present, the team does not yet have clear guidance on how to integrate AI effectively into their workflow. They want to understand where AI can genuinely add value in the UX design process, for example by enhancing creativity and efficiency, and where it may introduce risks such as reduced transparency, biased outcomes, or a loss of human insight.

ING WBAA supports internal ING teams that serve large corporate clients with their financing needs by creating advanced analytics tools. Within WBAA, the UX Research & Design team contributes to the development of these internal, data-driven tools that support activities such as fraud reduction, sustainable lending, and improving the day-to-day experience of front-office staff. However, the banking context makes the adoption of AI within UX design complex, as they work with sensitive data. This requires strict compliance with internal policies and external regulations. As a result, not all AI tools can be freely used, and access to external tools is often restricted. Designers who want to experiment with AI therefore face limitations in terms of available tools, data access, and integration into existing workflows. This creates a tension between the potential value of AI and the need for responsible and trustworthy use. There is a strong need to ensure that AI-supported design processes remain transparent, unbiased, and aligned with organisational standards for risk management. For this project, one of the key stakeholders is therefore a risk officer, who can support the responsible integration of AI and help determine under which conditions AI tools may be used in a compliant and trustworthy manner.

1.3 Current AI use

Currently, the team makes limited use of AI in the design process, primarily through Microsoft Copilot. All team members have access to a work licence, which allows them to use AI functionalities within Microsoft applications such as Word, Excel, Teams, and PowerPoint. Copilot can support activities such as desk research, content generation, and image creation, and enables users to experiment with creating their own agents within the platform.
Importantly, Copilot is designed so that information remains within the company's environment and is not used to train public models, which is crucial given the sensitivity of financial and customer data. This security and compliance profile is a key reason why the team primarily relies on Copilot. At the same time, the use of other AI tools is often restricted on ING laptops, meaning that designers must switch to personal devices if they want to explore external tools.

1.4 Design Goal and Approach

AI has the potential to enhance the UX design process by supporting creativity, accelerating exploration, and improving efficiency. At the same time, it can introduce significant risks when it falls short in areas such as transparency, contextual understanding, and reliability. These risks are particularly relevant within a banking environment, where responsible and compliant use of AI tools is essential. Currently, UX researchers and designers at ING primarily rely on Copilot and have limited knowledge of how AI can be applied effectively and appropriately within their design workflow.

As a result, there is a clear knowledge gap within the organisation regarding not only how AI can be integrated, but also which AI tools exist beyond Copilot and how these can be applied within the UX design workflow. Currently, UX researchers and designers at ING primarily rely on Copilot, as this is the only non-restricted AI tool available on ING laptops, resulting in a narrow and constrained exploration of AI possibilities, while having limited awareness of alternative AI tools and their potential value for different design activities. In addition, there is uncertainty about whether other AI tools are allowed to be used (e.g., on personal laptops), and under which conditions this use would be compliant with organisational and regulatory requirements. This creates practical constraints, where designers either only use Copilot or only occasionally experiment with other tools in an informal and unstructured way. Moreover, there is a lack of clear guidelines and organisational support on how to use AI responsibly within the design process. As a result, designers lack confidence in making informed decisions about AI use, have limited time and space to explore alternatives, and do not have a clear understanding of where in the design process AI can provide meaningful added value versus where it may introduce risks. Together, this leads to a situation where AI use remains limited, fragmented, and largely exploratory, rather than being systematically integrated into the UX workflow in a way that enhances creativity and efficiency, while safeguarding trustworthiness.

The central opportunity of this project is to understand how AI can be embedded into the workflow of UX researchers and designers at ING. This requires clarifying the conditions under which AI can be used safely, how designers currently use AI, which types of AI tools can improve the design process, and at which stages of the design process such tools can provide meaningful value.

Therefore, the overarching research question is initially framed as “How can AI be integrated into the UX design workflow for internal banking products in a way that enhances creativity and efficiency, while safeguarding trust, transparency and design integrity?”
This is later refined in Chapter 3.7.

The project will adopt a qualitative research approach. First, a literature review will be conducted to examine existing research on AI in the banking industry and on AI in UX design. Databases such as Scopus, Google Scholar, Web of Science, ScienceDirect, and the TU Delft library will be used, with search strings including terms like “AI”, “banking”, “regulated sector”, “design(ers)”, “creativity”, “efficiency”, “trust”, “transparency”, and “design integrity”. Based on this review, a conceptual framework will be developed that serves as the foundation for semi-structured interviews with members of the UX research and design team at ING WBAA, in order to understand the current UX design workflow and their existing experiences with AI. A total of 10 interviews will be conducted with the team members of the UX research and design team at ING WBAA. To validate the findings and ideas emerged from the literature review and interviews, a co-creation session will be held with members from the UX R&D team. Ideally this will take place with one UX Researcher, one UX designer and one Service Designer, as these are the 3 different roles within the team. These roles will be described more deliberately in Chapter 2.2. Finally, the project will explore different AI tools and their features to build an overview of which tools could support UX designers at different stages of their work. The findings from these different sub-studies will be synthesised into an integrated perspective.

The initial goal is to embed AI into the UX research and design workflow at ING WBAA in a way that enhances designers’ creativity and efficiency while safeguarding trust, transparency and design integrity. The focus will be on the process of designing internal tools at ING WBAA. The project aims to provide clear guidance on when and how to use AI responsibly within this process and to deliver strategic, as well as practical value for UX researchers and designers. The initial goal of the project was to translate these insights into a set of design principles and a practical playbook with useful guidelines and inspiring examples. This scope is later revised in Chapter 6.1.

The project is structured using the Double Diamond framework, which consists of four phases: Discover, Define, Develop, and Deliver (Figure 1). This framework provides a systematic approach to both exploring the problem space and refining the final design. In the Discover

phase, divergent thinking is used to explore the context and generate insights through research. These insights are then synthesised in the Define phase, where the problem is reframed and key design directions are established. Following this, the Develop phase reintroduces divergence through ideation, enabling the exploration of multiple design possibilities. Finally, in the Deliver phase, these ideas are converged into a single design direction, which is further refined and validated. This iterative process of divergence and convergence ensures that the final outcome is both grounded in research and rigorously developed, resulting in a substantiated final design.

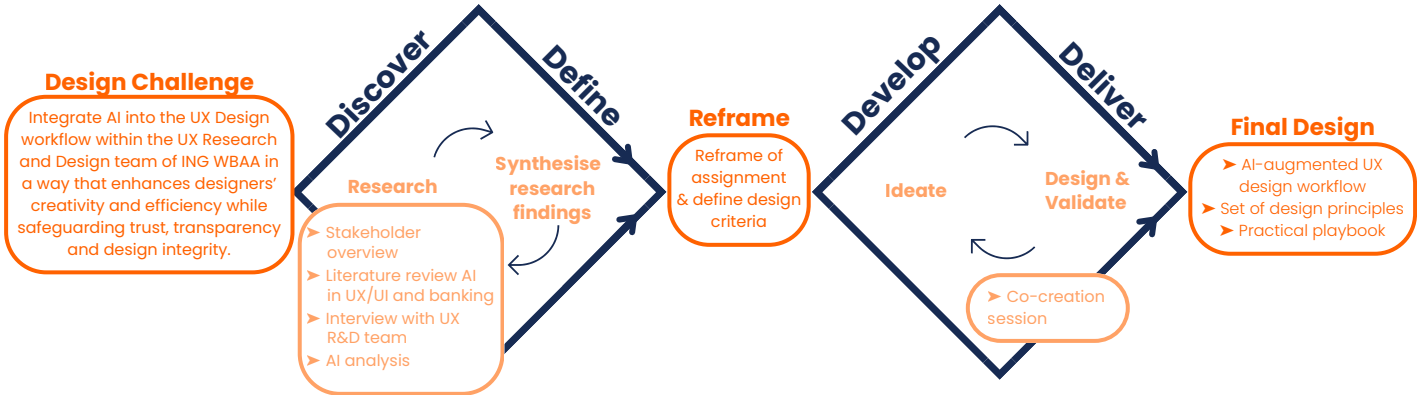


Figure 1: Project appoach

Chapter 2
Context

2.1 ING & ING WBAA
2.2 Stakeholder Overview
2.2.1 Primary Stakeholders: UX Research & Design chapter
2.2.2 Secondary Stakeholders: ING WBAA tribe
2.2.3 Secondary Stakeholders: Risk Officer
2.2.4 Secondary Stakeholders: AI Specialist
2.2.5 Affected Stakeholders: Internal Users

This chapter outlines the organisational context in which the project is situated. It provides an overview of ING as an organisation and clarifies where ING WBAA and its UX Research & Design team are positioned within the broader organisational structure. In addition, the chapter presents a detailed stakeholder overview, focusing on the UX Research & Design team within WBAA as the primary stakeholder group, while also identifying secondary stakeholders and affected stakeholders. This contextual grounding is essential to ensure that the final deliverables are practically relevant and aligned with the organisational, regulatory, and operational realities of working within ING WBAA.

For the first part of the research, internal ING documents were analysed to get more insight into ING and the organisational context in which the UX Research & Design team operates. These documents included internal presentations, process descriptions, and organisational materials that provided information on stakeholders, team structures, governance, and the organisational setup of ING WBAA.

2.1 ING & ING WBAA

ING, formally referred to as ING Group (Figure 2), is a Dutch international bank with its headquarters located in Amsterdam Bijlmer. The organisation offers services in banking, insurance, and asset management and is one of the largest banks in Europe. ING can be broadly divided into two main banking domains: ING Retail Banking and ING Wholesale Banking. In addition to these core banking activities, ING is organised into several major functional domains, including Technology, Risk, Finance, Operations, and Sustainability. For this research, it is essential to understand the distinction between Retail Banking and Wholesale Banking, as these represent fundamentally different operational fields within the organisation.

Figure 2: Logo ING Group

Retail Banking serves individual customers across ten markets: the Netherlands, Belgium, Luxembourg, Germany, Spain, Poland, Italy, Romania, Australia, and Turkey. In contrast, Wholesale Banking focuses on supporting large corporate clients and financial institutions with their financing needs in more than forty countries (Figure 3). Wholesale Banking offers global reach combined with local and sector-specific expertise and works closely with clients to address complex challenges, including sustainability-related issues.



Figure 3: Countries where ING Wholesale Banking is operating

The organisational structure (Figure 4) shows that ING is governed by an Executive Board, which includes the CEO, CFO, COO, CTO, the Head of Retail Banking, and the Head of Wholesale Banking. Beneath these executive roles, numerous specialised functions and domains are positioned (ING Analytics (INGA), 2025; ING Bank N.V., 2026).

This project focuses exclusively on the Wholesale Banking branch of the organisation, and more specifically on ING Wholesale Banking Advanced Analytics. The organisational structure highlights that ING is a strongly governance-driven organisation, in which innovation plays a crucial role. With the rapid evolution of artificial intelligence, ING must continuously anticipate technological developments and innovate accordingly. However, such innovation must always fit within strict frameworks of compliance, risk management, and accountability.

Within Wholesale Banking, several key domains can be distinguished, including WB Operations, WB Technology, WB Risk, and WB Transformation. The COO domain and the broader analytics and data capabilities that support Wholesale Banking also fall within this structure. Within this context, ING Wholesale Banking Advanced Analytics (WBAA) functions as a specialised capability that supports Wholesale Banking teams through data-driven, analytics-based, and (AI-enabled) solutions in the form of internal tools.

WBAA operates under ING Analytics within the COO domain and is organised around product squads that are responsible for the end-to-end development and delivery of internal products. These squads bring together cross-functional roles, including product managers, engineers, data specialists and UX professionals. In parallel, WBAA operates a chapter-based structure to support professional expertise and consistency across squads. The UX Research & Design Chapter is part of this chapter model and provides design expertise across multiple product squads. This dual structure, combining product squads and functional chapters, enables WBAA to balance ownership, cross-functional collaboration and professional development within a highly regulated organisational context (ING Analytics (INGA), 2025; ING Bank N.V., 2026).

Within Wholesale Banking, customer satisfaction is a central concern and is commonly referred to as Customer Experience (CX). CX encompasses how customers experience interactions with products, services, channels, solutions, and people. For WBAA, this notion of CX does not primarily concern external customers but instead focuses on internal organisational users, meaning that the outcomes of WBAA are aimed at improving internal processes rather than direct customer-facing experiences (ING Bank N.V., n.d.).

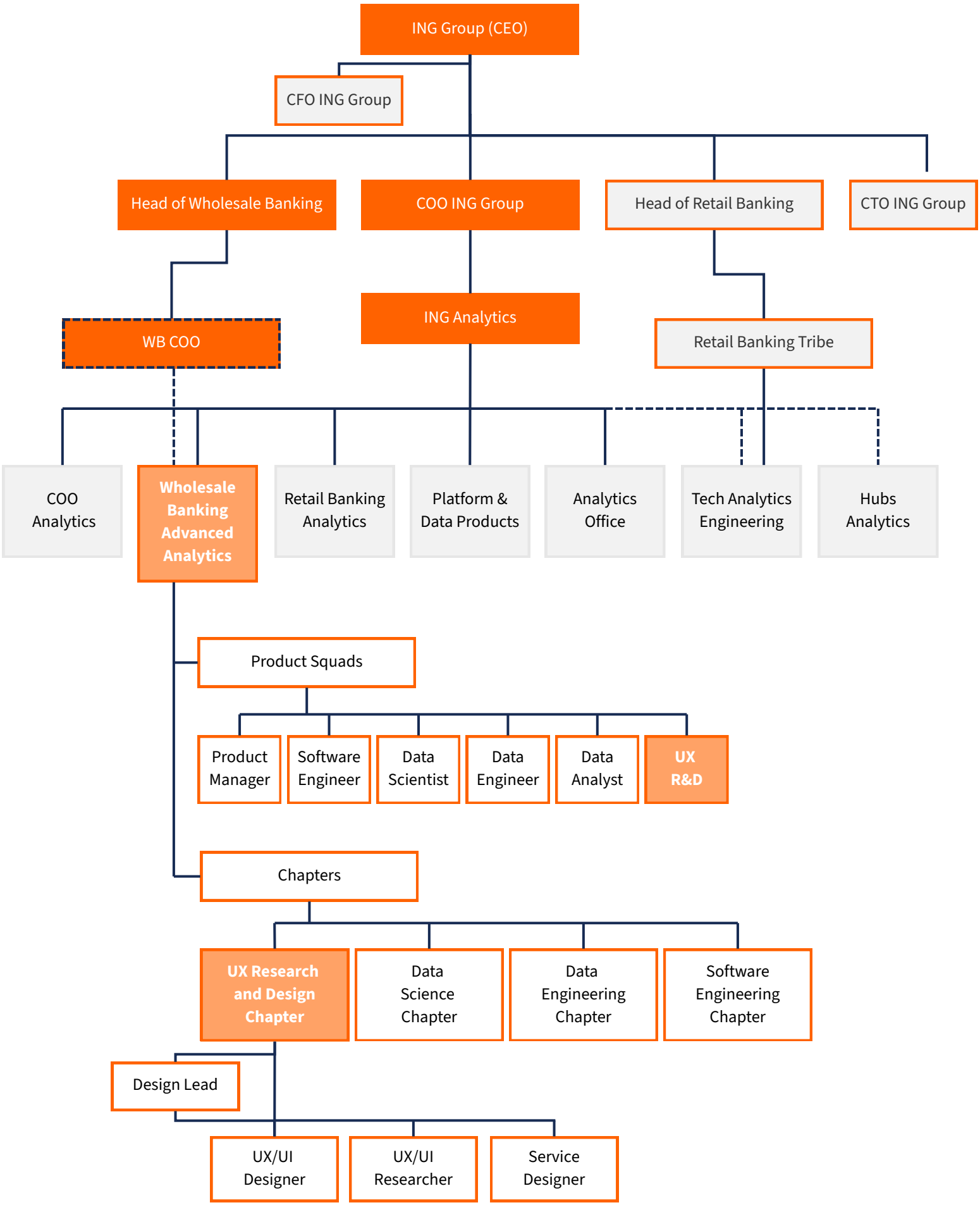


Figure 4: Organisational structure (ING Analytics (INGA), 2025; ING Bank N.V., 2026)

The described organisational context directly shapes the design challenge of this project. First, the governance-driven and highly regulated nature of ING requires that any AI integration explicitly addresses compliance, transparency, and risk management. This implies that the AI-augmented workflow must operate within a secure and controlled environment. Second, the squad and chapter structure requires the workflow to be flexible across different roles while maintaining consistency across teams. UX researchers, designers, and service designers operate within different project contexts but contribute to a shared process, meaning that AI support should be adaptable to multiple roles and use cases. Third, the focus on internal users means that improvements in the UX design process should ultimately lead to more effective and reliable internal tools for these internal users. Together, this highlights that the final design must not only enhance efficiency and creativity, but also fit within a complex organisational structure and regulatory environment.

2.2 Stakeholder Overview

The project is conducted for the ING WBAA UX Research and Design team, which helps develop internal tools for other teams inside ING. Integrating AI into this UX design workflow involves multiple stakeholders. To provide clarity on their role in the project, stakeholders are categorised into three groups: primary stakeholders (direct users of the solution), secondary stakeholders (influence and enable implementation) and affected/internal users (indirectly impacted by the outcomes). The primary stakeholder group consists of the UX Research & Design team itself.

2.2.1 Primary Stakeholders: UX Research & Design chapter

The UX Research & Design chapter comprises 12 members: 3 UX researchers, 5 UX/UI designers, 3 service designers, and 1 design lead. They are the primary focus of this project and the intended primary users of the final deliverables. The team is responsible for researching user needs, designing and validating interfaces, and ensuring that internal tools are usable, effective, and aligned with ING's brand and service standards. 10 team members will be involved in the qualitative research through semi-structured interviews to develop a clearer understanding of the current UX workflow and their experiences with AI. Their insights are essential for mapping the existing process, identifying relevant AI touchpoints, and later validating the proposed AI-augmented workflow.

To better understand the diversity within this primary stakeholder group, the key roles in the team can be summarised as follows:

UX/UI Designer - UX/UI designers are responsible for shaping the interaction between users and digital products, from individual interface components to end-to-end user flows. Their work focuses on the "surface" (the visual look and feel of digital products) as well as the "structure" (organising information and functionality in a way that makes complex applications intuitive and usable). They design interfaces and interaction flows that aim to be effective, efficient, and user-friendly.

UX Researcher - UX researchers conduct generative and evaluative studies to inform design decisions. Generative research explores user needs, motivations, and contexts through methods such as field studies, interviews, and diary studies. Evaluative research examines how concepts or prototypes perform in practice. The overall focus is on understanding people, their behaviours and needs, and translating these insights into actionable input for product and service design.

Service Designer - Service designers operate at the intersection of structure and strategy, designing systems that enable coherent and meaningful service experiences. They focus on coordinating and orchestrating how people, processes, and touchpoints connect across

journeys and products. Their goal is to shape end-to-end workflows that help both end users and internal stakeholders achieve their goals through seamless and consistent experiences.

Design Lead - The design lead oversees and coordinates the work of the rest of the team and plays an important role in coaching and professional development. Team members have weekly or bi-weekly one-to-one meetings with the design lead to discuss their growth and any guidance needed.

In addition to these one-to-one meetings, the team follows three core rituals. First, a weekly Design Stand-Up provides a short check-in on ongoing work, priorities, and support needs. Second, a weekly Design Knowledge Sharing session offers space to share work in progress, lessons learned, and inspiring examples with the rest of the team. Third, a structured peer review system ensures that team members regularly give and receive constructive feedback on each other's work, which supports both design quality and continuous learning (WBAA Design Chapter, 2025).

The UX Research & Design team is a multidisciplinary group based in the Netherlands, Romania, and the Philippines. As a result, most team meetings are held online via Microsoft Teams. The team is part of the WBAA Tribe, which consists of approximately 100 people with 23 different nationalities. Within this tribe, there are 10 product squads, each responsible for a specific internal product or tool. In each product squad, 1–3 members of the UX Research & Design team (known as the Design Chapter within the ING WBAA Tribe) are embedded. They work closely with the rest of the WBAA tribe, including product managers, data engineers, software engineers, data analysts, and data scientists to jointly create validated, reliable tools for internal teams within ING (Stellink, 2024).

As the primary users of the final design for this project, the UX Research & Design team defines the core requirements of the solution. The diversity of roles (UX, research, service design) implies that the final design must be flexible and adaptable to different types of design activities. In addition, the distributed and cross-functional nature of the team requires that AI support can be easily shared, understood, and applied across different contexts.

2.2.2 Secondary Stakeholders: ING WBAA tribe

The Design Chapter collaborates closely with various other roles within ING WBAA. UX designers operate in cross-functional product squads, working alongside product managers, software engineers, data scientists, data analysts, and data engineers. All squads fall under the same Tribe structure and share end-to-end responsibility for digital products, ranging from initial user research to implementation and running the application in production (ING WBAA, n.d.-a). These roles therefore form important, though secondary, stakeholders in the context of this research.

Product Managers - Product Managers within WBAA act as end-to-end drivers of the products developed by their squads. They define scope and timeline, escalate delivery impediments, communicate progress, and translate strategic domain priorities into concrete product deliverables. The role blends management, entrepreneurship, problem-solving, and delivery ownership, positioning product managers as key decision-makers in shaping how AI may be integrated into the workflow (WBAA Tribe Leadership, 2026).

Data Engineers - Data Engineers are responsible for the data architecture and infrastructure underpinning WBAA's products. Their work includes data ingestion, scalable processing, storage, and deployment of ML pipelines. They collaborate with data scientists and business stakeholders to transform raw data into usable datasets, ensuring data readiness for model development and analysis (ING WBAA, n.d.-b).

Software Engineers - Software Engineers at WBAA build and maintain production-grade software systems, writing high quality code, and applying Development and Operation practices, container platforms, and agile methodologies. They are responsible for integrating AI features into working software as part of product deliverables (ING WBAA, n.d.-a). Their involvement ensures that AI-augmented UX solutions are technically feasible, scalable, and secure.

Data Analysts - Data Analysts collect, analyse, and report insights based on data to provide internal users with a sturdy foundation to support the decision-making process, for which they use both traditional and emerging methods and systems. Their responsibilities include clarifying business requirements, building dashboards, maintaining data repositories, and providing data-driven evidence for strategic decisions (ING, n.d.-b). For this project, data Analysts may be relevant for validating whether AI-supported UX workflows improve decision quality or add measurable value.

Data Scientists - Data Scientists scope, develop, validate, and document machine-learning solutions that form the core of WBAA's analytics-driven products. They engage in advanced research and contribute to the development of new ML-based features (ING WBAA, n.d.-c). They can offer essential insights into how AI models used by designers should be validated, monitored, and integrated responsibly.

The WBAA Tribe fosters a culture of transparency, collaboration, and continuous learning through several recurring rituals. Every two weeks, the Tribe holds stand-up meetings to welcome new members, share updates, and communicate important information across teams. In addition, monthly knowledge-sharing sessions provide a dedicated space where different squads present recent investigations, experiments, or accomplishments. These sessions openly highlight both successes and failures, reinforcing a culture where learning is

prioritised over perfection. Two times a year, the Tribe also organises Experiment Days, a three-day internal hackathon in which employees pitch ideas in advance and collaborate in small teams to explore them in depth. Some of the outcomes developed during these days are later implemented within the organisation, while many others remain non-work-related explorations. Regardless of implementation, Experiment Days are considered a valuable opportunity for creativity, experimentation, and cross-team engagement. These events provide opportunities for designers, researchers, and technical experts to explore AI tools, share successes and failures, and validate new workflow concepts.

These secondary stakeholders play a critical role in shaping how AI can be integrated into the UX workflow in practice. Product managers influence priorities and decision-making, engineers determine technical feasibility, and data specialists ensure data quality and model reliability. As a result, the proposed AI-augmented workflow must align with technical constraints, product goals, and data infrastructure.

2.2.3 Secondary Stakeholders: Risk Officer

A Risk Officer (or Business Control Specialist) plays a crucial role in ensuring that all activities within ING comply with relevant laws, regulations, and internal policies. Their work involves risk management, data-driven analysis of business impacts, and advising senior management to ensure that projects are executed safely and in compliance with regulatory requirements (ING, n.d.-a). Given that this project focuses on integrating AI into the UX workflow, a risk officer is essential to ensure trustworthiness, compliance, and responsible AI use, especially around data handling and model oversight. This means that the deliverables must explicitly address when and how AI can be used, what risks are involved, and how these risks can be mitigated.

2.2.4 Secondary Stakeholders: AI Specialist

AI specialists provide expertise on GenAI development, internal capabilities, past experiments, successes, and failures. Engaging with them helps clarify what AI tooling is technically feasible, what has been attempted within ING WBAA, and what guardrails are required to ensure trustworthy use of AI. Their input will help map existing AI tools, identify limitations, and inform which tool categories can meaningfully contribute to the UX workflow.

2.2.5. Affected Stakeholders: Internal Users

Another important stakeholder group consists of the internal users for whom the tools are designed. These stakeholders are not directly involved in the UX workflow itself, but are indirectly affected by its outcomes, as improved workflows should result in better, more usable, and more reliable internal tools.

The primary stakeholders, operating in product squads, develop a wide range of tools for different user groups, ranging from Know Your Customer (KYC) analysts and employees

working in Financial Crime Prevention (FCP), to Customer Loyalty Teams (CLT), Transaction Services (TS), and employees involved in Bank Guarantees (BG). Some platforms are even designed for the entire Wholesale Banking (WB) and Advanced Analytics (AA) tribes. As a result, this stakeholder group is highly diverse and broad. To better understand these users, a short description of each group is provided below.

KYC: Employees responsible for researching and assessing clients to ensure ING knows who their customers are, what they do, and whether they operate within acceptable risk boundaries. They review customer information, assess risk profiles, and support compliance processes.
FCP: Employees working on detecting, preventing, and managing financial crime-related risks and compliance activities within ING.
CLT: Employees responsible for reviewing mortgage applications and making decisions based on imported customer data. They verify whether information is complete and contact customers when additional information is needed.
TS: Employees working on payment services, cash management, transaction-related products, and sales opportunities for ING's large corporate clients.
BG: Employees working with bank guarantee-related financial products and workflows.
Employees within WB & AA tribe: A broad internal audience using data, analytics, and platform tools across Wholesale Banking. Some products are designed to support large parts of the Wholesale Banking and Advanced Analytics organisation.

Even though this stakeholder group is very broad, all internal users are part of ING Wholesale Banking and ultimately contribute to supporting large corporate clients with their financial services and operations. The diversity of internal users highlights that the outcomes of this research must support a wide range of contexts, tasks, and expertise levels. This increases the importance of maintaining design quality, clarity, and reliability when integrating AI into the workflow. Ultimately, the value of AI integration should be reflected in improved usability and effectiveness of the tools delivered to these users.

See Figure 5 for an overview of the primary and secondary stakeholders involved in the project.

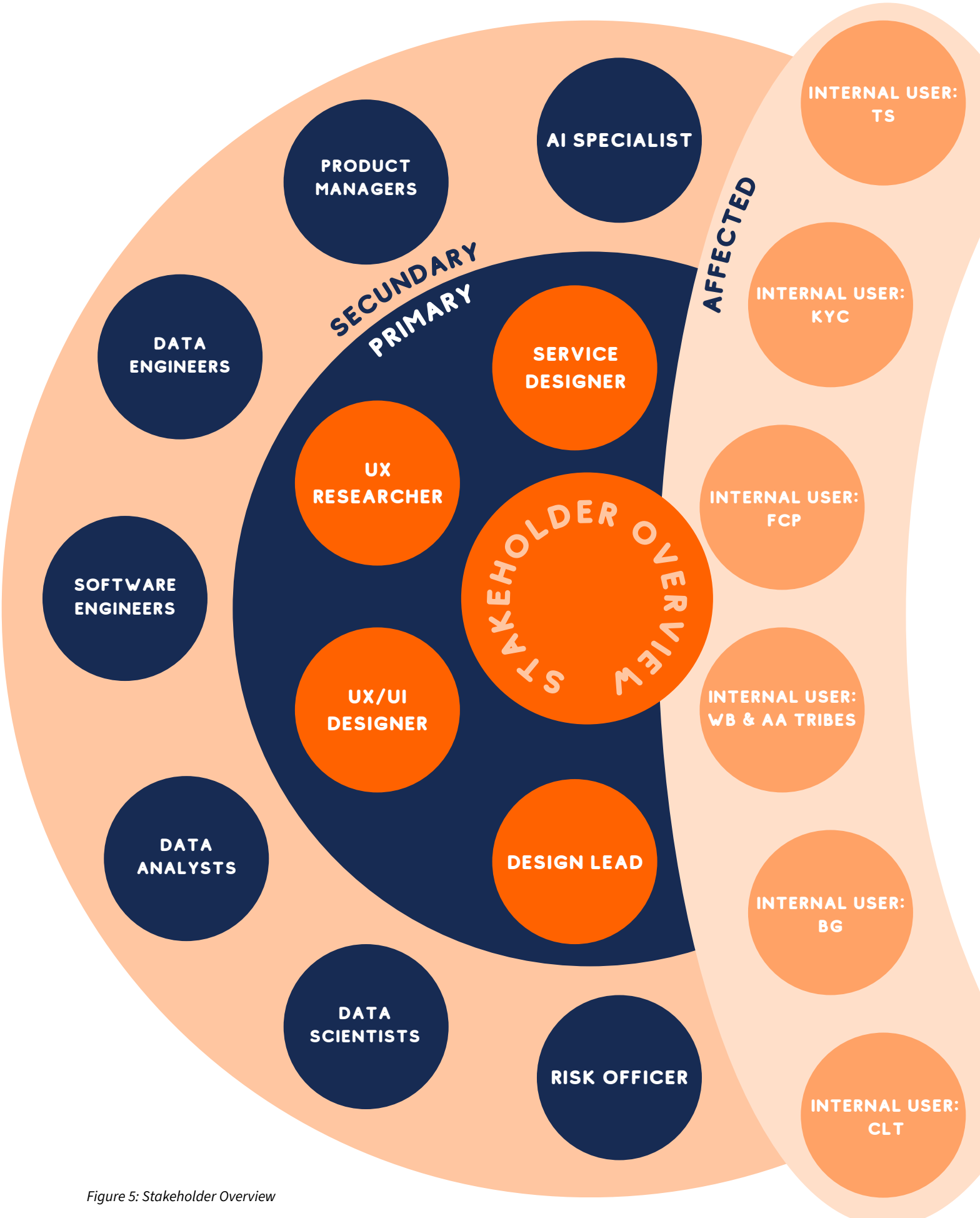


Figure 5: Stakeholder Overview

Chapter 3

Literature Review

3.1 Method of Literature Selection
3.2 Trustworthy and Human Centred AI
3.3 Appropriate Trust
3.4 AI in UX/UI Design
3.5 AI in a Regulated Context
3.6 Summary
3.7 Conceptual Framework

This chapter reviews relevant academic literature on AI, UX and regulated environments. It lays the foundation for the central research question of this paper. It examines how Human-Centred AI, trustworthy AI, and appropriate trust shape the use of AI in design, especially UX/UI design. Across the reviewed literature, a consistent pattern emerges while AI can meaningfully improve design work by enhancing creativity and efficiency, it can also introduce risks associated to trustworthiness. Finally, it looks at operating within a regulated banking environment and synthesises the literature into a conceptual framework that guides the empirical phases of this research.

3.1 Method of Literature Selection

This literature review lays the foundation for the central research question of this paper: How can AI be integrated into the UX design workflow for internal banking products in a way that enhances creativity and efficiency, while safeguarding trust, transparency and design integrity? The literature review can be divided into four subjects: 1) Trustworthy and Human Centred AI, 2) Appropriate trust, 3) AI in UX/UI design, and 4) AI in a regulated context.

The goal of this literature review is to examine existing research on AI in the (UX/UI) design and the banking industry. To identify relevant literature, multiple databases were used, including Scopus, Google Scholar, Web of Science, ScienceDirect, and the TU Delft Library. Searches were done based on keywords related to the research question. Search strings included “AI” / ”Artificial Intelligence”, “banking”, “financial sector”, “regulated sector”, “UX/UI”, “user experience design”, “design(ers)”, “creativity”, “efficiency”, “trust”, “trustworthy AI”, “transparency”, “design integrity”, “human-in-the-loop”, “HCAI”, “human agency”, “authenticity”.
The initial search resulted in approximately 80-90 sources. After removing duplicates and clearly irrelevant papers based on title and abstract screening, around 50 articles remained. These were further reviewed through full-text screening, resulting in a final selection of approximately 20 core papers that directly informed this chapter.

To ensure relevance, literature published after 2021 was prioritised, as AI is rapidly evolving, and information on it must be up to date. Articles were included if they met one of the following criteria:

1. Providing insights on AI in the banking or financial domain
2. Providing insight on AI applications in UX/UI, design processes, creativity or efficiency.
3. Discussed trustworthy AI, Human-Centred AI, appropriate trust, or governance models relevant to regulated environments.
4. Offered frameworks, models, or findings applicable to integrating AI into internal organisational workflows.

Sources that did not meet one of these needs were excluded from the research.

While a focus on recent literature was prioritised, several foundational sources (e.g. Shneiderman, 2021; Thoring & Müller, 2011) were retained because they provide core theoretical principles on human-AI collaboration and creativity that remain highly relevant and are frequently cited in more recent work.

The outcome of this literature review forms the conceptual foundation for defining AI touchpoints within the UX workflow and for evaluating this through the lenses of trustworthiness, human agency, and regulatory constraints, which are central to this research.

3.2 Trustworthy and Human-Centred AI

Kahn et al. (2020) argue that certain tasks are inherently better suited for humans than for machines, particularly in the context of AI-supported work. This reinforces the importance of maintaining a human-in-the-loop approach, where humans and AI collaborate, but humans retain final control and decision-making authority. From a Human–Computer Interaction (HCI) perspective, this is essential to prevent a design of losing authenticity, transparency, and design integrity within design processes. HCI emphasises iterative user involvement through methods such as participatory design, contextual design, and Value-Sensitive Design.

Human agency and oversight also constitute the first requirement in the framework for trustworthy AI described by Kowald et al. (2024). The authors outline six requirements an AI system must meet to be considered trustworthy:

1. Human agency and oversight,
2. Fairness and non-discrimination (equal treatment for all people included),
3. Transparency and explainability (understanding the AI system and being able to explain its decisions),
4. Robustness and accuracy (reliable system performance, including under unexpected circumstances),
5. Privacy and security (protection of personal and sensitive information, and resilience to attacks),
6. Accountability (clarity about who is responsible for an AI system's output) (Figure 6).

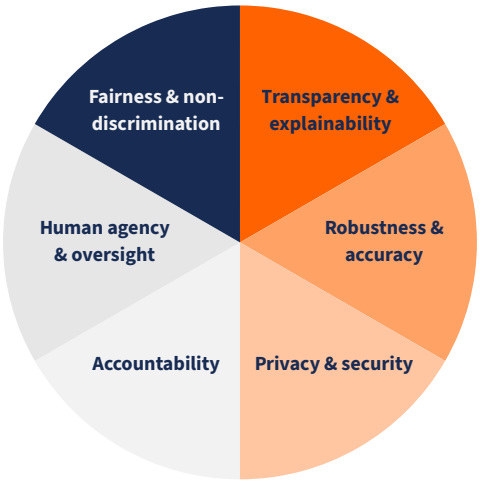


Figure 6: Requirements for trustworthy AI (Kowald et al., 2024)

These requirements apply across the entire AI lifecycle, including design, development, and deployment phases. For this project, they function as a checklist to evaluate whether proposed AI integrations in the UX design workflow are sufficiently trustworthy, an especially vital consideration in a regulated banking environment.

A further dimension emerging from Kowald et al. (2024) is that trustworthiness is context-dependent. An AI system that appears safe, accurate, or trustworthy in one setting may not behave similarly in another. This has direct relevance for this research: in the banking domain, requirements such as privacy and security carry particular weight and cannot be treated as generic or optional.

The concept of Human-Centred AI (HCAI) expands on these ideas. HCAI systems are designed to enhance human performance in specific tasks and to improve user satisfaction. Like the trustworthy-AI framework, HCAI also requires trustworthiness, but adds expectations around usability, safety, and ethical conduct throughout design, development, and implementation. The core principle is that AI should augment, not replace, human capabilities. This view is strongly articulated by Desolda et al. (2025) and Shneiderman (2021), who argue that human intelligence provides contextual understanding, judgement, and experiential knowledge, qualities AI cannot replicate.

Desolda et al. (2025) further explain that HCAI can support designers by acting as a proactive collaborator working towards shared goals. This reflects HCAI's multidisciplinary nature, situated at the intersection of HCI, machine learning, software engineering, and AI ethics. In practice, HCAI involves users throughout the full process, from early design to development and ongoing monitoring, through Human-Centred Design (HCD) approaches. Continuous user feedback ensures not only usability but also alignment with user needs, expectations, and values.

In this research, the trustworthy AI and HCAI principles function as boundary conditions: they define the minimum requirements that any AI integration in the UX workflow must satisfy.

3.3 Appropriate Trust

Degachi et al. (2024) emphasise that effective human–AI collaboration depends on users developing appropriate trust in AI systems. Appropriate trust refers to a calibrated understanding of how trustworthy a system actually is, including awareness of the risks associated with relying on it. It is positioned between the two extremes of over-trust and under-trust, both of which can lead to poor or inaccurate decisions. For example, an over-trusting loan officer may approve a high-risk loan solely based on an AI-generated credit score, whereas an under-trusting officer may disregard reliable AI insights and incorrectly deny an applicant. To avoid such outcomes, users must understand how to apply appropriate trust when interacting with AI systems.

Degachi et al. also describe how appropriate trust plays a role in Human-Centred AI (HCAI) Design, identifying three analytical lenses through which trust can be evaluated:

1. Development Ethicality, which emphasises autonomy, privacy, competence, and fitness-to-task,
2. Communication of Trustworthiness, focusing on understandability, system limitations, and traceability,
3. Interactivity, which concerns responsiveness, personalisation, and user autonomy in the interaction.

Together, these lenses offer a structured way to assess and design for appropriate trust in AI-supported systems (Figure 7). These lenses on appropriate trust complement the trustworthy AI framework by focusing not on the system itself, but on how designers interact with it, making them particularly valuable for designing AI-supported workflows. They can inform the interview questions, function as workflow checkpoints, and contribute directly to the formulation of design principles.

