Accenture Song

TU Delft

Designing adaptive user interfaces in the age of malleable software

Master thesis
Strategic Product Design

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Abstract

This thesis investigates how Accenture Song can strategically design hyper-personalized digital products in response to rapid developments in malleable software. As user expectations increasingly shift toward hyper-personalized experiences, and as research shows that customization can improve efficiency, satisfaction and accessibility, Accenture Song must adapt its approach to digital product design. Malleable software enables end-users, designers and developers to adapt digital products more easily during use and development. However, most current hyper-personalization strategies remain system-driven, limiting user agency. This reveals a gap in how malleable software can support adaptive, user-centric digital products through user customization.

The aim of this thesis is threefold: to understand how malleable software can enable hyper-personalization in digital products, to explore how these tools can be embedded within the design and development process of the Design & Digital Products (D&DP) practice, and to define how Accenture Song should position itself strategically in relation to malleable software.

The research follows a diverging and converging design approach across three phases. The first phase builds contextual knowledge on current and emerging hyper-personalization strategies, resulting in eight interaction design principles for designing hyper-personalized digital products using malleable software. The second phase applies generative research methods to uncover latent customization needs of Generation Z in digital financial products. The final phase focuses on co-creation and iterative prototyping with malleable software, leading to a demonstrator, an intervention framework for D&DP's design and development process, and a strategic and tactical roadmap for Accenture Song.

One of the key findings is that malleable software enables a shift from system-driven personalization toward user-driven customization, improving the end-user experience by increasing efficiency, accessibility and user agency. In addition, malleable software supports faster validation, concept development, ideation and co-creation within internal design and development processes, while also creating opportunities for Accenture Song to engage clients through hyper-personalized digital products and new service offerings.

Preface

This thesis represents the final milestone of the MSc Strategic Product Design program at Delft University of Technology. The project was conducted in collaboration with Accenture Song during the period from September 2025 to February 2026. Accenture Song provided me the opportunity to carry out a graduation project within a professional design and consulting environment.

Throughout this thesis, I explored how emerging developments in malleable software and AI are reshaping the way digital products can be designed, customized and evolve over time. Working at the intersection of strategic design, digital product innovation and AI-enabled tooling allowed me to translate the vague concept of malleable software into more tangible design knowledge and actionable outcomes for Accenture Song. This project challenged me to operate across strategic, conceptual and practical levels, and significantly contributed to my development as a strategic product designer.

I am thankful to everyone at Accenture Song for their openness, collaboration and support throughout this project. I would like to thank the members of the Design & Digital Products team, and especially **Lars** and **Ynhi**, for their weekly support, guidance and critical feedback during the project.

I would also like to thank my supervisors at TU Delft, **Bart** and **Peter**, for their valuable insights and consistent support throughout the graduation process. Their guidance helped sharpen the direction of this thesis and improve the quality and rigor of the thesis outcomes.

This thesis aims to contribute to the current gray area surrounding malleable software and AI developments in digital products, such as vibe coding, by demonstrating design knowledge on how these technologies can be leveraged in digital product design.

Enjoy reading!

Joppe Roorda

Reading Guide

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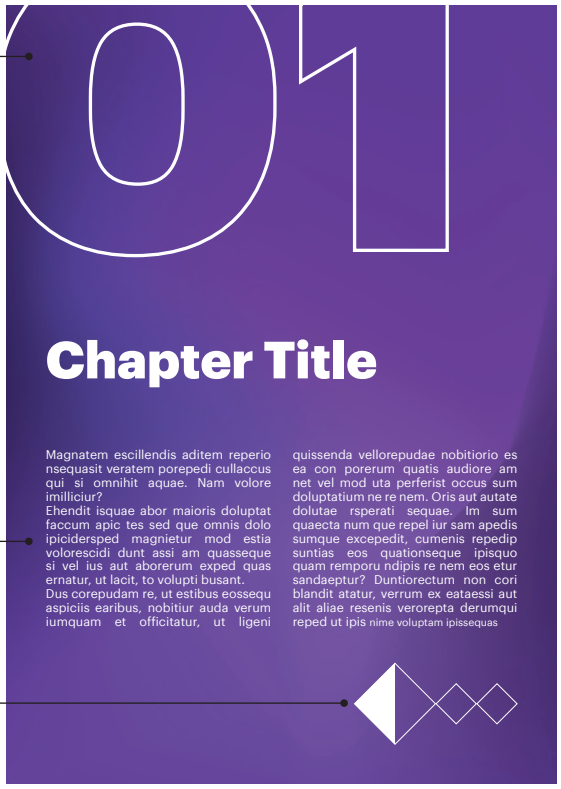

Introduction to the chapter

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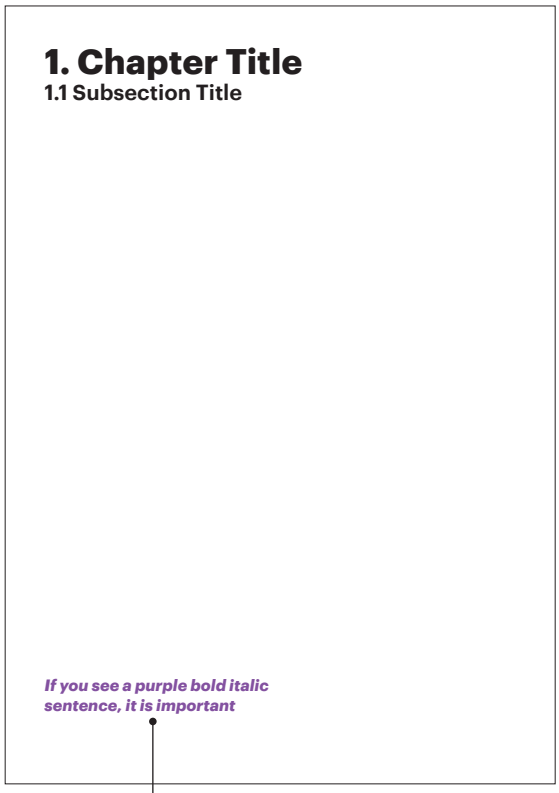

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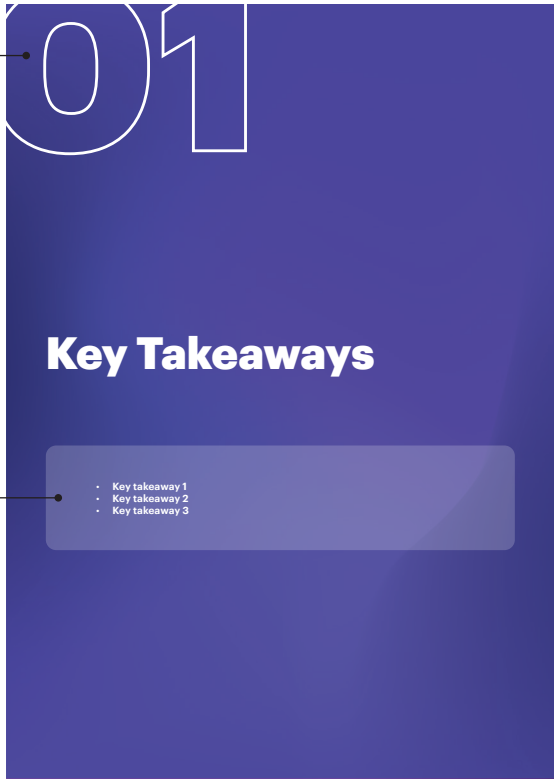


Chapter Key Takeaways

Abbreviations

General

D&DP	=	*Design & Digital Products*
FTE	=	*Full-time equivalent*
Gen Z	=	*Generation Z*
IBAN	=	*International Bank Account Number*
POV	=	*Point of View*
RFP	=	*Request for Proposal*
TU Delft	=	*Delft University of Technology*

Technical abbreviations

AI	=	*Artificial Intelligence*
EUD	=	*End-User Development*
GenAI	=	*Generative Artificial Intelligence*
GEO	=	*Generative Engine Optimization*
LCM	=	*Large Code Model*
LLM	=	*Large Language Model*
LVM	=	*Large Vision Model*
ML	=	*Machine Learning*
NFC	=	*Near Field Communication*
NLP	=	*Natural Language Processing*
SaaS	=	*Software-as-a-service*

Design and user interface

AR	=	*Augmented Reality*
AUI	=	*Adaptive User Interface*
GenUI	=	*Generative User Interfaces*
HCI	=	*Human-Computer Interaction*
RtD	=	*Research-through-Design*
UI	=	*User Interface*
UX	=	*User Experience*

Table of Content

01

Introduction

This chapter highlights the relevance of this graduation project. It will be discussed how malleable software can be leveraged to improve digital products in the context of hyper-personalization. This project focuses on digital financial products and Generation Z as a target group.

1. Introduction

Digital products have become deeply embedded in everyday life. On average, people spend more than six hours per day online, primarily through mobile devices and laptops, but also via connected products such as smart home systems or wearables (Statista, 2025). As users' expectations and contexts continuously evolve, digital products must adapt to changing user needs. This is particularly evident for Generation Z (Gen Z), people born between 1996 and 2010, who spend a significant amount of time online and expect highly customized and adaptive digital experiences (McKinsey, 2025; PWC, 2025).

This thesis explores how digital products can be designed to address these evolving user needs and enhance usability, with a specific focus on Gen Z within the context of digital finance. This scope was defined in consultation with Accenture Song, as financial institutions are key clients and attracting Gen Z is strategically important. Gen Z is projected to become the largest and wealthiest generation in history, making them a critical target group for financial services (AFM, 2025; McKinsey, 2025).

1.1 Project Context

This thesis is conducted in collaboration with **Accenture Song**, the creative consultancy division of Accenture, a global professional company specializing in IT services and consulting. As the creative force within Accenture, Accenture Song drives growth through digital transformation by helping organizations create relevant and meaningful experiences. Operating at the intersection of business, technology and design, it focuses on transforming brands, products and services through human-centered innovation.

Accenture Song's mission revolves around fostering growth through relevance, supporting clients throughout their entire digital journey, from strategy and concept development to implementation and market delivery. Its approach integrates creative thinking, technological expertise, and data intelligence to design comprehensive digital solutions that not only meet business goals but also resonate deeply with end-users. This customer-centric philosophy is key in enhancing engagement, satisfaction, and long-term value creation.

This thesis is performed within the Design & Digital Products (D&DP) practice. Figure 1 shows the governance of Accenture Song and where D&DP is positioned within this organization. The D&DP team designs and develops digital products and services across various sectors such as finance, retail, and health.

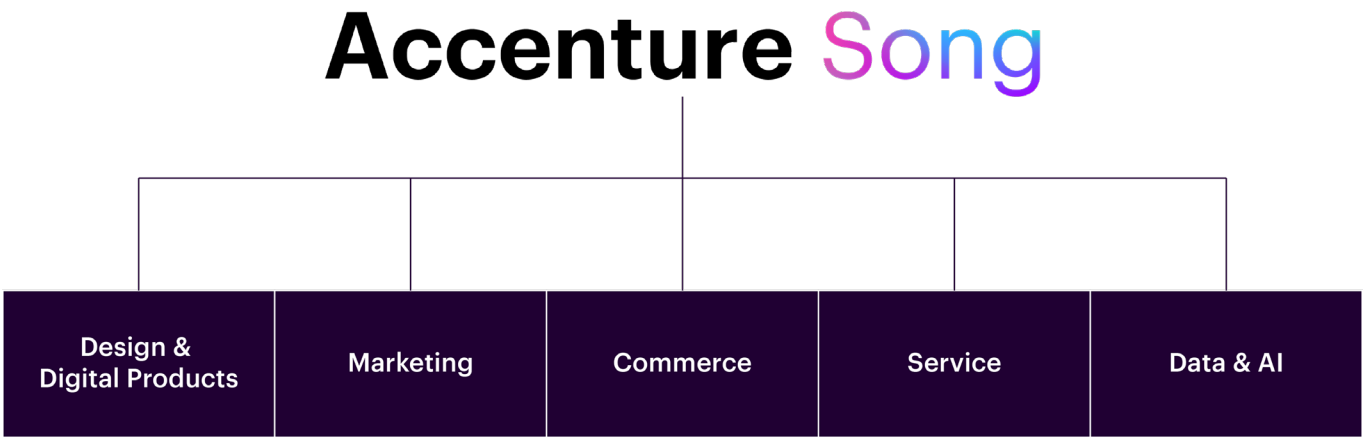


Figure 1: Governance Accenture Song

Within this domain, a key trend is hyper-personalization, which leverages AI and real-time data to deliver highly tailored customer experiences (IBM, 2025). Research shows that around 70% of consumers expect personalized interactions, and companies that successfully meet these expectations generate up to 40% more revenue than slower-growing competitors (McKinsey, 2021). As a result, hyper-personalization has become a critical driver of both customer engagement and competitive advantage.

A related concept is malleable software, referring to digital products that empower users to adapt interfaces and functionalities to their specific needs. Unlike traditional system-driven personalization, malleable software gives users direct control over interfaces and features. For example, a customizable financial dashboard lets users rearrange tools to match their personal banking workflow.

For Accenture Song, these trends represent challenges: to anticipate evolving client and customer expectations and to stay at the forefront of digital innovation. To engage potential clients, the company regularly develops a Point of View (POV), which is a strategic report outlining market trends and Accenture's approach. By exploring how to design adaptive, user-centric digital products, this project aims to deliver actionable insights and guidelines that strengthen POVs and enhance client offerings. Additionally, conducting this design project in collaboration with Accenture Song provides an ideal context for this project, as the company has extensive experience in driving digital transformation and translating emerging technologies into meaningful user experiences.

1.2 Project Assignment

The concept of malleable software is gaining attention in technology innovation circles but remains largely unfamiliar within Accenture Song. Exploratory interviews and informal conversations with D&DP employees revealed that its potential impact on design work, client expectations and future workflows is unclear to many colleagues. While interest is growing, the concept is still vague and lacks practical application in current design practices.

As Accenture Song aims to lead in emerging technologies, it is essential for its teams to develop a clear understanding of how malleable software could influence future digital products. The core challenge of this design project is therefore to translate this vague concept into actionable design knowledge.

The assignment for this project is defined by the following two objectives:

1. *Raise internal awareness by clarifying what malleable software is and why it matters*
2. *Explore its broader impact on hyper-personalization, adaptability and client engagement*

The central research question of this thesis is:

RQ: ***How can Accenture Song apply malleable software principles to design adaptive, user-centric digital products within the context of hyper-personalization?***

The assignment of this thesis is to develop understanding of the current emerging landscape of hyper-personalization and malleable software, identify user needs with user customization, and design hyper-personalized digital products with malleable software. Following the order of these three objectives, the sub-questions of this project are:

Sub-RQ1.1: *What forms and strategies of hyper-personalization currently exist in digital products, and what opportunities and limitations do they present?*

Sub-RQ1.2: *What are the key characteristics and design principles of malleable software, and how does it differ from traditional personalization approaches?*

Sub-RQ2.1: *What are key Gen Z needs for customization in digital financial products?*

Sub-RQ2.2: *How can malleable software principles be translated into design requirements for digital financial products?*

Sub-RQ3.1: *How should malleable software be implemented in digital financial products?*

Sub-RQ3.2: *How can Accenture Song incorporate malleable software into its approach for engaging clients and integrate it into project delivery?*

The research questions will be addressed through a combination of contextual research, generative research, prototyping and reflection. All research questions will be explicitly answered in the conclusion of this report.

1.3 Approach and Methods

This project uses the foundation of the Double Diamond approach, which is developed by the British Design Council (2005), to guide the overall process. However, the traditional Double Diamond approach is adjusted to this design project with an extra third diamond added (Figure 2). The approach is known for its balance between divergent exploration and convergent focus, which makes this adjusted method well-suited for addressing complex and futuristic problems.

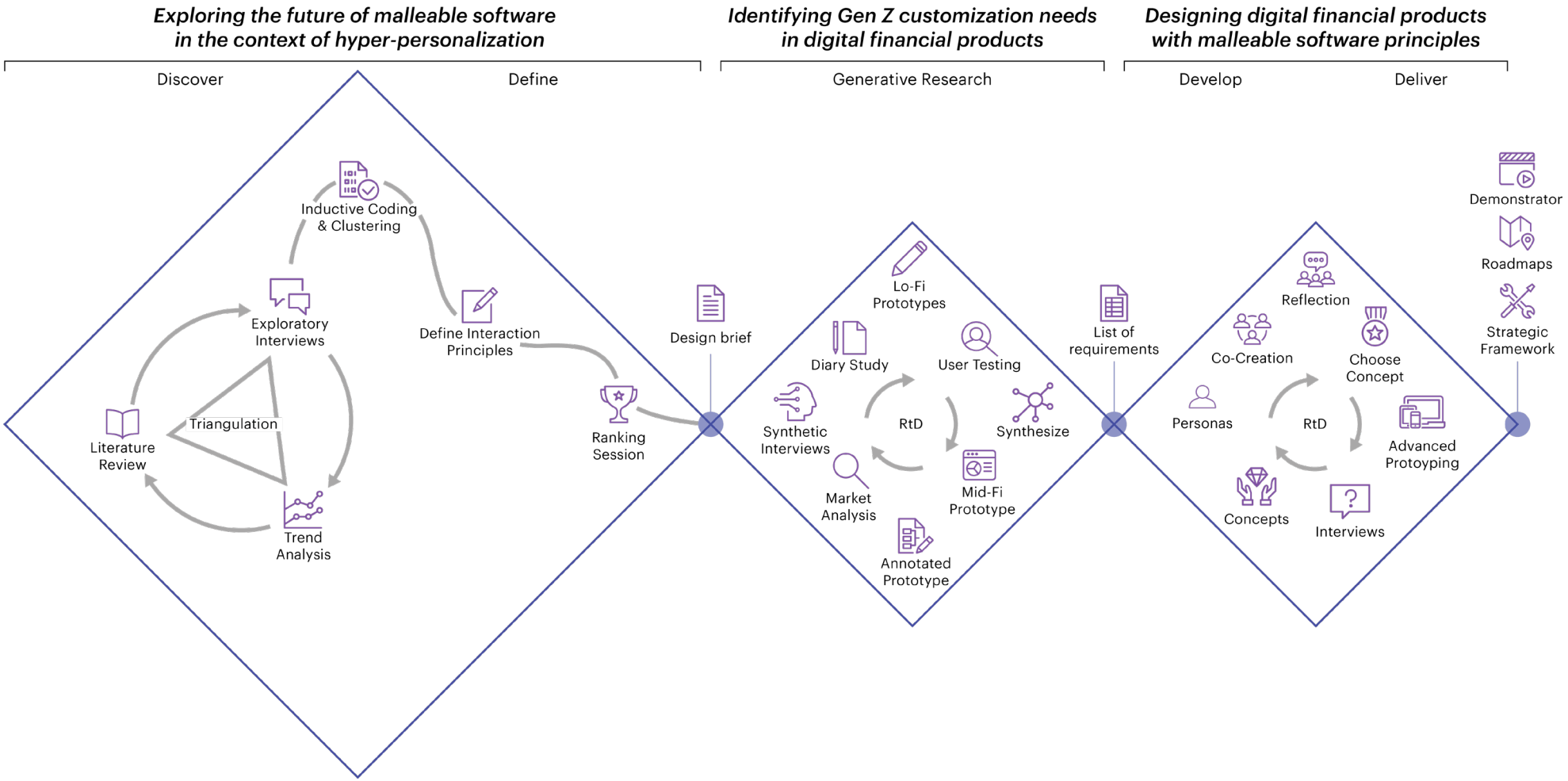


Figure 2: Triple Diamond approach with design methods

The first diamond will provide insights into the current state of hyper-personalization in digital products and the potential of malleable software.

Discover

The discovery phase involves contextual research, including literature review, trend analysis and exploratory interviews, to identify opportunities, constraints and trends related to hyper-personalization in digital products. Triangulation is used here as an approach that combines multiple research techniques (Figure 3). According to the Encyclopedia of Research Design, triangulation refers to the use of multiple data sources to enhance the credibility of a research study (Salkind, 2010). This contextual research will help to define which aspect of hyper-personalization to address. The exploratory interviews with experts in digital product design are semi-structured with the goal to identify insights, constraints and opportunities in implementing more user customization in digital products. The trend analysis will be focused on finance and Gen Z, because the second and third diamond will explore malleable software principles in digital financial products as a use case with Gen Z as a target audience.

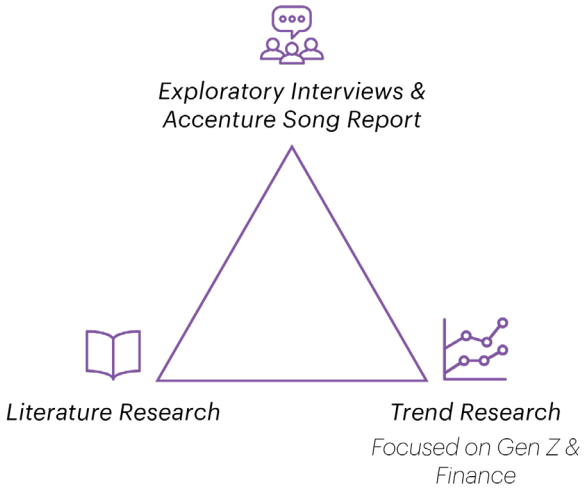


Figure 3: Triangulation for contextual research

Define

The Define phase synthesizes insights to develop interaction principles for integrating malleable software into digital products, enhancing personalization and adaptability. These interaction principles are ranked in a prioritization session with D&DP's advisory team and the Customer Tech Lead to focus the second diamond on the most relevant interaction principles for Accenture Song.

The outcome of the define phase is a design brief, including the most relevant interaction principles, scoping and the design goal for the last phases of this design project.

The goal of the second diamond is to identify Gen Z customization needs in digital financial products. This diamond is structured around generative research.

Generative Research

In this phase of the design project, the main goal was to uncover latent user needs of Gen Z regarding digital financial products with Research-through-Design (RtD) and generative design methods. Low-fidelity prototype testing, a diary study of Gen Z's financial behavior and synthetic user interviews were conducted to understand how Gen Z interacts with digital financial products.

User interface prototypes are created to test the interaction principles and demonstrate their potential value. These prototypes generate design knowledge through reflection, discussion and user testing. Low-fidelity prototypes are initially developed and tested to identify underlying customization needs, enabling rapid iteration and exploration of how malleable software can be integrated into digital products. To translate insights from the low-fidelity prototype testing into a more mature concept, a mid-fidelity prototype is created in Figma.

To synthesize all insights from the Generative Design phase, a list of requirements is developed. This list of requirements functions as assessment for validating the final prototype, which is developed in the last diamond.

In the final diamond, the RtD approach is again applied, with a focus on co-creation and prototyping using Lovable, an AI-driven design tool built on malleable software principles. This third diamond consists of two phases: Develop phase and Deliver phase.

Develop

In this phase, the mid-fidelity prototype evolves into more developed prototypes to improve the UI design according to generated design knowledge from earlier prototypes.

Besides prototyping, a co-creation session with D&DP employees is facilitated to generate prototypes for integrating malleable software in adaptive digital financial products. A second session was organized to provide participants more time to iterate on their prototypes using Lovable and provide feedback during a reflection exercise. Design knowledge generated in these sessions is used in the last phase.

Deliver

The Deliver phase delivers a final demonstrator of a hyper-personalized digital financial product, and a tactical and a strategic roadmap for adapting to malleable software developments. Accenture Song can use the final demonstrator to engage financial services clients, and the roadmaps to leverage malleable software internally and for client service and product offerings.

Additionally, an intervention framework will consolidate the knowledge generated through co-creation and reflection sessions, as well as through prototyping with Lovable, to translate insights into an improved design and development process for D&DP.

1.4 AI Declaration

In this thesis, AI tools are used to increase the efficiency of both research and design methods. During the design process, the tool NotebookLM was used to efficiently analyze scientific articles, Gemini 3.0 was used for synthetic user interviews and Lovable was employed during the co-creation session to develop UI prototypes through natural language input. Additionally, Lovable was used in the development of the final prototype, and ElevenLabs for generating a voice over for the demonstrator. Lastly, ChatGPT is used to improve writing and to improve prompt engineering for Lovable. Figure 4 illustrates when AI tools are leveraged within this design project and its balance with human-led design.

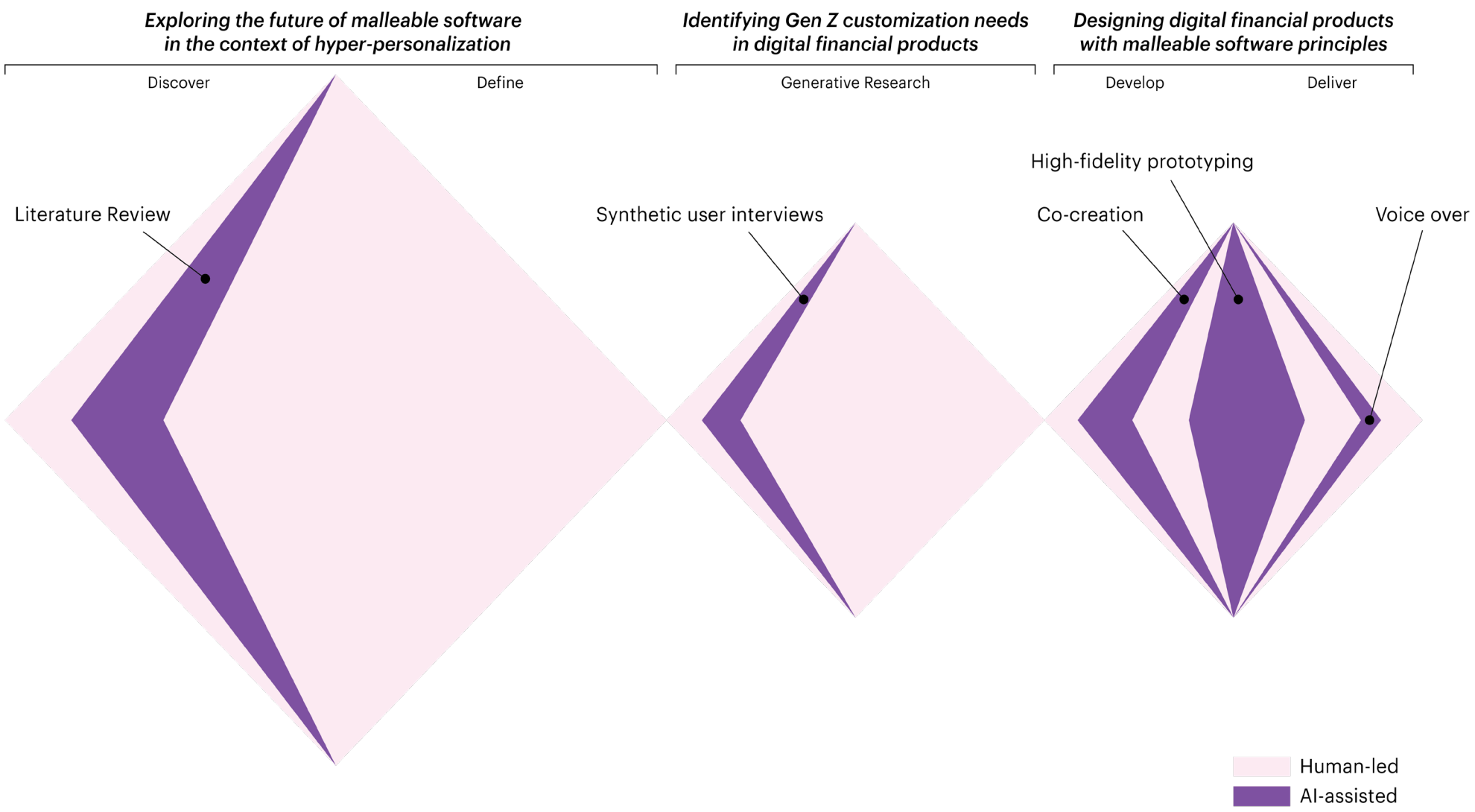


Figure 4: Triple Diamond approach with AI-led phases

NotebookLM is an AI-driven research tool and thinking partner that analyzes sources you add in notebooks. First, relevant scientific articles were identified manually using ScienceDirect and Scopus, and the snowball search method was leveraged to increase the number of relevant articles. Subsequently, scientific articles were downloaded and added as input into notebooks in NotebookLM. This tool helped searching for relevant citations and analyze full articles efficiently. So, this tool assisted in gathering most relevant input for the literature review.

