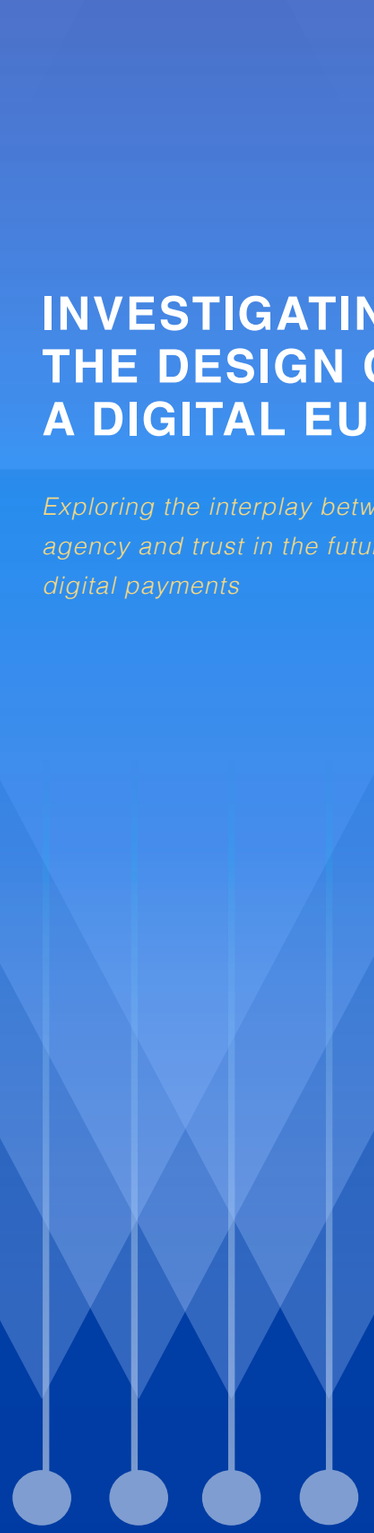
TU Delft

De Nederlandsche Bank
EUROSYSTEEM

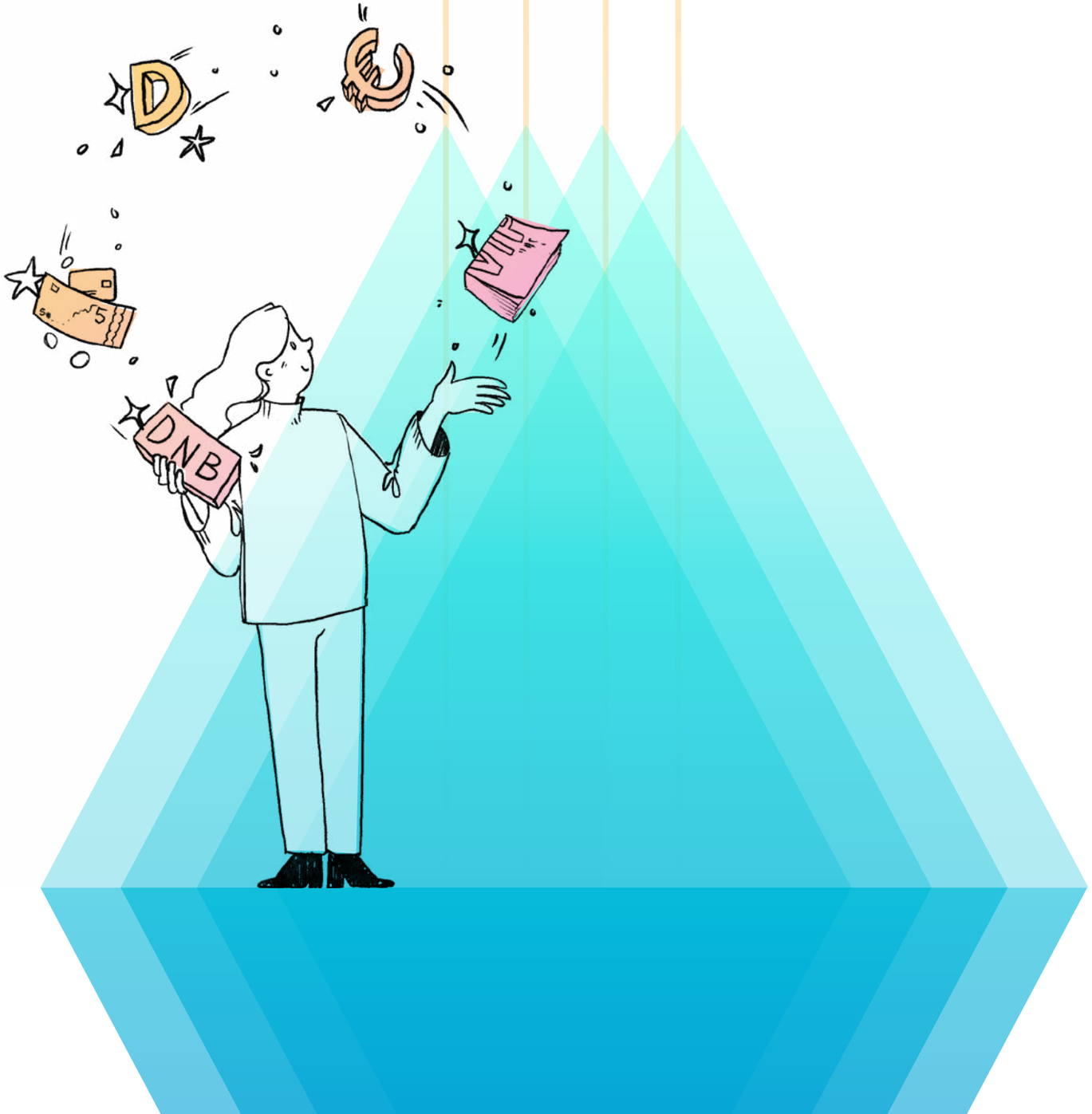
INVESTIGATING THE DESIGN OF A DIGITAL EURO

Exploring the interplay between agency and trust in the future of digital payments



Master Thesis
Sterre Witlox
MSc. Integrated Product Design

February 2025



INVESTIGATING THE DESIGN OF A DIGITAL EURO

Exploring the interplay between agency and trust in the future of digital payments

Sterre Binskjen Anne Witlox

Master Thesis
MSc. Integrated Product Design
Faculty of Industrial Design Engineering
Delft University of Technology

Supervisory team
Prof. ir. Matthijs van Dijk
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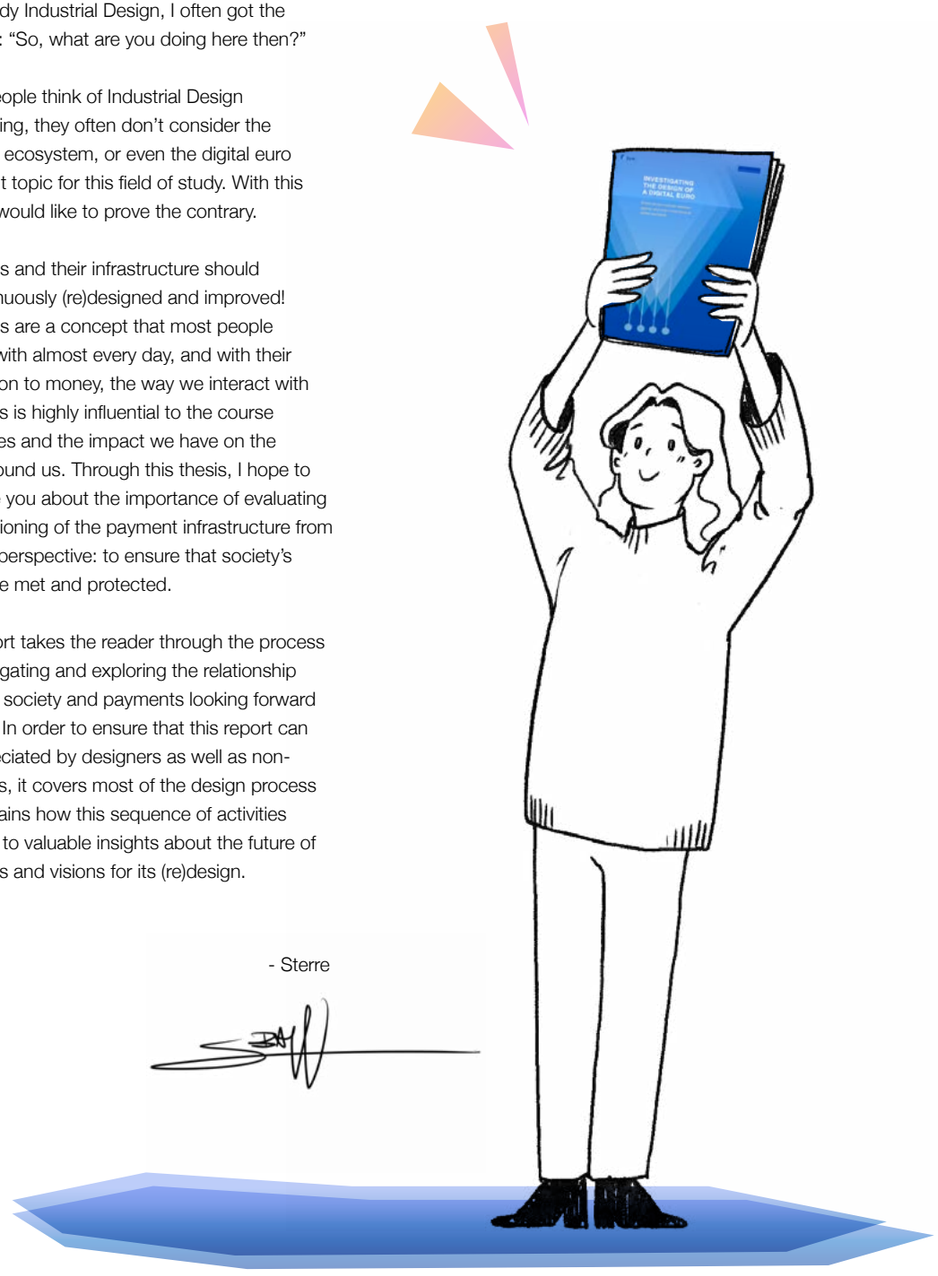
PREFACE

When I told people at De Nederlandsche Bank that I study Industrial Design, I often got the question: “So, what are you doing here then?”

When people think of Industrial Design Engineering, they often don’t consider the payment ecosystem, or even the digital euro a relevant topic for this field of study. With this thesis, I would like to prove the contrary.

Payments and their infrastructure should be continuously (re)designed and improved! Payments are a concept that most people interact with almost every day, and with their connection to money, the way we interact with payments is highly influential to the course of our lives and the impact we have on the world around us. Through this thesis, I hope to convince you about the importance of evaluating the functioning of the payment infrastructure from a public perspective: to ensure that society’s needs are met and protected.

This report takes the reader through the process of investigating and exploring the relationship between society and payments looking forward to 2035. In order to ensure that this report can be appreciated by designers as well as non-designers, it covers most of the design process and explains how this sequence of activities can lead to valuable insights about the future of payments and visions for its (re)design.



- Sterre

ACKNOWLEDGMENTS

I feel highly fortunate to conclude my time as an industrial design engineering student with this project. The topic of payments and the philosophical questions surrounding it have engaged me deeply, but especially the support I have received in the process has allowed me to work on it with joy until the last minute.

First, I would like to express my gratitude to my supervisory team from TU Delft, Matthijs van Dijk and Jaap Daalhuizen, who have supported me from the design side.

I would like to thank Matthijs for his enthusiasm for the project from the very first moment. Our meetings had an extremely energizing effect on me, and it was a pleasure learning about the ViP methodology from you. I really enjoyed our meetings at your office, pulling me out of my regular context, even though the road there was not always the smoothest ;)

Jaap, I would like to thank for our low-stress weekly meetings that gave me an opportunity to land and gather my thoughts at such regular intervals. The wide domain of this project and the complexities of the surrounding context were often a source of confusion. Your ability to summarize my barrage of thoughts with a simple sentence: “So what I think you are saying is....”, was extremely helpful in organizing this chaos. I also appreciate your tendency to say “have fun” rather than “good luck” whenever we went our separate ways. I think that reminder to enjoy the process greatly contributed to the results that were ultimately achieved.

I would also like to thank the supervisors assigned to me from De Nederlandsche Bank, Anneloes van Gent and Huib Klarenbeek, for their enthusiastic engagement with the topic and their open-mindedness toward the creative design process. For non-designers, the design process can be difficult to follow at times, especially the Vision in Product design methodology. Huib and Anneloes’ enthusiasm and open-mindedness allowed me to create with high levels of creative freedom while receiving frequent and valuable insights about the world of payments. I also felt highly welcomed into the wider RBO team and will look back fondly on the weekly stand-ups, where we extensively discussed the highlights of the past weekend.

Next, I would like to thank anyone with whom I spoke about my project during the last six months. This thesis occupied most of my thoughts and actions, and I’m sure my friends, family, and acquaintances noticed. As payments are a concept that virtually everyone interacts with, and the digital euro is especially mysterious and intriguing, I have been able to enthusiastically and extensively discuss my project with many people, greatly helping me develop my position as a designer in this domain.

Of those who had to be bothered with my endless philosophizing about payments, I would specifically like to thank a couple of people. Matthias, who has supported me greatly and who will be pleased to know his girlfriend’s brain is returning from thesis-land; My parents, who have always supported my creative and academic passions and whom I can count to lean upon; and my friends from industrial design, who have filled many coffee breaks with inspiring conversations.

The last honorable mention is the Design Drawing Staff, not only for their (emotional) support during this thesis but especially for the past six years, during which I have had the pleasure of assisting in drawing classes. Their confidence in me as a second-year student to become a teaching assistant has allowed me to grow and become the designer I am today.

EXECUTIVE SUMMARY

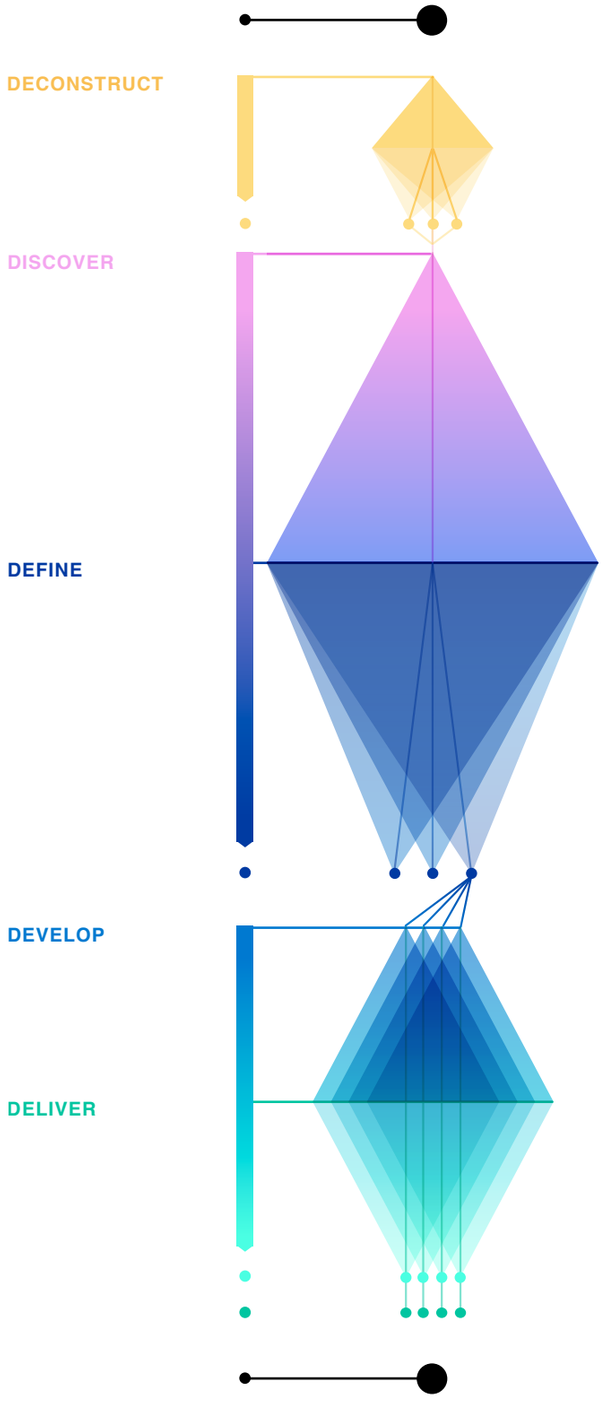
Society is becoming increasingly digital and as a result, digital means of payment are rising in importance. Faster, more efficient, and increasingly accessible payments in the Netherlands have caused a decline in the use of cash, as many consumers and merchants choose private payment methods over central bank money (Betaalvereniging, 2024). As the use of cash dwindles, the key values associated with central bank money such as inclusivity, privacy, resilience, or usability across Europe might no longer be secured.

In response, the euro system, consisting of 20 central banks of the euro area including the European Central Bank and the Dutch Central Bank, is working on the introduction of the Digital Euro: a new form of central bank money designed to address these challenges (European Central Bank, 2024). While the policy level vision for the digital euro is strong, improving resilience of the European payment infrastructure, vision about the value on an individual level should be deepened and translated to the design of the Digital Euro. In order to achieve this policy level vision it is important that consumers and merchants adopt the payment method as a result of the value it brings them.

This thesis investigates how society interacts with payments today, anticipates how these interactions are likely to evolve, and identifies how DNB and other stakeholders in the Netherlands' payment infrastructure should intervene through the design of the digital euro.

The study is approached using the Vision in Product Design methodology, to create a design vision for the Digital Euro based on the emerging challenges from the investigated likely future vision. This project answers the following 3 research questions:

- "What are the main design challenges in the current relationship between society and payments?"
- "Which design challenges emerge as a result of the changing relationship between society and payments in the Netherlands by 2035?"
- "Upon which of the challenges emerging from the changing relationship between society and payments can DNB intervene through the design of the digital euro?"



DECONSTRUCT

To better understand the starting point of this thesis, the product "payments" is analyzed on three interconnected levels: product, interaction and context level. The shift from public to private payments has intensified the conflict between the public role of the payment infrastructure and private actors facilitating it. Three challenges impairing the current relationship between society and payments are identified:

1. **MARKET LIMITATIONS FOR ACCESSIBILITY**
2. **(DIGITAL) FINANCIAL LITERACY**
3. **TRUST**

DISCOVER AND DEFINE

This thesis explores the evolving relationship between society and payments, with a focus on the interplay between *agency* and *trust*: The digitization of payments has shifted the power dynamic, often positioning users as either the product or the consumer in financial transactions. In this opaque digital system, individuals must rely on trust. However, identifying who or what to trust remains challenging for many. Three key challenges for payments in general arise based on three trust attitudes identified in the re-framing:

	Emerging Challenges	Future Visions
A.	**UNSAFE FINANCIAL BEHAVIOR** Blind reliance on systems not designed in the best interest of individuals.	**RESPONSIBLE DIGITAL FINANCIAL INCLUSION** Payments should empower individuals to make informed financial decisions, ensuring they understand risks and can navigate digital transactions safely.
B.	**FEELING STAGNANT AND INSIGNIFICANT** Functional use of payments without tangible connection to their broader impact.	**EXPERIENCING IMPACT THROUGH PAYMENTS** Payment systems should allow individuals to see and influence the broader effects of their financial choices, fostering a sense of agency and contribution to society.
C.	**LOW TRUST IN OTHERS AND INSTITUTIONS** Distrust and individualism that undermine collective action and social cohesion.	**TRUSTWORTHY PAYMENT INFRASTRUCTURE** A reliable, transparent, and publicly governed payment system should reinforce trust in financial institutions and ensure stability for all users.

DEVELOP AND DELIVER

From the three identified challenges, one is selected for deeper exploration and design. The designed interventions for the digital euro, illustrate solutions that are in line with DNB's mission to restore the values of central bank money while adapting to the needs of a digital society.

1. **TANGIBLE DIGITAL PAYMENTS -**
2. **SECURE DIGITAL PAYMENTS -**
3. **LEARNING DIGITAL PAYMENTS -**
4. **TANGIBLE VALUE FOR DIGITAL PAYMENTS -**

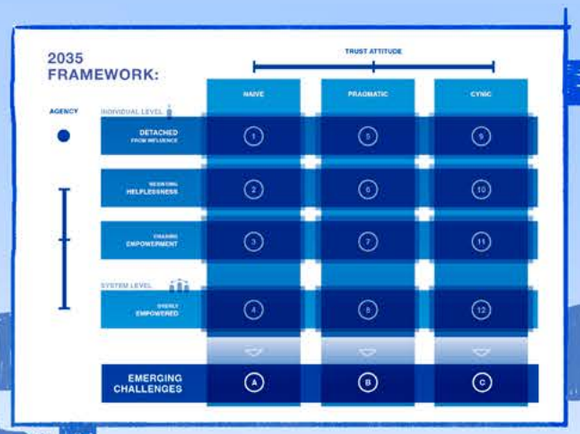
To conclude this project, the designed interventions are validated within DNB and projected along a roadmap for further development.

Rather than a conclusion, the outcomes from this thesis serve as a starting point for DNB to address the challenges emerging from the changing relationship between society and payment, through the digital euro or otherwise.

VISUAL EXECUTIVE SUMMARY

INVESTIGATING THE DESIGN OF A DIGITAL EURO

DeNederlandscheBank
EUROSYSTEEM



THREE EMERGING CHALLENGES FOR PAYMENTS 2035

- A NAIVE, RISKY FINANCIAL BEHAVIOUR
- B FEELING STAGNANT AND INSIGNIFICANT
- C LOW TRUST IN OTHERS AND INSTITUTIONS

THREE VISIONS FOR THE FUTURE OF PAYMENTS

- A RESPONSIBLE DIGITAL FINANCIAL INCLUSION
- B EXPERIENCING IMPACT THROUGH PAYMENTS
- C TRUSTWORTHY PAYMENT INFRASTRUCTURE

WELCOME!
DIGITAL PAYMENTS

FOUR CONCEPT INTERVENTIONS FOR THE DIGITAL EURO

2035

HEALTHY DIGITAL PAYMENTS

1: TANGIBLE DIGITAL PAYMENTS

2: SECURE DIGITAL PAYMENTS

3: LEARNING DIGITAL PAYMENTS

4: APPRECIATING PUBLIC PAYMENTS

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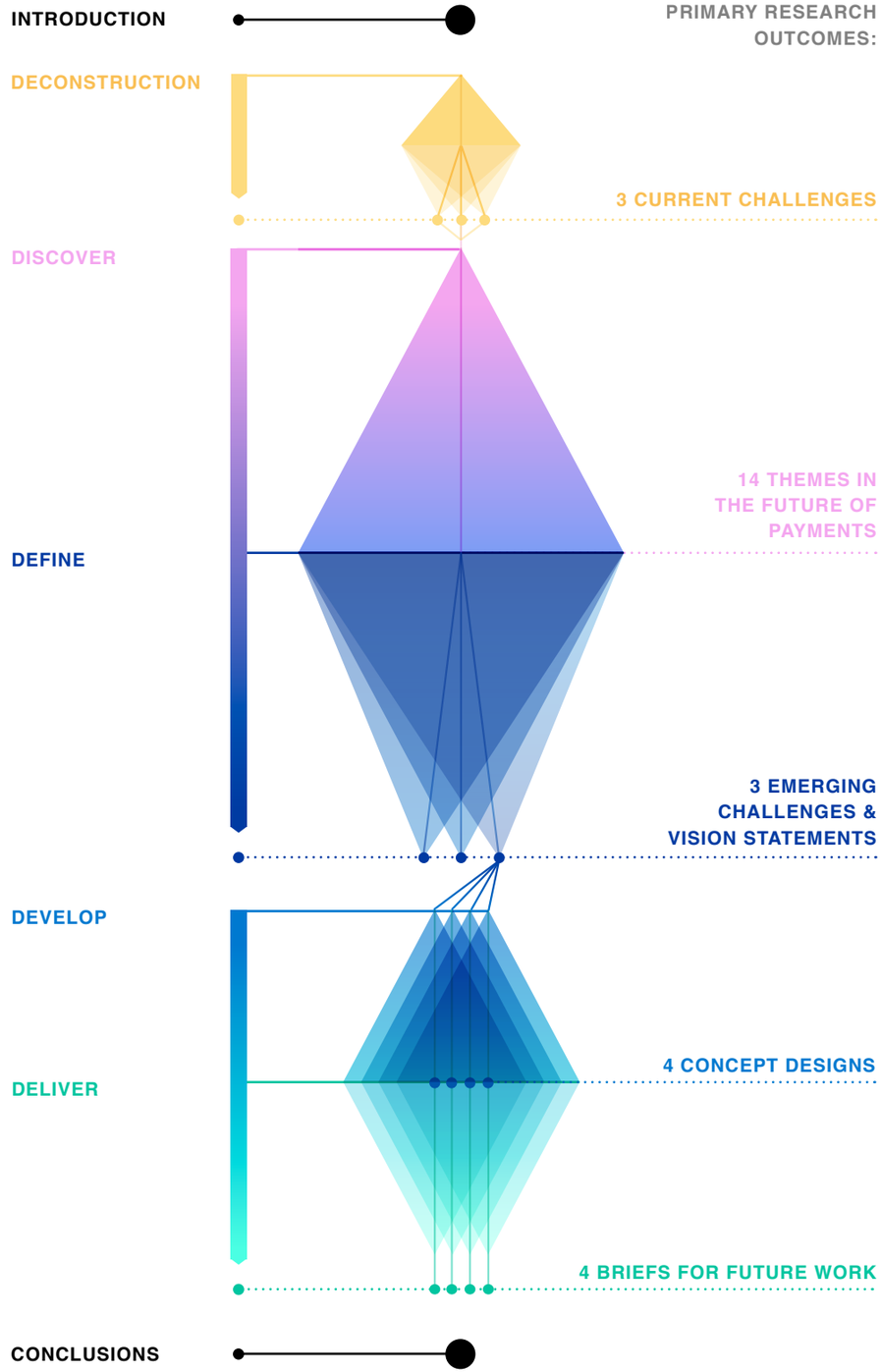


DEFINITIONS

This thesis explores concepts that may be unfamiliar to those outside the (central) banking sector. To ensure clarity for the readers of this thesis, key terms are defined to provide a common understanding and avoid confusion.

De Nederlandsche Bank (DNB) is the Dutch central bank, and a collaborator on this thesis. Their main responsibility is managing financial stability in The Netherlands.

European central bank (ECB) is the European counterpart of DNB. This institution started around the introduction of the euro system, where some countries in the European union decided to adopt one collective currency: the euro.

Central bank money is a type of money that is brought into circulation by central banks. At the time of writing this thesis, the only form of central bank money accessible for end users, consumers and merchants, is cash. The digital version of this is currently under investigation at the European Central bank: the Digital Euro.

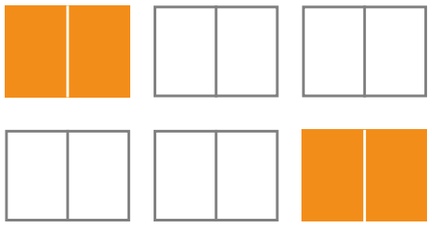
Private money is money issued by a private entity, such as commercial banks (European Central Bank, 2023). Due to the decline of cash in our payments, 7% of our money is being created though parties such as commercial banks.

Digital Euro (D€) is currently being considered to be a digital version of central bank money. The D€ is not a new currency, like crypto currencies. The value of a D€ is one on one convertible to the Euro. This definition is subject to change as a result of political or policy decisions from the D€ project at the European Central Bank.

READING GUIDE

Each chapter in this thesis represents a phase in the research approach. At the end of each phase the conclusions are separated as research outcomes.

INTRODUCTION



CONCLUSION
RESEARCH OUTCOMES

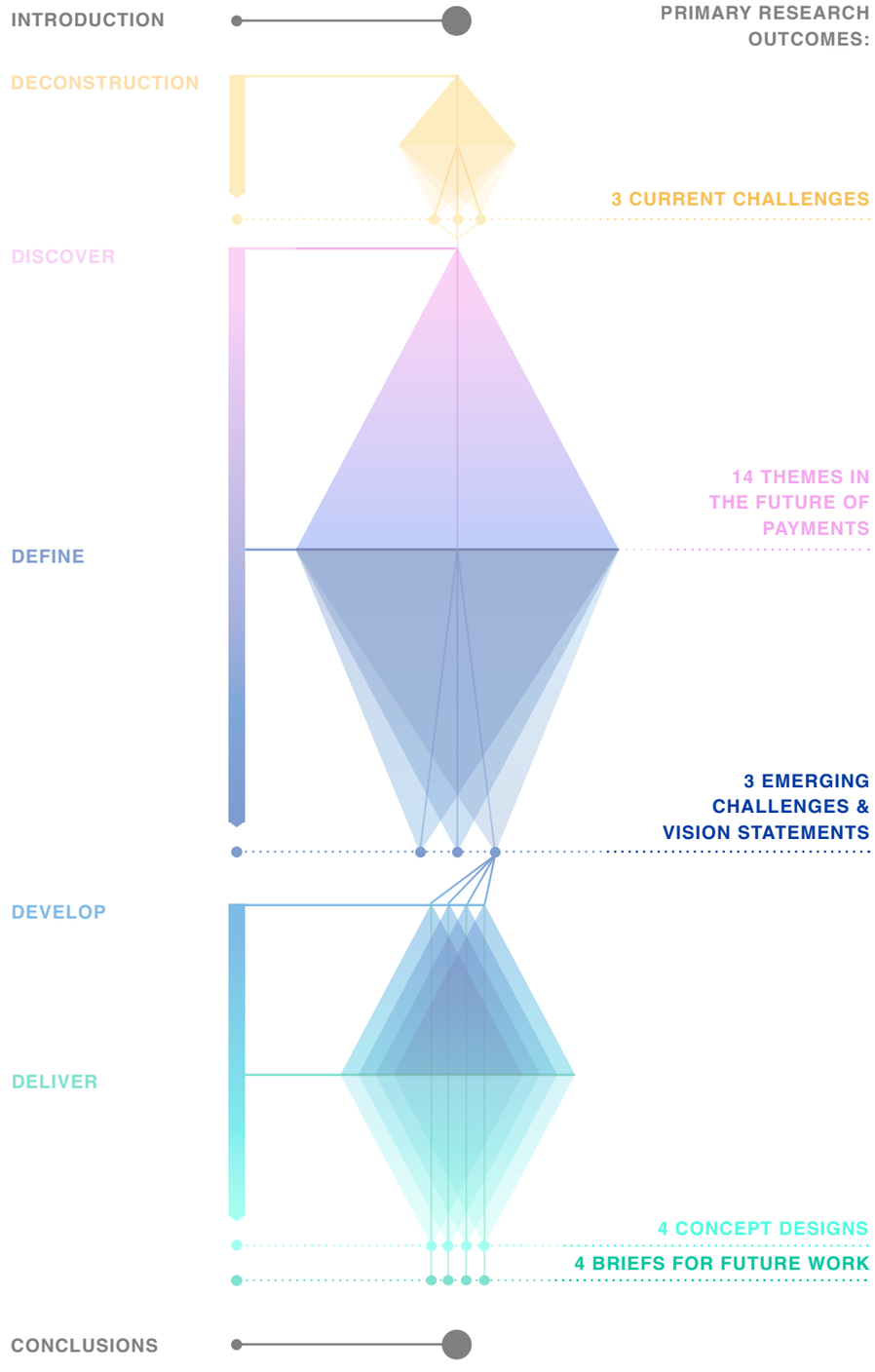
The colored pages at the beginning of each phase indicate the introduction of the purpose of this chapter and the research questions that are answered based on the body contents and the research outcomes.

The main body of the report is found on the white pages. Here you can find the explicit steps undergone during the research process and a largely chronological overview of the research.

The darker colored pages indicate the conclusions and present the primary research outcomes of each phase.

SHORT ON TIME? Please read only the introduction and concluding pages. This should give you a general overview of the outcomes of this research and their implications/purpose.

INTERESTED IN FULL APPROACH/ PROCESS? The body takes the reader along, and clarifies the research methodology better. Explanations are suitable not only for designers, but also laypersons in the field of design.



1. INTRODUCTION

With the first PIN transaction in 1985 the Netherlands saw the beginning of a transformative shift in how people interact with money. Over the years, cultural and policy changes and technological advancements have driven society away from cash towards digital payments, fundamentally altering the landscape of everyday interactions with money.

This transition has been instrumental in modernizing the Dutch payment ecosystem, offering faster, more efficient, and increasingly accessible payments through private payment providers. But is “faster, more efficient and increasingly accessible” what society needs from payments? In a world where we are becoming increasingly dependent on private companies for the design of payments, it might be valuable to take a step back and evaluate what payments should be designed for, from a public perspective.

INTRODUCTION CONTENTS **P.**

1.1 CONTEXT OF THE STUDY

In 2021, the European Central Bank (ECB) began exploring the idea of a “Digital Euro”: A digital form of central bank money, similar to a digital version of cash. As the project has evolved over the past few years, it has become clear that the Digital Euro would be a digital form of central bank money intended to complement the existing payment ecosystem with the primary goal of improving the resilience of the European payment infrastructure (European Central Bank, 2024). It aims to offer a payment method aside from cash and digital payments in stores, as well as an alternative for credit and debit cards in e-commerce transactions.

The Dutch Central Bank (DNB), a key player in this initiative, is part of the ECB’s governing council, which includes representatives from all European central banks. The DNB is actively involved in the conceptualization, development, and decision-making processes surrounding the Digital Euro.

Aside from supervision of banks, insurance companies and pension funds, DNB is responsible for the distribution and maintenance of the Dutch payment infrastructure for public and private money: Cash and digital money respectively.

In the Netherlands we see a steady decline in the use of central bank money, where currently only 20% of payments in stores are done with cash (Betaalvereniging, 2024). Additionally in an attempt to reduce money laundering and tax evasion, the Dutch government has recently voted (24 sept 2024) to limit cash purchases to 3000 euro starting April 2025. Hereby further limiting the usability of cash.

As an immediate implication of the reduced use of cash, we see the use of digital, private money increasing: more than 90% of total Dutch payments are done digitally (Betaalvereniging, 2024). This market of digital payments is currently completely in the hands of private companies such as commercial banks and private payment providers like Visa and MasterCard. This also raises concerns as the global payment infrastructure is becoming increasingly dependent on non-European companies (VISA & MasterCard)(Westberg, 2024b).

The Dutch Central Bank (DNB) recognizes and appreciates several key values of central bank money, including inclusivity, privacy, resilience, and usability across Europe. As cash use decreases, the unique benefits of central bank money are at risk of disappearing, since these values are not inherently provided by private, digital money. To maintain these values in a digital version of central bank money, DNB is lobbying for a “cash-like” Digital Euro.

The ongoing development of the Digital Euro (D€) offers an opportunity to re-evaluate the relationship between society and payments from a “public perspective”. By designing digital central bank money to meet evolving societal needs, we can ensure that the values of central bank money are preserved and strengthened in an increasingly digital world.

Figure 1: DNB’s current/previous design goal for D€: *“Cash in een digitaal jasje” (Cash in a digital jacket)*

1.2 PROBLEM DEFINITION

DNB seeks to investigate the changing payment needs within the Netherlands in order to better define the strategic direction of the Digital Euro. This initiative marks a shift in DNB's role within the Dutch digital payment ecosystem. Traditionally focused on oversight and maintenance of this payment infrastructure, DNB is now taking on an active role in designing a new digital means of payment. Rather than merely monitoring, DNB is working on the introduction of a new element aimed at enhancing the payment landscape from a perspective of public interest.

A public means of digital payment presents an opportunity to address challenges arising from the dominance of private payment providers. The current infrastructure relies on profit-driven entities, meaning not all societal needs are guaranteed to be met: if a required intervention/ product is not profitable, it risks being overlooked. The Digital Euro could introduce a more balanced payment infrastructure, ensuring accessibility and stability beyond profit incentives.

Pending political approval, the Digital Euro is expected to launch around 2030 (Nagel, 2024a). To ensure a forward-looking yet practical approach, the future visioning focuses on the year 2035. This time-frame allows us to address both the challenges anticipated at the time of the Digital Euro's introduction and those emerging in the subsequent years. Looking further ahead would introduce greater uncertainty, reducing the accuracy and reliability of the framework.

Based on this prior information and timeline, we can derive the problem statement:

DNB seeks to investigate a design vision for the Digital Euro, addressing challenges emerging from the changing relationship between society and payments in the Netherlands in 2035.

1.3 RESEARCH QUESTIONS

Given DNB's mandate to regulate the Dutch payment infrastructure, it was decided to focus the research and design towards the context of The Netherlands. To provide an answer to the problem stated previously, this thesis answers 3 research questions in chronological order.

DECONSTRUCT:
In order to determine how the relationship between society and payments is changing, it is relevant to understand payments as they exist now. In the deconstruction phase of this project the existing products, interactions and context surrounding (digital) payments are analyzed to answer the first research question:

RQ1: "What are the main design challenges in the current relationship between society and payments?"

DISCOVER & DEFINE:
In discover and define we look towards the future by collecting context factors that are expected to influence the relationship between society and payments in 2035. Based on clusters of these context factors we can define what are the underlying, driving forces behind this changing relationship, and which challenges emerge as a result, thereby answering the second research question:

RQ2: "Which design challenges emerge as a result of the changing relationship between society and payments in the Netherlands by 2035?"

DEVELOP & DELIVER:
In the develop and deliver phase, one of these emerging challenges is addressed and translated to a series of interventions, illustrating how these challenges can be used as a starting point for further design. Addressing all emerging challenges within the scope of this project is unrealistic, therefore it is valuable to support further research, which will have the opportunity to address the challenges more completely. 4 briefs for future work are developed in order to answer the third research question:

RQ3: "On which of the challenges emerging from the changing relationship between society and payments can DNB intervene through the design of the digital euro?"

It is important to note that Research Question 3 focuses specifically on interventions through the design of the Digital Euro. This deliberate choice complements the ongoing work already undertaken by DNB and aligns with the unique design opportunity presented by the introduction of a new means of payment and a new form of central bank money. However, this focus also introduces a limitation to the design space. By linking the interventions to the context of the Digital Euro, the exploration is inherently constrained. Designing without this limitation could potentially lead to alternative, innovative results and diverse forms of interventions, broadening the scope of possibilities beyond the Digital Euro.

1.4 GENERAL PROJECT APPROACH

The Digital Euro project has a clear vision at the policy level, rooted in the needs of the European Central Bank (ECB): "*to maintain financial stability within the euro system at a macroeconomic scale. As a tool, the Digital Euro aims to strengthen the euro area's strategic autonomy and monetary sovereignty by enhancing the overall efficiency of the European payments ecosystem"* (European Central Bank, 2024). However, for this "policy level vision" to succeed, widespread public support for the introduction and adoption of the Digital Euro is critical.

At the individual level, the design vision should be expanded and explored further. What unique value does the Digital Euro bring to everyday payments? What value can a form of digital central bank money bring to society? DNB is interested in the answers to these questions, particularly focused on the Dutch payment infrastructure. The absence of a well-defined vision for how individuals will interact with and benefit from the Digital Euro highlights an opportunity to leverage the Vision in Product Design (ViP) method, developed by Van Dijk and Hekkert (2016).

According to the Vision in Product design (ViP) methodology: *"Designing is about exploring what is possible tomorrow, instead of solving the problems of today"* (Hekkert & Van Dijk, 2016). This forward-looking approach enables designers to imagine and shape future relationships between society and products. By exploring how the relationship between society and payments may evolve, we can intervene more meaningfully and steer developments toward a desirable future vision.

The introduction of the Digital Euro has sparked debate, with some viewing it as an unnecessary addition to the payment infrastructure, or even a potential threat (Nagel, 2024). However, the ViP methodology emphasizes that designing is not merely about creating products; "*design is fundamentally about developing value for society and designing products that have a reason to exist"* (Hekkert & Van Dijk, 2016). The investigation of the Digital Euro offers a unique opportunity to re-examine the meaning of central bank money. Why should central bank money exist in a digital form? What role should it play in a future payment system?

The ViP approach offers a structured way to explore and define the likely and desirable future, ensuring the design of a Digital Euro aligns with both societal and individual payment needs. The pending implementation timeline of the Digital Euro (D€), expected in four to five years (Nagel, 2024a), makes this methodology particularly relevant; focusing solely on today's issues might not adequately address the challenges of tomorrow's context.

The ViP methodology is structured around two phases: deconstructing and designing. These phases involve analyzing and working across three levels: product, interaction, and context level.

In the deconstruction/preparation phase, the aim is to understand why payments exist as they do today. What qualities define current payment methods, how do people interact with them, and what contextual forces have shaped these dynamics? Through this we can understand how the context of today has shaped payments as we know it.

After the preparation phase, the process shifts direction towards designing. Instead of designing products based on the current context, ViP encourages designers to envision the conditions of a future context that should guide product development. This "context-to-product" approach, illustrated in the second half of the ViP model (figure 2), allows designers to create products that align with the aspirations and values of a future society, ensuring their relevance and impact.