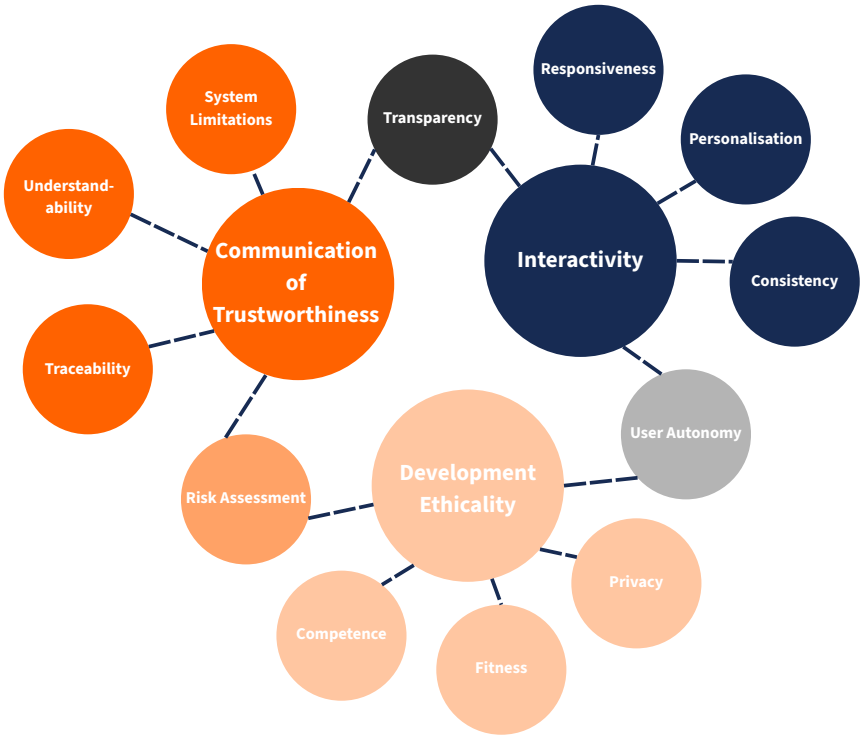


Figure 7: Lenses to evaluate trust

3.4 AI in UX/UI Design

Research on AI within UX design practice presents a diverse and sometimes fragmented landscape. While ML based design supporting tools have progressed substantially, their real-world adoption remains limited. A key reason is that UX designers often under-trust AI systems, mainly because they lack control over the generative process. In addition, they perceive model outputs as generic or too distant from real design constraints. Designers report that integrating such outputs requires so much customisation that the tools become inefficient rather than helpful. Many existing systems are built for oversimplified use cases, which is particularly problematic in UX design where context, constraints, and domain-specific details are central. This mismatch contributes to the well-documented practitioner gap between what AI tools currently support and what UX designers actually need. Most available AI-enabled tools focus on graphical interface elements, such as Photoshop, Figma, Sketch, and Webflow. These tools remain valuable, but designers increasingly express a need for AI support in design-thinking activities, including user research, interviews, and testing (Lu et al., 2022).

Lu et al. (2022) identify four major opportunity areas where AI could augment the UX workflow:

1. Design inspiration search (helping designers find relevant references beyond keyword search),
2. Design alternative exploration (generating alternatives for existing designs),
3. Design system customisation (adapting components or widgets to a company's design style and guidelines),
4. Design guideline violation checks (reminding designers to design inclusively).

These areas directly relate to this research within ING WBAA, as they highlight workflow stages where AI integration could be meaningful.

Beyond these opportunities, Zhu et al. (2024) examine how generative AI (GenAI) models such as ChatGPT can support enterprise-level UX workflows, demonstrating that they can significantly enhance multiple tasks. Where AI was first mainly used for text and image generation, it is now developed to predict user behaviour and assist decision-making (Zhu & Luo, 2022). Designers, who once required extensive modelling skills to render 3D concepts, can now simply describe their idea textually and have AI generate corresponding 3D models. This has the potential to greatly improve efficiency and stimulate innovation (Al-Sa'di & Miller, 2023).

Zhu et al. (2024) further demonstrate that AI can accelerate design-brief creation. Their study shows a 48.6% reduction in operation time when designers use AI compared to manual workflows. Designers perceived this as highly valuable, although they also noted the presence of inaccuracies, such as overly long outputs, distorted viewpoints, or fabricated content. Therefore, verification of authenticity remains essential. Third-party evaluators rated AI-generated briefs as more operable and understandable, yet slightly less accurate, reinforcing the need for verification steps in UX workflows and design principles.

Li et al. (2024) complement this by exploring UX designers' perceptions of GenAI. They find that experienced designers typically view GenAI as a supportive tool that complements their expertise, while junior designers tend to associate GenAI with higher risk, especially regarding job displacement. Their study also maps an eight-step UX design workflow:
1) Business requirements, 2) user requirements, 3) ideation, 4) prototyping, 5) user testing, 6) iteration, 7) solution, 8) design handoff.
They note, however, that workflows vary widely across organisations, with smaller companies often following shorter processes.

Li et al. (2024) also identify six key themes:

1. Limitations of Current UX Design Tools, like a frictional design to development handover, lack of design support and fragmented tools.
2. Challenges in Current UX Design, like managing stakeholder expectations, understanding the end-user, lacking domain knowledge and designing to satisfy both business value and user needs.
3. Attitude of UX designers towards GenAI, as previously mentioned in this report.
4. Human-AI collaboration, where AI is a supportive tool and humans keep agency.
5. Ethical concerns, like originality, copyright, ownership, Privacy, transparency, and equal access to GenAI.

6. Future impact of GenAI in UX, both positively and negatively.

These themes will inform the interview guide for this research.

GenAI, sometimes also referred to as “creative AI”, generates creative outputs based on input from the user, also known as user prompts. For instance, when asked to generate a bike in the style of Piet Mondrian, it can produce multiple computational images without requiring human technical skills. Yet GenAI also exhibits hallucinations, producing confident but incorrect or fabricated information (Thoring et al., 2023). Some researchers state that hallucinations can function as creative features, especially in image generation where unexpected deviations may spark new ideas (Ramaswamy et al., 2024). Despite this potential, hallucinations generally remain a limitation and require human oversight.

For design, defined as creating something new and useful, it is essential to understand how AI can contribute meaningfully. Evolutionary creativity, a theory applicable to both human and machine creativity, is particularly relevant here. Thoring and Müller (2011) describe evolutionary creativity as an iterative process involving generation (via recombination and mutation), selection (choosing and testing ideas) and retention (storing and reproducing information). Thoring et al. (2023) extend this by framing creativity in terms of variation (AI’s strength) and selection (primarily a human task). AI excels in producing numerous design variations based on human prompts, but humans must select the concept that best fits context, quality criteria, and requirements. Selected designs can then be fed back into the variation loop. See figure 8 for an explanation of the interplay between human and AI in design. Computational systems that create multiple design variations based on designers’ inputs are referred to as Generative Design (GD), aligning with the broader principle that AI should remain an assistive tool, while humans retain agency and responsibility (Choudhury et al., 2025). This resonates strongly with ING WBAA’s need for trustworthy, human-controlled AI integration.

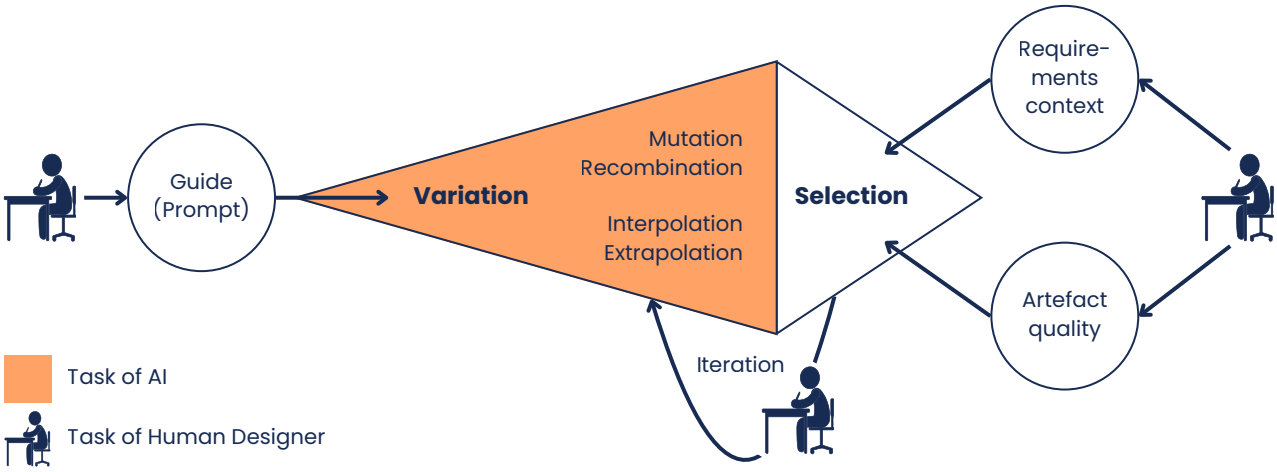


Figure 8: the interplay between human and AI in design described by Thoring et al. (2023)

Thoring et al. (2023) also outline ten opportunity areas where AI could augment design even further:
1) Guided prompts, 2) Mutation control, 3) Recombination control, 4) Interpolation (better human control over direction/degree), 5) Extrapolation (make AI think beyond latent space), 6) Selection based on context, 7) Selection based on artefact quality, 8) Iteration guidance, 9) Transferable concepts, 10) Externalisation: naming/expressing latent dimensions.
These ten areas directly inform this research and will guide the interview questions about the UX workflow and its pain points.

Furthermore, Georgieva and Georgiev (2025) show that GenAI can stimulate creativity and imagination for both designers and non-designers. However, they warn that GenAI is double-edged: while it enhances ideation, it can also disrupt workflow structures and raise issues around authorship and agency. Major challenges include unpredictable outputs, the complexity of prompt engineering, and the need for interdisciplinary collaboration. The use of GenAI also introduces broader ethical considerations, including sustainability, bias, discrimination, data use, and labour exploitation, as highlighted by van der Maden et al. (2024). Finally, Choudhury et al. (2025) call for more empirical studies with professional designers, as well as stronger concerns for privacy, security, consent, and ethical practice, highlighting an important gap that this research aims to address.

Where the previous sections define constraints and interaction principles, this stream specifically identifies where in the UX workflow AI can add value, forming the basis for identifying AI touchpoints in this research.

3.5 AI in a Regulated Context

AI has the potential to improve UX/UI design in several ways, such as increasing efficiency, reducing cognitive load, and enhancing creativity. At the same time, AI is also transforming the broader banking industry, where it is increasingly applied to tasks such as personalised customer experience optimisation, credit-risk evaluation, fraud detection and prevention, automation of repetitive work, predictive analytics, and audit efficiency. Together, these applications contribute to improved privacy, efficiency, security, risk management, compliance, decision-making, and customer experience within financial institutions. However, as Pamarthi (2024) notes, the adoption of AI in banking also introduces risks, including technological limitations, a lack of expertise and research, unclear privacy and ethical regulations, insufficient data ecosystems, high resource costs, and low organisational awareness regarding AI adoption (Figure 9).

Integrating AI into UX design workflows becomes even more complex when operating within a highly regulated domain such as banking. Institutions like ING WBAA process sensitive personal and financial data, which means that AI systems must comply with strict standards for security,

privacy, and data governance. Pamarthi (2024) highlights that financial technology systems are frequently targeted by cyberattacks, underscoring the need for strong safeguards such as encryption, multifactor authentication, and firewalls to protect organisational and customer data. This aligns with ING's internal requirements, which mandate that AI tools must not expose sensitive information and must comply with internal security protocols.

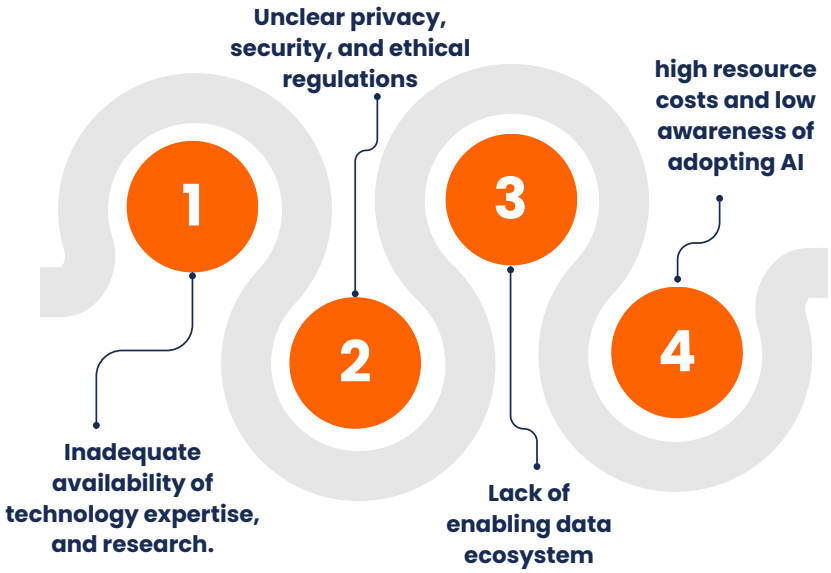


Figure 9: Challenges for AI adoption (Pamarthi, 2024)

The earlier-discussed trustworthy AI framework by Kowald et al. (2024) is directly applicable here. The authors emphasise that the trustworthiness of AI is context-dependent: an AI system considered trustworthy in one domain may not be trustworthy in another because the associated risks, expectations, and potential harms differ. In regulated environments such as banking, the requirements of privacy, security, robustness, and accountability therefore carry significantly more weight than in less regulated design settings.

In addition, explainable AI (XAI), human oversight, and ethical governance are essential considerations when AI is used in financial UX workflows. Xu et al. (2024) show that AI-driven UX/UI design has already transformed the FinTech sector by reducing cognitive load, speeding up design processes, improving accuracy, and increasing customer satisfaction. However, they also stress that these benefits must be accompanied by transparent systems, human-in-the-loop practices, and clear ethical guidelines, especially in domains where errors can have high impact.

Together, these insights highlight that AI in a regulated banking context requires a heightened level of trust, security, transparency, and oversight. For ING WBAA, this means that any proposed AI integration into the UX workflow must be evaluated not only for creativity and efficiency gains, but also for compliance with strict regulatory and ethical standards. In this context, trustworthiness functions as a boundary condition for AI use, meaning that identified

opportunities can only be realised when they meet requirements related to privacy, security, accountability, and human oversight.This positions trustworthiness not as an additional design consideration, but as a prerequisite that determines whether and how AI can be meaningfully integrated within the UX workflow.

3.6 Summary

The literature together forms a coherent structure for this research. AI in UX identifies potential opportunity areas within the workflow, creativity research explains how AI supports variation and exploration, appropriate trust explains how designers engage with AI systems, and trustworthy AI and HCAI define the conditions under which such use is acceptable.

Across the reviewed literature, a consistent pattern emerges, while AI can meaningfully enhance design work, particularly in terms of creativity and efficiency, it also introduces risks when outputs are ungrounded, inaccurate, or fabricated.
This reinforces the need for AI to be integrated into the ING WBAA UX design workflow strictly as an assistant, rather than as an autonomous designer. This perspective aligns strongly with the principles of Human-Centred AI (HCAI), where human agency, oversight, and responsibility remain central, and AI functions as a supportive tool rather than a substitute for human judgement. The literature on evolutionary creativity further supports this position: AI excels at generating variations, but selection, contextual judgement, and quality assessment must remain in human hands to maintain design integrity (Thoring et al., 2023; Thoring & Müller, 2011). Similarly, enterprise UX studies show that although GenAI significantly speeds up tasks such as design-brief creation, its outputs frequently contain inaccuracies, distortions, or hallucinations, requiring ongoing verification by designers.

Taken together, the literature strongly indicates that for UX work within a regulated banking environment, maintaining human control at all times is essential, not only to safeguard creativity and decision-making quality, but also to ensure trustworthiness, transparency, and alignment with regulatory expectations (Kowald et al., 2024).

3.7 Conceptual Framework

Based on the conducted literature review, a conceptual framework was developed. Figure 10 presents a visualisation of this framework, which combines the main insights from the literature and translates them to the context of ING WBAA.
The framework connects three core elements:

1. The UX design workflow as described by Li et al. (2024)
2. AI opportunity spaces that can augment this workflow, identified by Lu et al. (2022)
3. Governance conditions for trustworthy AI in a regulated banking environment, drawing on the work of Kowald et al. (2024), Shneiderman (2021), Desolda et al. (2025), and Degachi et al. (2024).

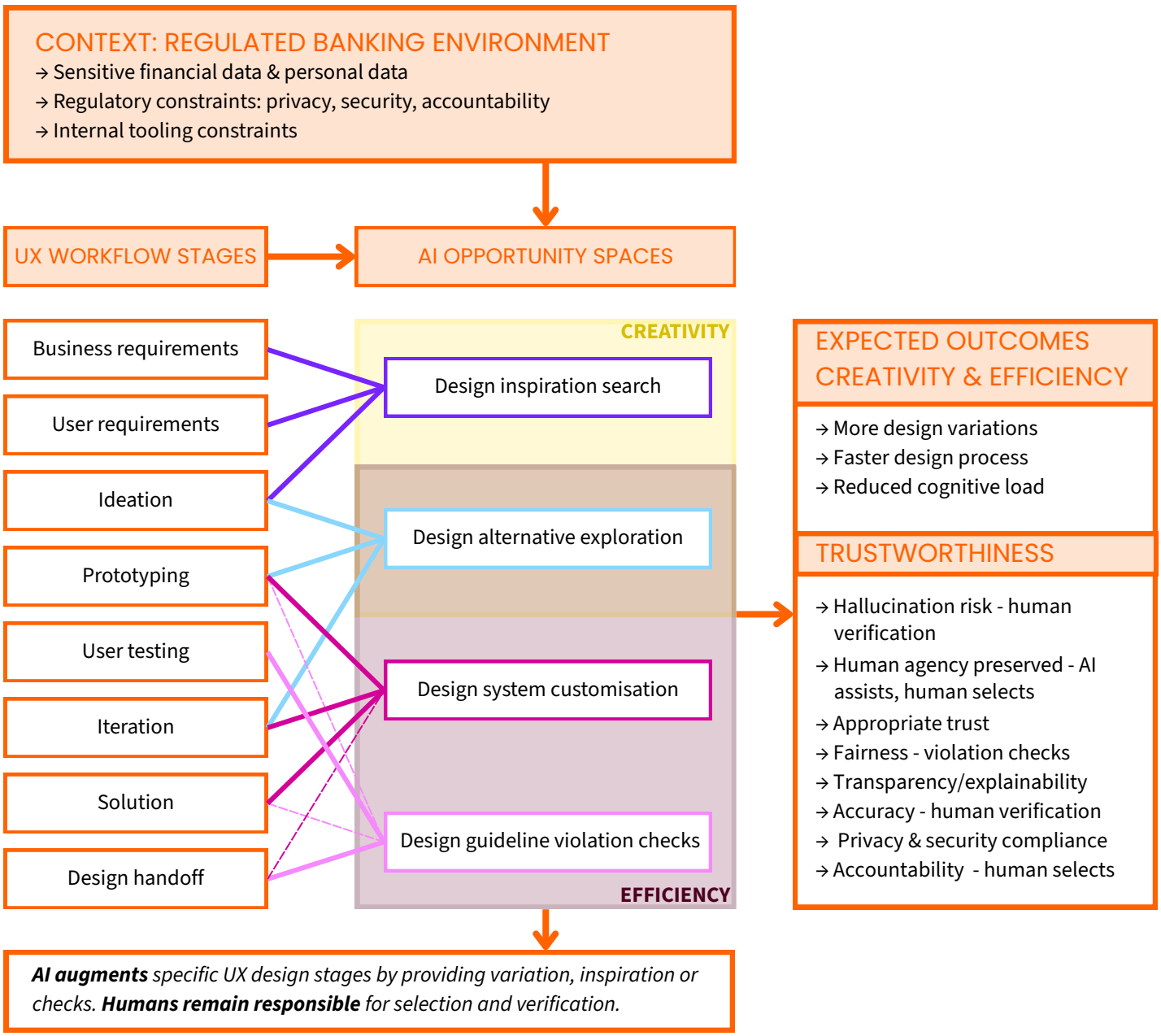


Figure 10: Conceptual framework for integrating AI in the UX design workflow

At the top of the framework, the regulated banking environment represents the organisational context of ING WBAA. This context is characterised by the handling of sensitive financial and personal data, internal tooling constraints, and strict regulatory requirements related to privacy, security, and accountability. These factors determine the conditions under which AI may be used. This aligns with the research on AI adoption in the banking sector, which highlight both significant opportunities (like fraud detection, credit-risk evaluation, and automation) and risks related to security, compliance, and governance (Pamarthi, 2024).

The middle of the framework connects the UX workflow stages to four AI opportunity spaces identified in the "AI in UX/UI design" section of this chapter. These opportunity spaces support creativity and efficiency, as described by Thoring et al. (2023), Georgieva and Georgiev (2025), and Zhu et al. (2024). Examples of such support include generating visual and textual

inspiration, guiding prompt formulation, producing diverse design alternatives, aligning designs with organisational design systems and guidelines, and performing design guideline violation checks. Furthermore, the framework explicitly highlights that AI functions only as an assistive tool, and that human agency remains central. AI can support designers through variation, inspiration or automated checks, but human designers remain responsible for verification and final decisions (Shneiderman, 2021).

On the right side of the framework, the expected outcomes are divided into two groups. First, creativity and efficiency outcomes include more design variations, faster design processes and reduced cognitive load for designers (Thoring et al., 2023; Georgieva & Georgiev, 2025; Zhu et al., 2024). Secondly, the trustworthiness block summarises governance conditions drawn from the trustworthy-AI framework (Kowald et al., 2024), Human-Centred AI (Shneiderman, 2021; Desolda et al., 2025) and work on appropriate trust (Degachi et al., 2024). These conditions consist of:

1. Human verification due to hallucination risks and inaccuracies in AI outputs
2. Preservation of human agency (AI assists, humans select)
3. Development of appropriate trust to prevent users from over- or undertrusting a system
4. Fairness through guideline and violation checks
5. Transparency and explainability of AI-generated content
6. Compliance with privacy, security and accountability requirements.

Initially, this project adopted the following research question: “How can AI be integrated into the UX design workflow for internal banking products in a way that enhances creativity and efficiency, while safeguarding trust, transparency and design integrity?”

During the literature review, it became clear that trust, transparency and design integrity are not separate constructs, but are all part of trustworthy AI, as described by Kowald et al. (2024). In addition, informal conversations revealed that the UX Research & Design team does not exclusively work on banking products but designs internal tools for other teams within ING. Although these tools often support banking-related activities, they are not always financial products. For these reasons, the research question was refined to:

“How can AI be integrated into the UX design workflow for internal tool development in a way that enhances creativity and efficiency, while safeguarding trustworthiness?”

The removal of the term banking from the research question does not diminish the importance of the regulated context, as ING operates within the financial sector. Consequently, the research remains situated within a regulated banking environment, and trustworthiness remains a central concern.

The conceptual framework therefore serves as a base for the further work in this thesis. It guides the design of interview questions, the identification of AI touchpoints in the current workflow, and the evaluation of proposed AI integrations against both creativity and efficiency gains and trustworthiness conditions in ING's regulated banking context.

Chapter 4
Methodology

4.1 Research Design
4.2 Data Collection
    4.2.1 Informal Conversations
    4.2.2 Semi-Structured Interviews
    4.2.3 Additional Steps

The conceptual framework outlined in the previous chapter provides the theoretical and analytical foundation for this research. By integrating insights from the literature review on AI in UX design, trustworthy AI, Human-Centred AI, and AI adoption in regulated environments, the framework shows where AI can meaningfully augment the UX design workflow and under which conditions such integration can be considered trustworthy. This chapter builds on this framework and will describe how the framework is used as a guide for the research design, the development of the interview questions, and for identifying relevant AI touchpoints within the current UX workflow.

4.1 Research Design

This study adopts a qualitative research approach to explore how the current UX design workflow at ING Wholesale Banking Advanced Analytics (WBAA) is structured and how AI can be integrated into this workflow. A qualitative approach is appropriate because the research focuses on the experiences and perspectives of members of the ING WBAA UX Research and Design team, for which rich, contextualised insights are required. Qualitative research enables an in-depth exploration of participants' subjective experiences and viewpoints, which is essential for connecting the findings to real-world organisational challenges.

At the same time, qualitative research has both strengths and limitations. Its strengths include contextual relevance, in-depth insights, holistic perspectives, recognition of participant voice, and scope for reflexivity and flexibility. These characteristics make qualitative research particularly suitable for understanding complex phenomena. However, qualitative research also presents challenges, such as limited generalisability, high resource demands, research complexity, strong dependence on researcher knowledge and skills, and susceptibility to researcher bias (Lim, 2024). When conducting qualitative research, it is therefore important to remain aware of these dual aspects and to account for them throughout the research process.

Lim (2024) further emphasises the importance of distinguishing between single-case and multiple-case study designs in qualitative research. This study is conducted as a single-case study, as the data are analysed within the context of one specific organisational case. The case under investigation is the UX Research & Design team within ING WBAA, with the aim of exploring how AI can be integrated into the UX design workflow for internal tool development. Defining the study as a single-case study is particularly relevant because factors such as trustworthiness, governance, and workflow constraints are highly context-dependent. Within this single case, multiple stakeholders are considered at a conceptual level (as described in Chapter 2.2), including product managers, engineers, data specialists, and risk officers. However, for the primary data collection phase, the focus is placed on the UX Research & Design team, as they are the direct users of the UX workflow and therefore the primary stakeholders of the proposed AI-augmented solution. This ensures alignment between the research design and the central research question.

The primary objective of this research is to develop a deep understanding of the specific organisational context, rather than to produce statistically generalisable findings. Such depth is necessary to identify where AI can genuinely add value and where it may introduce risks within this setting. The goal is to translate the findings into a well-structured AI-augmented UX design workflow, accompanied by a set of design principles and a practical playbook tailored to this case. Later in the process the deliverables are revised. Ensuring that the outcomes provide tangible value for members of the UX Research & Design team at ING WBAA is a central aim of the study.

To structure the overall research process, this study follows the Double Diamond framework (Figure 11), developed by the Design Council (2005). This Double Diamond framework alternates between phases of exploration (divergence) and focus (convergence), making it well suited for addressing complex organisational challenges, like in this project. The framework guides the research process from exploring and analysing the organisational context and current UX design workflow at ING WBAA (Discover and Define) to developing, testing, and refining an AI-augmented UX design workflow (Develop and Deliver). The Double Diamond allows for flexibility and iteration, enabling new insights to inform subsequent steps while maintaining a clear overall direction. This is particularly relevant in the context of this study, as findings may require adjustments throughout the research process due to the regulated and deadline-driven environment in which ING WBAA operates.

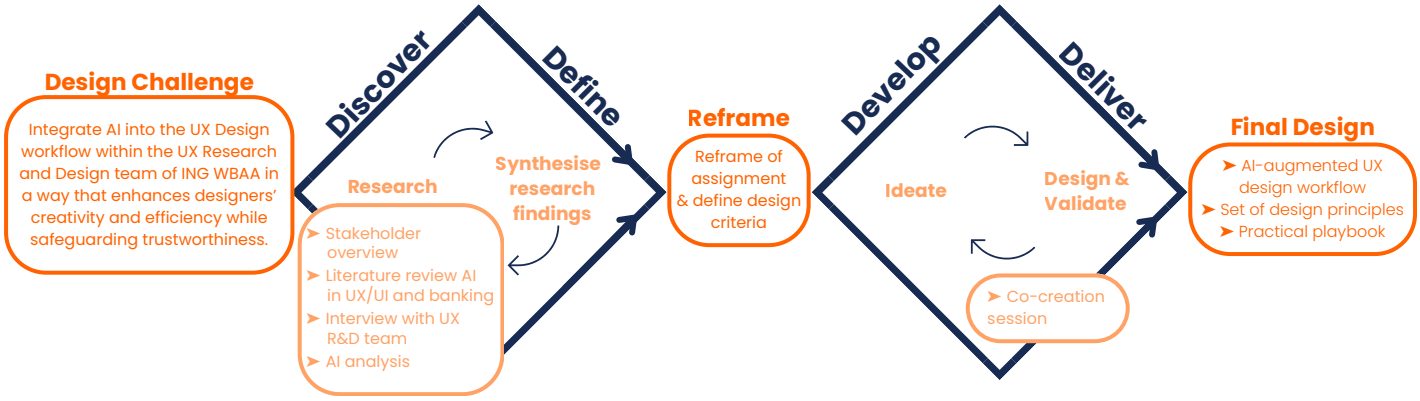


Figure 11: Project appoach

4.2 Data Collection

Data for this study is collected using multiple qualitative methods to get a rich and contextualised understanding of the UX design workflow at ING WBAA and the role AI currently plays within it. This triangulation approach strengthens the trustworthiness of the findings by capturing the phenomenon from different perspectives (Lim, 2024).

4.2.1 Informal Conversations

At the beginning of this project, as well as throughout its duration, informal conversations were conducted with members of the UX Research & Design team and other stakeholders within ING WBAA. These conversations took place during regular work interactions and meetings and served as an important contextual foundation for the research. In the early stages of the project, they were useful for gaining an initial understanding of the roles and responsibilities within the team and for developing insight into the extent to which AI was already being used in ongoing projects. This understanding helped guide the search to relevant literature and the development of the interview questions, as the researcher started the formal data collection phase with baseline contextual knowledge. The informal conversations contributed to building an understanding of the organisational context, clarifying terminology specific to ING, and surfacing early insights related to existing workflows, challenges, and perceptions of AI use.

Although these conversations were not systematically analysed as primary data, they played an important supporting role throughout the research process.

4.2.2 Semi-Structured Interviews

After the creation of the conceptual framework based on the reviewed literature, an interview protocol was developed, which can be found in Appendix B. This protocol forms the primary data collection method of this research and consists of semi-structured interviews with members of the UX Research & Design team. Semi-structured interviews were chosen to allow the conversation to proceed smoothly and flexibly when needed, enabling participants to share their experiences, perspectives, and concerns in depth, while also ensuring consistency across interviews using a shared interview guide. The interviews focused on the current UX design workflow, existing AI usage, perceived opportunities and risks of AI integration, and the conditions required for trustworthy AI use, to explore how AI could augment the UX workflow within the specific organisational and regulatory context of ING WBAA.

A total of 10 participants from the UX Research & Design team were included in the interviews. The team consists of 12 members in total. However, 2 members were unavailable due to scheduling constraints, resulting in a final sample of 10 participants. While full participation would have been preferable, this sample still represents the majority of the team and is considered sufficient for qualitative research, where the focus lies on depth rather than statistical representativeness. The participants included UX researchers, UX/UI designers, and service designers, ensuring representation of the different roles within the team. This diversity allowed for capturing a broad range of perspectives on the UX workflow and the use of AI within it.

After conducting the interviews, a thematic analysis was performed using ATLAS.ti a qualitative data analysis software tool that supports systematic coding and pattern identification. All interview transcripts were first anonymised and then imported into the software. Meaningful segments of text were then labelled with codes capturing recurring statements, experiences, and perceptions expressed by the participants. ATLAS.ti enabled the identification of how frequently certain codes occurred across participants, providing an overview of shared patterns within the dataset.

The coding process followed a hybrid approach, combining both deductive and inductive coding. Deductive codes were initially derived from the conceptual framework developed in the literature review, including themes related to AI opportunity areas, trustworthiness, and human-AI collaboration (Figure 12). At the same time, inductive coding was applied to capture new and unexpected insights emerging directly from the interview data, ensuring that the analysis remained grounded in participants' experiences (Figure 13).



Figure 12: Examples deductive codes

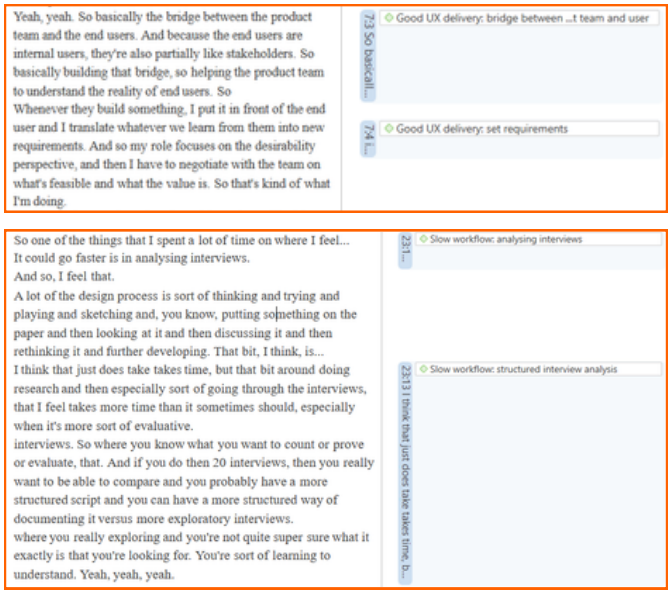


Figure 13: Examples inductive codes

After this, the related codes were clustered into categories to find the overarching themes that present recurring concerns, needs, expectations and boundaries of the participants. By focusing on patterns across all interviews, this thematic analysis emphasises shared experiences rather than individual preferences, providing a grounded understanding of the collective wants and needs regarding AI support within the UX Research & Design team.

To improve the quality and trustworthiness of the research, several steps were taken. First, all interview transcripts were anonymised prior to the start of the thematic analysis to ensure participant confidentiality. In addition, reflexive notes were maintained throughout the research process in order to remain aware of the researcher's own assumptions and potential biases. Second, codes and themes were iteratively reviewed and refined during the analysis process to ensure internal consistency and alignment with the data. Third, triangulation was applied by comparing insights from the semi-structured interviews with findings from informal conversations and the literature review. This helped to validate emerging patterns and strengthen the credibility of the findings.

4.2.3 Additional Steps

In addition to the interviews with the UX Research & Design team, a co-creation session and a validation session with the team, as well as validation conversations with other key stakeholders, such as a risk officer and a data scientist, were conducted in a later phase of the project. These stakeholders play an important role in ensuring that proposed AI integrations align with organisational, technical, and regulatory constraints within ING WBAA. The purpose of these validation activities is to evaluate whether the developed design is feasible, compliant, and trustworthy within this specific organisational context. By incorporating these perspectives, the study ensures that the final design is not only user-centred but also aligned with the broader requirements of a regulated banking environment.

Chapter 5

Preliminary Results

5.1 Interview Analysis
5.2 Clustering
    5.2.1 Sensemaking and Alignment
    5.2.2 Qualitative Research
    5.2.3 Continuous Iteration
    5.2.4 Sparring Partner
    5.2.5 Trust
    5.2.6 Organisational Limitations
    5.2.7 User Validation
    5.2.8 Alternative Exploration
    5.2.9 Lack of Standardisation
    5.2.10 Conclusion
5.3 Revised Framework

This chapter highlights the findings from the 10 semi-structured interviews with UX designers, UX researchers and service designers within ING WBAA. The interviews focused on participants' current workflow, their AI use, opportunity areas and trust level. The interview findings reveal both shared patterns and role-specific differences. Additionally, the findings uncover key pain points and highlight where AI support is currently limited, forming the basis for identifying opportunity areas for the ideation phases. The findings are translated into a revised framework that builds upon the previous conceptual framework.

5.1 Interview Analysis

After conducting the interviews with members of the UX Research & Design (UX R&D) chapter of ING Wholesale Banking Advanced Analytics, clear similarities and differences emerged. Among the ten participants, three had the role of Service Designer, two were UX Researchers, four were UX Designers, and one participant was transitioning from UX Designer to UX Researcher. These role distinctions were reflected in how participants described their contribution to the UX workflow and their position within product squads.

UX Designers generally described a workflow that aligns with the UX process described by Li et al. (2024), while noting that this workflow is not linear in practice. Instead, designers reported moving back and forth between stages depending on project context, stakeholder involvement, and product maturity. Despite this non-linearity, most UX Designers indicated that they eventually engage with all stages of the workflow represented in the conceptual framework. Service Designers described a broadly similar workflow but with a distinct focus. Their work focuses less on interface-level design only and more on alignment, coordination, and orchestration across teams and stakeholders. As a result, their activities span multiple workflow stages, with particular attention to long-term coherence, shared understanding, and system-level integration. In contrast, UX Researchers described a more specialised workflow that is primarily concentrated in the early research and discovery phase. They act as a bridge between users and product teams by identifying user needs, uncovering pain points, and defining design criteria that inform later design decisions. After this phase, responsibility typically shifts to UX Designers, who lead ideation, prototyping, testing, and iteration. Taken together, the UX Research & Design chapter collectively covers all stages of the workflow described by Li et al. (2024).

As described in previous chapters, members of the UX R&D chapter operate within cross-functional product squads. The UX professionals often work alone or with one or two additional UX colleagues within a squad. The interviews revealed considerable variation in the types of tools being developed. All projects discussed involved internal tools with AI features integrated into their functionality. The primary responsibility of the UX professionals in these squads is the design of user interfaces and interaction flows for these AI-enabled tools, rather than the development of AI models themselves.

5.2 Clustering

Based on the thematic analysis of the interviews, the codes were organised into clusters with overlapping themes that form the base of the revised framework (Figure 16 on page 53). The framework distinguishes three phases: Research/Discovery, Design, and Finalisation.

5.2.1 Sensemaking and Alignment

When discussing what constitutes good UX delivery within the product squads, six participants emphasised their role as intermediaries between users, developers and other stakeholders. UX professionals are expected to align user needs with business value, translate insights into clear requirements, and support decision-making within the team. This mediating role was described by one of the Service Designers as “not only talking to other UX designers or users, but also a lot to stakeholders and the tech lead and the product owner, discussing about the direction of the product” (P1). Similarly, a UX Researcher referred to their role as “basically the bridge between the product team and the end users” (P2), and a UX Designer as “the representative of the user that puts on the table what is necessary or needed for the user” (P9).

Activities such as journey mapping, risk identification, usability testing, and synthesising fragmented information were frequently mentioned. Several participants referred to this as “organising the chaos” inherent in complex, data-driven projects. The ultimate goal of these activities is to deliver a structured, validated design that can be further developed and implemented by other members of the product squad.

5.2.2 Qualitative Research

Across the interviews, qualitative research, particularly interview analysis, was consistently described as one of the most time-consuming parts of the UX workflow. While conducting interviews was generally considered manageable, participants identified significant challenges in the surrounding activities. These include planning and coordination, reviewing recordings, analysing and synthesising insights, creating reports, and waiting for follow-up responses from stakeholders. One participant noted that “what I spend a lot of time on is analysing interviews”, adding that this phase “takes more time than it sometimes should” (P1). This was echoed by another participant, who stated that “it’s always hard to get enough time to do the analysis thoroughly” and described the process as “a lot of effort going through the interviews” (P2). Several participants noted that analysis requires substantially more time than the interviews themselves, especially when many interviews are conducted. As one participant illustrated, “I spent around five hours on user interviews, but then I need to spend around ten hours on analysis” (P8).

AI support in this phase is currently limited to transcription and summarisation, primarily through Copilot. All AI-generated output is validated due to concerns about hallucinations. However, participants indicated that validation is relatively straightforward because they conducted the interviews themselves and are therefore able to quickly identify inaccuracies in the generated output. This situation highlights a clear opportunity space within the research and discovery phase, as AI could potentially be used for more than transcription and summarisation alone, as long as human oversight remains in place.

5.2.3 Continuous Iteration

Across the interviews, participants indicated that most projects are not considered finished but continue to evolve based on ongoing user feedback. Participant 4 said: “We create something

and we keep iterating on it. It's never really 'done'". This continuous iteration is logical seen the fact that the tools are AI-enabled tools, which require frequent updates to remain accurate, relevant, and trustworthy. Several participants described products that are already in active use while still undergoing substantial refinement. As a result, the notion of design handoff differs from traditional linear design processes. Rather than marking a clear endpoint, design handoff occurs while designs are still being iterated on and refined in collaboration with developers and other stakeholders. One participant described this dynamic by explaining that "with every user test, we learn something new, so we need to tweak something with the design and then align again with business and other stakeholders" (P3). This challenges conventional interpretations of the handoff phase and reinforces the non-linear nature of UX work within AI-driven product contexts.

5.2.4 Sparring Partner

Although all participants were working on AI-related products, their personal use of AI tools within the UX process was described as relatively limited. One clear example discussed was AI-Driven Due Diligence (AIDD), a product that leverages AI to extract and interpret data from documents. Despite designing such systems, participants reported constrained AI usage in their own workflows. This limitation was caused by organisational constraints, such as restricted access to AI tools due to regulatory and data security considerations, as well as limited awareness of AI possibilities. As a result, a gap emerges between the AI-driven nature of the products being designed and the low integration of AI within the UX design and research process itself.