Another AI-driven tool that is used in this thesis is Gemini 3.0, which is a Large Language Model (LLM). This tool is used for synthetic user interviews to generate answers of seven Generation Z personas, based on loads of online data about Generation Z. The goal was to gather quick explicit knowledge from various Gen Z personas on financial behavior. To set up these synthetic user interviews, a research discussion guide was developed manually. Gemini created answers to all these questions per persona as output. This output is analyzed manually by coding, resulting in Gen Z financial behavior insights.

The AI-driven tool Lovable is used extensively in the last phase of the design process. Lovable is a no-code platform designed to build, iterate and deploy full-stack web applications and websites using natural language prompts. This tool is used in a co-creation session with employees of D&DP and for iteration to develop interactive prototypes with natural language. Additionally, this tool is leveraged to develop the final prototype of this design project demonstrating malleable software in a digital financial product. Appendix A.1 illustrates the development process of the final prototype with Lovable. In both the co-creation development and final prototype development, LLMs are used to optimize prompts used as input for Lovable. In Appendix A.2, examples of prompts and resulting designs created by Lovable can be found.

The prototypes created by employees with Lovable, have manually been translated into prototype posters with Figma and Adobe Illustrator. The final prototype developed with Lovable is used to manually design a demonstrator. For this demonstrator, three personas and a storyboard have been created, which are used as a foundation for the final demonstration video. This demonstration video is designed in Adobe Premiere manually and a voice over for this video is created with ElevenLabs, which is an AI-driven voice generator. The text for this audio is written manually and added as a prompt to ElevenLabs.

01

Key Takeaways

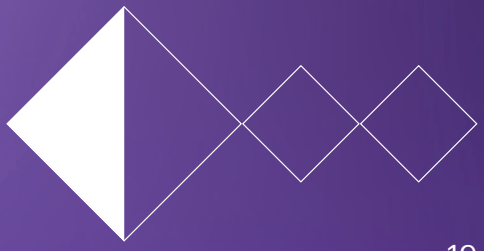
- The project is conducted in collaboration with the Design & Digital Products practice of Accenture Song
- This thesis will explore how Accenture Song can apply malleable software to design hyper-personalized digital products
- AI tools are used in this project to explore malleable software approaches and develop prototypes through multiple phases of the design project

02

Exploring Context

This chapter focuses on exploring adaptive user interfaces in the context of hyper-personalization, with specific attention to the concept of malleable software. It outlines the key opportunities, constraints and trends associated with hyper-personalization in digital products, forming the exploratory foundation of this design project.

To strengthen the credibility and robustness of the findings, a triangulation approach is applied. The chapter is structured accordingly and combines multiple research methods. The first Subsection presents insights derived from a literature review, the second Subsection discusses findings from exploratory interviews, the third Subsection eleborates on insights of a report developed by Accenture Song and the final Subsection elaborates on insights from a trend analysis.



2. Exploring Context

2.1 Literature Review

This Subsection provides the theoretical background for this design project by examining existing knowledge on malleable software and hyper-personalization in digital products. It explores how evolving user needs, technological advancements and design methodology influence the creation of more flexible and personalized digital experiences. By synthesizing insights from theory, this chapter establishes the academic and practical context in which the research is positioned.

2.1.1 Hyper-Personalization in Digital Products

Technological innovation is consistently accompanied by rising consumer expectations. In digital product design, this has resulted in increasing demand for personalized experiences that feel relevant and unique to each user. As described in the introduction, around seventy percent of consumers expect personalized digital interactions (McKinsey, 2021). This Subsubsection explores the concept of hyper-personalization in digital products, its technical foundations, and the key challenges that emerge when designing personalized digital experiences.

What is Hyper-Personalization?

Traditional personalization techniques mainly addressed customers by name or suggested products based on past purchases. Hyper-personalization, in contrast, leverages detailed user data, such as browsing behavior, location and contextual factors like time or weather, to deliver highly tailored experiences, products and services through advanced technologies. This deep form of personalization has become increasingly prevalent across industries such as retail, entertainment, healthcare and banking. It relies on technologies like artificial intelligence (AI), generative AI (GenAI), machine learning (ML) and real-time data analytics to create highly individualized customer experiences (IBM, 2025).

In modern business context, hyper-personalization is recognized as a key driver of customer engagement and satisfaction, as it allows organizations to deliver what is most relevant and desirable to each user (Murugasu & Subbarao, 2025). As consumers increasingly interact with products and services online, their digital behavior has become a valuable resource for understanding individual needs and expectations (Prentice et al., 2020).

Tseng et al. (2010) distinguish personalization from customization: while customization fulfills explicit requirements of specific user groups or market segments, personalization aims to satisfy individual needs more effectively. Hyper-personalization extends this by using predictive and contextual data to anticipate needs and adapts experiences in real time. This thesis positions customization as a user-driven mechanism to enhance hyper-personalization. The project explores how a deeper, more user-driven form of customization, referred to as malleable software, can enable hyper-personalized experiences.

This thesis examines hyper-personalization at the user interface (UI) level, moving beyond traditional content recommendation to personalize the interaction itself. According to Flowmapp (2023), this is achieved through mechanisms like customization, adaptive design and context-aware interfaces, where layouts and navigation adjust in real time to user intent. Earlier research by Schiaffino and Amandi (2004) introduced the concept of interface agents, which are computer programs that provide personalized assistance. This shift from system-driven adaptation to interaction-driven personalization represents an important step toward more adaptive and user-centric digital products.

Adaptive User Interfaces

Adaptive User Interfaces (AUIs) represent the tangible realization of hyper-personalization, especially in the context of malleable software. AUIs dynamically adjust their content, presentation and behavior to optimize the user experience (Gaspar-Figueiredo et al., 2026). These systems respond to evolving user needs while maintaining consistency in usability and interaction quality.

The principle underlying AUIs is plasticity: the ability of a user interface to adapt to user requirements while remaining resilient

across diverse contexts (Miraz et al., 2021). Two methodological approaches dominate AUI development. Rule-based systems rely on predefined rules that dictate adaptation, while data-driven systems use ML to predict necessary adaptations from user data (Gaspar-Figueiredo et al., 2026). Rule-based systems tend to be limited in flexibility, whereas data-driven methods demand extensive datasets and computational resources.

A recurring question in AUI research is whether adaptations should occur under system control or user control (Miraz et al., 2021). Universal adaptation may be technologically feasible in the future, but meaningful application requires understanding the human mental model. This demands multidisciplinary collaboration across diverse researchers.

Lavie & Meyer (2010) identified several key considerations for AUI design. Adaptivity is not universally beneficial, and AUIs often operate in complex, dynamic environments where different variables affect interaction quality. They recommend considering intermediate levels of adaptivity rather than treating adaptation as an all-or-nothing feature.

User Interface Customization

UI customization enhances usability and user experience by allowing individuals to tailor digital environments to their preferences. Research shows that customization can improve efficiency, satisfaction and accessibility while fostering a sense of personal agency and identity (Alves et al., 2024).

Customization also provides psychological benefits by increasing users' perceived ownership and engagement in co-creation. Despite these advantages, most digital systems offer limited customization options. Many third-party solutions require technical knowledge or substantial effort, restricting access for non-expert users (Alves et al., 2024).

Interestingly, Alves et al. (2024) found that people often enjoy customizing interfaces for others more than for themselves. This social motivation suggests potential for community-based customization platforms where users share, modify and build on each other's designs. Such systems could integrate mechanisms for recognition, feedback and gamification to sustain engagement over time. In the podcast POM by Alexander Klöpping and Ernst-Jan Pfauth (2025) these community-first platforms, as a vision by Greg Isenberg, are discussed as offering potential because they enable a collaborative remix culture where users can instantly share, adopt and iterate on AI-generated workflows tailored to their needs.

However, the creative process of customization introduces cognitive challenges (Alves et al., 2024). Many users struggle with ideation and lack guidance when making changes. Familiarity with existing interfaces can hinder imagination of alternatives. Adoption of customization assistance tools remains limited due to factors such as high self-efficacy, perceived effort and the desire for control. Addressing these challenges requires balancing usability with creative empowerment, ensuring that users can personalize effectively without becoming overwhelmed.

Generative User Interfaces

Recent advances in AI have introduced a new paradigm in UI design known as an intent-based outcome specification (Nielsen, 2023). In this paradigm, users express what they want to achieve rather than how the system should achieve it. Moran and Gibbons (2024) refer to this implementation as Generative UI (GenUI): UIs that are dynamically generated in real-time by AI, tailored to user needs and context. As illustrated in Figure 5, this capability enables a fundamental shift from static, universal designs to highly personalized experiences.

GenUI builds upon the End-User Development (EUD) paradigm (Lieberman et al., 2006), which allows users to create or modify applications according to their needs. Unlike EUD, GenUI eliminates the need for programming expertise by delegating technical work to AI-based tools (Okopnyi et al., 2024).

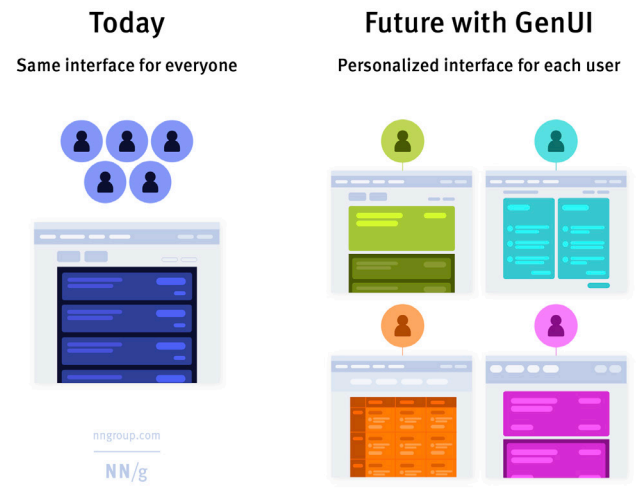


Figure 5: GenUI illustration (Moran & Gibbons, 2024)

To enable adaptive and malleable interfaces, Cao et al. (2025) propose using task-driven data models as the foundation for UI generation. These models structure the entities and data properties relevant to a user's intended task. As shown in Figure 6, LLMs interpret natural language prompts to generate these models, which are then translated into UI specifications (Cao et al., 2025; Namoun et al., 2024). The resulting interfaces evolve continuously in response to user interactions.

Namoun et al. (2024) introduce the concept of Large User Interface Models (LUIMs), which integrate LLMs, Large Vision Models (LVMs) and Large Code Models (LCMs) to support automated interface generation and usability prediction.

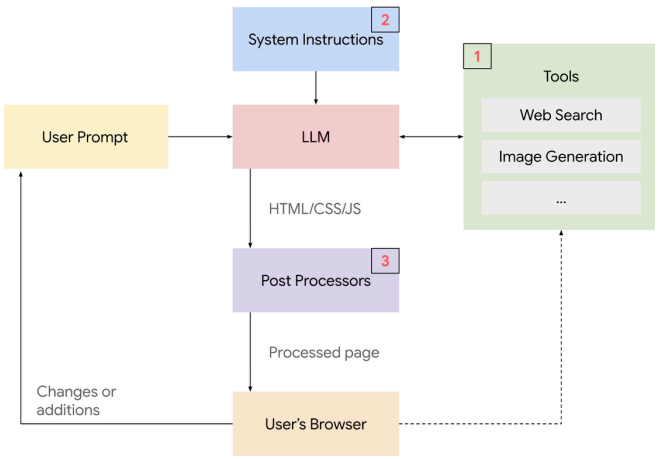


Figure 6: A high-level sytem overview of the GenUI implementation (Google, 2025)

Despite their promise, GenUI systems face several challenges. Reliability of AI outputs remains a concern and users may need to learn prompt-engineering skills to communicate intentions effectively. Excessive adaptivity can also undermine the design principle of consistency, especially in collaborative contexts where different users experience distinct interfaces (Okopnyi, 2024). Moreover, current GenUI prototypes often overlook key usability factors such as efficiency, learnability and satisfaction (Namoun et al., 2024). Addressing these gaps is crucial for integrating generative intelligence into practical and user-friendly systems. For designers, this shift implies a growing need to move from static interface creation toward designing adaptable frameworks, guiding AI behavior and ensuring that system autonomy remains aligned with human intention and usability principles.

Challenges in Designing Hyper-Personalized Digital Products

Personalization is a defining characteristic of modern digital products, yet it raises complex design challenges. While much existing research emphasizes data-driven personalization, this thesis focuses on user-driven personalization through customization and adaptability in interfaces. The goal is to understand how users can shape digital environments to suit their goals and contexts.

A central challenge is determining the appropriate degree of control between system-driven adaptation and user-driven customization. Adaptive systems can enhance efficiency but risk reducing transparency and user autonomy when they act autonomously. Designers must therefore balance automation with user control to preserve agency and usability. Intermediate levels of adaptivity often produce the best results, ensuring consistency while still offering flexibility (Lavie & Meyer, 2010).

Another challenge concerns accessibility and effort. Many customization tools remain technically demanding, limiting participation to expert users. Simplifying these processes and providing intuitive guidance are essential for broader adoption.

Cognitive factors further complicate personalization. Users often find it difficult to envision new interface configurations or articulate desired changes. Design solutions must therefore support creativity and exploration without overwhelming users.

Finally, personalization can benefit from community engagement. Research by Alves et al. (2024) indicates that social motivation enhances participation in customization. Designing systems that include feedback, communication and recognition mechanisms can sustain user engagement over time. Additionally, designers must also ensure inclusivity to make these systems accessible to users with varying levels of skill, creativity and technical confidence.

2.1.2 Malleable Software

The Concept of Malleable Software

The early vision of personal computing imagined a "new kind of clay", a malleable material that users could reshape to suit their needs. In practice, however, most digital environments resemble sealed appliances: rigid, predefined and resistant to change. Users must often adapt their workflows to the software, rather than the other way around. This rigidity stems from a long-standing assumption that users are passive consumers rather than active co-creators.

Malleable software challenges this paradigm by proposing systems that users can easily adapt and reconfigure to their specific needs. The core goal is to restore user agency, making modification routine, not exceptional and ensuring that adaptation happens fluidly "at the point of use" rather than relying on distant engineering teams (Litt et al., 2025).

This concept was formally articulated by Philip Tchernavskij (2019) in his doctoral thesis *Designing and Programming Malleable Software*. His central argument is that software should evolve with users, allowing them to modify or extend functionalities as their needs develop. Traditional software engineering focuses on flexibility at the code level but offers little room for end-user adaptability. In contrast, malleable software aims to maximize what can be modified directly through interaction, making adaptation possible at the interface, not only in the source code. Figure 7 demonstrates how adaptation becomes possible at the UI level, treating software not as a static product but as a collection of malleable resources.

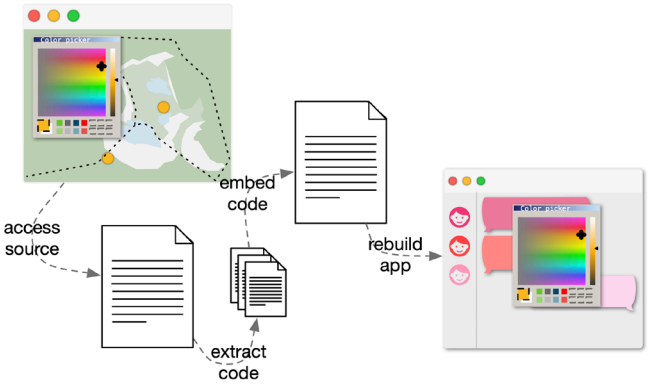


Figure 7: Concept of malleable software (Tchernavskij, 2019)

Tchernavskij frames malleable software as a design vision rooted in the ideals of tailorable systems, emphasizing pluralism, the idea that diverse users should be able to shape their digital environments without being forced into standardized molds. He critiques the current software ecosystem as economically and technologically biased toward centralized, "one-size-fits-all" solutions. To counter this, he advocates for tools and infrastructures that support plurality, enabling multiple communities to collaborate without consolidating around identical interfaces or data structures.

Current State of Malleable Software

Contemporary Human-Computer Interaction (HCI) research has advanced malleable software through experimental prototypes and theoretical work on user agency. The core ambition remains consistent: restoring user autonomy by enabling software to adapt to people rather than enforcing fixed workflows (Litt, 2023; Litt et al., 2025).

A key barrier to malleability lies in the "app paradigm", in which applications function as closed systems that tightly couple data and functionality. This limits interoperability and constraints user control. In response,

researchers advocate for composable software architectures, where functions and interface elements can be detached, recombined and shared across systems, better supporting adaptation and user creativity (Litt et al., 2025).

One foundational approach to enabling malleability is the local-first architecture, where data is primarily stored and processed on the user's device rather than centralized servers. This approach not only enhances privacy and performance but also grants users genuine ownership and control over their data, a prerequisite for meaningful adaptation (Local First Podcast, 2024).

Recent advances in LLMs have introduced new opportunities for malleability. By interpreting natural language prompts, LLMs can generate or modify small software tools, potentially democratizing software creation (Litt et al., 2025). Figure 8 illustrates how LLMs can be leveraged in a systematic overview of the malleable software concept.

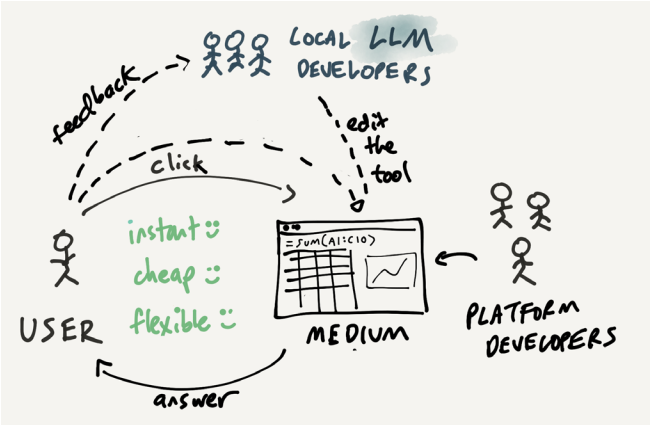


Figure 8: LLM integration in malleable software concept (Tchernavskij, 2019)

Cao et al. (2025) explored this concept in Jelly, a prototype for generative and malleable user interfaces (Figure 9). The system converts user intent, expressed in natural language, into task-driven data models that dynamically generate UI components. Users can iteratively refine these interfaces through additional prompts or direct manipulation. The data model ensures transparency and continuity as the interface evolves. However, researchers note that while LLMs facilitate intent expression, conversational interfaces remain limited, necessitating hybrid models that combine AI assistance with direct manipulation for intuitive control.

Another recurring challenge is the steep learning curve associated with software modification. Malleable systems must provide a "gentle slope of tailorability", allowing users to progressively gain control without encountering abrupt technical barriers (Litt et al., 2025). Tools such as Figma exemplify this principle by supporting both basic composition and more advanced extensions within a single environment.

Despite technological progress, many obstacles to malleability are systemic rather than technical. Tchernavskij (2019) argues that software production is structurally biased toward uniformity due to economic incentives favoring scale and standardization. This forces diverse user communities to either perform repetitive integration work or align with restrictive platforms. Achieving true malleability therefore demands infrastructures for plurality, where diverse configurations can coexist without fragmentation.

The Software-as-a-Service (SaaS) model presents an economic contradiction: it monetizes fixed, finished products, whereas malleable software implies continuous adaptation. New business models, potentially based on per-adaptation licensing or community-driven feature sharing, must be explored though these introduce risks such as "micro-transaction fatigue" (McDonald, 2025).

In summary, malleable software currently sits at the intersection of growing technical feasibility and persistent systemic constraints. While LLMs and local-first architectures expand the potential for user-driven adaptation, broader adoption will depend on reconfiguring both software infrastructures and economic models.

Relevance for Accenture Song

As a leader in emerging technologies, Accenture Song is well positioned to explore the potential of malleable software. Its strong focus on end-user-driven growth makes it particularly relevant to understand how malleable systems can address evolving client and customer needs. However, interviews with employees revealed limited awareness of malleable software as a design and technology paradigm. This thesis therefore aims to increase understanding within the organization by articulating how malleable software can be integrated into digital products.

Malleable software closely aligns with Accenture Song's emphasis on customer relevance by enabling users to actively shape the products they use. Instead of static, one-size-fits-all experiences, malleable systems support ongoing adaptation of interfaces to users' goals and contexts. This sense of ownership and empowerment can strengthen emotional connection and long-term engagement, key drivers of meaningful and relevant customer experiences.

Jason McDonald, who is the Global Asset Lead at Accenture Song, has written a Point of View (POV) titled "*The Possible Future of One-Size-Fits you Software*" about the concept of malleable software (McDonald, 2025). So, there is some awareness about malleable software in other teams of Accenture Song abroad. He described that possibilities of malleable software felt real when experiencing vibe-coding for the first time. Vibe coding is an emerging software development practice where developers interact with LLMs using natural language, allowing for rapid prototyping and code generation through conversations (Malamas et al., 2025). Based on McDonald's POV, we can think of the shift toward systems that adapt to users, rather than requiring users to adapt to systems in three tiers of functionality:

- *Tier 3 (Rigid)* – Fixed frameworks and navigation defined by developers
- *Tier 2 (Configurable)* – Preference-driven environments where features can be toggled, reordered, or lightly customized
- *Tier 1 (Malleable)* – Fully adaptive functionality in which the system listens to context, generates new workflows, and embeds them seamlessly into the front-end

Most enterprise SaaS solutions remain at Tier 3, but by the early 2030s, Tier 1 systems could become the dominant model (McDonald, 2025). At that point, every instance of software could become a unique digital organism. Economically, there could be a shift from SaaS licensing toward per-adaptation models, in which users pay fractional costs for each function created.

For Accenture Song, this evolution represents both an opportunity and a design challenge. Malleable software opens new avenues for client differentiation while requiring new design principles, methods and decision frameworks. This thesis investigates how malleable software can be meaningfully integrated into digital products in ways that align with Accenture Song's client contexts, creative standards and long-term vision.

2.1.3 Synthesis: Key Insights

This literature review explored two key domains relevant to this thesis: hyper-personalization in digital products and the concept of malleable software. Together, these perspectives provide the conceptual basis for investigating how adaptive and user-driven personalization can shape future digital experiences.

The review shows that hyper-personalization has evolved from simple rule-based customization toward data-driven adaptation powered by AI. However, most current approaches remain system-controlled, limiting user autonomy. Malleable software introduces an alternative vision in which users gain control over how software behaves and appears, allowing them to tailor digital products to their specific goals and contexts. This shift from system-driven to user-driven personalization represents a significant step toward more empowering and sustainable digital experiences.

Despite its promise, malleable software remains conceptually young and practically underexplored. Technical research demonstrates feasibility through local-first architectures and generative interfaces, yet there is little understanding of how such systems should be designed for everyday use or how they might fit within professional design practices like those at Accenture Song.

To address this gap, this thesis will explore how malleable software principles can inform the design of adaptive, user-centric digital products. By iteratively designing and testing prototypes, the design project aims to uncover practical design principles that guide how adaptability and user control can coexist within digital interfaces.

In conclusion, while hyper-personalization currently relies on automated data-driven systems, malleable software offers a path toward direct user empowerment. This thesis addresses the lack of practical frameworks for applying malleable software in professional contexts. Developing and testing UI prototypes provide a structured approach to explore this transition and generate actionable design knowledge for Accenture Song.

2.2 Exploratory Interviews

2.2.1 Approach

To gather insights from internal data and explore the vision from employees on customization in digital products, exploratory interviews with six participants were held and an internal report was analyzed. The goal of the exploratory interviews was to get a better understanding of Accenture Song's current approach toward customization in digital products and to understand how experienced employees think customization in digital products will evolve. Participants were selected based on the following criteria: working for at least 5 years at Accenture Song, different roles in the organization and experience in digital product design (Table 1).

The exploratory interviews were semi-structured, for which research discussion guides were developed to guide these interviews (Appendix B). Notes were processed in user interview templates that divided the outcomes into the future state, gains & pains in customization currently and notes (Appendix C.1). Main insights from these exploratory interviews will be covered in the next Subsubsection.

Participant	Role	Experience at Accenture Song (years)
P1	*Creative Technology Manager*	*8*
P2	*Service Design Associate Manager*	*8*
P3	*Digital Integration Senior Manager*	*12*
P4	*Lead D&DP Customer Tech*	*7*
P5	*Lead D&DP NL*	*18*
P6	*Full Stack LLM Development Associate Manager*	*14*

Table 1: Sampling of participants exploratory interviews

2.2.2 Results

By inductive coding the exploratory interviews were analyzed to identify recurring themes from various interviews. The exploratory interviews show that the future of digital products is moving toward deeper integration with LLM-driven ecosystems. As users increasingly interact with services through AI intermediaries, the UI layer becomes more dynamic, adaptive and partially generated in real time. Concepts such as Generative UI (GenUI), liquid interfaces and malleable software all point toward a shift in which interfaces are no longer fixed but flexibly assembled around user intent.

Across the six interviews, almost all participants stressed the importance of integrating digital products with LLMs. They foresee a future in which people rely on LLMs as their primary assistant, reducing the need to manually open separate mobile apps. For Accenture Song and its clients, this means that the underlying ecosystem behind the UI will become more important.

At the same time, several constraints and opportunities emerged. Small user-initiated adjustments seem more feasible than fully generative interfaces, which is in line with literature covered in the research. Including security in digital products was mentioned as the biggest constraint when developing digital products with malleable software. This is due to the fact, that users are otherwise able to do malicious things, like misusing data. Designing guardrails is therefore crucial to prevent users from doing malicious things and guaranteeing security. Frameworks and protocols such as Apple's App Intents and the MCP protocol signal that the technical foundation for LLM-app integration is evolving. OpenAI has introduced Apps SDK on the 6th of October 2025, a framework to build apps for ChatGPT, and ChatGPT Atlas, which is a web browser. This shows that OpenAI is very active to integrate digital products into their LLM. Lastly, examples like Revolut show that user customization is already gaining traction in finance. However, this is just the beginning of user customization in digital products.

The themes have been clustered into four clusters: framework integration, app-agnostic customizability, voice prompts and incremental adaptation & guardrails. These clusters are used to develop interaction principles cards in the define phase, which will be covered in Chapter 3. In Appendix C.2 more details on insights of exploratory interviews can be found.