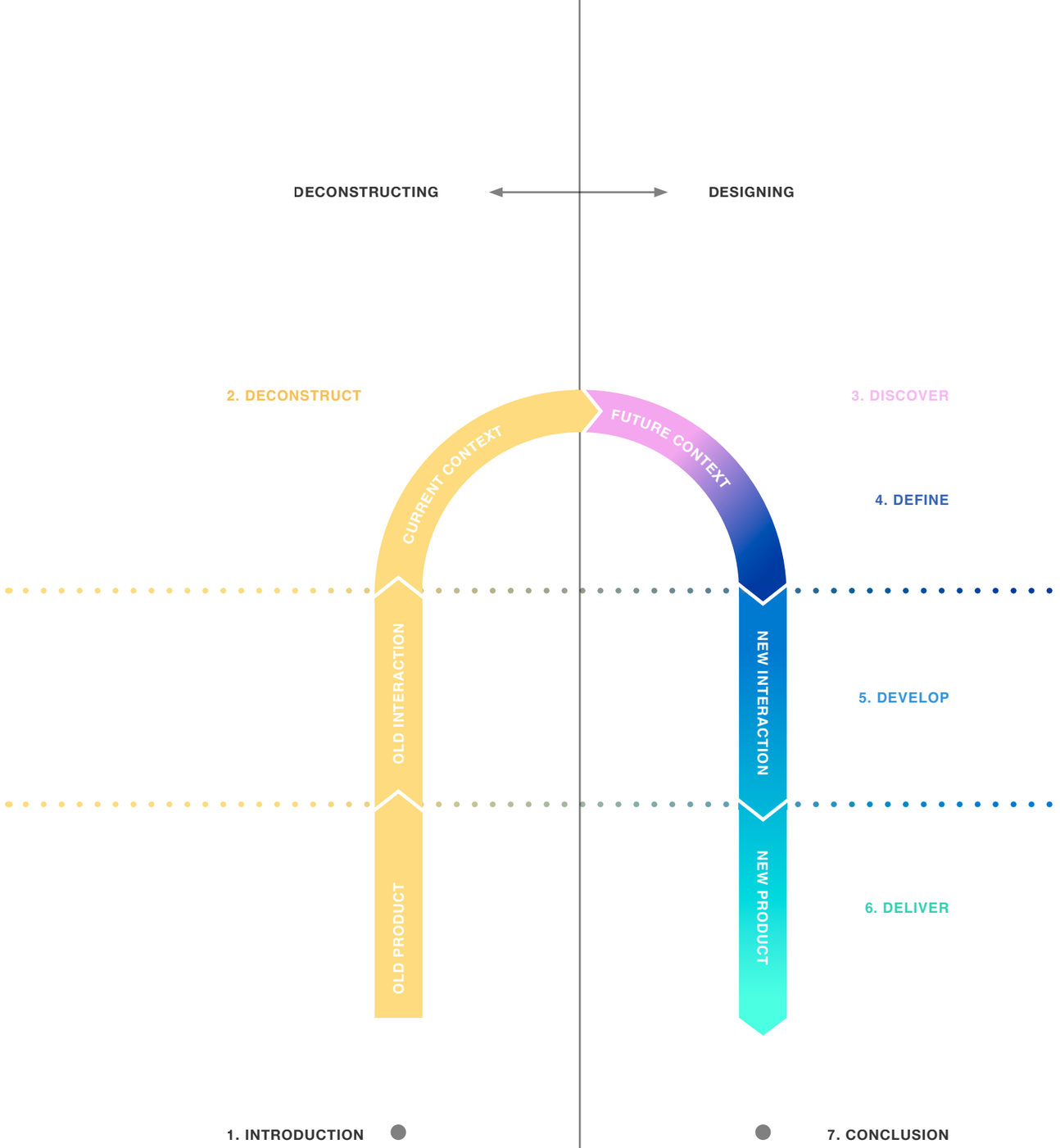
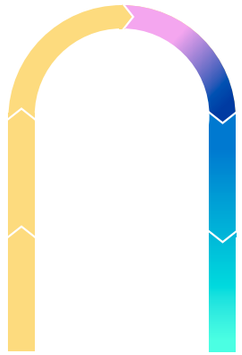


Figure 2: Visualisation ViP methodology

1.5 REPORT STRUCTURE

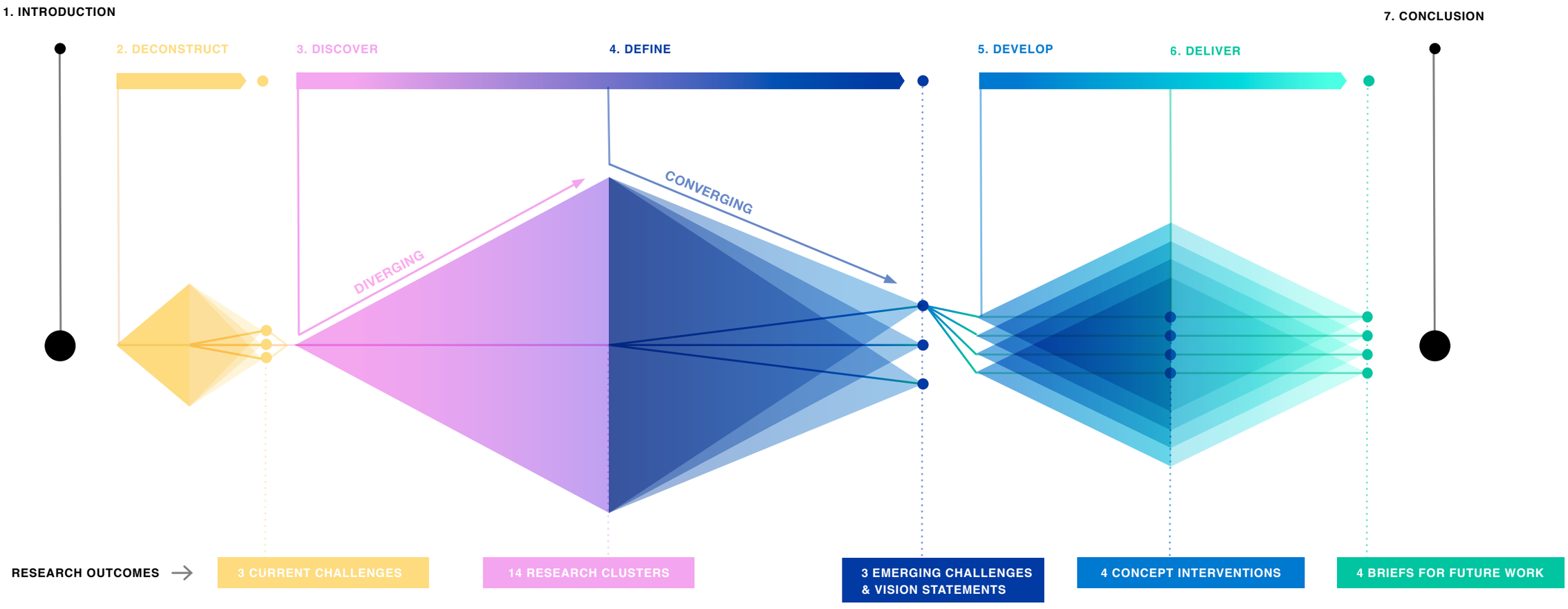
While Vision in Product Design (ViP) is the primary design methodology used in this thesis, it was decided to communicate the general the design process using the Double Diamond model (Design Council, 2005). The ViP process follows a distinctive down-up-down direction (as seen in see figure 2), which can be difficult to track in a linear report format. To enhance clarity, this thesis represents the process through the Double Diamond framework, which visually distinguishes the diverging and converging phases of design:

- **DIVERGING** involves gathering insights, exploring possibilities, and postponing judgment to foster creativity.
- **CONVERGING** focuses on structuring, decision-making, and synthesizing the most valuable outcomes from the previous phase (Design Council, 2005).



When aligning the ViP process with the Double Diamond structure, a third diverging-converging iteration emerges: “deconstruct”, also known as the deconstruction phase in ViP. ViP begins with an analysis of the current product-interaction-context, and the insights from this phase can be synthesized separately. This clearly defines the starting point of the “discover” phase where we investigate future developments. This separation allows for distinct conclusions about the current relationship between society and payments and enables a structured comparison with the designed likely future scenario later in the report.

At the end of each diamond, research outcomes are presented.



1.6 APPROACH PER PHASE

Each chapter follows a distinct section of the Vision in Product Design (ViP) framework. This chapter provides an overview of the methods used in each phase of the process.

DECONSTRUCT

Deconstruct follows the first half of the ViP curve, analyzing the existing payment landscape on three levels: product, interaction, and context. This was done through:

- Historical analysis – Examining how forms of money have evolved over time.
- Journey mapping – Understanding how people currently interact with payment systems.
- (Simplified) Stakeholder mapping – Identifying key parties involved in payments.
- Attending stakeholder meetings and debates – Investigating the challenges that concern payment industry stakeholders.

By deconstructing current payment methods, this phase establishes a baseline understanding necessary for designing a new payment system. Additionally, three key challenges are identified, which later serve as a comparison point for the challenges emerging from the framework developed in the Define phase.

DISCOVER

This phase marks the beginning of the second half of the ViP process: designing. Starting at the context level, the goal is to identify context factors likely to influence the future relationship between people and payments. These factors—trends, developments, states, and principles—are identified through:

- Desk research – Exploring external reports, literature, and studies.
- Co-creation with mentors from DNB – Leveraging domain expertise.
- Expert interviews – Engaging with professionals beyond DNB's core economic and payment-related focus.

The insights gathered from these activities were clustered into 14 themes that define influential factors for the future context of payments.

DEFINE

Building upon the identified clusters, this phase focuses on uncovering underlying dimensions that act as driving forces. This was done through:

- Exploring a variety of dimensions – Identifying potential structuring principles.
- Evaluation with DNB mentors – Assessing relevance and applicability.
- Testing design potential – Understanding the interplay between dimensions.

Two key dimensions were selected and combined into a framework, leading to the identification of 12 potential future payment situations. Based on this framework, vision statements were formulated for three emerging challenges, outlining what DNB should focus on and how these challenges should be addressed.

DEVELOP

From the three emerging challenges, one was selected for further development to illustrate how DNB can apply the framework to re-think and re-design payments and the payment infrastructure in the Netherlands.

Each challenge consists of four specific payment situations, each of which was designed using the ViP method, focusing on shaping a desired user interaction. The main design methodology centers around using an "interaction analogy", where we analyze an existing interaction and distill the desirable qualities to translate to the interaction with payments.

By the end of this phase, four concept interventions were developed.

DELIVER

The final phase involved validating and refining the framework and developed concepts through:

- Interviews with relevant DNB stakeholders – Gathering feedback and assessing feasibility.

Based on these insights, a roadmap is outlined and project briefs were written to guide further research and implementation. Thereby making the continuation of this research more accessible for DNB.

1.7 CONTINUOUS CO-CREATION

This project was carried out under the supervision of two policy advisors from DNB who played an active role throughout the process. Our weekly meetings served as an ongoing form of co-creation, where we discussed progress, debated emerging questions, and navigated the complexities surrounding payments.

Co-creation within this project served three key purposes:

1. FACT-CHECKING AND UNDERSTANDING COMPLEX TOPICS
Payments, money, central banking, and the broader European economic system are intricate and multifaceted topics. Weekly discussions provided an opportunity to clarify concepts that were difficult to grasp independently. These conversations often evolved into philosophical explorations of the principles underlying payments, ultimately helping me refine my position on the topic.

2. COMMUNICATING THE PROJECT APPROACH
The steps taken in the ViP methodology are usually not immediately intuitive, especially for those unfamiliar with the process or the design process in general. Through providing weekly updates on the steps taken and how they interconnected, it was ensured that the supervisors remained aligned with the process and understood the logical connections in the sequence of conclusions that emerged.

3. SPARRING ON VISION AND CONCEPT DIRECTIONS
Designing for a vast infrastructure like payments posed challenges with solutions outside the field of expertise of a typical design student. Through discussions with my mentors, I was able to filter out less promising directions while strengthening the most viable ones with their expert knowledge. Their insights not only refined the scope of my work but also inspired new approaches to shaping the relationship between people and payments.

Figure 3: Illustration weekly check up sessions with Huib and Anneloes

2. DECONSTRUCT

This chapter addresses the first research question: “What are the main design challenges in the current relationship between society and payments?” The objective is to analyze the historical, technological, and social contexts that have shaped payments as we know them today. This includes investigating why payment systems have developed the way they have, how people interact with these systems, and the broader forces at play driving these interactions. By breaking down these elements, we aim to gain a deeper understanding of the relationship between society and payments in their current form.

To achieve this, the chapter is structured around three sub questions that explore payments from distinct but interconnected perspectives:

PRODUCT LEVEL:
“Why have means of payments evolved over time?”

INTERACTION LEVEL:
“How do people interact with payments?”

CONTEXT LEVEL:
“Who are the actors shaping payments, and who are the stakeholders?”

By addressing these subquestions, we create an overview of today’s design challenges in the relationship between society and payments. This understanding allows us to compare current challenges with the challenges identified in the following research phase, focusing on future developments.

DECONSTRUCTION CONTENTS **P.**

2.1 CURRENT MEANS OF PAYMENT

In this chapter we deconstruct the current *product* of payments “means of payment”. This is done through identifying the qualities of payments as we know them today and how they have come to be this way. From these qualities we aim to answer the following subquestion:

WHAT DRIVES THE CHANGE IN MEANS OF PAYMENTS?

“Payments” are one of the mediums through which individuals and society at large interact with money. The product associated with this can be named the *“means of payment”.* Over the course of history these means of payment through which we interact with money have evolved based on the technological advancements of the time as well as cultural developments. Figure 4 shows a summary of the key moments in history where the means of payment change (Stringer, 2016).

Most notably we see that the concept of “money” has gotten increasingly abstract as we move towards a more convenient and efficient monetary system. While trading a cow for a sheep would take considerable effort and time, people can now able to pay thousands of euro’s in a fraction of a second, while nothing tangible is transferred.

The products representing our money have not only lost tangibility in a physical sense, but are also increasingly distanced from the commodity value they once represented: digital money has no intrinsic value. Commodity money like livestock and grains maintains value even if it can’t be traded, but modern means of payment are purely a “story” shared between all members of society. Money is an “inter-subjective concept”: it only holds value because we collectively agree it does (Harari, 2014). This belief in the value of money is a shared understanding that binds society together, despite the lack of any material foundation behind it.

In conclusion, this timeline illustrates that the change in means of payment is predominantly driven by technological advancements and a pursuit of efficiency and convenience. As a result, the concept of money is becoming further removed from intrinsic value, thereby increasing the amount of trust needed in the functioning of our means of payment.

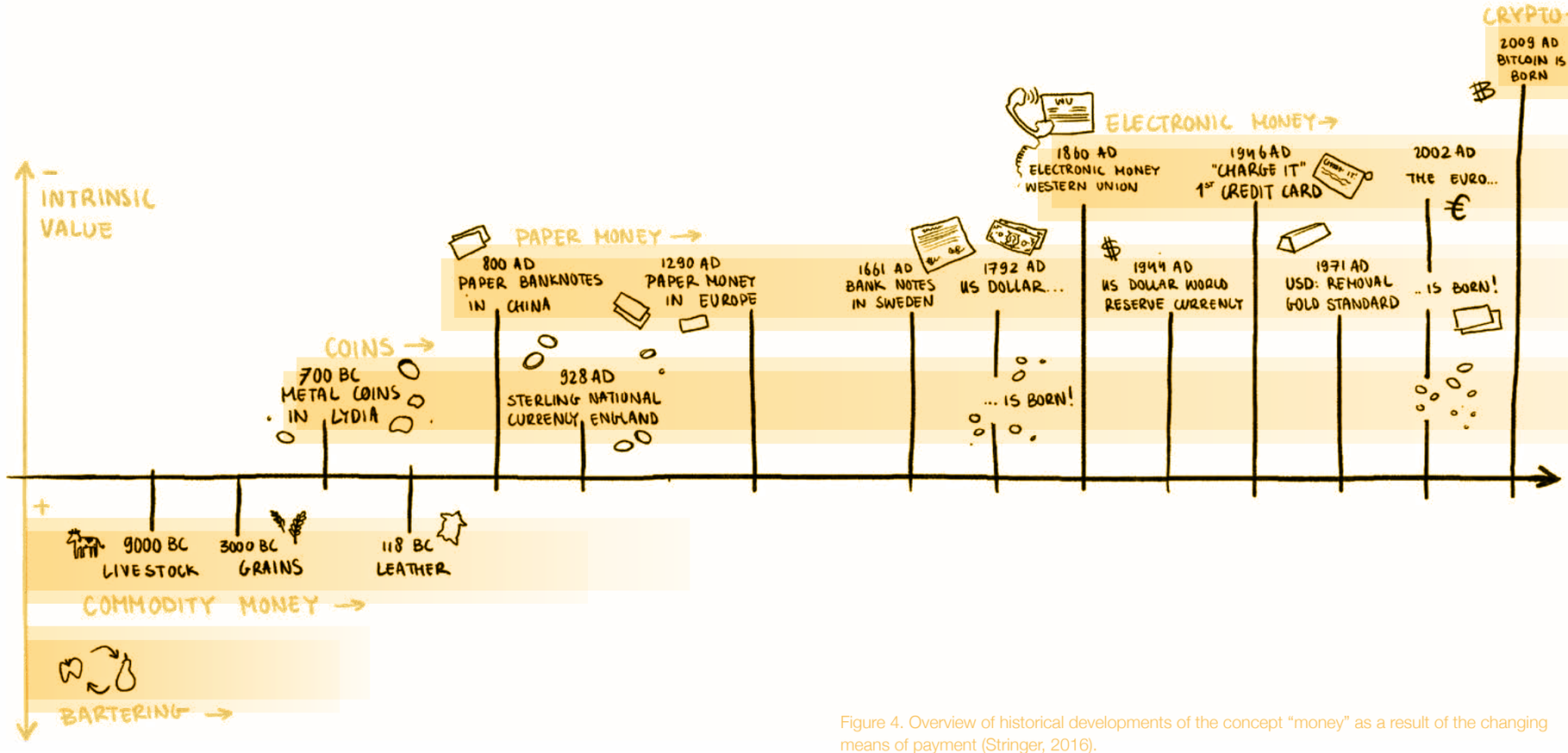


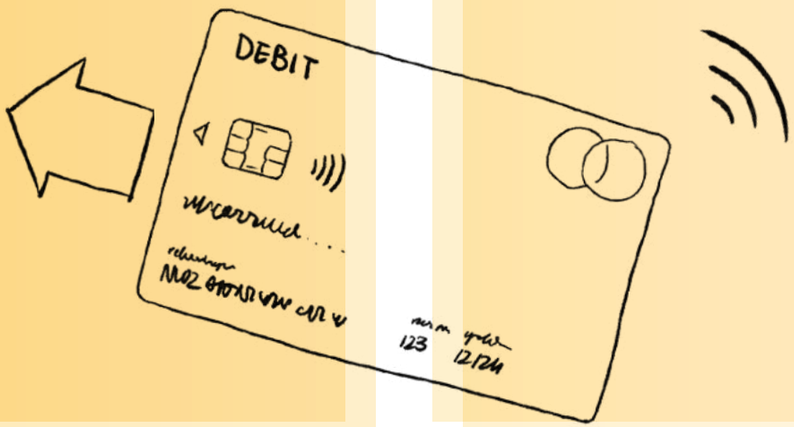
Figure 4. Overview of historical developments of the concept “money” as a result of the changing means of payment (Stringer, 2016).

2.2 INTERACTIONS WITH PAYMENTS

The ViP methodology considers products as a means to accomplish or develop “interactions” (Hekkert & Van Dijk, 2016). They define interaction as *“a qualitative description of the relationship between a product and a user.”* In this context, the product being analyzed is the means of payment, and the user includes virtually everyone, given it is essential for any form of autonomy in the current social and financial system.

Due to the broad user base and diverse payment methods, numerous payment interactions could be studied. However, this research focuses specifically on in-store payment interactions, as DNB is currently prioritizing this function for the Digital Euro. While the D€ is expected to support additional functionalities such as peer-to-peer transfers (P2P) and e-commerce payments, the primary emphasis remains on in-store transactions. According to the most recent source from the Betaalvereniging (2024), the most commonly used in-store payment methods today include cash, card (inserted), contactless card, and mobile contactless payments.

On the following pages, the way people interact with each means of payment are illustrated. From this, interaction qualities are distilled. These are used to explicitly define the interaction between user and product. A variety of interaction qualities were identified during brainstorming, but ultimately the deciding terms were determined by the designer.



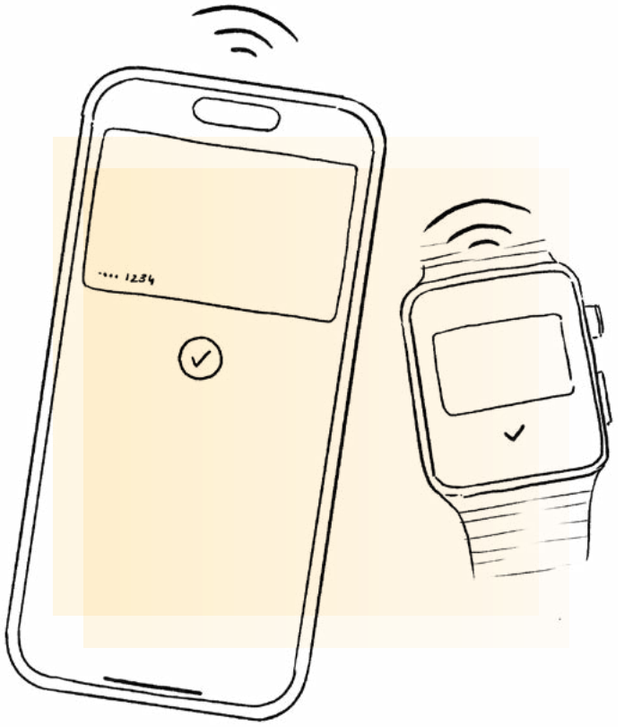
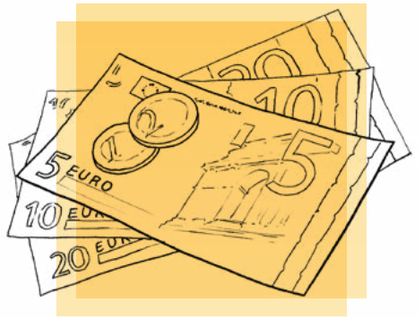


FIGURE 5: DISTRIBUTION TOTAL PAYMENTS NL 2023 (BETAALVERENIGING, 2024).

20 % CASH	8% CARD (INSERTION)	43 % CARD CONTACTLESS	29% MOBILE AND WEARABLES CONTACTLESS
		72 % CONTACTLESS	

2.2.1 CASH



Cash payments are characterized by a **deliberate** and **reflective** interaction, inherently tied to a **sense of payment pain.** Unlike digital transactions, paying with cash requires individuals to plan ahead, ensuring they have sufficient funds before making a purchase. The inherent need for planning and foresight fosters a continuous evaluation of spending habits, as users must decide when to withdraw more cash and how to allocate it. Additionally, the physical act of handing over tangible money reinforces the awareness of expenditure, making each transaction feel more significant. This sense of payment pain can lead to more deliberate spending habits, as individuals are constantly reminded of the limitations of the money in their wallet.

INTERACTION QUALITIES:

DELIBERATE | **REFLECTIVE** | **PAINFUL**

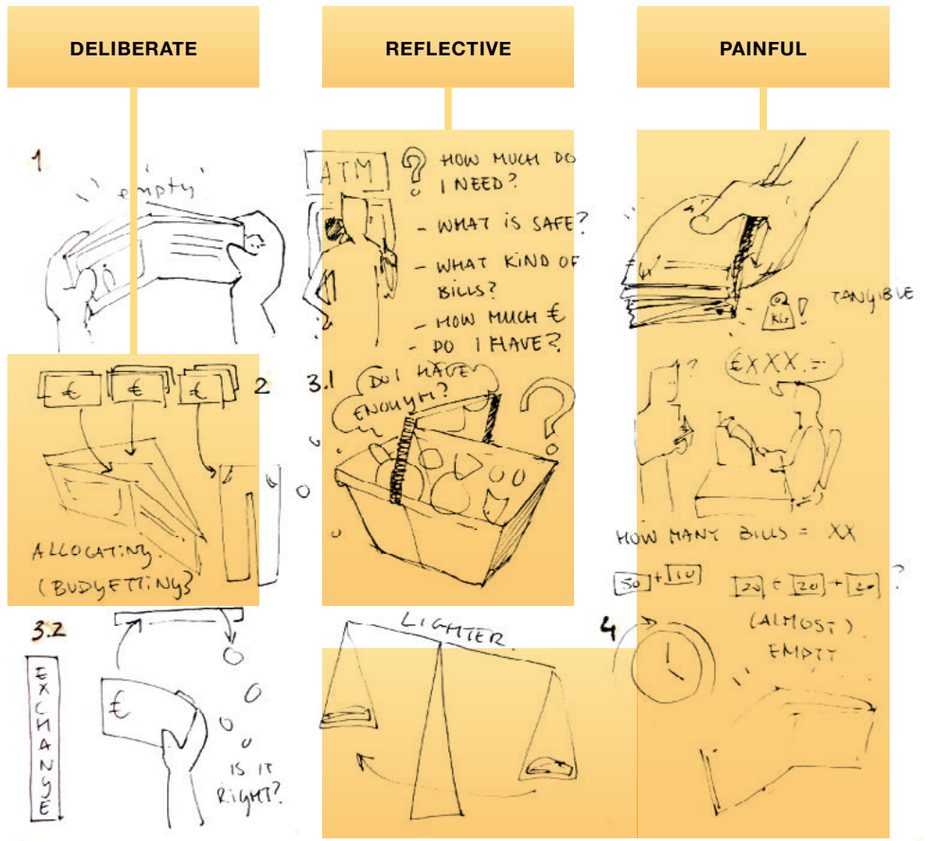


Figure 6: exploration of steps in the interaction with cash for in-store purchases

2.2.2 CARD BY INSERTING

Card insertion payments are defined by a **safe** and **focused** interaction. The requirement to enter a personal pass-code adds a protective layer, ensuring that only the cardholder can authorize transactions. This security feature provides peace of mind, as stolen or lost cards remain unusable without the correct PIN.

Additionally, the act of entering the pass-code demands attention, directing the user's eyes to the screen displaying the transaction amount. This moment of focus reinforces awareness of spending, making each payment a more conscious decision rather than an automatic action.

INTERACTION QUALITIES:

SECURE | **FOCUSED**

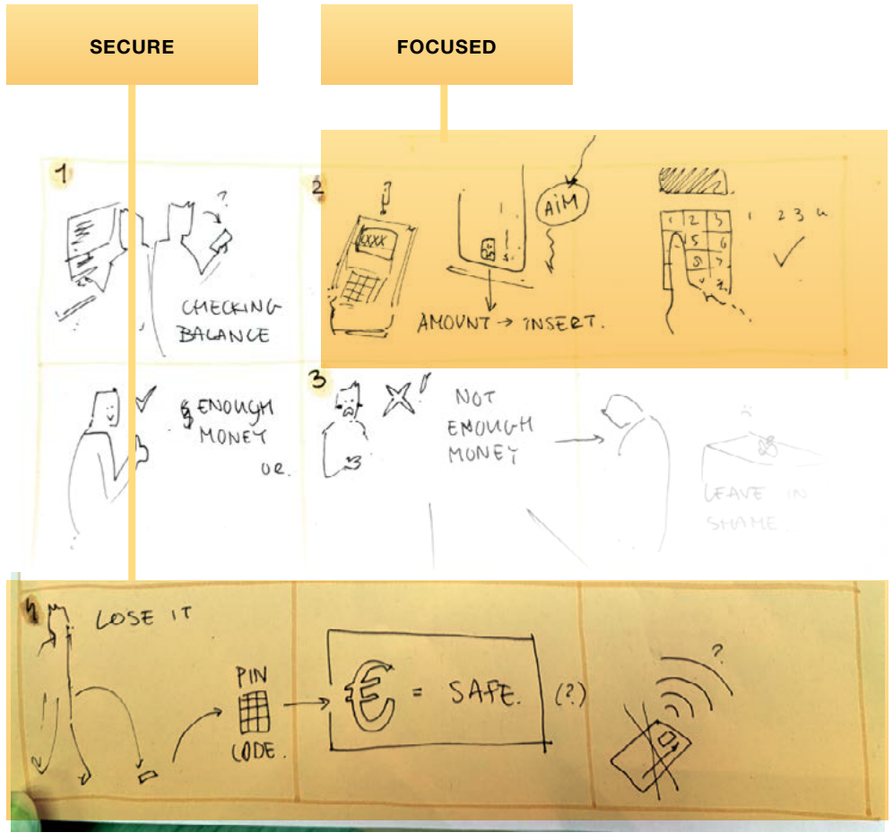
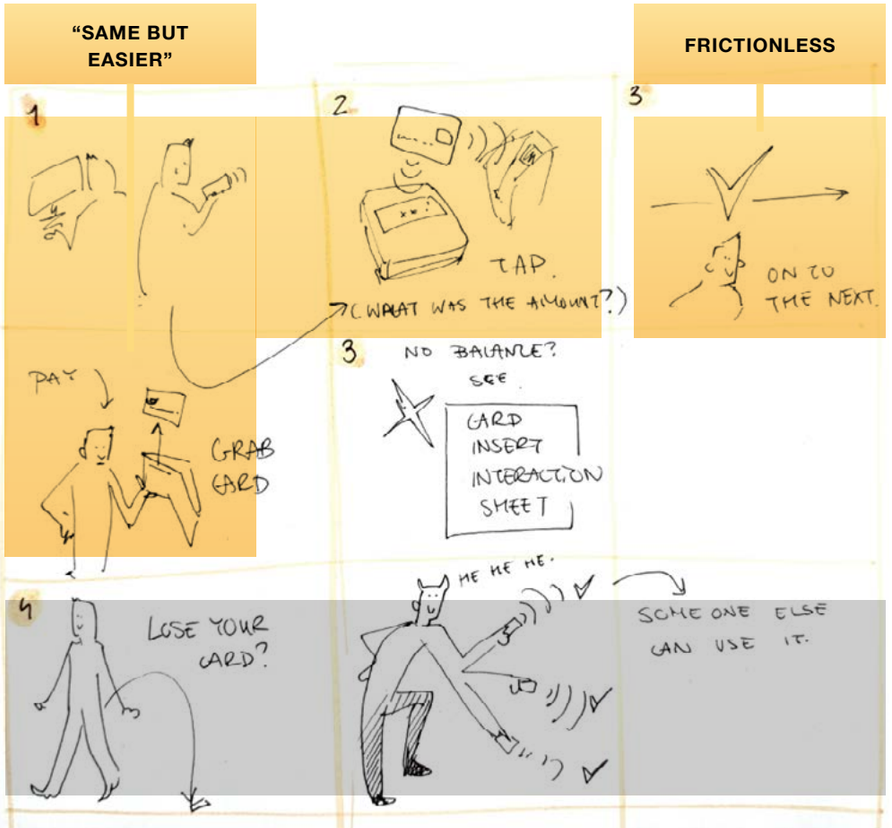


Figure 7: exploration of steps in the interaction with card by insertion for in-store purchases

2.2.3 CARD CONTACTLESS

The interaction of contactless payments using a card can be defined as **frictionless**, offering a **“same but easier”** experience compared to traditional card payments. While maintaining the fundamental mechanics of card transactions, they remove the PIN requirement for small value payments (€50), making the process quicker and smoother. This mechanism can be considered the gateway to frictionless payments, where convenience is prioritized over deliberate spending awareness.

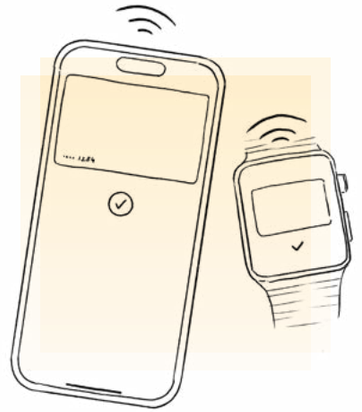
INTERACTION QUALITIES:



An interesting observation here, is that card by inserting is the most safe means of payment analysed, while contactless payment features make it less safe. Anyone can use your money when they find it and the user hasn’t blocked the card yet.

Figure 8 exploration of steps in the interaction with card contactless for in-store purchases

2.2.4 MOBILE AND WEARABLE CONTACTLESS



The interaction for mobile contactless payments can be defined by their **frictionless** and **occluding** nature, making transactions nearly effortless and **painless.** With smartphones always within reach, users experience almost no transition between daily activities and the act of making a payment. NFC technology eliminates the need to open a payment app, enabling instant transactions. Unlike cash or cards, which are explicitly linked to spending money, phones serve multiple functions, further distancing the act of paying from the awareness of spending money. All this contributes to minimizing payment pain.

INTERACTION QUALITIES:

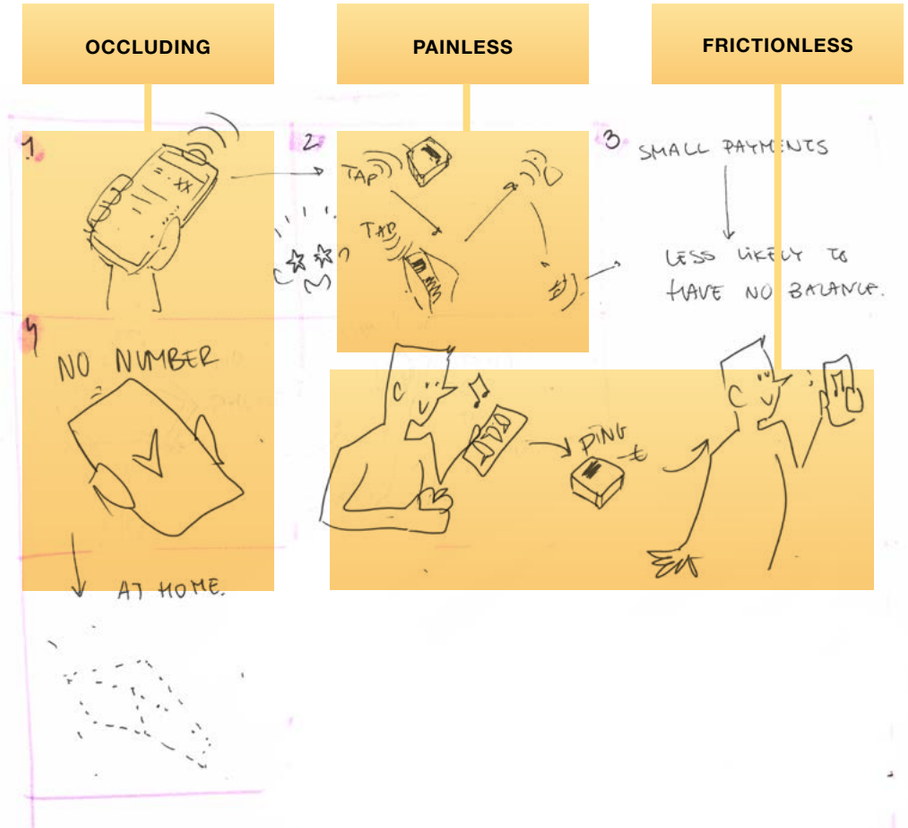


Figure 9 exploration of steps in the interaction with mobile contactless for in-store purchases

2.2.5 CONCLUSIONS INTERACTIONS WITH PAYMENTS

HOW DO PEOPLE INTERACT WITH PAYMENTS?

In figure 11, on the right, the previously analyzed means of payments have been placed in order of their age. Where cash is the oldest of these, mobile contactless payments are the newest.

While mobile payments are the youngest means of payment commonly used in the Netherlands, it will be the most used means of payments in store by 2024 if the trend of increased use continues (Betaalvereniging, 2024)(figure 10). This change in consumer behavior/choices can be justified from two opposing perspectives.

Consumers prefer contactless, frictionless payments because it is the most convenient and stops individuals from experiencing “payment pain”: the negative emotion felt when spending money (Van Vugt, 2025).

Businesses also stand to gain from supporting/ encouraging frictionless payments and reducing as much payment pain as possible: companies that have less payment friction see faster growing revenue (Donald, 2024).

In conclusion, Dutch people are increasingly using frictionless payment methods such a contactless payments using card or mobile (Betaalvereniging, 2024). The payment interaction changes as a result of the movement towards frictionless payments, and we can see an exchange of tangibility and transparency for the sake of convenience. Where cash payment interactions are slower and informative due to the tangible exchange of money, contactless payments are at high speeds, sometimes completely without looking at the total amount of money being paid.

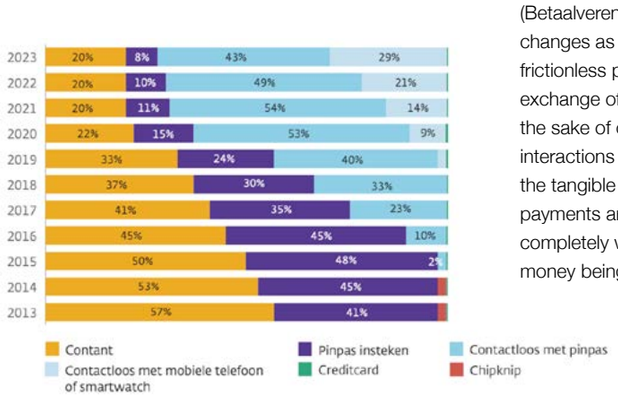
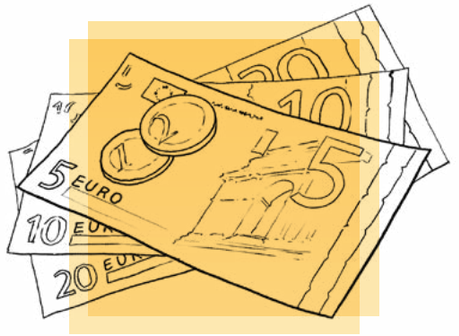


Figure 10 Distribution total payments by means of payment (Betaalvereniging, 2024).

UPCOMING MEANS OF PAYMENT DURING THE WRITING OF THIS THESIS

Buy now pay later was making its entrance into in-store payments while this thesis was being compiled (NOS, 2024). Since it was not among the most commonly used means of payment in store, it was not analyzed in this phase of the project. The interaction of buying something and paying later is however in line with the movement towards frictionless payments. BNPL is a more extreme version as this version of frictionless payment not only stimulates consumers to pay with less friction, but also to pay extra for the convenience of the payment delay. People are enabled to spend money they don’t have. Removing the only remaining friction in existing payment systems. Its effects on the relationship between society and payments will be considered in the *discover* and *define* sections of this thesis.



CASH
20% of payments in the Netherlands 2023

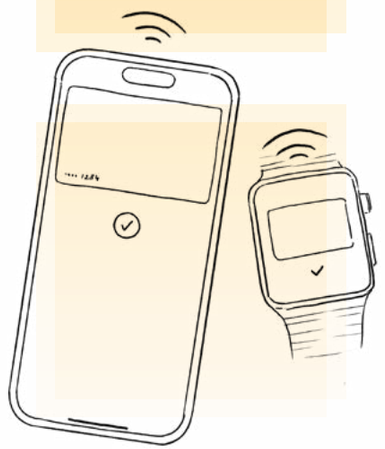
Interaction qualities
DELIBERATE
REFLECTIVE
PAINFUL

CARD BY INSERTING
8% of payments in the Netherlands 2023

Interaction qualities
SECURE
FOCUSED

CARD CONTACTLESS
43% of payments in the Netherlands 2023

Interaction qualities
FRICTIONLESS
“SAME BUT EASIER”



MOBILE AND WEARABLE CONTACTLESS
29% of payments in the Netherlands 2023

Interaction qualities
FRICTIONLESS
OCCLUDING
PAINLESS

Figure 11 Distribution total payments by means of payment (Betaalvereniging, 2024).

2.3 ACTORS IN PAYMENTS

Previously it was argued that the relationship between society and payments is not solely dictated by the consumer but is also significantly influenced by market players. The payments infrastructure in the Netherlands has become increasingly fragmented (De Nederlandsche Bank, 2022a), making it challenging for laypersons to understand and navigate in a conscious way. To address this complexity, sketching an overview of the actors in the digital payments infrastructure is valuable for understanding the current context. This understanding will provide a foundation for designing interventions that respond effectively to the current state of the payment infrastructure.

WHO ARE THE ACTORS SHAPING PAYMENTS?