When participants were asked about their personal use of AI, both within the work environment and in their personal lives, a relatively limited set of tools was mentioned. Across all ten interviews, participants referred to the use of ten distinct AI tools in total. All participants reported using Microsoft Copilot in their work environment, as this is the only AI tool officially approved and accessible on ING-issued laptops. In addition to this work tool, several participants reported using other AI tools in their personal contexts. These included ChatGPT (7 participants), Google Gemini (4), Perplexity (3), Figma Make (3), Claude (2), Nano Banana (2), and, mentioned by a single participant each, GitHub, MidJourney, and Codex (Figure 14).

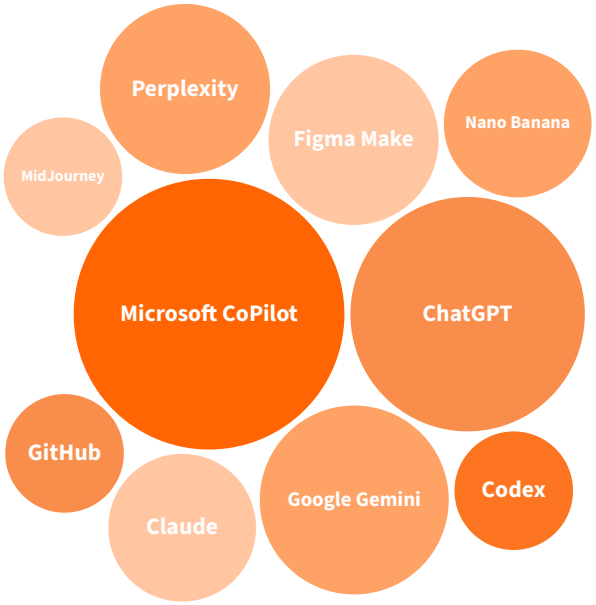


Figure 14: Overview of frequency of AI tools mentioned by participants

Most of the mentioned tools were described as being used primarily as sparring partners, supporting activities such as ideation, reflection, writing, and structuring thoughts, rather than as tools for automation or creation. Participants associated AI primarily with conversational and reflective support. One participant explicitly stated: “I use it as a sparring partner to create better research plans, insight reports, and presentations” (P4). Similarly, Participant 8 noted: “I basically take AI as a sparring partner. I put very unstructured thoughts into AI and iterate from there”.

The limited knowledge and diversity of tools available to them, combined with the emphasis on AI as a sparring partner, suggests a relatively narrow awareness of the broader range of AI capabilities that could potentially support UX research and design workflows. Participants indicated that this limited use is influenced by organisational restrictions as well as uncertainty about which AI tools are available or relevant for their work context. At the same time, this limitation also highlights a clear opportunity space. The findings suggest potential to expand the role of AI beyond its current use as a sparring partner, towards more varied and targeted forms of support within UX research and design processes.

5.2.5 Trust

Across the interviews, participants consistently emphasised the importance of maintaining human control when using AI. This emphasis reflects a key condition for appropriate trust: AI is accepted when it supports human judgement, but not when it replaces it. Particularly in the research phase, participants expressed an appropriate level of trust in AI for supportive and low-risk tasks, such as transcription and summarisation. These tasks were seen as efficiency enhancing without directly shaping design decisions.

However, participants were more cautious when AI outputs could directly influence design decisions or stakeholder communication. In these later phases, Design and Finalisation, participants demonstrated what can be characterised as a form of cautious trust. Their trust depends on factors such as output reliability, and the ability to verify results. Several participants described AI outputs as inconsistent, overly generic, or “average,” making them unsuitable for decision-critical contexts. As one participant explained, AI support is valuable, but “it’s not something you can really rely on for final decisions” (P7). Concerns about hallucinations and misinterpretations further reinforced this cautious trust. Participants indicated that they were particularly reluctant to trust AI outputs that lacked transparency, such as clear sources or citations. One participant explicitly noted that when outputs are not traceable, “I immediately don’t trust it” (P8). In addition, data privacy and regulatory considerations contributed to hesitation.

Lastly and maybe most importantly, participants also pointed to a lack of knowledge about the broader possibilities of AI as a key factor shaping their trust levels. Several indicated uncertainty about which tools are available, allowed, or suitable for specific UX tasks. As a

result, most participants relied almost exclusively on Microsoft Copilot, not necessarily because it was perceived as the most capable tool, but because it was the only one they felt confident using. One participant reflected that “if I knew better what I could do with it and where it would be practically helpful, I would probably use it more” (P1).
This indicates that trust is not rejected entirely, but is conditional on the perceived reliability and traceability of AI outputs. As a result, this theme informs the revised framework by highlighting the importance of transparency, verification, and human oversight as key conditions for AI use in the workflow.

5.2.6 Organisational Limitations

Participants frequently referred to organisational constraints as a key factor shaping their current use of AI tools. As a result, most participants relied almost exclusively on Microsoft Copilot for work-related tasks, regardless of whether other AI tools might be better suited for specific UX activities. This reliance was not necessarily driven by preference, but by perceived safety and approval within the organisational context. One participant explained that Copilot is used simply because “that’s the one we are allowed to use on our ING laptop” (P5) and described their current AI use as “heavily” dependent on this single tool. In addition to formal restrictions, participants described uncertainty about what is permitted in practice, for example whether external AI tools could be used if all recognisable data were anonymised. This lack of clarity often resulted in cautious behaviour and limited exploration of AI capabilities. As one participant noted, “I’m never completely sure what I’m allowed to put into other tools, even if I anonymise everything” (P6). Another participant reflected that this uncertainty leads to conservative choices, stating that “you rather do what you know is safe than risk doing something wrong” (P2).

Although organisational constraints emerged as a recurring theme across the interviews, addressing these constraints is not the primary focus of this research. Instead, these constraints are taken as a given within the organisational context.

5.2.7 User Validation

During the interviews, several participants indicated that user testing can be time-consuming and difficult to organise, primarily because end users are hard to reach or have limited availability. As one participant noted, “user insights are very nice to have, but always so difficult to find those users, to find time, their time” (P6). Similarly, another participant emphasised that user testing frequently becomes a bottleneck in projects because “we don’t always have access to users and their schedules are packed” (P9).
This challenge was, however, not reported uniformly across the sample: four out of ten participants explicitly described difficulties in accessing users for testing, whereas others reported having relatively strong and ongoing relationships with their user groups. For example, one participant emphasised the importance of maintaining good long-term

relationships with users in order to facilitate repeated contact and smoother recruitment for future testing activities. This variation suggests that challenges related to user availability are partly contingent on existing user relationships and project context, rather than being inherent to user testing as a practice.
For participants who did experience difficulties in reaching users, limited availability was described as a practical constraint that could lead to delays or a reduction in the scope of testing activities. In these cases, constrained access to users was perceived to slow down iteration cycles and limit timely feedback on design decisions, pointing to a structural bottleneck in the testing phase of the workflow.

Based on these findings, an opportunity area emerges for exploring the use of AI as a user in testing activities. Rather than replacing real user involvement, AI-based users could support early or interim evaluations by simulating user interactions, identifying potential usability issues, or stress-testing assumptions prior to engaging human participants. In this interpretation, AI functions as a complementary tool that helps designers anticipate issues, prioritise test scenarios, and prepare more focused user tests. Such an approach could reduce dependency on immediate user availability while preserving human testing for moments where contextual understanding, empathy, and accountability are essential.

5.2.8 Alternative Exploration

The exploration of design alternatives was recognised by multiple participants as an important component of the design process, particularly during ideation and early prototyping. Interviewees emphasised that considering multiple alternatives supports critical reflection, reduces premature convergence, and improves the overall quality of design decisions. At the same time, several participants noted that time constraints often limit the extent to which broad alternative exploration can be pursued in practice. Under such conditions, designers tend to rely more heavily on prior experience, familiar patterns, or stakeholder preferences rather than engaging in wide divergence. As one participant explained, designers' ideas are inherently shaped by what they have previously encountered, noting that "your ideas are limited to the experiences you've had. If you haven't experienced a certain flow or edge case, it wouldn't be top of mind" (P3). This illustrates how constrained exploration can reinforce experiential bias, narrowing the range of considered alternatives when time or exposure is limited.

Several participants therefore expressed interest in AI as a way to expand exploratory capacity without significantly increasing workload. One participant described this as using AI to surface alternatives that can then be critically evaluated by the designer: "If an AI tool could give me different variants or alternatives with the same priorities, that would be really helpful… then from a human eye you decide which one makes more sense" (P10).

Based on these findings, an opportunity area emerges for AI-supported alternative exploration. AI could be leveraged to rapidly generate, vary, or recombine design alternatives in the early stages of the process, thereby supporting broader exploration within existing time constraints.

5.2.9 Lack of Standardisation

Lastly, as previously discussed, the design handoff phase differs from a traditional linear handoff. Rather than marking a clear endpoint, handoff takes place while products are still evolving. Within this phase, participants frequently pointed to a lack of consistency across the tools being developed. Several participants noted that the teams creating AI-enabled tools are not required to follow shared design guidelines, such as standardised colour schemes, components, or interaction patterns. Participants acknowledged that this lack of alignment is not inherently problematic, as the tools serve different purposes and are not necessarily intended for the same user groups. However, multiple participants indicated that the absence of shared guidelines increases effort during handoff and implementation. Several participants suggested that introducing a basic level of design consistency, such as a shared visual language or component library, could streamline this phase. As Participant 10 noted, design handoff is "something that could benefit from having standards and patterns and an aligned way of doing it".

Taken together, these findings suggest that the finalisation and handoff phase represent two clear opportunity areas: creating consistent design styles through design system support and AI-supported guideline or handoff checks, aimed at improving consistency while preserving flexibility. While full standardisation may not be necessary or desirable, participants indicated that introducing a set of design guidelines could smooth the design handoff.

5.2.10 Conclusion

The table in Figure 15 summarises the main interview clusters, the supporting evidence, the related phase of the UX workflow, and the resulting AI opportunity areas. Together, these clusters show that AI opportunities emerge differently across the UX workflow and are shaped by both practical bottlenecks and trust-related constraints. Not all clusters result into AI opportunity areas. Some represent boundary conditions or structural characteristics of the workflow, which shape how the opportunities can be implemented. The revised framework in the following section builds on these findings by connecting phase-specific pain points to corresponding forms of AI support.

Cluster	Supporting Evidence	Related UX Phase	Resulting AI opportunity area
Sensemaking and alignment	Participants describe UX work as mediating between stakeholders, and as aligning user needs, business value, and requirements.	Research + Design	Operational automation
Qualitative research	Interview analysis is described as one of the most time-consuming parts of the workflow. AI is now mainly used for transcription and summarisation.	Research	Interview analysis
Continuous iteration	Participants explain that products are rarely finished and continue to evolve through feedback, testing, and repeated alignment	All phases	Condition for all opportunity areas
Sparring partner	AI is mainly used for ideation, reflection, writing, and structuring thoughts, rather than automation or creation.	Research + Design	Ideation expander
Trust	Trust depends on reliability, traceability, transparency, and the ability to verify outputs. AI is accepted for low-risk tasks, but users are more cautious in later phases.	All phases	Condition for all opportunity areas
Organisational limitations	Most participants rely on Microsoft Copilot because it is the only approved AI tool on ING laptops	All phases	Condition for all opportunity areas
User validation	User testing can be difficult because users are hard to reach and have limited availability, which slows iteration.	Design	AI as user for testing
Alternative exploration	Time constraints and prior experience can limit divergence. Participants expressed interest in AI-generated alternatives.	Design	Creator for both new & alternatives
Lack of Standardisation	Inconsistent design guidelines and handoff practices increase effort during finalisation and implementation.	Finalisation	Design system customisation + handoff guideline checks

Figure 15: Cluster table

5.3 Revised Framework

Based on the findings from the semi-structured interviews, a revised conceptual framework was developed (Figure 16), building on the initial framework presented in Chapter 3. This revised framework combines the key insights from the interviews by showing current AI use, trust levels, and main pain points across the research, design, and finalisation phases of the UX workflow. Appendix E shows how the framework evolved from the initial version.
The framework builds on the identified clusters by translating the findings into phase-specific insights and related AI opportunity areas. Instead of repeating all findings, the framework brings them together into one clear overview that shows where and how AI can support the UX workflow.

The results show that AI is not used equally across the workflow. It is mainly used in the research and discovery phase, where participants use AI for tasks such as summarising, structuring information, and supporting sensemaking. These use cases fit well in early-stage research, where AI can help speed up work without taking over important interpretation decisions. At the same time, the findings show that interview analysis is a major bottleneck in this phase. This highlights clear opportunities for AI-supported interview analysis and operational automation. In the design phase, AI use is more selective. It is mainly used as a sparring partner, for example to support ideation, structure thoughts, and reflect on ideas. This shows a form of human–AI collaboration where designers stay in control while using AI to explore ideas. However, the findings also show challenges in exploring enough alternatives and in user testing. This leads to opportunity areas such as AI-supported alternative exploration, AI-assisted ideation, and AI-supported user testing. In the finalisation phase, AI is hardly used. This is mainly because higher levels of trust, consistency, and accountability are required, especially in a regulated banking environment. The findings also show that there is a lack of consistency in design handoff. This creates opportunities for design system support and AI-supported guideline checks.
Across all phases, the framework shows that AI use is strongly influenced by trust and organisational constraints. Designers show a form of cautious trust in AI: they only use it when the output is reliable, transparent, and easy to verify. In addition, restrictions on tools and data limit the use of external AI solutions. As a result, trust, transparency, human control, and compliance act as important conditions for how AI can be used within the workflow.

Overall, the framework shows that AI integration in the UX workflow is both opportunity-driven and constraint-aware. It does not describe one final solution, but works as a tool to understand where AI can add value. It links pain points, current AI use, and trust conditions to concrete opportunity areas. These opportunity areas are then used as a starting point for the ideation phase, where they are translated into design solutions for trustworthy AI-supported UX processes.

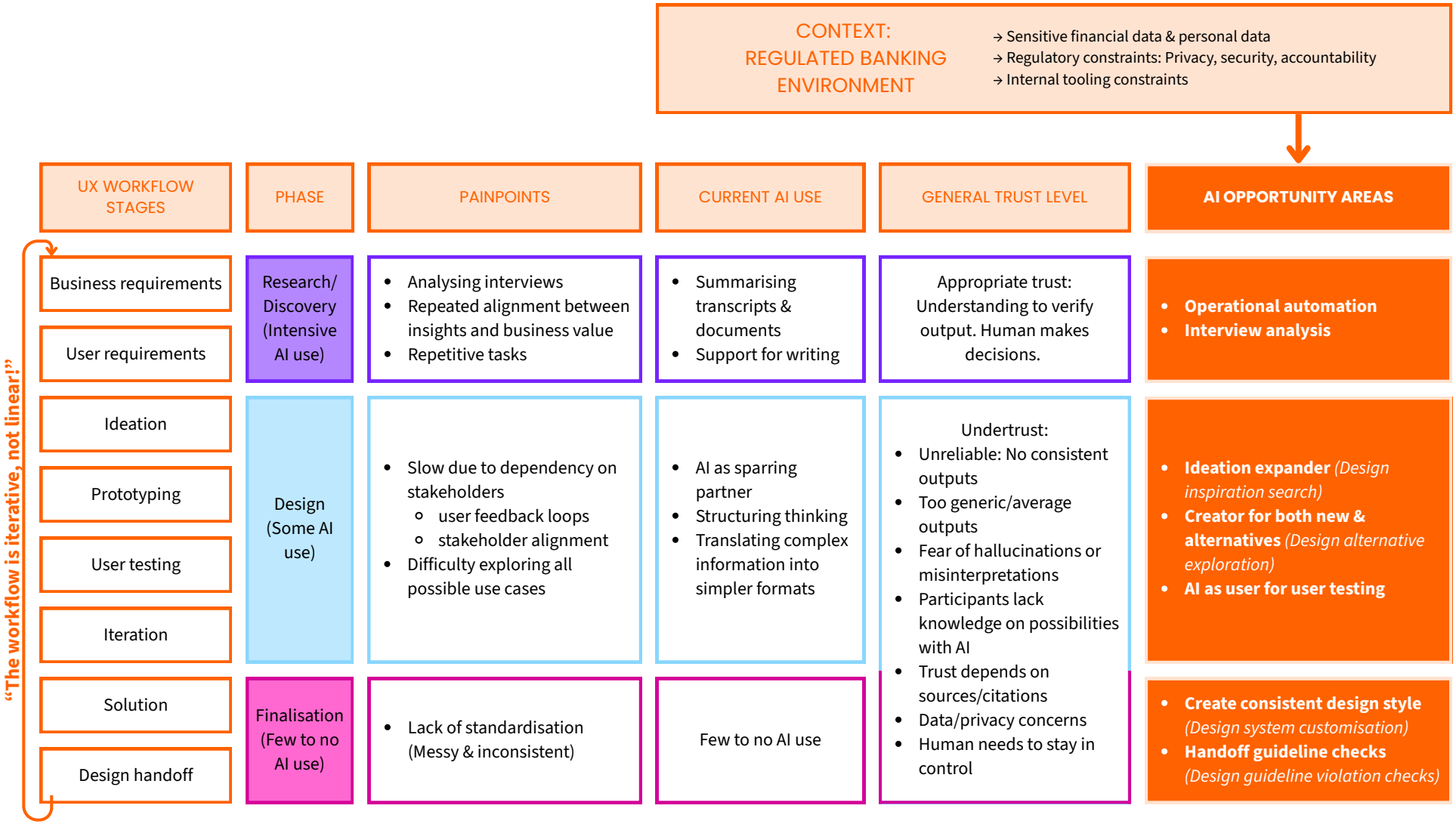


Figure 16: Revised Framework

Chapter 6

Design Phase

6.1 Project Deliverables
6.2 Design Principles
6.3 Design Criteria
6.4 Ideation
6.5 From Ideas to Concepts
6.6 Co-Create
    6.6.1 Participants and Setup
    6.6.2 Validation of the Revised Framework
    6.6.3 Concept Evaluation
    6.6.4 Vibe-Coding
    6.6.5 Reflection
6.7 Final Design: Orange Insight
6.8 User Journey
6.9 Efficiency Gains
6.10 Validation
    6.10.1 Feasibility
    6.10.2 Desirability
    6.10.3 Viability

This chapter presents the design phase of the project, translating the interview findings and identified opportunity areas into concrete design directions. It outlines the development of revised deliverables, the formulation of design principles and criteria, and the ideation and concept development process. The chapter ultimately culminates in the final design, Orange Insight, which was developed through the application of multiple methods and demonstrates a strong alignment with the insights derived from the preceding research. This final design is validated based on its feasibility, desirability and viability.

6.1 Project Deliverables

Based on the interview findings, a deliberate decision was made to revise the project deliverables. Initially, the project aimed to produce a guidebook accompanied by a set of design principles for trustworthy AI-supported UX processes. However, insights from the interviews indicated that providing recommendations alone would be insufficient within the organisational context of ING WBAA. Participants repeatedly emphasised that the use of external AI tools is strongly constrained by organisational, regulatory, and data-security requirements, which limits the practical applicability of generic guidance on AI tool usage.
Several interviewees expressed uncertainty about what types of data are permitted to be shared with AI tools, particularly when these tools are accessed on personal or non-approved devices. This uncertainty often leads to cautious behaviour and restricted use of AI, even in cases where participants recognised potential benefits. As a result, designers tend to rely exclusively on officially approved tools, not necessarily because these tools best support their workflows, but because they are perceived as organisationally safe. These findings suggest that advising designers to adopt existing external AI tools would not sufficiently address the underlying constraints shaping current AI use.

Importantly, the interviews revealed that the core problem is not only a lack of knowledge about AI tools, but also the absence of a safe, approved, and transparent environment in which AI can be meaningfully integrated into the UX workflow. This reframes the design challenge: instead of supporting designers in selecting and using external tools, the challenge becomes enabling AI use within the boundaries of organisational constraints, trust requirements, and compliance conditions. In response to these insights, the scope of the deliverables was adjusted. In addition to defining a set of design principles, the project now aims to design an interface concept for an internal AI tool. Such a tool would be developed within the organisational infrastructure of ING, allowing designers to work with internal data without being concerned about data leakage, regulatory compliance, or uncertainty about permitted use. This shift from a guidebook to an internal AI tool is therefore not merely a practical adjustment, but a direct design decision grounded in the empirical findings. It reflects the need to move from abstract recommendations towards a concrete, context-specific solution that enables trustworthy and compliant AI use in practice. As a result, the final concept emerged as a necessary outcome of the research, rather than a new direction introduced in this phase.

6.2 Design Principles

The design principles below act as a guide that translates the research findings into actionable guidelines for designing an internal AI tool for the team. These design principles will be used to evaluate the final concept.

1. **Human agency is non-negotiable**

AI may support design work but should never replace human judgement or decision-making. UX professionals retain full control over interpretation, selection, and final design choices at all times.

2. **Trust must be calibrated, not maximised**

The goal is not a maximum trust level for AI, but to have appropriate trust. AI should be used in ways that prevent both over-reliance and under-reliance in a tool.

3. **AI should strengthen design thinking, not shortcut it**

AI should augment exploration, synthesis and reflection, not bypass them. Critical reasoning, sensemaking, and contextual judgement remain human responsibilities.

4. **Privacy and compliance are design constraints, not afterthoughts**

AI-supported design tools must comply with organisational requirements from the outset. Data protection, security, and governance constraints are integral design parameters rather than issues to be addressed retrospectively.

5. **Verification is required**

All AI-generated outputs must be reviewed and validated by humans before they are used in decision-making or stakeholder communication. Verification is a mandatory step in the UX workflow due to the risk of inaccuracies and hallucinations.

6. **Transparency about AI behaviour and limitations**

AI support must be understandable and traceable. Designers should be able to see what the AI does, on what basis outputs are generated, and where the system's limitations lie. Lack of transparency undermines trust and adoption.

6.3 Design Criteria

The design principles in the previous section describe the qualities that an internal AI tool should have. The design criteria define the lens through which the different concepts will be evaluated and compared. The principles function as design guidelines, while the criteria function as an assessment instrument, used to determine which concept offers the strongest fit with the research findings and the context. Establishing these criteria before the ideation phase ensures that concept selection is grounded in the research and not steered by the outcome. This helps to prevent bias towards more visually appealing or technically novel ideas and instead prioritises concepts that address validated needs and constraints.

Seven design criteria guide the evaluation:

1. **Strength of the underlying pain point** - The extent to which the concept addresses a pain point that emerged strongly and consistently across the interviews. Concepts that respond to widely shared and structurally embedded bottlenecks are valued more highly than those that were mentioned by only a few participants.
2. **Technical feasibility** - The degree to which the concept can realistically be developed, deployed, and maintained within ING's internal systems, given the strict constraints. Concepts that rely on controlled data environments are considered more feasible than those requiring external dependencies.
3. **Preservation of human agency** - The potential to which the concept keeps the user in control, positioning AI as a support mechanism rather than an autonomous decisionmaker. Concepts that enable users to actively accept, reject, or modify AI-generated outputs are preferred over those that risk shifting authority to the system.
4. **Transparency and traceability** - The degree to which the concept provides insight into how AI outputs are generated, for instance through traceability to source data, explanation, or confidence indicators. This criterion directly addresses the undertrust identified in the interviews, where non-transparent outputs led to reluctance in adoption.
5. **Distinctiveness** - The extent to which the concept offers value beyond what is already available or being introduced within ING, such as Microsoft Copilot and Figma Make. Concepts that fill clear gaps in the existing tool landscape are valued more highly than those that overlap with capabilities the organisation is already gaining.
6. **Fit with non-linear workflow** - The concept's capacity to fit the iterative, non-linear nature of the UX workflow and the level of AI use considered appropriate for the phase it targets. Concepts operating in phases where higher trust and human oversight are required, such as finalisation, must demonstrate that they respect those constraints.
7. **Compliance and risk alignment** - The extent to which the concept aligns with organisational requirements related to data governance, compliance, and risk mitigation. Concepts that support secure data handling, accountability, and auditability are considered more likely to be acceptable within a regulated banking environment.

6.4 Ideation

With this adjusted scope, design principles and criteria in mind, and grounded in the opportunity areas identified in the revised framework, the project transitioned into the ideation phase. The ideation activities were structured in two steps. First, an exploratory ideation was conducted to examine the range of existing AI tools and functionalities that currently support UX research and design practices. This step served to map relevant capabilities and patterns rather than to select specific tools for adoption (Figure 17). Subsequently, a second ideation phase focused on defining what an internally developed AI tool should be able to support, based on the identified opportunity areas and the specific needs articulated by interview participants (Figure 18). Together, these ideation activities form the foundation for translating the revised framework into concrete design directions.



Figure 17: AI tool ideation

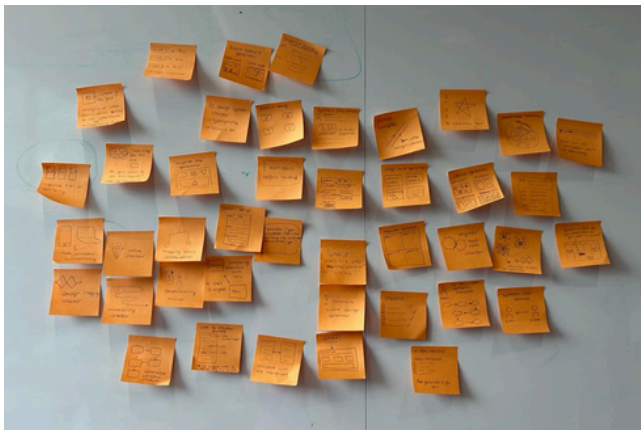


Figure 18: AI support ideation

To broaden thinking, an ideation session was conducted with fellow IDE MSc students (Figure 19), one from the master's programme Designing for Interaction (DFI) and one from Strategic Product Design (SPD). The goal of this session was to explore alternative perspectives on how AI could augment UX design workflows and to generate design ideas without the constraints of ING-specific tooling, governance, or policies. During the session, participants were introduced to the research context, the revised framework, and key challenges identified in the interviews and literature review. Through structured ideation exercises, like the Crazy 8's method (Knapp et al., 2016), where participants are challenged to think of 8 different ideas in 8 minutes (Figure 20), participants generated ideas for AI-supported activities, workflow adaptations, and design principles. These ideas were discussed collectively and reflected upon in relation to feasibility, desirability, and alignment with human-centred and trustworthy AI principles. The outcomes of this ideation session were not treated as validated solutions but as exploratory inputs.

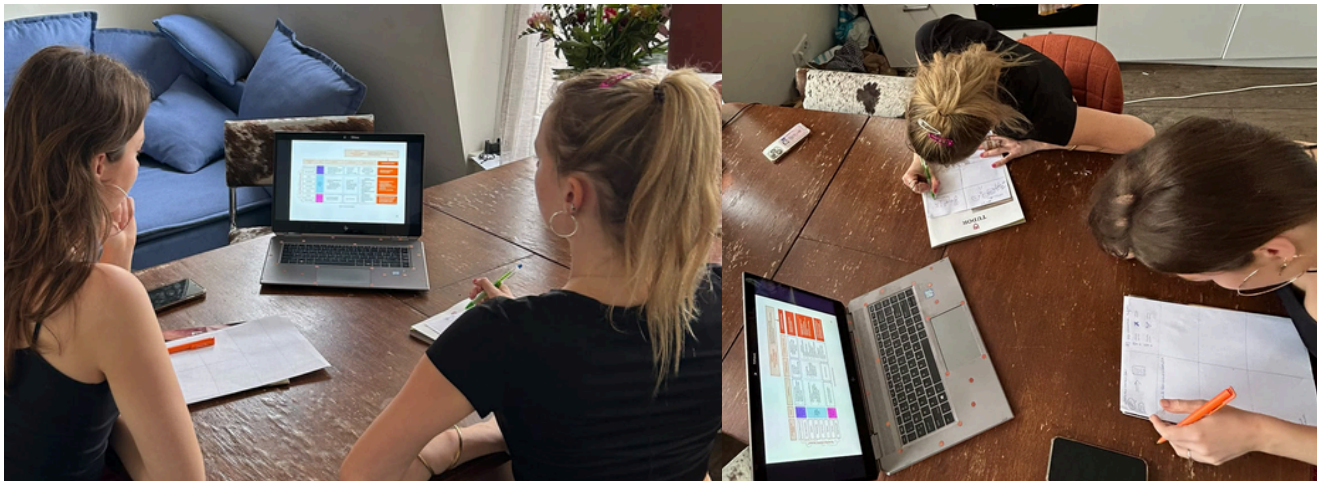


Figure 19: Ideation session IDE students

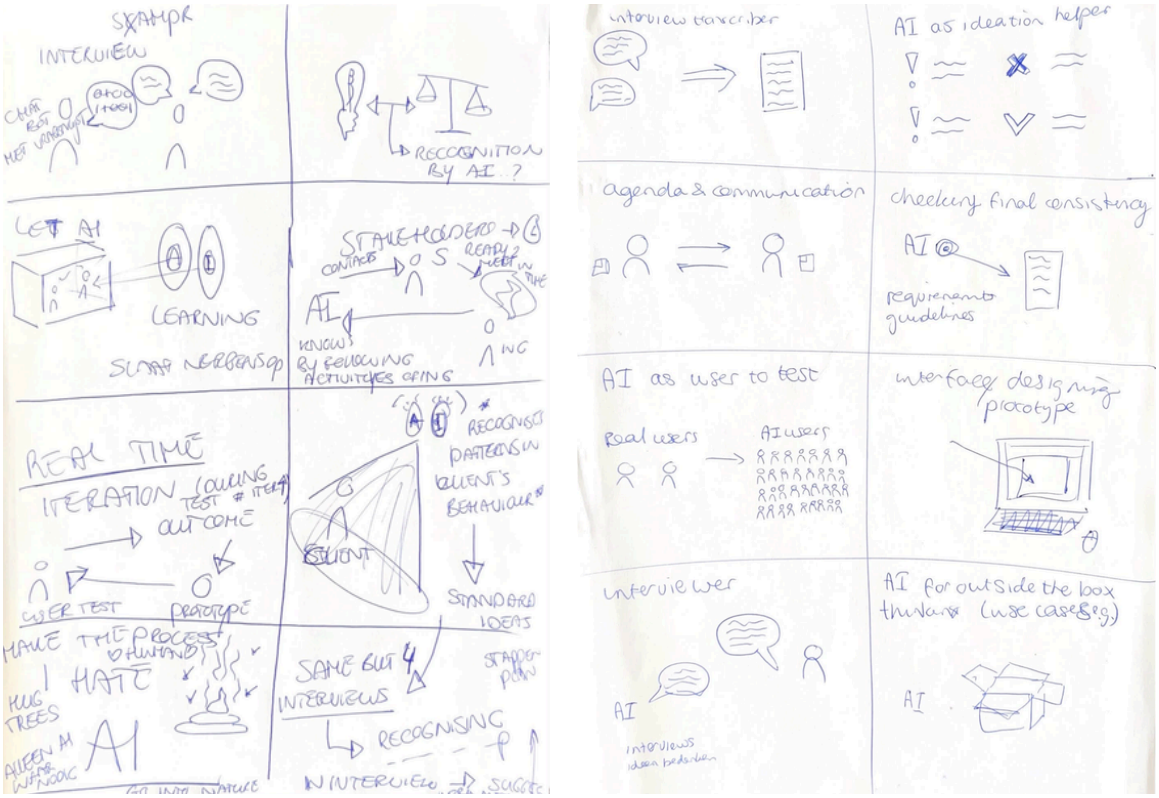


Figure 20: Crazy 8's method outcomes

6.5 From Ideas to Concepts

After the initial phase of generating many ideas, the focus shifted towards refinement through elimination and combination. This was achieved by clustering the generated ideas, which quickly resulted in four overarching clusters. These clusters could be directly linked to the previously identified opportunity areas (Figure 21). Each cluster was subsequently examined in detail see which features should be added, removed or replaced. This was done through the SCAMPER method (van Boeijen et al., 2020, p. 173). This process of evaluation and synthesis ultimately led to the formulation of four design concepts, each targeting specific needs, constraints, and opportunities identified across the workflow. See appendix F for an overview of the process of going from ideas to concepts.

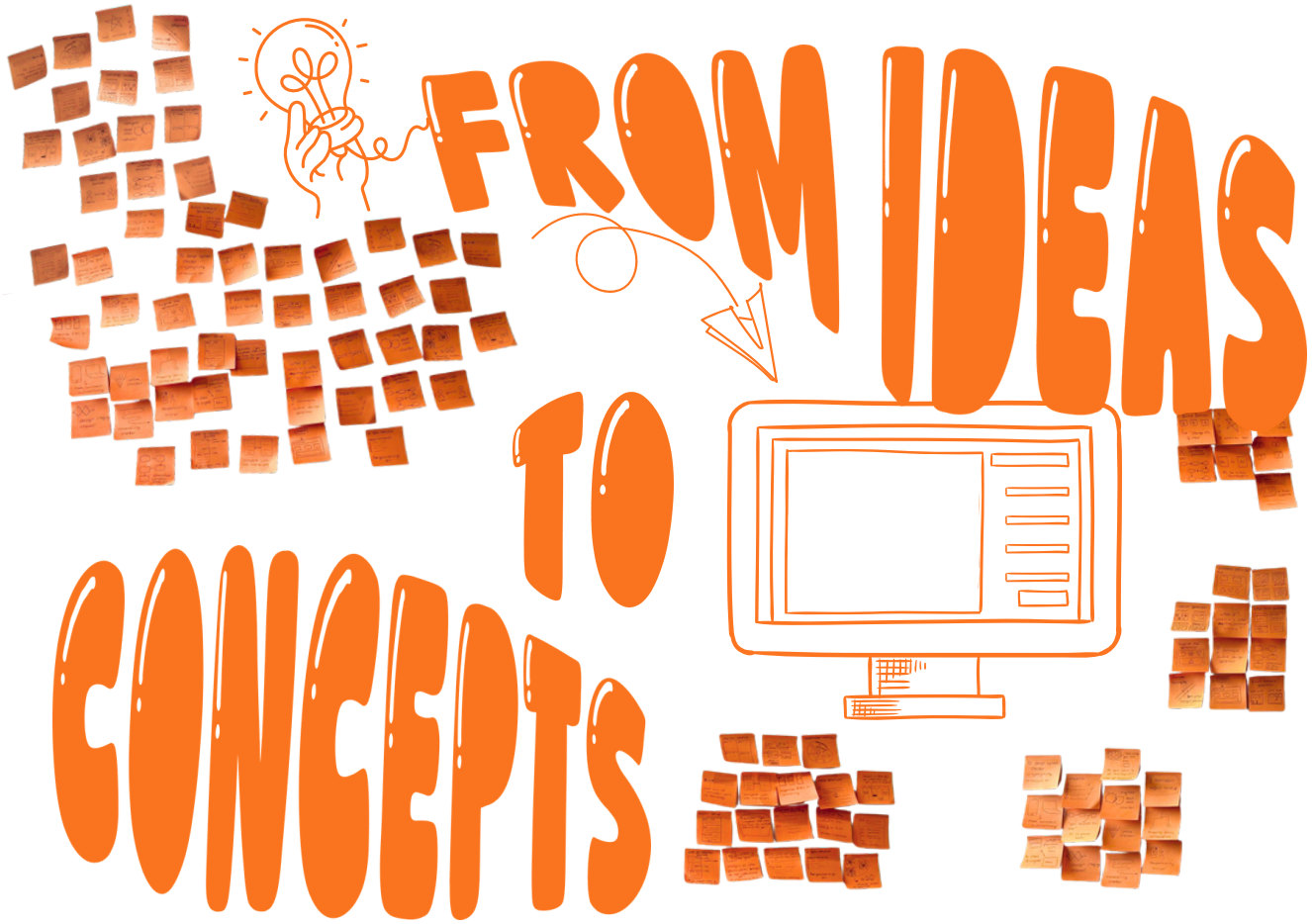
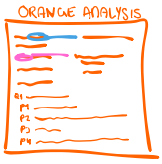


Figure 21: Clustering ideas

One concept was developed to support activities in the research and discovery phase, two concepts focused on challenges and opportunities within the design phase, and one concept addressed the finalisation phase. Each concept reflects a different emphasis within the workflow, acknowledging that designers' needs, decision-making processes, and degrees of uncertainty vary across stages. By distributing the concepts across these phases, the resulting set aims to capture both the breadth of opportunities identified during ideation and the differentiated requirements of each stage of the design process.

The following section provides an overview of the four concepts and outlines their respective focus areas within the UX workflow.



Concept 1: Orange Analysis

Orange Analysis (Figure 22) is designed to support qualitative research activities in the research and discovery phase. The concept addresses a recurrent challenge identified in the interviews: the high time investment and cognitive load associated with analysing qualitative interview data, particularly in environments where research timelines are constrained.

The core purpose of Orange Analysis is to accelerate interview analysis while explicitly maintaining human control, transparency, and accountability. Rather than autonomously generating insights, the tool follows a human-in-the-loop approach in which the researcher first manually codes one interview. The system then learns from this initial coding logic and applies the same thematic structure to subsequent interviews. All AI-generated codes are clearly labelled as suggestions and must be actively accepted, edited, or rejected by the user.

By restructuring transcripts per interview question rather than per participant, the tool supports cross-participant comparison and reduces the need to repeatedly read full transcripts. Additional features, such as frequency indicators, confidence warnings, and traceability to original quotes, are intended to support reflective sense-making rather than automated conclusions. Overall, Orange Analysis positions AI as a senior research assistant that augments analytical efficiency without replacing interpretive judgement.