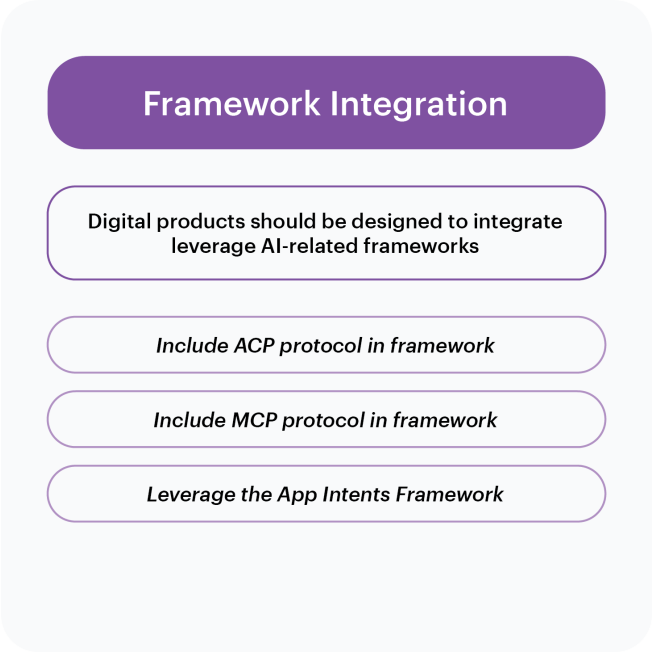


Figure 10: Cluster "Framework Integration"

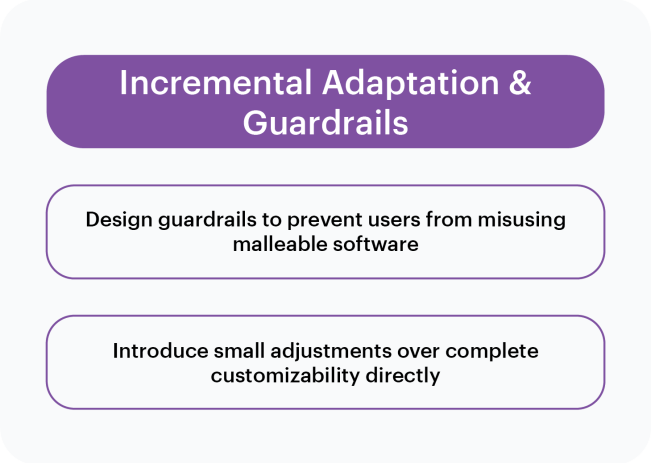


Figure 11: Cluster "Incremental Adaptation & Guardrails"

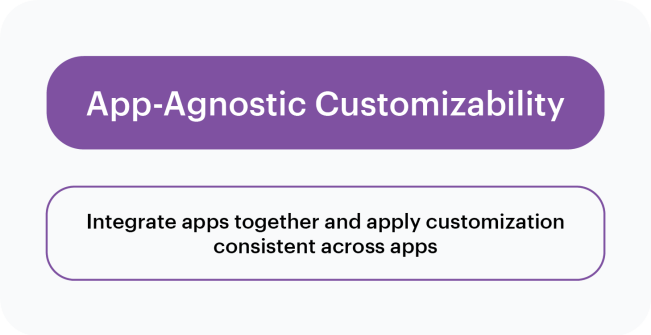


Figure 12: Cluster "App-Agnostic Customizability"

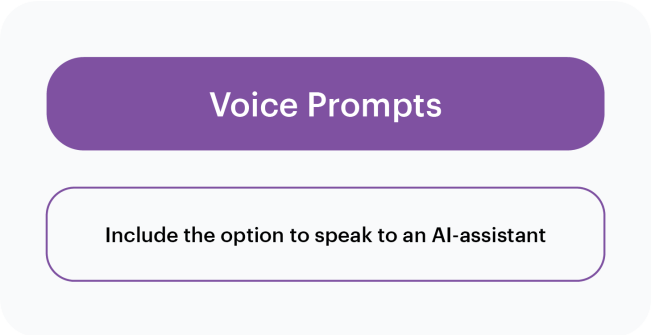


Figure 13: Cluster "Voice Prompts"

2.3 Accenture Report

Besides interviewing internal experts, an internal report about designing with and for AI is analyzed (Accenture Song, 2025). This report was created by Accenture Song to explore how digital product design can be improved by incorporating AI in digital products and during the design process. Relevant insights for this project were extracted from the part about incorporating AI in digital products and will be discussed in this section. This report stressed that AI systems make UI/UX more dynamic and that designers must learn how to shape ambiguity.

According to this report, designers should develop new ways to address the unique challenges that come with AI. Today's interfaces including AI elements are just the beginning. One of the recommendations is that simply offering suggested prompts fails to address a deeper UX challenge. Users often do not know what to ask for, when to ask something or how the system will respond. The interface must help users navigate ambiguity, expose system boundaries and stay in a state of exploration.

Another recommendation is that not every interaction with a digital product should be with a prompt. User interfaces can improve the interaction by having buttons and providing context. Buttons will still have their place in a natural language experience, but interactions that balance the control of traditional UI with the spontaneity of AI must be defined.

A limitation of AI systems is that not all responses are accurate. Designers can help users validate the GenAI's output by showing sources and by clearly indicating what content is generated and what is direct from the source text.

Lastly, agents can intelligently prompt the user and offer assistance at natural moments during user task transitions. Additionally, agents can dynamically generate interface elements in real-time based on context and user requirements to deliver personalized and context-aware interfaces, also referred to as UI on the fly.

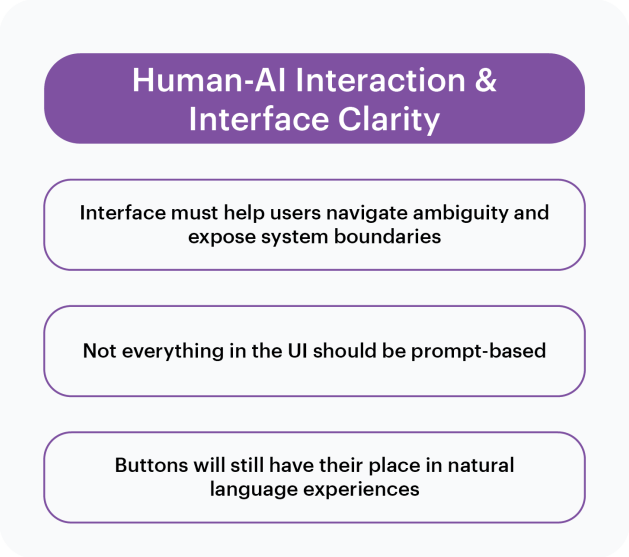


Figure 14: Cluster "Human-AI Intercation & Interface Clarity"

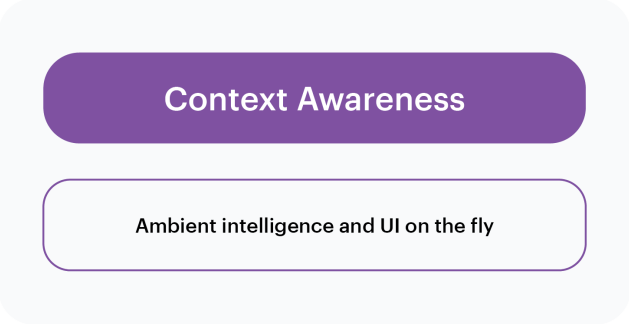


Figure 15: Cluster "Context Awareness"

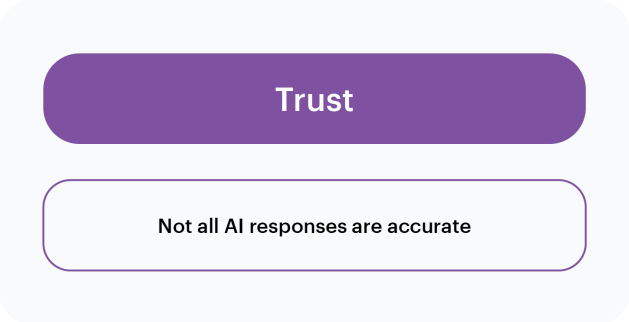


Figure 16: Cluster "Trust"

2.4 Trend Analysis

The goal of this trend analysis was to identify trends related to hyper-personalization, customer behavior, technology, Generation Z and finance. Since the last phases of this project are focusing on digital financial products, this contextual exploration examines how emerging trends reshape financial consumer behavior. Throughout the analysis, Generation Z (people born between 1996 and 2010) stood out as a tech-savvy generation, making them a suitable target group for malleable software. Gen Z's influence in the workforce is steadily growing, and over time they will inherit significant wealth from their parents. Gen Z'ers are projected to make up not only the largest generation but also the wealthiest in history (McKinsey, 2025). Therefore, for traditional banks such as ING and Rabobank, attracting this generation is becoming an increasingly important priority. At the same time, competition from neobanks such as Revolut is intensifying, making it crucial for traditional banks to stay relevant to this new generation of customers.

This trend analysis was conducted by reviewing multiple trend reports and integrating insights from two other Strategic Product Design graduation projects. The first graduation report, titled *Envisioning the future of financial services, shaped by Gen Z*, was analyzed for insights into Gen Z's financial habits. For the second graduation project, *Envisioning the future of Private Banking shaped by the next generation*, an online meeting was held to exchange research findings. This meeting mainly helped to verify trends from the trend analysis and to discuss if the findings align with the needs of ING, the client for the graduation project that is also a potential client for Accenture Song.

All identified trends were clustered into eight clusters to derive insights and explore how interactions between Gen Z and digital financial products are evolving.

Intelligent Personalization & AI Companionship

Customer expectations for highly personalized experiences continue to rise. Yet, a significant gap exists between these expectations and current offerings, as many interactions remain generic and insufficiently customized to individual financial goals or behavior (Capgemini, 2024). There is a shift from traditional personalization to proactivity, meaning that marketers leverage AI to not only respond, but also anticipate consumer needs (Accenture, 2025). Personal AI assistants embody this shift and are shaping the future of customer interactions (Zendesk, 2024). Cleo, a financial AI assistant for the next generation, is an example of this trend. AI is also gaining trust by more than half of US consumers to deliver proactive reminders to pay bills, save money and provide a comprehensive breakdown of their spending (SBS, 2025).

Natural language interfaces are accelerating the adoption of AI search, making gen AI tools a go-to channel. One in two users have already informed a purchase decision using gen AI, making it the fastest-growing source for recommendations and advice in the past year (Accenture, 2025). This development suggests that LLMs, like ChatGPT, are becoming trusted companions in everyday financial decision-making.

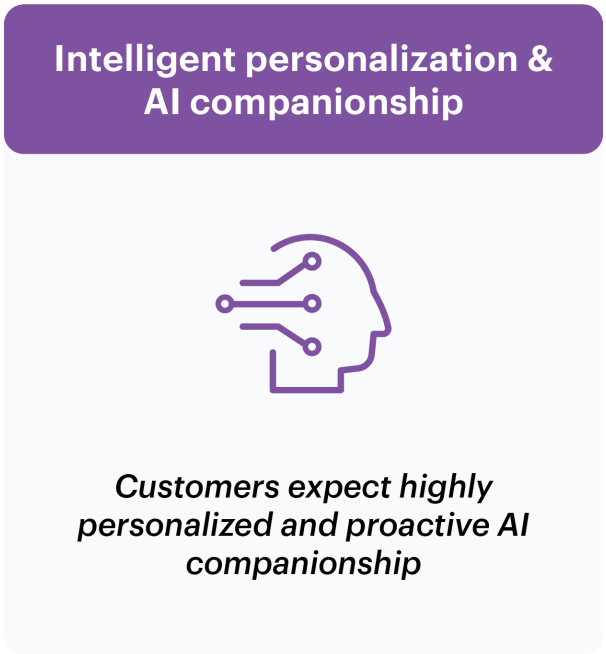


Figure 17: Trendcluster 1

Financial Mindset: Risk-averse but impulsive

Gen Z displays a dual financial mindset that can best be described as risk-averse yet impulsive. According to AFM, which is the Dutch Authority for the Financial Markets, Gen Z has impulsive spending behavior (AFM, 2025). This is reinforced by a focus on fulfilling immediate emotional needs, rather than putting much thought into long-term savings (Buitenhuis, 2025; PWC, 2025). As a result of this short-term orientation, a large portion of Gen Z lacks a financial buffer and is therefore more likely to fall back into payment issues (AFM, 2025).

At the same time, Gen Z is uncertain about the future and also risk-averse (Buitenhuis, 2025). This generation is cautious with spending money and has a mindset to be money driven. This tension reveals an underlying struggle between maintaining financial control and responding to immediate desires.

Financial mindset: risk-averse but impulsive

Gen Z is risk-averse and has a money-driven mindset, but is also spending impulsively

Figure 18: Trendcluster 2

Financial Education & Empowerment

There is a rise in financial platforms aiming to improve financial well-being. BUUT, a Dutch bank helping youngsters to save money and with budgeting, is one example. Consumers show openness to financial education. A survey found that almost half of US consumers want educational programs to help them become financially stronger. Additionally, 33% are seeking predictive insights and personalized recommendations to manage their finances better (MX Technologies, 2024).

Within Gen Z, a clear gap in financial literacy persists (Buitenhuis, 2025). Integrating education and empowerment features into mobile banking environments can help reduce this gap and support users in making more informed financial decisions.

Financial education & empowerment

Rise in personal finance managements tools, and there is a gap within Gen Z's financial literacy

Figure 19: Trendcluster 3

Customized & Modular Financial Ecosystems

According to a survey, 57% of consumers would link all their finances into a single mobile app if given the option. This is despite many financial institutions offering this feature on their mobile banking apps (MX Technologies, 2024). In line with this need, (financial) super apps have emerged as one of the most promising innovations in mobile banking (Kapron, 2025). These super apps, like WeChat, are single applications that integrates multiple services, such as messaging, e-commerce and financial transactions into one platform.

Focusing on Gen Z, this generation prefers convenience, speed and personalized recommendations (AFM, 2025). This generation seeks highly customized, intuitive solutions and are not inherently brand loyal. They remain brand agnostic until given a reason to commit (PWC, 2025). Regarding finances, Gen Z users select different platforms for specific financial needs. This reflects a growing trend toward a more customized financial ecosystem, where users collect a 'toolkit' of banking platforms that best meet their individual needs (Buitenhuis, 2025).

Customized & modular financial ecosystems

Consumers want all finances in a single mobile app, and Gen Z seeks highly customized solutions

Figure 20: Trendcluster 4

Investing & Major Saving Goals

In tension with the fact that Gen Z tends to focus more on fulfilling immediate needs than putting much thought into long-term savings, nearly half of this generation aspires to major saving goals (AFM, 2025). They do this by investing more frequently than other generations. So called "finfluencers", which are social media finance influencers, are becoming more popular and advice Gen Z'ers on stock investing, saving strategies, personal finance and cryptocurrency. Almost 40% of this generation rely on finfluencers for their information for investment decisions (Govindarajan et al., 2025). Cryptocurrency is popular within this age group.

Investing & major saving goals

Gen Z aspires to major saving goals and focuses on investing in stocks and cryptocurrency

Figure 21: Trendcluster 5

Digital Individualism & Identity Formation

Gen Z is growing up in a time of rising individualism (Santos et al., 2017). They spend considerable time alone and online, living in a digital world (AFM, 2025). They constantly share what they think, feel, do and compares themselves to the curated online lives of others. This behavior makes them an appropriate target audience for experimenting with customization in digital products. Additionally, Gen Z appears to be less privacy-conscious (AFM, 2025).

Digital individualism & identity formation

Gen Z is growing up in a time of rising indivualism and live in a digital world

Figure 22: Trendcluster 6

Flexible Work & Local Economic Behavior

Gen Z is more likely to work flexible or freelance jobs compared to older generations (AFM, 2025). In parallel, consumers are signaling the importance of buying local from their own markets (McKinsey, 2025). This is because over the past five year, we have seen disruptor consumer brands encroach on global, multinational brands.

Flexible work & local economic behavior

Gen Z is more likely to work freelance and consumers are buying more local products

Figure 23: Trendcluster 7

Voice Assistant

Voice AI gains ground as a preferred channel for resolving more complex customer issues (Zendesk, 2024). This suggests that conversational interfaces may play an increasingly significant role in future mobile banking interactions.

Voice assistant

Voice AI assistants are becoming more popular

Figure 24: Trendcluster 8

02

Key Takeaways

- Hyper-personalization strategies are currently system-driven, limiting user agency
- Malleable software is still underexplored, but technical research has already proven feasibility
- Insights from literature review, exploratory interviews, a report and trend analysis have been clustered and will be used in the next Chapter

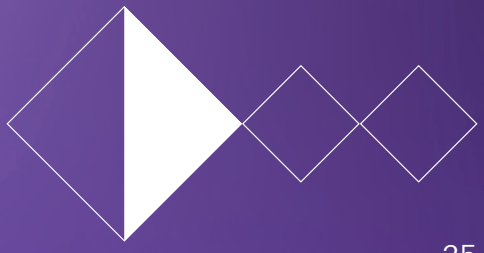
03

Defining Interaction Principles

This chapter focuses on defining the design task for this thesis. Building on the contextual insights obtained through the triangulation approach in the Discover phase, 21 interaction principles for integrating malleable software in digital products are synthesized. These interaction principles translate research insights into actionable design knowledge.

The synthesized interaction principles are subsequently clustered into thematic groups to structure and clarify their relevance. To determine their strategic importance, the resulting interaction principle themes are ranked during a prioritization session with D&DP's Advisory team and besides together with the Lead Customer Tech. The outcome of these sessions is a set of prioritized interaction principle themes.

From this prioritization, four interaction principle themes are selected and used as the foundation for the development of the design brief. This design brief defines the design assignment and serves as the starting point for the last phases of this design process.



3. Defining Interaction Principles

3.1 Translating Research Findings

In the define phase, following the Triple Diamond approach, insights from contextual research are being synthesized to define interaction design principles regarding malleable software. Since triangulation was used for contextual research, insights from different perspectives had to be brought together. This is done firstly by clustering insights from contextual research (Appendix D). Subsequently, 21 interaction principles cards have been developed to create illustrative explanations of certain interaction principles that emerged from clustering the contextual research insights.

The interaction principles cards can be used as a foundation for designing hyper-personalized digital products. However, it would not be feasible to test all 21 interaction principles in the last phases of this project. That is why the decision is made to combine the interaction principles cards into eight themes and rank them with employees to test most relevant interaction principle themes for D&DP, Accenture Song's clients and customer experience. A visualization of how interaction principle themes are defined from contextual research can be seen in Figure 25.

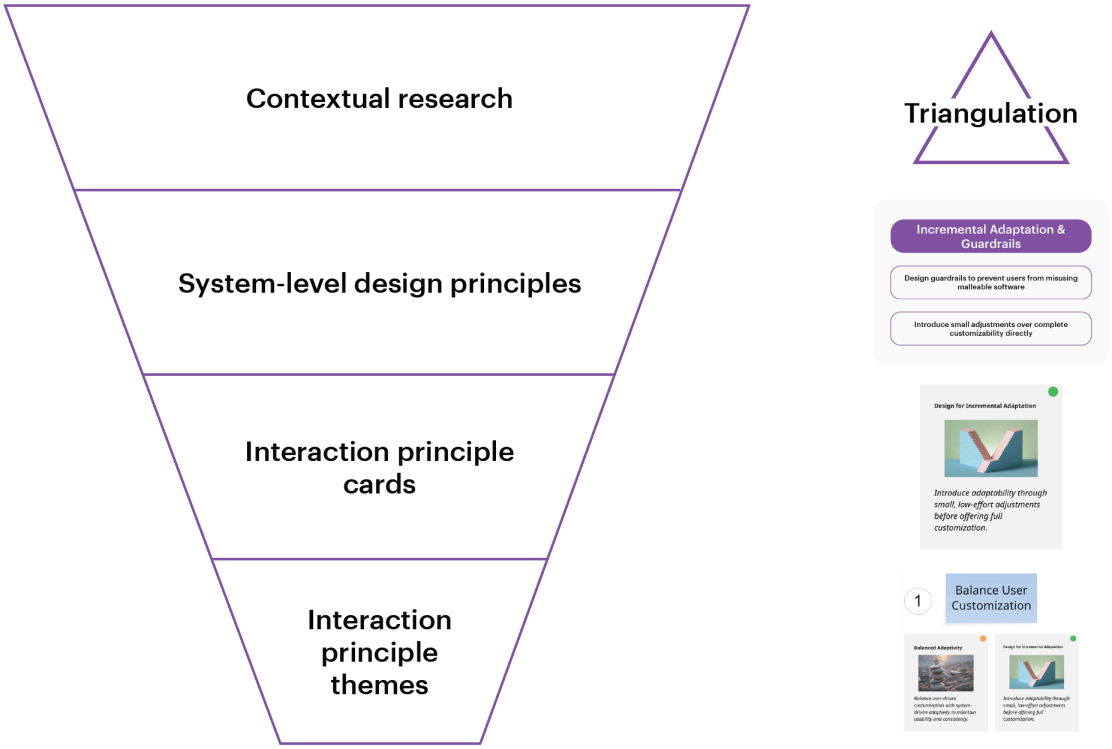


Figure 25: From contextual research to interaction principle themes

3.1.1 Interaction Principle Cards

All insights from contextual research are used as input for interaction principle cards. Firstly, system-level design principles were defined that concluded what designers should incorporate in UIs to successfully include malleable software according to literature, exploratory interviews and trends. Subsequently, these system-level design principles were clustered, because there was overlap between contextual research findings. These clusters are the basis for the interaction principle cards. The cards are used to make the clusters more tangible and expressive. To make these cards more tangible, a title, an illustration and a short explanation were added (Figure 26). All 21 interaction principle cards can be found in Appendix E.

Figure 26: Example of Interaction Principle Cards

3.1.2 Interaction Principle Themes

The interaction principle cards were clustered based on commonalities. First initial clusters were adjusted because the mapping session with the Customer Tech Lead demonstrated that the themes could be more detailed. The following themes were clustered:

Balance User Customization

User-driven customization should be carefully balanced with system-driven adaptivity to preserve usability and consistency. Rather than exposing complete customization directly, digital products should offer incremental adjustments, allowing users to build understanding over time.

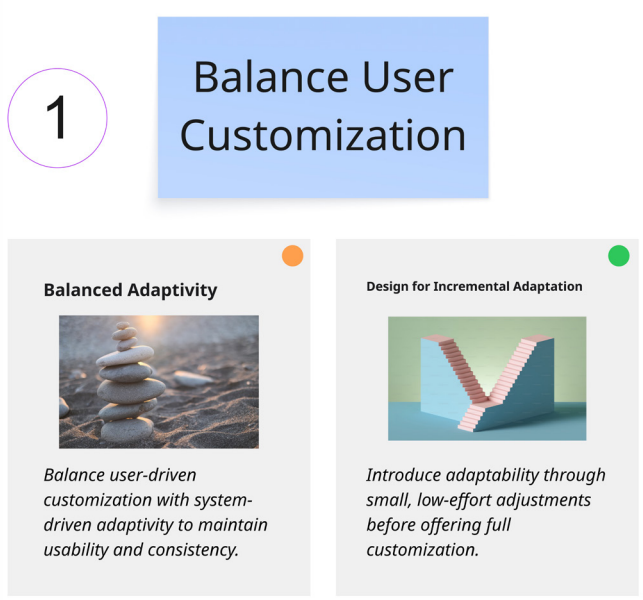


Figure 27: Balance user customization

Create Trust & Security

Trust is established by making system provenance explicit and enabling users to verify generated outcomes. Clear ethical and technical boundaries should be embedded in the back end to protect users from unintended outcomes or misusages of data. This is particularly important in sensitive industries such as finance.

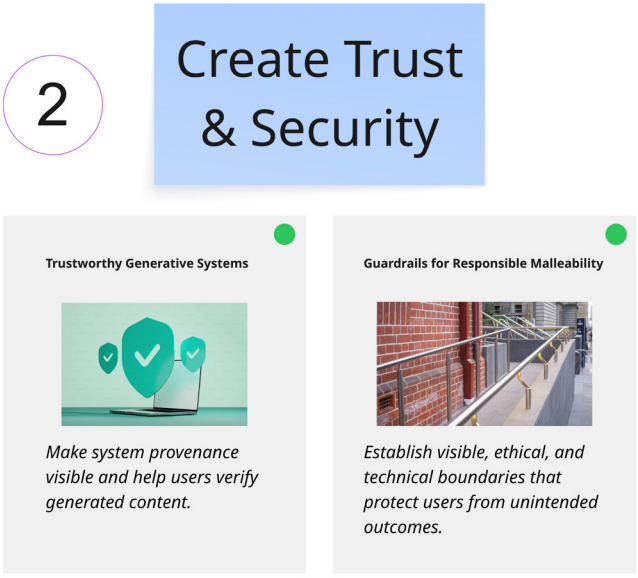


Figure 28: Create trust & security

Easy & Conversational Interaction

Effortless interaction is achieved by minimizing cognitive load while enabling meaningful customization. UIs should support both expressive and intuitive interaction through a combination of natural language, voice input and direct manipulation. Conversational interaction can lower access barriers and empower users with advanced functionality without requiring technical expertise.

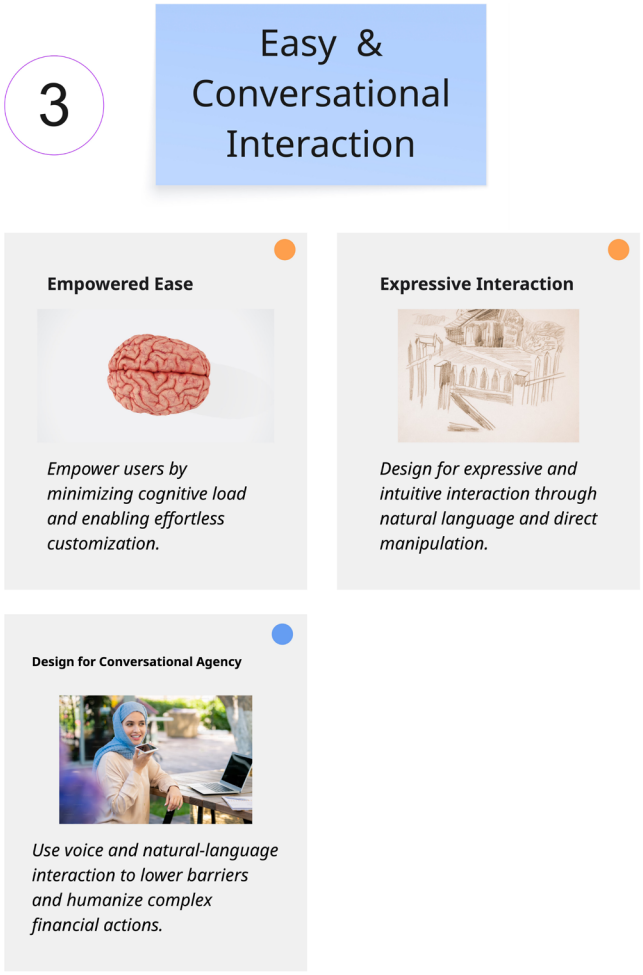


Figure 29: Easy & conversational interaction

Financial Wellbeing Gen Z

Financial wellbeing should be supported through the seamless integration of learning and financial literacy into everyday interactions. Goal-based design and visible progress tracking can encourage future-oriented behaviors, while emotionally intelligent digital companions can anticipate needs, guide users with empathy. Effective financial systems should address both the emotional and rational dimensions of financial decision-making and remain responsive to fluctuating income streams and evolving life patterns typical of Gen Z.

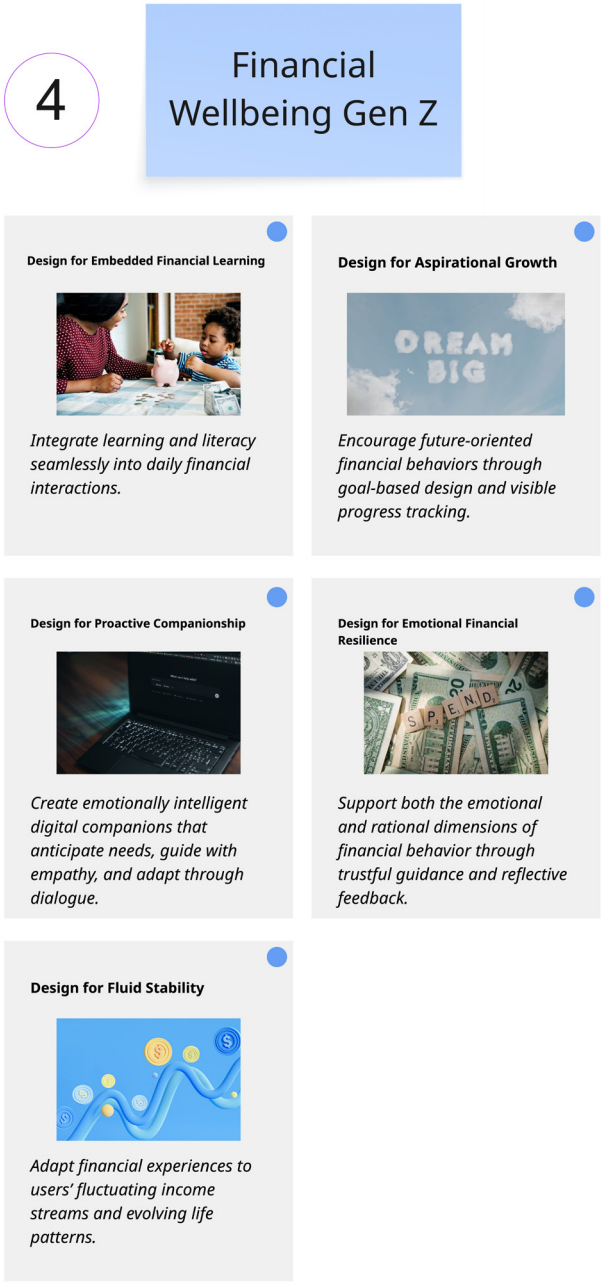


Figure 30: Financial wellbeing Gen Z

Digital Community Engagement

Community-driven engagement enables pluralistic customization by allowing users to learn from and build upon other's designs and customizations. By supporting transparent and socially resonant customization, digital financial tools can help users express and shape their financial identity.