POLICYMAKERS AND OVERSIGHT

De Nederlandsche Bank (DNB) is a key policymaker focusing on the safety, accessibility, and resilience of the payment infrastructure. Their role differs for public and private money:

- **CENTRAL BANK MONEY:** DNB collaborates closely with Geldmaat to ensure that cash remains accessible to most individuals, emphasizing the importance of central bank money as a public good.
- **PRIVATE MONEY:** As part of their oversight mandate, DNB instructs payment providers to improve their services when issues arise concerning their key priorities—safety, accessibility, and resilience. However, their involvement goes via commercial parties and they are therefore more removed from direct user interactions. This means that if there are concerns with digital payments, their intervening actions are always indirect as all digital payments in the Netherlands are currently private. This is a valuable opportunity for the digital euro, as the central banks will have more direct influence about the way this means of payment is shaped.

CARD ISSUERS

People access digital payments through cards and accounts provided by commercial banks. These banks act as intermediaries between consumers and the broader payment infrastructure, connecting users to digital financial systems.

INFRASTRUCTURE PROVIDERS

The cards provided by commercial banks typically operate through global networks such as Visa and MasterCard. These companies play a crucial role in enabling digital payments, but their involvement comes with financial implications: For every payment made using a Visa or MasterCard card, these companies receive a fee.

MERCHANTS

Merchants facilitate the payment interactions between consumers and themselves. They shoulder the costs of digital payments, including the fees charged by card networks. This dynamic influences pricing strategies and may indirectly affect consumers through higher prices. Merchants also play a pivotal role in adopting and promoting innovative payment solutions, which can shape consumer behavior and expectations.

CONSUMERS

Consumers are central to the payment ecosystem. Consumers rely on the accessibility and reliability of digital payment systems to conduct their daily transactions. However, the complexity of the payment infrastructure often leaves them unaware of the underlying costs and processes. This is exacerbated by the fact that it is illegal for consumers to bear the direct costs of digital payments in Europe (Your Europe, 2022), and retailers must absorb these fees.

This cost structure highlights an important dynamic within the private payment system: for individuals payments seem like a public good, and a right, because they are seemingly free.

Figure 12 visualizes the way these stakeholders are connected in the money flows of digital payments according to a simplified version of the 4 party system: a commonly used graphic visualizing data flows in digital payments. In reality there are more than 4 parties involved in all steps of the process, but the ones identified here are the most relevant for understanding the context shaping payments today.

In conclusion, payments have become increasingly convenient and painless because their design is shaped by commercial banks and infrastructure providers, with limited influence from merchants and consumers. Regulations make payments seem free to consumers, while merchants absorb the costs, driving up prices for consumers. Visa and MasterCard's duopoly keeps fees high, as a result of limited competition. DNB oversees payment accessibility, safety, and resilience but has limited direct control over digital payments. This market-driven system has prioritized convenience, benefiting consumers who prefer seamless transactions and private entities that profit from increased payment volumes.

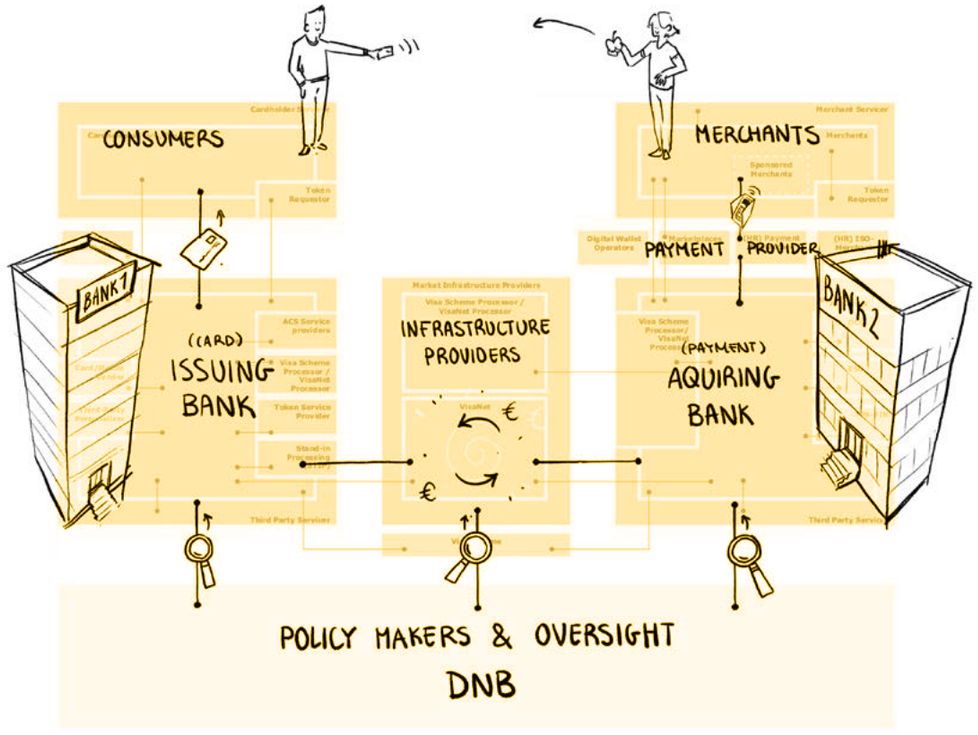


Figure 12. Overview of primary stakeholders for payments in the Netherlands. For details refer to appendix C

2.4 CHALLENGES IN PAYMENTS

In this chapter we explore how the current means of payment impact the stakeholders of payments, and which challenges can be identified for the design of payments today. To answer this, I attended two events centered around discussions on the design of the current payment infrastructure. Rather than discussing the challenges on policy level, these events discussed how payments provide value to society at user level. Insights from these events were synthesized to identify the pain points in the relationship between society and payment today.

The first event I attended was “Een D€ voor Iedereen,” organized by De Nederlandsche Bank. During this symposium they invited a wide range of stakeholders for the digital euro. E.g. advocacy organizations for general consumers, disabled people, children, merchants, as well as representatives from several commercial banks and other actors in the providing side of the payment infrastructure.

The second event was “Een geldsysteem voor iedereen”, hosted by Pakhuis de Zwijger. It was centered around discussions with the panel and the audiences addressing the inclusivity of the monetary system as a whole.

Analyzing my notes from these two sessions I distilled 3 challenges, which were primary conclusions from either session, or discussed in both. While it cannot be said with objective certainty that these are the 3 most pressing challenges at this time, identifying these helps us to better understand how the context of payments has lead to the current design of payments. The three challenges identified are market limitations for accessibility/inclusivity, (digital) financial literacy, and trust:

MARKET LIMITATIONS FOR ACCESSIBILITY

DNB recognizes inclusivity as a challenge for payments and considers it one of it’s 3 focus points in their vision on payments (De Nederlandsche Bank, 2022a). While digital payments have become the most popular means of payment in the Netherlands (Betaalvereniging, 2024), they are not universally accessible. Especially low financial literacy and the complexity of digital interfaces exclude certain groups from fully participating in the financial ecosystem.

At the “Een geldsysteem voor iedereen” event, hosted by Pakhuis de Zwijger, discussions expanded to address the inclusivity of the monetary system as a whole. It was argued that the payment system must cater to the diverse needs of the population, ensuring equitable participation regardless of socioeconomic status. Participants raised the question: should the payment infrastructure, and payments in general, be considered a public good? While the Dutch payment infrastructure exhibits characteristics of a public good (Stellinga et al., 2021), it is argued that payments today are primarily market-driven, favoring profitability over accessibility.

(DIGITAL) FINANCIAL LITERACY

Commercial payment providers have developed “user friendly” and “frictionless” digital payment products, but these often focus on the majority of the digital savvy population and therefore may exclude individuals who cannot (adequately) navigate the technological side. This issue was raised at both events, where participants pointed out that leaving accessibility to market forces undermines the principle of equitable participation. A payment system reliant on private interests risks sidelining public values such as resilience, inclusivity, and fairness.

During the event “D€ voor Iedereen,” organized by De Nederlandsche Bank (visualized in figure 6), stakeholders discussed the importance of designing a Digital Euro (D€) that goes beyond basic access. The insights revealed that “inclusivity” should not only ensure access but also address diverse user needs and preferences, ensuring that everyone feels motivated to adopt and use the Digital Euro. Features like anonymity and mandatory acceptance (not typically associated with accessibility) were highlighted as critical to fostering trust and engagement among all user groups.

TRUST

From the events it was argued that trust remains central to the functionality of any payment system. Without widespread trust in the reliability and existence of money, the entire monetary system risks collapse, as seen historically in instances of bank runs. However, the increasing privatization of payment systems has raised concerns about transparency and accountability.

Figure 13: Visual summary Digital Euro symposium, organized by De Nederlandsche Bank

2.5 DECONSTRUCTING CONCLUSIONS:
3 CHALLENGES FOR PAYMENTS TODAY

Through deconstructing the concept of payments at three levels: product, interaction, and context level, we have attempted to answer the question “How can we describe the current relationship between society and payments?”. This analysis has shed light on the complex nature of payments, and some challenges identified for payments, considering the current context.

PRODUCT LEVEL
At its core, payments are a mechanism for value exchange, and the product associated with this is the “means of payment” (NL: betaalmiddel). Over time, these means have evolved, prioritizing efficiency and convenience. However, this evolution has led to a detachment from intrinsic value, making value exchange less tangible and harder for individuals to comprehend. From coins and banknotes to digital transactions, the abstraction of money has significantly impacted how people understand and engage with the concept of money.

INTERACTION LEVEL
As a result, the way we interact with payments has undergone a significant transformation. Modern payment systems are designed to be frictionless, enabling rapid and seamless transactions. While this efficiency has value for payment providers and merchants, and is appreciated in general by consumers, it has also reduced conscious engagement with financial decisions from the user perspective. Payments have become integrated into devices and platforms that are central to our social and entertainment lives, often resulting in impulsive or mindless spending behaviors.

CONTEXT LEVEL
The broader context of payments reveals a tension between public and private interests. While payments play a central role in societal functioning, the infrastructure supporting them is predominantly market-driven. As a result, the product of payments exists in a gray area between being a public good and a commercial product. This dual nature creates challenges in ensuring inclusivity, as market-driven solutions may not prioritize accessibility for all groups. Discussions at events like “D€ voor iedereen” and “Een geldsysteem voor iedereen” have highlighted the evolving definition of inclusivity. Beyond ensuring access, inclusivity might need to encompass addressing specific user needs, such as privacy and transparency, to foster trust and participation.

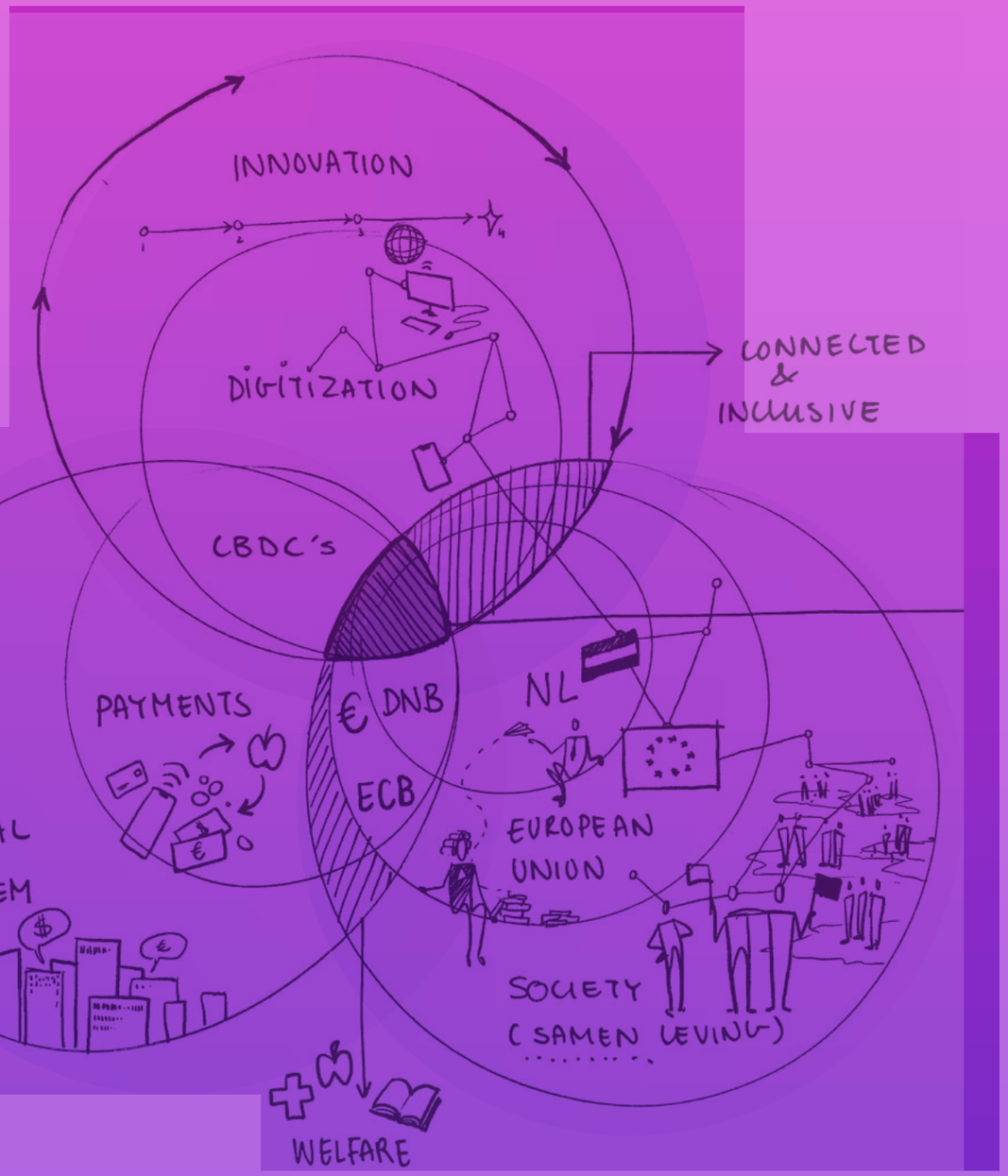
Based on the insights from the deconstruction on 3 levels and the insights from the events incorporating stakeholders, 3 challenges impairing the current relationship between society and payments have been identified.

1. **MARKET LIMITATIONS FOR ACCESSIBILITY**
2. **(DIGITAL) FINANCIAL LITERACY**
3. **TRUST**

Looking forward, these challenges can help us determine how the relationship between society and payments has changed. In the following chapter we will investigate how the relationship between society and payments is likely to change. To conclude this following chapter we can compare the current challenges, 2025, with the challenges emerging in likely future, 2035. Will these challenges overlap with the challenges for the future relationship between society and payments?

Figure 14. Impression of “Een Geldsysteem voor iedereen” at Pakhuis de Zwijger. Body language of engaged attendants

3. DISCOVER



This chapter marks the transition into the design phase of ViP (the second half of the curve) and lays the foundation for addressing the second research question: “What driving forces are likely to shape the relationship between society and payments in the Netherlands by 2035?”

Here, the research process focuses on diverging: the generation of insights (Design Council, 2005). Following the ViP methodology, a relevant research domain is identified, key context factors are gathered. and clustered.

To structure this exploration, the following subquestions are addressed:

1. What research domain is most relevant for investigating the future relationship between society and payments (2035)?
2. Which context factors are likely to influence this changing relationship?
3. What overarching themes connect these context factors?

By the end of this chapter, 14 key themes shaping the future of payments are identified. In the next chapter, these themes serve as the basis for uncovering the societal driving forces that will define the evolving relationship between people and payments.

DISCOVER CONTENTS **P**

3.1 RESEARCH DOMAIN

In this phase of the ViP methodology, we aim to identify the key themes expected to shape the relationship between society and payments in the future. By gathering insights on trends, developments, states and principles we can better understand the driving forces behind the evolution of payments. To ensure that these insights are relevant and contribute meaningfully to the research, a distinct research domain is established: *A description of the area in which we aim to make a contribution* (Hekkert & Van Dijk, 2011).

The research domain acts as a lens through which we analyze the world, ensuring that the collected context factors are both relevant and diverse. This serves two key purposes: (1) guiding the selection of insights that directly contribute to answering the research question, and (2) stimulating a broad perspective by considering influences that may not seem directly related to payments but still likely to affect their evolution. For example, while technological advancements are an obvious factor shaping digital payments, broader societal attitudes toward privacy also play a role in influencing consumer behavior and trust in payment systems.

To address the research question posed in this chapter the research domain for this thesis was defined as:

PAYMENTS IN A DIGITAL NETHERLANDS (2035)

In figure 15, the three lenses in this domain are represented.

This domain encompasses three subdomains expected to have a strong influence. Together, they allow for a comprehensive examination of both the changing dynamics of payments and the stable foundations within financial systems and societal norms

LENS 1: INNOVATION - DIGITIZATION: Captures the evolving aspects of the future, where innovation and improvements are drivers of rapid change and digitization.

LENS 2: FINANCIAL SYSTEM - PAYMENTS: Focuses on stable principles within monetary structures and the way society interacts with value exchange.

LENS 3: SOCIETY - THE NETHERLANDS: Examines the largely stable cultural and behavioral norms influencing payments and the monetary system at large.

For a more in-depth explanation of how this domain was determined please refer to appendix D,

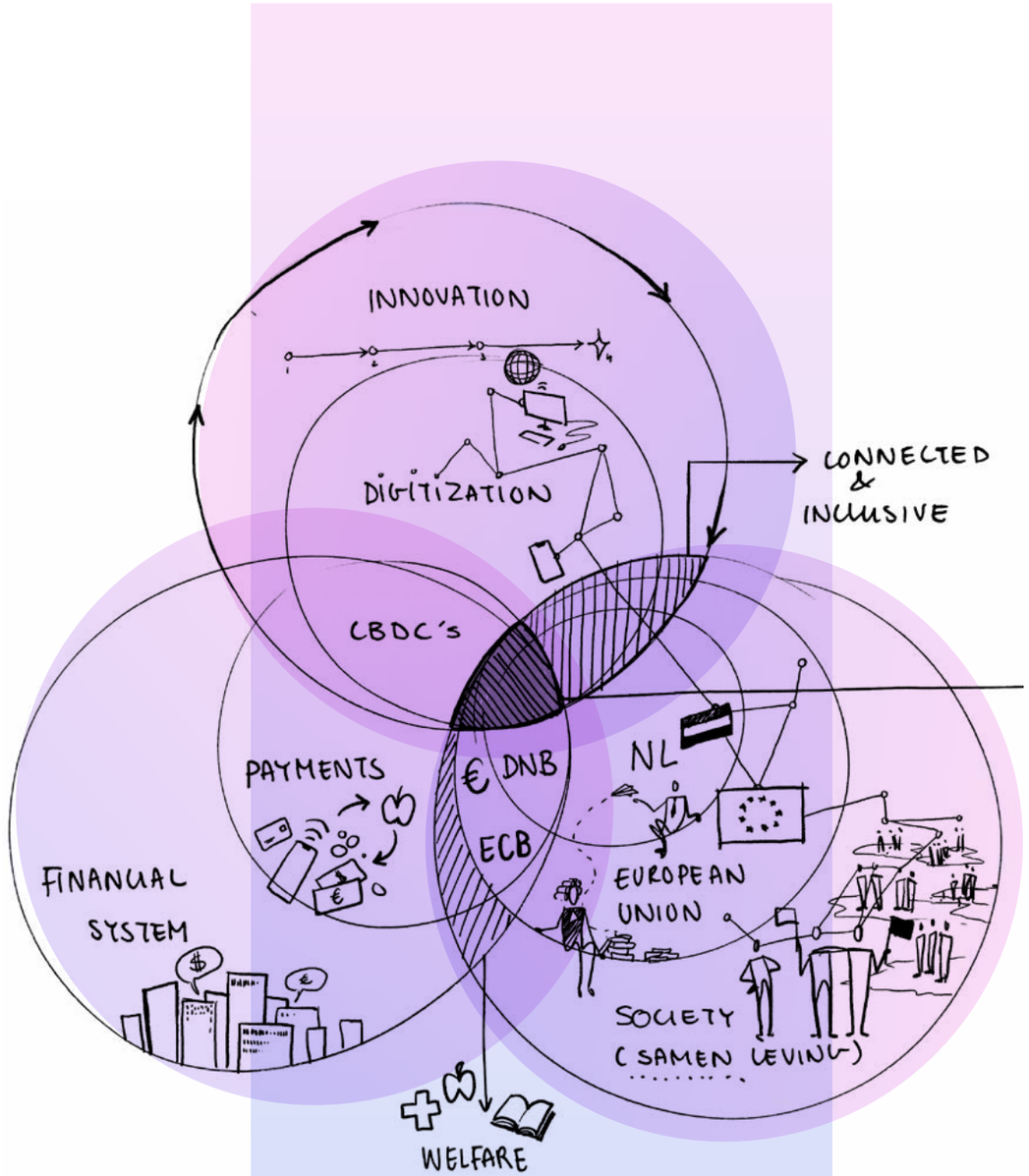


Figure 15: Research domain

3.2 GENERATION OF CONTEXT FACTORS

Based on this research domain, *Payments in a digital Netherlands,* a total of 149 insights, referred to as context factors, were collected. *"Factors are value-free descriptions of world phenomena as they appear"* (Hekkert & Van Dijk, 2011). They serve as building blocks for the likely future: While individually limited, these factors gain meaning when clustered, providing a deeper understanding of changes in the relationship between society and payments. These factors do not include moral judgments or indicate what the design should be, but the selection does reflect the (subconscious) values of the designer and tries to capture the values of DNB as described in the publications: DNB strategy 2025-2028 (De Nederlandsche Bank, 2024a) and Vision on Payments 2022-2025 (De Nederlandsche Bank, 2022a). The thesis supervisors were involved in the evaluation and discussion of context factors included and the directions of exploration.

In this study, most insights are sourced from academic papers, news articles or publications from DNB. In addition to this I have performed 3 interviews with persons of interest to understand their perspectives on the changing relationship with payments: Sociology, psychology, philosophy and economy. These fields of knowledge are each interesting in the way they perceive and shape payments. They are summarized on the next page. The insights were synthesized into additional context factors and analyzed alongside the broader dataset.

To maintain variety and depth in the dataset, a structured log was kept to track the distribution of trends, developments, states, and principles (figure 16). This ensured a balance between stable and dynamic factors—capturing both predictable constants and emerging uncertainties in the future of payments. While economic and financial perspectives were readily available, integrating cultural and sociological viewpoints required additional effort but was essential for a holistic understanding. Within the time constraints of the research, an attempt was made to balance these perspectives as much as possible.

	Cultural	Psychological	Political	Demographic	Sociological	Economic	Biological	Theology	Climate	Technological		Totaal	%	
Trends	3		12	3	7	5			1	4		35	23%	**Total changes until 2035**
Developments	1		0	3	1	11			2	3		21	14%	56
States	6	12	9	2	7	9		1	1	9		56	38%	**Total constants until 2035**
Principles		20	2			2	9	4				37	25%	93
Totaal	10	32	23	8	15	27	9	5	4	16	**Totaal:**	149		
% of total	7%	21%	15%	5%	10%	18%	6%	3%	3%	11%				

Figure 16 Overview of distribution context factors

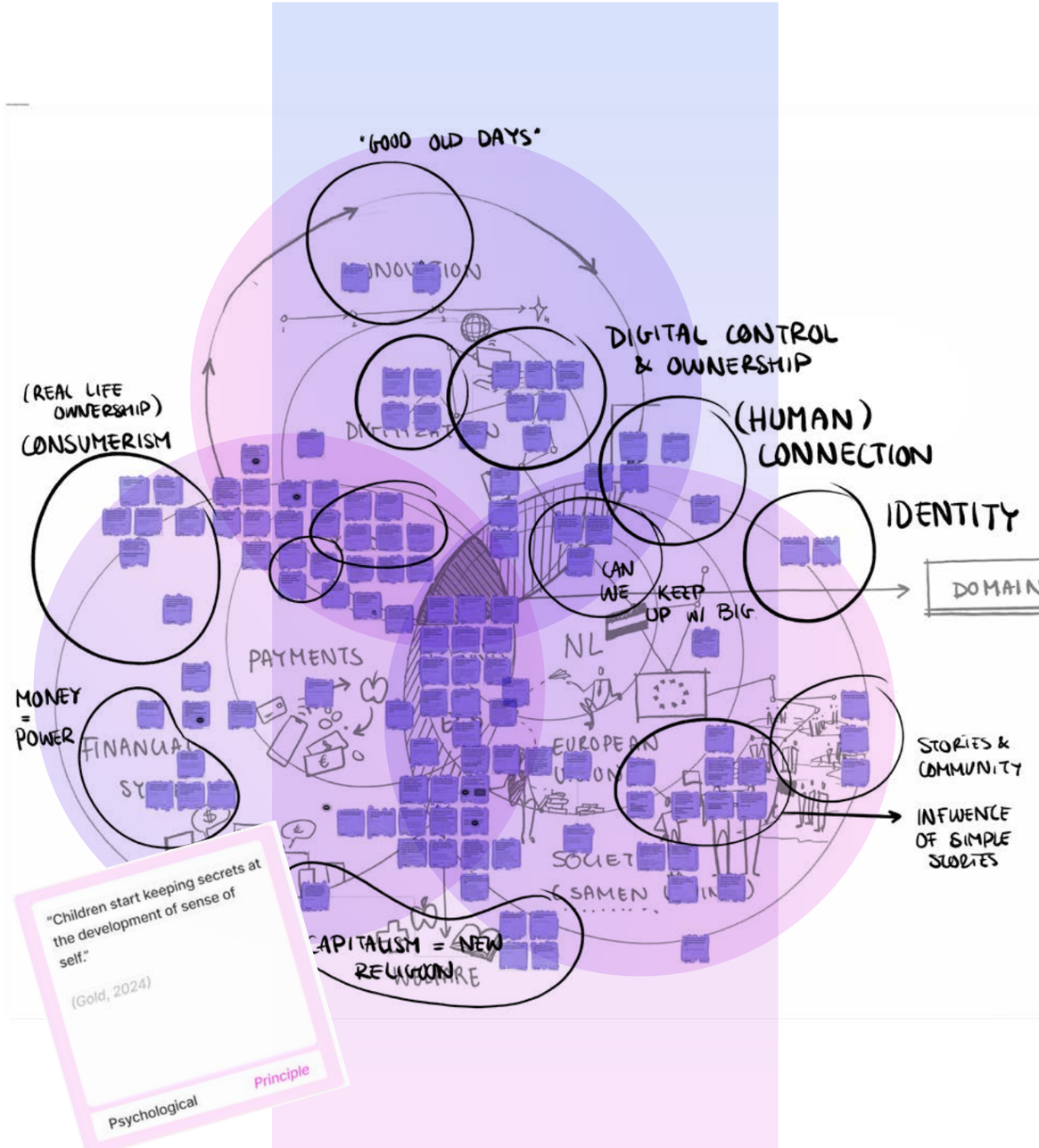


Figure 17 context factors distributed over domain

3.3 EXPERT INTERVIEWS

To ensure a diverse range of perspectives, outside the knowledge within DNB, three experts from different domains were interviewed. These each contribute insights into the evolving relationship between society and payments. Instead of conventional interviews, these were open discussions, exploring the philosophical and systemic implications of payments within their respective fields.

On the right, some quotes characterising these conversations are highlighted. For a more detailed breakdown of each discussion, refer to appendix E.

The most valuable insights from these interviews were translated into context factors and integrated into the broader selection.

“THE COMPLEXITY OF THE FINANCIAL SYSTEM CONTRIBUTES TO THE CONTINUED EXISTANCE OF IT.”

“PRIVATE MONEY AND PAYMENT SYSTEMS ARE INHERENTLY UNSTABLE, WHILE PUBLIC PAYMENTS ARE TYPICALLY STABLE.”

1. MARTIJN JEROEN VAN DER LINDEN

Economist, PhD author of *Design Guidelines for the Monetary and Financial System in the Digital Age*, co-author of *The Waterworks of Money*

“BANKS DON’T SELL MOST OF THE DATA THEY AQUIRE FROM THEIR PAYMENTS, BECAUSE THEIR CUSTOMERS VALUE THEIR PRIVACY.”

2. MARKUS UNTERNAHRER

Sociologist, co-author of *Unlocking the Payment Experience: Future Imaginaries in the Case of Digital Payments*

“PRIVACY IS A FORM OF SECRET KEEPING”

“CONFIDENTLY PROCLAIMING SOMETHING AS THE TRUTH, PLACES THE BURDEN OF PROOF ON YOUR OPPONENT. TRUE UNTIL PROVEN WRONG.”

3. ANDREAS WISMEIJER

Psychologist, researcher at Tilburg University, specializing in the psychology of secrets

3.4 CLUSTERING CONTEXT FACTORS

Clustering the context factors is the first step towards creating a structure in which they are all connected (Hekkert & Van Dijk, 2011). The collected context factors can be combined into clusters describing larger themes influencing the relationship between society and payments. These clusters are either combinations of factors pointing to the same underlying direction, or emergent quality clusters that bring together factors, where they together indicate/imply a new direction all together. The combinations of clusters show us themes describing the developments for the relationship between society and payments.

The clustering was initially done individually to get a comprehensive overview of the complete set of context factors. A second iteration was done in collaboration with Joost van Baar, a fellow design intern at DNB, and Huib Klarenbeek and Anneloes van Gent, my regular supervisors from DNB. Through this process, 149 context factors were synthesized into 14 clusters: A manageable number for further analysis and design. The clusters are presented on the following pages as research outcomes of this phase.

LIST OF CLUSTERS:

1 Consumers as Products
2 Seeking Digital autonomy
3 Building barriers of independence
4 New rules in payments
5 Overconfidence in a Digital age
6 Influential fairy-tales: Heroes and villains of modern society
7 The abstraction of money
8 The Search for Lightness in a Serious Society
9 The illusion of trust in digital authenticity
10 Moral boundaries of Capitalism
11 The Dilemma of Growth vs. Sustainability
12 Unequitable burdens
13 Power of broken Promises in a Digital Democracy
14 Challenges of a shared money

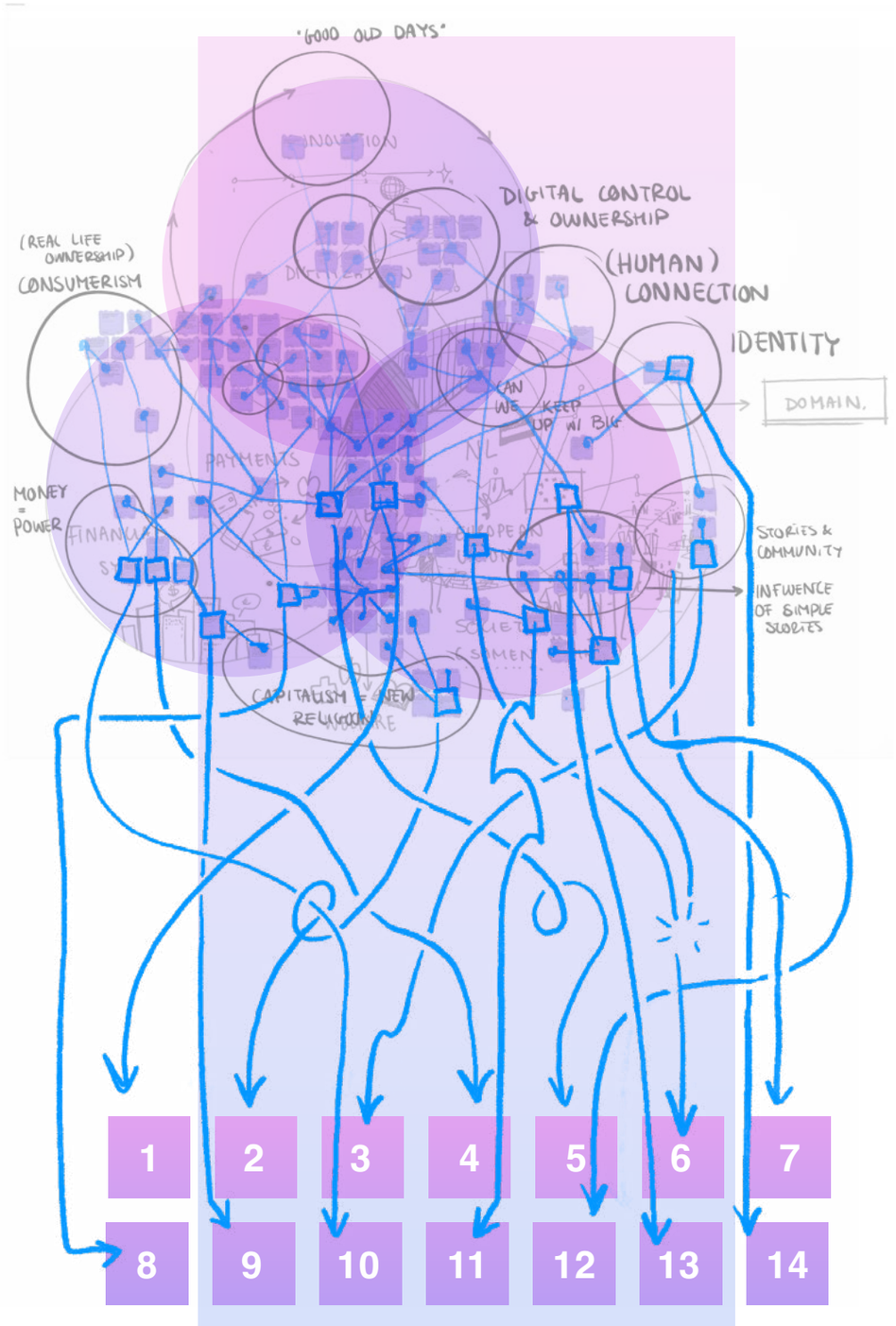
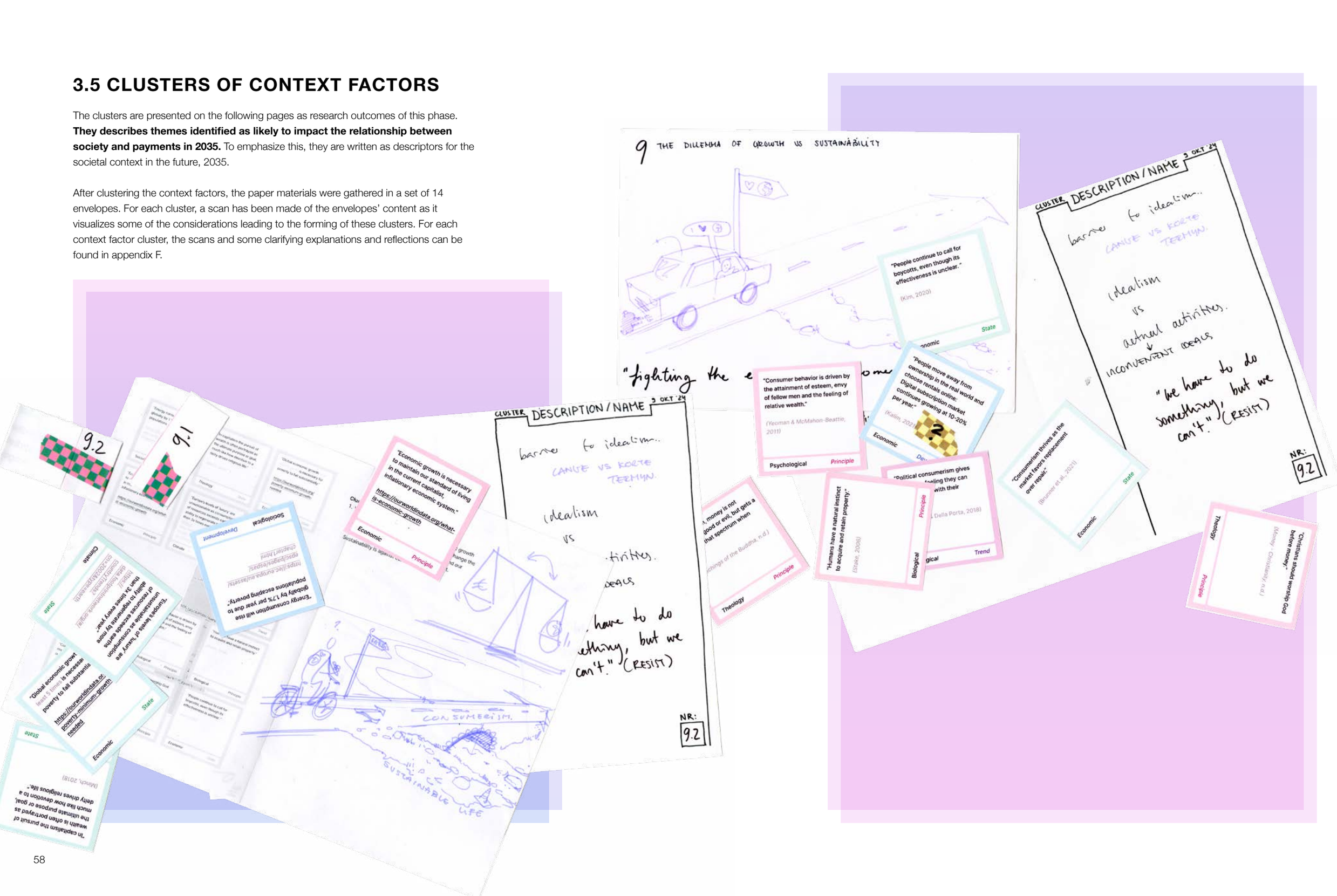


Figure 18 Visual representation of clustering

3.5 CLUSTERS OF CONTEXT FACTORS

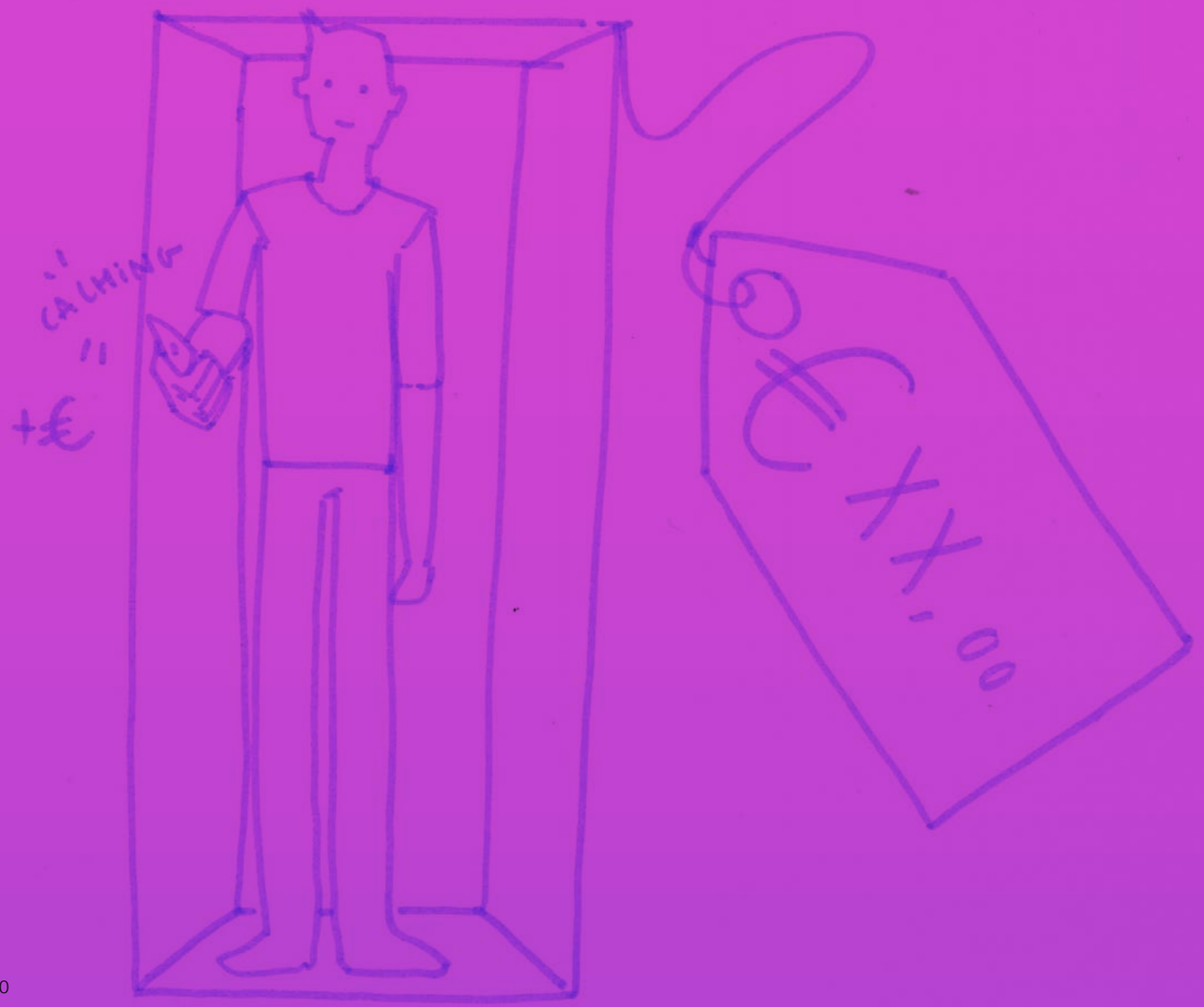
The clusters are presented on the following pages as research outcomes of this phase. **They describes themes identified as likely to impact the relationship between society and payments in 2035.** To emphasize this, they are written as descriptors for the societal context in the future, 2035.