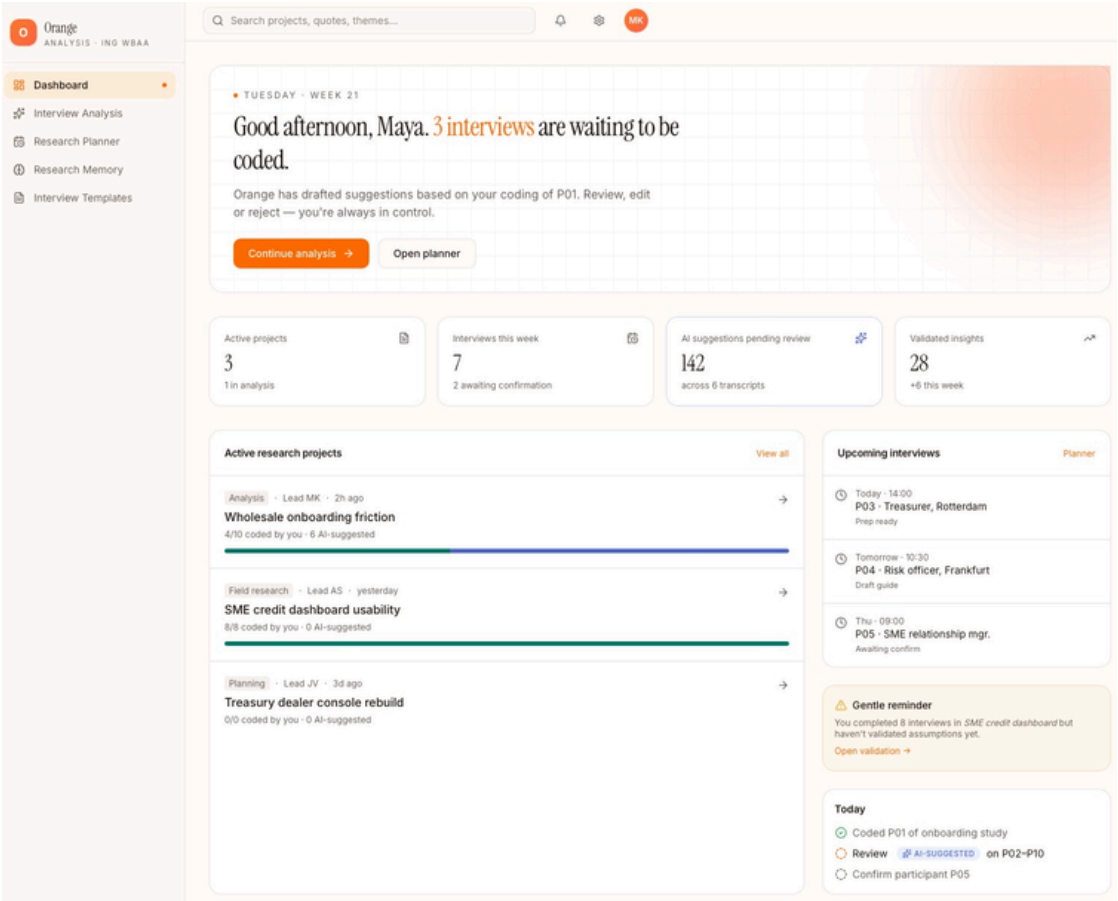
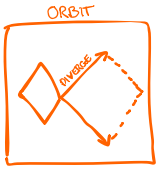


Figure 22: Interface concept 1



Concept 2: ORBIT

ORBIT (Organised Brainstorming & Ideation Tool) (Figure 23) focuses on supporting ideation and alternative exploration during the design phase. The concept responds to findings from the interviews indicating that designers value broad exploration but are often constrained by time, experience, or dominant solution patterns.

ORBIT is explicitly positioned as an ideation expander rather than a solution generator. Its primary function is to broaden designers' thinking by generating multiple perspectives, alternative design directions, and "what if" scenarios that challenge assumptions. For a single design problem, ORBIT can surface differentiated alternatives (e.g. conservative, accessibility-first, or unconventional approaches), each accompanied by an explanation of trade-offs and appropriate contexts of use.

Importantly, ORBIT avoids convergence by design. It does not rank or recommend a "best" option, but instead supports divergent thinking prior to decision-making. Features such as edge-case exploration, extreme scenario thinking, and critical reflection prompts are intended to counter premature convergence and experiential bias. In this way, ORBIT acts as a creative sparring partner that amplifies human creativity while preserving designer agency.

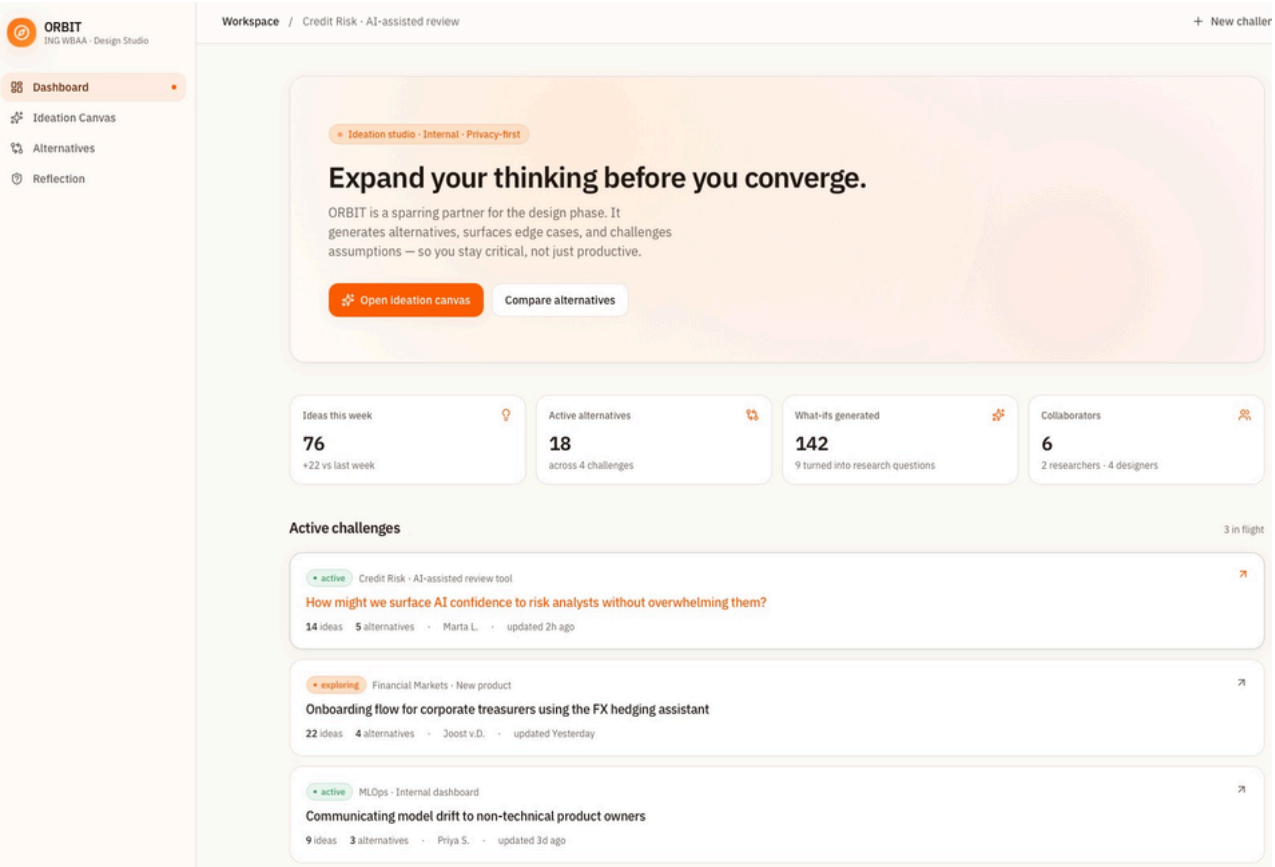
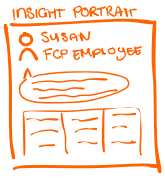


Figure 23: Interface concept 2



Concept 3: Insight Portrait

Insight Portrait (Figure 24) addresses early validation needs within the design phase by enabling designers to reflect on assumptions before conducting real user testing. The concept is motivated by interview findings showing that user access is often limited and that early validation opportunities are therefore valuable.

Insight Portrait uses clearly marked synthetic ING employee personas to simulate how different internal roles might experience a design. These personas are based on aggregated organisational patterns rather than real individuals and are explicitly framed as exploratory tools, not representations of actual users. Designers can test concepts, workflows, or prototypes by letting personas "walk through" a design and surface potential friction points, questions, or concerns.

The tool further supports service-level thinking by enabling multi-persona debates, highlighting tensions between roles, and testing designs under different contextual conditions such as time pressure or high accountability. Throughout the interaction, Insight Portrait actively reminds users which insights are speculative and where real user validation is required. The concept thus supports reflective design practice while reinforcing the non-substitutive role of AI in user research.

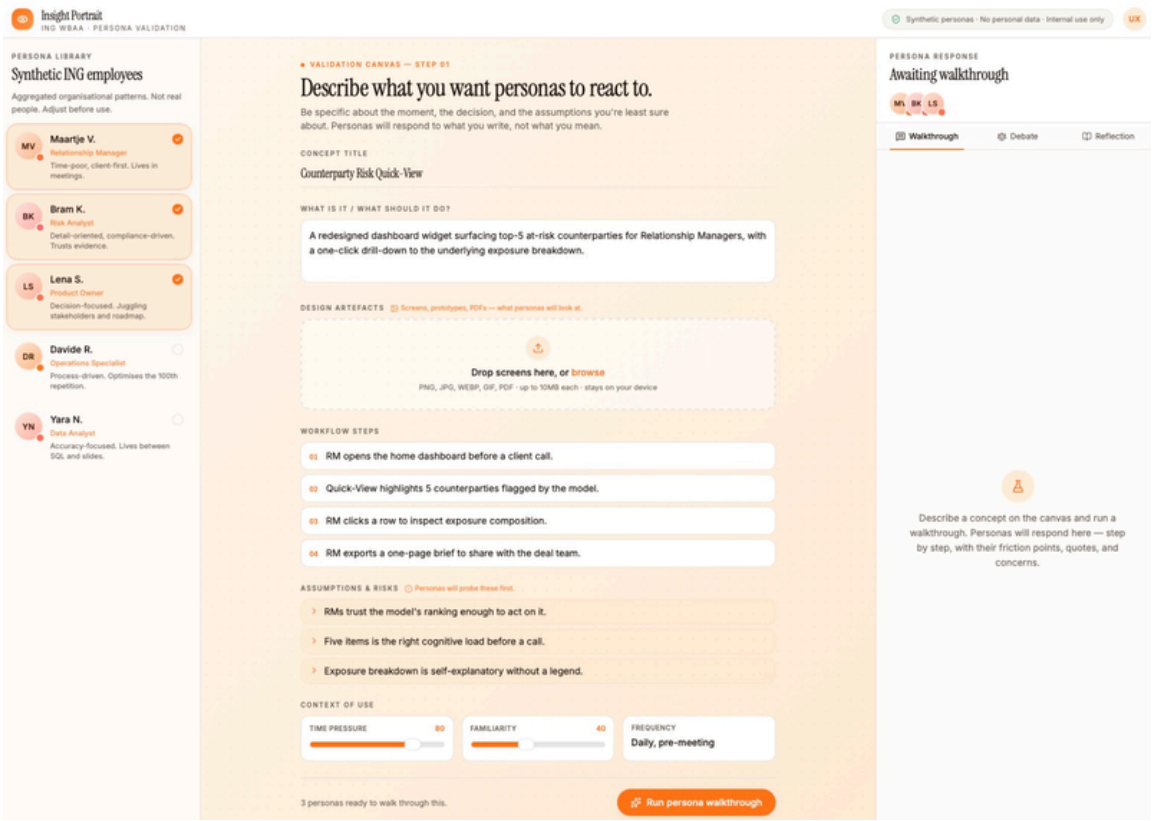


Figure 24: Interface concept 3



Concept 4: Align

Align (Figure 25) is situated in the finalisation phase of the UX workflow and focuses on improving handoff quality, consistency, and accountability. Interviewees frequently indicated that handoff to development is a fragile moment where inconsistencies, missing specifications, or unclear decisions can introduce risk.

Align functions as a quality gate and assistant rather than a creative tool. It analyses designs to flag inconsistencies in design system usage, accessibility considerations, interaction states, and guideline compliance. For each identified issue, the tool provides a clear explanation of why the issue matters and suggests possible remediations, without automatically applying changes.

In addition, Align supports handoff readiness by generating structured checklists, highlighting missing states or edge cases, and producing an exportable handoff package for engineers. An explicit audit trail records which issues were flagged, accepted, or ignored, reinforcing accountability in a regulated environment. Through this design, Align supports a transparent and trustworthy transition from design to development while keeping final responsibility with the human designer.

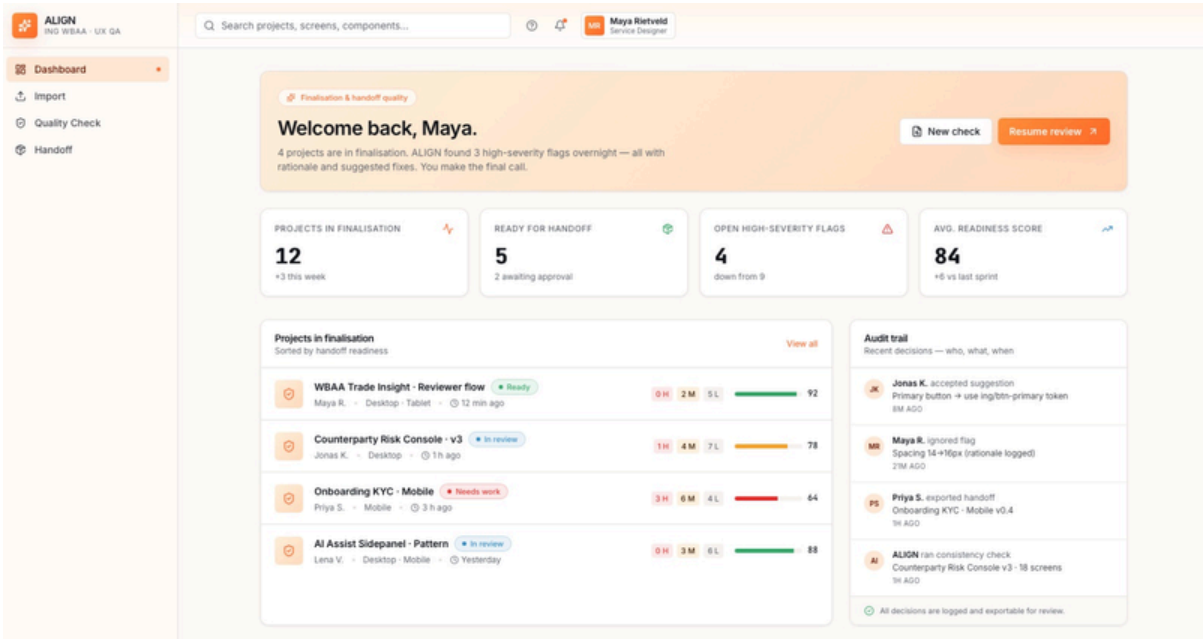


Figure 25: Interface concept 4

Taken together, the four concepts form a coherent set of AI-supported interventions across the UX workflow. Each concept is deliberately scoped to a specific phase and type of design activity, reflecting the empirical insight that designers' support needs evolve over time. Rather than maximising automation, the concepts consistently prioritise transparency, human oversight, and appropriate trust in line with the constraints of a regulated banking environment.

Harris Profile

To determine which concept provides the strongest fit for the UX R&D team within ING WBAA, the four developed concepts were systematically compared using a Harris profile (van Boeijen et al., 2020, p. 177) (Figure 26). This evaluation method enables multiple concepts to be assessed against a predefined set of criteria. The Harris profile was constructed using the seven design criteria defined in Section 6.3. To ensure that the evaluation reflects the relative importance of this context, the criteria were ranked in order of significance, with 1 representing the highest importance and 7 the lowest. The criteria were prioritised as follows:

1. Compliance and risk alignment
2. Strength of the underlying pain point
3. Technical feasibility
4. Preservation of human agency
5. Transparency and traceability:
6. Distinctiveness
7. Fit with non-linear workflow

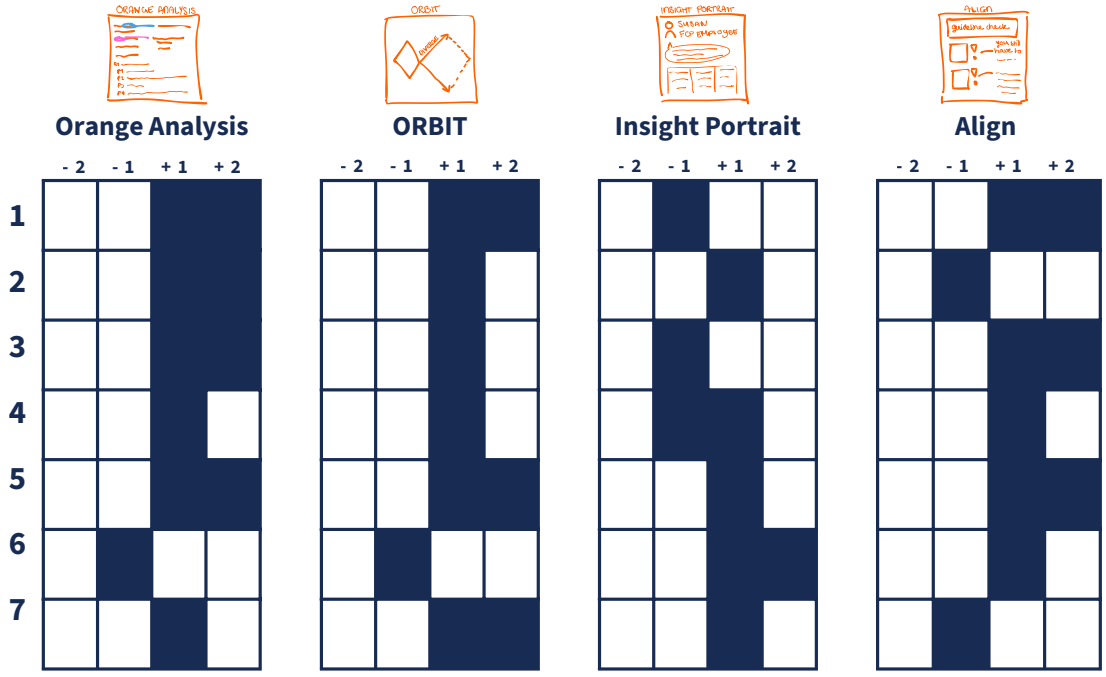


Figure 26: Harris Profile method

As shown in the Harris profile, Orange Analysis achieves the highest overall score, followed by ORBIT and Align. This indicates that Orange Analysis provides the strongest alignment with the weighted design criteria. However, it is important to note that the Harris profile is not intended as a definitive validation of the selected concept. To further validate the four concepts, a co-creation session is conducted in the following section. This session aims to gather qualitative feedback from stakeholders within the UX R&D team, allowing for reflection, critique, and refinement of the proposed concepts in a more interactive and context-specific manner.

6.6 Co-Create

To further validate and translate the opportunity areas identified in the revised framework into concrete design directions, a co-creation session was organised with members of the UX Research & Design chapter at ING WBAA. The primary goal of this session was twofold: first, to validate whether the opportunity areas and workflow representation resonated with practitioners' lived experiences, and second, to collaboratively explore and refine the proposed concept directions.

6.6.1 Participants and Setup

Initially, the co-creation session was planned with three participants, representing the three core roles within the UX R&D chapter: one UX Researcher, one UX Designer, and one Service Designer. Due to a last-minute cancellation, the final session was conducted with two participants: one UX Designer and one Service Designer. While the absence of a UX Researcher reduced the breadth of role perspectives, the two remaining participants both had extensive experience working on AI-enabled internal tools within cross-functional squads, making their input highly relevant for the objectives of the session.

The session lasted a total of 2 hours and 20 minutes, a bit longer than planned, but this allowed sufficient time to discuss the framework, reflect on the concepts in depth, and iteratively refine ideas through collaborative exploration.

6.6.2 Validation of the Revised Framework

The first part of the session focused on validating the revised framework and the opportunity areas derived from the interview study. Participants were asked whether they recognised their own workflows, pain points, and current use of AI within the framework.
Overall, both participants strongly recognised their daily practice in the framework and confirmed that the identified opportunity areas aligned well with their experiences. In particular, they agreed with the characterisation of UX work as non-linear, iterative, and strongly focused on sensemaking, alignment, and coordination across stakeholders.

However, two opportunity areas led to more nuanced discussion. First, regarding the finding that user testing is time-consuming due to busy and hard-to-reach users, the participants expressed differing experiences. One participant confirmed this as a significant bottleneck, while the other did not experience user availability as problematic. Through discussion, the participants jointly concluded that this difference was largely context-dependent and related to the specific user groups they worked with. For example, KYC analysts were described as a relatively large and accessible user group, whereas TS users form a much smaller group within ING and tend to have more limited availability. This insight suggests that constraints around user testing are not uniform across projects, but shaped by organisational context and user group characteristics.

Second, both participants partly agreed with the finding that exploring design variations is constrained by time. They acknowledged that exploring alternatives can be time-intensive, but noted that they are not always constrained by time to the extent suggested in the framework. This led to a refinement of the interpretation: while time pressure does not fully prevent alternative exploration, it does influence how broadly designers are able to diverge and which alternatives are considered feasible.
Aside from these nuances, the participants largely validated the findings and confirmed that the revised framework accurately reflected their workflows and challenges.

6.6.3 Concept Evaluation

After validating the framework, the session transitioned into the core co-creation phase. The four concepts developed during the ideation phase were presented sequentially. For each concept, participants were asked to individually reflect on four prompts:

- Where do you see value in this concept? (green post-its)
- What would not work for you in this concept? (pink post-its)
- Which three things would you change? (blue post-its)
- Additional notes or reflections (orange post-its)

This structured approach supported both individual reflection and collective discussion. An overview of this setup is shown in Figure 27.



Figure 27: Set up co-creation session

During the discussion of Concept 4 (Align), both participants immediately questioned whether a dedicated tool for the finalisation and handoff phase was necessary. While they agreed that handoff currently lacks standardisation, they expressed the view that this issue could be sufficiently addressed through a shared set of design principles and guidelines, rather than through the development of a separate AI tool. Given this consensus, and in order to use the available time effectively, the decision was made to not further elaborate Concept 4 during the

remainder of the co-creation session. This decision directly informed the subsequent scope of the project, shifting the focus for the finalisation phase towards principles rather than tooling.
In a later discussion comparing the other concepts, the participants also raised concerns about the feasibility of Concept 3 (Insight Portrait) within the ING context. They noted that creating realistic synthetic ING employee personas would require access to large amounts of internal employee data, which is not readily available and would raise significant privacy and governance concerns. As a result, the participants considered this concept less realistic for internal implementation.

Based on these discussions, the group collectively decided to focus primarily on Concept 1 (Orange Analysis) and Concept 2 (ORBIT), as these were perceived to have the highest practical potential and strongest alignment with existing workflows and organisational constraints.

6.6.4 Vibe-Coding

The final part of the session consisted of a collaborative activity referred to as “vibe-coding.” During this phase, the participants and researcher jointly reviewed the collected post-its and iteratively refined the selected concepts by translating feedback directly into prompts. These prompts were then used to adapt and evolve the concepts within the tool Lovable, which had also been used to create the initial concept interfaces.

This approach enabled rapid iteration and made design decisions explicit in real time. One example of a concrete outcome of this phase was the decision to completely remove interview template generation from Concept 1, as participants did not perceive sufficient added value relative to their existing practices. Similar refinements were made throughout the session as concepts were incrementally adjusted to better fit practitioners’ needs.

During the vibe coding phase, it became increasingly clear that there was stronger demand for a tool like Concept 1 (Orange Analysis) than for the other concepts. This preference was further reinforced by the fact that the tool Figma Make is on the way within the organisation, reducing the perceived need for additional AI support in the design space.
As a result, the remainder of the session focused primarily on further refining this Orange Analysis. Iteration continued until the participants felt the concept reflected what they would consider a “near-ideal” internal tool for qualitative research analysis within ING WBAA.
An overview of the co-creation session set-up and the final collaboratively refined version of Orange Analysis is provided in Appendix G.

Reflection

Although the co-creation session did not include a UX Researcher, the outcome of the session nonetheless resulted in a strong and explicit preference for Concept 1 (Orange Analysis). This preference was based on both feasibility and novelty in the context of ING WBAA. This evaluation is visualised in a C-box analysis (van Boeijen et al., 2020, p. 181) (Figure 28).

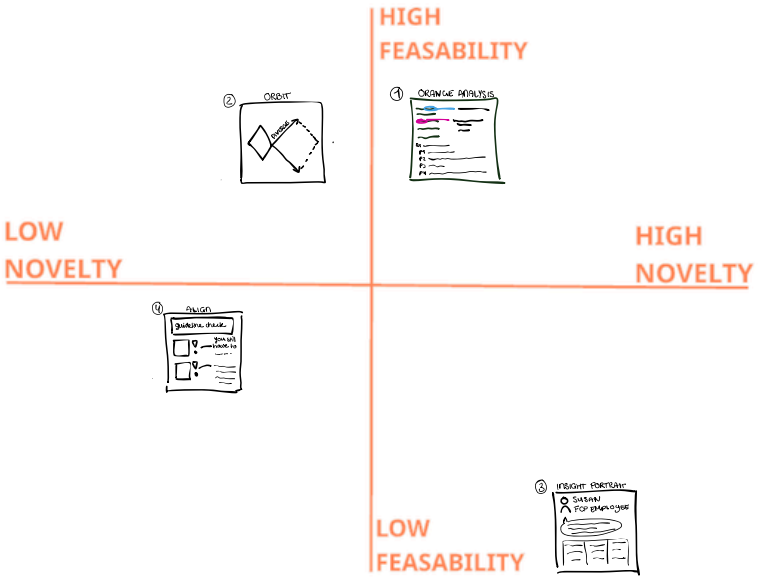


Figure 28: C-box analysis

This outcome of concept one is particularly notable given that qualitative interview analysis is an activity that is most centrally embedded in the UX Researcher role. As described in the interview findings, UX Researchers primarily operate in the research and discovery phase and spend a substantial portion of their time on analysing, synthesising, and translating qualitative data into actionable insights.

During the earlier interview phase, UX Researchers consistently identified interview analysis as one of the most time-consuming and cognitively demanding parts of their workflow. They also emphasised that AI support is currently limited to transcription and summarisation, while more advanced analytical support remains largely unexplored due to trust and transparency concerns. Against this background, it is reasonable to infer that a tool specifically designed to support human-in-the-loop qualitative analysis would be highly relevant for this role.
The fact that Concept 1 emerged as the most valued and further developed concept during the co-creation session, even without direct UX Researcher participation, can therefore be interpreted as an additional validation of its relevance. Both the UX Designer and Service Designer participating in the session recognised the large amount of time spent on qualitative analysis across the team and acknowledged that this phase represents a structural bottleneck in the workflow. From this perspective, a tool that meaningfully supports this part of the process is likely to generate value not only for UX Researchers, but for the UX R&D chapter as a whole.

Taken together, the preference for Orange Analysis can be seen as aligned with both the empirical interview findings and the role-specific responsibilities within the team. Rather than weakening the outcome, the absence of a UX Researcher in the co-creation session thus indirectly reinforces the conclusion that qualitative analysis support constitutes the most impactful opportunity area for the UX R&D team within ING WBAA.

To further reflect on this limitation, an additional informal validation was conducted with the UX Researcher who was initially intended to participate in the co-creation session. During this conversation, the preliminary outcome of the session, including the preference for Concept 1 (Orange Analysis), was discussed.

The UX Researcher confirmed that qualitative interview analysis is indeed one of the most time-intensive and cognitively demanding activities within their workflow. The value of a human-in-the-loop approach to coding was recognised and emphasised that existing AI support remains limited to transcription and basic summarisation. More advanced analytical support was perceived as highly valuable.

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6.7 Final Design: Orange Insight

Orange Insight, based on concept 1 (Orange Analysis), is an AI-assisted UX research workspace designed to support qualitative researchers and designers conducting interview-based studies. The tool focuses on augmenting human interpretation, and not replacing it, enabling researchers at ING to efficiently analyse interview transcripts while maintaining control and trustworthiness. Orange Insight is an internal organisational tool for ING, meaning that all information put into the tool strictly stays within the tool. Most importantly, the system embodies HCAI principles. This means that the human researcher always makes the final decisions, while the AI is utilised purely to enhance and support this human performance.

The core workflow centres on collaborative coding of interview transcripts, in which researchers manually code the first transcript and the system subsequently provides AI-assisted coding suggestions for the remaining data. This approach is grounded in imitation learning, a paradigm in which AI systems learn from human users by observing and replicating their behaviour (Gkiokas, 2016). Because qualitative coding is highly subjective and differs significantly from person to person, the tool benefits from this tailoring. To prepare the system, users can beforehand feed the tool a cheat sheet containing coding examples, do's, and don'ts, so the AI can learn from these predefined guidelines. This is crucial as research shows that AI systems are limited in their ability to generate meaningful structure without prior examples or training. Rather than creating categories or interpretations independently, AI primarily operates by reproducing patterns it has been shown (Alawamleh et al., 2024). As a result, providing an initial, human-coded transcript as well as a cheat sheet enables the system to align its subsequent coding suggestions more closely with the researchers' analytical perspective.

To achieve this effectively, the underlying structure relies on a hybrid approach combining a Large Language Model (LLM) and a Bidirectional Encoder Representations from Transformers (BERT) model, leveraging the unique strengths of each:

- The LLM handles generative tasks such as segmenting text into logical units and automatically creating concise summaries of the interviews.
- The BERT model is specifically dedicated to the actual qualitative coding and sentiment analysis. Because this model type can be precisely fine-tuned on the initial user-coded data and the uploaded cheat sheet, it is capable of calculating and delivering highly reliable and accurate confidence scores for its coding suggestions.

After all transcripts have been coded, the AI supports the next step by generating overlapping themes based on the accepted codes across all interviews. These themes are not fixed outcomes as they can be fully reviewed, adjusted, and edited by the user, ensuring the final interpretation remains entirely in human hands.

The tool is originally developed for the UX Research & Design team within ING Wholesale Banking Advanced Analytics (WBAA), but Orange Insight can be designed to support any research or design team working with structured analysis of qualitative data. It is particularly valuable in environments where traceability, accountability, and human oversight are critical.

Orange Insight aims to:

- Reduce the time and effort required for qualitative data analysis
- Support users in coding interview transcripts
- Improve consistency in coding across large datasets
- Support users in identifying patterns and themes across multiple interviews
- Maintain human control and trustworthiness
- Provide a structured, calm workspace aligned with organisational constraints

The application consists of seven primary areas:
1) Login screen, 2) Dashboard, 3) Interview Analysis, 4) Research Memory, 5) Planner, 6) Final Report, 7) Profile.

1. Login screen

Access to the system begins with a secure login screen (Figure 29), which functions as the entry point to the Orange Insight workspace. Users authenticate using their corporate key and password, ensuring that only authorised users can access sensitive research data. The visual design of the login screen is intentionally minimal and calm, reinforcing a sense of professionalism and trustworthiness from the first interaction.

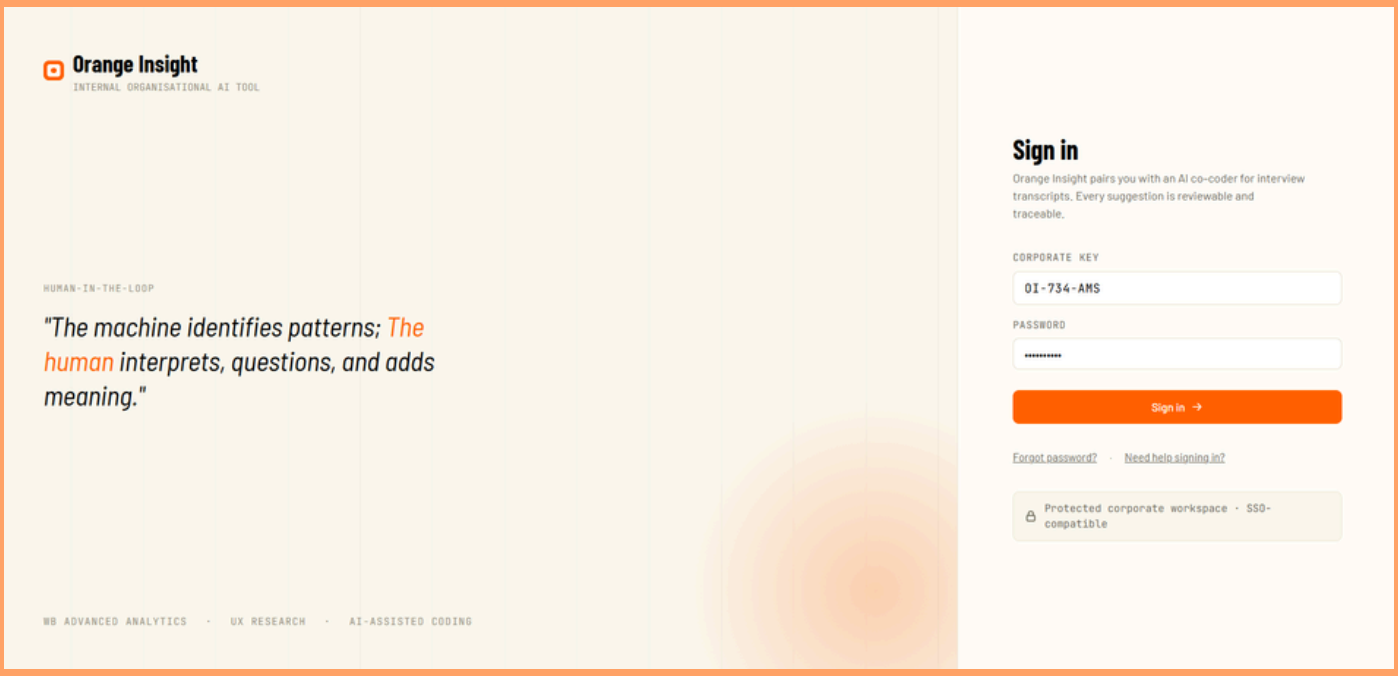

Figure 29: Login screen Orange Insight

2. Dashboard

Upon logging in, users are directed to the Dashboard (Figure 30), which provides an overview of ongoing research activities and highlights items requiring attention. The dashboard presents a personalised greeting, the number of active projects, interviews scheduled or completed within the current week, and AI-generated suggestions awaiting review. The “projects” table below this displays project status, progress, and the volume of AI-suggested segments. The “activity” table keeps users informed of recent coding updates, AI suggestions, and theme changes. In addition, “This weeks interview” strip provides insight into upcoming and completed interview sessions of this week. Together, this dashboard serves as an easy and efficient way to monitor your progress and see exactly what stage you are at.

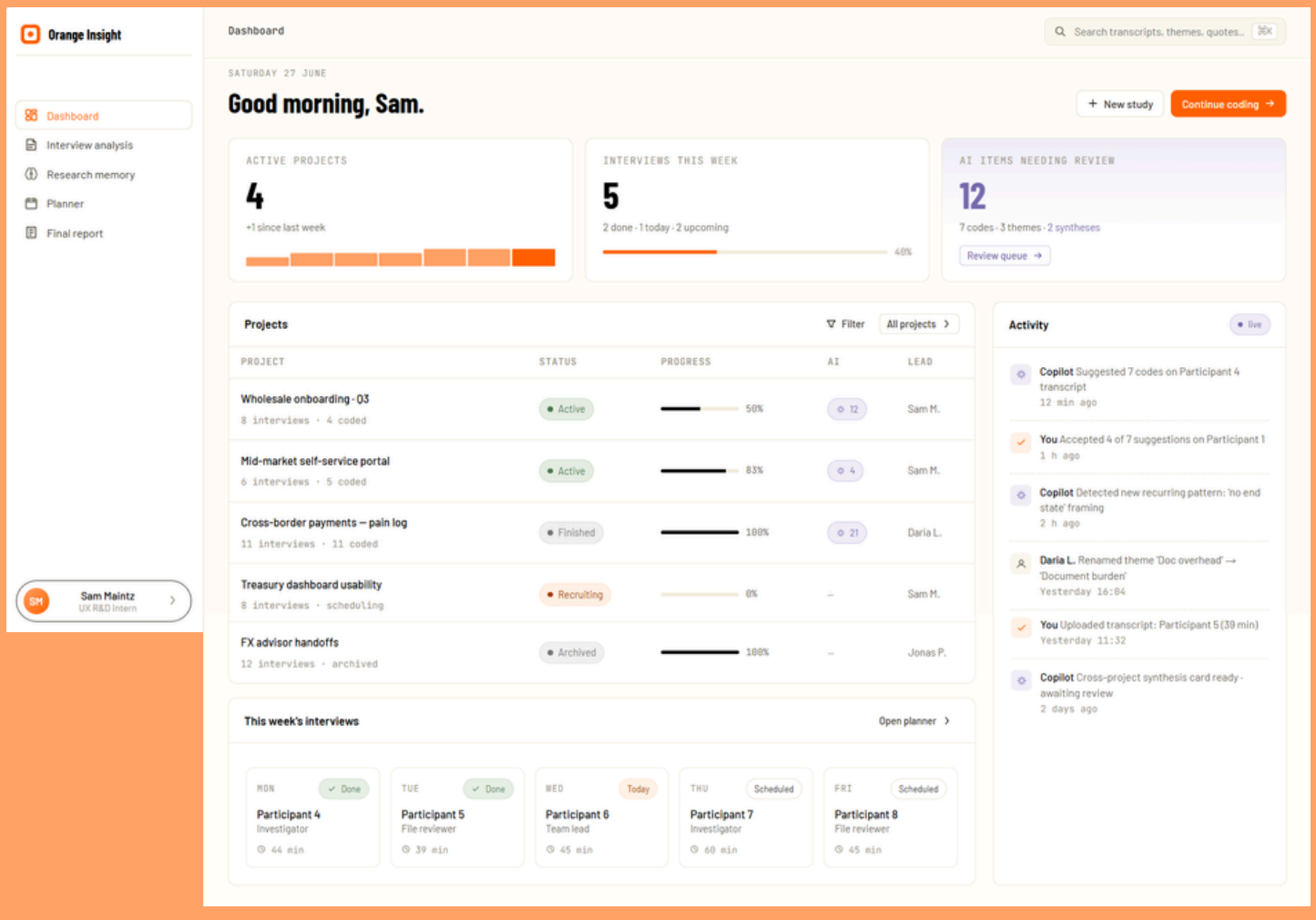

Figure 30: Dashboard Orange Insight

3. Interview Analysis

The central workspace of Orange Insight is the Interview Analysis screen, where qualitative analysis takes place. The process begins with an overview of your studies (Figure 31), allowing you to choose between different ongoing projects. A "New Study" button is available here to create a completely new research project from scratch.

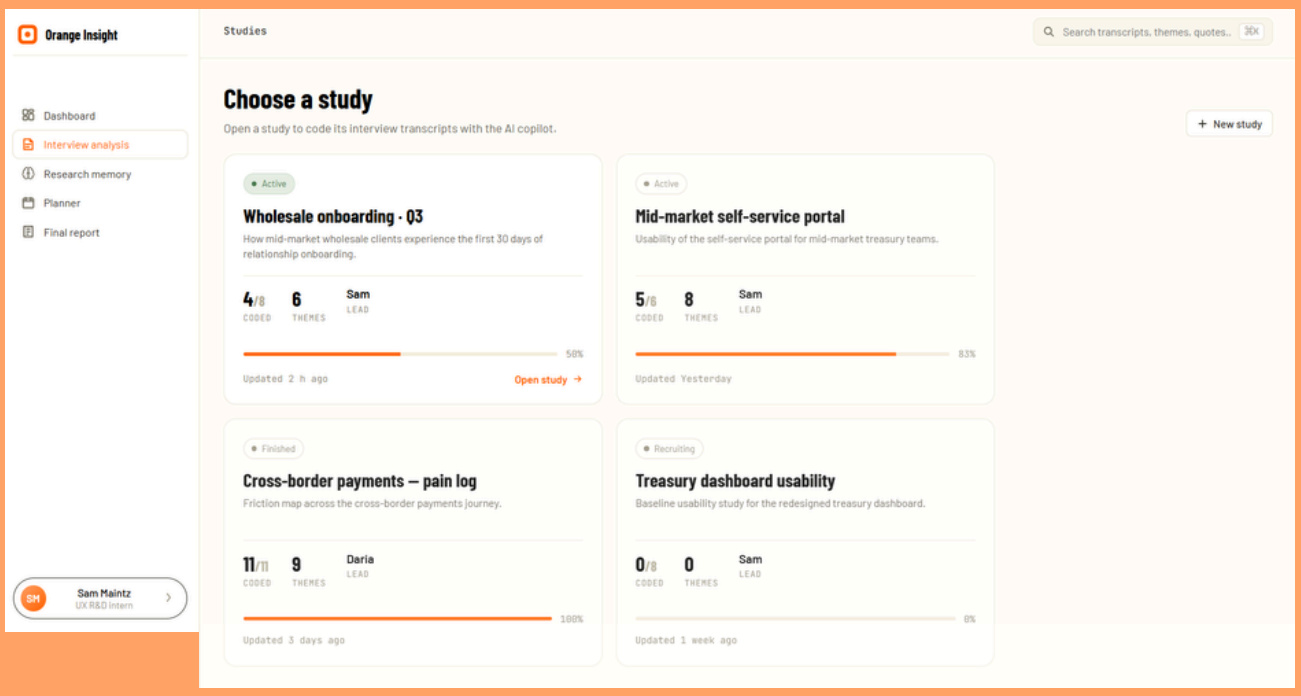

Figure 31: Interview analysis - Choosing a project

Selecting a project opens up the transcripts saved under that study (Figure 32). Here, users can click the "Upload transcript" button, which directly accesses the files on your laptop to upload new interview data. The researcher can still see participant names, which is crucial for conducting follow-ups if certain responses require clarification. In the rest of the tool all data is anonymised. Furthermore, a share function allows users to share the study with colleagues by searching for their name or email address, or by copying a shared link, providing options to give them edit, comment, or view-only access.