Figure 31: Digital community engagement

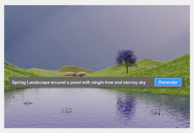
Navigation in Interface

AUIs should sense contextual signals, anticipate user intent and dynamically surface relevant UI elements at appropriate moments. A balance between traditional navigation patterns and natural language interaction in required to maintain usability and control. At the same time, systems should encourage exploration by exposing their capabilities and boundaries through contextual guidance and a sense of discovery.

6

Navigation in Interface

Design for Ambient & Contextual Intelligence



Enable systems to sense context, anticipate intent, and dynamically render interface elements at opportune moments.

Design for Hybrid Interaction

Balance traditional interface elements with natural language interactions to maintain usability and control.

Design for Navigable Ambiguity

Help users explore open-ended possibilities by exposing system boundaries, offering contextual guidance, and maintaining a sense of discovery.

Figure 32: Navigation in interface

App-Agnostic Customizability

Users should be empowered to assemble and tailor modular financial tools into coherent, adaptive ecosystems that extend beyond individual applications. Portability of data and features across individual applications enables customization at the ecosystem level.

7

App-Agnostic Customizability

Design for Modular Autonomy

Empower users to assemble, tailor, and interconnect modular financial tools into coherent, adaptive ecosystems.

Design for App-Agnostic Customizability

Enable customization beyond individual applications by making features and data portable across ecosystems.

Figure 33: App-agnostic customizability

Framework Integration & Economic Feasibility

Adaptive financial products should be architected to integrate fluidly across emerging AI protocols and LLMs. These systems must be locally grounded through data local-first principles and designed with long-term economic feasibility in mind.

8

Framework Integration & Economic Feasibility

Design for Seamless Framework Integration

Architect products to integrate fluidly across AI protocols and intent-based ecosystems.

Sustainable Foundations

Design adaptive systems that are locally grounded (data local-first) and economically feasible over time.

Figure 34: Framework integration & economic feasibility

3.1.3 Ranking Session

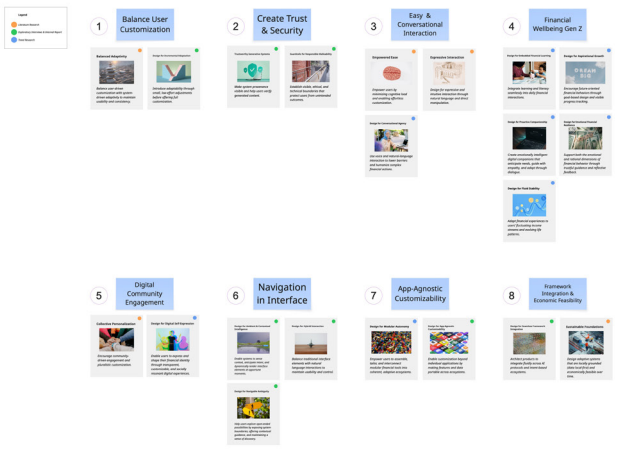
Firstly, in a session with D&DP's Customer Tech Lead, the interaction principles cards were mapped on strategic relevance for D&DP from a technical standpoint. This session was used to identify which of the principles should be requirements for the last phases of this design project and to test if principles were overlapping. According to this session, the initial clustered themes had to be refined, because the clusters could be more specific by restructuring. Additionally, a few of the interaction principles cards were appointed as requirements for in the design brief. These are the following interaction principles:

- *Prototypes should be integrated across AI protocols and the App Intents protocol*
- *Guardrails in the design are necessary to prevent users from misusing malleable software*
- *Local-first architecture to enhance privacy and grant ownership for end-users*

After restructuring the interaction principle themes, a mapping session with D&DP's Advisory Team was hosted to prioritize all interaction principles teams according to strategic relevance for D&DP, Accenture Song's clients and customer experience (Figure 35). In this session, 7 participants had to map the interaction principle themes on the matrix with the on the x-axis relevance for D&DP practice, and on the y-axis relevance for Accenture Song's clients and customer experience.

The results were analyzed by plotting all interaction principle themes that were plotted in the 'strategic priorities' box (top-right). The themes were ranked in the following order:

1. *Easy & Conversational Interaction*
2. *Balance User Customization*
3. *Financial Wellbeing Gen Z*
4. *Navigation in Interface*
5. *App-Agnostic Customizability*
6. *Framework Integration & Economic Feasibility*
7. *Digital Community Engagement*
8. *Create Trust & Security*



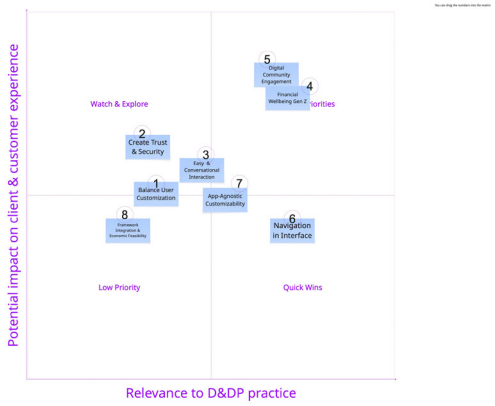


Figure 35: Ranking Interaction Principle Themes with D&DP's Advisory Team

3.2 Design Brief

To build a strong foundation for the last two phases of this design project and create a connection with the synthesis of all research findings during the first phase, a design brief was developed. This design brief is a one-pager explaining the context, objectives, scope, deliverable, success criteria and requirements of this design project (Figure 36).

Based on the ranking of the interaction principles, the second phase of the project will focus on exploring how the themes Easy & Conversational Interaction, Balance User Customization, Financial Wellbeing Gen Z and Navigation in Interface should be integrated in mobile banking UIs to incorporate malleable software principles.

Design Brief

Context & Background

*Contextual research (literature review, exploratory interviews, internal report analysis, and trend analysis) was conducted to explore the **current** and **future state** of **hyper-personalization** in **digital products**. The resulting insights were synthesized into **21 interaction principle cards**, grouped into **8 themes** that form the foundation for the last phases of this research.*

Objectives & Goals

- ***Generate design knowledge** by testing artifacts (prototypes) with end-users*
- *Identify **user needs** for customization in a mobile banking UI*
- *Develop **prototypes** of mobile banking UIs leveraging malleable software*
- *Translate generated knowledge into a **strategy** for Accenture Song to implement malleable software in digital products*

Interaction Principles

*The interaction principle themes were ranked by **strategic relevance** for Accenture Song during a mapping session with D&DP's advisory team. The 4 most relevant themes for D&DP, Accenture Song's clients, and customer experience are **Easy & Conversational Interaction**, **Balance User Customization**, **Financial Wellbeing Gen Z**, and **Navigation in Interface**. These themes will guide prototype testing in the next phase of this research.*

Deliverables

- ***Mobile banking UI prototype** with malleable software*
- ***Intervention framework** for designing hyper-personalized digital products*
- ***Strategy** for implementing malleable software in digital products*

Success Criteria

- *The outcome **contributes** to Accenture Song's **financial clients***
- *The outcome **demonstrates** how malleable software can **create value** in digital products*
- *The outcome creates **user-centered impact***
- *UI design framework is **technically possible** to develop*

Design Challenge

*How can Accenture Song apply **malleable software principles** to design **adaptive, user-centric digital financial products**?*

Scope

Use Case: **Mobile Banking**

This research explores malleable software in mobile banking UIs as a high-frequency, high-impact use case for adaptive digital products. The goal is to identify best practices that inform Accenture Song's financial clients and can be applied across other domains.

Target Group: **Generation Z** (people born between 1996 - 2010)

The study targets Gen Z, a generation of digital natives who value personalization and customization in digital products. Additionally, attracting Gen Z is a key priority for traditional banks in the Netherlands. Focusing on this group enables the creation of tailored guidelines for malleable software aligned with their needs and behaviors.

Requirements

- *Concepts should be integrated across **AI protocols** and the **App Intents protocol***
- ***Guardrails** in the design are necessary to prevent users from **misusing** malleable software*
- ***Local-first architecture** to enhance privacy and grant ownership for end-users*

Constraints & Considerations

- *Since malleable software technology is not yet fully developed, prototype-based experiments will be used to creatively simulate real interactions with such systems*
- *Including other interaction principles to improve design outcome*

Figure 36: Design Brief

03

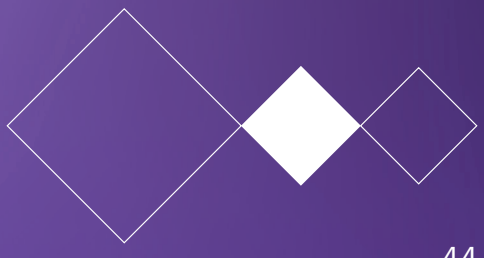
Key Takeaways

- Contextual research is translated into 21 interaction principle cards for designing hyper-personalized digital products using malleable software
- These interaction principle cards are clustered into 8 interaction principle themes
- In collaboration with D&DP's Advisory team the themes are ranked in a mapping session to identify the four most relevant interaction principle themes
- A design brief is developed based on all insights gathered in the first phase

04

Generative Research

This chapter outlines the phase in which user needs of Gen Z in digital financial products are uncovered through generative research methods. It begins with a market analysis of customization features in mobile banking products to establish a reference for current practices. Initial ideation explores the application of malleable software principles through low-fidelity UI sketches. A generative research approach, including synthetic user interviews, a financial diary study and low-fidelity prototype testing, is then used to uncover latent financial needs of Gen Z users. The design knowledge generated through this research forms the basis for a comprehensive list of requirements, which is essential for developing a prototype suitable for Accenture Song.



4. Generative Research

The ideation phase and market analysis formed the basis for the generative research. To quickly explore Gen Z's explicit financial needs and pain points, synthetic user interviews were conducted. Synthetic users are AI-generated profiles that simulate a target group by synthesizing existing data, allowing for rapid, high-level insights without involving real users (Moran & Rosala, 2025). As synthetic users cannot replace empirical research, these interviews were used primarily to formulate hypotheses for further exploration and low-fidelity prototyping.

To gain a deeper understanding of Gen Z's daily financial behavior, a mixed-method qualitative research approach was applied, based on the framework by Sanders and Stappers (2012) (Figure 37). This approach combines methods to uncover explicit, observable, tacit and latent knowledge. Explicit insights were derived from synthetic user interviews and trend analysis. Observable behavior was studied through a market analysis of customization features in existing digital financial tools and through a financial diary study with five Gen Z participants. In this study, participants documented their financial activities, providing insights into how digital financial tools are used in practice, while also capturing reflections on experiences and emotions.

Findings from these activities were translated into low-fidelity UI prototypes in the form of black-and-white screen sketches. These open-ended prototypes were tested with Gen Z participants to uncover tacit and latent needs related to user customization in digital financial products. This step was essential, as malleable software is still relatively unfamiliar within digital finance and requires exploration beyond stated user needs.

Finally, a co-creation session was facilitated with nine D&DP employees. Working in three groups, participants developed prototypes using Lovable, a prompt-based AI UI builder, each focusing on a different interaction principle. A follow-up reflection session enabled further iteration and feedback, demonstrating how malleable software tools can support rapid prototyping and concept development.

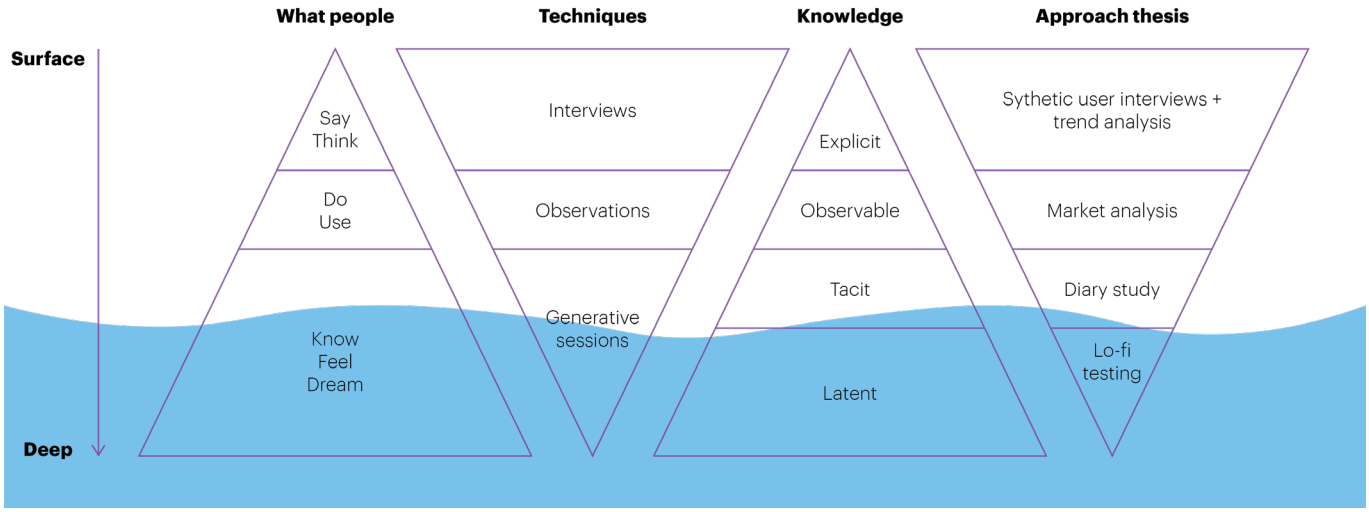


Figure 37: Methods that study what people Say, Do, and Make help access different levels of knowledge (Sanders & Stappers, 2012)

4.1 Exploring and Ideating

As the starting point of this phase, additional exploration of user customization in mobile banking applications was conducted. This analysis helped to further contextualize mobile banking as a relevant use case. Subsequently, ideation activities were carried out, including general sketching, UI sketching and storyboard creation. These activities made potential design directions more tangible and supported the exploration of how malleable software principles could be integrated into digital financial products.

4.1.1 Market Analysis

Mobile banking applications from Revolut, bunq and ABN AMRO were analyzed to assess the current state of user customization in mobile banking (Appendix F.1). Revolut and bunq emerged as frontrunners, offering comparatively advanced customization capabilities. The ABN AMRO app provides limited customization, allowing users to add an additional account widget, which is an element of an UI, to the main screen and view a categorized overview of income and expenses. However, these expense categories are often inaccurate. For example, while researching, the app incorrectly flagged a Podimo subscription as a fixed cost, whereas only a single Tikkie payment was made with the description “Podimo”.

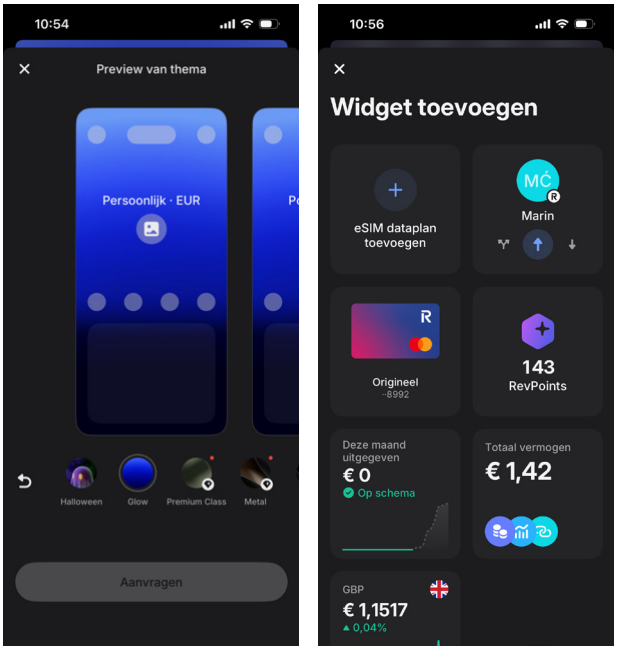


Figure 38: User customization in Revolut app

Revolut enables users to customize the app theme, add, remove and rearrange pre-made home screen widgets, and adjust the number of recent transactions displayed (Figure 38). bunq offers the highest degree of personalization by allowing users to create multiple personalized sub-accounts with unique IBANs (Figure 39). Customers can create savings accounts for specific goals while customizing icons and colors. Additionally, bunq supports the creation of fully custom budget plans within the app.

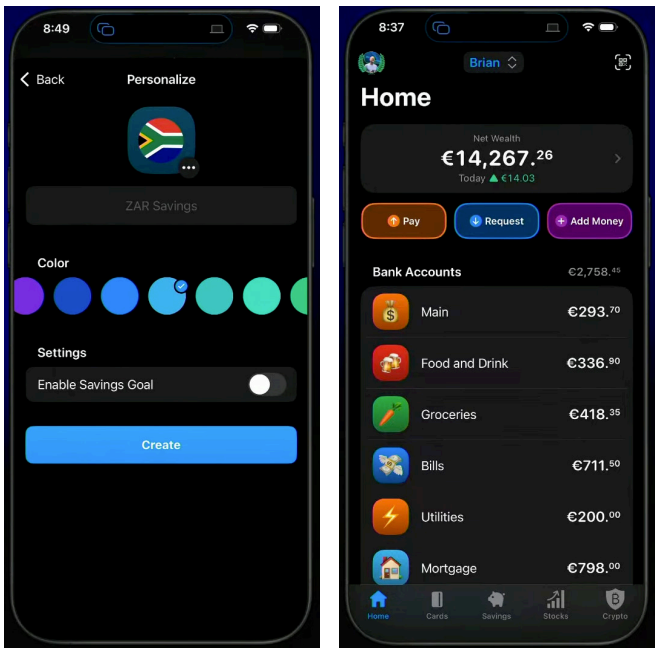


Figure 39: User customization in bunq app

4.1.2 Ideation

After exploring the current state of user customization in mobile banking applications, ideation focus on how financial UIs incorporating malleable software principles could be designed. This process began with exploratory sketches outlining initial ideas for enhanced customizability and defining associated user interactions. Two core interaction directions emerged from these sketches: modular UI components that users can rearrange and resize, and continuous AI assistance in providing customization possibilities and systemic guardrails.

These early sketches were iterated into low-fidelity UI frames using only black to maintain focus on structure and interaction logic rather than visual styling. The low-fidelity frames clarified key design decisions, such as the placement of customization triggers, the hierarchy between static and malleable elements and the balance between user control and system guidance.

In addition, storyboards were developed to explore and communicate potential interaction flows for the first low-fidelity prototype (Appendix F.2). These storyboards mapped how a user transitions from a default banking dashboard to a personalized configuration, including moments of AI suggestions, manual adjustment and confirmation. This made explicit how malleability unfolds over time rather than functioning as a single customization action.

This ideation phase marked the first translation of research insights into tangible UI concepts. Importantly, it revealed an initial design tension between flexibility and cognitive load: increasing malleability required clear scaffolding mechanisms to prevent user overwhelm. Subsection 4.4 further elaborates on how these insights informed the development and refinement of the subsequent low-fidelity prototypes.

4.2 Synthetic User Interviews

Seven synthetic users representing different profiles within Gen Z were created using Gemini 3.0, which is an LLM (Figure 40). These synthetic users were interviewed in Gemini, which answered questions based on large amounts of data about Gen Z'ers. An interview guide was developed to conduct structured interviews with each user (Appendix G.1). Gemini generated responses for all interview questions across the seven users, which were subsequently analyzed across six categories: introduction, daily behavior & routines, social context, expenses, worries & challenges and experiences with financial tools.

The analysis, which can be seen in Appendix G.2, revealed the following hypothetical insights. While Gen Z acknowledges the importance of well-organized finances, this generation is unwilling to accept the cognitive load associated with manual administration and boring interfaces. An ideal financial tool for Gen Z should offer a high degree of personalization, automate administrative tasks, act as a proactive financial coach, stimulate positive behavior change through feedback and gamification, and integrate banking, saving, investing and shares financial tools into one platform. Major concerns among Gen Z include the ability to purchase a home and repay debts. Key pain points relate to unexpected expenses, instant gratification, managing multiple subscriptions and handling shared costs with friends or roommates. These hypothetical insights are used to develop low-fidelity prototypes and are tested with Gen Z'ers. The results of this low-fidelity user testing research will be covered in Subsection 4.4.

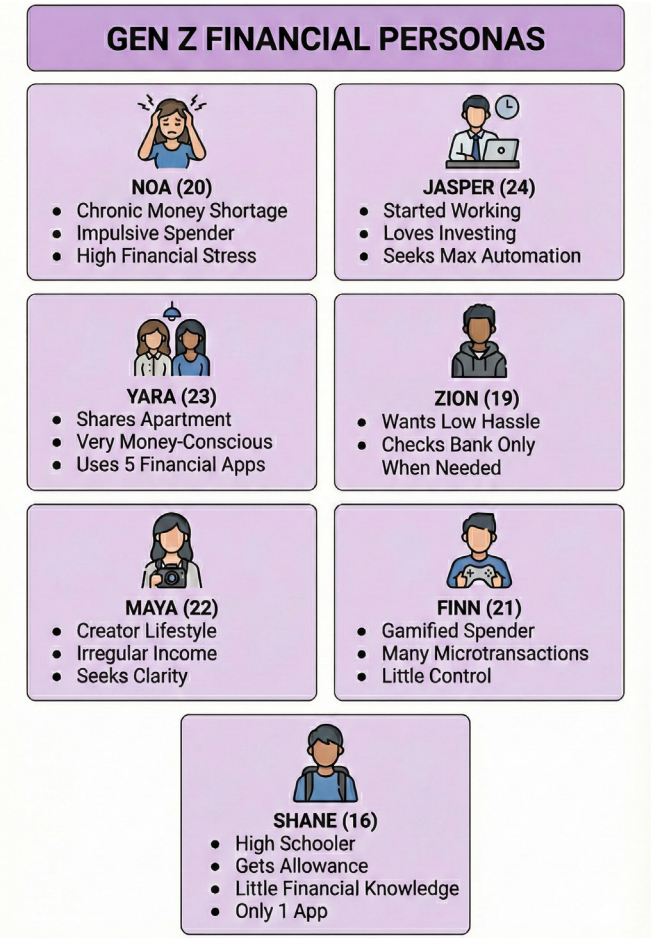


Figure 40: Synthetic personas (visualized with Gemini)

4.3 Diary Study

In a diary study, participants log daily activities as they occur to give contextual insights about real-time user behaviors and needs (Flaherty, 2024). For this research, a diary study was conducted to gain insight into the behaviors and needs of Gen Z related to finances (Figure 41) (Appendix H). Five Gen Z participants documented their financial activities over a five-day period, including interactions with mobile banking apps, saving tools, personal finance management and splitter apps, and investment platforms. Participants recorded the emotions experienced when opening financial apps, the context and purpose of each interaction and any desired changes or customization options within these tools. Additionally, participants were asked to share non-financial apps with UIs they appreciated and to explain which elements they would like to have in their financial apps.

The study revealed several key needs: the integration of multiple financial platforms into a single app; improved and adjustable expense categorization; a preference for simple UIs with minimal buttons; a consolidated overview of total wealth and investment portfolios; and enhanced search functionality with an assistant finishing search queries. Participants specifically valued the calculator functionality in the splitter app WieBetaaltWat, the adaptive UI of the Apple weather app and the gamification elements in the Duolingo app. The financial platforms used by participants included mobile banking apps such as ABN AMRO and Rabobank, stock and cryptocurrency apps and sharing costs apps including Tikkie and WieBetaaltWat.

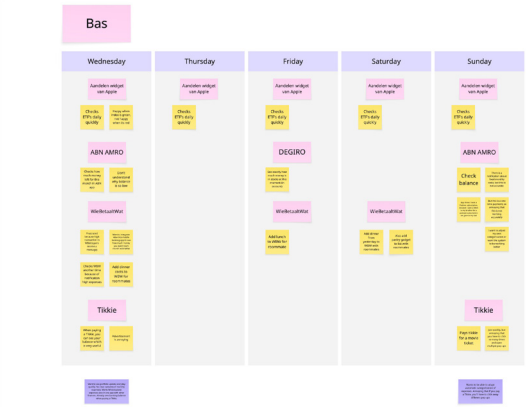


Figure 41: Financial diary of 1 participant

4.4 Low-Fidelity Prototype Testing

A first low-fidelity interface prototype was developed to quickly identify latent user needs and collect user feedback (Appendix I.1). To test this first prototype with users, a testing plan was created (Appendix I.2). This plan was used during testing to identify latent user needs and collect suggestions from participants. The first prototype was tested with three Gen Z participants to gather feedback for iteration (Appendix I.3). Prior to developing a revised prototype, annotated prototypes were created collaboratively with another Strategic Product Design students (Appendix I.4). This process helped identify design shortcomings, such as unclear icons and difficult button placement. Based on insights from the first user tests and annotated prototypes, an improved low-fidelity prototype was sketched and subsequently tested with six Gen Z participants following the testing plan (Appendix I.5). The set-up of this test can be seen in Figure 42. Findings from these sessions were mapped against the four interaction principles (Appendix I.6).

Figure 42: Low-fidelity prototype testing round 2

Results

Balance user customization

Participants emphasized the need for greater transparency regarding the AI assistant, including clear explanations of its role and capabilities, as finances are perceived as a sensitive topic. Several participants indicated they did not want the AI assistant continuously visible on the home screen and requested an option to toggle assistance on or off. In the first prototype, the role of the AI assistant during customization was unclear, indicating a need for improved interaction design in the final concept. Most participants preferred manually adding and positioning widgets rather than relying on natural language prompts, as this provided a stronger sense of control and involvement in customization.

Easy & conversational interaction

Participants expressed a desire to explicitly accept or decline AI-generated suggestions during customization to improve efficiency and trust. Search functionality was frequently used to find transactions and participants suggested that an AI assistant could help complete search queries based on historical transactions. Many participants were initially unaware of the customization possibilities enable by malleable software and requested more guidance, such as example UI configurations, to provide inspiration. A minor but relevant usability improvement was the addition of a button to manually end voice input. Overall, a key insight was the value of an interactive chat function capable of answering diverse questions and providing detailed financial insights on demand.

Navigation in interface

The presence of both a question icon in the tab bar and an 'ask me' button caused confusion among participants. Some users indicated a preference to customize the app at a later moment, highlighting the importance of making customization options easily discoverable within the settings, supported by clear explanations. Widgets were perceived as an effective and intuitive way to demonstrate the potential of malleable software, as users could easily add and adjust them. However, the introduction of the customization feature lacked clarity; participants suggested replacing the dismissible pop-up with a full-screen explanation when opening the app with this new functionality. Additional shortcut buttons, like a direct transfer option, were also desired by participants.

Financial wellbeing Gen Z

Participants valued quick insights through budgeting overviews and suggested budget widgets indicating spending progress within a given month. Insight into cash flow was considered particularly important, especially around monthly income moments such as salary and student loan payments. Accurate and adjustable expense categorization was repeatedly emphasized, with a preference for granular categories that users can modify. One participant suggested integrating a calculator function similar to that of the WieBetaaltWat app to quickly sum transactions. For the home screen, most participants preferred a consolidated overview of all accounts, including savings, debit and external investment portfolio balance if possible. One participant expressed a desire to hide savings balances to reduce impulsive spending. Finally, participants highlighted the importance of personalized notifications, such as alerts when spending exceeds predefined budget thresholds.

4.5 List of Requirements

To combine all input from synthetic user interviews, the diary study, low-fidelity prototype testing and co-creation, a list of requirements was developed (Delft Design Guide, 2013). This list of requirements forms the foundational checklist for the prototype development.

Interaction principle	Needs	Wishes
Navigation in interface	1. The product must provide an onboarding flow that explains a) Which UI elements can be customized b) What the AI assistant can do 2. Users must be able to create, edit and delete shortcuts (e.g. direct payment) 3. Information about UI customization must be accessible via settings	15. The UI must be simplified with not too many buttons 16. Visual examples must be provided of what users can change
Balance user customization	4. Users must be able to enable or disable the AI assistant at any time 5. Users must be able to configure notification preferences 6. Users must be able to correct or override automated expense categorization 7. The system must adapt initial configuration based on responses to an onboarding questionnaire 8. The product must use basic contextual data (time and location) to influence system behavior	17. There should be as little user administration necessary 18. The tool should have adaptive contextual UI elements
Easy & conversational interaction	9. The AI assistant must support completing search queries 10. The product must support both text-based chat and voice input 11. Users must be able to explicitly accept or reject AI suggestions 12. Users must be able to manually stop or finish an active voice interaction	19. Chat should provide financial insights if users ask
Financial wellbeing Gen Z	13. The product must display a consolidated financial overview 14. The product must integrate at least one external financial account or tool	20. Provide categorization in savings pockets 21. Add intervention notifications (should you buy this?) 22. Option to make a financial planning 23. Product should help users with advanced budgeting 24. Add a calculator function 25. Include gamification functionalities with positive feedback 26. Pro-actively coaching users 27. The product must support a pay-and-split functionality between at least two users

Table 2: List of requirements final prototype

04

Key Takeaways

- A market analysis uncovered how (neo)banks are currently offering customization in financial apps
- Synthetic user interviews surfaced explicit financial behavior of Gen Z
- A diary study surfaced observable knowledge on Gen Z's financial behavior
- Low-fidelity prototype testing uncovered latent Gen Z needs in hyper-personalized financial products
- A list of requirements is developed, based on findings, to assess for the final prototype

05

Designing Prototypes

Building on this foundation, a co-creation session is facilitated with nine participants from different D&DP sub-teams. Working in three teams, participants developed prototypes for digital financial products that integrate malleable software principles. The AI tool Lovable is used to create interactive prototypes within one hour, after which teams were given two weeks to further iterate before a final demonstration and reflection session.