After clustering the context factors, the paper materials were gathered in a set of 14 envelopes. For each cluster, a scan has been made of the envelopes' content as it visualizes some of the considerations leading to the forming of these clusters. For each context factor cluster, the scans and some clarifying explanations and reflections can be found in appendix F.



3.5.1 CONSUMERS AS PRODUCTS

As people increasingly prioritize sustainability and convenience, we are moving away from traditional product ownership in favor of digital subscriptions. What we once owned is now provided through recurring services, with the business model focused on keeping customers subscribed for long-term profit. Even with free digital products, data and attention are sold to advertisers. By 2035, most products and services are likely designed to maximize user engagement through addictive features and by lowering payment barriers, ensuring consumers stay hooked.



SUPPORTING CONTEXT FACTORS:

When (digital) products are free to use, the consumer (data) is typically the product (Mützel, 2021)

Addictions cause people to lose control over their actions, even when they know it is harming them (Biology of Addiction, 2024)

New technologies are often difficult to comprehend, but easy to use (FD, 2024)

Teens are especially vulnerable to develop (digital) addictions (Biology of Addiction, 2024)

Private companies are increasingly involved in payments (Research Nester, 2024)

The bombardment of advertisements and brand exposures have caused customer loyalty to decline (CBS, 2024)

To avoid losing customers, businesses are forced to offer new, more convenient payment methods (DNB)

Buy-now-pay-later' schemes are marketed to make young people think buying on credit a is not acquiring debt (Doelman, 2024)

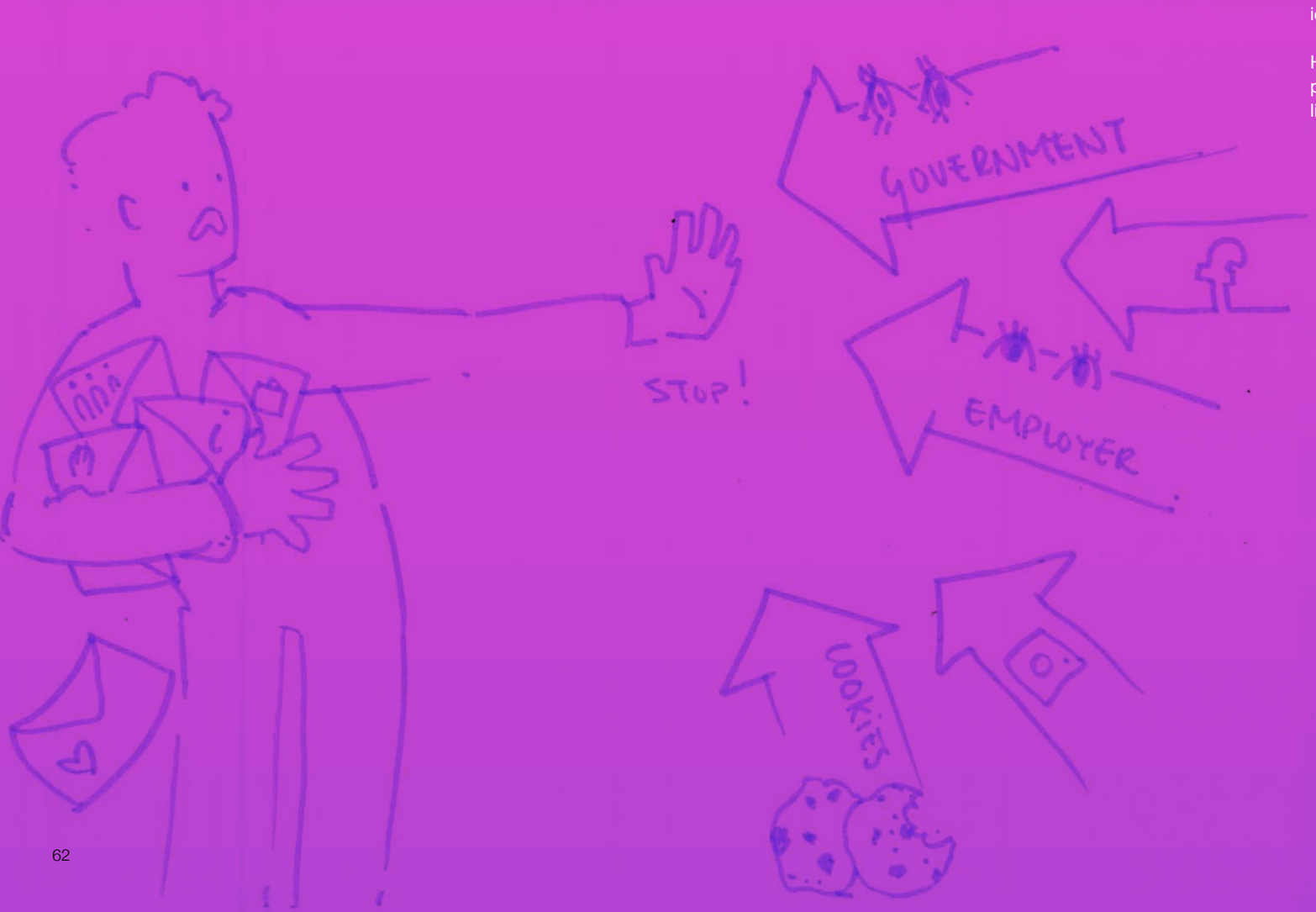
Technologic developments (NFC's, wearables, software) are making digital payments easier to use and more secure (Mützel, 2021)

People move away from ownership in the real world and choose for rental products (Kalim, 2021)

More people become exposed to unmonitored debt as "Buy now, pay later" market grows 11% annually (Research and Markets Ltd, 2024)

3.5.2 SEEKING DIGITAL AUTONOMY

Humans have an inherent need to feel in control of their lives. The ability to keep secrets is crucial to maintaining a sense of autonomy and safeguarding a personal identity. In the vast digital world, individuals struggle to control what is shared, what others can see, and what they wish to keep private. As digital products and on-line organizations play an increasingly dominant role in society, many long for a simpler, more private time, favoring cash and “dumb phones” as artifacts of a time where privacy was easier to protect.



Decreased privacy and security on-line pushes people to desire technological regression (Frattari, 2024)

A ‘dumb phone’ can protect your mental well being from overexposure to digital media (Frattari, 2024)

Highly personal advertisements feel like a breach of your private thoughts and feelings (Andreas Wismeijer)

Secrets improve autonomy over personal identity (Gold, 2024)

Having secrets without cognitive preoccupation, is beneficial for quality of life (Andreas Wismeijer)

Children start keeping secrets at the development of sense of self (Gold, 2024)

Feeling like your privacy is violated leads to anxiety, stress, and a loss of control (Priyanshu, 2024)

Mishandling private data is the most influential reason for decline in trust of their bank (Van Der Cruijsen et al., 2021)

News about increasing amount of “sovereign” people in NL is a symbol of decreasing (trust in) authority of the Dutch Government (Spraakmakers, KRO NCRV, 2023)

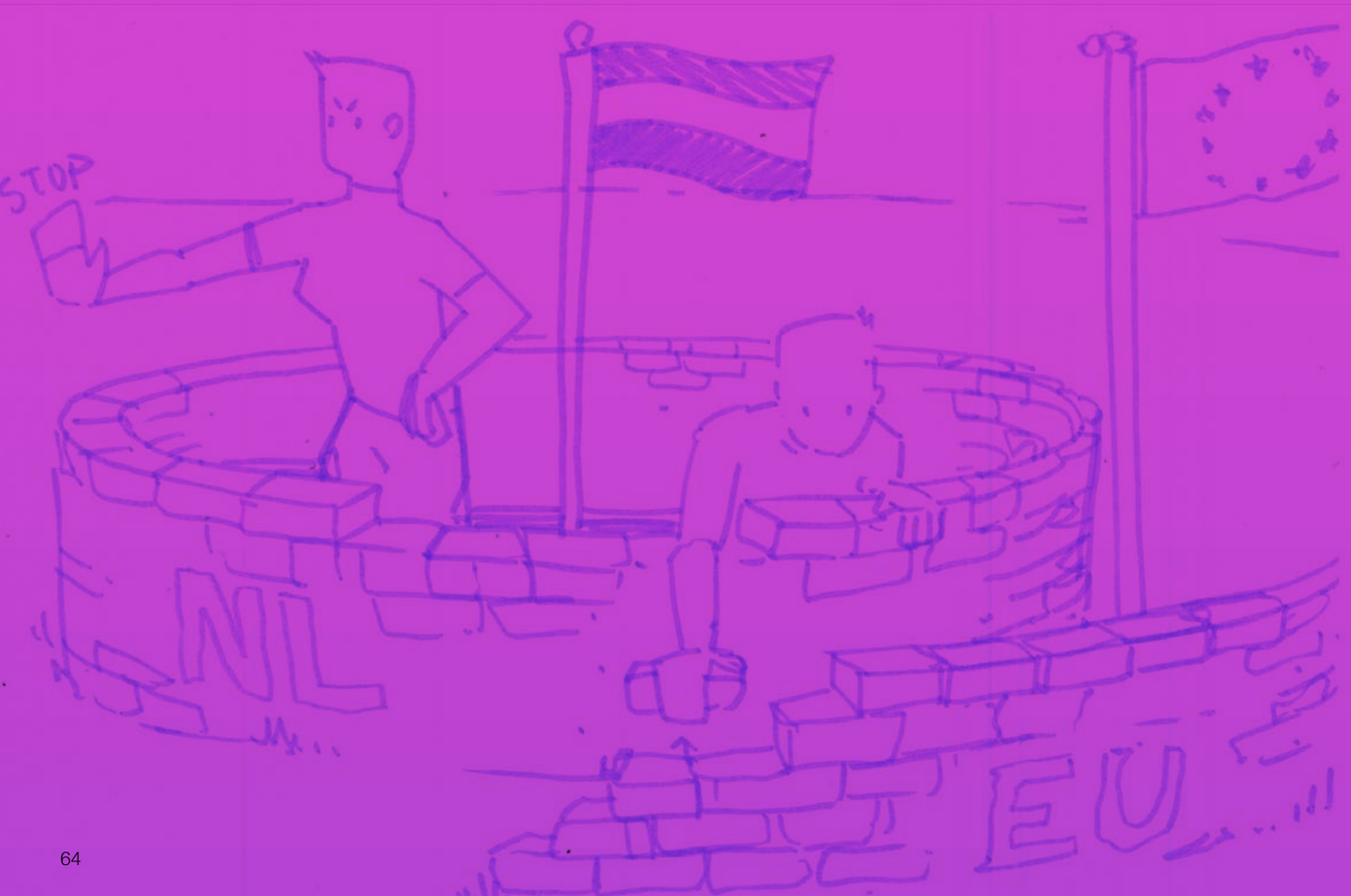
Trust in value of cash stays high while use of cash continues decreasing with 1% per year (ECB, 2021)

On-line platforms are providing more options for taking control over your digital privacy (Andreas Wismeijer)

Without the leverage of the European Union, individual countries can’t resist the (bad) influence of big tech. (FD, 2024)

3.5.3 BUILDING BARRIERS OF INDEPENDENCE

Global and local collaboration has played a key role in achieving widespread welfare across Europe. Now that it has become wealthy, and has much to protect, the rest of the world is often perceived as a threat to this hard-earned prosperity. Feeling increasingly disconnected from others in the global economy, people fear that outsiders will drag them down. To safeguard the welfare of their own communities, they begin building barriers around themselves, even if this risks weakening the very alliances that helped them achieve their prosperity in the first place.



SUPPORTING CONTEXT FACTORS:

Feeling wealthier makes us act more selfish (Piff & Robinson, 2024)

Uncertainty makes it more difficult to implement policies fostering long term improvement (International Monetary Fund, 2024)

In fear of a next financial crisis, first world countries are adopting more nation-centric policies (Schirm, 2022)

Accusing people of keeping secrets contributes to widespread distrust and manipulation (Gold, 2024)

Rising global tensions limit economic growth especially for Low Income Developing Countries (International Monetary Fund, 2024)

European payments are highly dependent on private, non European companies such as MasterCard and Visa (Atlantic Council, 2024)

Most countries are exploring, piloting or using CBDC's (Atlantic Council, 2024)

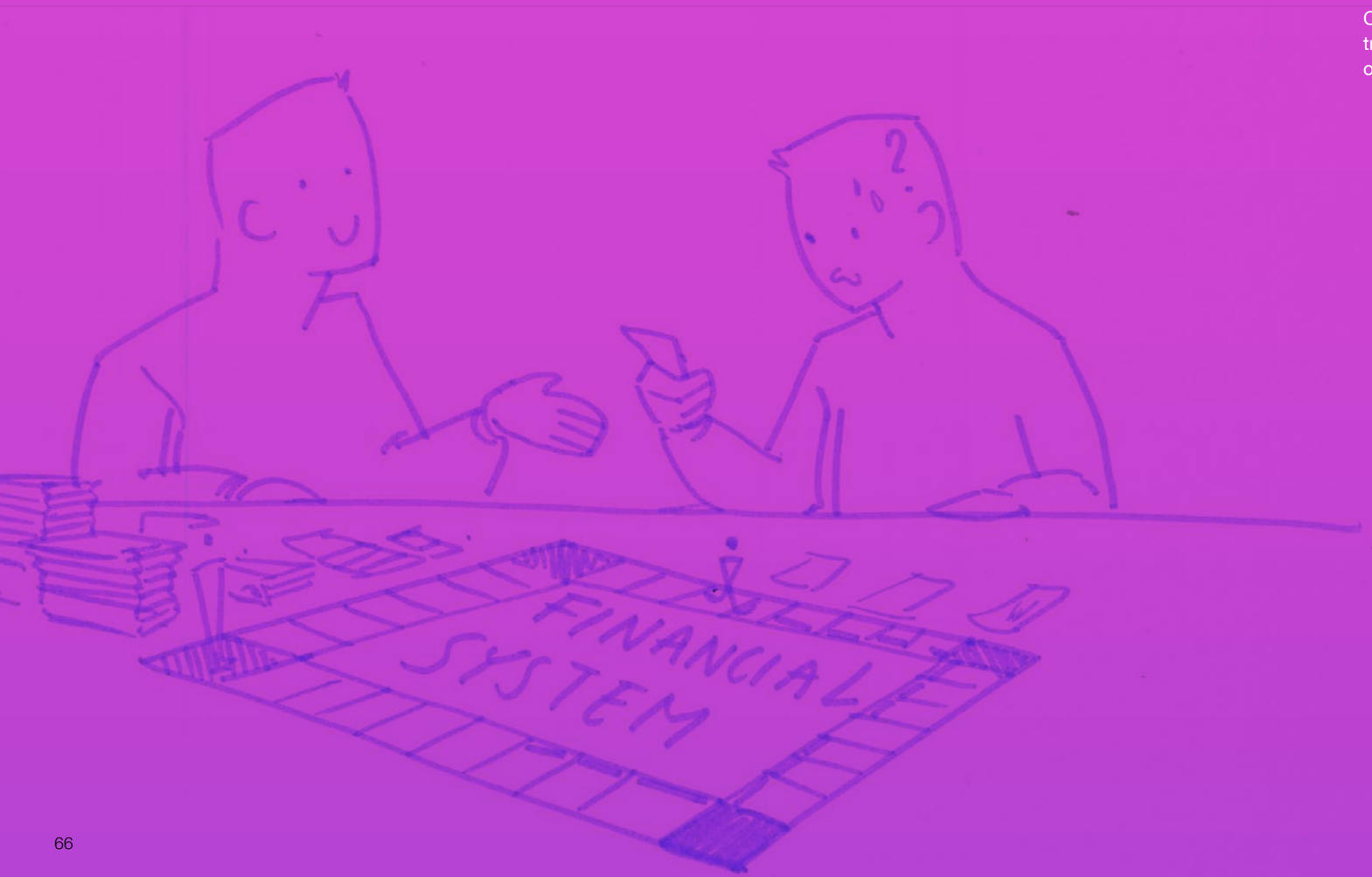
Central bank money is used as a tool for maintaining financial stability (ECB)

Europe doesn't keep up with global digital developments as they structurally invest less in R&D than Japan, USA and China (ESPAS - Global Trends to 2030)

Countries are creating trade barriers and domestic subsidies to bring back local industry at a high cost (Antras, 2024)

3.5.4 NEW RULES IN PAYMENTS

The financial system operates with a clear set of rules that can be both simple and complex to understand and navigate. While participating in this system has never been easier in the digital world of 2035, understanding the rules has become increasingly elusive. The constantly evolving digital landscape means that the most accurate and current information is found on-line. However, this poses significant challenges for those unable to discern truth from misinformation on-line. For the digitally illiterate, this creates a situation where they are forced to play the financial game without fully understanding the rules, often resulting in losses on their part.



SUPPORTING CONTEXT FACTORS:

More people are seeking on-line tools like StemWijzer as it becomes extremely time consuming to understand the viewpoints of all political parties (De Leeuw & Muselaers, 2022)

Non-specialists have trouble distinguishing truths from falsehoods on the internet (Eurostat, 2022)

Stock-trading-training's are especially successful when targeting beginner/ inexperienced investors (Business Research Insights, 2024)

Confidently proclaiming something as the truth, places the burden of proof on your opponent (Andreas Wismeijer)

Digital financial services are more accessible to financially literate/smart people (Van Rooij et al., 2012)

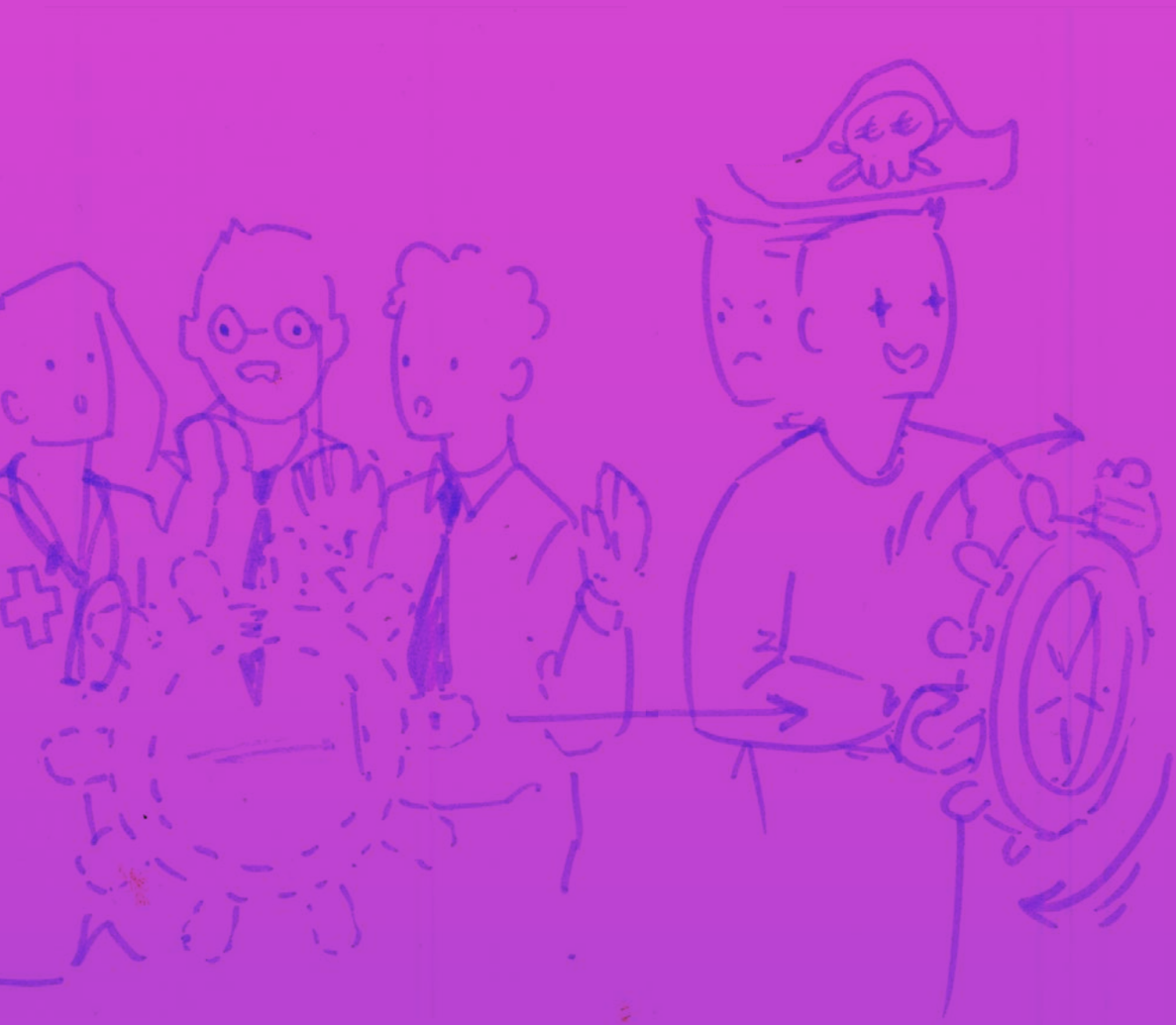
Especially lower educated groups source news from untrustworthy sources (Geers, 2020)

Unmonitored, Fin-techs are able to innovate at a speed unattainable by commercial banks (Mützel, 2021)

As investing becomes more like gaming/ gambling, 'investment app' market experiences significant growth (Global Market Insights Inc., 2023)

3.5.5 OVERCONFIDENCE IN A DIGITAL AGE

By 2035, people are becoming more determined to take control of their personal and financial well-being. As the governing structure grows more complex, there is increasing doubt about whether those in authority can effectively manage their responsibilities in such a rapidly changing society. The rise of digital tools like crypto-currencies, on-line health resources, and the flood of both accurate and misleading information has empowered individuals to believe they can manage things on their own. However, this confidence often leads to over-reliance on unreliable sources. Unrealistic promises of a better future are prioritized over fact-checking and consulting credible experts, organizations, or the government.



SUPPORTING CONTEXT FACTORS:

For digital currencies trust is not dependent on the system, but rather on the trust people have in their own digital proficiency (Schraten, 2019)

Misunderstandings of DNB's tasks and responsibilities reduce trust (De Nederlandsche Bank, 2022)

Individuals are increasingly asked to take responsibility for their retirement preparation (Van Rooij et al., 2012)

Dutch people increasingly place savings in other European countries (De Nederlandsche Bank, 2024b)

Trust in science is dependent on political affiliation (left vs right) and overall trust in institutions (Rathenau Instituut, 2024)

WebMD searching behavior negatively impacts satisfaction and trust in general practitioner (Rivetz, 2014)

Finfluencers' are increasing the amount of unknowledgeable investors on the market (Autoriteit Financiële Markten, 2021)

Distrust of financial institutions and government interference allow Crypto market to grow to 13B in 2034 (Fact.Mr, 2024)

Crypto currencies are more successful in individualistic cultures (Deleanu et al., 2019)

Most young adults (18-35, 51%) don't have the administrative skills or knowledge needed to manage their finances (Nibud, 2022)

Young people (18-34) are twice as likely to invest in crypto than the older generation (35-54) (Michael, 2024)

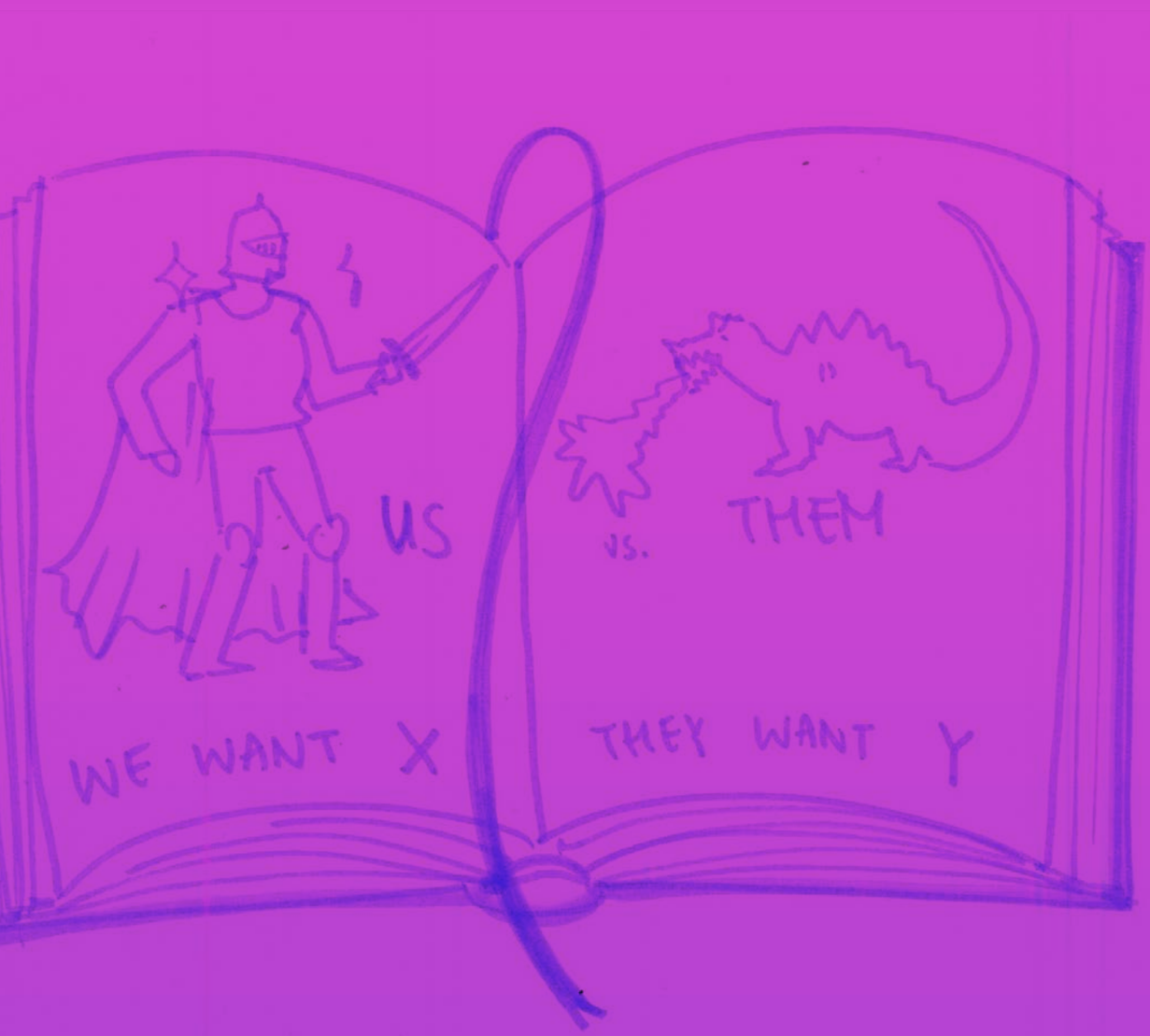
Increasing transparency helps improve trust in the government (Alessandro et al., 2021)

Humans have the tendency to remember the past as better than it actually was (Krank, 2019)

Population of atheistic and agnostic people grows as Christians let go of their affiliations with the church (Wormald, 2024)

3.5.6 INFLUENTIAL FAIRY-TALES: HEROES AND VILLAINS OF MODERN SOCIETY

Increased access to information in the digital age makes us more aware of global problems, but the complexity of our political landscape makes it harder to fully understand these issues and form balanced opinions and priorities. Our democratic system tends to favor opinions shared by large groups, particularly the majority. To gain influence, it's often more effective to craft a simplified narrative about our complex society by framing it in terms of heroes and villains. Whether these oversimplified "fairy-tales" actually address the complexities of the world is less important than how convincing they appear compared to opposing viewpoints



SUPPORTING CONTEXT FACTORS:

Shared stories create a sense of community and belonging (Prompt, 2023)

Our brains are hardwired to seek, understand, and resonate with narratives (Prompt, 2023)

People trust PayPal's platform, not because it is safe, but because it's simple (Schraten, 2019)

Sharing a currency makes Europeans feel more connected to the European identity. (Negri et al., 2020)

The Netherlands has a longstanding history of national pride and collaboration for the benefit of our nation (Pleij, 2019)

In religion, people have to trust that their beliefs are the truth (Semen, 2010)

Populism takes advantage of the complexity of politics, which is hard to understand (ESPAS, 2019)

Politicians with extreme views are more successful through attacking their opponents character than their arguments (Bail et al., 2018)

Democracy takes into account all voters, even when voters may lack the necessary information to make informed choices (Meyer, 2016)

Populism is a political style, relying on emotional and offensive language to stress the urgency of its demands, and their proximity to the people (ESPAS, 2019)

The increasingly harsh nature and tone of political arguments makes people feel that polarization is growing (Oostveen, 2024)

Exposure to opposing views on social media is more likely to cause polarization than to change someones mind (Bail et al., 2018)

Financial stability is a global public good requiring collaboration between nations (Kaul, 2003)

People from lower and middle class feel betrayed by the 'elite, highly educated' as a result of their radical, climate stances (Cuperus, 2024)

3.5.7 THE ABSTRACTION OF MONEY

Throughout history, the concept of payments has evolved in the journey towards creating a more efficient monetary system. To streamline transactions, society has gradually moved away from tangible assets with intrinsic value, making money increasingly abstract. By 2035, the digital age has further blurred the collective understanding of financial health, with money reduced to a balance that can be seen but never physically held. As slang shifts the narrative from “purchasing” to “getting,” and cash becomes less central to our financial balance, spending money no longer carries the same weight it once did.

SUPPORTING CONTEXT FACTORS:

The difference between intrinsic and monetary value of our money keeps increasing as we move towards a more convenient monetary system (DNB)

Money can be used without understanding the basic economic and legal mechanisms (Schraten, 2019)

Digitization of banking communication and payments causes more than 20% of Dutch people to struggle with their financial administration (Nibud, 2022)

Reduced insight into digital financial administration as 44% of people regularly pay for subscriptions they don’t want or use (Nibud, 2022)

Spending money on necessities hurts more than spending on luxuries (De Nederlandsche Bank, 2024a)

For teenagers, paying with cash hurts less than paying with card since the balance in their banking app doesn’t go down (De Nederlandsche Bank, 2024a)

New “street language” terms for money or purchasing are making the spending of money feel even more abstract (e.g. “Nieuwe patta’s halen ipv kopen) (Van Dongen, 2021)

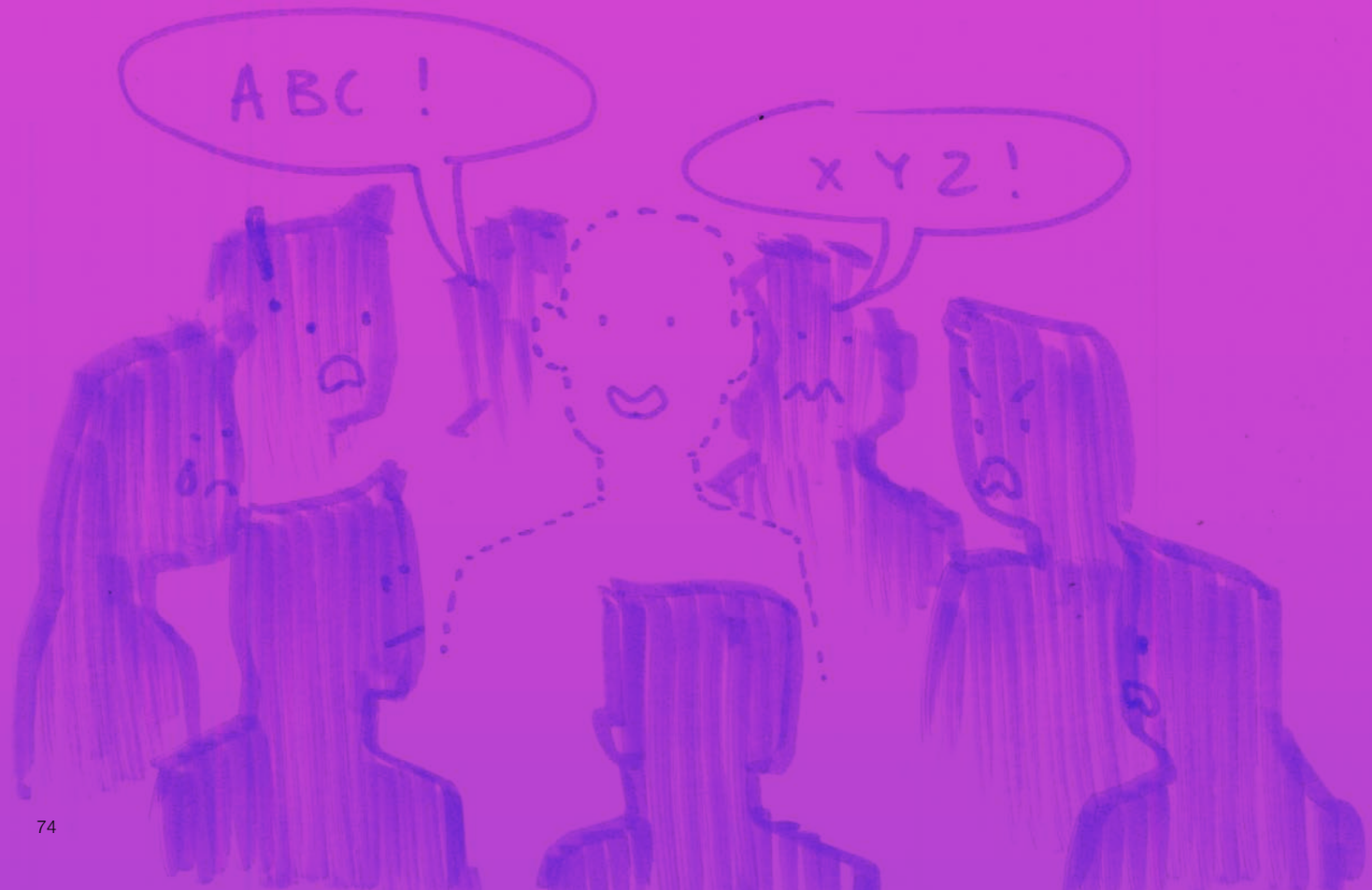
The younger the person, the more regularly they check their bank balance on-line (De Nederlandsche Bank, 2024a)

Getting paid more frequently causes people to feel wealthier and increases spending, while the additional spending causes them to actually be less wealthy (Giesler, 2022)

The use of central bank money is declining as people choose the more convenient payment methods with digital, private money (DNB)

3.5.8 THE SEARCH FOR LIGHTNESS IN A SERIOUS SOCIETY

As more of people's lives shift into the digital realm, individuals increasingly feel tracked, recorded, and remembered. The ability to escape past mistakes is a luxury only those who lived before the internet era truly experienced. Faced with the overwhelming complexity of modern life, people seek ways to escape its seriousness. Trends like "girl math," sensational fake news, and faceless troublemakers on social media reflect society's desire for lightness and enjoyment without the burden of being taken too seriously and remembered forever.



SUPPORTING CONTEXT FACTORS:

People like freely sharing their opinions on-line when their actual identity is kept secret (Andreas Wismeijer)

Secrets (and lying) are an useful tool for maintaining/improving your position in social situations as long as you aren't found out (Andreas Wismeijer)

Young people use mental workarounds like 'girl math' to escape the unpleasant feeling/reality of spending money on things they don't need (De Nederlandsche Bank, 2024a)

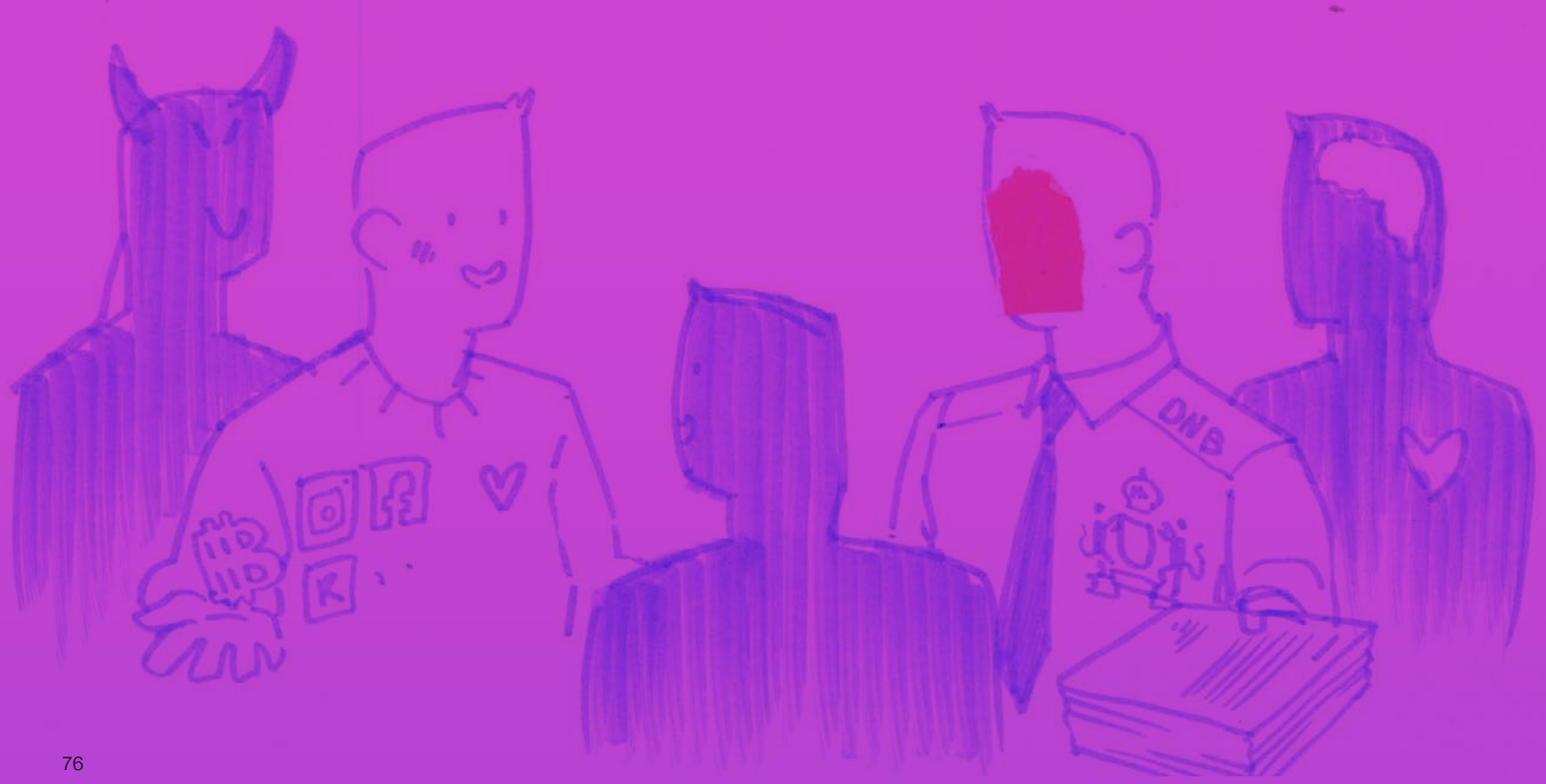
On social media, fake news travels faster and further than the truth (Bail et al., 2018)

Increasing complexity of government policies in a digital world force more people to seek comfort in the simple, comforting words of populists (ESPAS, 2019)

People increasingly seek a presence on social media to escape their presence in reality (Kırcaburun & Griffiths, 2018)

3.5.9 THE ILLUSION OF TRUST IN DIGITAL AUTHENTICITY

By 2035, the solitary human seeks to regain the human connection lost in the shift to a digital society. People are growing increasingly distrustful of large, impersonal organizations, and instead feel more connected to individuals who display their humanity on social media. Social media personas build trust and loyalty by sharing authentic glimpses of their lives, presenting themselves as relatable, independent voices in a world dominated by distant, corporate entities. This perceived trust and personal connection often outweigh the actual credibility of these individuals, which may not be backed by education or accountability. While influential figures may show their flaws to appear more human, they frequently conceal the full extent of their wrongdoings or hidden agendas.