Once inside a transcript, the screen is organised into three distinct columns. On the left, users can switch between different interview transcripts and track their progress through visual indicators that show the balance between human-coded and AI-suggested segments.

The central column contains the main transcript workspace, which can be viewed in three separate modes:

- Coded transcript view: The text is displayed with clearly differentiated coded segments. A clear visual distinction is made here: the orange underlined parts represent human-coded sections, while the blue underlined parts represent AI-suggested segments. Selecting an AI-suggested segment opens a popup that details the assigned theme, the AI's confidence score, the rationale behind the suggestion, and its provenance. From this interface, users are presented with the option to accept, reject, or edit the AI suggestion. If you accept the suggestion, it immediately turns orange, converting it into a human-coded segment because you, as the human expert, have reviewed it and confirmed that it is correct.
- "By question" mode (Figure 33): This mode reorganises the transcript data by specific interview questions. If you want to analyse a specific question, you don't have to navigate through every single transcript one by one. Instead, you can see all participants' responses to that question compiled together, significantly easing cross-participant comparison.

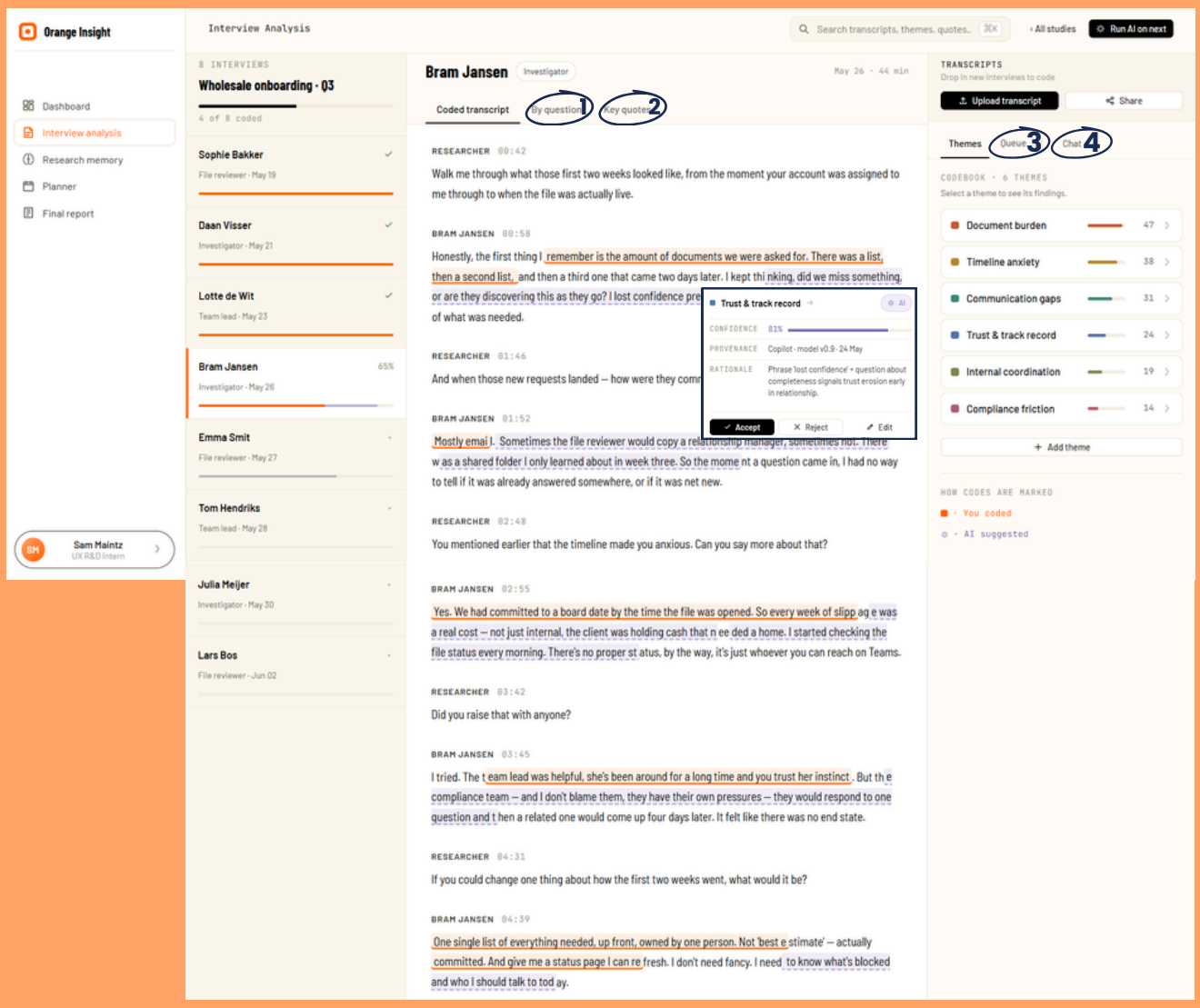

Figure 32: Interview analysis - Coded transcripts column

1



Figure 33: Transcripts sorted by question column

2

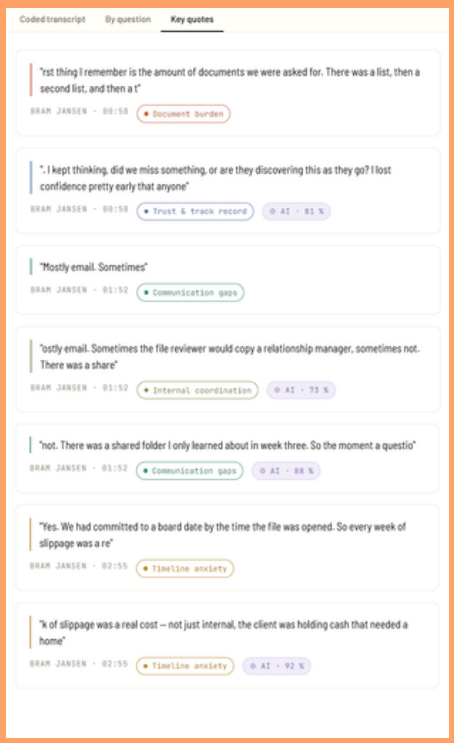

Figure 34: Key quotes column

3

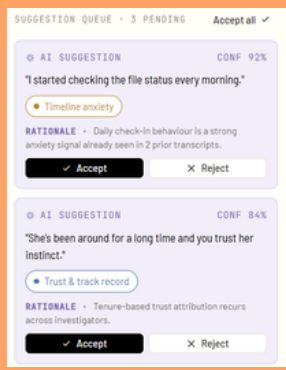

Figure 35: Pending AI suggestions

4

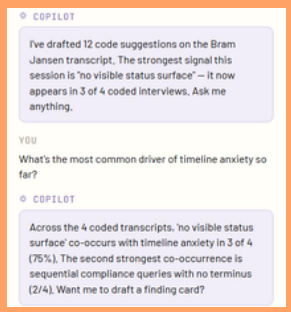

Figure 36: Chatbot function

- "Key quotes" mode (Figure 34): This view automatically isolates and presents the most important, high-impact quotes extracted from the transcript, linking them directly to their associated themes.

The column on the right side contains a panel supporting three key functionalities:

- Themes: After all transcripts have been coded, the AI supports the next step by generating overarching themes based on the accepted codes across all interviews. These themes are not fixed outcomes: they can also be reviewed, adjusted, and edited by the user. This ensures that the final interpretation remains in human hands, while the AI supports the process by reducing time and effort. This tab allows users to manage and explore these themes. Clicking on a specific theme provides a brief description along with supporting insights and connected quotes for quick verification (Figure 37).
- Queue (Figure 35): This provides a centralised list of all open AI suggestions. Because transcripts contain a massive volume of text, the queue serves as an easy way to ensure the researcher doesn't overlook any AI recommendations.
- Chat function (Figure 36): Users can interact directly with the system using a chat interface to ask specific questions about the data. The Co-pilot chat explores the material and immediately generates a summary answer.

To advance the workflow, the workspace features a "Run AI on next" button, which prompts the tool to process the subsequent transcript using the learned coding behaviour.

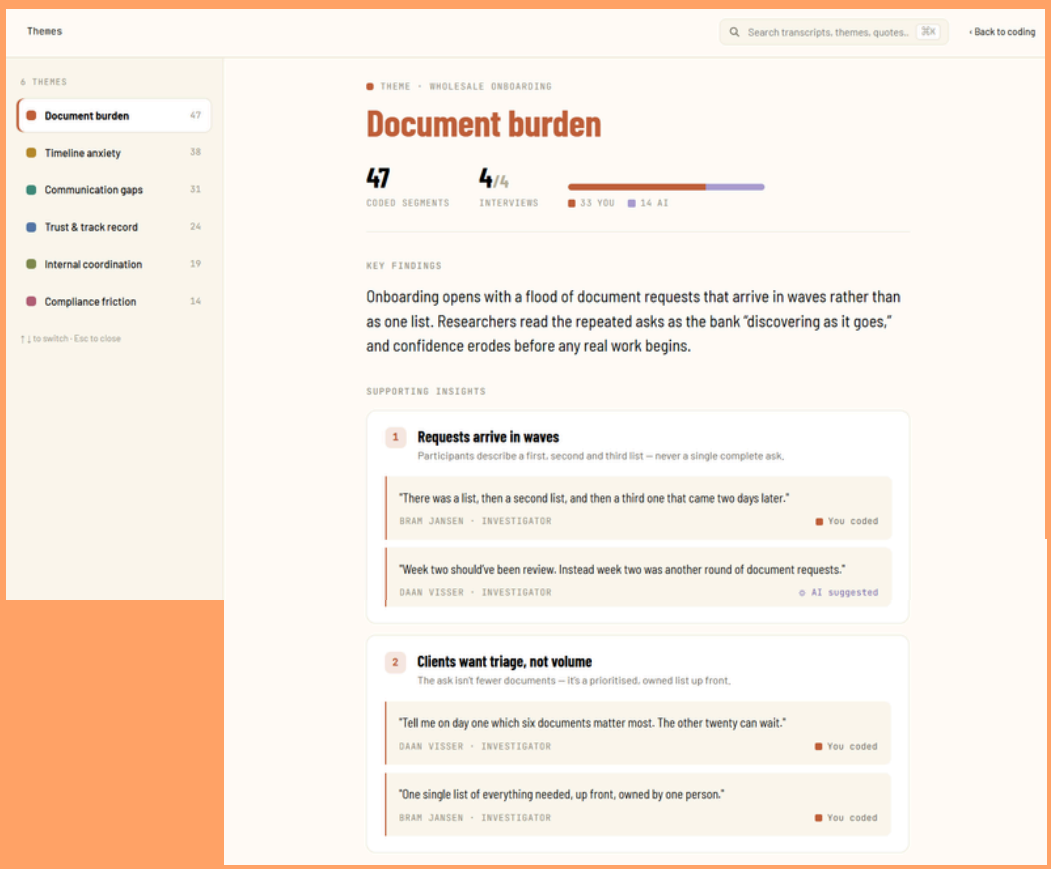

Figure 37: Overview themes

4. Research Memory

Orange Insight also includes a Research Memory workspace (Figure 38), which functions as a long-term organisational knowledge base. The foundational idea is that the tool will be used across multiple years, compiling all conducted research into this single database so that knowledge remains centralised, consistent, and independent of external, fragmented sources.

If a researcher wants to explore historical data, they can query the tool directly. The system returns a structured overview of previous findings, complete with supporting quotes and clickable study references. Each entry explicitly shows the year the study was conducted and the researcher who ran it. This allows you to evaluate whether the information is still relevant to your current study or if it is too outdated, while also providing the option to contact the original researcher if needed.

To ensure absolute privacy and compliance across the organisation, all data within the Research Memory database is completely anonymised. When looking into someone else's past research, a user cannot see any personal identifiable information regarding the participants, making it a safe asset for knowledge sharing and active cross-project learning.

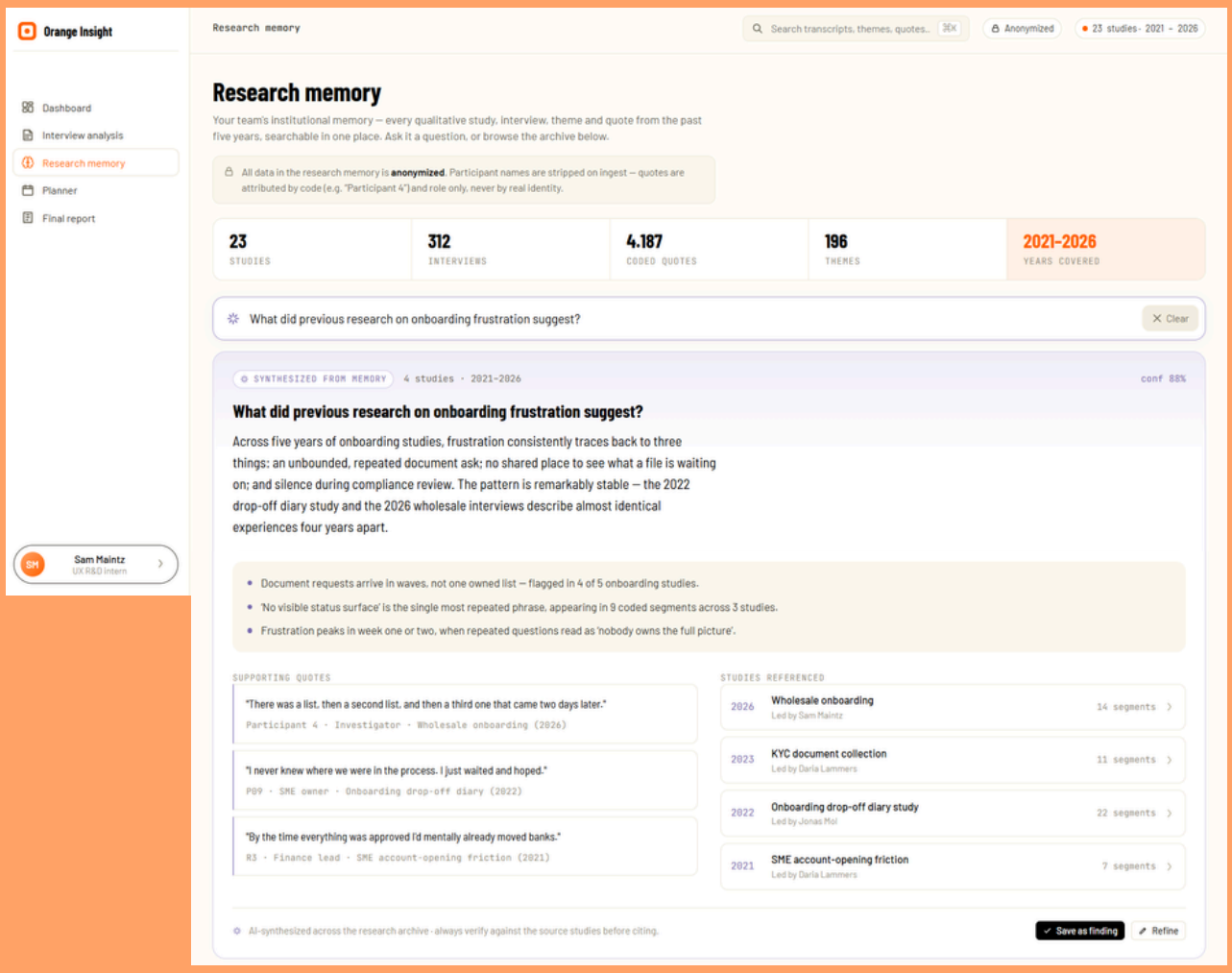

Figure 38: Research memory workspace

5. Planner

The planner workspace (Figure 39) supports the users with interview scheduling and tracking. It features both a Team Planner and a Personal Planner view. Within the Team Planner, you can see all the interview sessions that your colleagues have scheduled. This is highly practical. It ensures that when collaborating on a study, the team stays aligned regarding who has completed how many sessions, and with which participants. Alternatively, users can select the "Only me" filter to clear out the busy group schedule and view their personal timetable with total clarity (Figure 40).

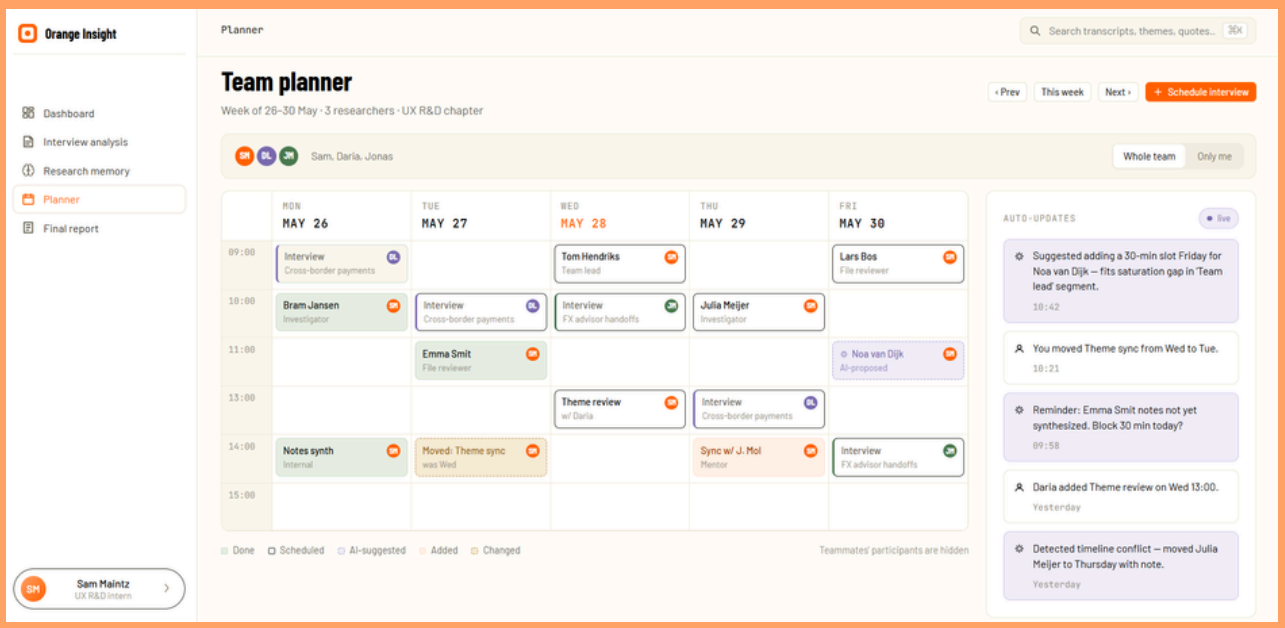

Figure 39: Planner workspace - Team Planner

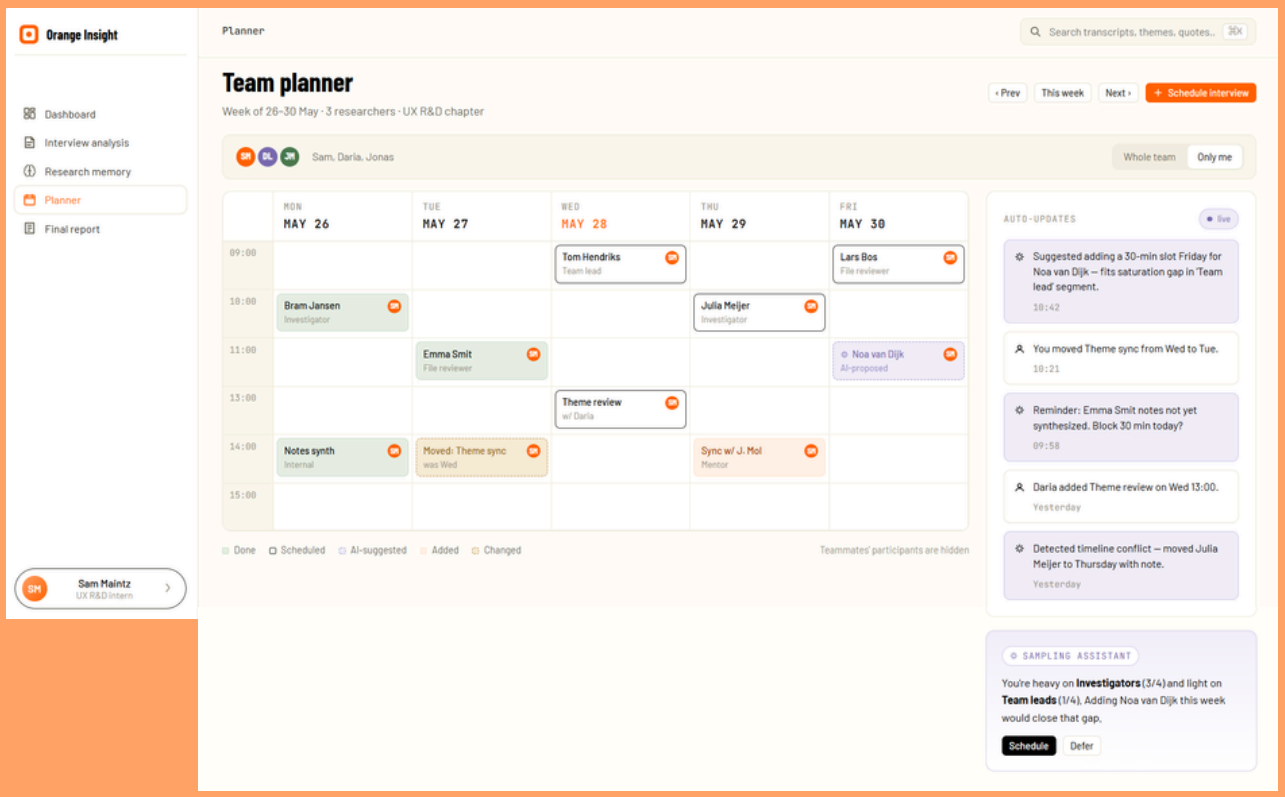

Figure 40: Planner workspace - "Only me" Planner

6. Final Report

As the analysis phase moves towards communication, the final report workspace acts as your final report assistant, supporting the transition from insights to deliverables (Figure 41). The tool automatically synthesises your data to generate headline findings and a short summary. It maps out the tracked themes by frequency, providing a concise explanation for each, alongside key quotes and AI-assisted drafts for visuals, recommendations, and strategic propositions.

Researchers have full control to edit every section, input their own visuals, or rewrite recommendations to keep accountability human-led. The interface also allows you to seamlessly switch between different individual studies to ensure you are exporting data from the correct project rather than blending studies together. Once finalised, the report can be exported directly as a PDF to be shared with teammates, clients, or other stakeholders. Crucially, all participant data within this reporting stage is entirely anonymised, ensuring no user data is leaked.

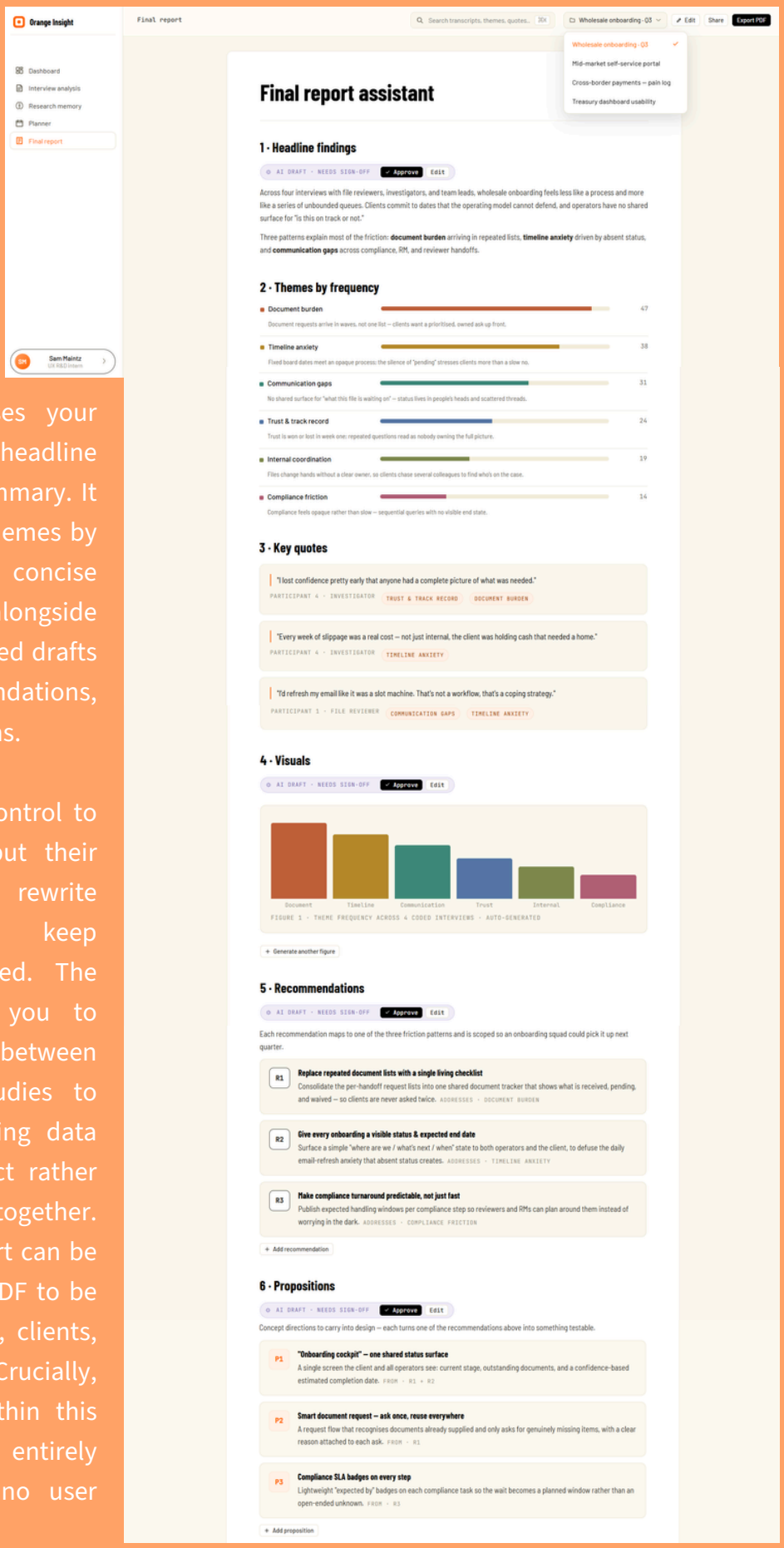

Figure 41: Final report workspace

7. Profile page

Finally, the profile page allows users to manage personal information and system settings (Figure 42). Users can view user-specific details, change passwords, and manage security configurations. It provides direct control over workspace preferences, interface density, AI confidence thresholds, and notification settings, ensuring high configurability and personalisation. Crucially, this is also the environment where users can upload and adjust the cheat sheet. This allows researchers to easily input or update the predefined guidelines, coding examples, do's, and don'ts that feed and train the AI before the analysis begins. Lastly, this environment provides the option to sign out of the system, which securely logs the user out and redirects them back to the original Orange Insight login screen (Figure 43).

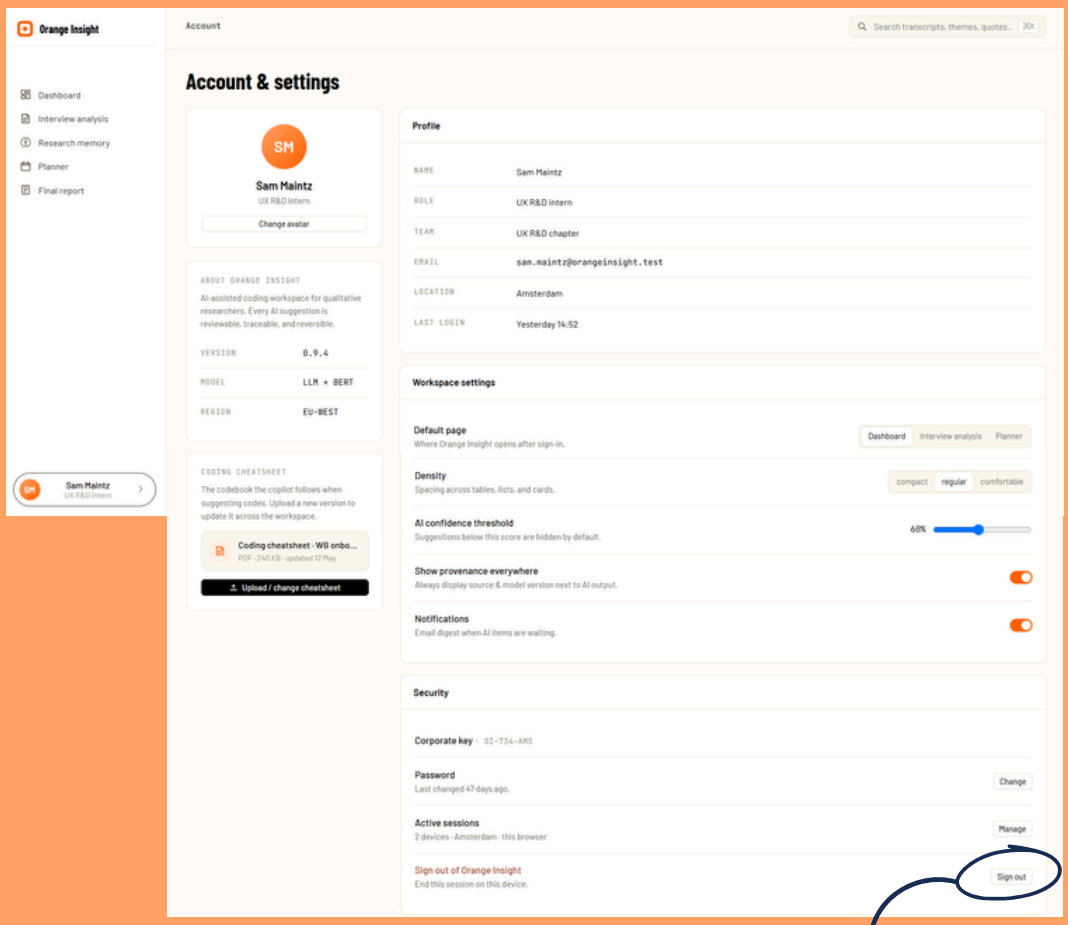

Figure 42: Profile page

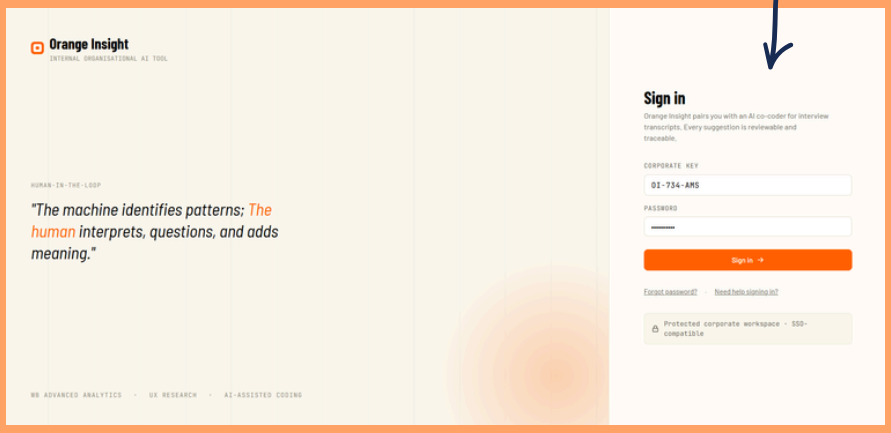

Figure 43: Back to login screen

6.8 User Journey

Figure 44 presents the user journey through Orange Insight from the perspective of a UX professional conducting a qualitative interview study. The journey is organised around seven interconnected workspaces: Login Screen, Dashboard, Interview Analysis, Research Memory, Planner, Final Report, and Profile. Rather than focusing solely on interface navigation, the journey map highlights two interaction types that are central to the design of Orange Insight: AI moments, where the system actively supports the workflow, and trust moments, where the researcher retains oversight, control, or responsibility. By visually distinguishing these moments, the journey map makes explicit how automation and human judgement are balanced throughout the qualitative research process.

The Journey starts by logging in and checking all updates in the Dashboard workspace, which provides a central overview. Then, the Interview Analysis workspace forms the core of the journey and is divided into a Coding phase (3A) and a Synthesis phase (3B). During coding, researchers begin by manually coding the first interview transcript. This provides the AI with an example of the researcher's coding logic and analytical approach. For subsequent transcripts, the system proposes codes that can be inspected through dedicated AI segments displaying the suggested theme, confidence score, rationale, and provenance information. Researchers explicitly accept, modify, or reject each suggestion before the AI is applied to additional transcripts. In this way, Orange Insight accelerates coding activities while ensuring that all analytical decisions remain under human control. During synthesis, the system supports interpretation by generating candidate themes from accepted codes across interviews. Researchers can review and edit these themes and explore supporting evidence. In addition, they can inspect a queue of AI-generated suggestions, and interact with a co-pilot chat to query the data and obtain rapid summaries. However, the responsibility for validating themes, interpreting findings, and determining their relevance remains with the researcher.

The Research Memory workspace functions as a shared organisational knowledge base, enabling users to search previous studies, findings, and quotations, while safeguarding privacy through the storage of fully anonymised research data. Within the Planner workspace, the AI suggests suitable interview scheduling opportunities, while scheduling decisions remain under the researcher's control. The Planner can be viewed through two different options: The team planner funtion and the Only me funtion.

In the Final Report workspace, the AI assists by synthesising findings, identifying prominent themes, and generating draft visualisations and recommendations. Researchers remain responsible for reviewing, editing, and approving every section before exporting the report. Similarly, the Profile workspace enables researchers to configure confidence thresholds and provenance visibility, upload and update the cheatsheet that influences AI behaviour, and manage security settings and account preferences.

The distribution of AI moments and trust moments throughout the journey is intentional and directly reflects the design principles established in Section 6.2. Trust moments are concentrated at stages where researcher accountability, interpretation, privacy, or system configuration are particularly important. Examples include authentication during login, reviewing AI-generated codes, validating and editing themes, ensuring that Research Memory contains only anonymised data, approving report content, exporting findings, and configuring AI confidence thresholds. These interactions operationalise the principles that human agency is non-negotiable (Principle 1), that privacy and compliance are taken into account from the start (Principle 4), that AI outputs require verification (Principle 5), and that system behaviour should remain transparent and understandable (Principle 6).

More broadly, the journey map illustrates the overarching design philosophy of Orange Insight: trust is not maximised but carefully calibrated. Consistent with Principle 2, the AI is assigned a meaningful yet clearly bounded role within the workflow. While the system contributes to efficiency by supporting coding, synthesis, knowledge retrieval, planning, and reporting activities, ultimate authority remains with the researcher. As a result, the researcher remains the accountable decision-maker throughout every consequential stage of the qualitative research process. Moreover, by reducing the time spent on repetitive and labour-intensive research activities, Orange Insight enables users to devote more attention to higher-value activities such as sensemaking, stakeholder collaboration, ideation, and design decision-making. In doing so, the system aligns with Principle 3 by strengthening the design thinking process rather than shortcutting it.

Taken together, the journey demonstrates how Orange Insight integrates AI into qualitative research in a way that balances efficiency, transparency, and human oversight. Rather than replacing researchers, the system is designed to augment their capabilities, allowing them to work more effectively while maintaining responsibility, trust, and ownership throughout the research and design process.

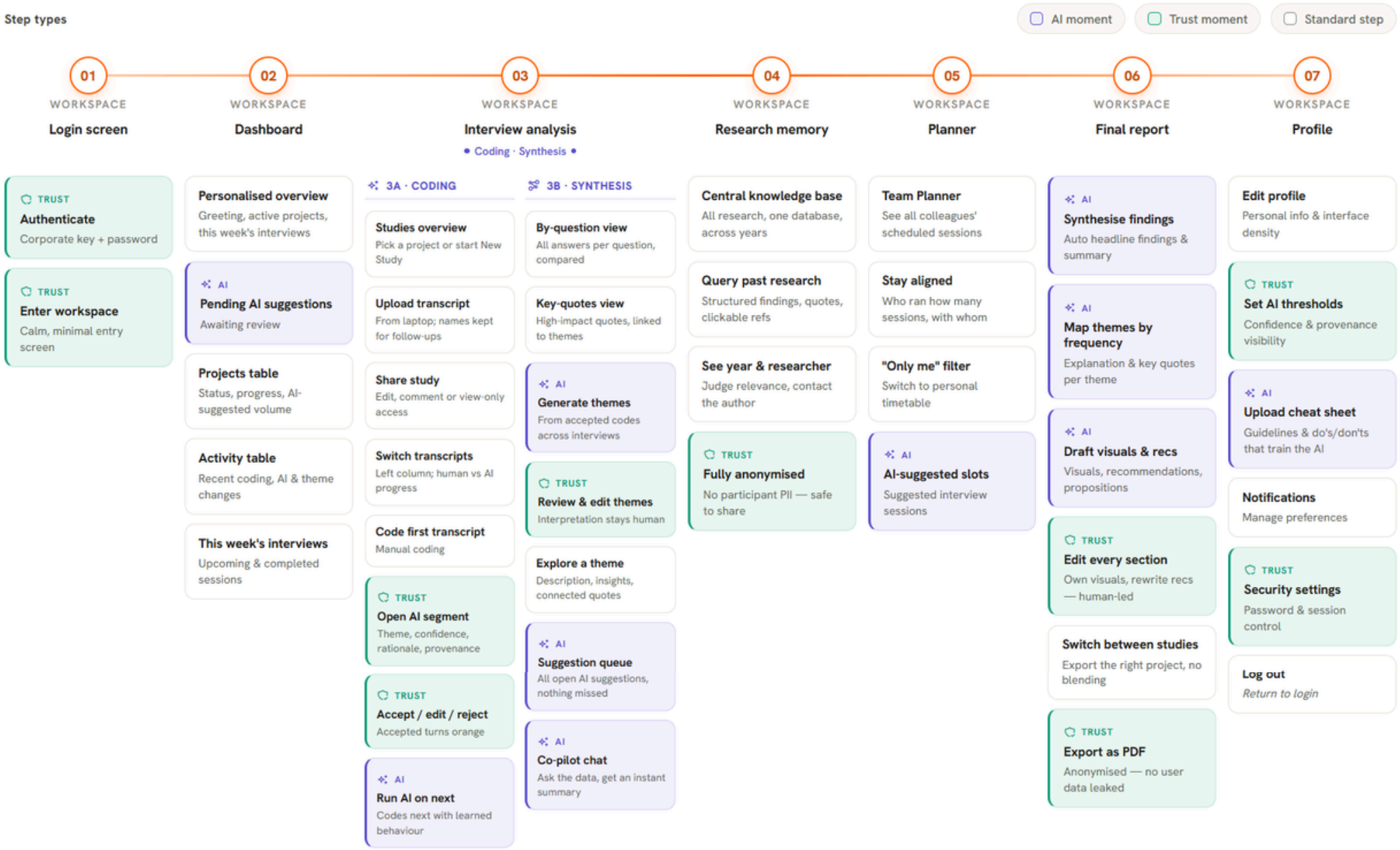

Figure 44: User Journey Orange Insight

6.9 Efficiency Gains

To assess the potential impact of Orange Insight, a preliminary business case was developed based on interview findings and observed workflow patterns within the UX R&D chapter. Participants consistently identified qualitative interview analysis as one of the most time-consuming phases of the UX workflow, often requiring significantly more time than the interviews themselves.