The resulting three prototypes are refined in line with the established requirements and enhanced malleable software integration. The most promising prototype is selected using a weighted criteria method and further developed using Lovable. To demonstrate its malleable potential, three Gen Z personas are applied, each representing a customized version of the same final prototype.

5. Designing Prototypes

5.1 Mid-Fidelity Prototyping

Based on insights from user testing with the low-fidelity prototypes, the designs were iterated into a mid-fidelity prototype. This prototype was developed in Figma and is presented in Appendix J. Only basic interactions were implemented, as the primary purpose of the mid-fidelity prototype was to translate testing insights into more detailed interface designs rather than to fully validate interaction flows. Due to the limited time scope of this thesis, the mid-fidelity prototype was not extensively tested and mainly served as inspiration for the final concept designs and prototyping of the best concept. The final prototypes were subsequently tested to collect more detailed insights and inform final iterations.

5.2 Co-Creation & Reflection Sessions

Co-creation

A co-creation session in the form of a hackathon was facilitated with nine D&DP employees representing different roles (Table 3). The session followed a structured format consisting of an introduction, ideation, concept development, prompt engineering, prototyping with Lovable and initial demonstrations (Figure 43). The setup of the session is shown in Figure 44. A shared Miro board was used to guide participants through the process and support collaboration (Appendix K.1).

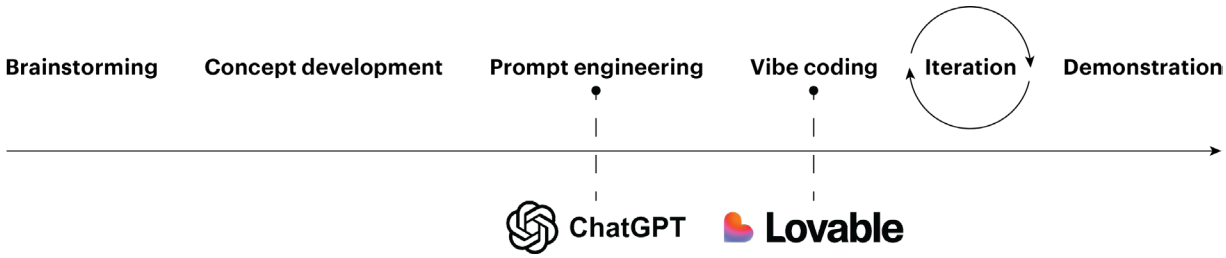


Figure 43: Process hackathon

Figure 44: Co-creation session

Participant	Role	Experience at Song (years)
P5	Lead D&DP NL	18
P7	Experience Transformation Manager	8
P8	Senior Creative Front-end Developer	5
P9	Product Management Specialist	4
P10	Growth Strategy Analyst	4
P11	Growth Strategy Analyst	3,5
P12	Growth Strategy Analyst	2,5
P13	Growth Strategy Analyst	0,5
P14	Thesis Intern	0,5

Table 3: Sampling of participants co-creation

During the introduction, the design challenge was framed around the tension between system-driven personalization and user-driven customization in digital financial products. Participants were asked to design a financial tool for Gen Z, assuming all technologies to be feasible. The interaction principles were explained, and a persona was introduced based on prior research into Gen Z's financial needs, with a focus on financial wellbeing (Appendix K.2). The AI-based UI builder Lovable was then introduced and demonstrated.

Participants were divided into three teams, each assigned to one interaction principle theme: balance user customization, easy & conversational interaction and navigation in interface. Using Lovable, teams developed prototypes through natural language prompting and iterative refinement, supported by LLMs such as ChatGPT. In Appendix K.4, more details on specific prompts and outcomes of the hackathon can be seen.

The first prototypes demonstrated clear conceptual differences, as each team explored its interaction principle independently. The team focusing on balance user customization developed a customizable integration of multiple financial tools. The navigation in interface team created a financial health tracker that structured financial information through clear navigation. The easy and conversational interaction team developed a socially oriented Gen Z solution focused on saving and expense splitting.

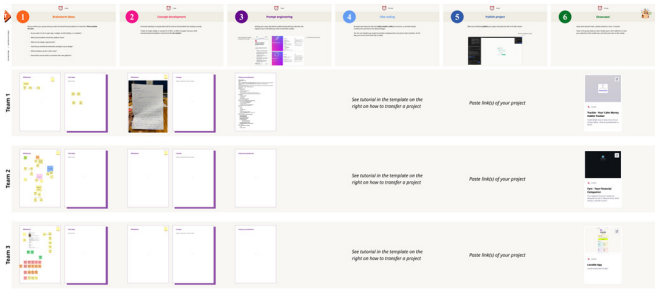


Figure 45: Miro board co-creation session (Appendix K.1)

Reflection

Two weeks after the hackathon, a follow-up reflection session was facilitated to allow further iteration and to evaluate both the prototypes and the use of Lovable as a malleable software tool. During iteration, teams mainly focused on adding missing or non-functional features and improving layout and visual design, such as color usage and screen hierarchy. Screenshots of the three prototypes in Lovable can be seen in Appendix K.4. The next Subsection will elaborate on the three final prototypes.

The reflection provided insights into how the tool supported the design workflow, how participants envision incorporating similar tools into future design projects and which limitations were encountered during use.

Participants highlighted that Lovable is particularly valuable for rapidly translating ideas into tangible prototypes, making it an effective addition to ideation sessions that traditionally rely on whiteboards or paper sketches. Several employees noted its potential for use in proposals where interactive prototypes can help communicate and substantiate Accenture Song's design and delivery capabilities. In addition, participants emphasized the value of such tools for rapid validation, enabling early testing and iteration of concepts.

At the same time, participants identified several limitations. Collaboration across multiple

devices was experienced as unpractical. Also, some functionalities were lost during iterative development and the tool tended to generate generic outputs when prompts lacked specificity. Furthermore, not all UI elements were immediately interactive. These reflections provided valuable input on both the opportunities and constraints of integrating malleable, AI-driven development tools into D&DP's design process and in co-creation sessions.

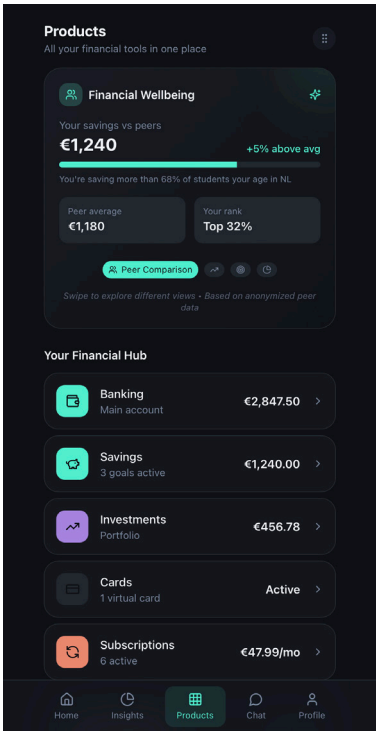


Figure 46: One of the co-creation outcomes

5.3 Prototype Posters

The three prototypes developed during the co-creation session with Lovable form the basis for the final prototype posters presented in this chapter. After the co-creation session, the participating teams were given two additional weeks to iterate on their prototypes, allowing for further refinement and elaboration.

To systemically understand the differences and overlaps between the prototypes, all functionalities resulting from the co-creation session were analyzed and positioned next to each other in Miro. This comparative overview made it possible to understand how each prototype operated, which malleable software principles were applied, and where functional gaps or overlaps existed. Based on these insights, three concept posters were created to clearly communicate the different conceptual directions.

Using the outcomes of the co-creation session as a foundation, the prototypes were further developed into three final prototype posters. In this step, additional malleable software principles were deliberately integrated to better align the prototypes with the objective of the design brief. The previously defined list of requirements is used as a guiding framework to ensure that all requirements and identified user needs were incorporated. An analysis of the co-creation outcomes, including identified improvement areas, is presented in Appendix L and informed the refinement of the final prototypes.

Prototype 1: Fynt

The first concept, Fynt, is an acronym for "For Your Next Trip" and is designed to support users in saving for long-term goals, like travelling. Insights from the trend analysis indicated that Gen Z users express a strong desire to save for long-term goals, while simultaneously experiencing difficulty in consistently saving money instead of spending it immediately.

Fynt supports this behavior by tracking financial growth through the integration of all financial platforms used by the user. The application visualizes spending trends on a weekly basis and contextualizes individual progress by comparing the user's financial behavior with peers from the same generation. This comparative feedback is intended to increase awareness and motivation.

Personalization is introduced through an onboarding questionnaire that captures individual user needs and preferences, which is used to tailor the UI. An AI-driven financial companion supports users by answering queries and providing insights directly within a chat function. The way this companion communicates and supports the user is adapted based on the onboarding results. Users can further customize the tool by selecting which financial platforms are integrated and by interacting with the AI-driven companion to adjust insights and support.

Prototype 2: Trackie

The second concept, Trackie, is a context-aware financial health tracker that adapts its behavior based on the user's situation. The application interprets contextual factors such as location and time to understand the user's daily routines and financial behavior. Trackie is designed as a cross-device experience, functioning not only as smartphone application but also as an adaptive widget for smartwatches and AR glasses.

Throughout the day, Trackie monitors the user's financial balance and provides nudges that are tailored to the current context. For example, when a user is at work and frequently spending money on lunch or coffee, the application or widget sends a nudge to raise awareness of increased spending. In addition, the tool provides a daily expense score to summarize financial behavior.

Customization is enabled through an onboarding questionnaire that identifies latent user needs. Users can adjust the nudging strategy within the application and define personalized boundaries, allowing them to control how and when the system intervenes. This adaptability enables Trackie to align with different financial attitudes and lifestyles.

Prototype 3: Spltr

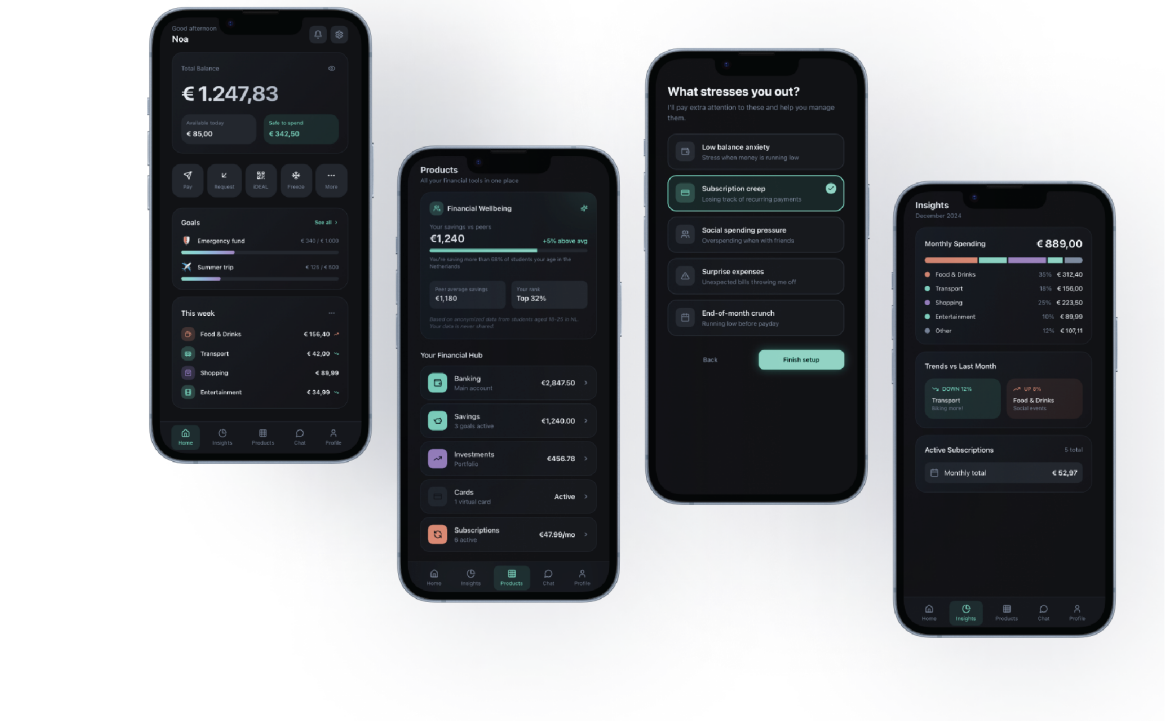
The third concept, Spltr, is a customizable application that supports users in splitting costs and managing budgets. The core functionality enables users to split expenses easily by adding or scanning receipts and selecting other people from contacts or suggested lists. Once a receipt is scanned or uploaded, the application automatically categorizes the expense.

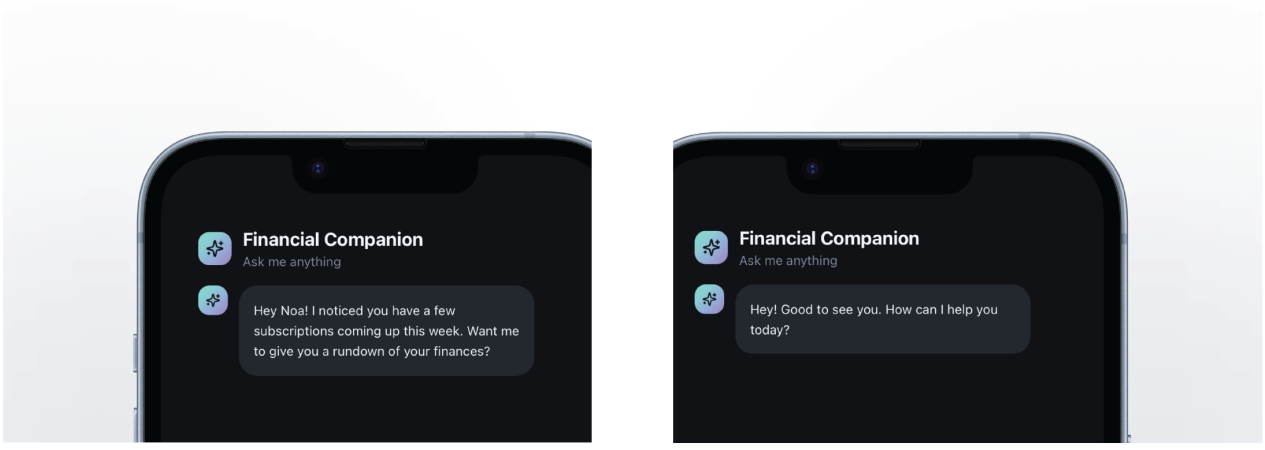
Payments can be completed through multiple methods, including direct payment links, QR code scanning or NFC by tapping phones. In addition to cost splitting, Spltr offers tailored saving pockets (spaarpotjes) that allow users to categorize both savings and expenses. The application automatically reallocates money between saving pockets when users change saving goals or decide to make purchases.

An AI-driven financial companion supports users in budgeting decisions. For example, users can ask whether they can afford a specific purchase, such as shoes, after which the assistant can transfer funds to the appropriate saving pocket if desired. Similarly, when paying for expenses like dining out, the assistant automatically deducts the amount from the corresponding saving pocket. This functionality integrates budgeting, spending and saving into a single adaptive system.

Fynt

Fynt is an acronym for “For Your Next Trip”. This app helps users towards financial growth, and thus saving for your next trip.



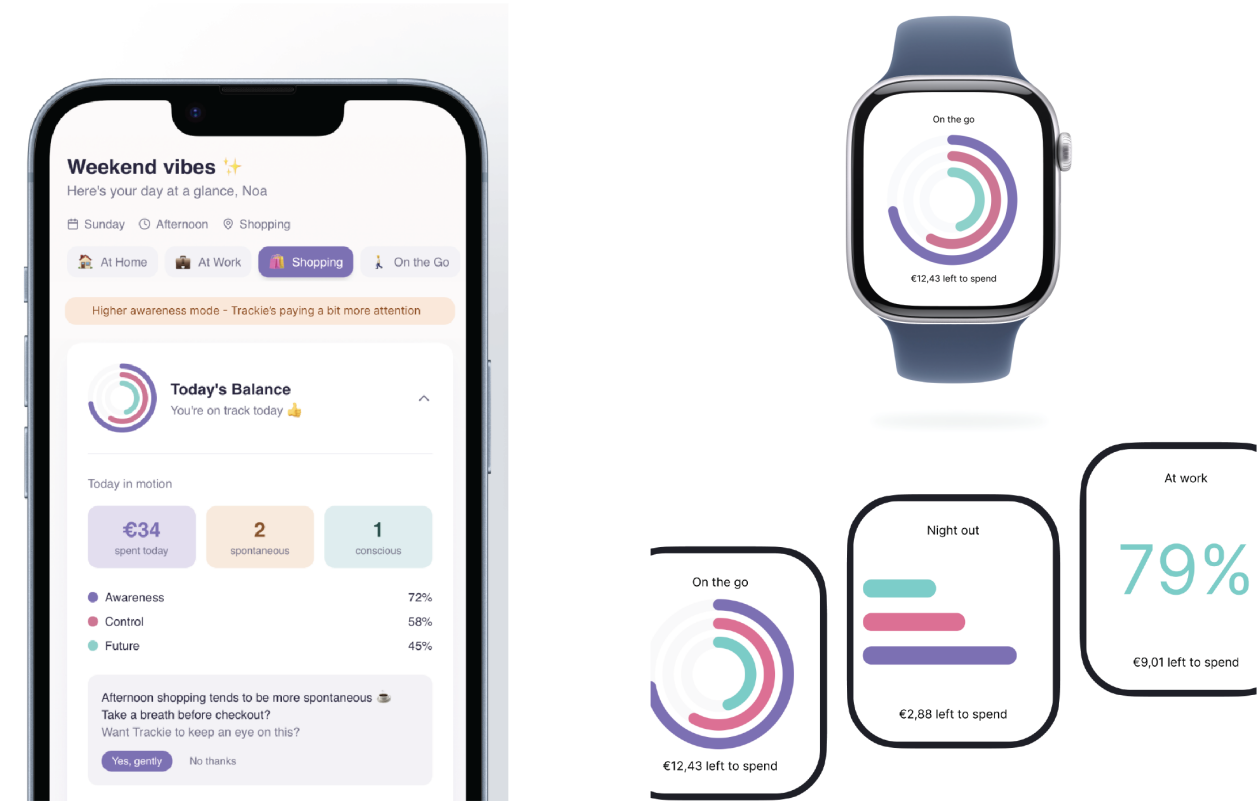


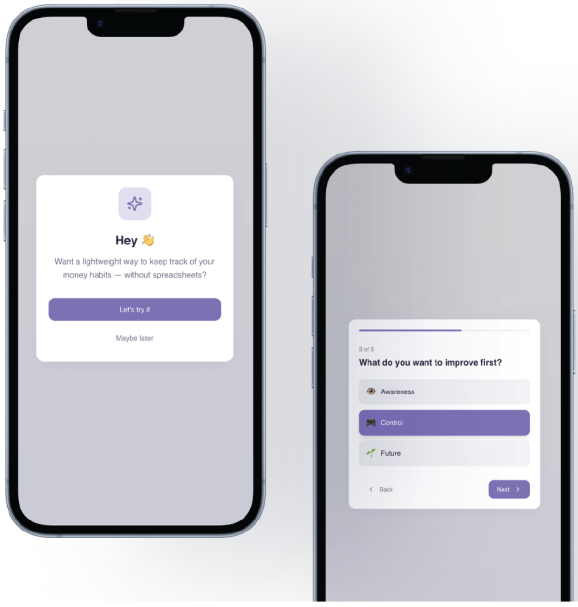
Track financial growth | Tailor AI assistant | Integrate all financial platforms | Explain spending patterns | Choose how you want to grow

Figure 47: Fynt prototype

Trackie

Trackie is the context-aware financial health tracker. Users can add Trackie as a widget across devices (smartphone, smartwatch or AR glasses).





Track financial balance | Sense situational context | Adapt nudging strategy | Explain spending patterns | Let users set boundaries

Figure 48: Trackie prototype

Spltr

Spltr (Splitter) is a customizable app that helps users splitting costs easily and assists with budgeting.

Split shared costs | Budget expenses in saving pockets | Automatic categorization | Pay your friends directly | Ask advice on purchases

Figure 49: Spltr prototype

The best prototype was selected using the weighted criteria method as described in the Delft Design Guide (2013) (Figure 50). Prototype 2, Trackie, achieved the highest overall score across all eight interaction principles and demonstrated the strongest degree of malleability. In addition, the Lead D&DP NL independently identified the same health tracker concept as the most viable offering for financial clients, reinforcing the outcome of the evaluation. He stressed that this prototype fits very well with Gen Z's needs in digital financial products.

Based on these results, Trackie was selected for further development and iteration into a final prototype. To identify missing or underdeveloped functionalities, an analysis was conducted against the predefined list of requirements (Appendix L). The following section elaborates on how this concept was refined and translated into the final demonstrator.

			Fynt			Trackie			Spltr	
Criteria	**Weight**		**Score**	**Total**		**Score**	**Total**		**Score**	**Total**
Degree of malleability (user customization)	20		5	100		8	160		7	140
Easy & conversational interaction	20		7	140		5	100		8	160
Balance user customization	15		5	75		9	135		6	90
Financial wellbeing Gen Z	15		6	90		9	135		7	105
Navigation in interface	10		8	80		6	60		7	70
Digital community engagement	5		3	15		5	25		6	30
App-agnostic customizability	5		6	30		3	15		3	15
Framework integration & economic feasibility	5		8	40		6	30		4	20
Create trust & security	5		3	15		5	25		4	20
Total score	**100**			**585**			**685**			**650**

Figure 50: Weigthed criteria results

5.4 Advanced Prototyping

5.4.1 Personas

To develop the final demonstrator, three personas are created to represent three customized user configurations of the final concept. These personas are used to explore how the same malleable software system can adapt to different users, context and financial behaviors within the Gen Z demographic.

The personas represent three distinct Gen Z profiles with varying relationships to money, pain points and needs. They are grounded in multiple sources, including trend analysis on Gen Z's financial behavior, insights from the thesis *"Envisioning the Future of Financial Services, Shaped by Gen Z"* (Buitenhuis, 2025), findings from low-fidelity prototype testing, the financial diary study and synthetic Gen Z personas generated using Gemini 3.0. By combining these sources, the personas reflect both empirically grounded patterns and exploratory design insights.

Persona A: Ben

Ben is a 20-year-old student living in an urban area (Appendix M.1). He relies primarily on a student loan as his main source of income and exhibits highly impulsive spending behavior. His spending is strongly influenced by social pressure and immediate needs, often leading him to spend money he cannot afford. Despite experiencing significant stress about repaying his student loan, Ben continues to spend impulsively to maintain his social status, for example by paying upfront for rounds of drinks. Ben also demonstrates high-risk financial behavior, preferring crypto investments as a perceived "quick fix" rather than engaging in traditional saving practices. His primary pain point is avoidance: he is afraid to open his banking app, which results in missed payments and a loss of control over smaller transactions. Ben requires financial support that reduces confrontation with his total balance, such as a clear "safe-to-spend" indicator and automated debt skimming to regain control without increasing financial stress.

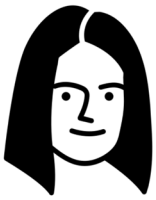
Persona B: Mette

Mette is a 17-year-old pupil who lives on pocket money and a clothing allowance provided by her parents, supplemented by a small income from a side job (Appendix M.2). She experiences her mobile banking app as boring and frequently mixes up her pocket money, clothing allowance and earned income. Mette represents a younger Gen Z subgroup for whom money functions primarily to support a lifestyle curated for social media.

She lacks a strong sense of financial responsibility and treats her bank account as a "reloadable gift card" funded by her parents. Her main struggle lies in the lack of engagement with traditional banking UIs, which she perceives as overly administrative and unappealing. As a result, she often fails to separate designated budgets, such as clothing allowance and pocket money. Mette requires a highly visual and gamified interface that creates engagement through goals, rewards and streaks, rather than through conventional financial overviews.

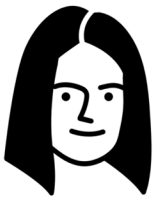
Ben de Wit

Age	20 years old
Location	Rotterdam, The Netherlands
Occupation	Student
Income level	Student loan



Anna Klopper

Age	26 years old
Location	Tilburg, The Netherlands
Occupation	Freelancer
Income level	Fluctuating freelance income



Mette Bergsma

Age	17 years old
Location	Sneek, The Netherlands
Occupation	Pupil
Income level	Pocket money + clothing allowance + side job

Figure 51: Personas (Appendix M for more details)

Persona C: Anna

Anna is a 26-year-old freelancer living in Tilburg (Appendix M.3). Although she earns a relatively high income, she struggles to understand how much she can spend due to uncertainties around taxes. She experiences platform fatigue, as she uses separate tools for business finances, private spending and investments, which obscures her overall financial picture and true net worth.

Her administrative anxiety leads her to postpone organizing finances, often resulting in stress and panic when quarterly tax deadlines approach. Noa needs financial support that consolidates her financial information into a single overview. Specifically, she requires a unified dashboard that automatically separates tax liabilities from disposable income, enabling her to understand her true spending power and providing stability comparable to a reliable business partner.

5.4.2 Final Prototype

To demonstrate how a digital financial product containing malleable software could look like for end-users, an interactive prototype was developed. The prototype was created using Lovable, enabling rapid development. Appendix N provides an example how iteration in this development process was performed. This chapter explains three representative user flows that demonstrate how the same financial tool can be customized for three distinct personas, highlighting the potential of malleable software to enable hyper-personalized experiences. First, the prototype's core functionalities are described across the four defined interaction principles, after which the user flows are elaborated in more detail.

Balance user customization

The prototype balances user-driven customization with system-driven adaptivity to provide flexibility while maintaining usability and control. During onboarding, the interface is initially tailored based on a short questionnaire, allowing the system to create a starting configuration that aligns with the user's financial goals and preferences. However, this automated setup remains fully adjustable: users can correct or override system-generated categorizations of transactions and saving pockets, reinforcing a sense of agency and transparency.

To further support user control, the AI assistant can be turned off when users prefer to customize independently or require less guidance. When entering the customization mode, inspiration is provided through examples of customized home screens by peers, leveraging community-driven behavior to lower the barrier to customization. Users can then either create entirely new widgets using natural language or voice prompts or selecting from pre-made widgets suggested by the system. These widgets can originate from designers or from other users, reinforcing a pluralistic and participatory customization ecosystem.

Widgets can be added, removed and reordered through direct manipulation, such as dragging UI elements across the interface or indirectly by instructing the AI assistant to reorganize the layout. In addition, users can personalize the frequency and tone of nudges, allowing the system's guidance to adapt to individual preferences. While the UI also uses contextual awareness to automatically adjust to the user's situation, all system-generated suggestions remain optional: users can accept or decline proposed configurations.

Users are not limited to rearranging existing UI elements but can also create entirely new tabs as part of their customization. For example, a user can ask the financial tool to add a dedicated page for freelance finances, where income, taxes, invoices and related insights are clustered in one place. This allows the UI to adapt to evolving life contexts without increasing the cognitive load for users who do not need these features.