SUPPORTING CONTEXT FACTORS:

Humans have evolved the basic need for social connection (Braren, 2023)

Companies and persons are perceived as having more integrity if they are more familiar (Alarcon et al., 2016)

Time spent with fellow humans decreases as people increasingly live in single person households (CBS, 2024)

Young voters increasingly find and trust political information found on social media (Wat Vinden Jonge Mensen Van De Politiek?, 2023)

Nowadays, more people are investing in risky investment products (such as crypto's) based on advice from unlicensed 'finfluencers' (Autoriteit Financiële Markten, 2021)

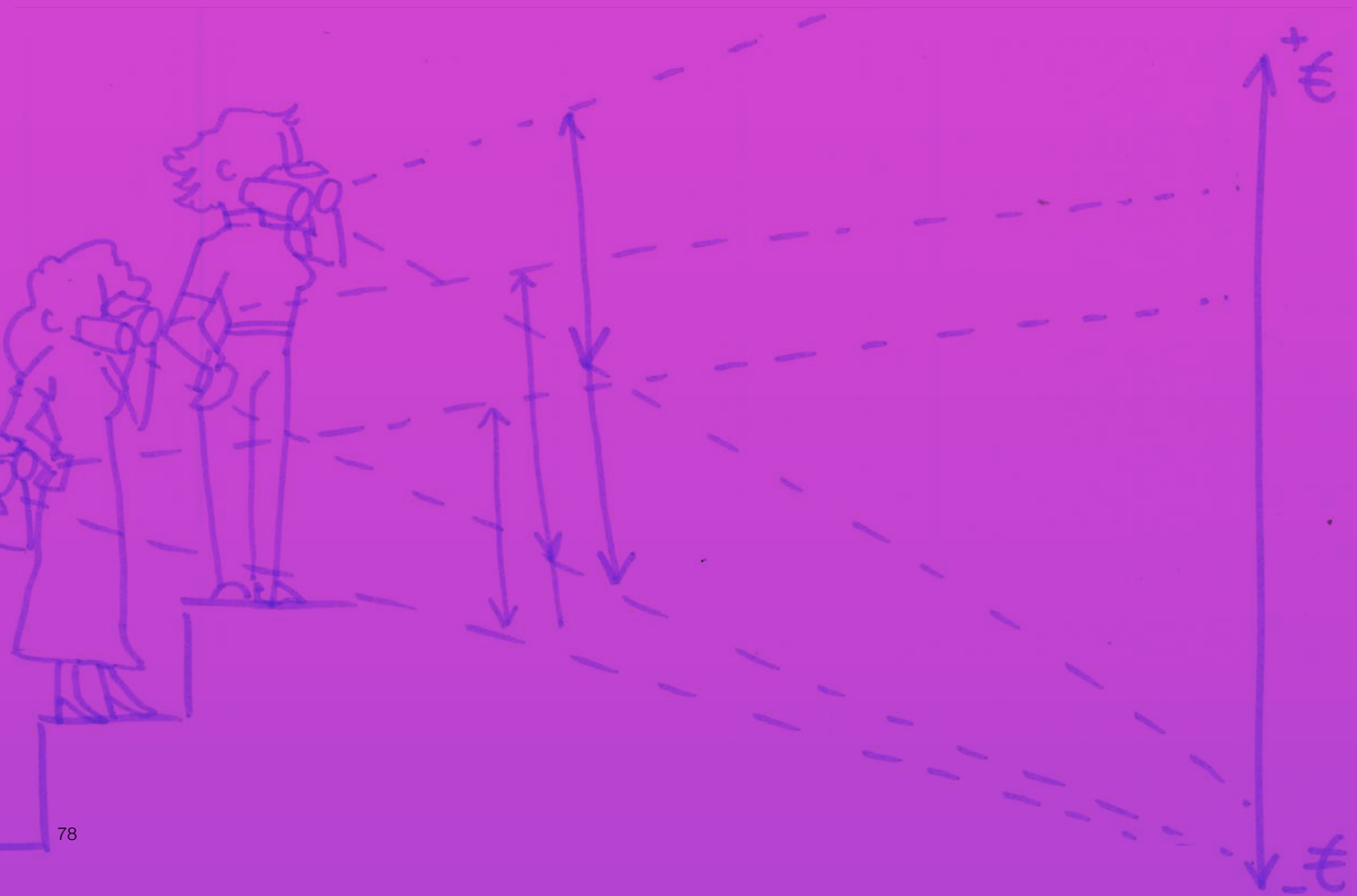
Sharing secrets forms loyalty, trust and a sense of connection (Gold, 2024)

Ambiguity and mystery feed the human ability to create imaginary stories (Grant, 1983)

Increased awareness of digital security causes large growth of the VPN market (CAGR 22%) (Precedence Research, 2023)

3.5.10 MORAL BOUNDARIES OF CAPITALISM

In capitalism, people can experience moral boundaries that define what they see as fair wealth distribution: within these limits, the market is perceived as functioning properly. However, when wealth distribution exceeds these boundaries, such as the stark contrast between the wealthiest 1% and the poorest 50%, capitalism is often viewed as unjust. The moral boundaries of capitalism are subjective to the group observing it. In the society of 2035, people are increasingly becoming entrenched in echo chambers that reinforce their beliefs, creating isolated groups with shared perspectives. As society fragments, what one group considers fair, just, or right can differ dramatically from the views of others.



SUPPORTING CONTEXT FACTORS:

Society imposes moral boundaries around the use of money (Zelizer, 1994)

Thinking about money is not purely rational, but deeply influenced by social values and relationships (Zelizer, 1994)

Humans are capable of making long term plans for the benefit of their children (Stake, 2006)

Egalitarian instinct: What we think is fair, trumps what is actually equal (Corning, 2015)(Charlton, 1997)

Rather than polarization (which is experienced by people) fragmentation is growing as people are seeking groups that confirm their own opinions (Oostveen, 2024)

Children are often inherently cooperative, but selfish behaviors are often taught/ rewarded more (Jiang, 2021)

People process information by looking for, or interpreting, information that is consistent with their existing beliefs (Casad & Luebering, 2024)

Especially in countries (communities) where many people suffer from poverty (>60%), most people (84%) would get personally involved to help someone who is struggling (Mercier et al., 2023)

Humans have a limited capacity to feel social connection. (up to 150 people) (Lafont, 2022)

3.5.11 THE DILEMMA OF GROWTH VS. SUSTAINABILITY

In Europe, there is a widespread consensus that welfare should be fairly distributed and poverty significantly reduced. Over the past few centuries, technological advancements have driven substantial economic growth, lifting the average standard of living well above the poverty line. However, human nature compels people to constantly seek more, trapping them in the pursuit of continuous economic growth: both to maintain their own standards and to raise the poorest out of poverty. By 2035, this pursuit is increasingly at odds with another urgent goal: sustainability. Achieving sustainability may require sacrificing some economic growth, presenting a difficult dilemma in a world still driven by the need for constant expansion.

SUPPORTING CONTEXT FACTORS:

Energy consumption will rise globally by 1.7% per year due to populations escaping poverty (ESPAS, 2019)

In capitalism the pursuit of wealth is often portrayed as the ultimate purpose or goal, much like devotion to a deity (Minch, 2018)

Global economic growth of at least 5 times is necessary for poverty to fall substantially (Roser, 2024a)

Economic growth is necessary to maintain our standard of living in the current capitalist, inflationary economic system (Roser, 2024b)

Europe's levels of 'luxury' are unsustainable as consumption of resources exceeds earths ability to regenerate by more than 3x times every year (Global Footprint Network, 2022)

Political consumerism gives people the feeling they can change the world with their money (Monticelli & Della Porta, 2018)

In Buddhism, money is not inherently good or evil, but gets a place on that spectrum when used (Teachings of the Buddha)

Consumer behavior is driven by the attainment of esteem, envy of fellow men (Yeoman & McMahon-Beattie, 2011)

Humans have a natural instinct to acquire property (Stake, 2006)

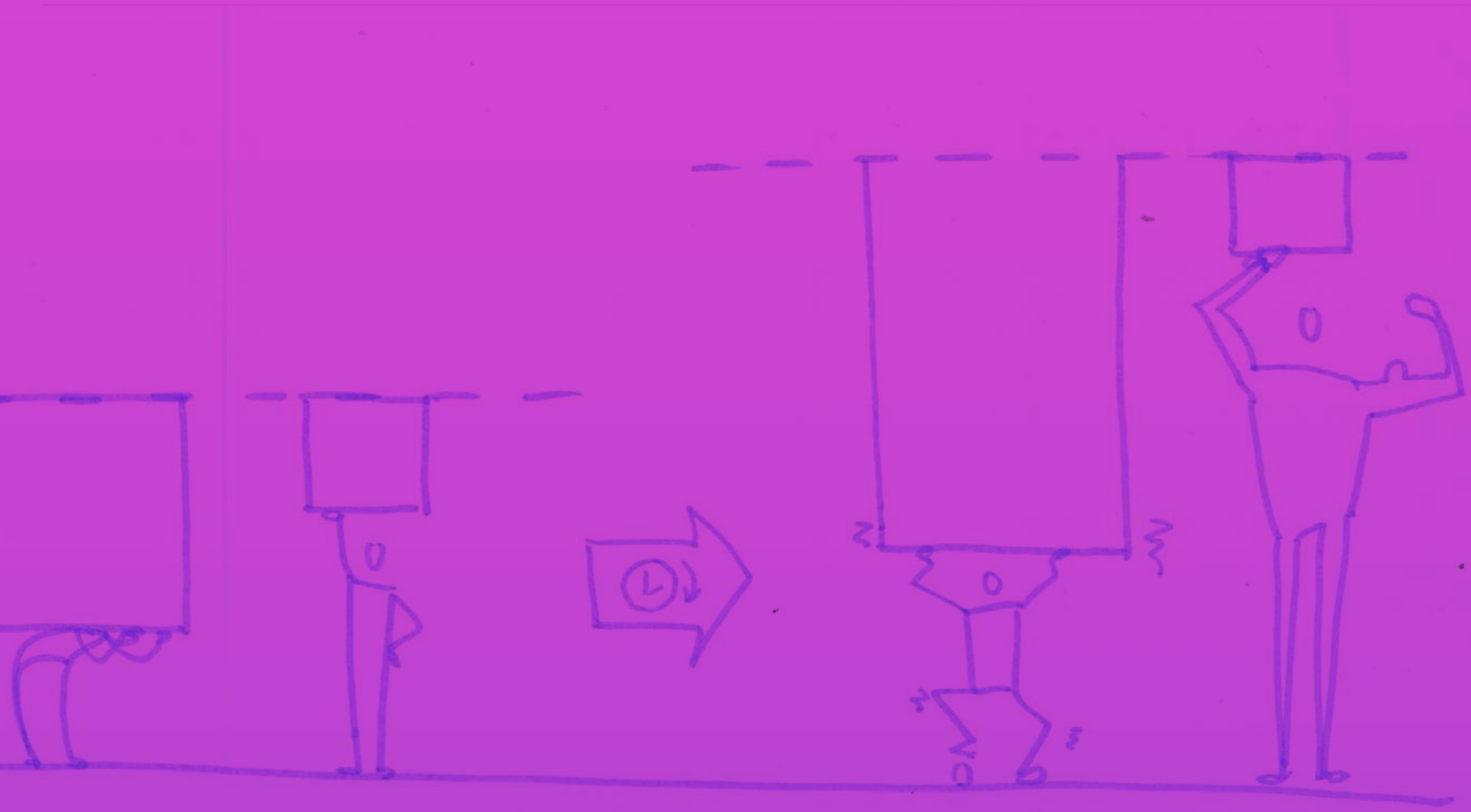
Consumerism thrives as the market favors replacement over repair (Brunner et al., 2021)

Christians should worship God before money (Money - Christianity)

People continue to call for boycotts, even though its effectiveness is unclear. (Kim, 2020)

3.5.12 UNEQUITABLE BURDENS

The basic principle of investment, where money generates more money, naturally leads to growing wealth inequality over time. By 2035, this dynamic could result in the rich becoming richer and the poor falling further behind. To address this imbalance, policies like taxes and stipends are introduced to create a more level playing field. However, this raises a key dilemma: what is truly fair? The subjective nature of fairness makes it difficult for society to agree on a solution. Should fairness be limited to our own population, extend to countries we've historically profited from, or include all those facing poverty worldwide? Since there is no objective standard for fairness, this question will likely continue to challenge in the years to come.



SUPPORTING CONTEXT FACTORS:

Inequality in the EU increases as southern countries bear higher healthcare and food costs (Menga, 2024)

Hyperinflation more common globally as political instability, wars and economic mismanagement are increasing in developing countries (World Bank Group, 2024)

Young groups struggle to enter the housing market as increasing older house owners vote for right wing parties that don't prioritize affordable housing policies (Brännlund & Szulkin, 2023)

Gender wage gap (NL) continues decreasing slowly as awareness grows (Centraal Bureau voor de Statistiek, 2023)

Money can generate money through investment (Waterworks of Money)

Financial inequality increases as increased expenditure on healthcare and food will impact poorer households more than wealthy households (Menga, 2024)

Inequality between education levels and correlation to parents income is increasing (ESB, 2023)

Secrets cannot be ranked from good to bad as the weight of a secret is highly subjective (Andreas Wismeijer)

People prefer earning only slightly more than others in their social circle to avoid jealousy (Andreas Wismeijer)

The mental load of potential climate change damage weighs heavily on the minds of people already in financial distress (Hornsey & Pearson, 2024)

3.5.13 POWER OF BROKEN PROMISES IN A DIGITAL DEMOCRACY

In the digital age, where nothing is forgotten, the unfulfilled promises of our democracy continue to shape our dissatisfaction with the system. Dutch citizens, paying 38% of their income in taxes (CBS, 2022), have high expectations of the services their government should provide. However, the collaborative nature of our democratic system often prevents politicians from fully delivering on their promises, even when they “win” the elections. By 2035, this dissatisfaction has only grown as the government struggles to meet expectations in an increasingly unstable political climate and resource-constrained world where nothing is forgotten.

SUPPORTING CONTEXT FACTORS:

As economic welfare levels don’t continue increasing, newer generations feel worse off than their parents (ESPAS - Global Trends to 2030, 2019)

It is human nature to not only to register negative stimuli more readily but also to dwell on these events longer than positive stimuli (Cherry, 2023)

49% of Europeans blame inflation rather than lagging wages for their decrease in purchasing power (Mercier et al., 2023)

The willingness to pay taxes (tax morale) is higher when people feel the government is spending their money well (Kemme et al., 2019)

Shrinking working age population will limits European prosperity (European Commission, 2023b) (Center for Global Development, 2024)

High inflation causes distrust of central banks and government (De Nederlandsche Bank, 2023)

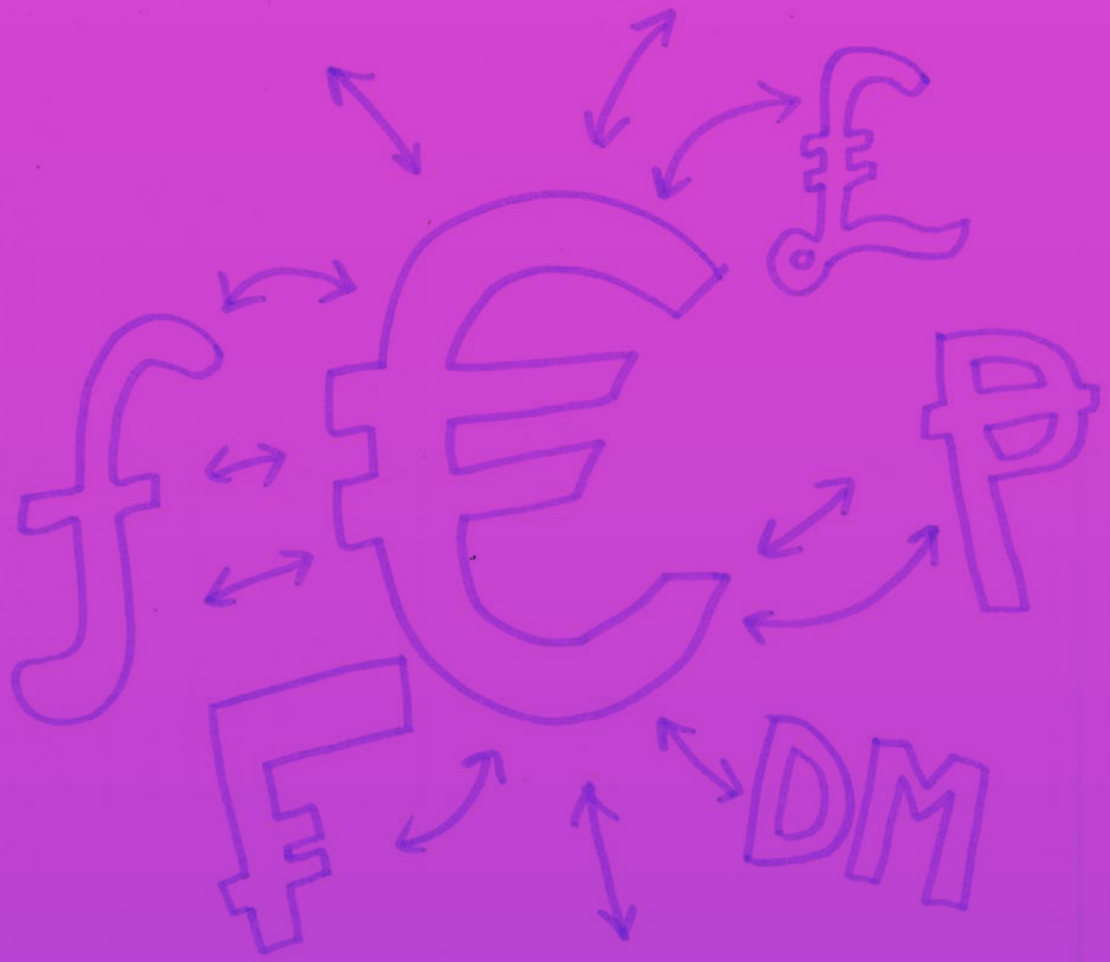
Children don’t learn how to solve their own problems as parents are increasingly involved in the smooth progression of their child’s life (Richards, 2019)

People have high(er) expectations of the government while trust and respect for authority continues decreasing (Ministerie van Volksgezondheid, Welzijn en Sport, 2022)

Political fragmentation in NL continues increasing as a result of reduced support for long standing political parties (De Leeuw & Muselaers, 2022)

3.5.14 CHALLENGES OF A SHARED MONEY

By 2035, Europe's increasing cultural and ethnic diversity introduces a broader range of needs and expectations for monetary products. Policy and innovation often conflict with the deeply rooted cultural values and traditions of native and migrating groups. The significance of family, national, and cultural customs in this diverse landscape makes it challenging to develop "one-size-fits-all" solutions within a shared currency system.



SUPPORTING CONTEXT FACTORS:

Europe becomes increasingly multi-ethnic and culturally diverse to maintain size of working age population (Springford, 2024)

Cash becomes increasingly used for saving (ECB, 2021)

Beliefs about money are often passed down from generation to generation (Abbenes, n.d.)

The replacement of familiar (payment methods and) routines has made people feel distrust towards the managers of our monetary system. (Schraten, 2019)

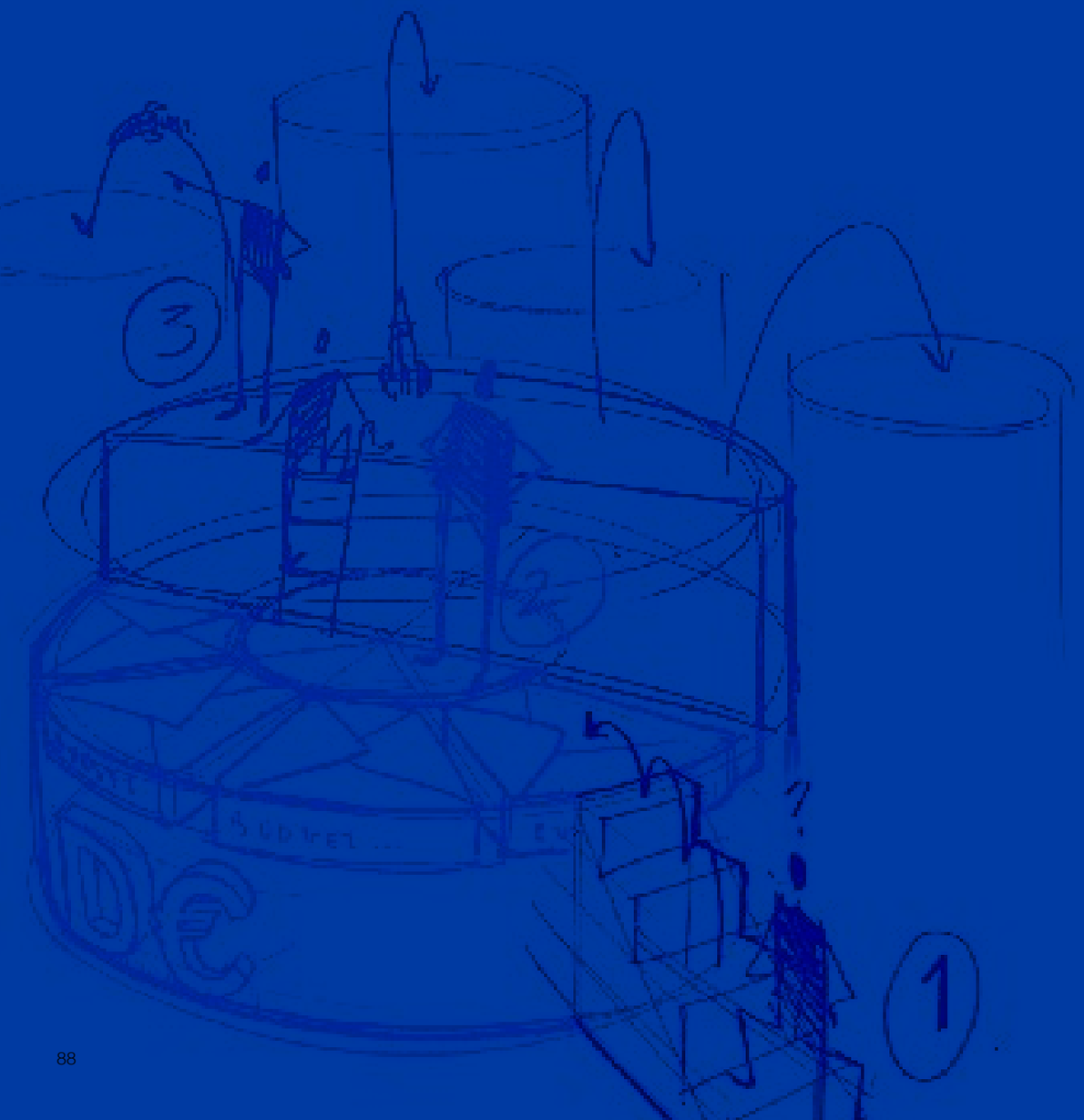
Charging or paying interest on loans is not allowed in Islam (Hayes, 2024)

While health and sickness are universal across the human kind, cultural differences affect the type of healthcare preferred by the patient (Putsch & Joyce, 1990)

'Tikkie Cultuur' increasingly causes frustration as people regularly receive tikkies for as little as 50 cents. (Fellinger, 2023)

As people choose to work more part-time: Wealth is increasingly measured in freedom rather than material property (Andreas Wismeijer)

4. DEFINE



This chapter marks the transition to the re-framing phase, where we re-define the problems emerging from the gathered insights in the discover chapter. This is done by addressing the second research question: *“What driving forces are likely to shape the relationship between society and payments in the Netherlands by 2035?”*

Based on the themes identified in the discover chapter, we can restructure the context and identify some underlying driving forces in the changing relationship between society and payments. By learning how the relationship will change, and why, we can anticipate the likely future and(re)design payments in a goal oriented way, based on an envisioned desirable future vision.

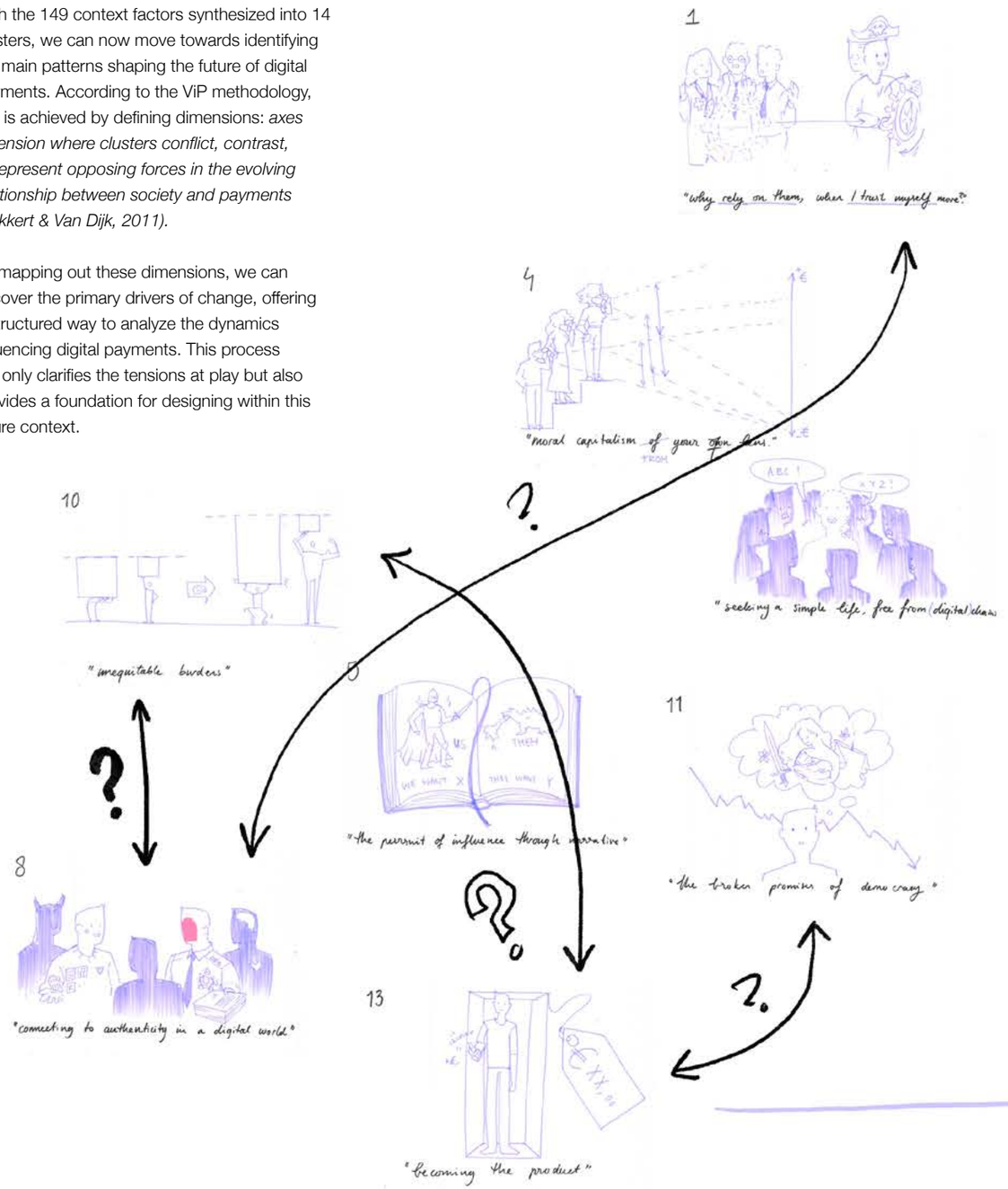
In the following chapter, the emergence of these drivers is substantiated from the contextual analysis. The interplay of these “driving forces” leads us to frame three emerging challenges for the changing relationship between society and payments. For each challenge a vision is written explaining how we should intervene in try to achieve an envisioned desirable future.

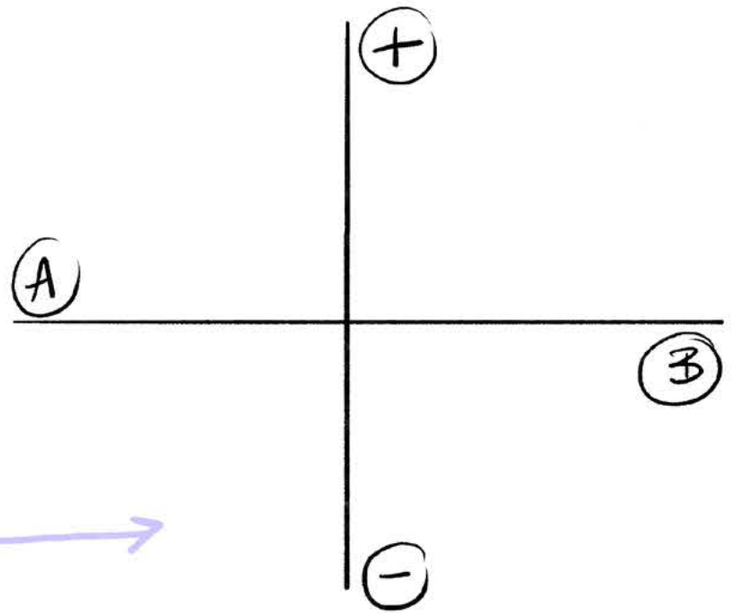
DEFINE CONTENTS **P**

4.1 STRUCTURING THE CONTEXT

With the 149 context factors synthesized into 14 clusters, we can now move towards identifying the main patterns shaping the future of digital payments. According to the ViP methodology, this is achieved by defining dimensions: *axes of tension where clusters conflict, contrast, or represent opposing forces in the evolving relationship between society and payments (Hekkert & Van Dijk, 2011).*

By mapping out these dimensions, we can uncover the primary drivers of change, offering a structured way to analyze the dynamics influencing digital payments. This process not only clarifies the tensions at play but also provides a foundation for designing within this future context.





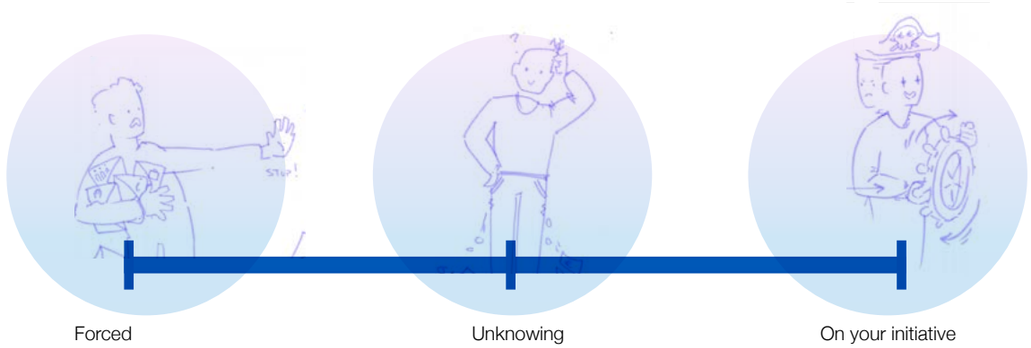
4.2 EXPLORATION CONTEXT DIMENSIONS

To determine the most meaningful context dimensions for the gathered context factors, multiple dimensions were explored. The final selection was made based on their ability to tell a compelling and relevant story about the future of payments. However, in the complex world of payments, many different narratives could be constructed.

All of these dimensions highlight interesting themes and tensions within the identified context clusters. While not all explored dimensions were selected, each provides insight into how the relationship between people and payments could evolve. The ones left out are not irrelevant; they simply do not represent the most critical driving forces shaping the future landscape.

A: SYSTEM PARTICIPATION IS...

Payments are a central piece in the financial system as we know it. If you want to be a functioning member of society participation is inevitable, but the way people perceive their role in this system varies greatly.



Forced — Unknowing — On your initiative

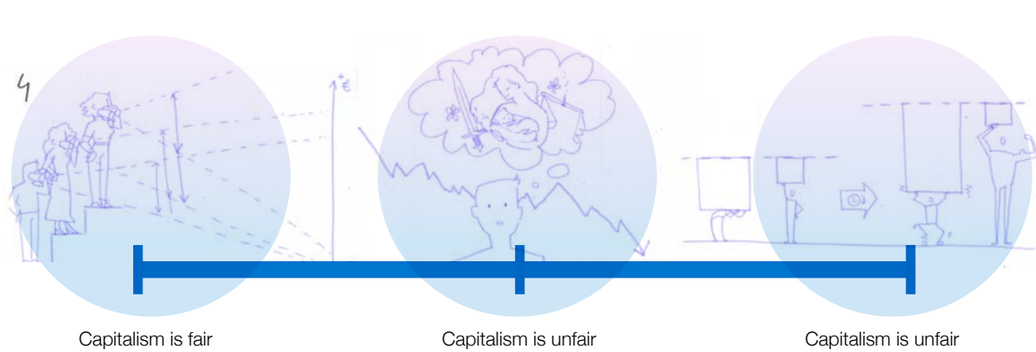
B: SELF SUFFICIENCY:

The Netherlands is often referred to as a welfare state, but freedom and autonomy is also highly valued. Tensions arrive between institutions expecting people to save themselves, and individuals expectations that they will be taken care of.

Individuals have to save themselves — Individuals (can) expect to be saved

C: THE PERCEPTION OF FAIRNESS OF OUR FINANCIAL SYSTEM

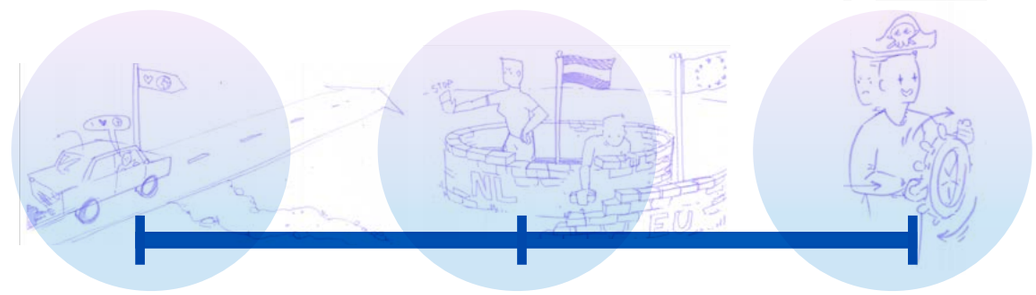
In the Netherlands, the financial system is based on capitalism, but not in it's purest form. Subsidies and taxes try to make it more fair, but tensions arise in the discussion about what is fair.



Capitalism is fair to me — Capitalism is unfair to me — Capitalism is unfair for everyone

D: PERCEPTION OF THE TOP PRIORITY

Building upon "fairness in our financial system", tensions arise in the way people see our collective priorities. Who is the center of the universe of payment systems?



The system — Us, the people — The individual

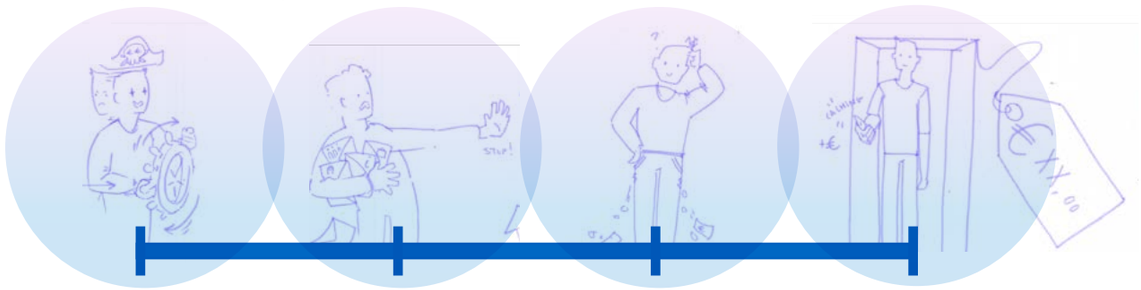
E: INDIVIDUAL VS LEARNING

The digitization of our world is changing the way people receive information and learn. Tensions arise between those who are able to empower themselves through the internet, in contrast to those who fall victim to the complexities.

Understanding seems easy — Unclear where to start — Is difficult

F: AGENCY

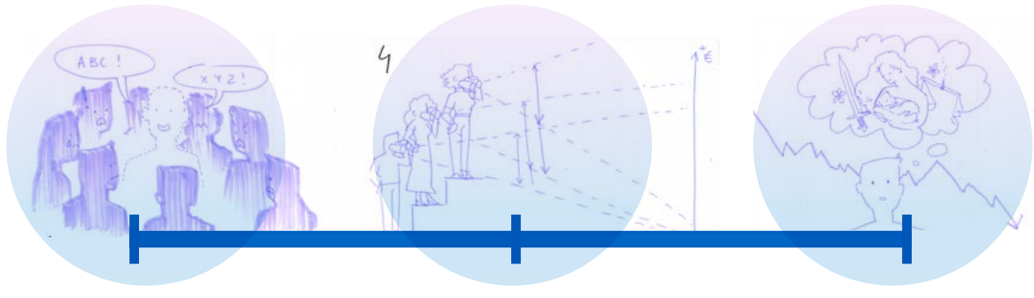
In capitalism, payments are one of the strongest ways for institutions or individuals to exercise power. This creates tensions between those who feel high levels of agency, and who are in control, and those who feel no agency, and are being controlled.



In control — Trying to have control — Out of control — Controlled

G: TRUST ATTITUDE

As we receive information differently than we are used to, determining who to trust becomes increasingly difficult: choosing uniform trust or distrust makes it easier for the user. Tensions arise between those who naively have blind trust in everything, and those who cynically distrust all.



Naive — Pragmatic — Cynic

In order to evaluate the usefulness of these dimensions, they were combined in a variety of frameworks (where two dimensions form the X and the Y axis). These frameworks were tested to see whether the combination of dimensions would generate interesting results. A complete overview of the tested frameworks can be found in appendix G.

Ultimately it was decided, together with DNB, that “Agency” and “Trust attitude” are the most relevant and inspiring dimensions. Payments are central to how individuals exercise agency, allowing us to act and influence the world around us. This also applies to a system level, as political parties use budgets to reflect their priorities—money is the medium through which society wields power.

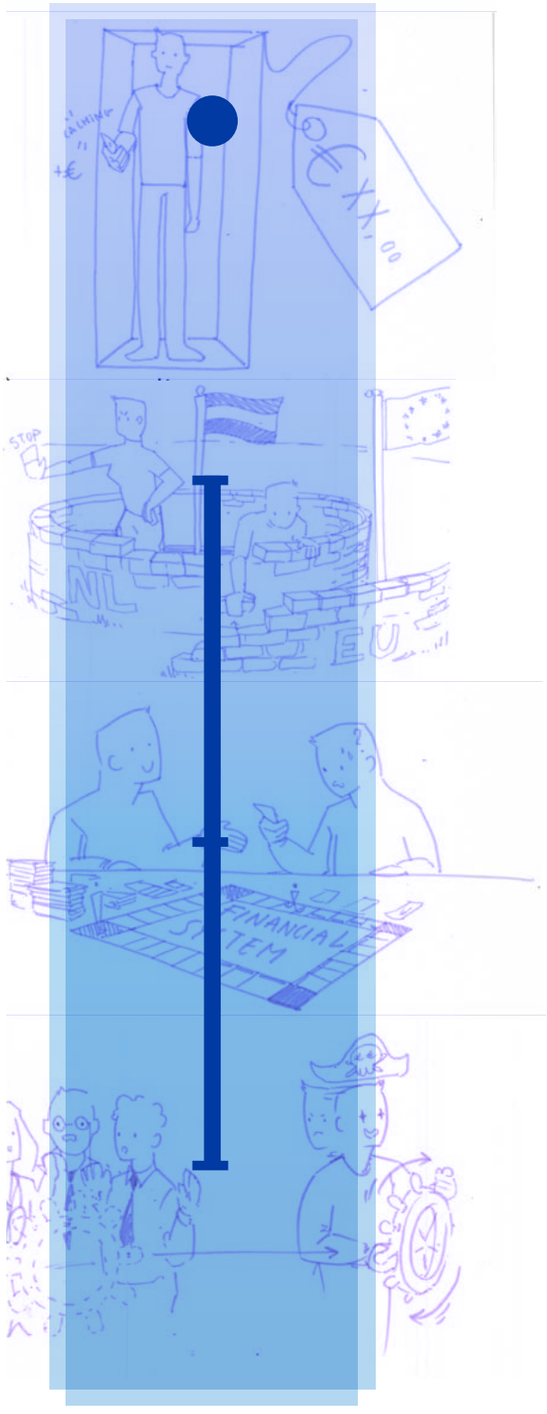
With the digitization of money and payments, traditional power dynamics are shifting. In these new payment situations, people’s actions are influenced by the level of agency and autonomy they feel.

To exercise agency effectively, we must carefully navigate trust and distrust according to our experiences and what we know. As the payment infrastructure becomes increasingly fragmented (De Nederlandsche Bank, 2022a) and complex payment situations become increasingly unfamiliar and predatory. Deciding what to trust becomes a challenge in many situations.

4.3 DIMENSION 1: AGENCY

The growing complexity of digital payments and the shifting power dynamics that accompany them are reshaping how individuals experience agency in financial transactions. As payment systems evolve, people must continuously adapt to new rules, and the way they navigate these changes has a profound impact on their sense of control. Are individuals consumers in the digital economy, or are they the product of it? This question highlights the range of experiences people have in relation to digital payments, from feelings of detachment and helplessness to resistance, manipulation, and, in some cases, over-empowerment. The varied experiences of agency within the digital payment landscape are critical to understanding how these systems affect individuals and society as a whole.