In the current workflow, a typical research cycle consisting of five interviews requires approximately 5 hours for data collection and 12.5 hours for analysis, resulting in a total of 17.5 hours. On average, this corresponds to approximately 2.5 hours of analysis per interview. These estimates are derived from the conducted interviews and reflect common practice within the team.

With the implementation of Orange Insight, the analysis phase can be partially automated while maintaining human oversight. The first interview still requires manual coding to establish the coding logic and ensure accuracy, estimated at approximately 3 hours. This slightly longer duration compared to the current workflow reflects the need for careful initial setup, as the system learns from the researcher's coding decisions and should not replicate incorrect patterns.

Once this foundation is established, subsequent interviews can be processed more efficiently. The remaining four interviews are estimated to require approximately 45 minutes each for analysis, resulting in a total analysis time of approximately 6 hours. Combined with the 5 hours required for conducting interviews, this reduces the total duration of a research cycle to approximately 11 hours.

This represents a potential time saving of 6.5 hours per cycle, corresponding to a reduction of approximately 37% compared to the current workflow. Such a reduction can significantly improve efficiency, particularly when multiple research cycles are conducted over time.
Importantly, the time saved is not only a matter of operational efficiency, but also creates opportunities to reinvest effort into higher-value activities. These include ideation, exploration, and stakeholder alignment, which may further enhance the overall quality and impact of the design process.

It should be noted that these estimates are based on expected impact derived from interview findings and concept validation. As such, they represent indicative projections rather than validated performance metrics. Actual time savings should be further assessed through real-world implementation and longitudinal use within the organisation.

6.10 Validation

To evaluate the feasibility, desirability, and viability of Orange Insight, a comprehensive validation process was conducted. This evaluation involved two main components: a broad peer review with the UX R&D team and targeted validation sessions with key organisational stakeholders within ING.

First, a one-hour Knowledge Sharing session was held with eight members of the UX R&D team, including service designers, UX researchers, and UX designers. This session consisted of a live demonstration of Orange Insight followed by a structured feedback activity, where participants reflected individually on the design via post-it notes and chat. They were asked to write down their perceived value, concerns, suggested improvements and any additional reflections. In addition to the general feedback, the evaluation was explicitly structured around the six design principles defined in Section 6.2:

1. Human agency is non-negotiable
2. Trust must be calibrated, not maximised
3. AI should strengthen design thinking, not shortcut it
4. Privacy and compliance are design constraints
5. Verification is required
6. Transparency about AI behaviour and limitations

The feedback confirmed that Orange Insight, if implemented in real practice, successfully supports human control, transparency, and structured analysis.

To further ground the concept within ING's specific organisational, technical, and regulatory context, additional validation sessions were conducted with key experts across various departments: a data scientist (WBAA), a risk officer (WBAA), a UX designer (Retail Banking), and a manager from the Transformation Office (Wholesale Banking). Their insights, categorised by feasibility, desirability, and viability, are detailed below.

6.10.1 Feasibility

Feasibility assesses whether Orange Insight can be technically built and operated within ING's existing infrastructure. This was evaluated with the data scientist and the risk officer through a live demonstration and technical discussion. Both stakeholders responded positively and recognised its potential both within the UX R&D team and beyond. They also confirmed that the concept would be technically feasible, specifically through a hybrid architecture combining Large Language Models (LLMs) and BERT-based models. In this setup, LLMs are considered suitable for tasks such as segmenting and summarising qualitative data, while BERT-based models could support more structured processes, including coding and confidence scoring. This hybrid approach aligns with the functional requirements of the concept.

The discussion highlighted two main technical design considerations. First, the "cold start" problem was highlighted as a key challenge, as the system initially lacks knowledge of user-

specific coding practices. Proposed solutions include preloading the system with historical research data and providing structured coding guidelines. Over time, performance could improve through imitation learning based on user interactions. Second, the proposed research memory function, designed as a repository of past interview data, raised questions about consistency over time. Specifically, model updates may lead to slight differences in how historical data is interpreted. However, this was not considered a major issue, as the research memory function primarily supports summarisation and pattern recognition, while core themes and codes remain the same.

Overall, the results suggest that Orange Insight is technically feasible within ING's infrastructure, provided that appropriate model selection and implementation strategies are applied.

6.10.2 Desirability

Desirability concerns whether Orange Insight addresses the needs and expectations of its intended users. Evidence for desirability is grounded in earlier interviews, the co-creation session, and validation with UX practitioners.

Across these activities, qualitative interview analysis consistently emerged as a major bottleneck within the UX workflow. Participants emphasised that the process is both time-consuming and cognitively demanding, particularly when analysing multiple transcripts and synthesising insights.

The design of Orange Insight directly responds to this challenge and is therefore well aligned with the needs and expectations of the team. By supporting and accelerating the process of interview coding, providing better structure across multiple transcripts, and assisting in identifying patterns, the tool addresses this core bottleneck. As a result, Orange Insight has the potential to significantly reduce the time and cognitive load required for qualitative analysis, while maintaining the quality and depth of insights. This value proposition was confirmed during validation sessions, where UX stakeholders indicated that they would adopt the tool in their workflows and recognised its potential to significantly improve efficiency in qualitative research. In addition, the concept was recognised as potentially valuable beyond UX research, particularly in domains involving large volumes of textual data.

At the same time, important nuances emerged. A UX designer from Retail Banking noted that the concept may be perceived as too academic in fast-paced environments, where quicker, less precise outputs—such as AI-generated summaries—are often preferred. This highlights a key trade-off between speed and accuracy, suggesting that desirability may vary depending on context.

In contrast, a manager from the Transformation Office within Wholesale Banking, which sits above Wholesale Banking Advanced Analytics in the organisational structure, was highly enthusiastic about the concept and strongly supported its implementation. In particular, she highlighted the Research Memory function as a major asset, arguing that such a feature could serve as a central knowledge repository, enabling broader access to insights, reducing duplicate research, and fostering a more customer-centric mindset across teams.

Furthermore, she noted that while her department had previously developed a basic internal tool with similar Natural Language Processing (NLP) logic for quantitative survey analysis, Orange Insight addresses a much deeper operational need by effectively capturing the nuanced context of qualitative transcripts. This strong interest was further demonstrated by a proposal to explore internal budgeting and a formal pitch for broader implementation within the bank following the conclusion of this project.

These findings suggest that Orange Insight is highly desirable for contexts that require depth, rigour, and structured analysis, such as ING WBAA. However, its desirability may vary across different organisational contexts, depending on workflow requirements, time constraints, and user preferences.

6.10.3 Viability

Viability concerns whether Orange Insight can be sustainably implemented within ING over the long term. This dimension was primarily assessed through discussions with the risk officer. While the concept was received positively, several conditions were identified as critical for long-term success.

First, continuous testing and monitoring are required, given the evolving nature of LLM-based systems. Ensuring consistent output quality is particularly important in a regulated environment. Second, long-term maintenance must be clearly organised. Responsibilities for updating software, managing dependencies, and maintaining infrastructure need to be explicitly assigned. Third, strict access and identity management (IAM) is necessary to ensure that only authorised users can access sensitive data, in line with privacy and compliance requirements. Finally, clear ownership of the tool is essential. An internal stakeholder must be responsible for development, deployment, and resource allocation, including cloud infrastructure and budgeting.

In summary, while Orange Insight is viable, its long-term success depends on organisational commitment, governance structures, and clearly defined ownership.

Chapter 7

Discussion

7.1 Theoretical Contributions
7.2 Practical Implications
7.3 Limitations
7.4 Recommendations

This chapter reflects on the core findings of this research by connecting the insights from the literature review, interviews, and co-creation sessions directly to the final design outcome, Orange Insight. It provides a critical evaluation of how the proposed solution bridges the gap between theoretical AI principles and daily UX practice within a regulated environment. Furthermore, this chapter outlines the theoretical contributions and practical implications of the study, addresses its inherent limitations, and concludes with actionable recommendations for future research and implementation.

7.1 Theoretical Contributions

This research contributes to the existing literature on AI in UX design by combining three domains that are often studied separately: Human-Centred AI (HCAI), appropriate trust, and AI-supported UX workflows in regulated environments. Rather than only discussing how these domains relate to each other on a theoretical level, this study also translates these insights into a concrete design outcome: Orange Insight.

When looking at existing literature on HCAI, many contributions remain relatively abstract. Concepts such as human agency are frequently emphasised (Shneiderman, 2021; Kowald et al., 2024), but are rarely implemented and demonstrated in real-world scenarios. This study contributes to that gap by showing that human agency in AI-supported UX work should not be treated as a general design value alone, but as a requirement that must be embedded in workflow structure and system interaction.
In this research, this is reflected in the principle that users remain responsible for interpretation and final coding decisions, while AI only provides suggestions. The first interview is coded manually by the user. Since qualitative coding is inherently subjective and differs between researchers, this step ensures that the system learns the user's personal coding logic. In addition the user feeds a cheatsheet to the tool with examples of preferred coding. This aligns with the concept of imitation learning, where AI systems learn from human users by observing and replicating their behaviour (Gkiokas, 2016). In addition, the AI in Orange Insight only provides suggestions rather than final decisions. Users must actively accept, reject, or edit these suggestions. This design choice ensures that human agency is preserved throughout the analysis process. By embedding these mechanisms directly into the interaction design, this study moves beyond purely conceptual discussions of HCAI and shows how these principles can be translated into a workflow in which AI augments, rather than replaces, human judgement.

Furthermore, the research contributes to the concept of appropriate trust described by Degachi et al. (2024). As described in the revised framework, trust levels differ across the various stages of the UX workflow. However, this study extends existing theory by showing that, in regulated UX contexts, appropriate trust is not only a user attitude, but a design outcome. Trust must be actively shaped through the design of interaction mechanisms and the organisational conditions in which the tool operates.
In the interviews, participants already demonstrated a relatively appropriate level of trust in low-risk tasks such as summarisation, but were more cautious when AI outputs directly influenced analysis or decision-making. This research shows that such trust can be better calibrated when systems provide traceability to original quotes, confidence indicators, explanations for AI suggestions, and explicit human approval steps. Together, these mechanisms enable verification and critical judgement, reducing the risk of both overreliance

and underuse. The broader theoretical contribution is therefore that appropriate trust in regulated AI-supported UX work must be designed through transparency, verifiability, and human-in-the-loop structures, rather than assumed to emerge automatically from user experience.

In addition, this study contributes to research on AI in UX workflows. Many existing studies, such as Lu et al. (2022) and Zhu et al. (2024), focus on what AI is technically capable of, but give less attention to how AI is actually used within organisations, especially in UX practice. This research shows that there is still a significant gap between AI capabilities and actual adoption by designers. More specifically, it demonstrates that this gap is not only caused by limited tool knowledge or lack of trust, but also by the absence of a safe, approved, and transparent environment in which AI can be integrated into everyday design practice. This is particularly relevant in regulated contexts such as ING, where data privacy, security, and compliance strongly shape what kinds of AI use are possible.

Orange Insight is designed to address this challenge and better fit the existing workflow. In the protected corporate environment of Orange Insight, all data remains within the organisation, allowing users to work with sensitive information without risking data leakage. Furthermore, the tool automatically anonymises all data in the research memory and final report function. This ensures that when other users access the shared research database, they only see anonymised data. In this way, Orange Insight aligns with organisational policies on privacy, security, and compliance, which is particularly important in a regulated banking context (Pamarthi, 2024).

Finally, the development of the conceptual and revised frameworks represents a key theoretical contribution. These frameworks integrate UX workflow stages, AI opportunity spaces, and trustworthiness conditions into a single model. Their contribution lies in showing that AI integration in UX workflows should be understood as phase-specific: opportunity areas, trust requirements, and acceptable forms of AI support differ across research, design, and finalisation. Rather than presenting AI integration as a generic innovation challenge, the frameworks show how different workflow stages require different balances between efficiency, creativity, human agency, and control.

Orange Insight aligns with this, as it is specifically designed for a particular stage in the workflow. It can be seen as a translation of the conceptual framework into a concrete product. It demonstrates how theoretical insights can be systematically transformed into design principles and ultimately into specific features and interactions. This strengthens the link between theory and design practice and shows how frameworks for trustworthy AI can be directly applied in the development of real tools.

7.2 Practical Implications

The results of this research provide concrete implications for ING WBAA but can also be applied to similar contexts or organisations. These implications are clearly reflected in the final design, Orange Insight.

The research findings show that successful AI integration is not only about the technology itself, but primarily about the level of trust users have in the tool. Designers and researchers are willing to use AI, but only if they remain in control and understand how the AI works. Orange Insight responds to this by presenting AI outputs as suggestions rather than final answers, providing transparency about how and why certain suggestions are made, and always allowing users to accept, edit, or reject outputs. This means that the focus is not only on improving efficiency, but also on ensuring the trustworthiness of the tool. These features enable users to rely on the tool in their daily work, ultimately making their research process more efficient.
The team indicated that qualitative interview analysis is one of the biggest pain points in their workflow. This task is highly time-consuming and cognitively demanding. At the same time, it is also one of the most important parts of the workflow, as it forms the foundation for all subsequent design decisions. By improving this phase, the overall quality and efficiency of the entire workflow can be improved. The focus on this phase of the workflow is particularly valuable for the team. As mentioned during the research, for the finalisation phase they prefer receiving guidelines rather than using a full AI tool, while for the design phase, tools such as Figma Make are already emerging. This further supports the decision to focus Orange Insight on the research phase, where the largest opportunity for improvement exists.

In addition, the research highlights the importance of aligning AI solutions with organisational and regulatory constraints. Within ING, strict rules regarding data usage and tool access limit the use of external AI tools. Orange Insight is therefore designed as an internal tool that operates within a secure, corporate environment, aligning with organisational policies on privacy, security, and compliance, which is essential for adoption in a regulated context such as the banking sector.

Finally, Orange Insight demonstrates that AI tools can also contribute to improving AI literacy within teams. Through features such as reviewing AI suggestions, interpreting confidence scores, and understanding how outputs are generated, users develop a better understanding of how AI works and when it can be trusted. In this way, the tool not only improves productivity, but also acts as a learning tool for responsible AI use, which in turn supports the development of appropriate trust among users.

Although these practical implications are derived from the UX Research & Design team within ING WBAA, they can also be applied to other organisations where qualitative interview analysis plays a central role in the design process.

7.3 Limitations

Despite its contributions, this study has several limitations that should be acknowledged as well:

- The research is a single-case study, focusing exclusively on the UX Research & Design team within ING WBAA. While this approach allows for in-depth, context-specific insights, it limits the generalisability of the findings. The results are strongly shaped by ING's organisational structure, regulatory environment, and tooling constraints, and may therefore not fully apply to organisations operating in different contexts.
- The study relies mostly on qualitative data collected through semi-structured interviews, which are inherently subjective. Although thematic analysis enables the identification of shared patterns, the findings depend on participants' perceptions and experiences. This introduces a potential risk of bias, both in the responses of participants and in the interpretation of the data by the researcher.
- The sample size is relatively small, consisting of ten participants. While this is appropriate for qualitative research and allows for detailed insights, it may limit the diversity of perspectives captured within the study.
- The co-creation session involved a limited group of participants and did not include a UX researcher during the main session. Although additional informal validation was conducted afterwards, this limitation may have influenced how the concepts were evaluated and refined.
- The study evaluates the integration of AI primarily through a conceptual design (Orange Insight) rather than a fully implemented tool. As a result, the concept has not been validated through real-world usage over a longer period of time. The effectiveness of the tool is therefore based on expected value rather than empirical evidence from actual implementation.
- Although the research takes organisational constraints into account, it does not analyse them in depth. While this aligns with the scope of the project, it limits insights into how such constraints could potentially be adapted or challenged to enable broader AI adoption within the organisation.

7.4 Recommendations

Based on the findings and limitations of this study, several recommendations can be made for future research. These recommendations directly build on the identified limitations and aim to strengthen both the validity and applicability of the results.

1. As this study evaluates Orange Insight primarily as a conceptual design, its impact has not yet been validated through real-world use. Future research should focus on implementing and testing the tool in practice over a longer period of time. This should include quantitative and qualitative evaluation metrics, such as time saved during interview analysis, perceived cognitive load, quality and consistency of coding, error detection, and

levels of user trust. By measuring these factors and testing the tool in practice, it would be possible to evaluate its actual impact on efficiency, trust and design quality over time.

2. The co-creation session in this study did not include a UX researcher, which may have influenced the evaluation of the concept. Future research should therefore include targeted validation with UX researchers specifically, as they are part of the primary users of qualitative analysis tools. This would allow for deeper insights into how the tool supports research-specific tasks, such as coding strategies, interpretation, and synthesis.
3. The research showed that limited awareness of AI tools and their capabilities contribute to the gap between AI potential and actual adoption. Future work could therefore explore the development of a guidebook or supporting document that help UX professionals by providing an overview of relevant AI tools (even if only usable on personal devices) and explaining when and how AI can be effectively used. This could include examples of safe use cases, explanations of organisational constraints, and guidance on responsible AI use within regulated environments.
4. Future research could aim to expand beyond a single organisational context. This study focuses on one specific organisation within a regulated banking environment. Studying AI adoption in different sectors, such as technology, consultancy, or government, could provide broader insights into how context influences the integration of AI into UX workflows. By comparing results across different environments, researchers can better understand which factors are context-dependent and which are more universal.
5. Another interesting direction for future research is to explore trust dynamics across different types of AI systems. This study primarily focused on analytical AI, such as support for interview analysis. However, AI is also widely used in generative tasks and decision support. Future research could investigate how trust differs across these types of AI and how this influences adoption, reliability, and user behaviour.
6. Another promising direction is to explore how AI can support collaboration within multidisciplinary UX teams. UX work typically involves close collaboration between designers, engineers, data scientists, and other stakeholders. Future research could focus on identifying current pain points in collaboration, and how AI can be used to improve these parts.

Together, these research directions can provide a more complete understanding of how AI can be effectively and responsibly integrated into UX design practices.

Chapter 8
Conclusion

8.1 Answering the Research Question
8.2 Reflection
8.3 Use of AI

This final chapter brings the research to a close by directly answering the central research question, assessing how Orange Insight successfully balances efficiency, creativity, and trustworthiness within ING's UX workflow. Following this synthesis, a personal and professional reflection is presented, evaluating the research process, the methodology, and the timeline from the author's perspective. Finally, the chapter transparently outlines the role and scope of AI assistance throughout the execution of this thesis, reinforcing the commitment to academic integrity and human ownership.

8.1 Answering the Research Question

This research was set out to answer the following research question: “How can AI be integrated into the UX design workflow for internal tool development in a way that enhances creativity and efficiency, while safeguarding trustworthiness?”

An interesting observation emerging from this study is that the UX design workflow at ING WBAA largely revolves around designing AI-driven tools. In that sense, the outcome of this research is somewhat self-referential: the research question is ultimately answered through the design of an AI-supported tool itself. The proposed solution, Orange Insight, demonstrates that AI can be effectively integrated by developing a custom, internally aligned tool within a protected corporate workspace. This ensures that the solution complies with organisational regulations, particularly regarding data privacy and security, which are critical within the ING context.

The question then becomes whether this solution successfully enhances creativity and efficiency as well as safeguards trustworthiness.

First, in terms of creativity, the contribution of Orange Insight may not be immediately evident, as the tool primarily focuses on the research phase rather than the design phase. At first glance, it could therefore appear that the tool does not directly support creative output. However, when considering the broader workflow, its potential impact becomes clearer. By accelerating the time-consuming process of qualitative interview analysis, the tool is expected to create more time and mental space for designers to focus on exploration, ideation, and the development of multiple design alternatives. In this way, Orange Insight has the potential to contribute to creativity indirectly, by freeing up cognitive resources and time that can be reinvested in creative activities. Thus, while it does not directly generate creative output, it is expected to enable a workflow that is more supportive of creativity overall.

Second, the impact on efficiency is more direct. The research phase, particularly interview analysis, was identified as one of the most time-consuming and cognitively demanding parts of the UX workflow. By supporting tasks such as coding transcripts, identifying patterns, and structuring insights, Orange Insight is expected to reduce the effort required in this phase. This could lead to a more streamlined workflow, allowing designers to move more efficiently from research to actionable insights. As such, the tool is expected to directly improve both the speed and effectiveness of the design process.

Finally, regarding trustworthiness, Orange Insight incorporates several design principles aimed at ensuring responsible and reliable AI integration. Features such as human-in-the-loop validation, transparency of AI suggestions, confidence indicators, and traceability to original

data are designed to maintain user control and understanding. Additionally, the use of a secure, internal environment ensures compliance with organisational regulations and protects sensitive data. Together, these elements aim to support appropriate trust in the system, helping to avoid both over-reliance and underuse of AI. This suggests that trustworthiness is not only a property of the technology itself, but also a result of intentional design and integration within a specific organisational context.

In conclusion, this research shows that AI can be meaningfully integrated into the UX design workflow by developing a context-specific, trustworthy, and workflow-aligned tool such as Orange Insight. Rather than proving its effectiveness in practice, the study provides a validated concept for trustworthy AI integration, whose actual impact on efficiency, creativity, and design quality still requires further implementation and real-world testing.

8.2 Reflection

To reflect on the entire process, it really felt like a rollercoaster. There were moments where I really enjoyed the project, and other moments where I struggled more. At the same time, it feels like the past few months have gone by very quickly. Overall, I am quite happy with the final result. Looking back, I think the decision to shift from creating a guidebook to designing an AI tool was a very good one. It made the project much more engaging and enjoyable for me.

The part of the project I enjoyed the most was definitely the co-creation session. I really liked the “vibe coding” part, where I could actively collaborate with participants to shape something that would genuinely bring value to them. I think that was also my main motivation throughout the project: I truly wanted to create something that would be useful for the team.

If I reflect on the quality of my work, I am generally satisfied. At the beginning of the project, everything felt quite unstructured in my head, and I struggled to bring all the pieces together. However, over time I think I managed to structure the project well. Especially the conceptual framework, and later the revised framework, helped me a lot. They provided a clear overview of the most important findings and allowed me to see everything at a glance.
At the same time, I feel that the results of this research are not necessarily groundbreaking. However, during the process I came to realise that this was not the primary goal of the project. The main objective was to create an outcome that could deliver real value to the team, especially since they do not have the time or capacity to explore these topics in depth themselves. In that sense, I believe I have succeeded in achieving that goal.

Involving stakeholders in the process was very valuable, both during the interviews and the co-creation session. It was unfortunate that an UX researcher was not able to attend the co-creation session itself. However, I was able to address this by validating the outcome afterwards through an informal conversation, which helped to strengthen the result.

Looking at my planning, I think it was generally quite good. However, I underestimated the amount of time needed for the literature review, which took significantly longer than expected. In the end, this did not cause major issues, as I still had enough time to complete the rest of the project. The analysis of the interviews also took a considerable amount of time, which reflects the main pain point identified within the team (if only I had already had a tool like this available during that phase). Despite this, I was able to complete everything within the planned timeframe.
That said, there are some things I would plan differently in hindsight. I could have scheduled certain activities earlier. For example, the co-creation session was only planned during the same week it took place, which made it more difficult to organise. Similarly, I would have planned the validation sessions with the risk officer and data scientist earlier in the process, as both stakeholders had very busy schedules. As a result, these validation moments took place shortly after the green light instead of before, which would have been more ideal.

Overall, this project has been a very valuable learning experience for me, both academically and personally. It challenged me to deal with uncertainty, make design decisions based on incomplete information, and continuously reflect on my own process. I have learned that creating something meaningful does not always mean creating something groundbreaking, but rather something that truly fits the needs of its users and context.

Looking back, I feel proud of the journey I went through and the outcome I was able to deliver. I am truly grateful for everyone who supported me throughout this process. Without their help, this thesis would not have been the same.
Overall, this thesis reflects not only the result of the project, but also my growth as a designer who aims to combine technology, design, and trust in a meaningful way.

8.3 Use of AI

Throughout the project, AI was used for inspiration in certain stages, helping to explore different perspectives and refine ideas. However, all key decisions, interpretations, and final content were made by the author. In addition, AI tools were used in the design process to support the creation of the interface of the four concepts and the final design of Orange Insight. These tools helped to visualise ideas and accelerate the prototyping process, while all underlying design decisions remained grounded in the research findings and were fully developed by the author. Importantly, AI was not used to autonomously generate academic content or to replace critical thinking. It was only used to support the writing process by improving language and readability. Specifically, AI was used as a spell checker (very useful for me, as someone with dyslexia), to assist with sentence formulation, and to help identify relevant sources. At times, it also served as a sparring partner for generating ideas. This approach aligns with responsible AI use in academic work, where AI supports the process while full responsibility for the content remains with the human author.

Chapter 9

References

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Chapter 10

Appendices

A. Initial Project Proposal
B. Informed Consent Sheets
C. HREC Checklist & Data Management Plan
D. Interview Protocol
E. Revised Framework
F. Ideation to Concepts
G. Co-Creation

Appendix A: Initial Project Proposal

Project title: Designing trustworthy AI-supported design processes
Sam Maintz 5255597

Introduction (291 words)
In contemporary organisations, artificial intelligence (AI) is becoming both increasingly prevalent and strategically essential. Companies across industries are accelerating their AI adoption efforts as competitive pressure intensifies. ING Wholesale Banking Advanced Analytics' (WBAA) Research and Design (R&D) team, who develop data-driven tools for global financing, fraud prevention, and sustainable lending, is actively engaged in this transition. However, the use of AI as a design tool in this team remains limited at present. Designers primarily rely on Copilot, and while the integration of Figma Make is underway, it is still in an early phase of development.

Shneiderman (2021) argues that the purpose of AI is to assist humans and organisations rather than replace them. For UX/UI designers, researchers and service designers, AI therefore holds significant potential as an assistive tool, provided that they understand how to use it effectively and responsibly. As Degachi et al. (2024) emphasise, successful collaboration between humans and AI requires appropriate trust, meaning that users must understand when AI is reliable and when it is not. Both overreliance and under reliance can cause risks. This is particularly relevant in the banking domain where transparency, accountability, and reliability are essential conditions for adopting new technologies. This also raises an important question for ING: In which parts of the design process can AI meaningfully enhance the work of designers, and where might it introduce risks or undermine trust and reliability?
Stakeholders include the ING R&D team, data scientists, data analysts and data engineers, a risk officer and users. The opportunity here lies in creating a workflow where AI is integrated in a trustworthy way. Limitations might be the current lack of guidance on how to use AI, limitations from Copilot restrictions, and the need for trust principles to avoid bias.

Problem Definition (200 words)
AI has the potential to enhance the UX design process by supporting creativity, accelerating exploration, and improving efficiency. At the same time, AI can introduce significant risks when it falls short in areas such as transparency, contextual understanding, and reliability. These risks are particularly relevant within a banking environment, where responsible and compliant use of AI tools is essential. Currently, designers at ING only use Copilot and have limited knowledge about how AI can be applied effectively and appropriately within their design workflow. As a result, there is a clear knowledge gap within the organisation regarding how AI can be integrated safely, responsibly, and meaningfully into design practices in a financial context.

The opportunity within this project is to understand how AI can be integrated into the workflow of UX designers at ING. It is important to understand the conditions under which AI can be used safely, how they use AI right now, which types of AI tools can improve the process, and at which stages of the design process such tools can provide meaningful value. The findings will be translated into an AI augmented UX design workflow that guides designers in making use of AI in an appropriate way.

Assignment (125 words)
Design an AI augmented UX design workflow and set of design principles to enhance creativity and efficiency of UX designers at ING WBAA throughout the design process, while ensuring trust, transparency, and design integrity.
The project will have a strategic, iterative research through design approach. It starts with a literature review on AI in design, followed by semi-structured interviews with multiple stakeholders to better understand the current workflows, limitations, challenges, desires, and expectations. These insights will be the ground on which the AI-augmented UX design workflow will be created. It will be validated with user tests and co-creation sessions. Based on this, the final outcome will be a strategically grounded workflow and set of design principles that guide ING UX designers in appropriate AI use.

Research Question:
How can AI be integrated in ING's UX design workflow for internal banking products in a way that enhances designers' creativity and efficiency, while safeguarding trust, transparency, and design integrity?
Sub-questions:
1. How do UX designers (and other stakeholders) at ING currently use and experience AI in their workflow?
2. In which parts of the design process can AI provide meaningful added value and where causes it risks to quality, clarity, trust, or integrity?
3. What design principles and conceptual frameworks can guide the use of AI in UX processes at ING?

Methodology:
Research through design – qualitative research

SQ1:
- Literature Review
- Semi-structured interviews with UX designers, AI specialists and other relevant stakeholders
- Context mapping of the current UX workflow
- Analysing documents of internal guidelines or tools

SQ2:

- Mapping the UX design process and identifying AI touchpoints
- Evaluation of AI design methods
- Review sessions with designers and other stakeholders
- Comparative analysis of safe vs. high-risk AI use cases

SQ3:

- Thematic analysis of findings from sub-questions 1 and 2
- Translation of insights into design principles and a conceptual workflow
- Iterative refinement based on feedback

Project planning important data:
Kick-off meeting: 09-02-2026 14.00-15.30 room C-2-450
Mid-term Evaluation: 07-04-2026
Green-light meeting: 01-06-2026
Final Presentation: 06-07-2026

Motivation and personal ambitions (179 words)
I am very drawn to the intersection of AI, design, and trust, as throughout my studies, I have had several courses focused on AI in design. In one, we learned to experiment with many AI tools for creative and analytical design tasks. In another course, together with a team, I developed the base for a startup called AI Classroom, a concept that helps secondary schools prepare students and teachers for a future shaped by AI. We received a 10 for that project. This made me even more enthusiastic and curious about the role of AI in design. Also because AI is becoming more essential in future design. I want to deeper understand how it can be used responsibly.
During this project I want to better develop my skills in doing qualitative research as well as critically evaluating AI methods and tools. I also want to become better in translating complex insights into actionable frameworks. What also excites me about the project is the opportunity to work collaboratively within a multidisciplinary team, while still having the freedom to work independently.

Expectations ING (210 words)
For this graduation project, I expect a supportive supervisory role from ING WBAA, including the opportunity to ask questions freely and to have regular meetings to discuss progress, findings, and next steps. I also expect to have access to relevant stakeholders within ING, particularly members of the Research and Design team, to conduct interviews and, where appropriate, to test intermediate outcomes. This access is essential for grounding the research and validating insights within the organisational context. Furthermore, I expect to be able to focus on my graduation project fully and to be treated as a graduating student rather than as an intern taking on additional operational tasks. Having the space to concentrate on research and design

activities is crucial for delivering a high-quality thesis. In terms of working environment, I expect to have the opportunity to work from the ING office. As I understand, working on-site at least one day per week is a common practice at ING. I expect to be present at the office more frequently, as I believe this will allow me to work most productively and to conduct high-quality research through close interaction with the team. Finally, I expect ING to facilitate access to relevant documentation, internal guidelines, and tooling insights where possible, within confidentiality constraints.

Resources:

Shneiderman, B. (2021). 56 ISSUES IN SCIENCE AND TECHNOLOGY. *AI*, *WINTER 2021*, 57. https://issues.org/wp-content/uploads/2021/01/56%E2%80%9361-Shneiderman-Human-Centered-AI-Winter-2021.pdf

Degachi, C., Mehrotra, S., Yurrita, M., Niforatos, E., & Tielman, M. (2024). Practising appropriate trust in Human-Centred AI design. In ACM, F. Mueller, P. Kyburz, J. R. Williamson, & C. Sas (Reds.), *CHI EA '24: Extended Abstracts of the 2024 CHI Conference on Human Factors in Computing Systems* (p. 269). ACM. https://doi.org/10.1145/3613905.3650825

Appendix B: Informed Consent Sheets

Participant ID: ……

Informed Consent Interview:

You are invited to take part in a research study titled "Designing Trustworthy AI-Supported Design Processes". This study is conducted by Sam Maintz, a Master's student at TU Delft (Faculty of Industrial Design Engineering, MSc Strategic Product Design), under supervision of Dr. Shahrokh Nikou (TU Delft), Pan Wang (TU Delft), and Jonas Piet (ING Wholesale Banking Advanced Analytics (WBAA)).

- Student/researcher: Sam Maintz
- Contact Person: Sam Maintz
- Contact Person ING: Jonas Piet, contact information provided to you by ING.

Purpose of the study:
The purpose of this study is to understand how AI can be integrated into ING WBAA's UX design workflow for internal banking products in a way that enhances creativity and efficiency, while safeguarding trustworthiness.

Participation:
If you participate, you will take part in a semi-structured interview about your work process, experiences with AI tools, and your views on opportunities and risks of AI in UX design.
- Estimated duration: 45–60 minutes
- Format: in person / online (Teams)

Your participation is completely voluntary. You may stop the interview at any time, without giving a reason, and without any consequences. You may also skip any questions you do not want to answer.

Data collection:
If you participate, the following data may be collected during the interview:
- written notes;
- an audio recording of the interview;
- a transcript of the interview.

Your name will not be included in the analysis or reporting. Information such as your role or work context may be described only in a non-identifiable way. Anonymised quotations may be used in the thesis report, presentations, or other research or educational outputs arising from this study.

Data access:
The data will remain under the control of ING. All raw data will stay within ING. Only anonymised interview transcripts may be stored privately outside ING environment for the duration of the research and for research purpose only. Access of this anonymised data is limited to:
- Sam Maintz, for the purpose of conducting and analyzing this research;
- the two academic supervisors at TU Delft, for supervision and assessment of the research;
- ING supervisor Jonas Piet, for supervision and assessment of the research.

Where relevant for supervision and assessment, data may be shared with TU Delft. Any such sharing will be limited to what is necessary for the research and academic supervision, and the data will be treated confidentially.

Storage:
The anonymised interview data and related research materials will be stored for the duration of the research and deleted after the research has been completed.

Informed Consent Form Interview:

I am participating voluntarily in this study. I confirm that I have received sufficient information and explanation about the study, that I have had the opportunity to ask questions, and that my questions have been answered satisfactorily. I have also had sufficient time to decide whether to participate. I am aware that this study consists of the following activity:

- Interview(45–60minutes).

I understand that data will be collected during the interview, including written notes, an audio recording, and a transcript. I give permission for the researcher to collect these materials and to make an audio recording for research purposes.

I understand that the data will be processed and analysed in anonymised form as far as possible. My name will not be included in the analysis or reporting. Information such as my role in the organisation may be described only in a non-identifiable manner.

I understand that the interview data will remain with ING, and that access is limited to the student researcher, the two academic supervisors at TU Delft, and the ING supervisor. I understand that, where relevant for supervision and assessment of the research, data may be shared with TU Delft and will be handled confidentially.

I understand that anonymised quotations may be used in the thesis report, presentations, publications, or other educational or research outputs related to this project. I understand that the final thesis report may be made available through the TU Delft repository.

I understand that anonymised data and related research materials will be stored for the duration of the research and deleted after the research has been completed.

I understand that I will not receive financial compensation for participating.

I understand that I may stop participating at any time and withdraw from the study without having to give a reason. I also understand that I am free to skip any question I do not wish to answer, and I can indicate this during the session. I will receive a copy of this consent form.

By signing this form, I give my consent to participate in the study. I confirm that I have read and understood the study information and what my participation involves.

_____	_____	_____
Name of participant	Signature	Date

Informed Consent Co-Creation:

You are invited to take part in a research study titled “Designing Trustworthy AI-Supported Design Processes”. This study is conducted by Sam Maintz, a Master’s student at TU Delft (Faculty of Industrial Design Engineering, MSc Strategic Product Design), under supervision of Dr. Shahrokh Nikou, in collaboration with ING Wholesale Banking Advanced Analytics (WBAA).

- Student/researcher: Sam Maintz
- Contact Person: Sam Maintz, s.a.maintz@student.tudelft.nl, +31622132692

The purpose of this study is to understand how AI can be integrated into ING WBAA’s UX design workflow for internal banking products in a way that enhances creativity and efficiency, while safeguarding trustworthiness and design integrity.

Your participation consists of two parts:

- **Background questionnaire**: This short questionnaire helps provide a general picture of who is participating (e.g., role/experience background). The questionnaire is designed to be anonymous.
- **Co-Creation session**: The co-creation session will take place in person (or online on Teams if not possible otherwise). During the session, we will collaboratively explore:
    1) where AI could add value across the UX workflow, and
    2) what safeguards/checkpoints are needed to ensure responsible and trustworthy use in a regulated banking environment.

Your participation is completely voluntary. You may withdraw at any moment, without giving a reason and without any consequences. You are free to skip any question or activity you do not wish to participate in.

Informed Consent Form Co-Creation:

I am participating voluntarily in this study. I confirm that I have received sufficient information and explanation about the study, that I have had the opportunity to ask questions, and that my questions have been answered satisfactorily. I have also had sufficient time to decide whether to participate. If I need further clarification, I may ask questions at any point during the study.
I am aware that this study consists of the following activity:

- Background questionnaire (5-10 minutes). Co-
- creation session (90-120 minutes).

Iunderstand that during the research data will be collected, such as notes, photographs, and audio and/or video recordings. I give permission for the researcher to collect these materials and for photographs and audio/video recordings to be made during the study. The data will be processed and analysed anonymously (without my name or other identifiable information)
The data will only be accessible to the lead researcher (Sam Maintz), the two academic supervisors at TU Delft, and ING WBAA. The photos and audio/video recordings (or quotes from the transcript) will be used to support the analysis of the collected data
The photos may also be used to illustrate research findings in publications and presentations about the project, including the project report that will be available in the TU Delft Repository. When deciding about photo use in the statement below, please consider that reports in the TU Delft Repository are publicly accessible. If you give permission to be recognizable, the photos may be used without blurring. You are, of course, completely free in your choice.

Igive permission for photos from my participation to be used:
A. Photos in which I am **recognizable**, may be used in publications and presentations about the project.
B. Photos in which I am **recognizable**, may be used **only for data analysis**, not in publications or presentations.
C. Photos in which I am **not recognizable** (e.g., blurred/only hands/materials), may be used in publications and presentations about the project.

Select A / B / C: _____

Igive permission for the data to be stored for up to 10 years after completion of this study and to be used for educational and research purposes. I understand that I will not receive financial compensation for participating. I understand that I may stop participating at any time and withdraw from the study without having to give a reason. I also understand that I am free to skip any question I do not wish to answer, and I can indicate this during the session. I will receive a copy of this consent form. By signing this form, I give my consent to participate in the study. I confirm that I have read and understood the study information and what my participation involves.