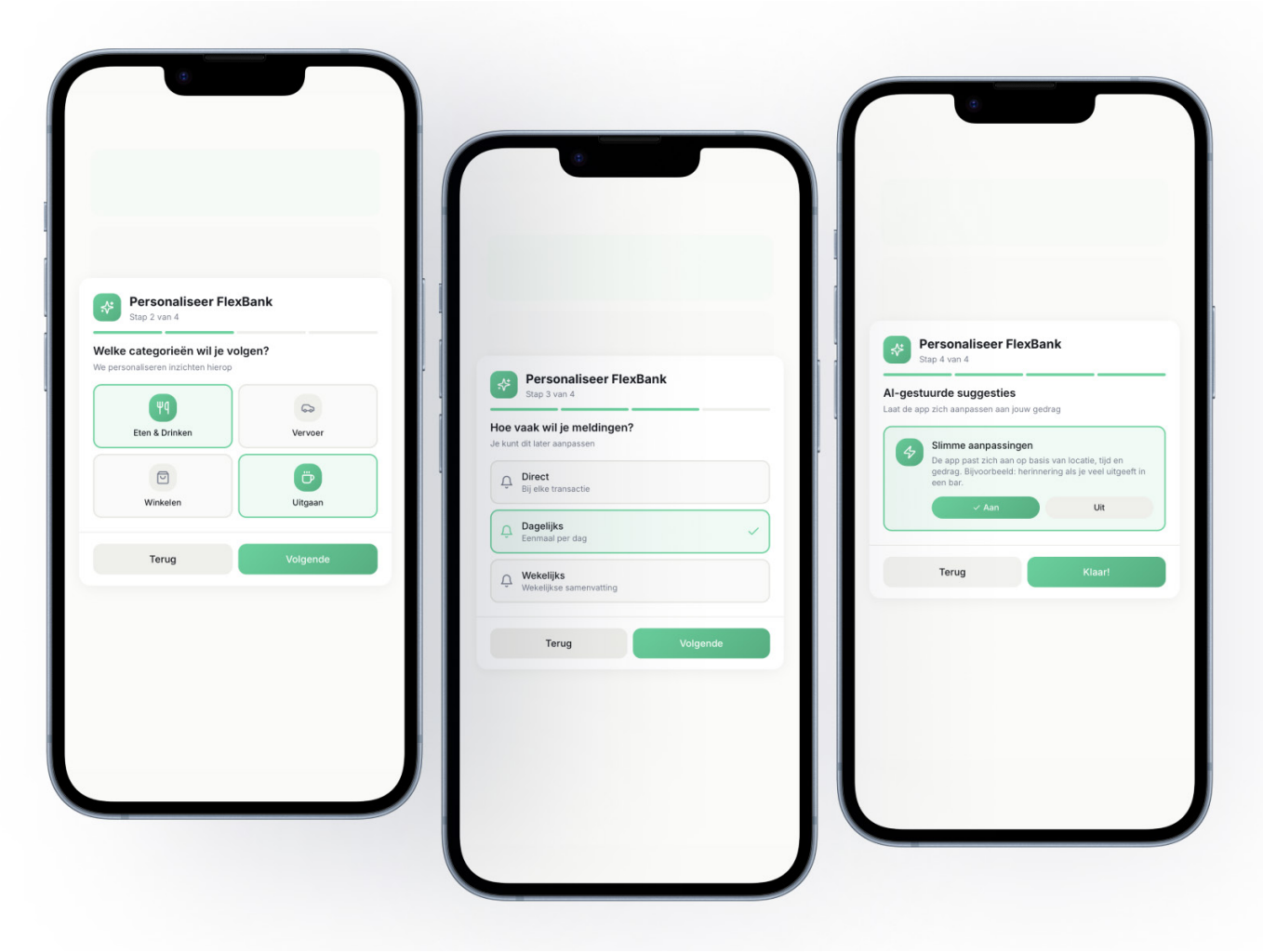


Figure 52: Hybrid UI configuration

Navigation in interface

Navigation is intentionally designed to remain familiar and predictable, even within a highly customizable environment. Research insights indicate that users still prefer interacting through buttons and traditional UI elements, rather than relying solely on conversational input. Therefore, the UI offers enough clearly labeled buttons, supported by subtle grey explanatory text that clarifies what specific buttons or widgets do.

To reduce cognitive load, the default navigation consists of only a homepage and a profile page. This simplified structure aligns with the strategy of incremental customization: users can expand or adapt the UI over time, but the initial setup remains intuitive and accessible. Guidance on how to customize the UI is embedded directly into the UI, rather than hidden in external tutorials.

Within the profile page, the location of different settings and information is clearly explained, and the UI provides strong visual cues when a user is in customization mode. Traditional UI patterns are deliberately retained to support usability. It was a design choice to use widgets as primary customizable elements, as low-fidelity testing showed that Gen Z users are already familiar with widget-based customization form their smartphones, particularly within Apple ecosystems.

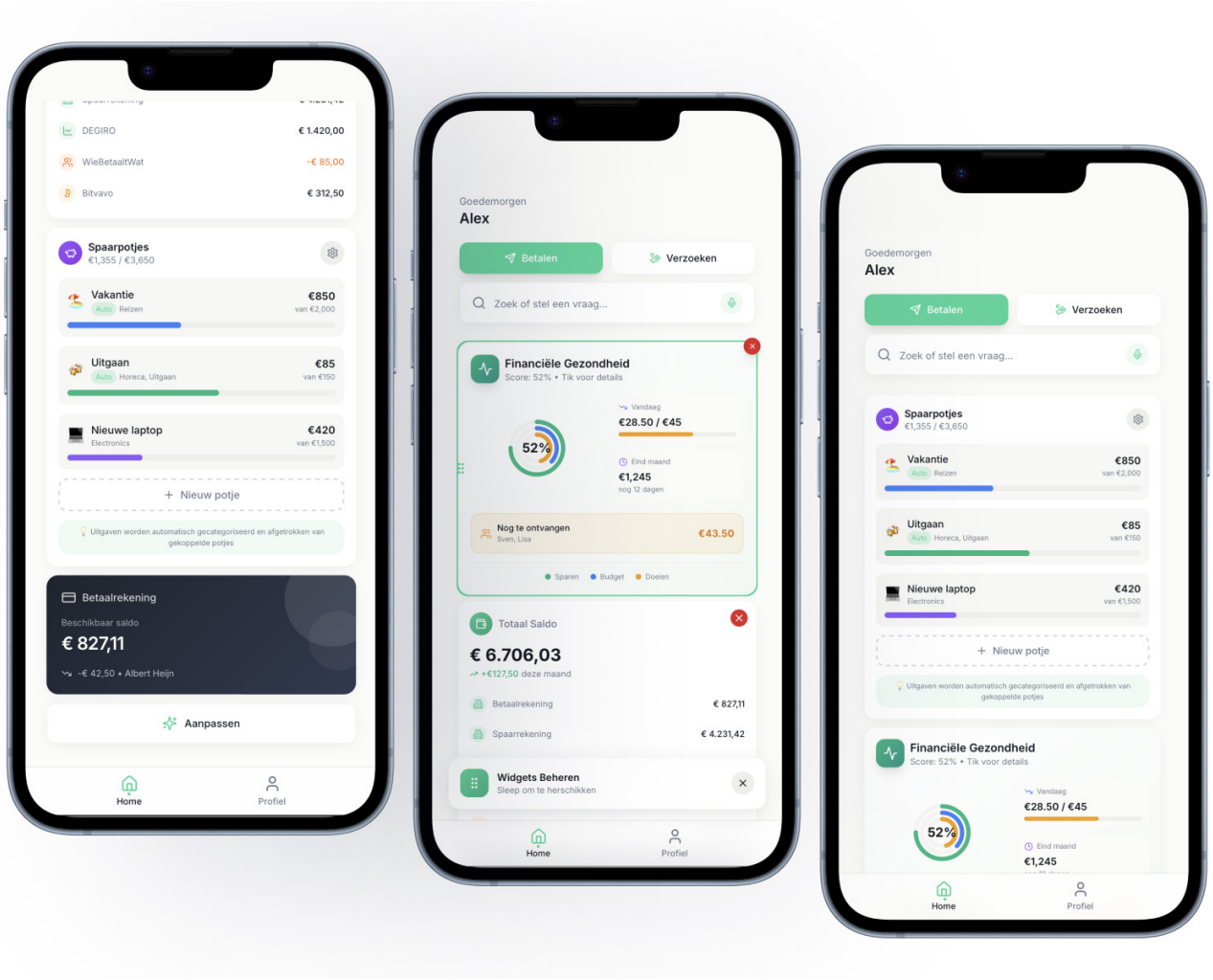


Figure 53: Navigation in UI for user customization

Financial wellbeing Gen Z

Financial wellbeing is anchored around a health tracker that functions as the core feature of the application. This tracker provides users with a clear and immediate overview of their financial health score and allows comparison with generational averages. To address impulsive spending behavior, which is identified as a key Gen Z trend, the tracker highlights impulsive purchases related to instant gratification, helping users become more aware of unnecessary spending. Weekly trends are visualized to show progress over time and reinforce positive financial behavior.

In addition, users can create saving pockets (spaarpotjes) to support concrete saving goals and manage contextual spending. Payments can automatically be made from specific pockets, such as paying for drinks from a “night out” pocket, enabled through contextual awareness based on location and transaction information analysis. Users can freely customize or add new saving pockets when new goals arise, such as planning a trip. The prototype also supports integration with external financial tools such as WieBetaaltWat, DEGIRO and Bitvavo. This integration addresses a major frustration identified in the financial diary study, synthetic user interviews and lo-fi prototype testing: the lack of a clear overview of total finances across platforms. The application further shows outstanding payment requests and incorporates these into future financial forecasts. To extend engagement beyond the smartphone, widgets can be added to smartwatches or AR glasses. Finally, the system provides active financial nudges during payments or transfers, which users can fully customize to maintain control over their experience.

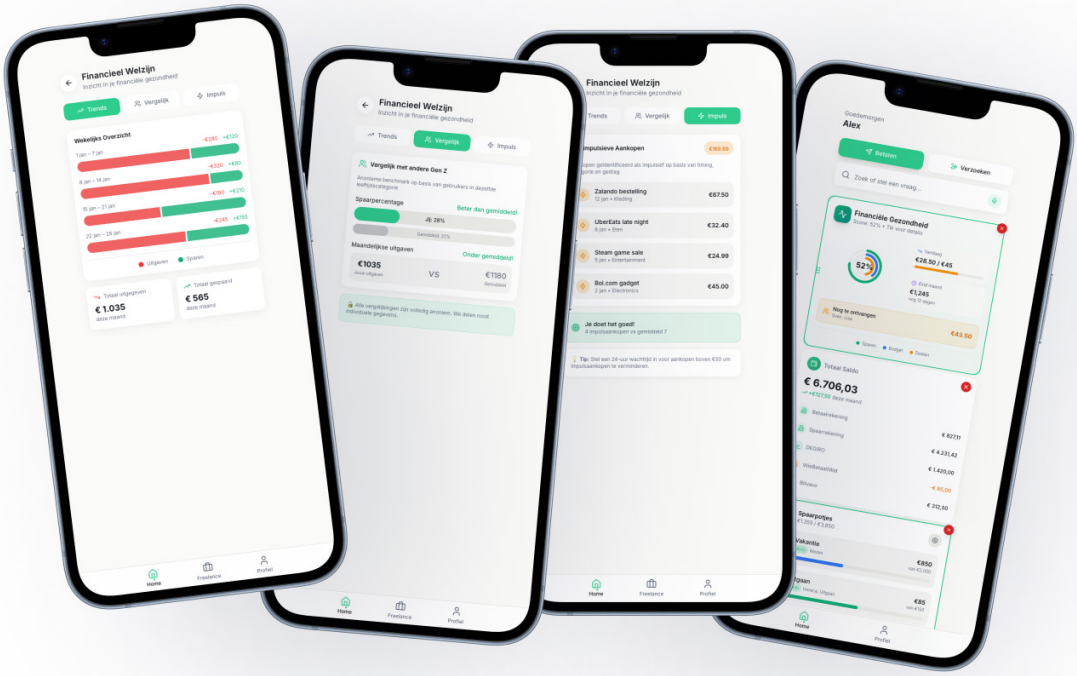


Figure 54: Financial health tracker

Easy & conversational interaction

The interaction model combines traditional input with conversational elements to lower barriers and increase accessibility. Users can interact via chat and voice, supported by a lightweight onboarding questionnaire that uses simple. Category selection instead of long forms. A smart search function assists users by completing search intents, such as finding a specific “Albert Heijn” transaction, with the option to use voice input for the same task.

Users can seamlessly switch between chatting with the financial assistant and contacting a human support agent within the application. Based on feedback from low-fidelity user testing, a dedicated control was added to manually stop voice prompts. This reinforces a sense of agency and control during conversational interactions, ensuring that voice functionality enhances rather than disrupts the overall user experience.

Figure 55: Assistant finishing search queries

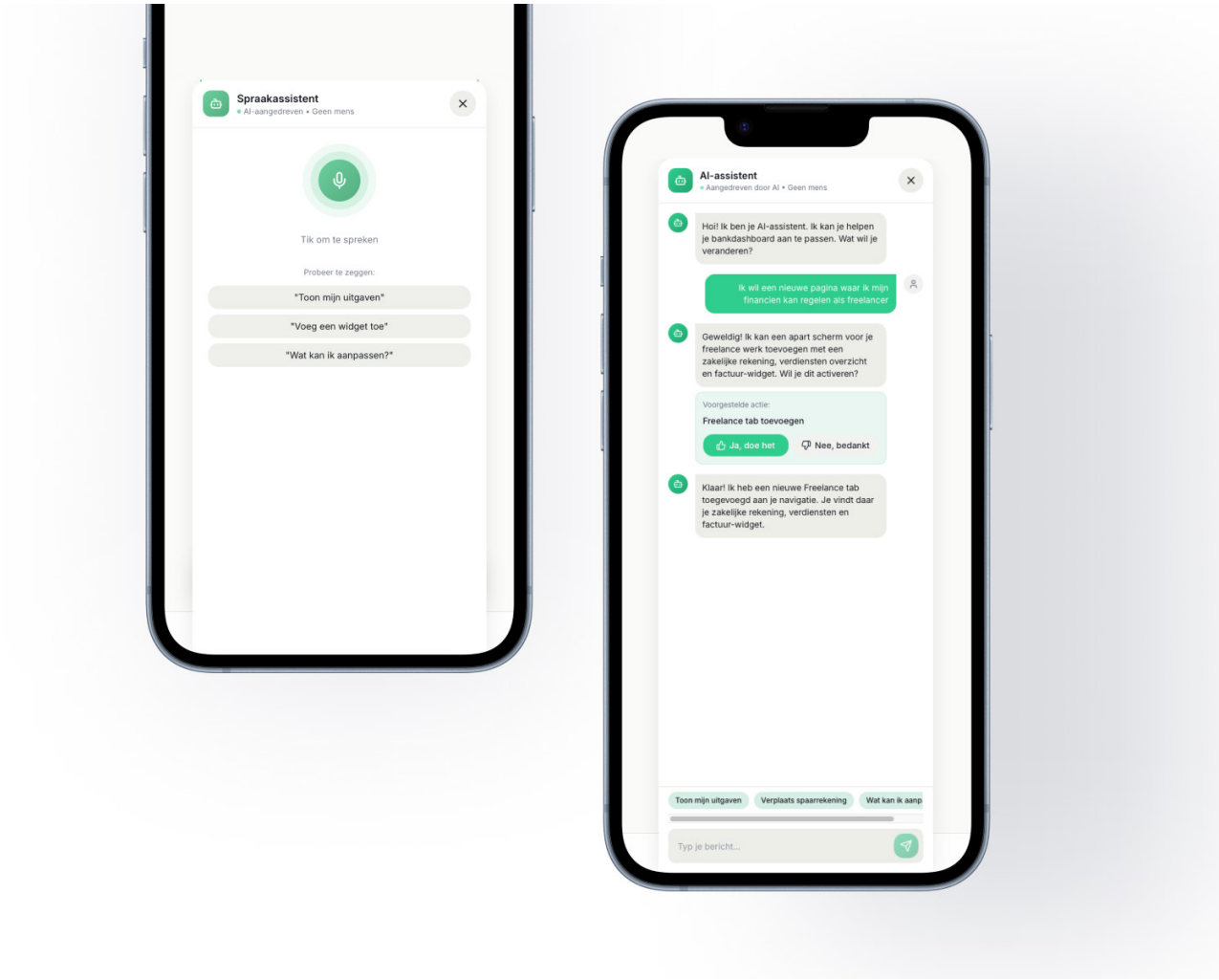


Figure 56: Chat and voice interaction with AI assistant

Last iteration

The visual design of the final prototype was refined in a concluding iteration to enhance its overall look and feel. An overview of these design adjustments is presented in Figure 57, with more detailed explanation provided in Subsection 6.2.

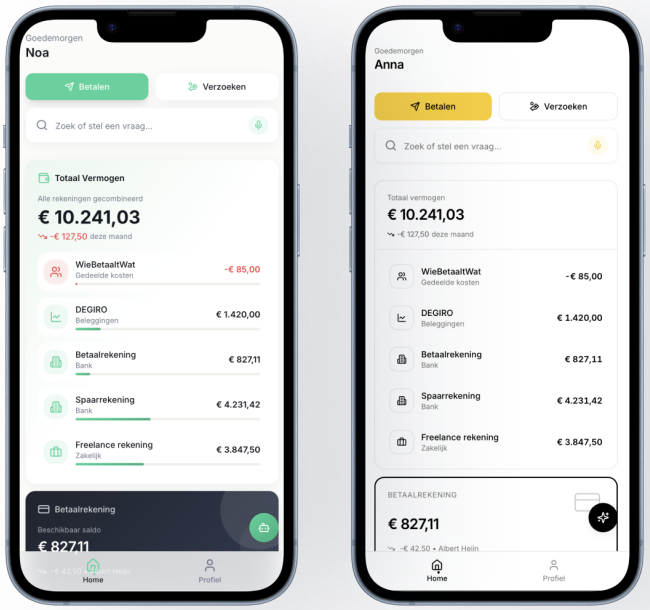


Figure 57: Change look and feel

05

Key Takeaways

- A co-creation with D&DP employees is facilitated to let employees explore designing with Lovable and develop three prototypes of hyper-personalized financial tools
- Additionally, a reflection session uncovered limitations and recommendations on using Lovable in the internal design and develop process
- Prototype posters have been created based on co-creation outcomes
- A final prototype is built with Lovable showcasing malleable software in a hyper-personalized financial app for Gen Z

06

Delivering Designs

This final phase translates the generated design knowledge into a concrete implementation strategy. The goal is to provide a strategic direction for Accenture Song to implement malleable software, rather than showing a detailed designed product to implement directly.

This chapter is structured across three interconnected layers: the product layer, the process integration layer and the strategy layer. The product layer focuses on how malleable software can be applied within digital products to enable meaningful hyper-personalization. The process integration layer introduces an intervention framework, referred to as MINT, which is designed for D&DP to support the integration of malleable software tools into the existing design and build process. Additionally, a hand-over PowerPoint file is created, explaining how to use all deliverables. Finally, the strategy layer outlines how Accenture Song can structurally incorporate malleable software into its internal workflows, service offerings and broader digital product portfolio.

6.1 Final Designs

The final designs include four deliverables that together enable Accenture Song to initiate a transition toward the broader adoption of malleable software. These deliverables are structured to bridge conceptual exploration, practical application and long-term strategic integration. This chapter will elaborate on all deliverables across three layers (Figure 58). The deliverables are handed over to the D&DP practice and consolidated into a hand-over PowerPoint file that explains how to use the deliverables.

The first deliverable is the final prototype in the form of a demonstrator, which illustrates how malleable software can be applied within a digital financial product to enable advanced user customization. This demonstrator is intended as a client-facing artifact to engage financial clients and support the acquisition of new projects. In addition, it serves as a reusable reference for D&DP to develop tailored demonstrators for other domains or clients. The demonstrator was developed collaboratively with D&DP employees through co-creation sessions and iterative prototyping using Lovable, directly linking this deliverable to the second outcome of this design project.

The second deliverable is an intervention framework designed to integrate malleable software into the existing design and build process of D&DP. The objective of this framework is to increase process efficiency while empowering designers and developers to work with malleable software tools. Through participation in the co-creation session and iterative prototyping activities, employees were already introduced to and gained hands-on experience with such tools, providing an initial foundation for adoption.

The final two deliverables consist of two complementary roadmaps, which are elaborated on in section 5.4. The strategic roadmap visualizes how Accenture Song can embed malleable software into its internal workflows, digital product offerings for hyper-personalization and service portfolio. The tactical roadmap translates this strategic vision into concrete actions required for successful implementation. Together, these deliverables structure the implementation strategy across product, process integration and strategy levels, which are further detailed in the following paragraphs.

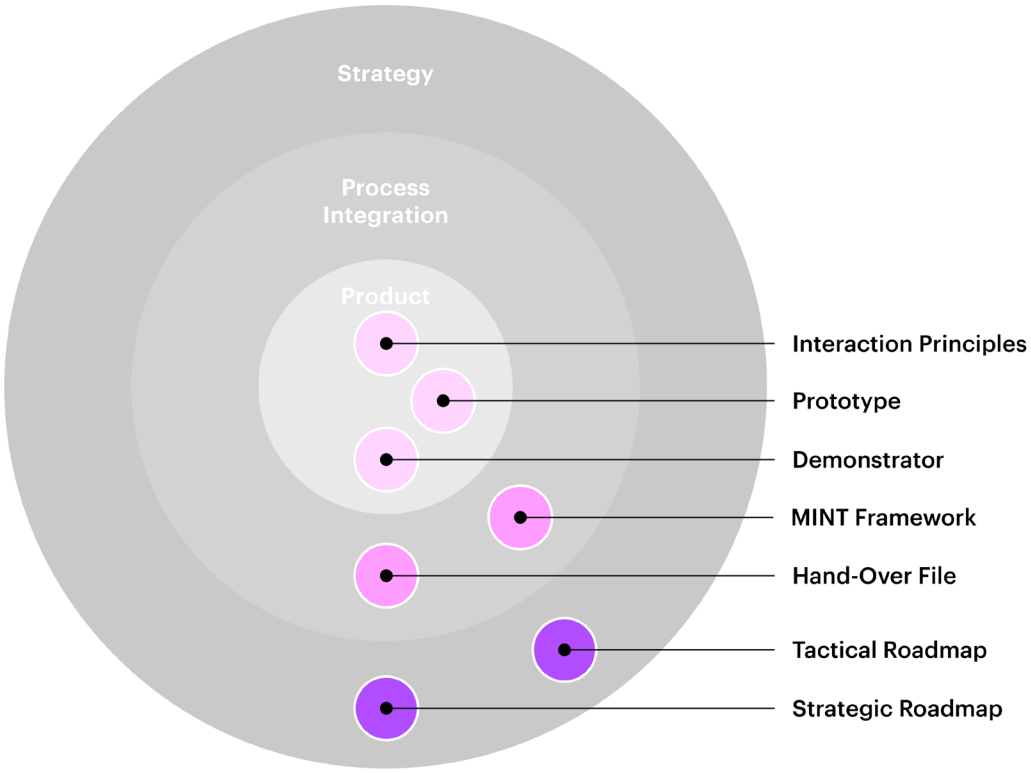


Figure 58: Correlated layers in the Delivery phase

6.2 Product Layer

This Subsection describes the design knowledge generated during the development of the final prototype and elaborates on how digital products can be designed containing malleable software principles to enable hyper-personalization. The objective of this layer is to translate research insights and prototyping learnings into reusable design principles that can be applied across digital products and industries. The principles are structured according to interaction principles, focusing on how adaptability, usability and user control can be balanced within malleable systems.

Balance user customization

Designing for malleable software requires a careful balance between user-driven customization and system-driven adaptivity to ensure usability, coherence and trust. Rather than offering full freedom upfront, the product should support balanced adaptivity, where the system actively assists users while still allowing them to remain in control. This can be achieved through contextual awareness, such as adapting UI elements based on location, time or usage patterns and through onboarding questionnaires that help the system understand user preferences early on and create a tailored starting configuration.

Users should also be given control over adaptive behavior by allowing them to customize notifications and nudges, ensuring that system intelligence supports rather than overwhelms them. An AI assistant can play a supportive role by suggesting UI configurations or feature setups based on natural language or voice input. To further reduce friction and uncertainty, designers and peer users can provide pre-made configurations that serve as inspiration, helping users understand what is possible within the system.

In addition, adaptability should be introduced incrementally. Instead of exposing full customization immediately, the design should start with simple, low-effort adjustments and gradually unlock deeper levels of control. Widgets can function as the primary building blocks for customization, enabling users to modify their interface step by step. Starter configurations provide a clear baseline that users can adapt over time, while assistance features, such as AI suggestions, can be turned on or off when users feel confident enough to customize independently. See Figure 59 how the final prototype demonstrates this balance in user customization.

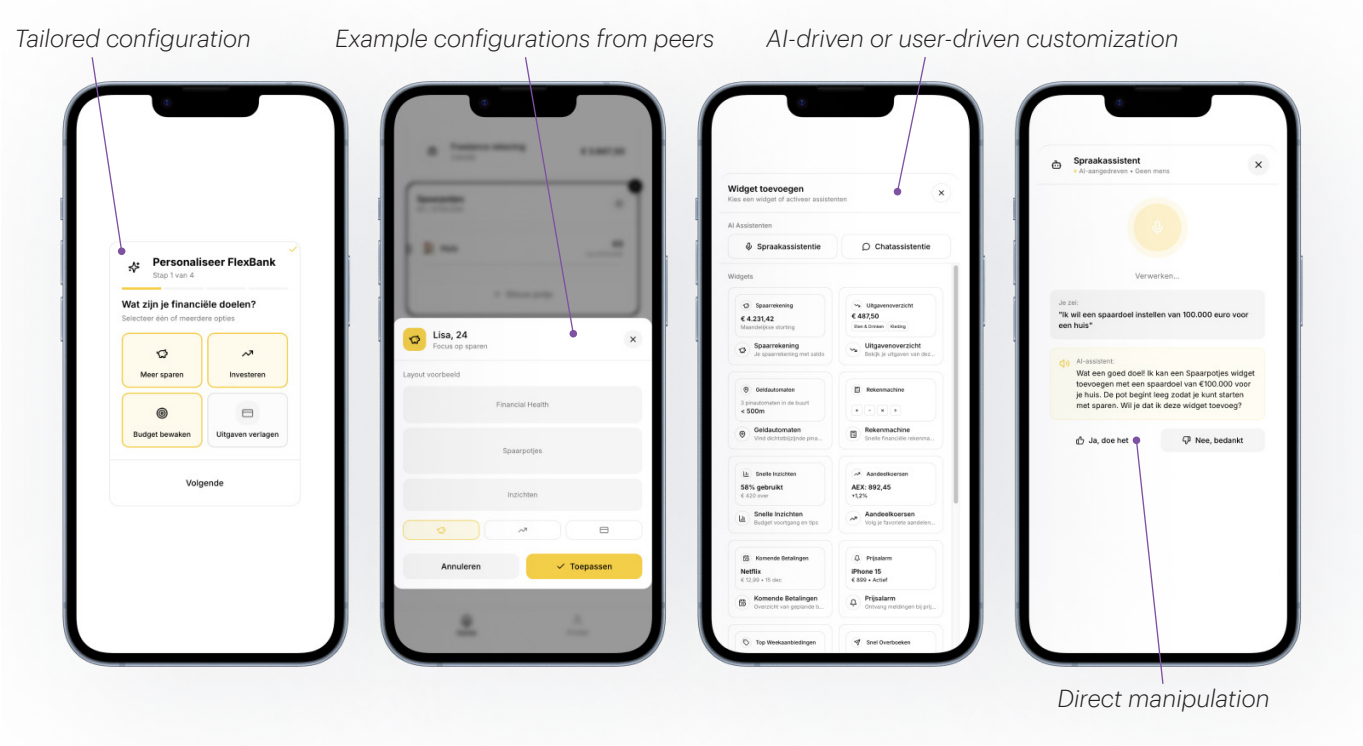


Figure 59: Balance user customization in final prototype

Navigation in interface

Navigation within a malleable product should support both clarity and exploration. The UI should be designed to incorporate ambient and contextual intelligence, allowing it to sense user context and dynamically adjust the presentation of information or UI modes. For example, the UI can adapt based on a user's location or time of day, ensuring that relevant information is surfaced at appropriate moments without requiring explicit input.