This dimension describes 4 steps within the experience of agency, based on 5 context factor clusters - themes for the changing relationship between society and payments.



DIMENSION 1: AGENCY

1

DETACHED
FROM INFLUENCE

Products and services are increasingly designed to retain consumers, turning users into the product rather than merely selling to them. This susceptibility to addiction and the inability to be autonomous in the digital world can leave people feeling helpless, with the sense that there's little they can do to change this.

2

RESISTING
HELPLESSNESS

Consumers feel increasingly threatened by on-line entities and fight for the right to maintain digital autonomy. In some cases, this resistance leads to rejecting the "digital world" entirely. On a broader scale, countries are also striving to protect themselves. Despite unprecedented prosperity, there is a growing fear of losing—of others taking advantage of the wealth that has been built.

3 4

CHASING
EMPOWERMENT

The digital world has introduced a new set of rules that people must learn to navigate. While the internet provides a wealth of information, using it effectively requires skill. Some groups of consumers try to benefit from the advantages the digital work introduced, this quest for empowerments involves trial and error.

5

OVERLY
EMPOWERED

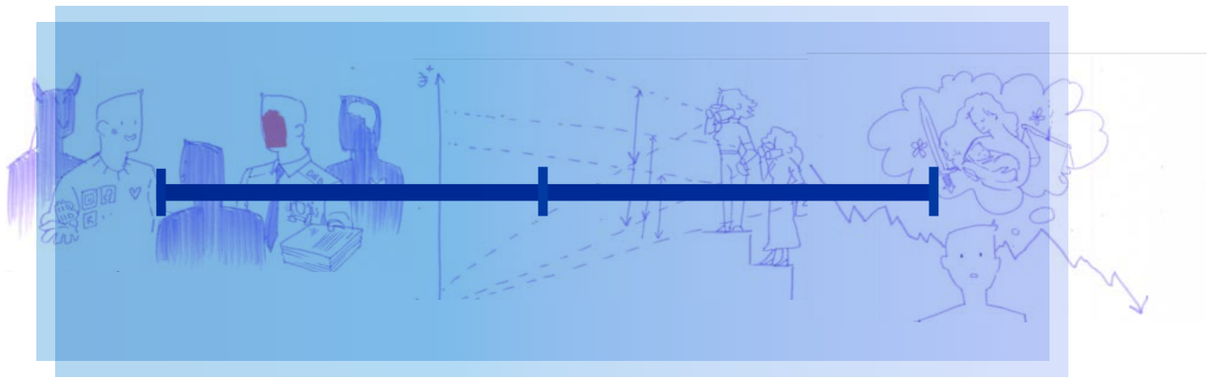
While some people attempt but fail to gain control in digital spaces, others boldly, even recklessly, seize control over their lives. They place little value on the authority of established institutions and take matters into their own hands, guided by personal experience and intuition. Their rejection of support and advice, heightens the potential to make mistakes and undermines the social securities set in place.

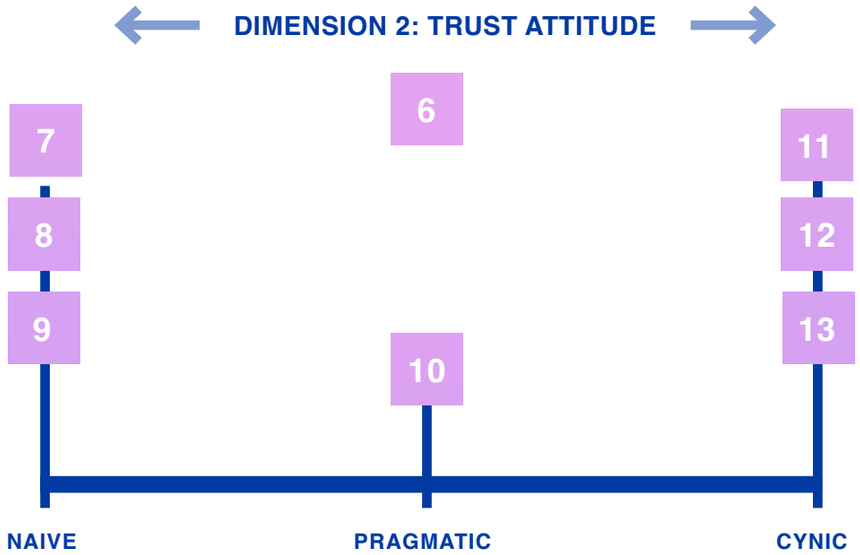
4.4 DIMENSION 2: TRUST

People increasingly encounter complexity in daily life: from convoluted tax and benefits systems to distinguishing between fake and real news on a day-to-day basis. As social media exposes individuals to global issues such as sustainability and conflict, the overwhelming nature of these topics often leads people to simplify their understanding, framing the world in black-and-white terms. This simplification is reflected in the range of worldviews people hold, from those who maintain a pragmatic, dynamic perspective to others who lean toward cynical or naive interpretations of reality. These varying trust attitudes, shaped by personal experiences and broader societal influences, play a critical role in how individuals engage with digital payment systems and the broader digital economy.

Understanding these worldviews is essential to addressing the trust challenges that arise in the evolving payment landscape.

This dimension describes 3 steps within trust attitudes based on worldview, using 8 context factor clusters - themes for the changing relationship between society and payments.





The naive worldview is primarily driven by the abstraction of money, the escape from serious life through the internet, and the shift in trust toward on-line personas that appear authentic. As digital money is less tangible than physical cash, people increasingly fail to perceive the impact of spending. Frictionless payment systems make it harder to grasp what it means to make a purchase and how it affects us. However, by thinking less about it, we also worry less about money in the short term.

It's not just money that feels less real in the digital world—our existence there also feels less real and serious. The idea of hiding behind a digital profile gives people the sense that they can live on-line without consequences, offering a temporary escape from the negative and serious aspects of life in the physical world. Additionally, the reduction in human contact drives people to seek authentic connections through other means. This reflects a simple, blind trust, even though digital authenticity is not always what it seems.

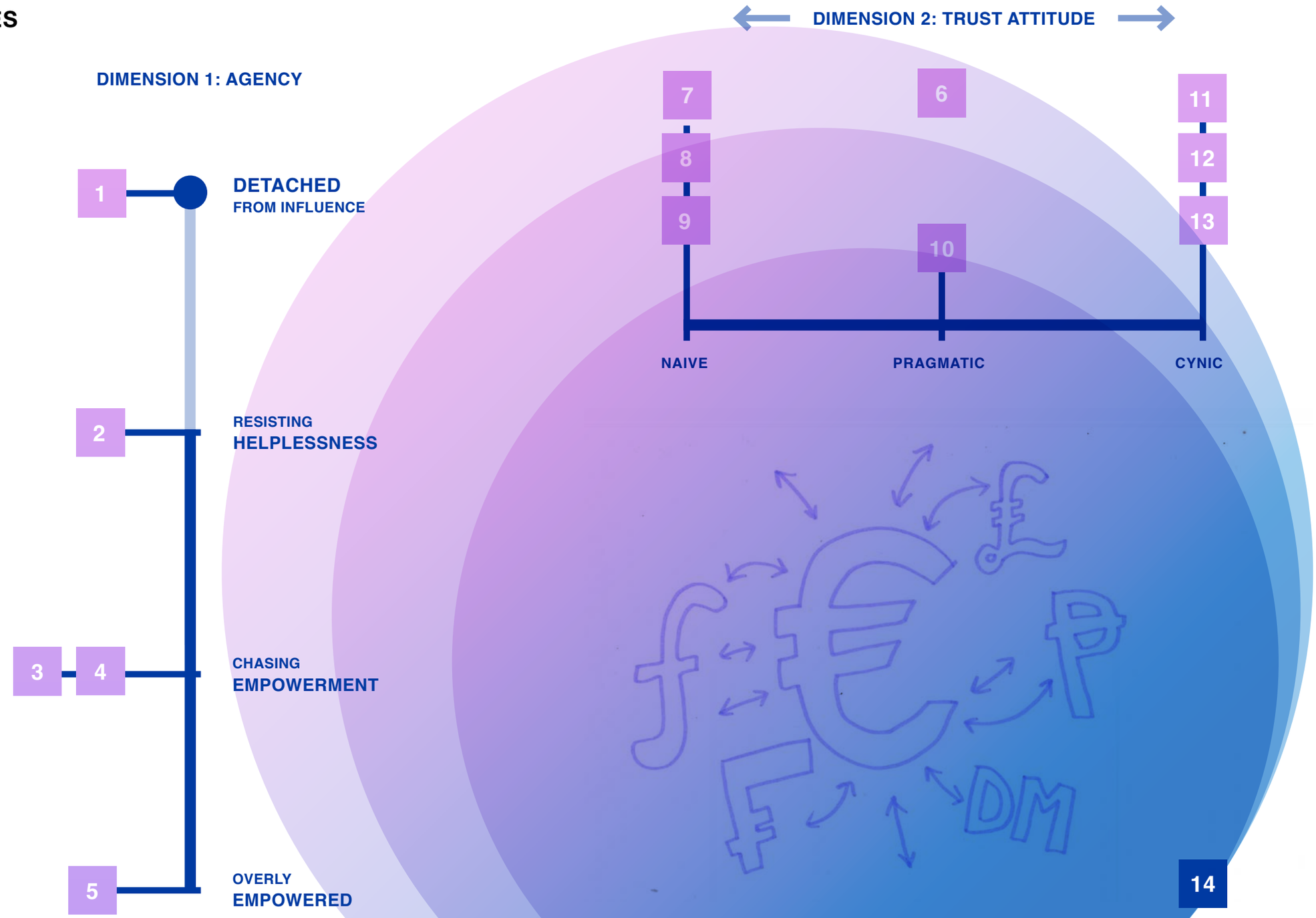
A nuanced, pragmatic worldview acknowledges that capitalism functions well within certain boundaries but also contributes to inequality when payments disproportionately favor one side. To maintain a fair and functional system, we must continually assess what benefits society as a whole and what does not. This calls for an ongoing understanding of the complexities of the world and society and the impact our collective payment behaviors have on it.

The cynical side of the spectrum is characterized by "blind distrust," driven by a sense that payments are to change oneself or the world as (the perception of) ever-growing inequality continues increasing. Lingering memories of broken promises within the democratic system foster feelings of abandonment and betrayal when protection seems lacking. Cynical distrust stems from the belief that the world is deteriorating and that the system is inherently incapable of functioning as a fair and just framework, undermining trust in the very foundations of a functioning payment infrastructure.

4.5 OVERARCHING VALUES

Almost all of the context factor clusters could be distributed on the two dimensions of trust and agency. The last cluster of insights is too general, but should absolutely be considered in the design process as an overarching “force”.

The growing cultural and ethnic diversity in Europe highlights the increasing variety of opinions and values that our money must accommodate. This is an important consideration for the design process, as central bank money is inherently a product that exists for everyone.



4.6 THE INTERPLAY OF AGENCY AND TRUST IN DIGITAL PAYMENTS

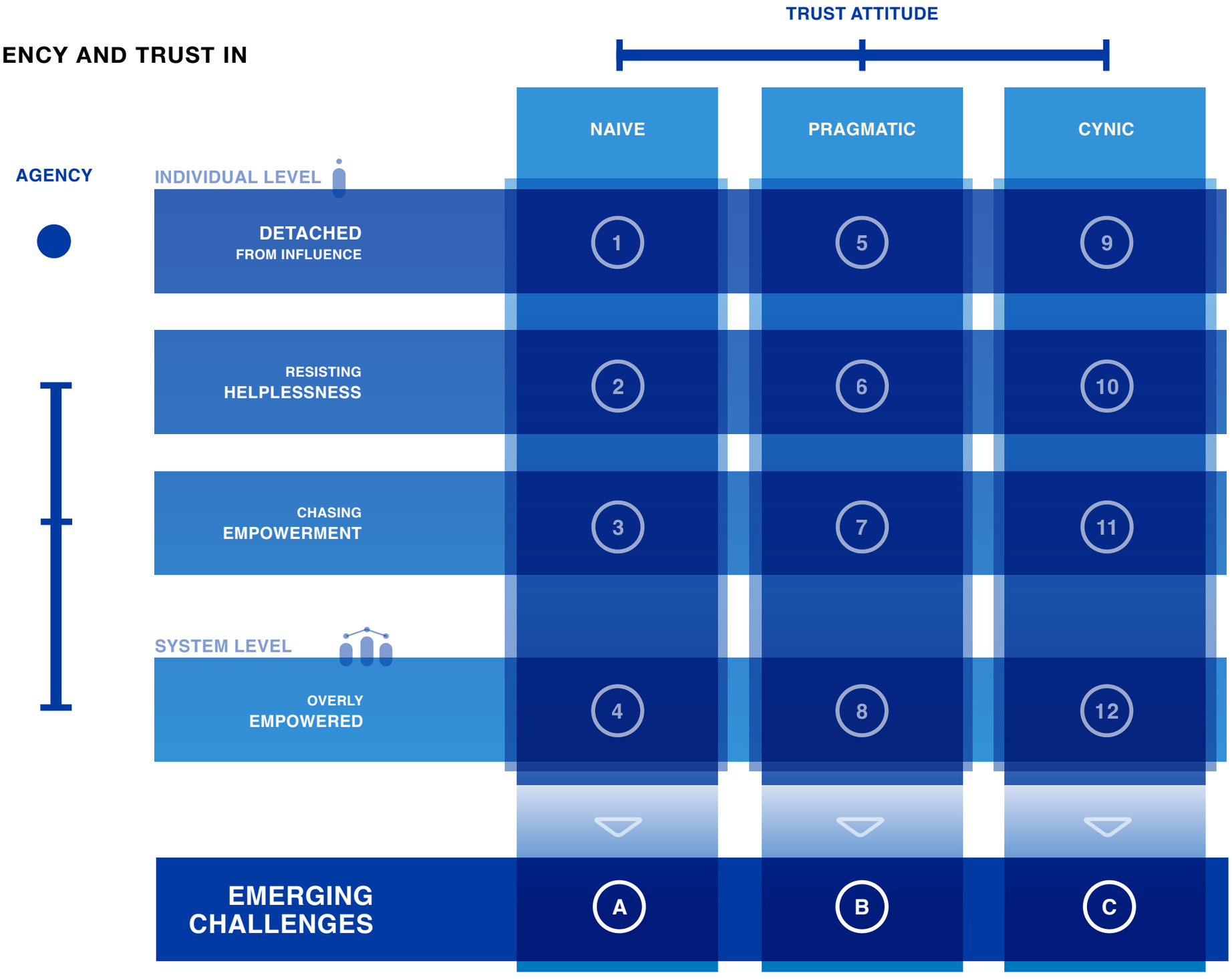
Based on the interplay of the two driving forces in the changing relationship between society and payments, we can create a framework: the interplay of these “forces” introduces 12 potential payment situations for the likely future. Every column contains 4 unique payment situations based on the different combinations of trust attitude and agency felt by individuals.

An interesting observation at this point is that the “overly empowered” situations reflect how individuals experience agency above the system, whereas the top three situations are more relevant to personal agency as an active part of the system. This distinction highlights an important dynamic: over-empowered individuals, by becoming complacent, often lose sight of the broader social systems that have enabled their sense of empowerment in the first place. In other words, their focus on personal control can lead them to overlook the collective structures that contribute to their autonomy. This shift in perspective is valuable for understanding the evolving relationship between society and payments, as it underscores the tension between individual agency and the larger systemic forces at play.

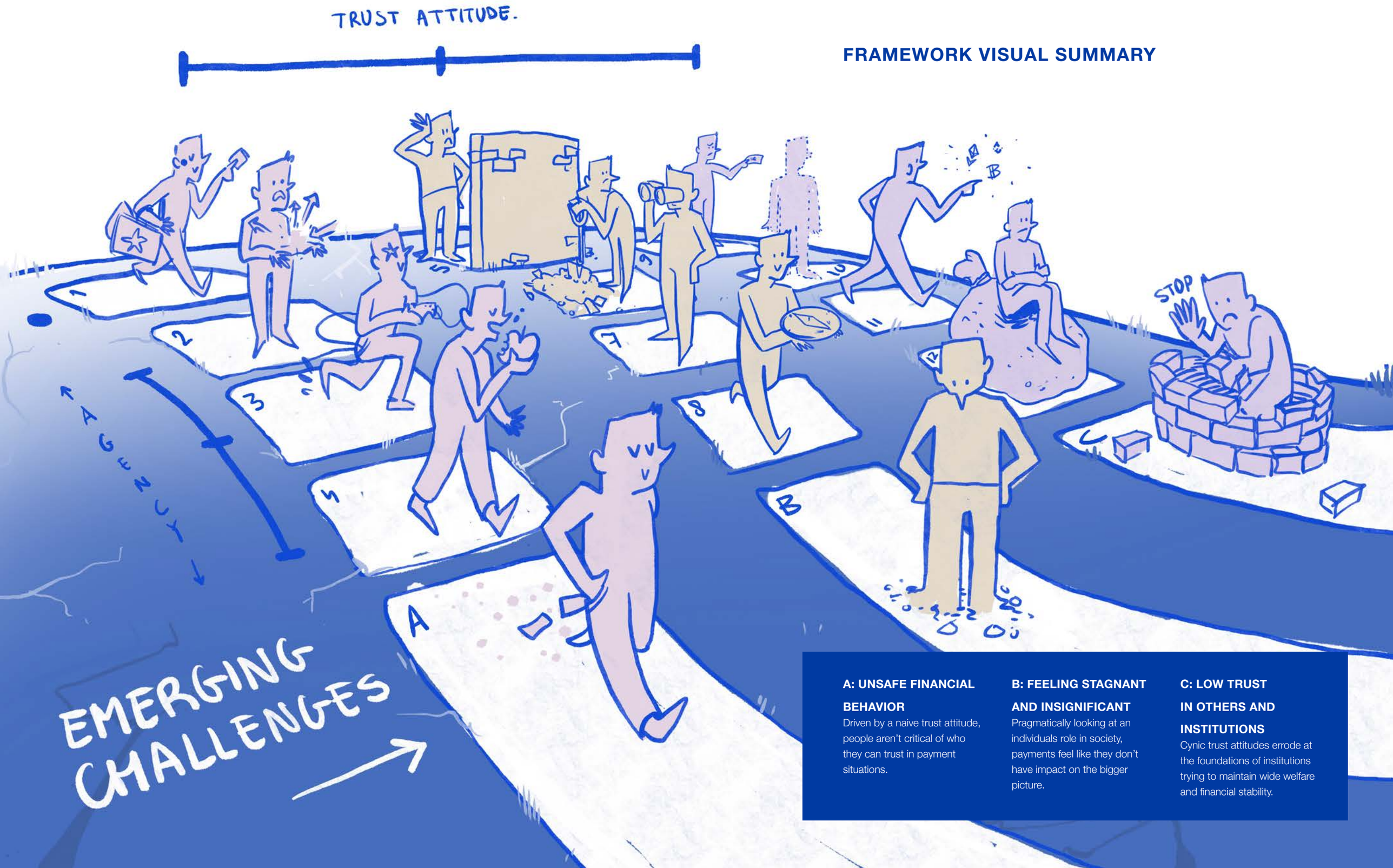
According to the ViP methodology, *designing is never neutral: it requires the designer to take an explicit stance* (Hekkert & Van Dijk, 2011). A purely objective approach is impossible, as every design decision reflects underlying values and priorities.

To make this position explicit, the next step involves formulating vision statements. These statements, grounded in the insights from agency-trust interplay, will guide the direction of design interventions. By doing so, we ensure that the design process is anchored in clear values, setting a trajectory toward a responsible, inclusive, and user-centered payment ecosystem.

In the following chapter, we will explore each column of the framework in greater depth, defining the risks, opportunities, and based on the designer values, vision statements are formulated which can be used as a starting point for design, where the ultimate goal is clear.



FRAMEWORK VISUAL SUMMARY



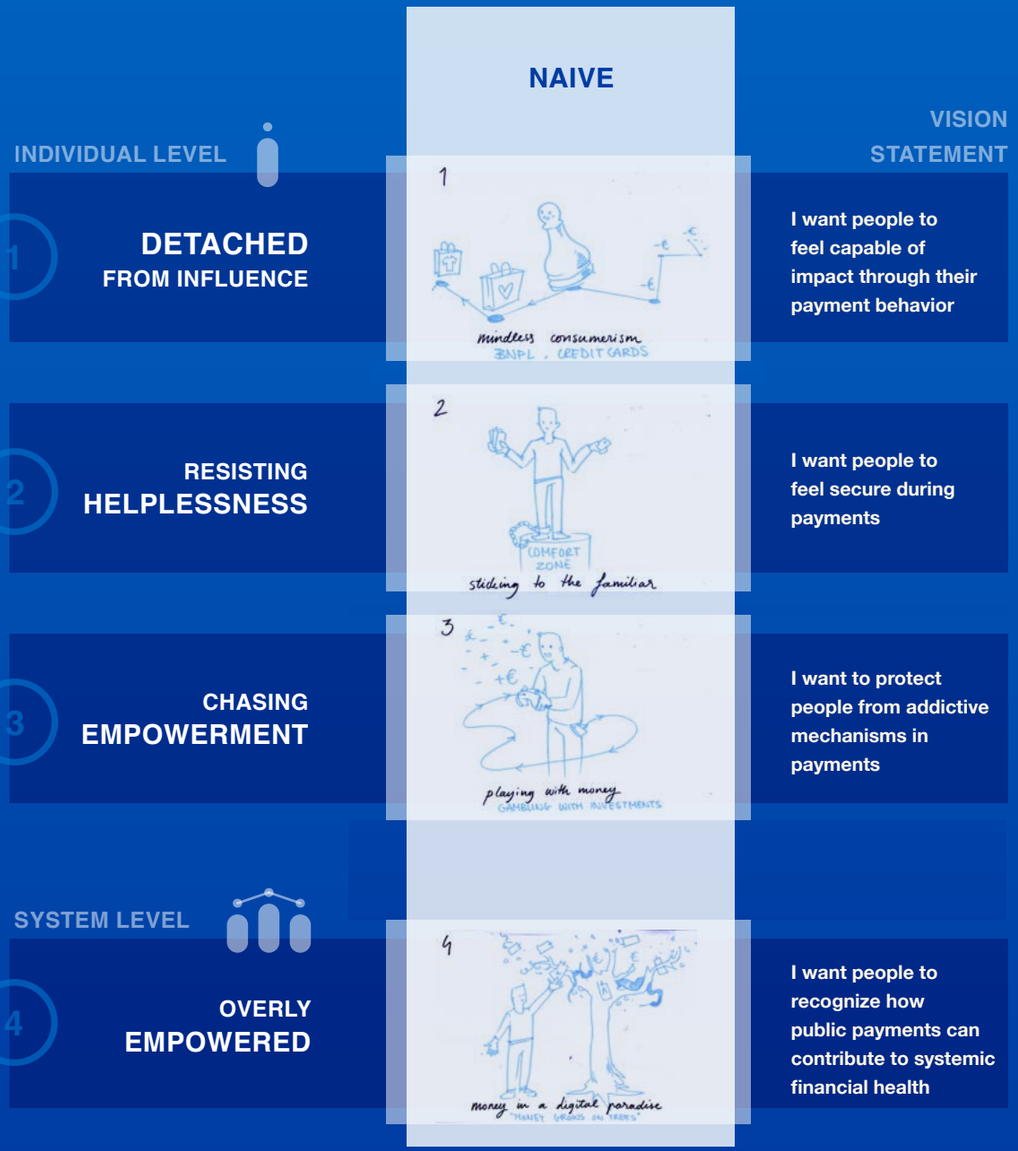
A: UNSAFE FINANCIAL BEHAVIOR
Driven by a naive trust attitude, people aren't critical of who they can trust in payment situations.

B: FEELING STAGNANT AND INSIGNIFICANT
Pragmatically looking at an individuals role in society, payments feel like they don't have impact on the bigger picture.

C: LOW TRUST IN OTHERS AND INSTITUTIONS
Cynic trust attitudes errode at the foundations of institutions trying to maintain wide welfare and financial stability.

4.6.1 CHALLENGE A: NAIVE

A naive worldview fosters blind trust in systems and others, encouraging risky financial behaviors, particularly in digital payments. The rising popularity of Buy Now Pay Later (BNPL) schemes and gambling apps exemplifies this trend. Individuals often fail to grasp the long-term implications of their actions, leaving them vulnerable to financial consequences. Over-empowerment further leads to naivety about the societal role of payments and the resilience or costs associated with the payment decisions we make.



RISKS

Naivety about digital payments exposes individuals to significant risks. Due to the sensitive nature of financial problems, a single negative experience with severe long-term consequences (such as falling into debt due to scams) can fundamentally alter an individual's perspective on financial systems (Van der Cruijsen et al., 2020).

Such experiences often push individuals toward a more cynical worldview (as supported by insight cluster 11, appendix F). High expectations and trust in the government or institutions can lead to feelings of betrayal and disappointment when those expectations are not met. This gap between what was promised and what is delivered fosters disillusionment, making individuals more likely to distrust the systems they once relied on. This shift towards cynicism can have a cascading effect, eroding societal trust and further destabilizing the financial ecosystem.

OPPORTUNITIES

In sight of this risk, there are significant opportunities to guide individuals towards safer financial behaviors within the digital payments. The 4 identified payment situations present ways to address these challenges by embedding protective measures at both personal and systemic levels. On a personal level, individuals should be guided to:

1. Avoid mindless payments by fostering awareness of their payments.
2. Mitigate uncertainty in payments through transparent systems and reflection.
3. Learn to act responsibly with payments by offering educational tools that build financial literacy from youth.

On a systemic level, payment infrastructures protected by emphasizing the public value of our payment infrastructure.

DESIGNER VISION

Financial inclusion was one of the starting points of this thesis, discussed during the kick-off meeting. Now, it becomes clear that financial accessibility may contributes to the risks we see in these situations. Here, access to digital payments is provided without the necessary skills to navigate them effectively.

Digital financial inclusion is a priority for DNB and one of the three pillars in their 2022-2025 vision on payments (De Nederlandsche Bank, 2022a).

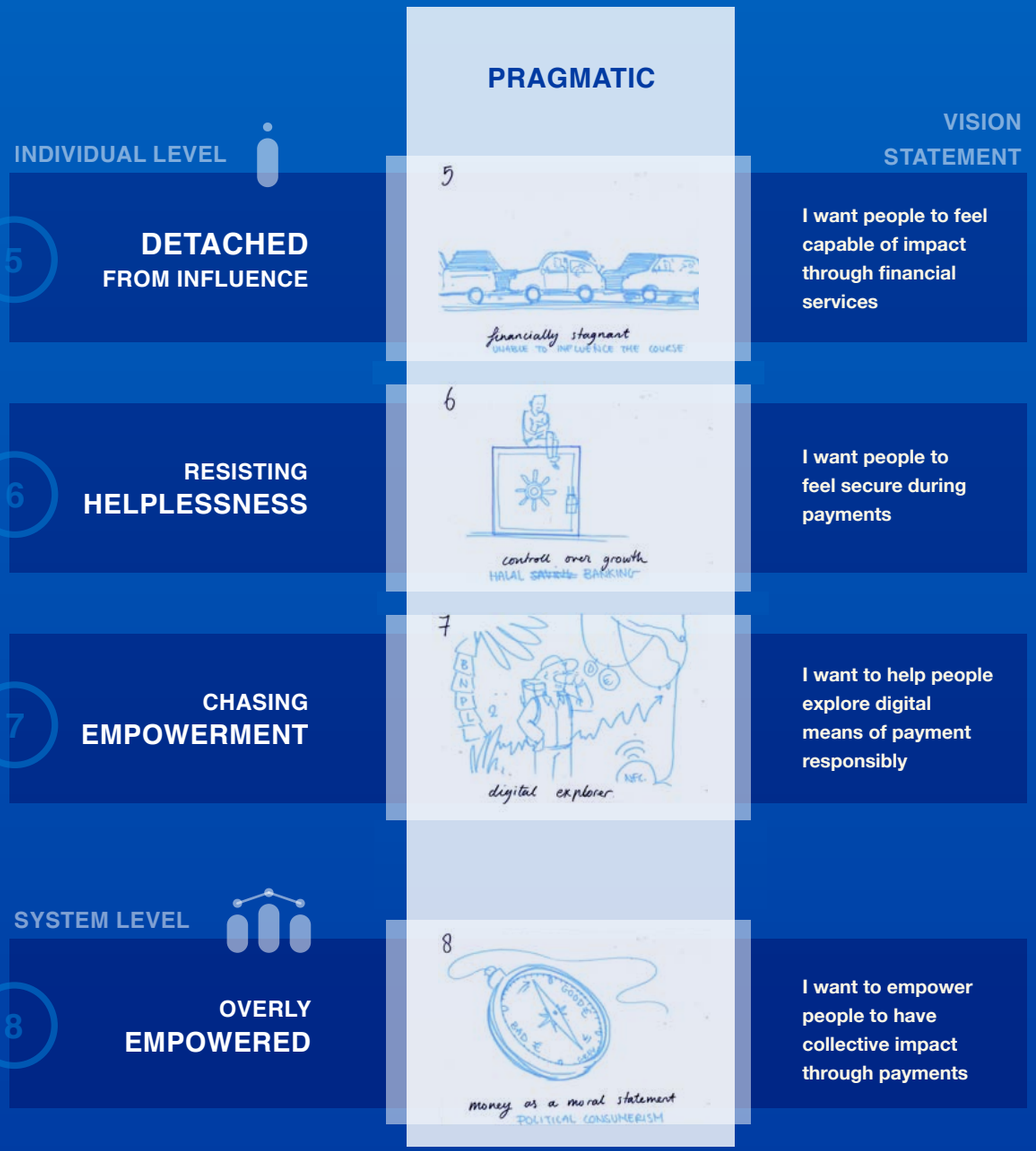
It is my vision that the focus should not solely be on digital financial inclusion but on ***responsible*** digital financial inclusion: Not just providing access to digital payments via the Digital Euro but also equipping individuals with the tools to protect themselves from the risks associated with digital payments.

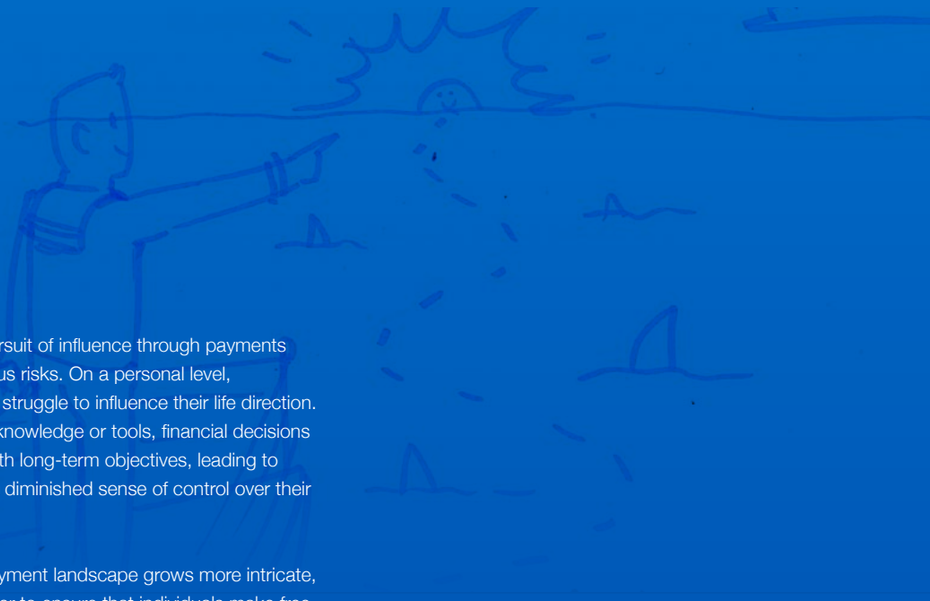
VISION STATEMENT

I want to enable responsible digital financial inclusion by protecting individuals and the payment infrastructure from risks as a result of naive behavior.

4.6.2 CHALLENGE B: PRAGMATIC

This challenge is characterized by the understanding that money is one of the most effective tools for exerting influence and achieving tangible impact. Strategic use of payments can shape systems and outcomes at various levels: from lobbying efforts that shape public policy to influencing the course of an individuals life. For the average individual, the power to influence the world around them is often perceived as limited. Beyond the ability to vote, people seek to use their payments to make a difference in their daily lives. This emerging challenge explores how payments can empower individuals and systems to achieve influence/impact.





RISKS

The practical pursuit of influence through payments introduces various risks. On a personal level, individuals often struggle to influence their life direction. Without proper knowledge or tools, financial decisions may not align with long-term objectives, leading to frustration and a diminished sense of control over their future.

As the digital payment landscape grows more intricate, it becomes harder to ensure that individuals make free and informed choices, often resulting in unintended outcomes. The lack of resources to navigate and optimize new payment methods can leave individuals at a disadvantage, unable to maximize their benefits.

At a broader systemic level, risks arise from individuals' lack of awareness regarding the political power embedded in payments. Many underestimate how their spending habits and financial decisions contribute to wider societal and political dynamics. This lack of awareness can perpetuate inequitable and unsustainable systems. Although political consumerism holds potential, achieving collective action across diverse groups is a substantial challenge. Without systemic support, individual efforts may struggle to create meaningful change.

OPPORTUNITIES

Payments offer significant opportunities to empower individuals. At the personal level, payments should be designed to:

1. Providing tools and resources that align financial decisions with personal aspirations.
2. Designing transparent payment systems to maintain control and clarity over payment decisions.
3. Educating about emerging payment methods and how to benefit from them.

On a systemic level, payment infrastructure should highlight how consumer choices influence societal outcomes to empower individuals to engage in political consumerism, consuming based on political views, more effectively.

Additionally, building platforms and networks facilitating coordinated financial actions among individuals can amplify their influence at a system level.

DESIGNER VISION

To unlock the potential of payments as a tool for influence, we must address both individual and systemic needs. On a personal level, individuals should be equipped to make proactive, informed payment decisions that are aligned with their goals and values. At a systemic level, raising awareness of the broader political and societal implications of payments can encourage collective action and foster meaningful change.

VISION STATEMENT

I want to support proactive payment decision-making by making payment decisions more conscious and goal oriented, to align with pragmatic objectives.

4.6.3 CHALLENGE C: CYNIC

On the cynical side, we observe some of the most undesirable behaviors from a societal perspective. There's a profound blind distrust in institutions, coupled with a strong desire to distance oneself from the collective functioning of both the financial and social systems. These situations are driven by the feeling of betrayal of trust for the system in it's entirety. This cynicism, while born from legitimate experiences, fosters isolation and hinders collective progress.

CYNIC

INDIVIDUAL LEVEL

VISION STATEMENT

9 **DETACHED FROM INFLUENCE**

I want people to gain insight in the effect of their payments

10 **RESISTING HELPLESSNESS**

I want people to feel their privacy is protected in payments

11 **CHASING EMPOWERMENT**

I want people to feel supported in payments within DNB oversight.

SYSTEM LEVEL

12 **OVERLY EMPOWERED**

I want people to recognise the value of paying taxes.

RISKS

Cynicism in payments carries significant risks at both personal and systemic levels. On a personal level, a lack of transparency can lead to frustration and disengagement. People often feel powerless when they are unable to see the results of their payments, such as how profits and costs are distributed. This absence of clarity can foster a sense of exclusion and deepen their distrust in the system.

Additionally, as individuals reject means of payment within the oversight of central banks, they may struggle to balance the risks associated with new, unmonitored payment methods. Without proper guidance, they risk exposure to financial instability and further erosion of trust.

On a systemic level, failure to address transparency and accountability can exacerbate societal distrust, weakening the shared understanding necessary for a functioning financial system.

OPPORTUNITIES

The desire/need for transparency in the payment situations driven by a cynic trust attitude, offer opportunities to rebuild trust and empower individuals through this method.

For interactions acting on an individual level, payments should be designed such that they:

1. Provide transparent insights into payment information, such as the actual costs of digital payments.
2. Protect the right to private payments.
3. Educate individuals on balancing risks and navigating new payment methods effectively.

On a systemic level awareness should be raised about the societal importance of the payment system and the role individuals play in maintaining it.

DESIGNER VISION

Navigating these situations requires a commitment to transparency at both the individual and systemic levels. By illuminating the inner workings of payments and the surrounding system we can begin to address the root causes of distrust and foster a more engaged and responsible society. Transparency is a crucial first step toward bridging the gap between cynicism conditional trust and participation.

VISION STATEMENT

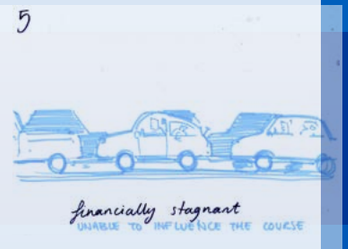
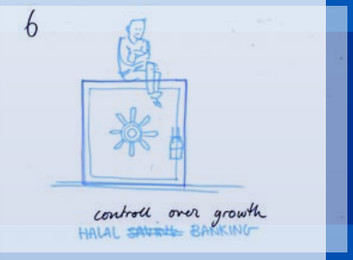
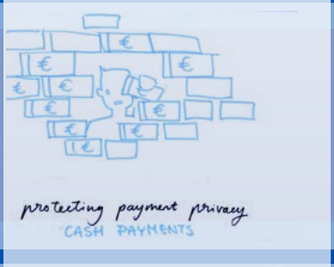
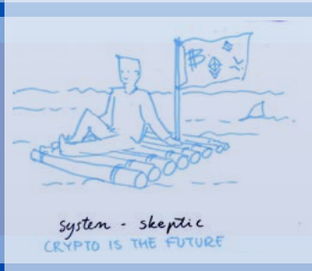
I want to improve trust in payments by providing transparency about the exchanges of value and data in payments.

4.7 OVERVIEW VISION STATEMENTS

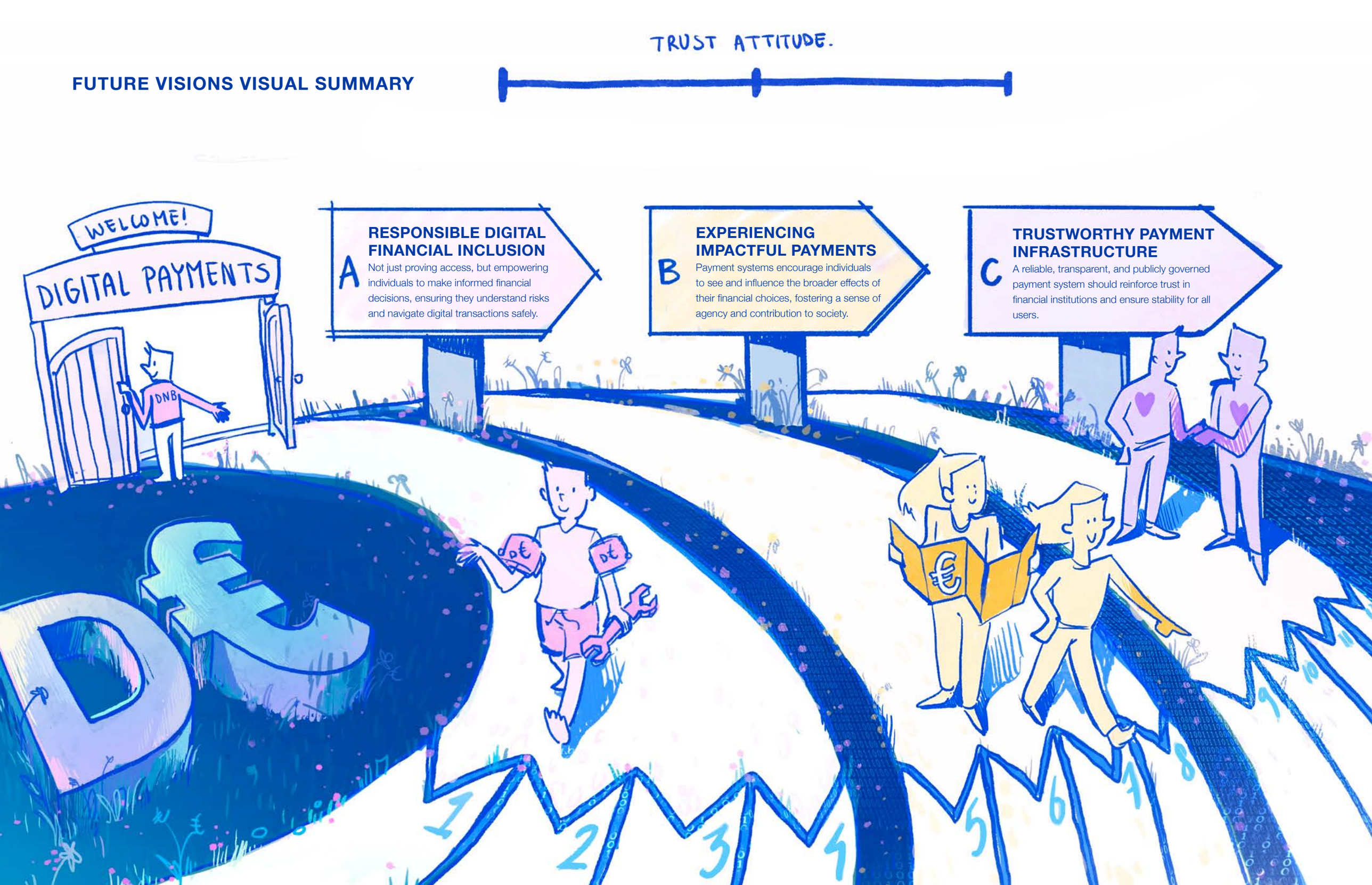
For each situation identified in the framework a statement is written. Every situation addresses a specific problem that should be addressed in order to achieve overarching visions A, B & C.