_____	_____	_____
Nameofparticipant	Signature	Date

Appendix C: HREC checklist & Data Management Plan

Delft University of Technology
HUMAN RESEARCH ETHICS
CHECKLIST FOR HUMAN RESEARCH

I. Applicant Information

PROJECT TITLE:	**Designing trustworthy AI-supported design processes**
Research period: *Overwhatperiodof time will this specific part of the researchtakeplace*	**09-02-2026 – 31-07-2026**
Faculty:	**Industrial Design Engineering**
Department:	**Strategic Product Design**
Type of the research project: *(Bachelor's, Master's,DreamTeam,PhD, PostDoc, Senior Researcher, Organisational etc.)*	**Master's**
Funder of research: *(EU, NWO, TUD, other – in which case please elaborate)*	**TUD**
Name of Corresponding Researcher: *(If different from the Responsible Researcher)*	**Sam Maintz**
E-mail Corresponding Researcher: *(If different from the Responsible Researcher)*	**S.A.Maintz@student.tudelft.nl**
Position of Corresponding Researcher: *(Masters, DreamTeam, PhD, PostDoc, Assistant/ Associate/ Full Professor)*	**Masters**
Name of Responsible Researcher: ***Note:** all student work must have a named Responsible Researcher to approve, sign and submit this application*	**Shahrokh Nikou**
E-mail of Responsible Researcher: *Please ensure that an institutional email address (**no Gmail, Yahoo, etc.**) is used for all project documentation/ communications including Informed Consent materials*	**S.N.Nikou@tudelft.nl**
Position of Responsible Researcher : *(PhD, PostDoc, Associate/ Assistant/ Full Professor)*	**Associate Professor**

II. Research Overview

a) Please summarise your research very briefly (100-200 words)

What are you looking into, who is involved, how many participants there will be, how they will be recruited and what are they expected to do?

Add your text here – (please avoid jargon and abbrevations)

AIcan enhance the UX design process by boosting creativity, exploration, and efficiency. However, it also poses risks related to transparency, context, and reliability. At ING, designers currently use only Copilot and have limited understanding of how to apply AI effectively and responsibly in their workflow.

This project aims to explore how AI can be safely and meaningfully integrated into the UX design process at ING by identifying current practices, potential tools and the design stages where AI can add the most value. The findings will be translated into an AI augmented UX design workflow that guides designers in making use of AI in an appropriate way.

The ING R&D team consists of twelve members, all of whom are expected to participate in

the study. They will be involved in conducting interviews and providing insights into their daily work routines.

b) **If your application is an additional project** related to an existing approved HREC submission, please provide a brief explanation including the existing relevant HREC submission number/s.

Add your text here – (please avoid jargon and abbrevations)

c) **If your application is a simple extension of, or amendment to,** an existing approved HREC submission, you can simply submit an HREC Amendment Form as a submission through LabServant.

III. Risk Assessment and Mitigation Plan

			If YES please complete the Risk Assessment and Mitigation Plan columns below.		*Please provide the relevant reference #*	
ISSUE	**Yes**	**No**	**RISK ASSESSMENT – what risks could arise?** *Please ensure that you list ALL of the actual risks that could potentially arise – do not simply state whether you consider any such risks are important!*	**MITIGATION PLAN – what mitigating steps will you take?** *Please ensure that you summarise what actual mitigation measures you will take for each potential risk identified – do not simply state that you will e.g. comply with regulations.*	**DMP**	**ICF**
A: Partners and collaboration						
1. Will the research be carried out in collaboration with additional organisational partners such as: • One or more collaborating research and/or commercial organisations • Either a research, or a work experience internship provider[1] [1] *If yes, please include the graduation agreement in this application*	**X**		Participants are employees of a partner organisation, which may create concerns around confidentiality or identification.	All data will be anonymised. No company-sensitive information will be published. Participation is voluntary and independent of job performance.		
2. Is this research dependent on a Data Transfer or Processing Agreement with a collaborating partner or third party supplier? *If yes please provide a copy of the signed DTA/DPA*		**X**				
3. Has this research been approved by another (external) research ethics committee (e.g.: HREC and/or MREC/METC)? *If yes, please provide a copy of the approval (if possible) and summarise any key points in your Risk Management section below*		**X**				
B: Location						
4. Will the research take place in a country or countries, other than the Netherlands, within the EU?		**X**				
5. Will the research take place in a country or countries outside the EU?		**X**				
6. Will the research take place in a place/region or of higher risk – including known dangerous locations (in any country) or locations with non-democratic regimes?		**X**				
C: Participants						
7. Will the study involve participants who **may** be vulnerable and possibly (legally) unable to give informed consent? (e.g., children below the legal age for giving consent, people with learning difficulties, people living in care or nursing homes,).		**X**				
8. Will the study involve participants who **may** be vulnerable under specific circumstances and in specific contexts, such as victims and witnesses of violence, including domestic violence; sex workers; members of minority groups, refugees, irregular migrants or dissidents?		**X**				

			If YES please complete the Risk Assessment and Mitigation Plan columns below.		*Please provide the relevant reference #*	
ISSUE	**Yes**	**No**	**RISK ASSESSMENT – what risks could arise?** *Please ensure that you list ALL of the actual risks that could potentially arise – do not simply state whether you consider any such risks are important!*	**MITIGATION PLAN – what mitigating steps will you take?** *Please ensure that you summarise what actual mitigation measures you will take for each potential risk identified – do not simply state that you will e.g. comply with regulations.*	**DMP**	**ICF**
9. Are the participants, outside the context of the research, in a dependent or subordinate position to the investigator (such as own children, own students or employees of either TU Delft and/or a collaborating partner organisation)? *It is essential that you safeguard against possible adverse consequences of this situation (such as allowing a student's failure to participate to your satisfaction to affect your evaluation of their coursework).*	**X**		Employees of ING (collaborating partner organisation) - Potential perceived pressure to participate.	Participation is voluntary, recruitment is not conducted by direct managers, and refusal to participate has no consequences.		
10. Is there a high possibility of re-identification for your participants? (e.g., do they have a very specialist job of which there are only a small number in a given country, are they members of a small community, or employees from a partner company collaborating in the research? Or are they one of only a handful of (expert) participants in the study?	**X**		Employees of ING (collaborating partner organisation	Anonymisation, removal of job titles, and aggregation of findings. No participant's profile will be disclosed.		
D: Recruiting Participants						
11. Will your participants be recruited through your own, professional, channels such as conference attendance lists, or through specific network/s such as self-help groups	**X**		Through professional networks inside ING: Perceived pressure to participate Sampling bias (only those comfortable with AI or with positive/negative opinions may respond)	Recruitment message explicitly states voluntary participation, no consequences for non-participation, and the right to withdraw at any time without giving a reason. Recruitment is done by the researcher, not by direct line managers, and managers will not be informed who participates. Use private invitations and don't publicly signal participation		
12. Will the participants be recruited or accessed in the longer term by a (legal or customary) gatekeeper? (e.g., an adult professional working with children; a community leader or family member who has this customary role – within or outside the EU; the data producer of a long-term cohort study)	**X**		ING contact facilitates access (gatekeeper) Selection bias: the gatekeeper might (intentionally or unintentionally) steer which people are approached.	Define the gatekeeper role strictly as "forwarding an invitation" only. Interested participants contact the researcher directly, ensuring the gatekeeper cannot observe who participates.		
13. Will you be recruiting your participants through a crowd-sourcing service and/or involve a third party data-gathering service, such as a survey platform?		**X**				
14. Will you be offering any financial, or other, remuneration to participants, and might this induce or bias participation?		**X**				
E: Subject Matter *Research related to medical questions/health may require special attention. See also the website of the CCMO before contacting the HREC.*						
15. Will your research involve any of the following: • Medical research and/or clinical trials • Invasive sampling and/or medical imaging		**X**				

			If YES please complete the Risk Assessment and Mitigation Plan columns below.		*Please provide the relevant reference #*	
ISSUE	**Yes**	**No**	**RISK ASSESSMENT – what risks could arise?** *Please ensure that you list ALL of the actual risks that could potentially arise – do not simply state whether you consider any such risks are important!*	**MITIGATION PLAN – what mitigating steps will you take?** *Please ensure that you summarise what actual mitigation measures you will take for each potential risk identified – do not simply state that you will e.g. comply with regulations.*	**DMP**	**ICF**
• Medical and *In Vitro Diagnostic Medical* Devices Research						
16. Will drugs, placebos, or other substances (e.g., drinks, foods, food or drink constituents, dietary supplements) be administered to the study participants? *If yes see here to determine whether medical ethical approval is required*		X				
17. Will blood or tissue samples be obtained from participants? *If yes see here to determine whether medical ethical approval is required*		X				
18. Does the study risk causing psychological stress or anxiety beyond that normally encountered by the participants in their life outside research?		X				
19. Will the study involve discussion of personal sensitive data which could put participants at increased legal, financial, reputational, security or other risk? (e.g., financial data, location data, data relating to children or other vulnerable groups) *Definitions of sensitive personal data, and special cases are provided on the TUD Privacy Team website.*		X				
20. Will the study involve disclosing commercially or professionally sensitive, or confidential information? (e.g., relating to decision-making processes or business strategies which might, for example, be of interest to competitors)	X		Participants may inadvertently disclose commercially sensitive information during interviews	Data minimisation in the interview protocol: instruct participants not to share client/customer data, and to focus on workflow patterns and experiences rather than confidential case details. During the interview, the researcher will interrupt and redirect if commercially sensitive details are shared; these segments will be removed from transcripts.		
21. Has your study been identified by the TU Delft Privacy Team as requiring a Data Processing Impact Assessment (DPIA)? *If yes please attach the advice/ approval from the Privacy Team to this application*		X				
22. Does your research investigate causes or areas of conflict? *If yes please confirm that your fieldwork has been discussed with the appropriate safety/security advisors and approved by your Department/Faculty.*		X				
23. Does your research involve observing illegal activities or data processed or provided by authorities responsible for preventing, investigating, detecting or prosecuting criminal offences *If so please confirm that your work has been discussed with the appropriate legal advisors and approved by your Department/Faculty.*		X				
F: Research Methods						

			If YES please complete the Risk Assessment and Mitigation Plan columns below.		*Please provide the relevant reference #*	
ISSUE	**Yes**	**No**	**RISK ASSESSMENT – what risks could arise?** *Please ensure that you list ALL of the actual risks that could potentially arise – do not simply state whether you consider any such risks are important!*	**MITIGATION PLAN – what mitigating steps will you take?** *Please ensure that you summarise what actual mitigation measures you will take for each potential risk identified – do not simply state that you will e.g. comply with regulations.*	**DMP**	**ICF**
24. Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (e.g., covert observation of people in non-public places).		X				
25. Will the study involve actively deceiving the participants? (For example, will participants be deliberately falsely informed, will information be withheld from them or will they be misled in such a way that they are likely to object or show unease when debriefed about the study).		X				
26. Is pain or more than mild discomfort likely to result from the study? And/or could your research activity cause an accident involving (non-) participants?		X				
27. Will the experiment involve the use of devices that are not 'CE' certified? *Only, if 'yes': continue with the following questions:*		X				
• Was the device built in-house?						
• Was it inspected by a safety expert at TU Delft? *If yes, please provide a signed device report*						
• If it was not built in-house and not CE-certified, was it inspected by some other, qualified authority in safety and approved? *If yes, please provide records of the inspection*						
28. Will your research involve face-to-face encounters with your participants and if so how will you assess and address Covid considerations?	X		Health and safety	Meetings will be held according to current health and safety guidelines (for now there are none).		
29. Will your research involve **either:** a) "big data", combined datasets, new data-gathering or new data-merging techniques which might lead to re-identification of your participants **and/or** b) artificial intelligence or algorithm training where, for example biased datasets could lead to biased outcomes?	X		Interview data from semi-structured interviews with members of the ING UX Research & Design team: audio recordings, interview transcripts, and researcher notes. Study on AI tools.	AI is studied conceptually (Don't know yet what tools etc.), not trained on participant data. No automated decision-making is applied to participants. All gathered data is only accessible to the researcher and will be removed after the study.		
G: Data Processing and Privacy						
30. Will the research involve collecting, processing and/or storing any directly identifiable PII (Personally Identifiable Information) including name or email address that will be used for administrative purposes only? (eg: obtaining Informed Consent or disbursing remuneration)	X		Yes for Informed consent could lead to privacy breaches if accessed by unauthorised parties Linking identity information to interview content could increase the risk of re-identification.	Store contact details in a separate file from research data, only accessible to the researcher. Assign each participant a participant code and use only codes in transcripts/analysis. Delete contact details as soon as administrative needs are complete. All participants will be anonymised in the report.		
31. Will the research involve collecting, processing and/or storing any directly or indirectly identifiable PIRD (Personally Identifiable Research Data) including	X		could lead to privacy breaches if accessed by unauthorised parties	Store contact details in a separate file from research data, only accessible to the researcher.		

			If YES please complete the Risk Assessment and Mitigation Plan columns below.		*Please provide the relevant reference #*	
ISSUE	**Yes**	**No**	**RISK ASSESSMENT – what risks could arise?** *Please ensure that you list ALL of the actual risks that could potentially arise – do not simply state whether you consider any such risks are important!*	**MITIGATION PLAN – what mitigating steps will you take?** *Please ensure that you summarise what actual mitigation measures you will take for each potential risk identified – do not simply state that you will e.g. comply with regulations.*	**DMP**	**ICF**
videos, pictures, IP address, gender, age etc and **what other Personal Research Data** (including personal or professional views) will you be collecting?			Linking identity information to interview content could increase the risk of re-identification.	Assign each participant a participant code and use only codes in transcripts/analysis. Delete contact details as soon as administrative needs are complete. All participants will be anonymised in the report.		
32. Will this research involve collecting data from the internet, social media and/or publicly available datasets which have been originally contributed by human participants		**X**				
33. Will your research findings be published in one or more forms in the public domain, as e.g., Masters thesis, journal publication, conference presentation or wider public dissemination?	**X**		Masters thesis			
34. Will your research data be archived for re-use and/or teaching in an open, private or semi-open archive?		**X**	All research data will be deleted after the research. Only the report will be archived.			

H: More on Informed Consent and Data Management

NOTE:*YoucanfindguidanceandtemplatesforpreparingyourInformed Consent materials)* *here* ____

Your research involves human participants as Research Subjects if you are recruiting them or actively involving or influencing, manipulating or directing them in any way in your research activities. This means you must seek informed consent and agree/ implement appropriate safeguards regardless of whether you are collecting any PIRD.

Where you are also collecting PIRD, and using Informed Consent as the legal basis for your research, you need to also make sure that your IC materials are clear on any related risks and the mitigating measures you will take – including through responsible data management.

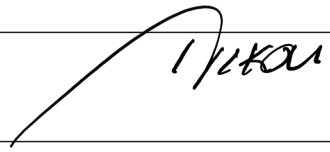
IV. Signature/s

Please note that by signing this checklist list as the sole, or Responsible, researcher you are providing approval of the completeness and quality of the submission, as well as confirming alignment between GDPR, Data Management and Informed Consent requirements.

Sam Maintz
Signature of Corresponding Researcher:
Date: 30-03-2026



Shahrokh Nikou
Signature (or upload consent by mail) Responsible Researcher:
Date: 30.03.2026



V. Completing your HREC application

Pleaseusethefollowinglisttocheckthat you have provided all relevant documentation

PLAN OVERVIEW

A Data Management Plan created using DMPonline

Title: DesigningTrustworthy AI-supported Design Processes

Creator: SamMaintz

Affiliation: DelftUniversity of Technology

Template: TUDelftData Management Plan template (2025)

Project abstract:
ThisData Management Plan is for my thesis of the Master Strategic Product Design at the faculty of Industrial Design Engineering at theTechnical University of Delft. My thesis is a collabortion between ING Wholesale Banking Advanced Analytics(WBAA) and the TU Delft. The purpose of this research is to explore how UX designers and researchers at INGcan responsibly integrate AI into their design workflows. The goal is to create an AI augmented UX design workflow/roadmap, together with a set of design principles and a practical playbook with guidelines, to deliver clear guidance on when, where and how to use AI responsibly. During the project I will conduct semi-structured interviews with the UX Research and Design team at ING WBAA. I hope to at least interview 8 people from the team.

ID: 200910

Start date: 09-02-2026

End date: 31-07-2026

Last modified: 25-03-2026

DESIGNING TRUSTWORTHY AI-SUPPORTED DESIGN PROCESSES

0. ADMINISTRATIVE QUESTIONS

1. Provide the name of the data management support staff consulted during the preparation of this plan and the date of consultation. Please also mention if you consulted any other support staff.
My supervisor Shahrokh Nikou reviewed this DMP

2. Is TU Delft the lead institution for this project?

- Yes, leading the collaboration – please provide details of the type of collaboration and the involved parties below

My thesis is in collaboration with ING Wholesale Banking Advanced Analytics.

I. DATA/CODE DESCRIPTION AND COLLECTION OR RE-USE

3. Provide a general description of the types of data/code you will be working with, including any re-used data/code.

Type of data/code	File format(s)	How will data/code be collected/generated? *For re-useddata/code:what are thesourcesandtermsof use?*	Purpose of processing	Storage location	Who will have access to the data/code?
Audio of interviews	.mp3	Microsoft Teams	To use insights & quotes from the interviews for in my report	One Drive TU Delft & One Drive ING	Sam Maintz & TU Delft supervisor
Interview Transcripts	.docx	Microsoft Teams	To use insights & quotes from the interviews for in my report	One Drive TU Delft & One Drive ING	Sam Maintz & TU Delft supervisor

II. STORAGE AND BACKUP DURING THE RESEARCH PROCESS

4. How much data/code storage will you require during the project lifetime?

- < 250 GB

5. Where will the data/code be stored and backed-up during the project lifetime? (Select all that apply.)

- Another storage system – please explain below, including provided security measures
- TU Delft OneDrive

One Drive ING (has same security system as TU Delft)

III. DATA/CODE DOCUMENTATION

6. What documentation will accompany data/code? (Select all that apply.)

- Data – README file or other documentation explaining how data are organised
- Data – Methodology of data collection

IV. LEGAL AND ETHICAL REQUIREMENTS, CODE OF CONDUCTS

7. Does your research involve human subjects or third-party datasets collected from human participants?
If you are working with a human subject(s), you will need to obtain the HREC approval for your research project.

- Yes – please provide details in the additional information box below

Iwill conduct semi-structured interviews with stakeholders. (See HREC document)

8. Will you work with personal data? (This is information about an identified or identifiable natural person, either for research or project administration purposes.)

- Yes

All data will be anonymised in the report

9. Will you work with any other types of confidential or classified data or code as listed below? (Select all that apply and provide additional details below.)
If you are not sure which option to select, ask your Faculty Data Steward ***for advice.***

- No, I will not work with any other types of confidential or classified data/code

10. How will ownership of the data and intellectual property rights to the data be managed?
For projects involving commercially-sensitive research or research involving third parties, seek advice of your Faculty Contract Manager ***when answering this question.***

The collected data will be co-owned by myself, ING WBAA and TU Delft.

11. Which personal data or data from human participants do you work with? (Select all that apply.)

- Proof of consent (such as signed consent materials which contain name and signature)
- Audio recordings
- Job title and/or employer
- Names as contact details for administrative purposes
- Gender
- Date of birth and/or age

12. Please list the categories of data subjects and their geographical location.

All participants work at ING WBAA. Some are located in Amsterdam, and some in Manila and Romania.

13. Will you be receiving personal data from or transferring personal data to third parties (groups of individuals or organisations)?

- No

16. What are the legal grounds for personal data processing?

- Informed consent

17. Please describe the informed consent procedure you will follow below.

Participants will be asked to read and sign a consent form, which will inform them about the goals of the research and the procedures of the project. They will also be informed that all data will be anonymised in the report.

18. Where will you store the physical/digital signed consent forms or other types of proof of consent (such as recording of verbal consent)?
One Drive TU Delft & One DriveING

19. Does the processing of the personal data result in a high risk to the data subjects? (Select all that apply.)
If the processing of the personal data results in a high risk to the data subjects, it is required to perform a Data Protection Impact Assessment (DPIA). ***In order to determine if there is a high risk for the data subjects, please check if any of the options below that are applicable to the processing of the personal data in your research project.***

- None of the above apply

23. What will happen with the personal data used in the research after the end of the research project?

- Anonymised or aggregated data will be shared with others

Only information needed for the report is in which department / team they are located within ING.

24. For how long will personal research data (including pseudonymised data) be stored?

- Personal data will be deleted at the end of the research project

25. How will your study participants be asked for their consent for data sharing?

- In the informed consent form: participants are informed that their personal data will be anonymised and that the anonymised dataset is shared publicly

V. DATA SHARING AND LONG TERM PRESERVATION

27. Apart from personal data mentioned in question 23, will any other data be publicly shared?

Please provide a list of data/code you are going to share under 'Additional Information'.

- All other non-personal data/code produced in the project

29. How will you share research data/code, including those mentioned in question 23?
Select all that apply and provide additional details below.

- All anonymised or aggregated data, and/or all other non-personal data/code will be uploaded to 4TU.ResearchData with public access
- I am a Bachelor's/Master's student at TU Delft and I will share the data/code in the body and/or appendices of my thesis/report in the TU Delft Repository

30. How much of your data/code will be shared in a research data repository?

- < 100 GB

31. When will the data/code be shared?

- At the end of the research project

32. Under what licence(s) will the data/code be released?

- CC0

VI. DATA MANAGEMENT RESPONSIBILITIES AND RESOURCES

33. If you leave TU Delft (or are unavailable), who is going to be responsible for the data/code resulting from this project?

My supervisors Shahrokh Nikou (S.N.Nikou@tudelft.nl) and Pan Wang (P.Wang-2@tudelft.nl), both from the faculty of Industrial Design Engineering

34. What resources (for example financial and time) will be dedicated to data management and ensuring that data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

None, I will handle all data management myself, using resources from the university.

35. Which faculty do you belong to?

- Faculty of Industrial Design Engineering (IDE)

Signature/s

Sam Maintz Signature of Corresponding Researcher: Date: 30-03-2026
ShahrokhNikou Signature (or upload consent by mail) Responsible Researcher: Date: 30.03.2026

Appendix D: Interview Protocol

Interview Protocol:
Semi-structured interview online via Teams for recording and immediate transcription.

- Duration: 45–60 minutes
- Participants: 10 members of the ING WBAA UX Research & Design team
- Sampling/recruitment: Direct invitation to team members because the project is conducted for this team and all members are within the case context
- Recording: Ask permission to audio record and transcript.
- Ethics: Explain study, storage, withdrawal rights. Informed consent form must be signed before starting the interview questions.

Script:
“Thanks for taking the time. I’m doing my graduation project on how AI can be integrated into our UX workflow at ING WBAA in a way that improves creativity and efficiency, while safeguarding trustworthiness. I’m interested in understanding your current workflow, how you currently use AI (if at all), and where you see opportunities and risks. Before we start, I’ll explain the study and ask you to sign the informed consent form, which you can read through first. You will also receive a copy. Participation is voluntary. You can skip questions or stop at any time. As also mentioned in the consent form sheet I’d like to audio record the interview so I can focus on listening. The recording will only be used for analysis.”

Interview guide
The guide is structured in five blocks:
A) Current workflow
B) Current AI usage and needs
C) AI opportunity spaces
D) Trustworthiness, risk, and appropriate trust
E) Requirements for a delivery

A) Current workflow

1. What is your role in the UX Research & Design team (UX/UI designer, UX researcher, service designer, design lead), and what types of projects do you typically work on? Would you describe yourself as a junior or senior designer? (Li et al., 2024)
2. Who are the internal users that you design for? Can you briefly describe their role in ING? (Li et al., 2024)
3. What does good UX delivery look like in your product squad? → What is expected from you? (Li et al., 2024)

4. Could you walk me through a typical project, from start (business & user requirements) to finish (handoff)? (Li et al., 2024)
    a. How does a project start? Is there a request, or do you come up with it yourself?
5. Where does the workflow feel slow, unclear, risky, or fragmented (for example, handoff issues, tool fragmentation, domain constraints etc.)? (Lu et al., 2022)
6. Which steps cost the most time or cognitive effort? (Zhu et al., 2024)

B. Current AI usage & needs

1. Do you currently use AI tools in your work? (Lu et al., 2022; Li et al., 2024)
    a. If yes: which ones and for what tasks?
    b. If no / limited use: what prevents you (e.g., tool restrictions, trust, quality, effort to customise)
2. What constraints (policy/security/compliance) currently affect how you can work, especially when using tools like AI? (Pamarthi, 2024)
3. Do you use AI outside of work? For what kind of things do you use it? (Li et al., 2024)
4. In your experience, when does AI save time, and when does it create extra work (for example verification or rework)? (Zhu et al., 2024)
5. Where would you want AI support most: research, ideation, testing, documentation, or something else? (Lu et al., 2022)

C. AI opportunity spaces mapping

1. Opportunity 1: Design inspiration search (Lu et al., 2022)
    a. How do you currently find inspiration/references? What works and what doesn't?
    b. Would AI-supported inspiration search help?

2. Opportunity 2: Design alternative exploration (Lu et al., 2022; Thoring et al., 2023)
    a. Where in your workflow do you explore design alternatives (ideation/prototyping/iteration)?
    b. Would you want AI support in this?

3. Opportunity 3: Design system customisation (Lu et al., 2022)
    a. How often do you need to adapt designs to the company's design system/style? How much time does this take?
    b. Would you like AI to assist in this? Why?

4. Opportunity 4: Design guideline violation checks (Lu et al., 2022; Kowald et al., 2024)
    a. What guidelines matter most in your work (accessibility, inclusivity, brand, compliance)?

b. Would AI-based guideline checks be helpful? Where should they appear in the workflow (early vs final gate)?

D. Trustworthiness, risk, and appropriate trust

1. Human agency & oversight (Kowald et al., 2024; Shneiderman, 2021)
   a. Where must a human always stay in control?
   b. What decisions should never be automated? & which should?

2. Transparency & explainability (Kowald et al., 2024; Desolda et al., 2025)
   a. What would you need to understand before relying on AI output?
   b. How should the tool communicate limitations and uncertainty?

3. Robustness & accuracy (Kowald et al., 2024; Zhu et al., 2024)
   a. What types of errors worry you most (hallucinations, wrong assumptions, missing context)?
   b. How do you currently verify outputs?

4. Privacy & security (Kowald et al., 2024; Pamarthi, 2024)
   a. What data would you never want to put into an AI tool?
   b. How do tooling restrictions affect your workflow?

5. Fairness & non-discrimination (Kowald et al., 2024; Degachi et al., 2024)
   a. Where could AI introduce bias in design decisions or user research synthesis?

6. Accountability (Kowald et al., 2024)
   a. If AI output contributes to a design decision, who should be accountable and how should it be documented?

7. Appropriate trust lenses (Degachi et al., 2024)
   a. Do you think you trust too much or too little in tools, or about right?
   b. What factors would help you trust AI more appropriately, not too much, not too little?

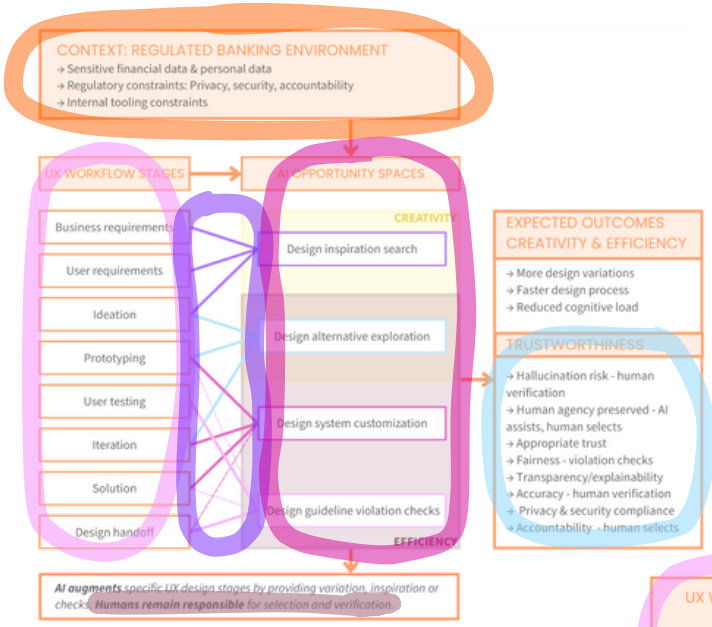
E. Requirements for delivery (Desolda et al., 2025)

1. If this research would deliver an output that helps in enhancing your workflow, what would make it genuinely useful for you?
2. How should it fit into your day-to-day work?
3. Would you prefer something physical or online?
4. What should be included: checklists, examples, do's/don'ts, templates, risk scenarios?

Closing of the interview

Is there anything important we didn’t cover yet you would still like to share?
Thank you for your time and for sharing your experiences and thoughts. Your input will be very helpful for the rest of my research. If you later want to add something you can always contact me. With your input and those of your colleagues, I hope to create a well tailored UX design workflow and playbook for you as a result.

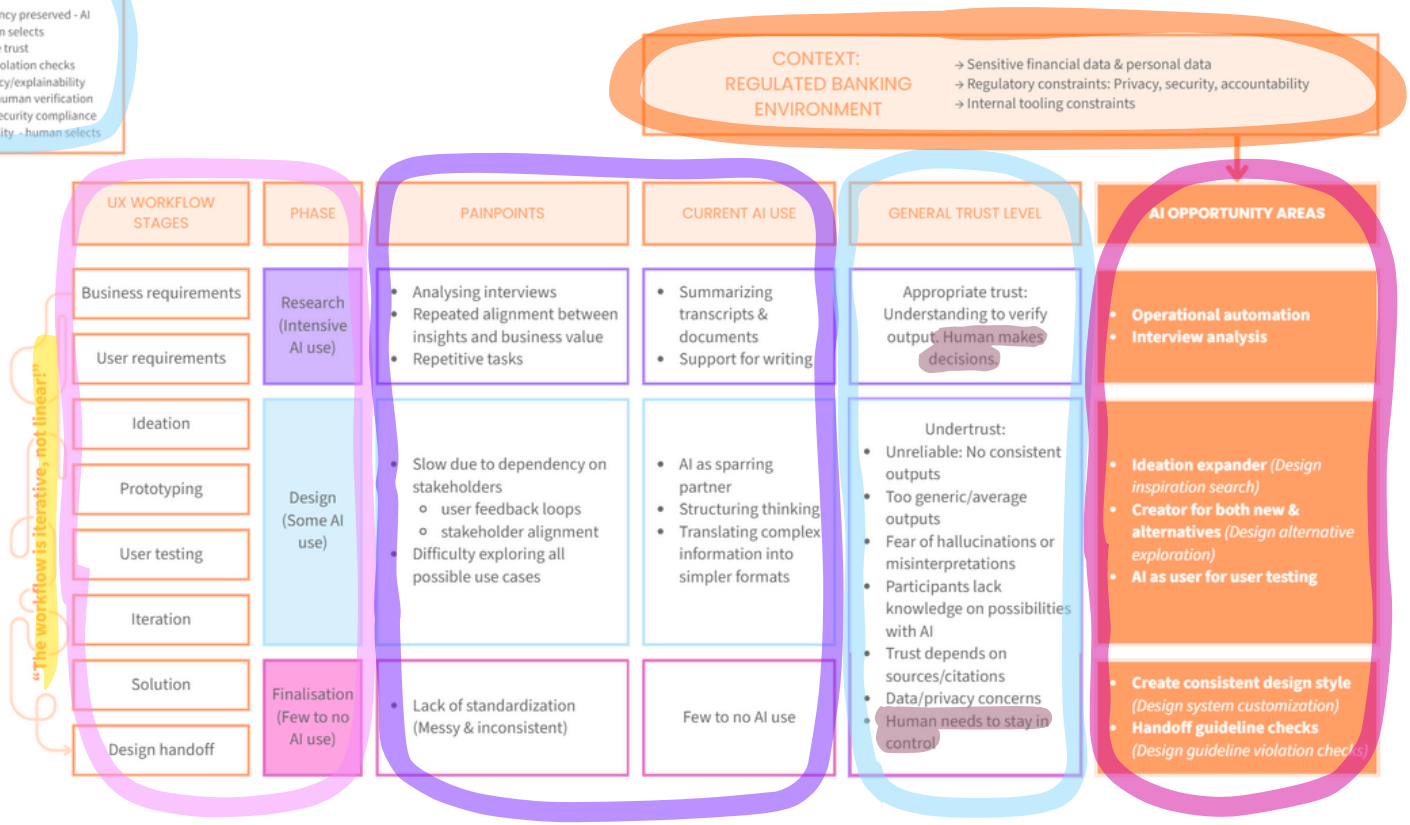
Appendix E: Revised Framework



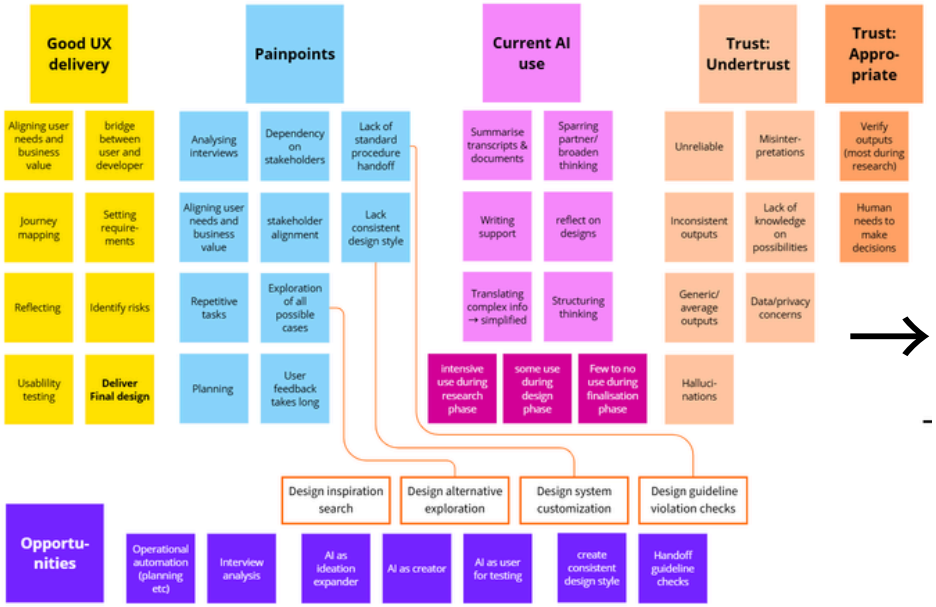
How did the framework go from ← this

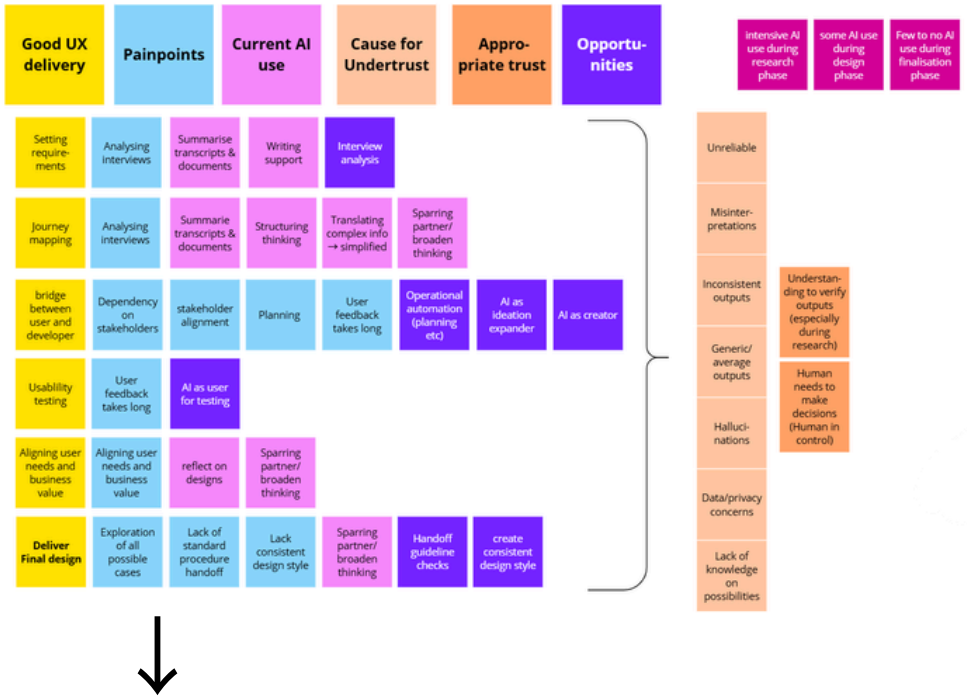
- Context
- UX Workflow
- Painpoints & current AI use (Relation between the workflow and the opportunity spaces)
- Trustlevel
- Human control
- AI opportunity spaces
- New finding