At the same time, the UI should follow a hybrid interaction model that balances traditional navigation elements with conversational interaction. While users can interact through chat or voice, they also should retain the ability to manually add, remove or rearrange widgets. Buttons and familiar UI controls remain essential for guiding users through both everyday tasks and customization flows, reinforcing a sense of control and predictability (Figure 60).

To support exploration without overwhelming users, the design should embrace navigable ambiguity. Users are encouraged to explore customization possibilities while being guided by contextual explanations embedded in the UI. When users express open-ended customization requests through the AI assistant, the system could clarify its own boundaries, explain what is possible or suggest alternative solutions that align with the user's intent. This maintains a sense of discovery while preventing confusion or unrealistic expectations.

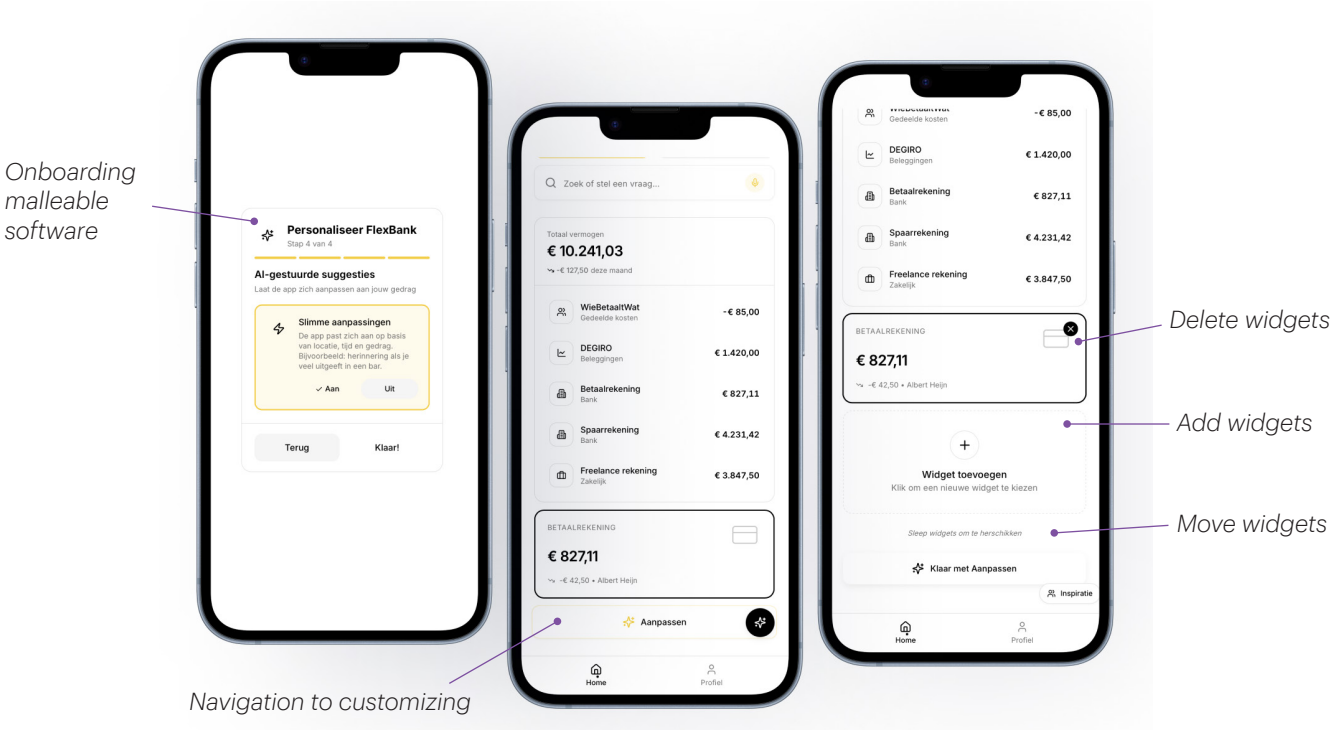


Figure 60: Navigation in interface in final prototype

Easy & conversational interaction

Ease of interaction is a foundational requirement for malleable digital products. The design principle of empowered ease focuses on minimizing cognitive load while enabling meaningful customization. The initial configuration of the product must be intentionally simple, with a limited number of widgets and UI elements to avoid overwhelming users. Onboarding plays a critical role by clearly explaining how customization works and what users can expect from the system.

Direct manipulation, such as dragging or resizing widgets, lowers the effort required to personalize the UI. When the AI assistant proposes changes or configurations, users must be always given a clear option to accept or decline these suggestions, reinforcing autonomy and reducing decision fatigue.

Expressive interaction further supports usability by combining natural language and voice input with direct manipulation. If the AI assistant creates a configuration that does not fully match the user's intent, the system must allow users to make quick manual adjustments rather than requiring them to restart the interaction. Conversational agency is reinforced through chat and voice interactions, which lower barriers to complex actions and make interaction with the system feel more human and approachable (Figure 61).

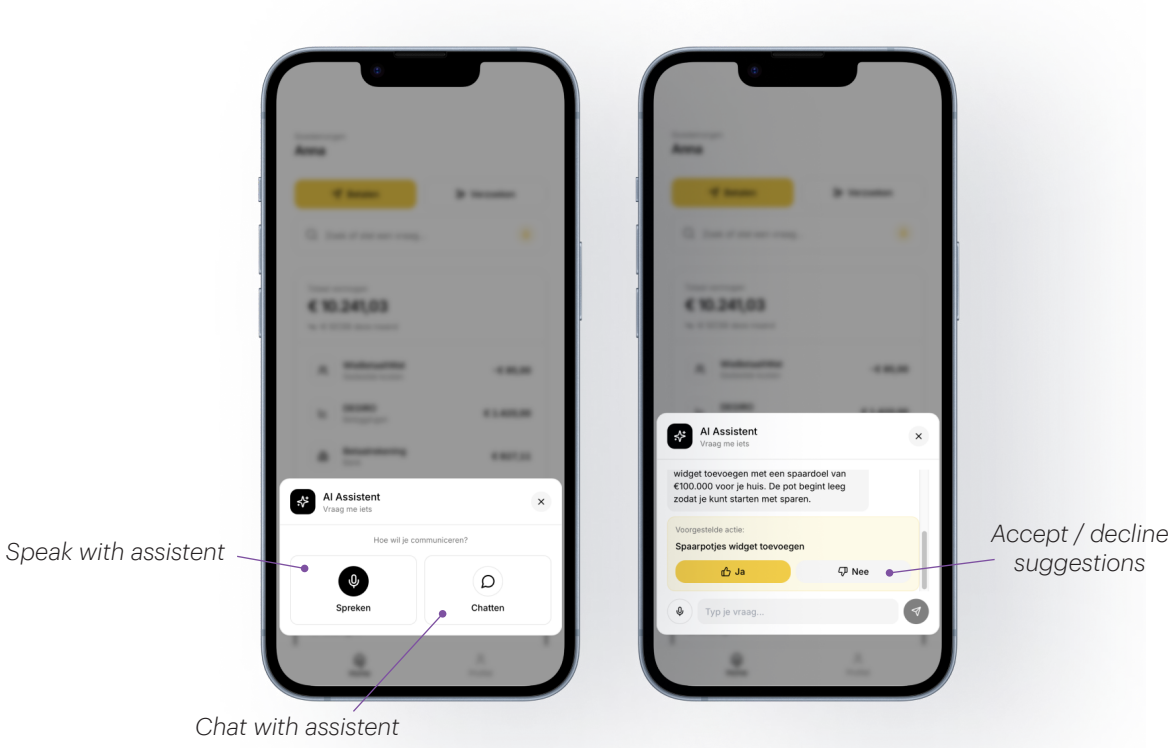


Figure 61: Easy & conversational interaction in final prototype

Financial wellbeing Gen Z

This last interaction principle is mostly relevant for designing digital products for financial clients. Embedded financial learning is achieved by integrating educational feedback directly into everyday financial interactions (Figure 62). A financial health tracker can provide continuous insight into spending and saving behavior, supported by personalized suggestions and peer comparisons that help users reflect on their habits and compare with others in their generation.

The design should also encourage aspirational growth by making future-oriented behavior visible and motivating. Features such as future financial forecasts and saving pockets translate abstract goals into tangible progress, helping users plan while staying engaged.

Proactive companionship is another key principle, where the financial tool should act as a supportive and emotionally intelligent companion. Through empathetic feedback, gamification and data-driven insights, the system should highlight patterns such as impulsive spending and offers guidance without judgement. This approach supports emotional financial resilience by addressing both rational decision-making and emotional responses to money. Financial health scores and reflective feedback help users build trust in the system and in their own financial behavior.

Finally, the principle of fluid stability can ensure that the product adapts to fluctuating income streams and changing life circumstances, which are common among Gen Z users. By integrating multiple financial tools into a single platform and continuously updating future forecasts, the system remains relevant and supportive as users' financial situations evolve.

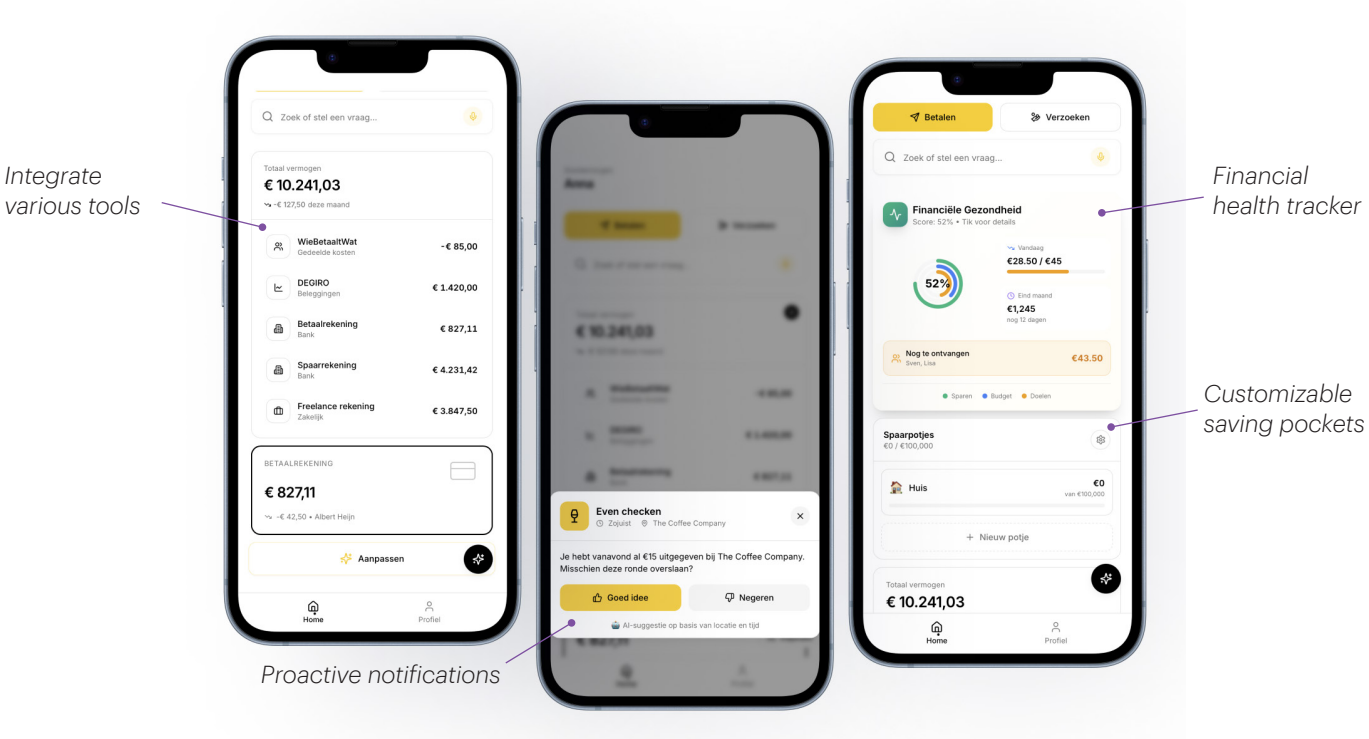


Figure 62: Financial wellbeing Gen Z in final prototype

Demonstrator

To deliver a ready-to-use demonstrator of hyper-personalization in a digital financial product, a scenario-based video of the final prototype was created. The video follows the persona Anna, a freelancer who wants to save for a house (Appendix M.3). Within the demonstration, Anna actively customizes the app using malleable software principles: she adds a "saving pocket" widget dedicated to her house goal and creates a separate navigation tab to manage all freelance-related finances. This showcases direct interface manipulation, user-controlled configuration and contextual financial guidance.

The demonstrator enables Accenture Song to tangibly communicate the value of malleable software to financial clients during POV and RFP presentations. By visualizing user-driven customization in realistic context, it makes the design knowledge founded in this thesis tangible and actionable.

Beyond financial services, the demonstrator also serves as inspiration for applying malleable software principles in other domains, such as healthcare platforms, retail applications, or automotive digital tools, where adaptive, user-configurable UIs can create similar strategic value.

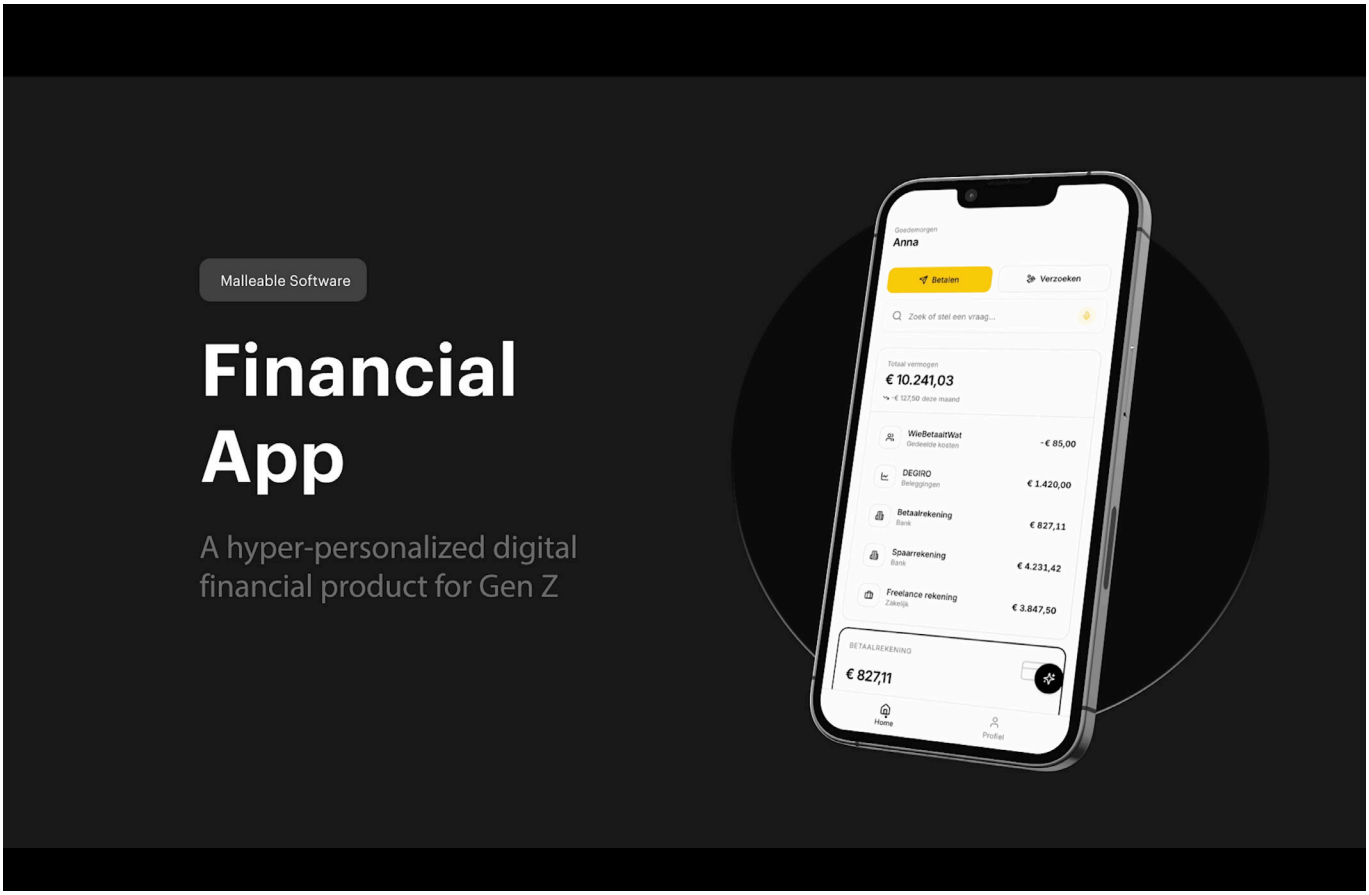


Figure 63: Demonstrator video of hyper-personalized financial app

6.3 Process Integration Layer

This subsection describes how malleable software tools can be embedded into D&DP's design and development process. Based on insights generated throughout this thesis, targeted interventions were developed to improve efficiency, client collaboration and adaptability. These interventions are structured in the ***MINT framework*** *(Malleability Integration & New Tooling)*, which functions as a flexible intervention model rather than a prescriptive methodology.

The framework consists of six iterative loops: Engage, Discover, Define, Develop, Deliver and Reflect. These align with the Double Diamond model already used within D&DP, lowering adoption barriers by embedding malleable software into existing workflows instead of introducing new process logic.

Two extensions complement the Double Diamond structure. The Engage phase addresses a key pain point identified by the Lead D&DP NL: acquiring and selling projects. Malleable software enables rapid creation of tailored, interactive demonstrators, strengthening client engagement while reducing time spent on POVs and RPFs.

The Reflect phase captures learning and ensures continuous improvement. Given the rapid evolution of AI-first tooling, structured reflection evaluates which tools add value in specific contexts and enables employees to propose and assess new tools. Insights feed back into toolkit development and workflow optimization.

Speaking to D&DP employees revealed that each project differs significantly in approach. Therefore, the MINT framework is intentionally designed as a modular framework suggesting tools, tasks and role distributions per phase rather than a fixed step-by-step process. Flexibility is reinforced through reflection across project types.

Each phase includes interventions derived from this project. Tested tools include *Lovable* and *Figma Make* for co-creation and rapid prototyping, *Gemini* for synthetic user interviews. Established tools such as *PowerPoint* and *Microsoft Copilot* remain integrated to ensure continuity. In later phases, AI-first development environments such as *Cursor*, *Vercel* and *Claude Code* are introduced to support building production-ready digital products. Although not tested directly, they represent the strategic shift toward agentic development identified by the D&DP NL Lead as major opportunity for D&DP.

Clear metrics and outputs are defined per phase to support accountability. For example, Engage performance can be measured through project acquisition rate, time spent on POVs and RFPs and number of demonstrators created. Subsequent phases assess speed, quality, adoption and learning, with outputs ranging from validated concepts to working digital products.

The toolchain layer positions *GrowthOS* as the backbone of integration. Despite current underutilization, both the Global Asset Lead and D&DP NL Lead identified strong potential for *GrowthOS* to centralize prompt libraries, generative UI tooling and scalable assets. Reflection session feedback confirmed strong perceived value of tools such as *Lovable* and *Figma Make*, particularly for ideation and rapid validation.

To clarify ownership, the framework incorporates a RACI matrix defining Responsible, Accountable, Consulted and Informed roles per intervention. A senior manager currently responsible for all tooling within D&DP will act as the product champion of the MINT framework. This role ensures governance, drives adoption, aligns tooling decisions with strategy and safeguards scalability across projects.

Adoption may introduce friction, as employees adapt to hybrid workflows and AI-supported development practices. Tool integration also has governance implications, potentially affecting team composition and role allocation. The Reflect phase is therefore critical to continuously evaluate interventions, incorporate feedback and embed malleable software in a context-sensitive and scalable manner within D&DP.

MINT Framework

A repeatable operating model to design, build and scale digital products with malleable software

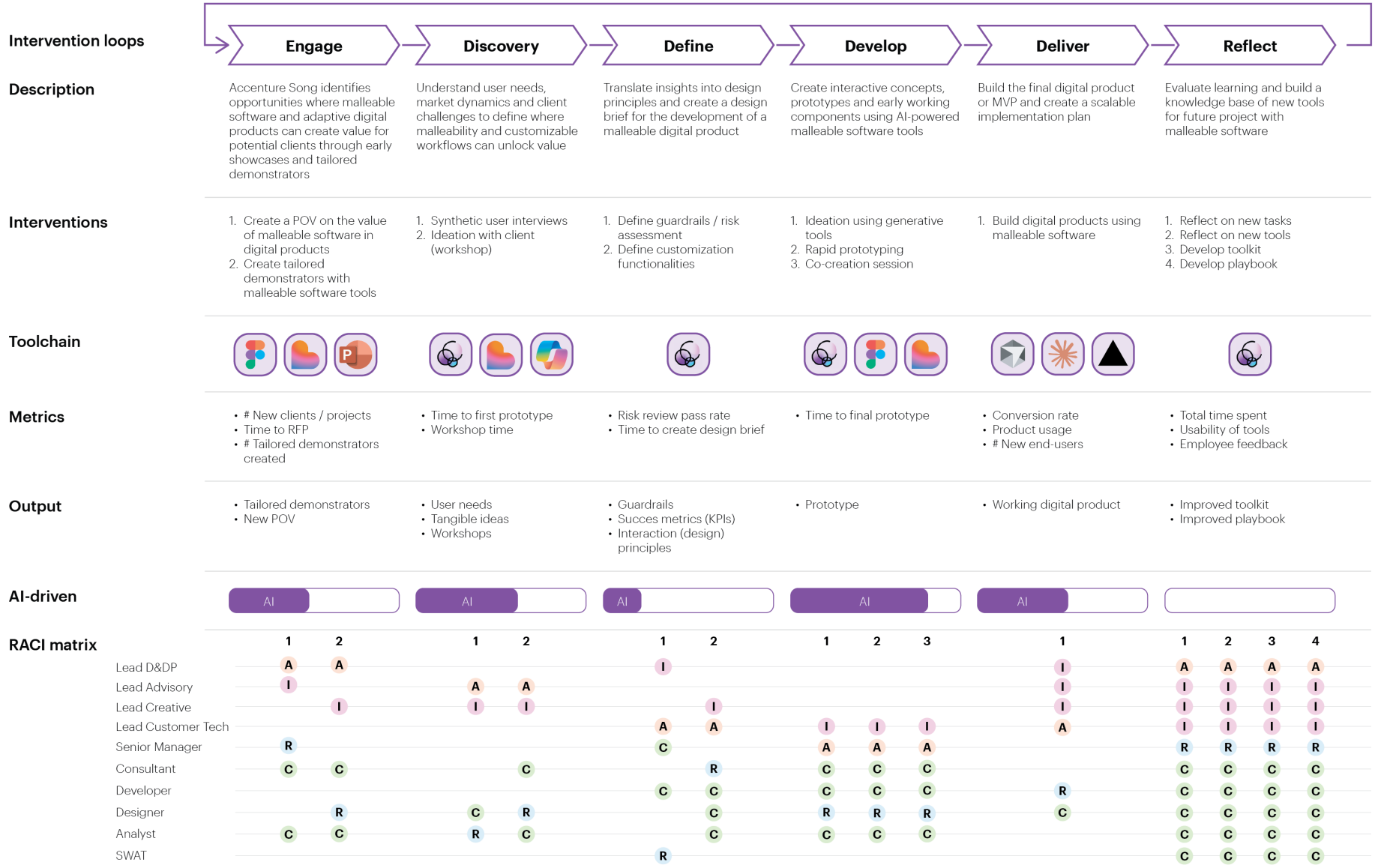


Figure 64: MINT intervention framework

6.4 Strategy Layer

As described earlier, two roadmaps were developed as key deliverables for Accenture Song: a strategic roadmap that visualizes a tailored transition toward malleable software and a complementary tactical roadmap that specifies the concrete actions required to operationalize this transition. Both roadmaps are structured across three-time horizons. The first horizon starts at the beginning of 2026, aligning with the facilitated co-creation session, and runs until mid-2026. The second horizon spans from mid-2026 to early 2027, while the third horizon extends throughout 2027. A north star vision anchors these horizons by articulating the long-term ambition for Accenture Song in successfully adopting malleable software.

6.4.1 Strategic Roadmap

The strategic roadmap consists of three interconnected layers, each leveraging malleable software at a different level of impact.

Layer 1: Internal workflow transformation

The first layer focuses on strengthening internal design and development workflows through malleable software tools such as Lovable. The strategy begins with experimentation to build internal capabilities, followed by the development and standardization of a shared toolkit. These tools are then embedded into enterprise workflows to ensure scalable adoption.

The north star vision for Accenture Song is to lead the transition toward malleable software-enabled design and development.

Layer 2: Service offering evolution

The second layer expands Accenture Song's client service offering. As Accenture primarily operates through services, strengthening client engagement is critical. Currently, project acquisition relies heavily on static artifacts such as slide decks for POVs and RFPs.

This strategy proposes replacing static communication with tailored, interactive demonstrators built using malleable software tools. Following project acquisition, client pilots introduce use customization features in controlled phases. In parallel, clients are supported in optimizing their products for Generative Engine Optimization (GEO), ensuring AI interpretability and readiness for product-agnostic integration.

After validation of feasibility, desirability and viability, the offering can scale. The north star vision is for clients to adopt adaptive workflows and actively engage in the malleable software transformation.

Layer 3: End-user hyper-personalization

The third layer enhances end-user customization within digital products. It begins with early-stage user research to uncover latent hyper-personalization needs. Malleable functionalities are gradually introduced during pilot phases, initially as beta features.

Community platforms support adoption, enabling users to share and explore customization configurations, an approach supported by research indicating that users often enjoy customizing for others. As familiarity increases, users adopt malleable interaction paradigms more broadly.

Ultimately, this strategy moves toward product-agnostic hyper-personalization, allowing users to configure and integrate experiences across platforms, strengthening long-term user engagement and value creation.

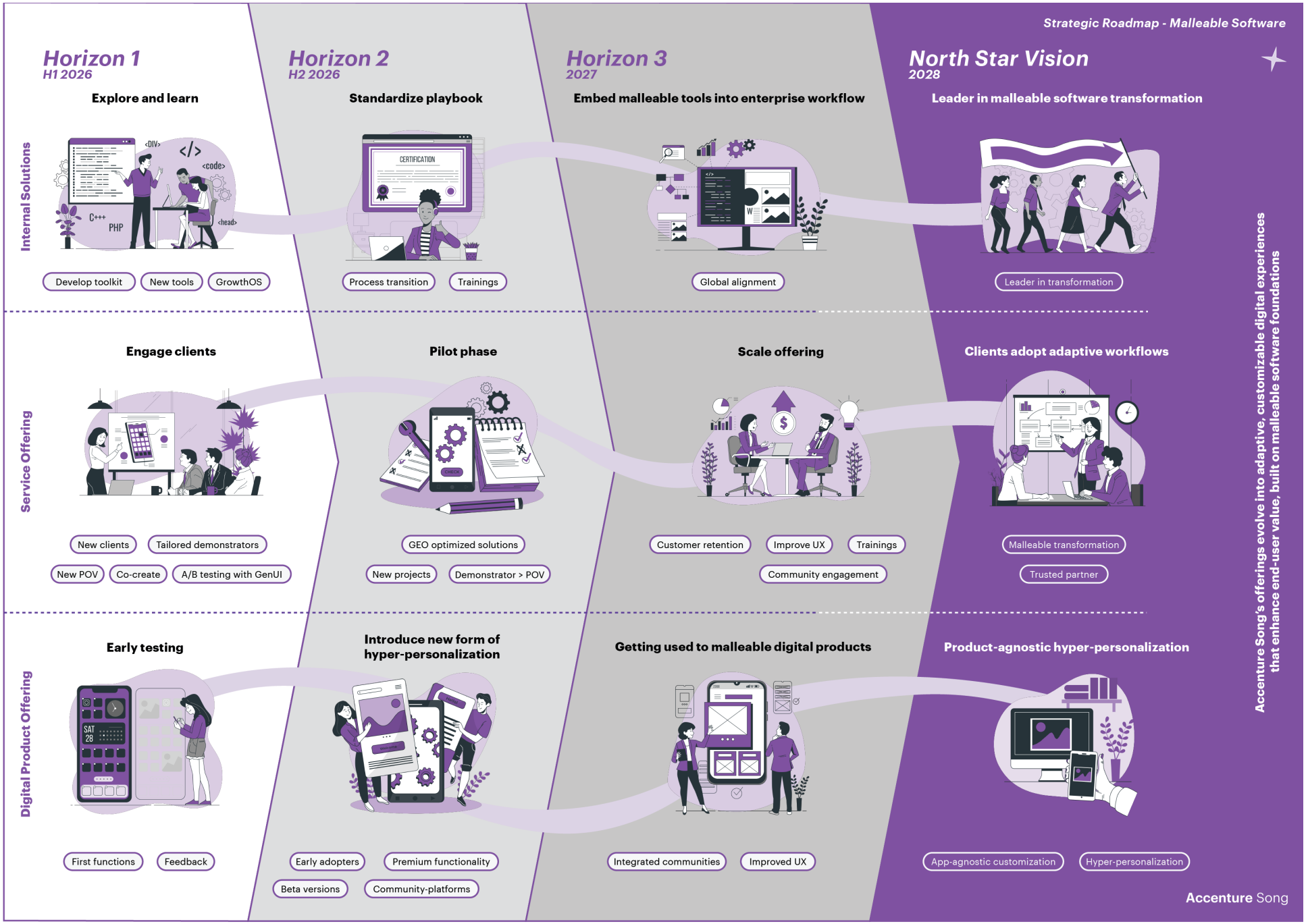


Figure 65: Strategic Roadmap

6.4.2 Tactical Roadmap

The tactical roadmap operationalizes the strategic ambitions for malleable software across the same horizons and levels as the strategic roadmap. For each horizon, it defines concrete actions, supporting tools, expected outputs and value creation. Tooling for the third horizon remains intentionally open to accommodate rapid technological developments.