INDIVIDUAL LEVEL

SYSTEM LEVEL

	NAIVE	PRAGMATIC	CYNIC
	A: I want to enable responsible digital financial inclusion by protecting individuals and the payment infrastructure from risks as a result of naive behavior.	**B: I want to support proactive payment decision-making** by making payment decisions more conscious and goal oriented, to align with pragmatic objectives.	**C: I want to improve trust in payments** by providing transparency about the exchanges of value and data in payments.
DETACHED FROM INFLUENCE	 **1: I want people to feel capable of impact through their payment behavior**	 **5. I want people to feel capable of impact through financial services**	 **9. I want people to gain insight in the effect of their payments**
RESISTING HELPLESSNESS	 **2: I want people to feel secure during payments**	 **6. I want people to feel secure during payments**	 **10. I want people to feel their privacy is protected in payments**
CHASING EMPOWERMENT	 **3: I want to protect people from addictive mechanisms in payments**	 **7. I want to help people explore digital means of payment responsibly**	 **11. I want people to feel supported in payments within DNB oversight.**
OVERLY EMPOWERED	 **4: I want people to recognize how public payments can contribute to financial health**	 **8. I want to empower people to have collective impact through payments**	 **12. I want people to recognise the value of paying taxes.**

FUTURE VISIONS VISUAL SUMMARY



5. DEVELOP

This chapter focuses on the designing phase, addressing the third and final research question: *"How can DNB intervene on the challenges emerging from this changing relationship through the design of the digital euro?".* Building on insights from the deconstruct, discover and define phases, this stage explores potential design interventions to ensure that the digital euro aligns with the identified societal needs.

From the three challenges identified in the re-framing phase, one has been selected for deeper exploration: *responsible digital financial inclusion.* To not only provide access to digital payments but also empower individuals to use these systems safely and effectively within a rapidly evolving digital society.

The conceptual interventions developed in this phase aim to illustrate how the situations identified in the framework can be translated into design interventions for payments. This phase is structured around the following subquestions:

1. Which challenge is most relevant for DNB to focus on for further development?
2. How can we define *"responsible digital financial inclusion"*?
3. How can we intervene to enable *responsible digital financial inclusion*?

DESIGNING CONTENTS **P**

5.1 COMPARISON CHALLENGES 2025 - 2035

The *develop* chapter focuses on transforming one of the emerging challenges into a series of concept interventions to achieve the written vision. Given that this thesis investigates the evolution of digital payments over the next 10 years, it is valuable to analyze which of the three emerging challenges is likely to arise first within this period, as this should probably be addressed most urgently.

For this I looked at the three challenges identified previously in the *deconstruct* chapter:

1. MARKET LIMITATIONS IN PROVIDING ACCESS: The market-driven nature of payment systems often prioritizes profitability over accessibility.

2. (DIGITAL) FINANCIAL LITERACY: Many individuals lack the knowledge or skills to effectively use digital financial tools.

3. LOW (MUTUAL) TRUST: A lack of trust between users, institutions, and systems undermines the reliability and adoption of payment methods.

Chapter 3 and 4 - *discover and define* - explored the driving forces likely to shape the relationship between society and payments in the Netherlands by 2035. This led to the identification of three new challenges, which reflect an evolution of the issues identified earlier. Comparing these challenges provides insights into how the payment landscape may develop over the next 10 years.

In the following paragraphs the connection between current challenges and future challenges is described and reflected upon.

A: UNSAFE FINANCIAL BEHAVIOR
Accessibility and financial literacy are identified as challenges for 2025. Currently efforts are underway to improve access to digital payments, but there is insufficient emphasis on educating users about how to use these tools effectively. Looking towards 2035 we can expect that this leads to the emergence of challenge A: Enabling *responsible digital financial inclusion*. In an attempt to provide access and solve the problems of today, banks and payment providers risk including people too quickly, without giving them the skills and protections to be safe in the world of digital finance.

B: FEELING STAGNANT AND INSIGNIFICANT
The deconstruction phase did not identify a challenge connecting to this. This gap emphasizes the importance of fostering autonomy in financial decision-making when redesigning payments looking towards the future. This gap also indicates that this may not be the most urgent challenge to tackle.

C: LOW TRUST IN OTHERS AND INSTITUTIONS
Trust remains a challenge in payments between 2025 and 2035. The lack of trust between consumers, institutions, and payment systems continues to erode without targeted interventions to build transparency and trustworthyness. The persistence of this problem will potentially exacerbate societal divisions.

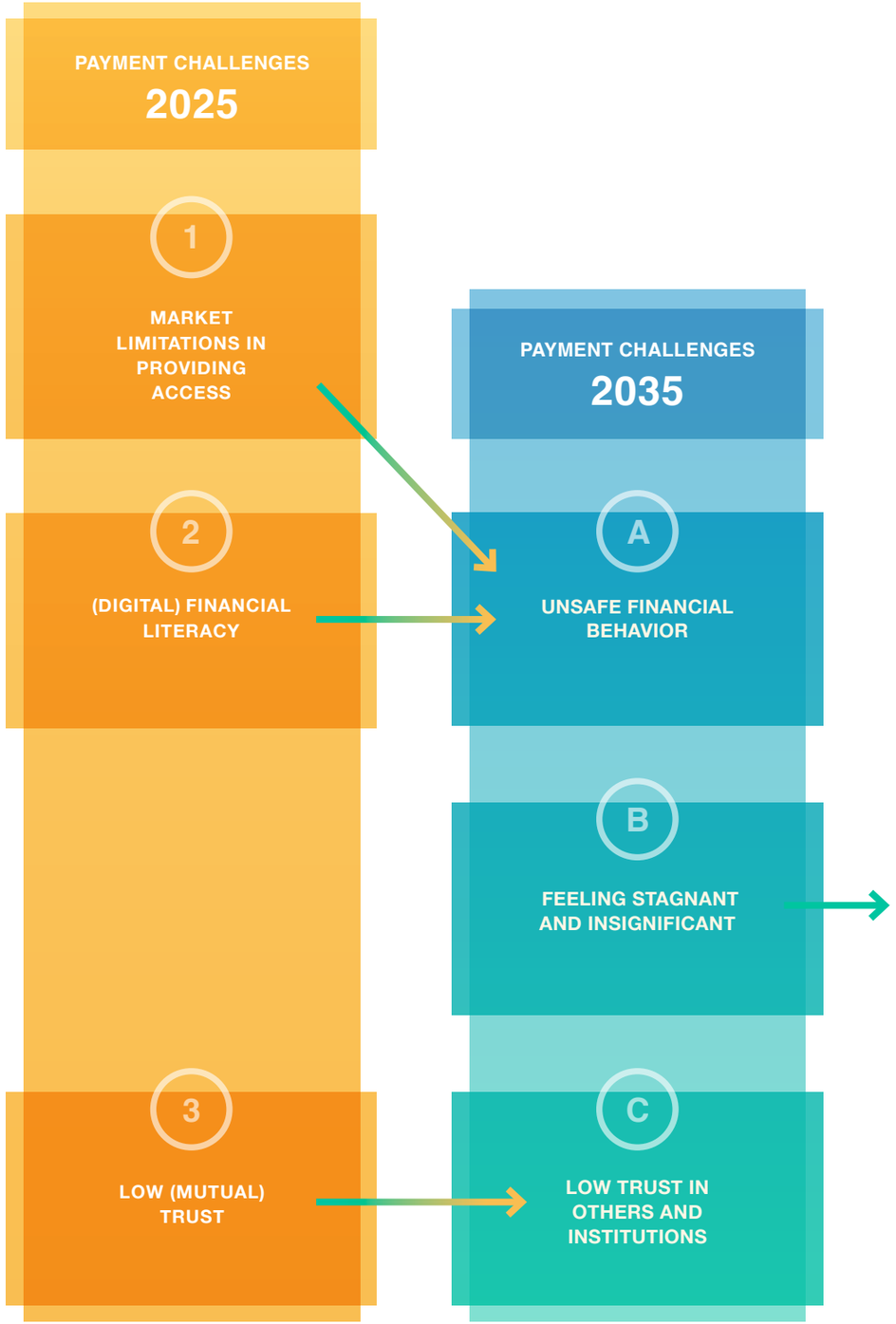


Figure 19: connections between challenges in the relationship between society and payments 2025-2035

5.2 CHOOSING DESIGN DIRECTION

Given the constraints of time and resources within this project, a decision was made to focus on one design direction identified in the earlier framework for further development. The selection was guided by the following criteria:

1. **Affinity with the Digital Euro:** The chosen direction must align closely with the objectives of the D€ to capitalise on this unique design opportunity of a new means of central bank money/payments.
2. **Affinity with DNB's Mandate:** As the central authority overseeing safe and accessible payment traffic (veilig & toegankelijk betalingsverkeer), the design focus preferably fits within DNB's scope of responsibility (De Nederlandsche Bank, n.d.-a).
3. **Design Opportunity:** The direction must promise high societal impact with minimal means, maximizing the potential value of the intervention. This criteria favors challenges that are expected to have an effect on payments sooner rather than later. As well as interventions focused around prevention rather than repairing.

From this, the focus was placed on addressing payment situations characterized by a "naive trust attitude", to achieve the vision of responsible digital financial inclusion:

1. **Affinity with the Digital Euro:** Many risks tied to naive trust arise from the private nature of current payment systems, where consumer behavior is often exploited for profit. Private payment providers encourage mindless consumption and addictive spending patterns, while trust among providers themselves is limited, hindering information sharing and collaboration. The D€, as a public form of money, offers a unique opportunity to shift this paradigm. Without a profit motive (winstoogmerk), the D€ can prioritize societal value over commercial gain, fostering safer and more equitable payment practices.
2. **Affinity with DNB's Mandate:** The issue of naive trust directly impacts the safety and accessibility of payment systems, key pillars of DNB's responsibilities. By tackling this challenge, DNB can ensure that individuals engage with payment systems more thoughtfully and securely.
3. **Design opportunity:** Research suggests that personal opinions and worldviews are shaped by lived experiences (Hartley, 2023). This means that setbacks in navigating digital payments may push individuals from a naive perspective to a cynical one. Thus it would be valuable to address this challenge before it becomes more difficult to help people.

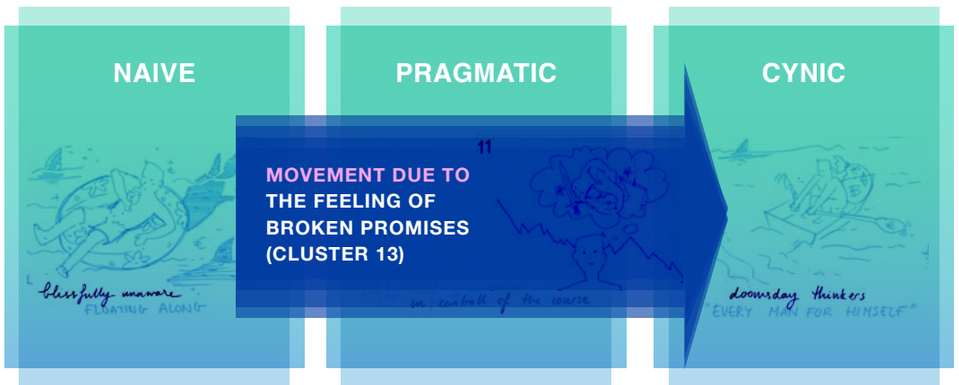


Figure 20 Bad experiences could drive people to adopt a cynic trust attitude more often.

Figure 21 Responsible digital financial inclusion is identified as the most relevant challenge for DNB at this time.

5.3 VISION STATEMENT

RESPONSIBLE DIGITAL FINANCIAL INCLUSION

In the previous chapter a decision was made to focus on the design for “responsible digital financial inclusion” by comparing the three emerging challenges. In the following chapter we explore this challenge further and translate it into a vision statement.

The identified payment situations for this vision reveal behaviors characterized by an “I’ll be alright” mentality, resulting in risky financial behavior due to a lack of reflection about what is trustworthy and what is not. Supported by the insights from the *discover* phase of this thesis, this is largely driven by the abstraction of money in the digital age and the growing inability to comprehend the complexities of digital means of payment and the wider impact of payments.

The digitization of payments has created a divide between individuals who are digitally literate and able to navigate this effectively, and those who struggle to keep up. In the identified situations, people fail to approach money with the seriousness it requires, overlooking the long-term consequences of their payment decisions. Research suggests that personal opinions and worldviews are shaped by lived experiences (Hartley, 2023). This means that setbacks in navigating digital payments may push individuals from a naive perspective to a cynical one - something DNB should want to avoid at all cost, as trust is a high priority for them (De Nederlandsche Bank, n.d.-a).

Helping individuals recognize their influence and societal roles can encourage long-term thinking and planning that supports both personal well-being and community strength. This requires going beyond providing basic access to financial tools and ensuring that people understand how to use these tools responsibly and critically.

FROM FINANCIAL INCLUSION TO RESPONSIBLE FINANCIAL INCLUSION

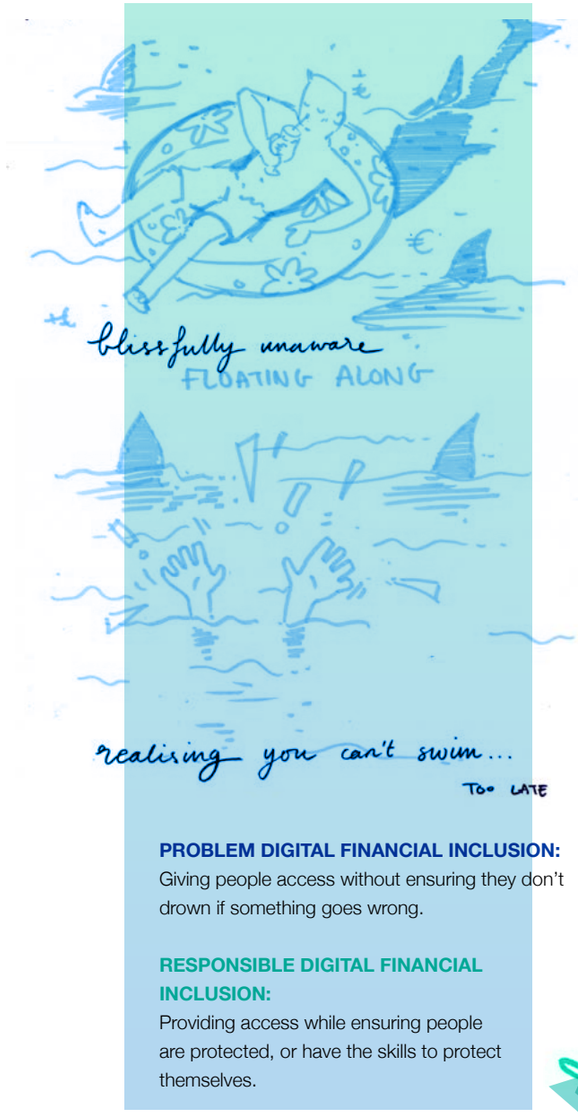
Digital financial inclusion is commonly defined as providing access to essential digital financial services. For DNB, this means facilitating access to basic payment functions such as opening a bank account, viewing balances, receiving and depositing funds, and making digital payments (De Nederlandsche Bank, 2022a). However, while this approach addresses basic accessibility, it does not account for the loss of financial control experienced by individuals who lack the knowledge to manage the long-term implications of their financial decisions.

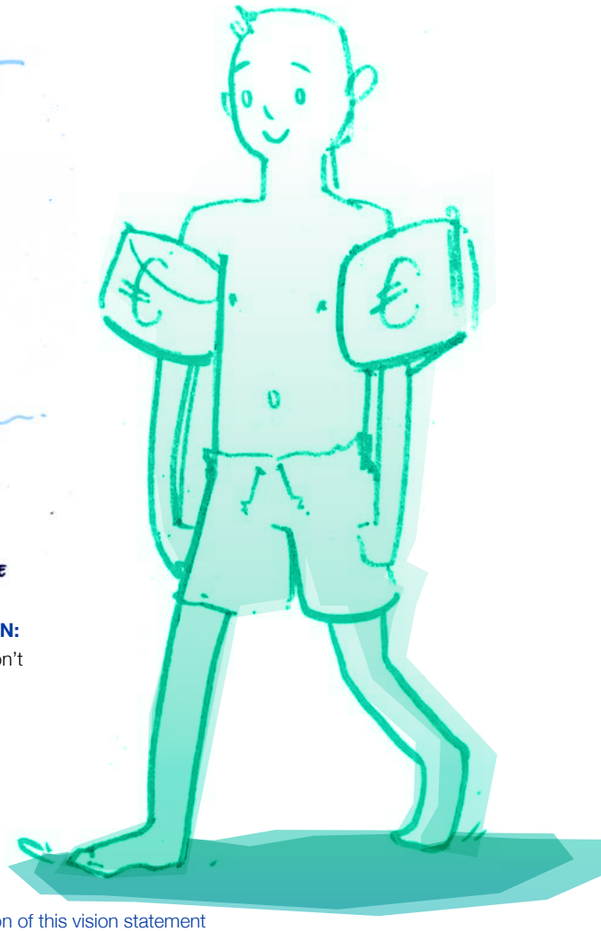
In the “naive situations” identified in our framework, basic access to digital financial services has unintentionally increased exposure to financial risk. Market-driven innovations have prioritized making payments easier and more seamless but have not provided the necessary opportunities for individuals to learn and adapt to the new tools. This creates an environment of irresponsible digital financial inclusion, where individuals have access but lack the skills to use digital financial services safely and effectively.

To address this challenge, DNB should shift its focus from basic financial inclusion to responsible digital financial inclusion. Responsible digital financial inclusion is not just about ensuring access: it is about equipping individuals with the knowledge, skills, and protections required to navigate the complexities of the digital payment ecosystem safely.

Thus we come to the following vision statement:
“I want to enable responsible digital financial inclusion by protecting individuals and the payment infrastructure from risks as a result of a naive trust attitude.”

By prioritizing responsible digital financial inclusion, DNB can bridge the gap between access and capability, empowering people to regain control over their financial lives and participate confidently in the digital economy. This approach aligns with DNB’s mandate to foster safe and accessible payment systems while addressing the systemic risks posed by naive and uninformed financial behaviors. Additionally focused on giving ownership over the problem to the parties who are giving access. In the case of the Digital Euro, DNB is partially involved. In the case of payments in general, we would even attribute ownership to private payment providers.





PROBLEM DIGITAL FINANCIAL INCLUSION:
Giving people access without ensuring they don’t drown if something goes wrong.

RESPONSIBLE DIGITAL FINANCIAL INCLUSION:
Providing access while ensuring people are protected, or have the skills to protect themselves.

Figure 22 Visualisations made during the exploration of this vision statement

5.4 DEFINING

RESPONSIBLE DIGITAL FINANCIAL INCLUSION

DNB defines digital financial inclusion as ensuring that everyone can independently carry out basic payment functions. This includes opening a payment account, activating a payment card, depositing and withdrawing cash, viewing account balances and transactions, and issuing payment orders (De Nederlandsche Bank, 2022a). However, responsible digital financial inclusion goes beyond access; it emphasizes empowering individuals to engage with digital payment infrastructure safely, critically, and effectively. In the previous chapter we stated that responsible digital financial inclusion is "providing access while ensuring people are protected, or have the skills to protect themselves".

From the framework we identified 4 situations where there is risky financial behavior. By address these four situations provoking naive behavior, we aim to achieve responsible digital financial inclusion. Each situation reflects a distinct area of concern where naivety creates risks:

1. **NAIVE ABOUT THE IMPACT OF MINDLESS PAYMENTS**: Individuals often underestimate how small, daily financial decisions accumulate and impact their overall financial health.

2. **NAIVE ABOUT HELPLESSNESS IN PAYMENTS:** The increasing speed of rapid payments creates a sense of urgency and reduces the information available during transactions. This can lead individuals to feel powerless, despite the reality that control ultimately lies with the person holding the money.

3. **NAIVE ABOUT MANIPULATION FOR PAYMENTS:** Digital payments often mask manipulation techniques, such as behavioral nudges designed to encourage overspending or addiction to consumption patterns.

4. **NAIVE ABOUT THE PUBLIC FUNCTION OF PAYMENTS:** A lack of awareness about the societal role of public money and payments can lead to apathy or misguided trust in private entities, which prioritize profit over public interest.

In order to address these situations and the specific challenge identified in each situation, an additional vision statement is written. Through designing for these statements we aim to illustrate what responsible digital financial inclusion can look like:

PERSONAL LEVEL

1. **PROTECTION FROM MINDLESS PAYMENTS:** "In such situations that evoke naive behavior, I want people who feel detached from influence to feel capable of impact through their payment behavior, though making the influence of their spending explicit."
2. **PROTECTION FROM UNCERTAINTY IN PAYMENTS:** "In such situations that evoke naive behavior, I want people trying to avoid helplessness to feel secure during payments, through providing delays and time to make payments based on objective information"
3. **LEARNING TO PROTECT ONESELF IN PAYMENTS:** "In such situations that evoke naive behavior, I want people who are overly empowered to recognize how public payments can contribute to healthy local economies."

SYSTEM LEVEL

4. **PROTECTING THE PAYMENT INFRASTRUCTURE:** "In such situations that evoke naive behavior, I want people who are overly empowered to recognize how public payments can contribute to healthy local economies."

By addressing these statements, responsible digital financial inclusion ensures that individuals are not only enabled to participate in the digital payment infrastructure but are also empowered to navigate it responsibly. This approach aligns with DNB's mission to ensure safe and accessible payment systems while fostering financial literacy and trust among users.

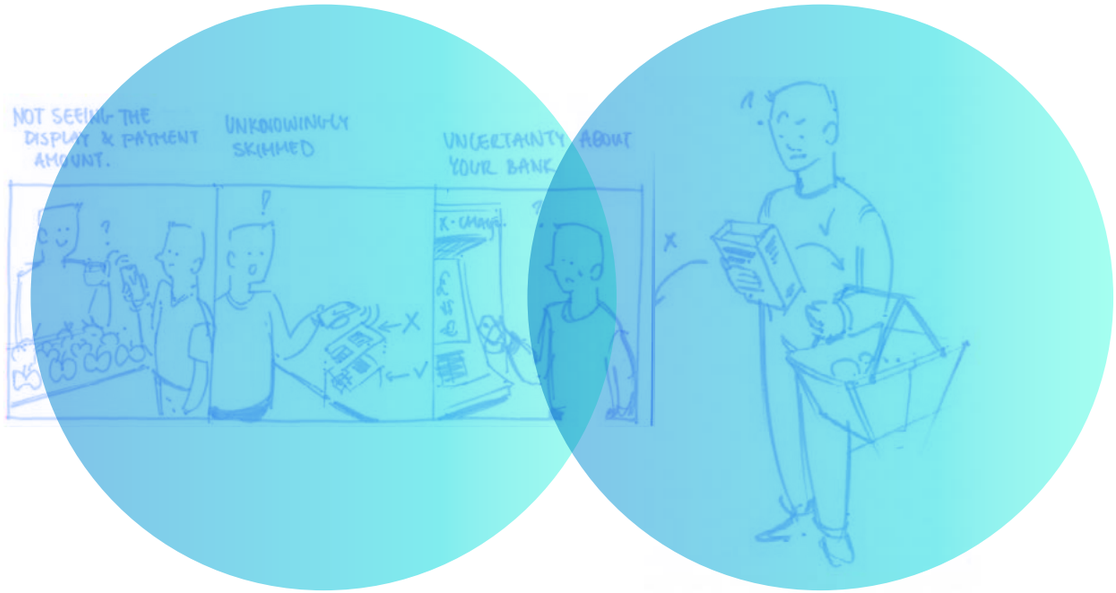
Figure 22 Illustration responsible digital financial inclusion

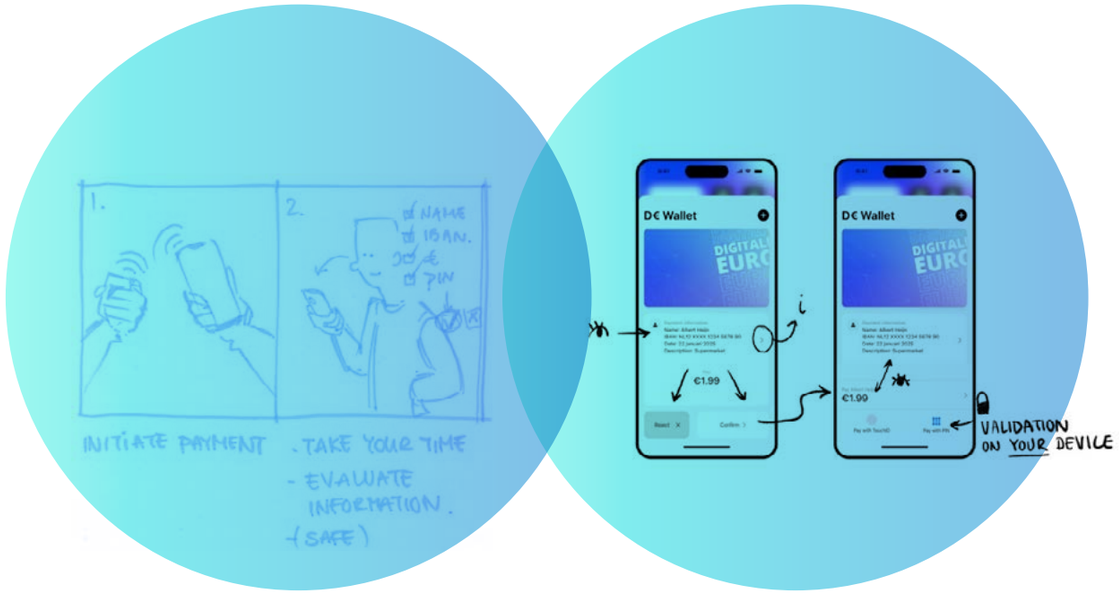
5.5 DESIGN APPROACH

In the *develop* chapter we aim to translate the design vision into interventions/designs for the digital euro. The ViP methodology provides a structured approach to this process, ensuring that interventions align with the overarching design vision.

The design process unfolds in four distinct steps:

By following these four steps, we aim to create meaningful interventions that redefine digital payment interactions, ensuring they align with the evolving trust-agency dynamics shaping the future of payments.





1. DEFINING THE UNDESIRABLE INTERACTION FURTHER

In the *define* chapter, we identified situations that illustrate problematic aspects of the payment experience. This step makes the problem explicit by analyzing how people currently interact with payments and identifies the underlying problem.

2. FORMULATING THE DESIRED INTERACTION ANALOGY

With a clear problem definition, we explore what kind of interaction might be desirable in each situation.
This is done using an interaction analogy, which helps translate abstract design goals into concrete interaction qualities.

3. DESIGNING THE INTERVENTION CONCEPT

Based on the desired interaction qualities, we develop design concepts (interventions) that bridge the gap between the current and desired interaction.
This involves exploring features that align with the vision statement to ensure a meaningful interaction with payments through our designed interventions.

4. VISUALIZING AND COMMUNICATING THE DESIGN

To bring the design to life, we detail and visualize the intervention. Through creating mock ups and other visualisations of the concept, we demonstrate how the intervention enhance the payment experience.

5.6 GENERAL DESIGN ANALOGY: HEALTHY EATING

The ViP methodology is an interaction centered design methodology: *Rather than just coming up with a product idea, the vision describes the relationship between the user and the product* (Hekkert & Van Dijk, 2011). In this case we aim to design a new relationship between society and digital payments. In ViP, this is typically done through using a design analogy: Analyzing an existing interaction in a different context to shape the desirable new interaction with the product being designed.

The 4 situations in the naive column reflect risky behaviors that may harm long-term financial health of consumers. For instance, individuals may accumulate small expenses without realizing their impact until it's too late or make poor financial decisions due to a lack of information in stressful situations. These behaviors are comparable to unhealthy eating habits, where poor choices stem from convenience, stress, or limited options. So, we could compare the situations from the framework as being "unhealthy payment behavior".

This issue is exacerbated by the privatization of payments, which to a certain extent fails to provide "healthy" digital payment options, leaving individuals to choose between means of payment ultimately designed to generate profit for others. As a public means of payment, the Digital Euro (D€) has the potential to serve as a healthy alternative: empowering individuals to make healthier payment decisions by adding it to the payment infrastructure.

This analogy of "healthy eating" serves as the foundation for developing interventions. By drawing specific parallels, the interactions with future payments can be re-imagined to promote healthier financial behaviors. I believe "healthy eating" is an especially useful analogy to design with as it is relatable for most people, so it will be straightforward in communicateing the desired effect.

Additionally, "eating healthy" is a process that has many seperate aspects, from "Setting goals to eat healthier" to "making the healthy choice in store" or "enjoying/eating in moderation". Some of the separate interactions contained in the analogy that served as inspiration are visualized on the right in figure 23.

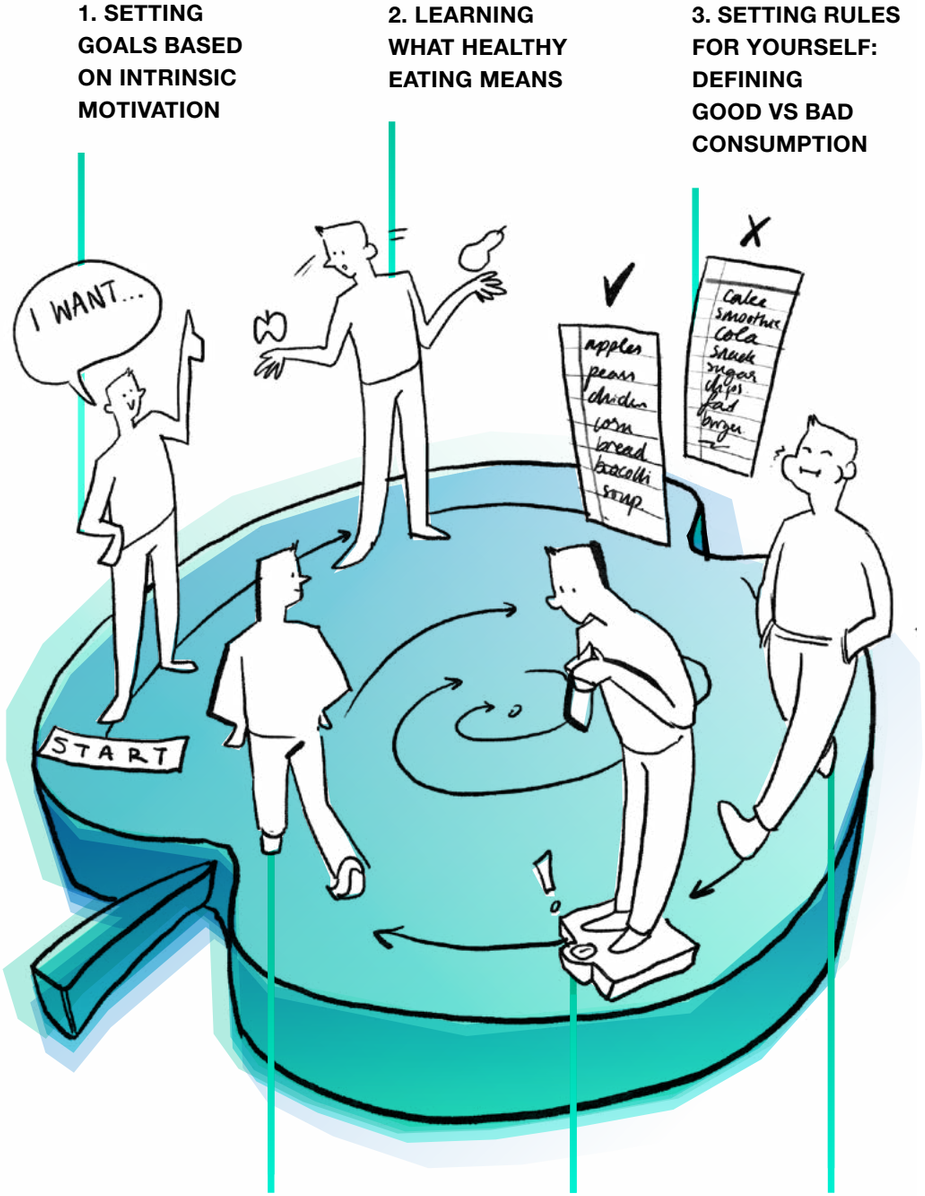


Figure 23 Visualization of some situations and interactions that could be used design analogies

5.7 OVERVIEW INTERVENTIONS 1, 2, 3, 4

Based on the previously outlined design approach and the interaction analogy of healthy eating, four interventions were developed to support responsible digital financial inclusion. These interventions illustrate how DNB could address the challenges identified in the define chapter and serve as conceptual explorations rather than finalized solutions.

Given the limited time for this project, it would be premature to claim that these interventions represent definitive or final versions. Instead, they should be viewed as starting points for further development and refinement.

The following chapters provide an overview of the design steps and outcomes for each intervention, demonstrating how the proposed methodology was applied in practice. Not all of the content produced for the design is included in order to streamline the story. Determining the exact formulation of the vision statements, choosing the design analogy and settling on an intervention was an iterative approach. Like with the clusters identified in the *discover* chapter, the content for each intervention was kept separate using envelopes, so they could be developed independently.

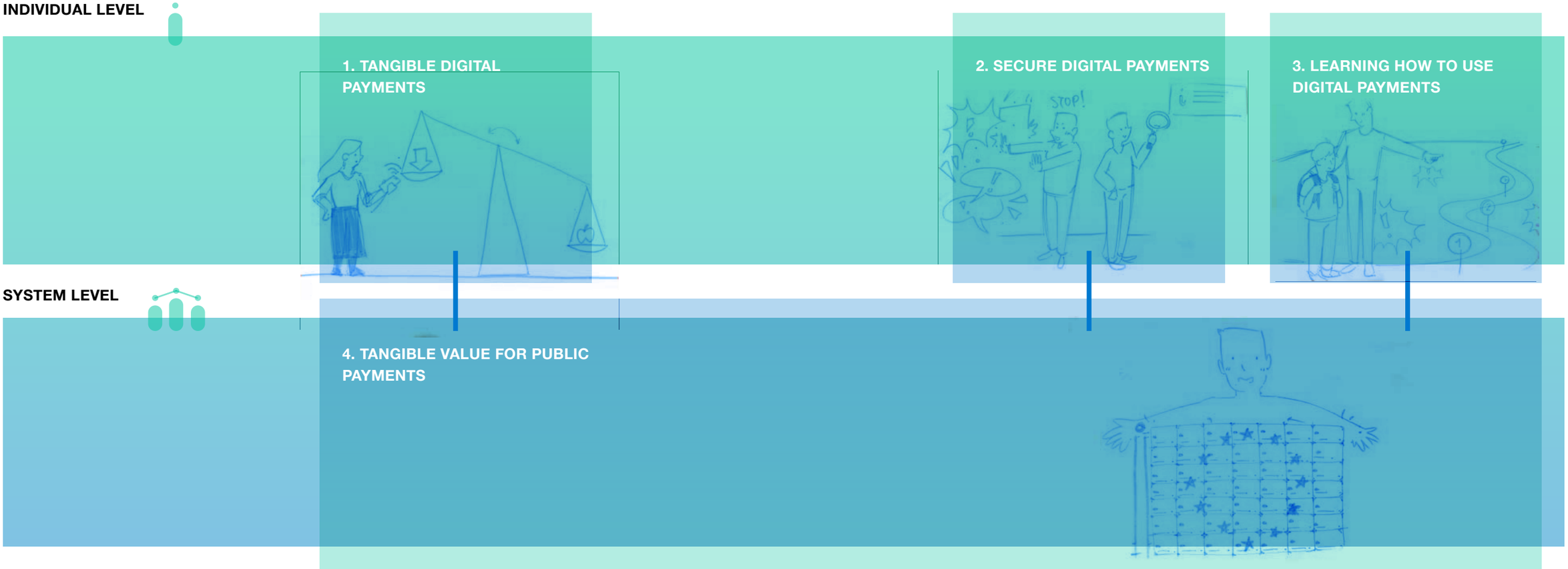
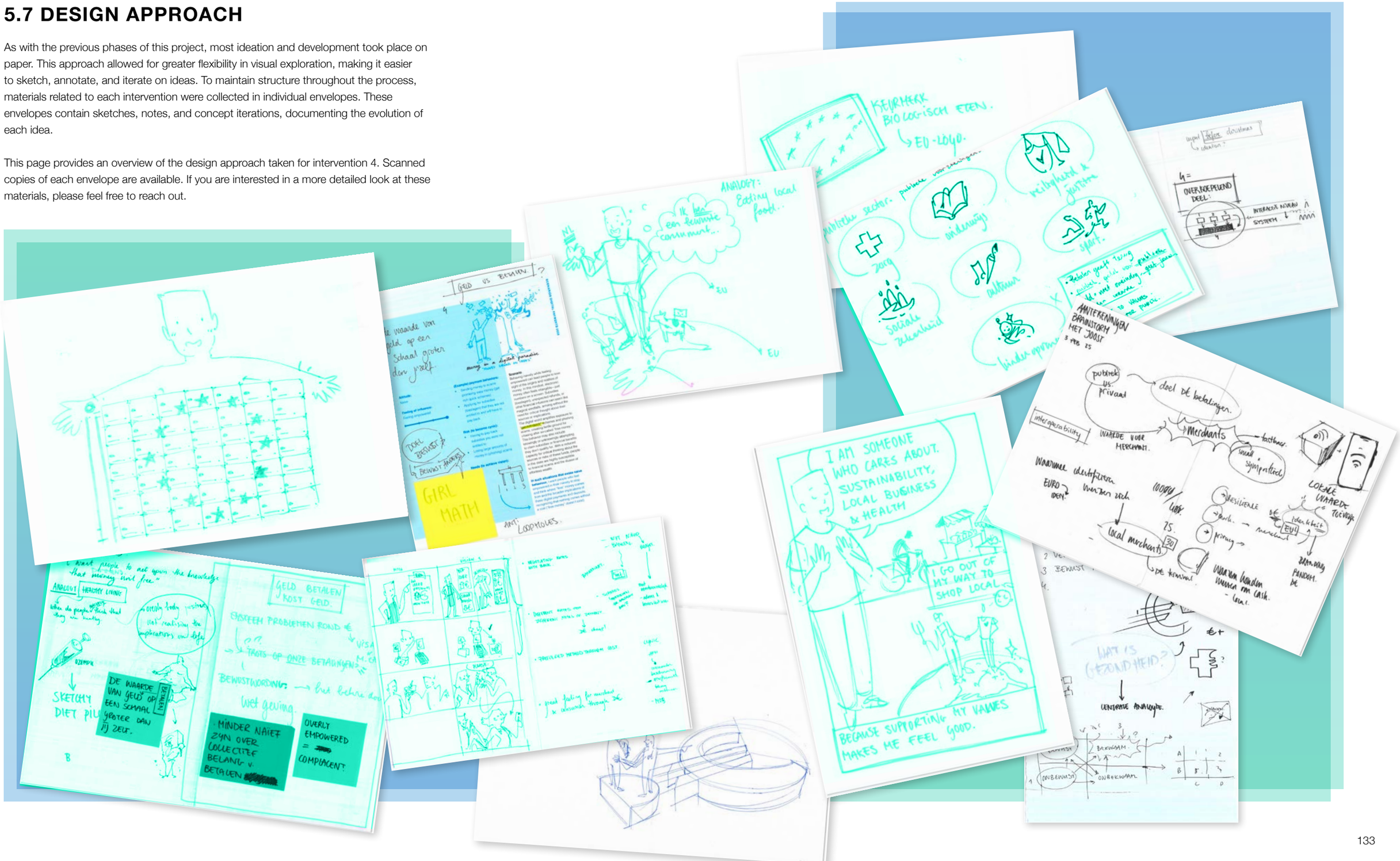


Figure 24 Visualisation of some situations and interactions that could be used design analogies

5.7 DESIGN APPROACH

As with the previous phases of this project, most ideation and development took place on paper. This approach allowed for greater flexibility in visual exploration, making it easier to sketch, annotate, and iterate on ideas. To maintain structure throughout the process, materials related to each intervention were collected in individual envelopes. These envelopes contain sketches, notes, and concept iterations, documenting the evolution of each idea.