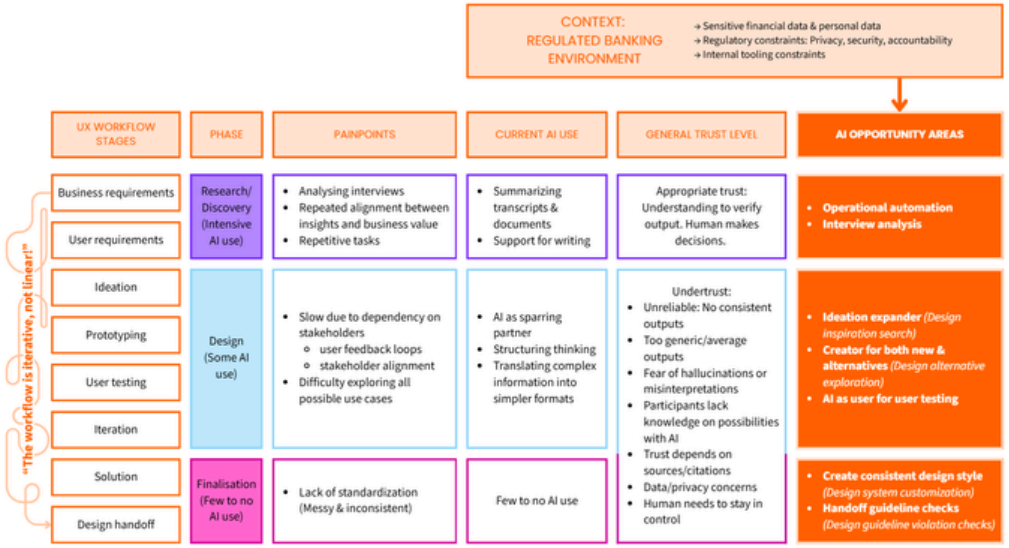
To this →



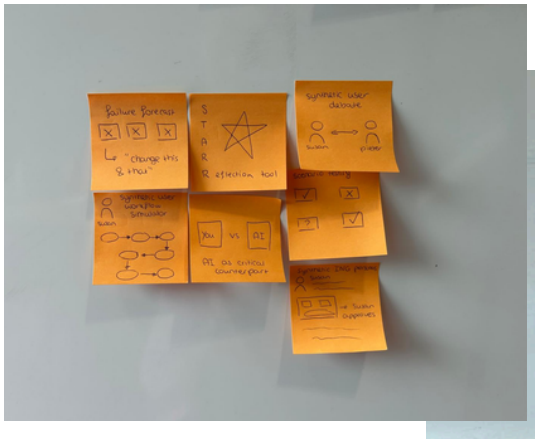
From themes to framework

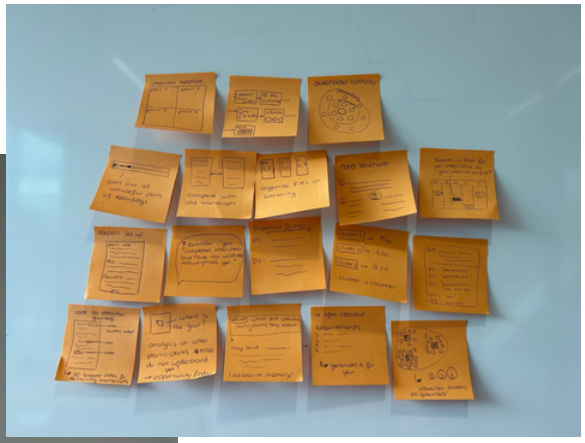


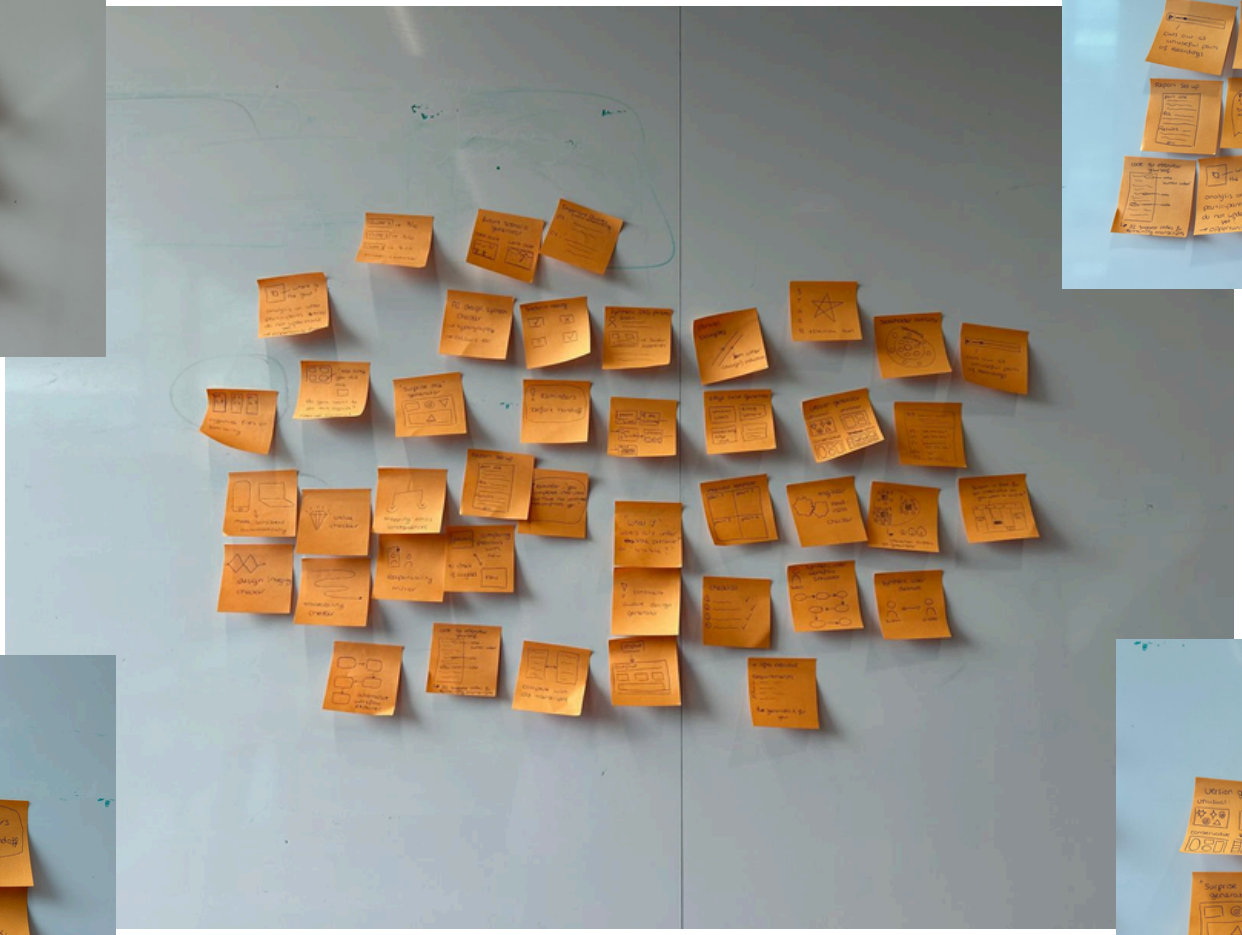


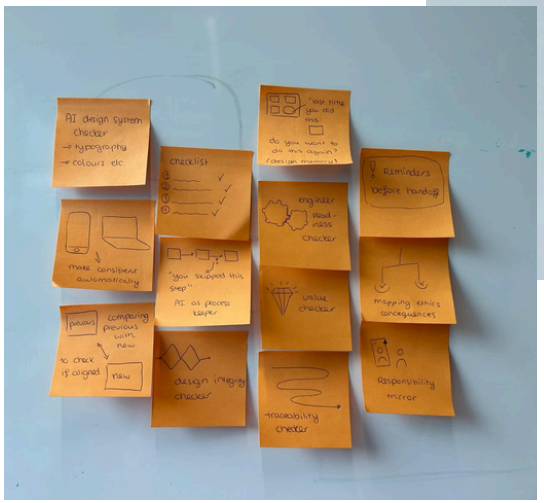


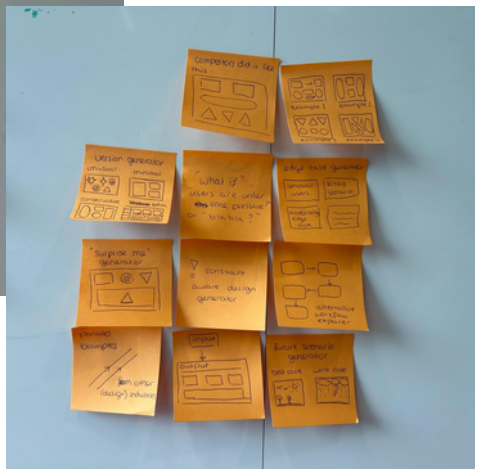
Appendix F: Ideation to Concepts









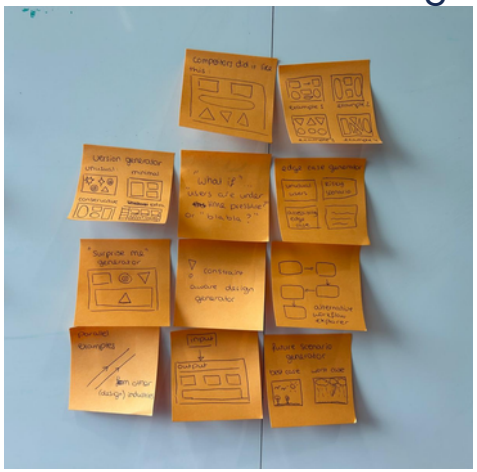


Research phase



1

Design phase

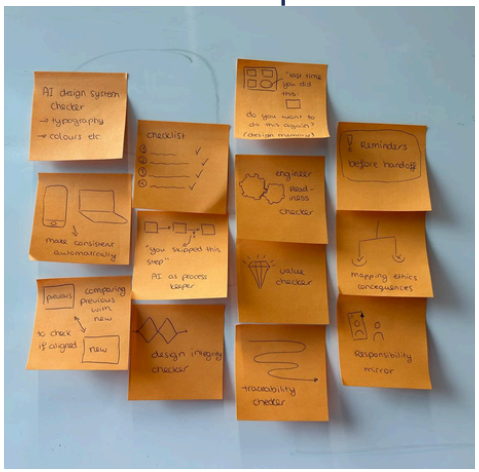


2



3

Finalisation phase



4



① S

Replace human coding with AI coding → + automatic identification of key quotes

C

coding + cluster + key quote extraction + Research database + planner

A

human codes first transcript AI imitates

M

expand it with cross-project clustering → it recognizes patterns from previous research

P

use Research database for onboarding → show new employees examples

E

eliminate 'Reminder' → already a lot of ideas & this not the main pain point in Research phase

R

→ first show themes before coding everything → code based on these themes.

② S

Replace brainstorming with AI generated alternatives / ideas

C

alternative generator + future scenario generator + examples from other companies

A

make it constraint aware → no ideas that would not be feasible

M

extreme scenarios → might not give the best ideas but can function as inspiration for good ideas

P

use tool as a training tool for designers → expanding creativity

E

Remove constraints awareness → for more out of the box ideas → maybe not all feasible but can function as inspiration

R

Start with self generated versions → use tool for Refinement

③ S

Replace Real users with synthetic users

C

scenario testing with synthetic users

A

use the tool for the research phase → interviews / questionnaires etc.

M

- failure forecast... → make this positive → "what works well?"
- don't test with intended users but with totally different user group

P

→ use tool to train junior designers → let the synthetic users make edits

E

Remove Reflection → AI as counterpart is enough

R

→ test before involving real users → use synthetic users for the interviews

④ S

Replace manual checks with AI design system checker → Replace 'human memory' with AI Reminders

C

→ checklist → Reminders → engineer Readiness checker → design system checker

A

make multiple 'checker' options per context → for handoff to engineer → for handoff to user etc.

M

implement it in design phase instead of at the end as a check, so throughout designing everything is checked and can be changed immediately

P

checker for the engineers if they did not miss any steps intended by designer

E

eliminate alignment between previous projects → option to make it different

R

validate trougout the process instead of only at the end → guidance during whole design process.

Ideation "What can it do?"

AI OPPORTUNITY AREAS

- **Operational automation**
- **Interview analysis**

Schedules interviews	Organise files	Schedule tasks	Analyse & structure notes	Prepare reports	Sends reminders →	"You completed interviews but haven't validated assumptions yet."	creates interview template	makes slides	makes stakeholder overview	
Code one interview - AI does the rest the same	outlines important quotes	sets requirement list	Structures transcripts per question	AI clusters + counts →	"Mentioned by 7/10 users" "Low confidence: only one source"	AI research memory (look into old interviews) →	"What did users previously say about onboarding frustration?"	AI research gap detector	Research memory keeper	visualizes clusters on greatness

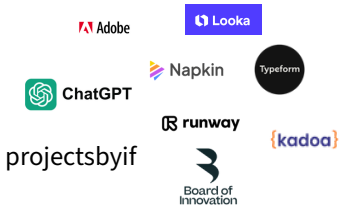
- **Ideation expander** *(Design inspiration search)*
- **Creator for both new & alternatives** *(Design alternative exploration)*
- **AI as user for user testing**

Input: user problem, workflow, target users →	AI generates: UX patterns, competitor examples	Edge case generator →	unusual users / extreme behaviour	risky scenarios / accessibility edge cases	"What if" agent →	What if the user was under time pressure? What if the user had low financial literacy?	Cross-domain inspiration engine: Parallel examples from other industries	Design memory → "Last time you did this, do you want this again?"	
AI generates a few different versions →	unusual version / conservative version / minimal version / accessibility first version	Alternative explorer: unexpected layouts, alternative flows	Input: research insights, requirements & painpoints. AI creat UI concept	Constraint-aware design generator	AI as critical counterpart	Alternative future generator → generating best & worst case scenario			
Synthetic user personas	AI friction simulates: goes through the user process	AI debate testing: multiple AI personas test & discuss concerns	Scenario testing	Failure forecast	selfreflection tool				

- **Create consistent design style** *(Design system customisation)*
- **Handoff guideline checks** *(Design guideline violation checks)*

AI design system checker → Typography, colours etc.	Context aware component suggestions	Adapting same workflow for desktop, mobile, modes	AI as project comparer → looks at previous & others projects and compares	AI as responsibility mirror	Traceability checker → is all information valid	Design integrity checker
AI gives check reminders before handoff	Enigineer readiness checker →	"This design may confuse developers because..."	AI compliance checker	AI as process keeper → notes if you skip something	Mapping ethical concequences	

Ideation on AI tools



AI OPPORTUNITY AREAS										
• **Operational automation** • **Interview analysis**	Microsoft CoPilot Copilot	Zapier AI	Notion	Claude Cowork Claude	Marvin AI	Otter.ai	Dragon Naturally-Speaking			
	Dovetail AI	Condens	Microsoft CoPilot	Perplexity perplexity	Notebook LM NotebookLM	MeetGeek	Grain	NVivo	Atlas.ti	
• **Ideation expander** *(Design inspiration search)* • **Creator for both new & alternatives** *(Design alternative exploration)* • **AI as user for user testing**	Milanote AI	Mobbin	Pinterest Visual Search	Adobe Firefly	MidJourney	Stable Diffusion	Swire	DALL-E 2	Gamma Gamma	Ideogram Ideogram
	Variant	Framer	supabase Lovable Lovable	Figma Make	Claude Code & Design	Stitch (Galileo)	Ulzard (miro)	V0 AI	Canva Canva	
	VolksPortret Volksportret	Synthetic users	Maze AI	Character.ai character.ai						
• **Create consistent design style** *(Design system customisation)* • **Handoff guideline checks** *(Design guideline violation checks)*	Figma Make	Specify	Supernova							
	Stark	Figma Dev Mode	Locofy.ai							

Appendix G: Co-Creation



Co-creation session
UX R&D Chapter

22-05-2026 Sam Maintz / WBAA x TU Delft IDE

do your thing



What is the planning?

1. Introduction (5 min)

- Short desciption about how today's session will look like and the goal of today

2. Discussing the problem statement (5-10 min)

- We will discuss if you recognize your workflow in my renewed framework (painpoints, current AI use, trust level)

3. Generating first ideas and discuss (40 min)

- Looking at a few examples on how AI could support you
- What works? What does not? How would your ideal AI tool look like?

5. Co-Create (40 min)

- We build together towards the perfect tool

6. Reflection and closing (5-10 min)

- What feels valuable? What does not?

2

Goal

The goal of today is not to find the 'perfect' solution but to understand where the most valuable opportunities are located

Phase

We will work with first hand prototypes that are not working yet

Mindset

There is no right or wrong. Please be critical so I can improve.

3

The problem statement

5-10 min



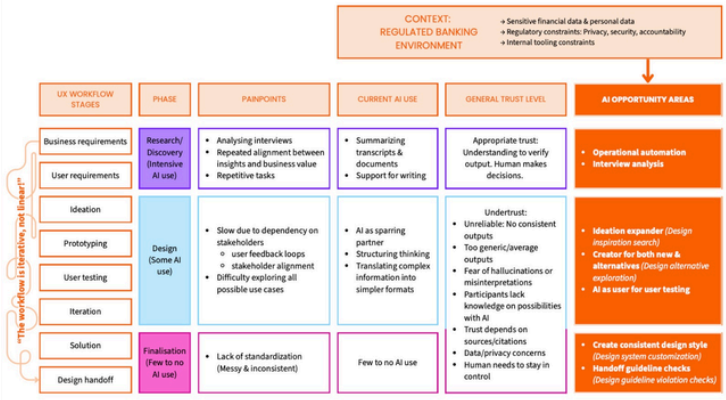
Explore first ideas

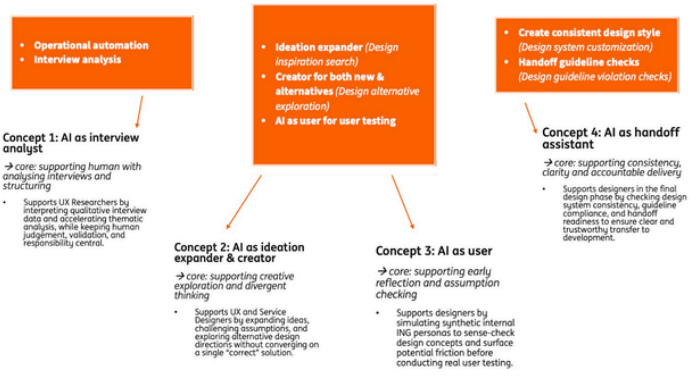
40 min



The problem statement

Members of the UX R&D chapter within ING WBAA currently spend significant time on analysis, ideation and handoff, while AI is (often) under used due to limited trust, transparency and constraints.





Exploring the 4 concepts

For each concept, one by one, please reflect on:

- Where do you see value?
- What would not work for you in this concept?
- If you could change three things about this concept, what would it be?

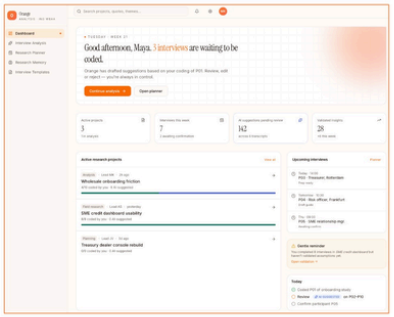
Concept 1

AI as interview analyst

→ *core: supporting human with analysing interviews and structuring*

https://orange-insight-guide.lovable.app/

An AI-supported research assistant that accelerates qualitative interview analysis by learning from one human-coded interview and applying the same coding logic to the rest, while keeping the researcher in control.



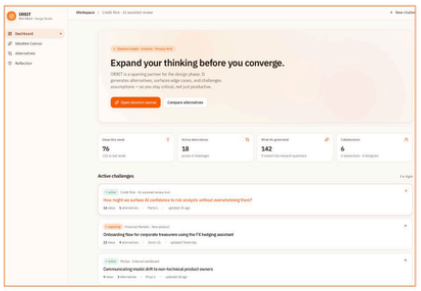
Concept 2

AI as ideation expander & creator

→ *core: supporting creative exploration and divergent thinking*

https://orbit-ai-explorations.lovable.app/

An ideation expander that helps UX and Service Designers explore more ideas, alternatives, and perspectives by challenging assumptions and generating design directions without making final decisions.



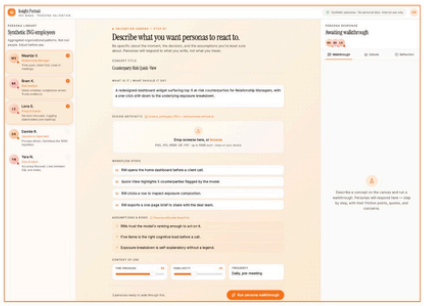
Concept 3

AI as user

→ *core: supporting early reflection and assumption checking*

https://internal-view-ai.lovable.app/

An early validation tool that uses synthetic ING employee personas to simulate how different internal users might experience a design, helping teams sense-check assumptions before real user testing.



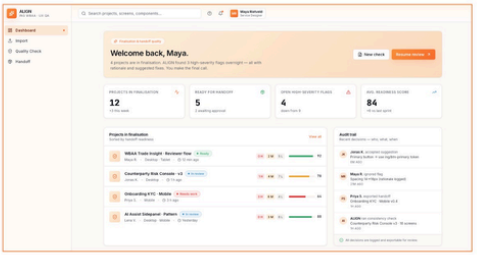
Concept 4

AI as handoff assistant

→ *core: supporting consistency, clarity and accountable delivery*

https://align-handoff-guardian.lovable.app/

A final quality and handoff assistant that checks design consistency, guideline compliance, and implementation readiness to support a clear, trustworthy handoff to development.



Discussing

Discuss what we wrote down:

- What are similarities?
- Where are differences? And why?
- What does the perfect AI application look like for you?

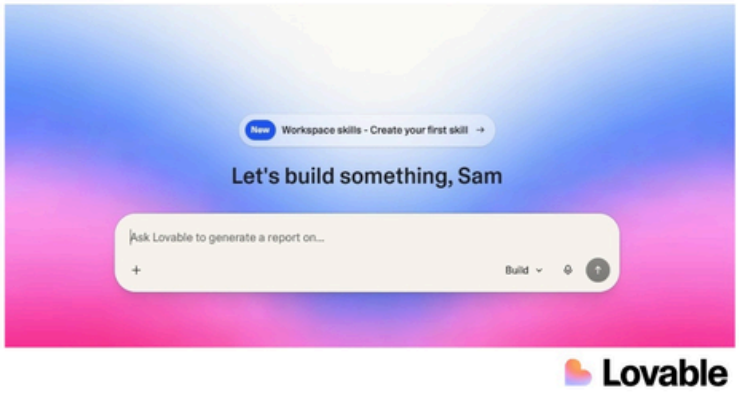


Building together

40 min

Building together

We are going to 'vibe code' together: Quickly turn ideas into simple, tangible prototypes.



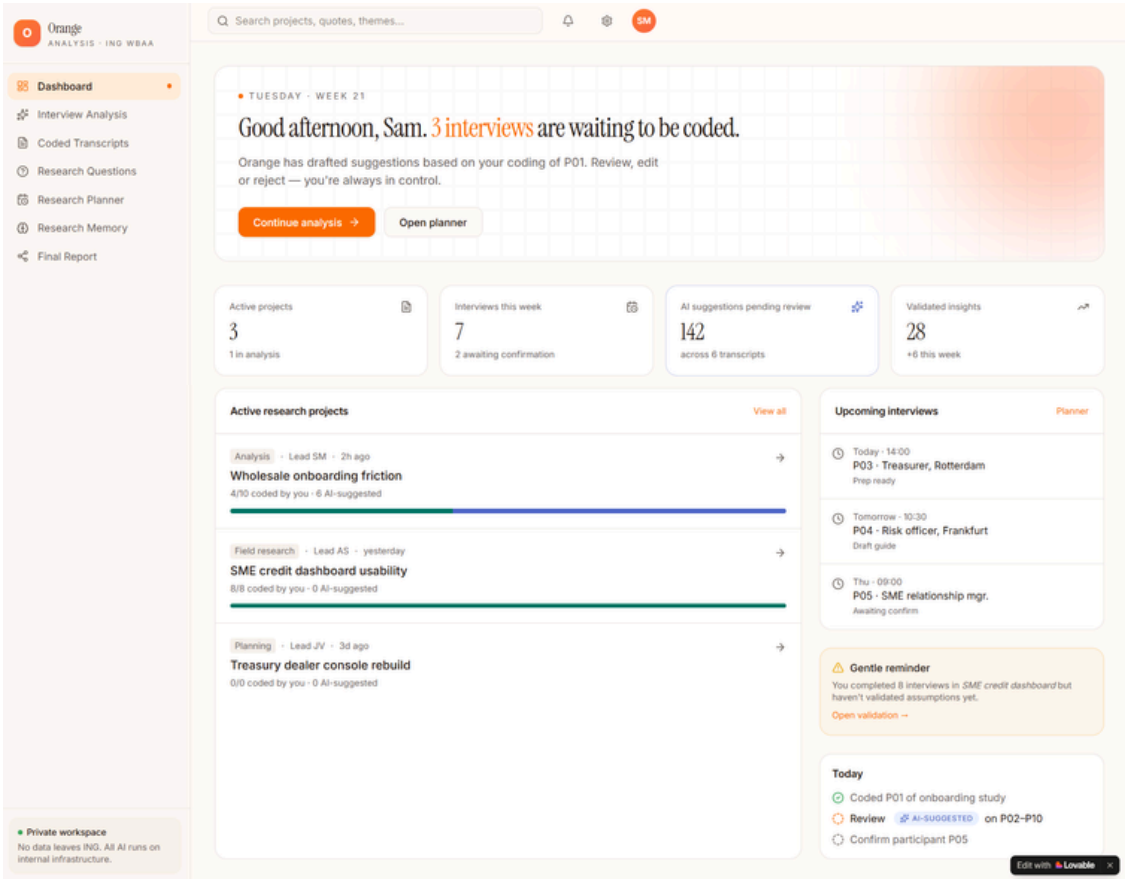
Prompt (text) → interface (design)

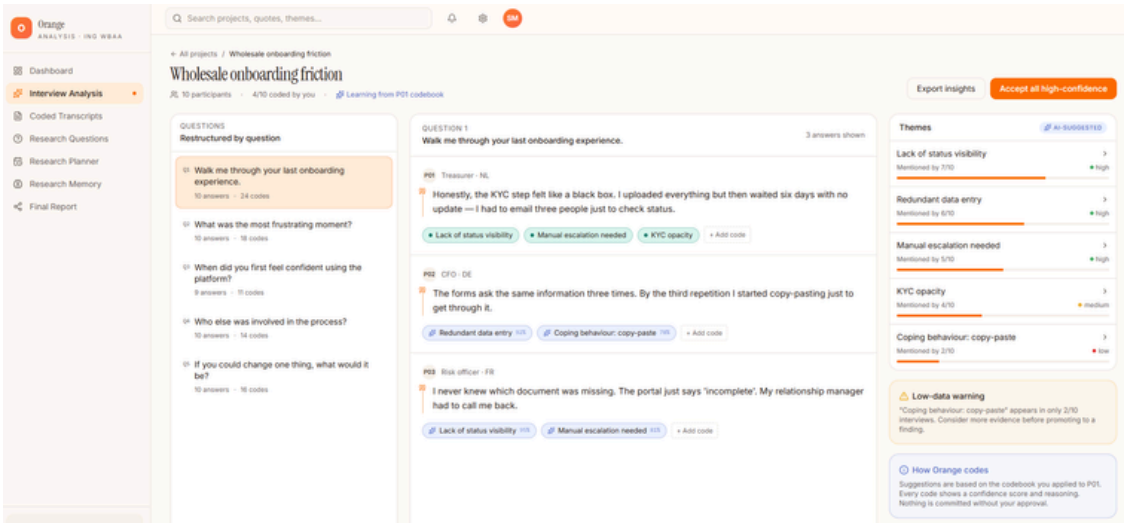
Reflection

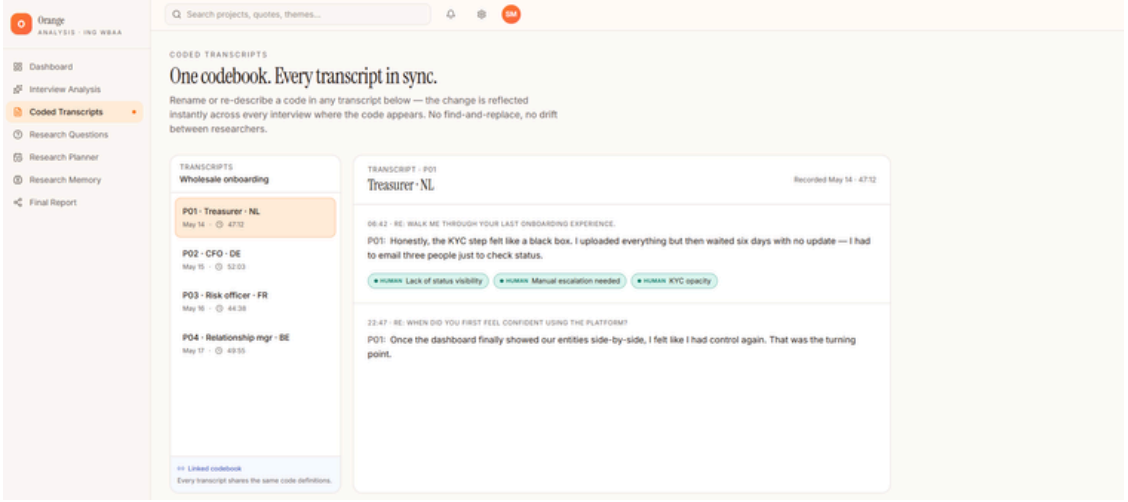
Looking at what we have created together:

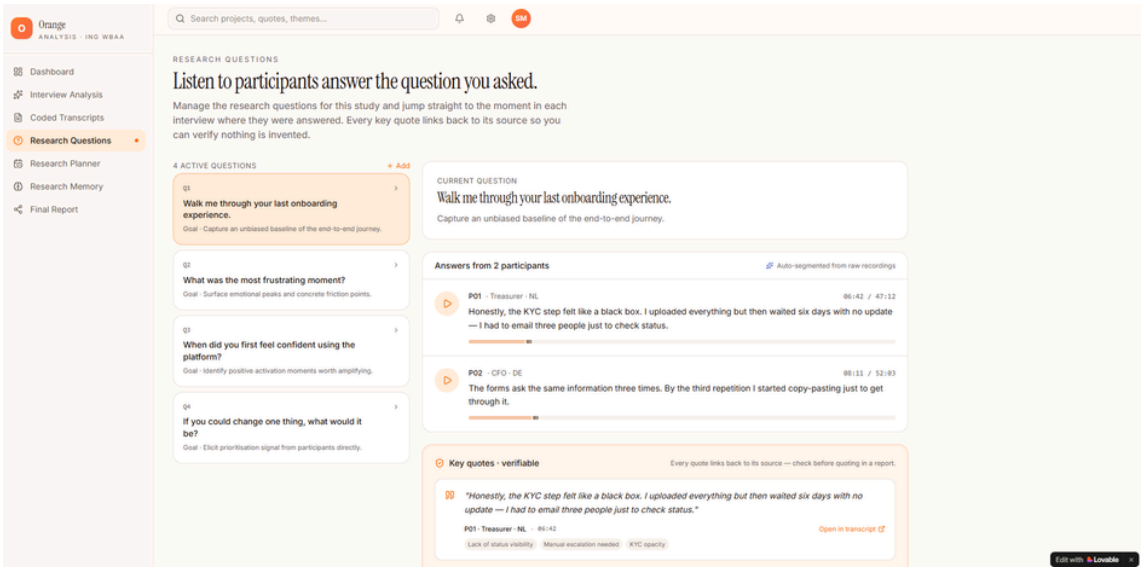
- What concept adds the most value?
- What could cause this concept not to work in practice?
- If you could choose one change to make, what would it be?

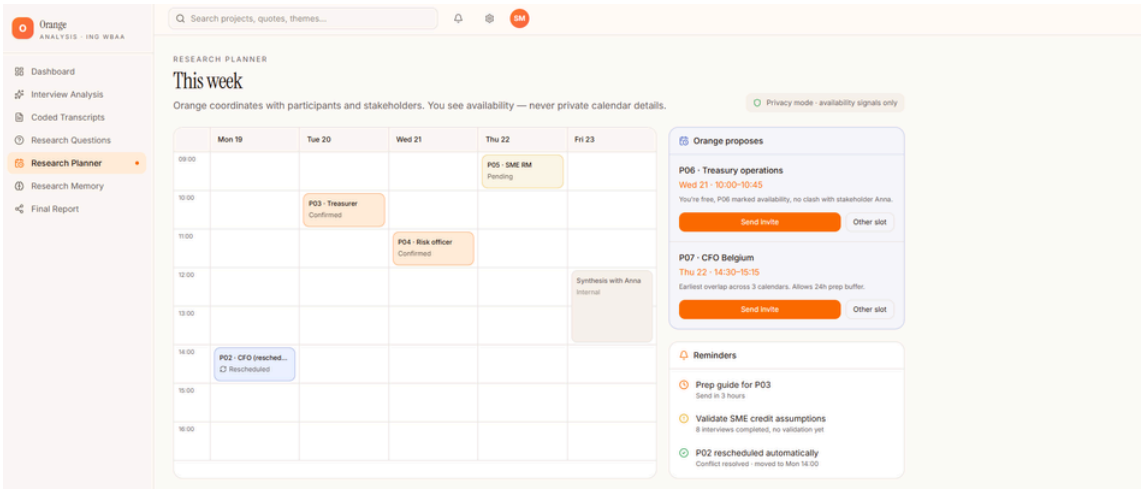
What we build through vibe-coding together

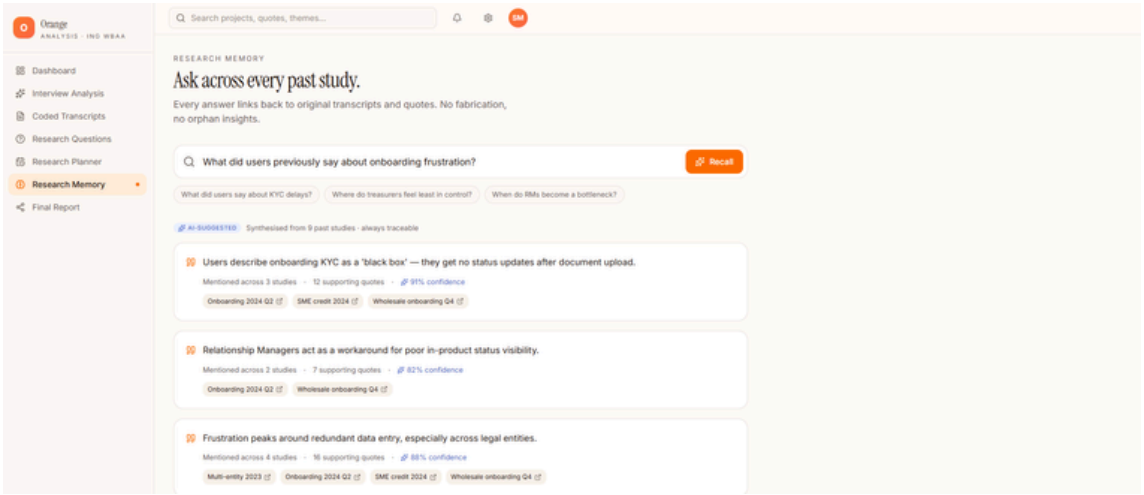







Orange
ANALYSIS · ING WBAA
Search projects, quotes, themes…
SM
Dashboard
Interview Analysis
Coded Transcripts
Research Questions
Research Planner
Research Memory
Final Report
RESEARCH QUESTIONS
Listen to participants answer the question you asked.
Manage the research questions for this study and jump straight to the moment in each interview where they were answered. Every key quote links back to its source so you can verify nothing is invented.
4 ACTIVE QUESTIONS
+ Add
Q1
Walk me through your last onboarding experience.
Goal · Capture an unbiased baseline of the end-to-end journey.
Q2
What was the most frustrating moment?
Goal · Surface emotional peaks and concrete friction points.
Q3
When did you first feel confident using the platform?
Goal · Identify positive activation moments worth amplifying.
Q4
If you could change one thing, what would it be?
Goal · Elicit prioritisation signal from participants directly.
CURRENT QUESTION
Walk me through your last onboarding experience.
Capture an unbiased baseline of the end-to-end journey.
Answers from 2 participants
Auto-segmented from raw recordings
P01 · Treasurer · NL
06:42 / 47:12
Honestly, the KYC step felt like a black box. I uploaded everything but then waited six days with no update — I had to email three people just to check status.
P02 · CFO · DE
08:11 / 52:03
The forms ask the same information three times. By the third repetition I started copy-pasting just to get through it.
Key quotes · verifiable
Every quote links back to its source — check before quoting in a report.
"Honestly, the KYC step felt like a black box. I uploaded everything but then waited six days with no update — I had to email three people just to check status."
P01 · Treasurer · NL · 06:42
Open in transcript
Lack of status visibility
Manual escalation needed
KYC opacity
Edit with Lovable


Orange
ANALYSIS · ING WBAA
Search projects, quotes, themes…
SM
Dashboard
Interview Analysis
Coded Transcripts
Research Questions
Research Planner
Research Memory
Final Report
RESEARCH PLANNER
This week
Orange coordinates with participants and stakeholders. You see availability — never private calendar details.
Privacy mode · availability signals only
Mon 19
Tue 20
Wed 21
Thu 22
Fri 23
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
P05 · SME RM
Pending
P03 · Treasurer
Confirmed
P04 · Risk officer
Confirmed
Synthesis with Anna
Internal
P02 · CFO (resched…
Rescheduled
Orange proposes
P06 · Treasury operations
Wed 21 · 10:00–10:45
You're free, P06 marked availability, no clash with stakeholder Anna.
Send invite
Other slot
P07 · CFO Belgium
Thu 22 · 14:30–15:15
Earliest overlap across 3 calendars. Allows 24h prep buffer.
Send invite
Other slot
Reminders
Prep guide for P03
Send in 3 hours
Validate SME credit assumptions
8 interviews completed, no validation yet
P02 rescheduled automatically
Conflict resolved · moved to Mon 14:00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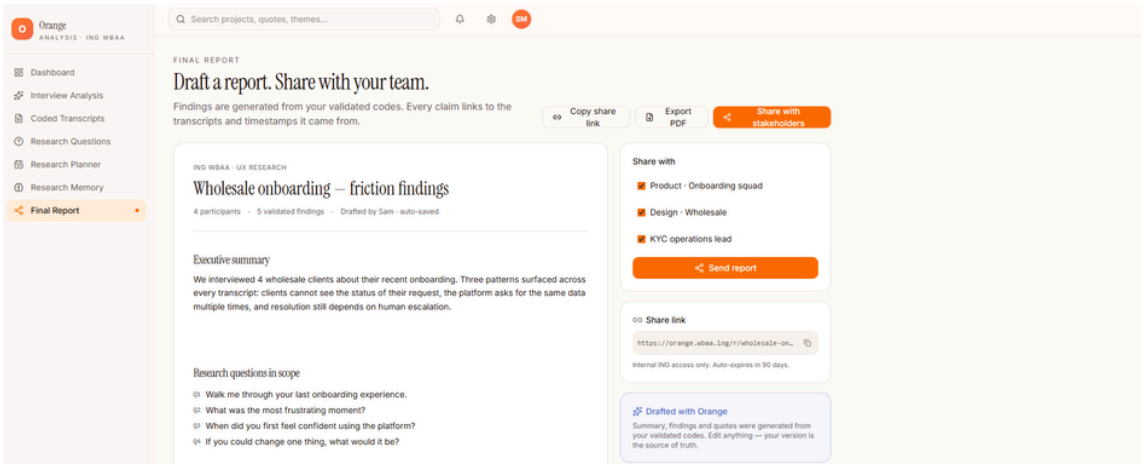
RESEARCH MEMORY
Ask across every past study.
Every answer links back to original transcripts and quotes. No fabrication, no orphan insights.
What did users previously say about onboarding frustration?
Recall
What did users say about KYC delays?
Where do treasurers feel least in control?
When do RMs become a bottleneck?
AI-SUGGESTED
Synthesised from 9 past studies · always traceable
Users describe onboarding KYC as a "black box" — they get no status updates after document upload.
Mentioned across 3 studies · 12 supporting quotes · 91% confidence
Onboarding 2024 Q2
SME credit 2024
Wholesale onboarding Q4
Relationship Managers act as a workaround for poor in-product status visibility.
Mentioned across 2 studies · 7 supporting quotes · 82% confidence
Onboarding 2024 Q2
Wholesale onboarding Q4
Frustration peaks around redundant data entry, especially across legal entities.
Mentioned across 4 studies · 16 supporting quotes · 88% confidence
Multi-entity 2023
Onboarding 2024 Q2
SME credit 2024
Wholesale onboarding Q4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Final Report
FINAL REPORT
Draft a report. Share with your team.
Findings are generated from your validated codes. Every claim links to the transcripts and timestamps it came from.
Copy share link
Export PDF
Share with stakeholders
ING WBAA · UX RESEARCH
Wholesale onboarding — friction findings
4 participants · 5 validated findings · Drafted by Sam · auto-saved
Executive summary
We interviewed 4 wholesale clients about their recent onboarding. Three patterns surfaced across every transcript: clients cannot see the status of their request, the platform asks for the same data multiple times, and resolution still depends on human escalation.
Research questions in scope
Q1 Walk me through your last onboarding experience.
Q2 What was the most frustrating moment?
Q3 When did you first feel confident using the platform?
Q4 If you could change one thing, what would it be?
Share with
Product · Onboarding squad
Design · Wholesale
KYC operations lead
Send report
Share link
https://orange.wbaa.ing/r/wholesale-on…
Internal ING access only. Auto-expires in 90 days.
Drafted with Orange
Summary, findings and quotes were generated from your validated codes. Edit anything — your version is the source of truth.