Internal solutions

The internal track focuses on enabling employees to adopt and embed malleable software into daily workflows. Key actions include identifying and evaluating tools, developing a standardized internal toolkit, integrating tools into GrowthOS, formalizing a playbook and embedding it into enterprise workflows. Dedicated training programs support capability building, while collaboration with the SWAT team mitigates risks related to end-user customization.

In later horizons, the focus shifts toward product-agnostic internal workflows, enabling adaptive practices across projects. Core milestones include playbook standardization and global alignment of malleable software integration within Accenture Song.

Service offerings

This layer transitions from static POVs and slide-based RFPs toward tailored, interactive demonstrators to improve client engagement and project acquisition. Co-creation sessions using tools such as Lovable are embedded into projects, and generative UI methods enhance rapid experimentation and A/B testing.

Parallel to this, Accenture Song introduces GEO services to ensure AI interpretability of client products. In the second horizon, client pilots test malleable software principles with end-users. Key milestones include acquiring new projects by mid-2026 and ultimately offering adaptive, product-agnostic solutions.

Digital product offering (D&DP)

The product track progresses from basic customization toward generative elements, beta releases, fully malleable interfaces and ultimately product-agnostic solutions. Continuous user testing in early horizons uncovers client- and context-specific needs.

Digital products are designed for seamless LLM integration, while community-driven platforms enable users to share and learn customization practices. Over time, this supports broader adoption of malleable interaction paradigms.

Tools

GrowthOS serves as the central backbone across all horizons.

- *Horizon 1*: PowerPoint complements interactive demonstrators; Lovable supports ideation and co-creation; Figma Make enables refined prototyping.
- *Horizon 2*: Focus shifts to building malleable products using AI-first development environments such as Claude Code, Vercel and Cursor, alongside human-in-the-loop workflows.
- *Horizon 3*: Tooling remains undefined to maintain strategic flexibility.

Expected outputs

- *Horizon 1*: Tailored client demonstrators, a POV on malleable software, an internal toolkit and initial client projects.
- *Horizon 2*: A standardized playbook, GEO-optimized products, modular design systems and expanded pilot projects.
- *Horizon 3*: Fully malleable digital products, scaled malleable workflows and a comprehensive malleable product portfolio by 2028.

Value creation

Value is created across three dimensions:

- **Accenture Song**: Early efficiency gains and stronger client engagement, followed by increased project acquisition and validated malleable solutions, supporting a transition toward software-based revenue streams.
- **Clients**: Low-risk experimentation via pilots, improved AI interpretability, enhanced engagement through interactive prototypes and higher customer retention.
- **End-users**: Progressive involvement through feedback, beta participation and community learning, culminating in fully hyper-personalized, product-agnostic digital experiences.

Tactical Roadmap - Malleable Software

Horizon 1 | Horizon 2 | Horizon 3

H1 2026 | H2 2026 | 2027 | 2028

Establish foundation & tailored demonstrators

Improve internal design process with malleable software tools and engage clients by showing potential of malleable software in digital products

Pilot, standardize & measure impact

Set up pilots at clients to develop and test digital products with malleable software principles

Launch & scale

Launch first digital products with malleable software principles for clients

North Star Vision

Accenture Song's offerings evolve into adaptive, customizable digital experiences that enhance end-user value, built on malleable software foundations

Internal solutions

- Identify tools → Evaluate tools → Develop toolkit → GrowthOS integration → Develop playbook → Standardize playbook → Enterprise workflow integration → Fully adaptive workflow
- Develop trainings → Provide trainings
- Process transition
- Global alignment
- Include SWAT team

Leader in malleable software transformation

Service offering

- Create POV → Tailored demonstrators → Engage clients
- Offer malleable software tools
- Offer adaptive workflows
- Co-creation sessions → A/B tests GenUI
- New projects
- Set up pilots → Gather end-user feedback
- GEO optimization

Clients adopt adaptive workflows

Digital product offering

- Basic customization → First generative elements → Beta versions → Malleable customization → Product-agnostic solutions
- User testing
- Launch malleable products
- LLM integration
- Include digital communities

Product-agnostic hyper-personalization

Tools

Output

	Internal playbook	Optimized GEO products	Launch malleable digital products	Expand malleable product offering
≥ 4 Demonstrators				
Internal toolkit				
New POV	≥ 2 client pilots	Modular design system	Embed new tools in enterprise workflow	Global offering
≥ 3 projects using new tools				

Values

Business	Process efficiency	Client engagement	Acquire new projects	Impact validation	Leader of transition	New revenue stream	
Clients	Explore without risk	Feel empowered	New offering	AI-integration	Early adopters	Improve UX	Customer retention
End-users	Explore customization	Provide feedback	Premium functionality	Learn customizing	Product-agnostic customization	Improved hyper-personalization	

Accenture Song

Figure 66: Tactical Roadmap

06

Key Takeaways

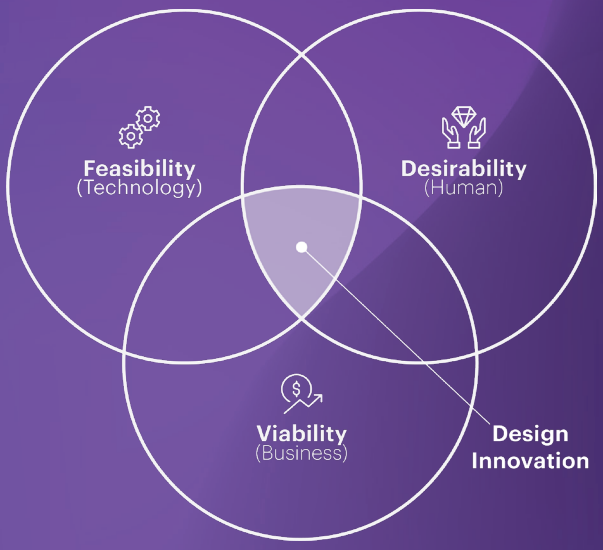
- The **demonstrator** can be used by Accenture Song in POVs and RFPs to engage clients
- The **MINT intervention framework** provides D&DP an implementation strategy of malleable software tools into the design and develop process
- A **strategic roadmap** outlines an overal strategy for Accenture Song towards a malleable software transition
- A **tactical roadmap** provides step-by-step actions to follow the transition strategy
- To hand over the outcomes to Accenture Song, a **hand-over PowerPoint** is created

07

Validation

To validate the relevance of the design outcomes, a holistic validation approach was used. The strategy and concept are evaluated across the three lenses of innovation (Figure 18). This framework helps assess whether the design outcomes create value for humans (Accenture Song's clients and their end-users), the business (Accenture Song's business model) and whether they are technically feasible to build.

This framework is commonly used within Accenture Song, ensuring alignment with its established approach to validating new strategies and digital products.



7. Validation

The validation of this thesis follows two complementary directions.

- First, it evaluates the ***prototype*** and ***demonstrator*** to assess the value of hyper-personalized digital products.
- Second, it evaluates the ***MINT framework*** and ***roadmaps*** to assess their value as internal instruments for integrating malleable software within Accenture Song.

Together, these validation activities assess both product-level impact and organizational adoption potential of malleable software within Accenture Song.

7.1 Hyper-Personalized Digital Products

Desirability

Desirability was assessed against the consolidated list of requirements derived from contextual research, including literature reviews, trend analysis, synthetic user interviews, diary study and prior research on Gen Z financial behavior.

These sources consistently indicate that Gen Z users expect digital financial products to provide:

- Customization
- Dynamic adaptation
- User control within structured boundaries

Low-fidelity prototype testing with Gen Z participants confirmed these insights. Participants interacted with a customizable banking interface and reflected on perceived value and unmet needs. Increased levels of personalization were consistently experienced as engaging and relevant, particularly when flexibility did not compromise clarity.

This validates that structured hyper-personalization aligns with identified user needs.

Importantly, while the prototype was instantiated within the financial context, the validated user preferences are not domain specific. These expectations are increasingly observable across digital products, like health platforms, education environments and e-commerce applications. The findings therefore suggest that the design principles embedded in the prototype have broader applicability beyond financial services, contributing to the wider discourse on adaptive digital product design.

Feasibility

Feasibility was assessed through literature review and expert interviews.

Technological developments in generative UI systems and adaptive interfaces indicate increasing maturity of malleable software infrastructures. An exploratory interview

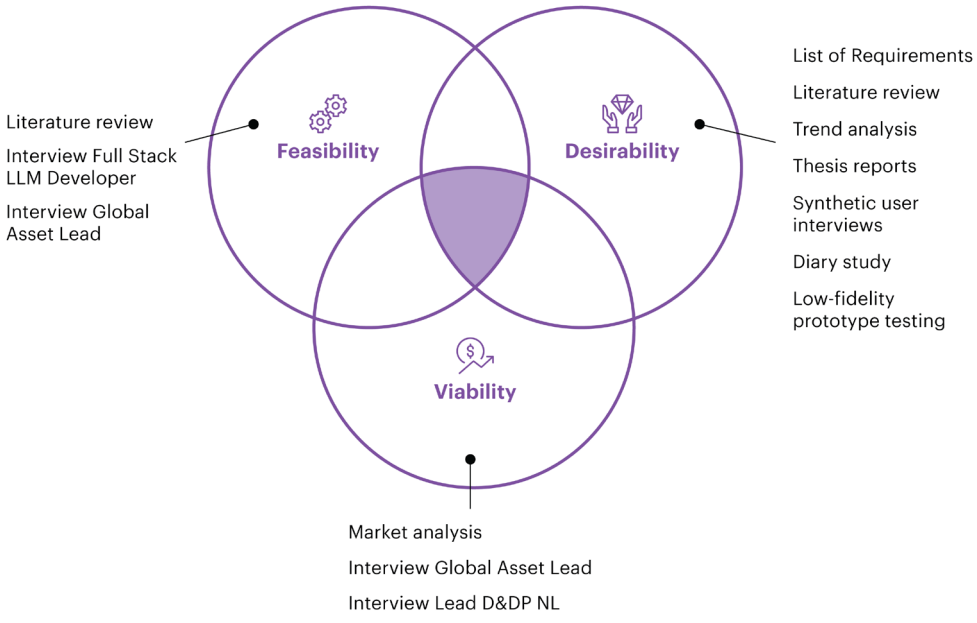


Figure 67: Validation methods for the prototype & demonstrator

with a Full Stack LLM Development Associate Manager confirmed that scalable implementation is technically plausible, provided robust guardrails and data governance mechanisms are embedded.

The Global Asset Lead further indicated that improvements in generative UI rendering speeds are progressing rapidly, suggesting a maximum of 18 months for this technology to be deployed successfully.

While full production-readiness requires further maturation, the trajectory of technological development supports the technical feasibility of the proposed prototype.

Viability

From a business perspective, the Global Asset Lead indicated a strategic shift within Accenture Song toward increasing software-driven revenue stream (targeting 20-30% revenue).

Hyper-personalized digital products align with this ambition by enabling scalable software propositions rather than purely FTE-based consulting models.

Market signals further support viability. Neobanks such as Revolut and bunq already offer limited customization features, while traditional banks such as ABN AMRO are incrementally adopting personalization elements. Although these features remain constrained, they signal increasing customer expectations around adaptability.

This competitive landscape creates clear strategic opportunities for Accenture Song to support clients in advancing toward more sophisticated malleable digital products. Beyond financial service clients, the eight interaction principles and inspiration of the final prototype can be used by Accenture Song to develop tailored demonstrators for clients in other industries.

7.2 Malleable Software Integration

Desirability

The desirability of the MINT framework was validated during a co-creation sessions and subsequent reflection session with D&DP employees.

Participants applied the malleable software tool Lovable to move from idea generation to functional prototypes within a significant shortened timeframe. During reflection, employees identified clear added value, particularly in:

- Early concept development
- Client co-creation workshops
- Rapid validation phases

Expert interviews reinforced these findings. Both the D&DP NL Lead and Global Asset Lead confirmed that comparable tools are already being experimented with across international teams and are perceived as valuable accelerators in the design process. The Global Asset Lead referenced a recent engagement in France for a major cosmetics corporation, where Accenture Song facilitated co-creation sessions using a tool comparable to Lovable. As stated by the Global Asset Lead: *"The client felt so empowered by these kinds of design tools"*.

These findings validate that the MINT framework addresses a real internal demand for structured integration of malleable software tools.

Feasibility

Feasibility of MINT was assessed through infrastructural alignment and tool maturity.

The framework builds upon existing tools and infrastructures, including GrowthOS, which can function as an integration backbone within the design and development workflow. Additional tools proposed in the framework (e.g., coding assistants) are commercially available and improving rapidly.

This design project itself demonstrated that interactive prototypes could be generated using these tools, validating short-term feasibility at the prototype level.

While full-scale production systems require further technological stabilization, the interview with the Global Asset Lead indicated expected maturity within approximately 12 – 18 months. This supports phased implementation through the proposed roadmaps.

Viability

Viability was evaluated through strategic interviews and reflection insights.

The Global Asset Lead indicated that malleable software tools can reduce product validation phases by approximately 50% and compress project timelines from several months to significantly shorter delivery cycles. This efficiency gain directly impacts profitability and scalability.

Employees further noted that rapid transition from idea to prototype frees time for higher-value strategic activities. The D&DP NL Lead emphasized that embedding GrowthOS more consistently could streamline cross-team alignment and increase operational efficiency. The strategic and tactical roadmaps were validated in interviews focusing on:

- Process integration
- Service implications
- Alignment with GrowthOS
- Long-term scalability

Both leads confirmed that the proposed phased integration reduces organizational risk and aligns with Accenture Song's ambition to scale software-driven offerings.

Additionally, role transformation toward smaller, strategically oriented teams suggest that MINT not only integrates tools but support a future-proof organizational model.

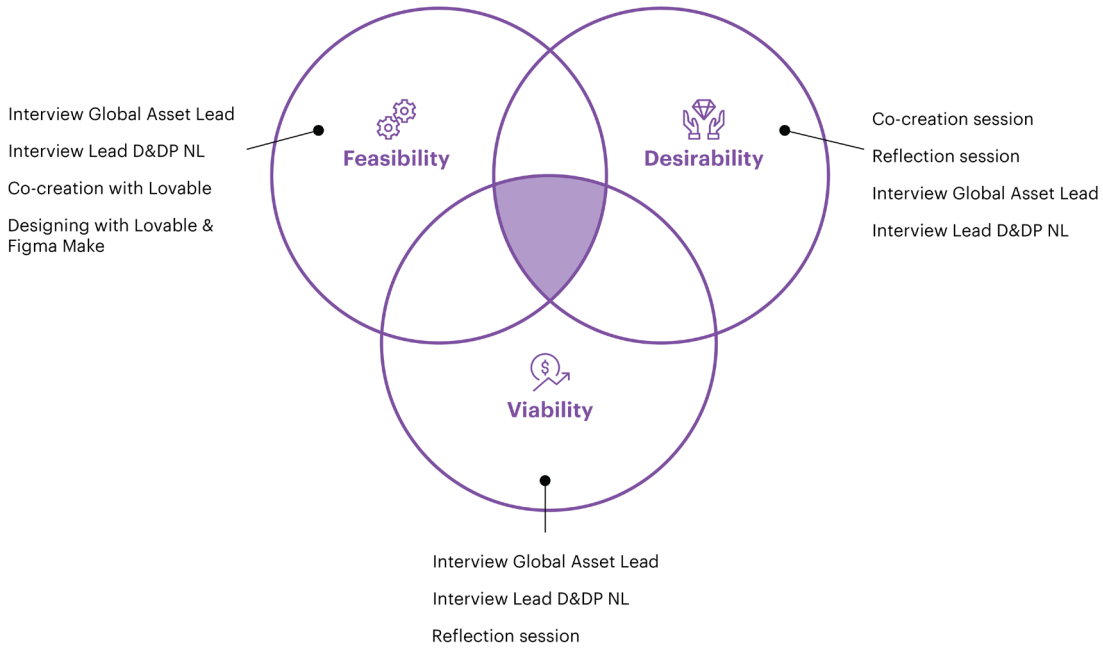


Figure 68: Validation methods for the MINT framework & roadmaps

07

Key Takeaways

- The design outcomes are validated across the three lenses of innovation
- This **prototype** and **demonstrator** have proven desirability, feasibility and viability of malleable software in digital products to improve hyper-personalization
- Additionally, this project has proven desirability, feasibility and viability of the **MINT framework** and **roadmaps** to improve D&DP's design process and Accenture Song's overall strategy

8. Conclusion

This thesis addressed the research question: ***"How can Accenture Song apply malleable software principles to design adaptive, user-centric digital products within the context of hyper-personalization?"***

This question is answered through the integrated outcomes: a strategic and tactical roadmap, the MINT intervention framework, eight interaction principles and the digital financial product prototype demonstrating malleable software in practice. Together, these outcomes illustrate how malleable software can be applied at product, process and organizational levels within Accenture Song.

Current state of hyper-personalization and malleable software

Current hyper-personalization strategies rely on system-driven adaptation. While effective in increasing engagement, these approaches often limit user agency. Research indicates that user-driven customization enhances efficiency, satisfaction, accessibility and personal agency.

Malleable software shifts control from system to user by enabling active interface configuration rather than passive system adaptation. This thesis identified eight interaction principles to leverage malleable software for hyper-personalization purposes in digital products. For Accenture Song, the most relevant principles include balancing user customization, providing clear and supportive interface navigation, supporting Gen Z's financial wellbeing and enabling easy and conversational interaction.

Gen Z needs and design requirements for digital financial products

Gen Z demonstrates a strong need for meaningful customization. They value the ability to modify UI elements while receiving structured guidance through onboarding, pre-made widgets and AI-supported suggestions. Crucially, AI assistance must remain optional and transparent to preserve user control and prevent cognitive load.

Gen Z expects conversational interaction through chat and voice, clear explanations of system behavior and direct manipulation of suggested changes. Transparent AI-generated content, intuitive navigation, shortcuts and contextual guidance are essential for providing customization.

To support financial wellbeing, users expect proactive budgeting support, clear financial health indicators, expense categorization, cross-platform overviews and customizable notifications and nudges. These insights were translated into a list of requirements, which informed the development of the final prototype.

Designing digital products with malleable software

The prototype functions as an interactive demonstrator of hyper-personalized financial experiences and can support client engagement with POVs and RFPs.

The MINT framework outlines how D&DP can integrate malleable software into existing workflows and scale it organizationally. The strategic and tactical roadmap translate the project insights into a three-layer strategy: digital product offerings, service offerings and internal process. This strategy guides implementation over the next eighteen months.

The prototype, framework and roadmaps were validated through generative design methods, co-creation and reflection sessions, and interviews with the Global Asset Lead and the D&DP NL Lead.

Overall contribution

This thesis demonstrates that malleable software provides Accenture Song with a viable pathway toward adaptive, user-centric digital products. By translating a theoretical concept into interaction principles, a validated prototype, an implementation framework and actionable roadmaps, the project bridges theory and practice. Malleable software is positioned as both a design capability and a strategic opportunity to strengthen hyper-personalization, client engagement and long-term digital product innovation.

9. Discussion

One of the key insights from this design project is the distinction between system-driven adaptation and malleable user-driven customization for hyper-personalization. The literature review shows that many digital products rely on algorithmic optimization with rigid systems. While such approaches can increase user experience, they often lack the flexibility to adapt to personalization needs of different customers.

The findings of this project suggest that malleable software offers a fundamentally different approach. Instead of optimizing within fixed boundaries, malleable systems allow those boundaries themselves to change over time. This reframes hyper-personalization from a purely optimization-driven challenge into a design problem concerned with adaptability, openness and user agency. However, this also introduces complexity, as increased malleability requires improved data governance and security, and inconsistency of brand principles must be addressed.

A second important discussion point concerns the impact of rapidly evolving malleable design and development tools. During the project, developments in Generative UI, tools such as Lovable and Figma Make, and build environments like Vercel and Cursor progressed at a pace that outstripped existing academic literature. The Global Asset Lead described his role as working in a gray area in which we currently are positioned, which aligns with the gray area in which this design project is positioned. As a result, insights form the literature review became partially outdated during the process. While the most innovative insights were gathered from product developments in this area and a published paper by Google about Generative UI.

This highlights a broader methodological challenge for design research in emerging technological domains. While academic literature provides theoretical grounding, practice-driven experimentation and expert insights become increasingly important when technologies evolve faster than formal research cycles. For Accenture Song, this reinforces the value of a design-led exploratory approach, while also raising questions about how to validate relevance of new innovations.

Thirdly, this design project primarily focused on the front-end design and experience layer of digital products, while the back-end implications of malleable software were not researched in detail. Nevertheless, understanding back-end systems is highly relevant and needs further research. As emphasized by the Global Asset Lead: *"Designers need to understand data models better because the data you can ingest should impact your design"*. This highlights the structural dependency between interface malleability and underlying data architectures. Such integration is particularly critical for Accenture Song, given its strategic ambition to evolve from a predominantly service-based consultancy toward a hybrid model that also delivers scalable software solutions.

The in-depth interviews surfaced several organizational tensions related to the rise of malleable software, which is expected to fundamentally reshape the roles of designers and developers. As emphasized by both the Global Asset Lead and the D&DP NL Lead, future teams may require fewer designers and developers, while placing a greater emphasis on strategists. The Global Asset Lead noted, *"I think that the barrier of being a designer is going to decrease quite quickly, as people who know what good design is can create it with AI."* Adapting to this shift represents a significant organizational challenge, as it requires changes in team composition and new skills related to new malleable tools within Accenture Song.

Finally, the current generation of malleable software tools for both designing and developing digital products is improving rapidly. Although the quality of generated digital products is not yet consistently sufficient for full-scale product launches, the Global Asset Lead suggests that this level of maturity is likely to be reached within approximately eighteen months. This projected timeframe provides Accenture Song with a strategic window of opportunity to adopt malleable software principles, refine the internal workflow and further develop its service offerings in anticipation of these technological advancements.

10. Limitations & Recommendations

This chapter reflects on the limitations of this design project and outlines recommendations for future research, design practice and organizational adoption. The limitations are discussed across methodological, conceptual, technical and organizational dimensions, followed by forward-looking recommendations that build on the project's findings and the application of malleable software principles within D&DP.

10.1 Limitations

A primary limitation of this thesis lies in its domain focus. The design exploration and final prototype are grounded in the financial services context, with a particular emphasis on Gen Z users and daily financial interactions. While the resulting design principles are framed to be used across various industries, their validation is inherently shaped within the financial domain. The applicability of these principles in other industries has not been empirically tested in this project.

Malleable software serves as the central theoretical foundation of this thesis, yet the concept itself is still evolving within both academic and professional discourse. While the project translates malleable software theory into concrete interaction and product-level design principles, these interpretations remain in the gray area. As the Global Asset Lead emphasized, it is a nice job to explore the gray area, but there is also uncertainty.

As a result, this thesis contributes to generating design knowledge rather than theory validation. The lack of established benchmarks or standardized evaluation criteria for malleable software limits the ability to quantitatively assess its effectiveness compared to more traditional personalization or configuration paradigms.

Currently, malleable software design tools are not good enough to design digital products of good quality without manual adjustments yet. The output of Lovable still required adjustments and was often not corresponding all requests perfectly. Moreover, this output of malleable software tools make development even more difficult at this moment, which means that manual adjustment is still required.

Data governance and security stood out during interviews as a key limitation in developing digital products containing malleable software principles. A Full Stack LLM Developer also stressed that without guardrails users could misuse their ability to customize a digital product freely.

Lastly, this design project focused on front-end design of user-centric digital products. However, the back-end design of malleable digital products is also highly important for Accenture Song when developing digital products. Malleable software development tools, like Vercel and Cursor have not been explored within this design project.

10.2 Recommendations

Future research should focus on empirically validating malleable software principles in digital products across multiple industries and end-users. To be more specific, research into customization needs for other type of digital products than financial tools, can improve digital product design. It is key here to build more prototypes and test these to generate design knowledge.

In addition, further research could explore how data governance and security must be designed to develop safe digital products. This will build a better foundation for back-end design of digital products containing malleable software principles. Also, developers must dive deeper into creating guardrails in digital products containing malleable software to prevent end-users from misusing the customization functionality.

The MINT framework provides an intervention for the design and develop process for D&DP, but the efficiency of working with these tools and the quality of the digital products should be measured. There is still a lot of opportunity to explore how to most efficiently design a workflow moving from rapid prototyping with malleable software design tools to developing a final product with malleable software. There are tools identified in this project that can assist during the Develop phase (e.g., Vercel, Cursor and Claude Code), but these tools require further exploration by D&DP employees to identify their potential. Additionally, reflective sessions with employees should be facilitated to integrate new tools and tasks in a way fitting the needs of employees.

Besides the discovered tools, there will be more relevant tools launched and developed in the coming 18 months. Accenture Song should monitor developments in this area to apply the right malleable software tools into the full innovation cycle.

Finally, from the in-depth interviews it became clear that less designers and developers are required to work on the same project at the same time, with help of new malleable software tools. Developments of these tools will impact the quality delivered by these tools and could therefore impact team composition. Future research should explore how the role division within teams can be optimized.

11. Reflection

This graduation project addressed a highly complex and evolving topic, situated in a gray area shaped by rapid developments in malleable software and AI. Throughout the project, the field continuously evolved, with new tools, updates and startups emerging. An example is the Generative UI generation offering in Gemini 3.0, which is launched somewhere halfway the project. This dynamic context required constant adaptability and critical reflection and reinforced the importance of design not only for current capabilities but for ongoing change.

A key learning outcome of this project was the development of facilitation skills. I gained hands-on experience in developing and facilitating a co-creation and a reflection session, which proved essential for translating abstract technological developments into shared understanding and actionable design insights. Conducting in-depth interviews with highly experienced professionals, including Accenture Song's Global Asset Lead, further strengthened my ability to engage in strategic-level conversations and integrate expert perspectives into the design process.

Throughout the project, a central ambition was to inspire designers, strategists and developers by demonstrating innovative, AI-driven tools and workflows. An important realization was that the true value of these tools lies not in the technology itself, but in how they are strategically integrated into existing workflows. This includes leveraging AI for different purposes, such as internal product development, client engagement or end-user customization, rather than treating it as a singular solution.

It was particularly rewarding to see how this design project sparked curiosity and discussion within Accenture Song. Employees become inspired and initiating conversations around the topic emphasized the relevance of experimentation and learning in this emerging domain. Presenting the project outcomes to both the D&DP practice and to everyone at Accenture Song Netherlands enabled the sharing of knowledge generated through this thesis and reinforces its practical impact.

Overall, this project was both challenging and enjoyable, precisely because it embraced experimentation, learning and uncertainty. I am grateful for the extensive support from Accenture Song and for the opportunity to conduct this research within a professional setting, which significantly contributed to my growth as a strategic product designer.

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