This page provides an overview of the design approach taken for intervention 4. Scanned copies of each envelope are available. If you are interested in a more detailed look at these materials, please feel free to reach out.



5.7.1 INTERVENTION 1: UNDESIRABLE INTERACTION

SITUATION DESCRIPTION:
Trust attitude: Naive
Feeling of Agency: Detached from influence

Behaving naively while feeling detached from any ability to make meaningful change can lead people to situationally, disconnect from responsibility for their long-term financial well-being. In a world where consumers are increasingly the product, they're bombarded with constant messages to buy, buy, buy. This relentless pressure can make saving or planning for the future feel pointless, influencing people to believe that worrying about finances isn't necessary at this moment. With this attitude, people may focus on fleeting happiness from impulsive consumption rather than their long-term stability, something they remain ultimately responsible for. The more they spend on short-term dopamine boosts, the more depressing their financial situation becomes, as debts and unpaid bills pile up. This avoidance can spiral into a delay in dealing with problems, pushing them closer to the point where recovery feels impossible.

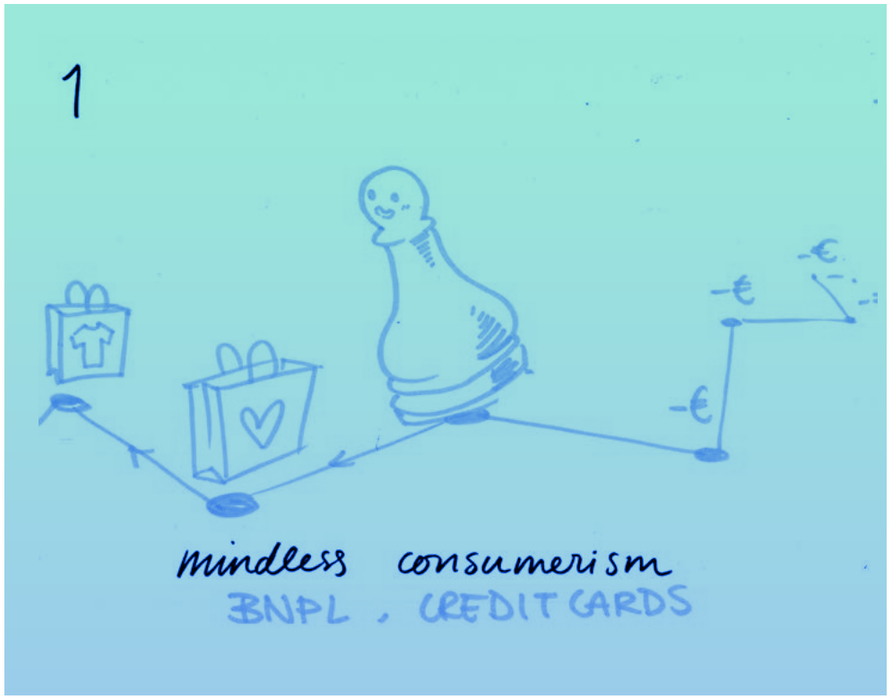


Figure 25 Illustration situation 1: Naive and detached from influence

TANGIBLE DIGITAL PAYMENTS

UNDESIRABLE INTERACTION:
This situation focuses on the payment interaction driven by contactless payments and mindless spending. Specific aspects of this interaction identified as being undesirable are:

- Not even thinking about payments
- No "payment pain"
- Lack of oversight in (small) payments
- Easy to lose yourself to impulses when there is no information/feedback to reflect on

To address these undesirable aspects of the identified situation, the impact of payments should become more tangible at the moment of spending, reinforcing users' awareness of their financial influence.

This leads us to the following vision statement:

VISION STATEMENT

"In such situations that evoke naive behavior, I want people who feel detached from influence to feel capable of impact through their payment behavior, though making the influence of their spending explicit."

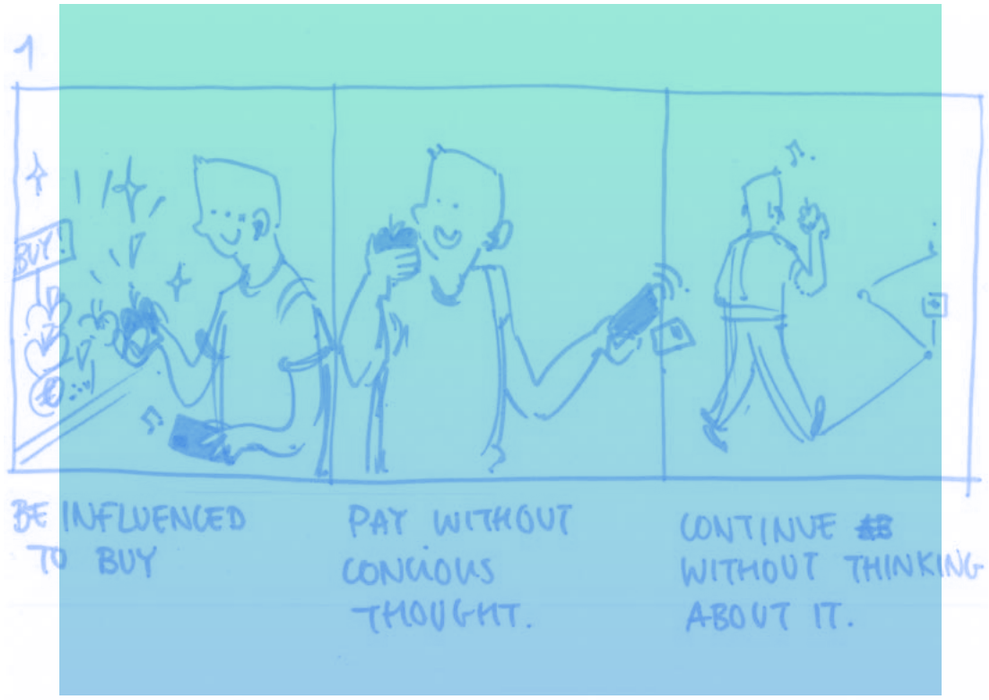


Figure 26 Illustration situation 1:undesirable payment interaction

5.7.1 INTERVENTION 1: INTERACTION ANALOGY

The interaction analogy used for the design of this intervention is:
Receiving instantaneous feedback from your body after overeating, prompting reflection and behavioral change in habits.
This analogy follows a sequence of steps that gradually improve unhealthy behaviors over time.

1. CONSUMING IN EXCESS
Unhealthy foods trigger dopamine-driven impulses, making people crave and consume them. Without any immediate feedback to stop, individuals may continue eating far beyond their needs.

2. OVEREATING LEADS TO NEGATIVE EFFECTS
Consuming too much sugary or fatty food results in physical discomfort (e.g., stomach pain, sugar crashes, or general regret). These negative effects act as signals, reminding individuals that their choices did not align with their long-term health goals.

3. REFLECTING & LEARNING CYCLES
After experiencing negative consequences multiple times, individuals start connecting their choices to the outcomes. Learning is gradual: immediate change is rare, but through repeated experiences, people refine their understanding of what works best for them.

TANGIBLE DIGITAL PAYMENTS

4. CONSUMING IN MODERATION
With past experiences in mind, individuals make deliberate choices that align with their personal limits and goals. They don't completely avoid indulgence, but they learn to exercise self-control and spend responsibly.

This analogy illustrates how immediate feedback can shape behavior, whether in eating habits or financial decision-making. By incorporating instant but non-restrictive feedback in digital payments, users can gradually develop a healthier relationship with money.

INTERACTION QUALITIES
From this interaction analogy we can distill the following interaction qualities:

1. **INSTANTANEOUS –** Feedback happens at the moment of payment in order to most efficiently link the feedback to the behavior.
2. **REFLECTIVE** – Users are prompted to pause and consider their choices based on feedback.
3. **NON-RESTRICTIVE** – Users are not restricted in (future) decision making, rather being guided to intrinsic change.

Figure 27 Illustration situation 1: desirable interaction

5.7.1 INTERVENTION 1:

Thus, the desired interaction can be described as:

With the digital euro (D€), consumers receive immediate feedback on the impact of their spending, prompting reflection through their own implicit reactions to this information. Specifically, how they feel in response to it.

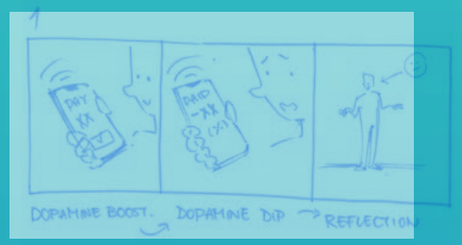


Figure 28 Illustration situation 1: desirable interaction

CONCEPT
The intervention to achieve this desired interaction could look something like this:

A payment feature in the digital euro that makes the change in D€-balance explicit. Providing instant feedback about the effect spending has on the amount of money they have.

This can be complemented by a second feature:

Using "pre set budgets", where the relative decrease in balance is larger. Consumers have to actually choose where the money is coming from and what their initial intentions for this money were, thereby strengthening the perception of influence.
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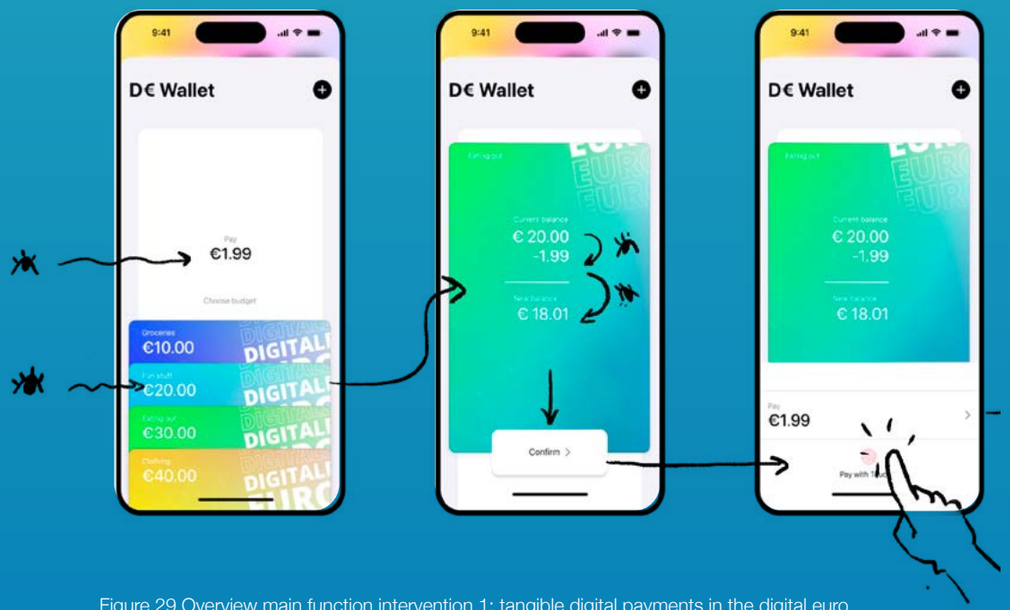


Figure 29 Overview main function intervention 1: tangible digital payments in the digital euro

TANGIBLE DIGITAL PAYMENTS

CONCEPT SCENARIO:

SET UP
The first step of healthy eating analogy and internal reflection, is creating something to reflect upon, a goal, an intention. There has to be a little voice saying "I want to be healthier", I believe the same can be said for payments. For example through saying "I am happy spending up to €20 per month on coffee". Exceeding this budget means sneaking into unhealthy behavior. By creating explicit budgets for certain things via the digital euro, users can create these goals/limits for themselves to reflect upon during the payment interaction. The set up is characterized by 3 steps:

1. FIRST INTRODUCTION TO BUDGETS
D€ can be used without budget functionalities, but it is stongly promoted when you open to the homepage.

2. DISTRIBUTE BUDGETS
Based on the amount of money in the D€ account, users slide their budgets around to allocate the money they can spend. Anything not allocated should go to savings.

3. MANAGE BUDGETS
From this point onwards, users see their budgets everytime they open up the application. Setting these budgets until the next payday set a goal to stay within the budget for this time.

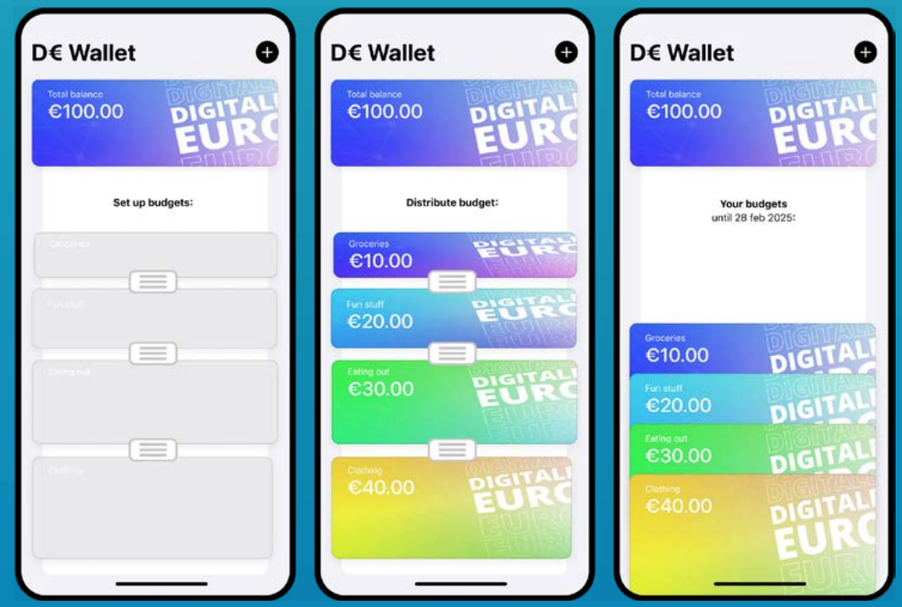


Figure 30 Overview set up intervention 1: tangible digital payments in the digital euro

5.7.1 INTERVENTION 1:

PAY WITH D€
The payment interaction focusses on making the influence of their spending tangible, in a minimally intrusive way. As we want the interaction with this product to be non-restrictive, we shouldn't be sacrificing usability for insights.

1.D€ IS EASY TO USE
The payment feature works similarly to most other forms of frictionless payment to initiate payment. Making it too difficult at this point could result in no-one adopting this means of payment.

2. INSTANT FEEDBACK
The user confirms payment and is guided to look at the amount deducted, thereby connecting this with their payment.

3. MANAGE BUDGETS
As their payment and an actual reduction of funds becomes connected, the user becomes aware of the real-ness of spending money.

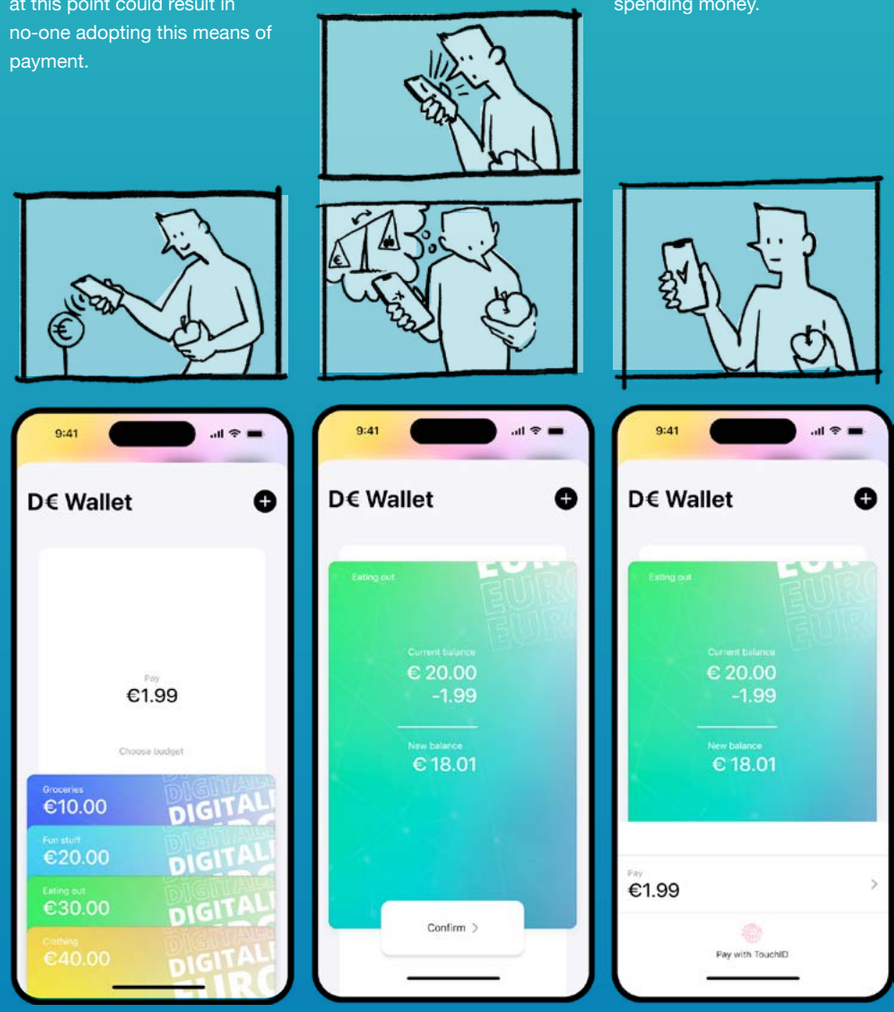


Figure 31 Overview main function intervention 1: tangible digital payments in the digital euro

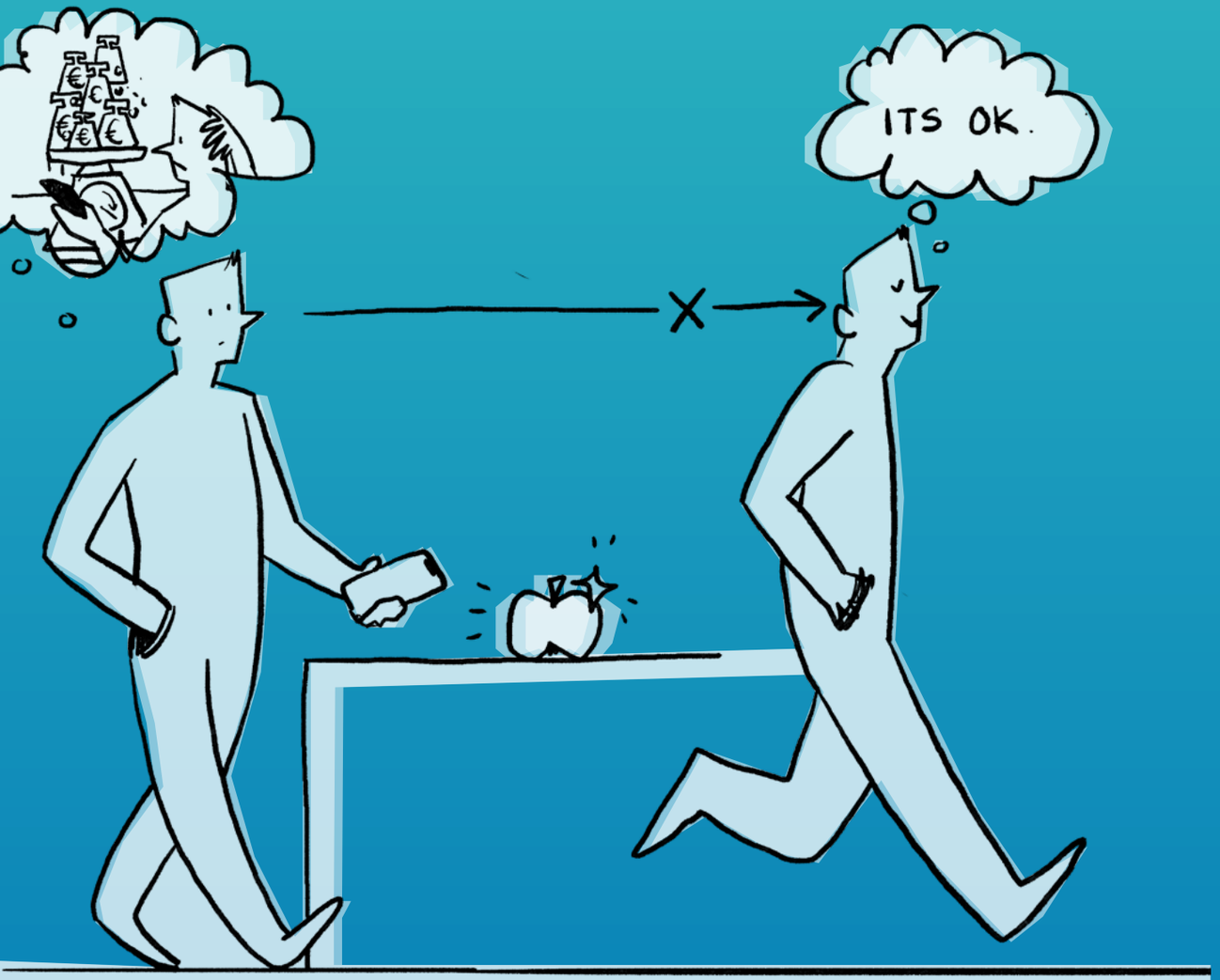
TANGIBLE DIGITAL PAYMENTS

REFLECTIONS IN PROGRESS
As this process is repeated within the time period set for the budget, users see that even small purchases will have their impact and stay on top of the amount of money in their digital euro wallet.

Figure 32 intervention 1: cumulative effect of payments

5.7.1 INTERVENTION 1:

Ultimately, this intervention aims for people to think about the effects it has on their balance everytime they pay. Sometimes this means buying something, because the user deems it worthy. Sometimes this may lead to conciously deciding not to spend money on something they don't want or need: something that isn't worth it.



TANGIBLE DIGITAL PAYMENTS

WHY D€ SPECIFICALLY

The Digital Euro (D€) provides a unique opportunity for implementing this feature due to its distinct payment infrastructure. Unlike existing systems that operate through private schemes like Visa and MasterCard (explained in Chapter 2.3), D€ functions outside these networks. Currently, frictionless payments primarily flow through digital wallets such as Apple Pay or Google Pay.

By integrating this feature into the Digital Euro, private corporations are bypassed. Instead, the users payment data would either remain within the user's bank (which already has access to transaction data) or, in the case of locally stored digital euros, no payment data would be shared at all.

Private companies could derive significant value from data generated through budgeting and transaction tracking, but many users view such data collection as an invasion of privacy. As a public means of payment, D€ is uniquely positioned to prioritize user privacy over profit, ensuring that sensitive financial data is neither monetized nor exploited.

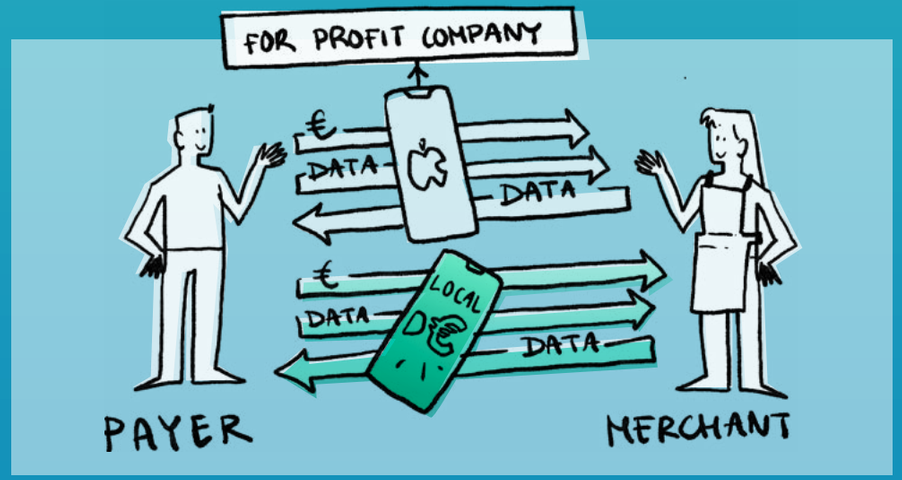


Figure 33 Overview data transfer through payments current vs digital euro contactless payments.

NEXT STEPS

The further development of this intervention should investigate the way we make payments tangible during the payment interaction.This version uses the visualisation an impact calculation, but alternatives like skeuomorphic designs (e.g., visualizing money as cash or budgets as envelopes) were also explored. Testing with users would validate which means of "making tangible" is most effective.

The technical feasibility also needs assessment. Anneloes van Gent (DNB) noted that implementing this would be challenging. Collaboration with experts in payment innovation is necessary to explore how this concept could be integrated into D€.

5.7.2 INTERVENTION 2:

UNDESIRABLE INTERACTION

SITUATION DESCRIPTION:
Trust attitude: Naive
Feeling of Agency: Resisting helplessness

Behaving naively while attempting to avoid feeling helpless stems from the fundamental shift in trust dynamics introduced by digital payments. Unlike cash transactions, where both parties can try to verify the authenticity of the money received, digital payments require the payer to place their trust in external devices and systems beyond their control. This reliance can create a sense of detachment and vulnerability. Additionally, the speed of digital transactions reduces the time available for individuals to analyze information, often making them feel rushed and powerless in the moment, further lowering their sense of financial agency. Specifically, people may feel insecure about:

- Amount of money being deducted
- Who you are sending money to
- Who you are giving your PIN-information to

Figure 34 Illustration situation 2: Naive and resisting helplessness

SECURE DIGITAL PAYMENTS

UNDESIRABLE INTERACTION:
This situation focuses on the insecurity felt during digital, frictionless payments. Specific aspects of this interaction that are undesirable include:

- Not having a clear overview of payment information
- Being rushed during payments
- Having to place trust in unfamiliar devices rather than your own.

To address these aspects, the payments interaction should be redesigned to make the user feel safe.

This leads us to the following vision statement:

VISION STATEMENT

"In such situations that evoke naive behavior, I want people trying to avoid helplessness to feel secure during payments, through providing delays and time to make payments based on objective information"

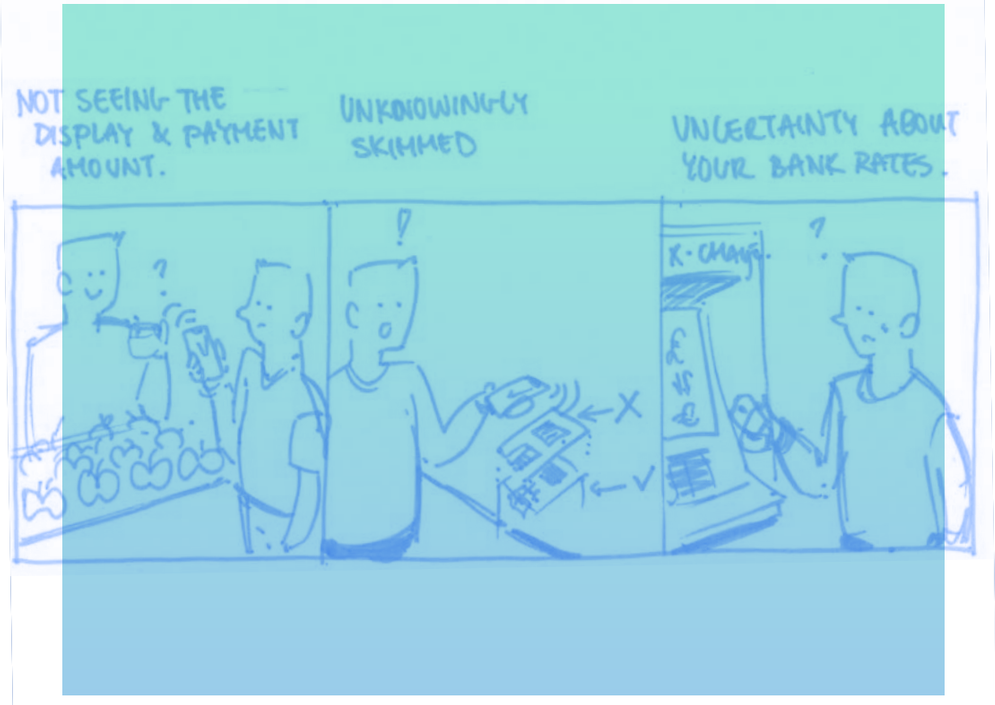


Figure 35 Illustration situation 2: undesirable payment interaction

5.7.1 INTERVENTION 2:

INTERACTION ANALOGY

The interaction analogy used for the design of this intervention is:
Checking nutritional information before deciding to consume or buy.

This analogy illustrates how conscious decision-making in a secure and controlled environment can lead to healthier financial behaviors in digital payments.

1. DETERMINING WHAT YOU WANT TO EAT
Just as eating healthy requires understanding what you put into your body, responsible spending requires understanding where your money is going. Consumers have specific goals for their diet. Similarly, they should have goals for their spending.

2. TAKE TIME TO CHECK NUTRITIONAL INFORMATION
When trying a new food, people often assess its nutritional value before consuming it. They may check for caloric intake, sugar levels, or unwanted ingredients like palm oil or saturated fats.
Similarly, in payments, users should have access to clear, relevant information before making financial decisions, such as details about the merchant, transaction type, and potential impact on their budget.

3. DECIDE "YES OR NO" BASED ON NUTRITIONAL INFORMATION
After reviewing the nutritional information, consumers can consciously decide whether or not to eat the food.

In payments, users should feel fully in control of their transactions, deciding whether to proceed or decline based on the provided financial details.

INTERACTION QUALITIES
From this interaction analogy we can distill the following interaction qualities:

1. **INTENTIONAL –** Encourages users to actively engage with their payment choices.
2. **NON-COERCIVE** – Empowers users without restricting their freedom to spend.
3. **EMPOWERING** – Provides the right information at the right time to support better decisions.

1. DETERMINING WHAT YOU WANT TO EAT

2. TAKE TIME TO CHECK NUTRITIONAL INFORMATION

Figure 36 Ilustration situation 2: desirable interaction

5.7.1 INTERVENTION 2:

Thus, the desired interaction can be described as:
When initiating a payment, P2P, in store, or at ATM's, consumers are informed about the recipient of their payment, and they are in control of the decision to pay based on this information.

Right: figure 37 Illustration situation 2: desirable interaction

CONCEPT
From this we came to the following concept direction:

A payment feature in the digital euro ensuring a transparent transaction. The user's own trusted device provides information about the receiver of payments. For example: Name, Date, IBAN nr merchant, Amount of €. Type of transaction

The user decides to abort or confirm the payment based on this information.

This can be complemented by a second feature:

The payment is fully validated on your own device: through PIN code or biometric. Getting trustworthy information through a trusted device may improve the feeling of security in payments.

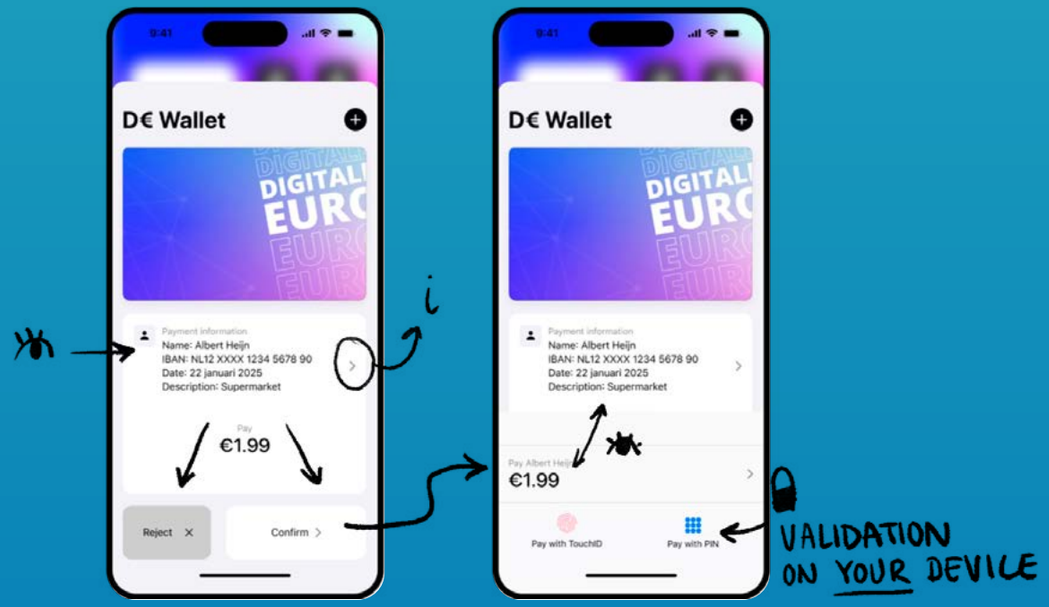


Figure 38 Overview main function intervention 2: secure digital payments in the digital euro

SECURE DIGITAL PAYMENTS

CONCEPT SCENARIO:
A series of mock up interfaces were created to illustrate the interaction with "tangible payments in the digital euro" and clarify how this addresses our vision: " **I want to people to feel secure during payments."**

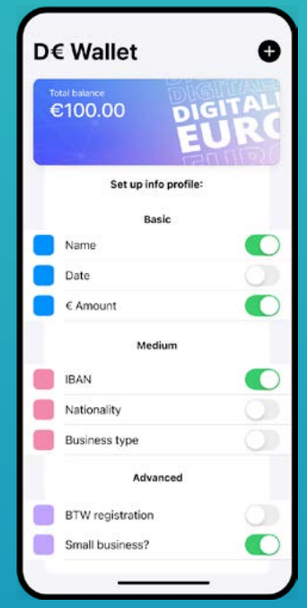
1. SET UP
The process begins with setting up personal wishes for payment information visibility. While providing information is essential, overloading users can be counterproductive. Giving users control over what information they see fosters a greater sense of autonomy and security.

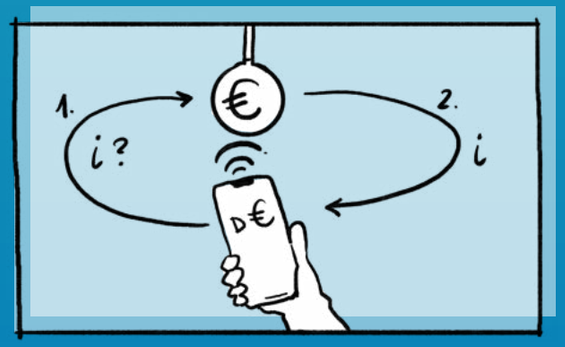
Every time a payment is initiated through the Digital Euro, users will receive relevant transaction details. To ensure transparency, merchants must provide comprehensive payment information to qualify for Digital Euro transactions.

This could imply two scenarios for merchants, who provide the information visible during payments:

1. Full Compliance: Provide all required details to ensure seamless Digital Euro transactions.
2. Partial Compliance: If any required information is missing, a red warning or exclamation mark will alert the user, potentially deterring payment.

In both cases, this information should be trustworthy and regularly validated.





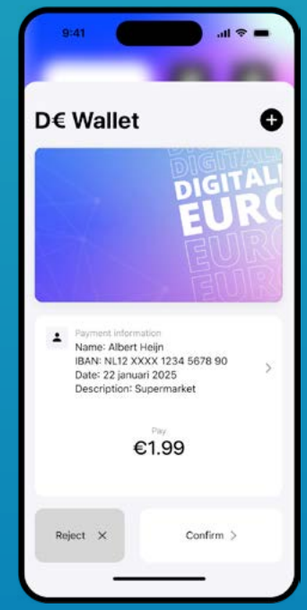


Figure 39 Overview set up intervention 2: Secure digital payments in the digital euro

5.7.1 INTERVENTION 2:

SECURING TIME FOR CONTROL OVER PAYMENTS
The feeling of security in this intervention is created by the presentation of objective information, and the moment needed to analyse this. In the interaction analogy this moment takes place in the store, in a calm moment which often doesn't exist anymore in payments. Thus the digital euro needs to introduce this calmness, even in store, when people want payments to go quick.

In this illustration, the cofirmation is slightly delayed. There is a timer that scrolls from left to right along the confirm button (as visualised in the sequence in figure 40). When the button becomes white, the user can proceed to pay.

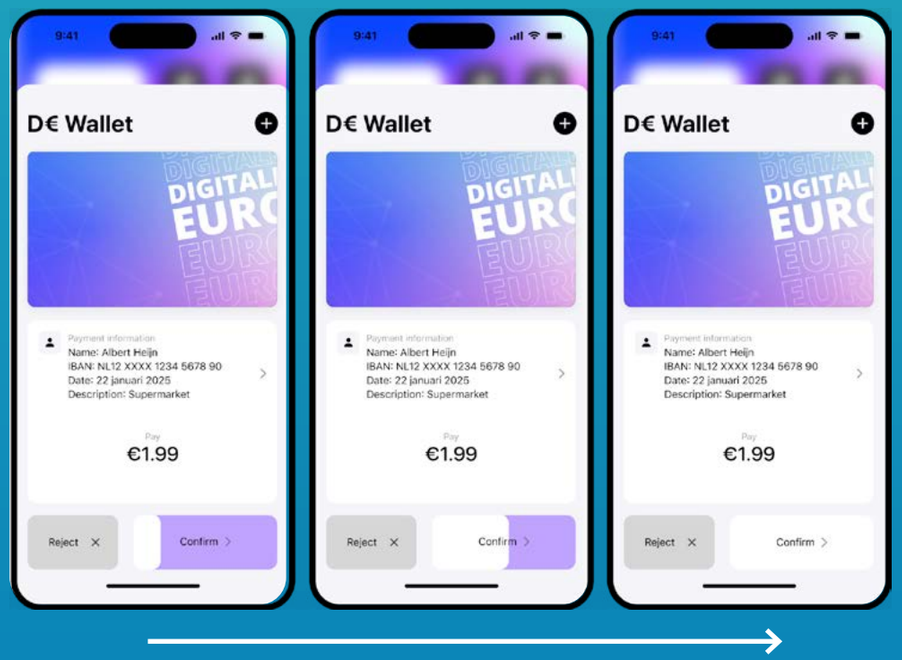
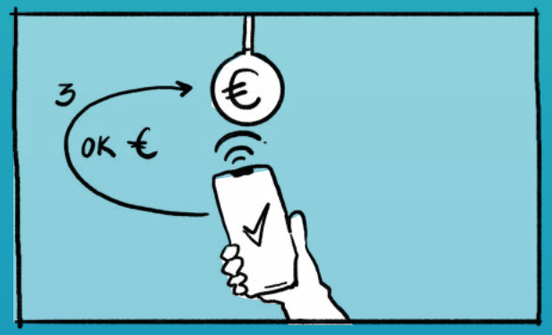


Figure 40 Overview function intervention 2: delay in payments

SECURE DIGITAL PAYMENTS

CONFIRMATION VIA D€
Earlier we identified the "external payment device" as a factor supporting the uncertainty in payments: the payer is required to place their trust indevices and systems they feel no controll over. A higher feeling of security could be fostered through making the verification of the payments take place on the user's own trusted device.



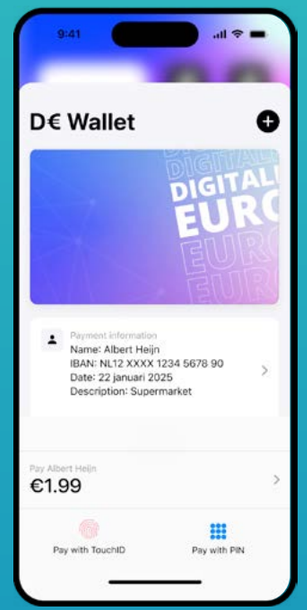


Figure 41 Overview function intervention 2: verification via device

NEXT STEPS FOR FURTHER DEVELOPMENT:
Delaying the payment interaction is a reverse movement of the trend we can currently observe. Especially looking towards the future, it would be valuable to observe the effects this will have on user and merchant satisfaction.

How people react to such features should also be investigated further. Will this delay in payments and the presentation of information support users in feeling secure during payments? How will they react if the information they see is not what they expected?

5.7.3 INTERVENTION 3:

UNDESIRABLE INTERACTION

SITUATION DESCRIPTION:

Trust attitude: Naive

Feeling of Agency: Chasing empowerment

Behaving naively while chasing empowerment through digital payments often means diving into new tools and methods without grasping the potential risks or the rules that come with them. Finfluencers and other profit-driven entities amplify this by promoting digital payments or investments as simple and lucrative, without taking responsibility for educating users about the dangers involved. This creates a false sense of security for individuals unaware of what they're stepping into.

Gambling with digital money, whether through speculative investments or volatile platforms, feels enticing, especially when small wins at the start create an illusion of ease and control. However, the lack of critical understanding often leads to overconfidence, and betting more than they can afford to lose. The rise of unregulated, dopamine-fueled platforms only adds to the problem, pulling people into a cycle of risk-taking that is difficult to break.

Figure 42 Illustration situation 3: Naive and chasing empowerment

UNDESIRABLE INTERACTION:

This situation focuses on the feeling of empowerment driven by addictive mechanisms withing payments. Specific aspects of this interaction that are undesirable include:

- False Empowerment – Users feel in control while unknowingly acting against their own financial well-being.
- Loss of Value Awareness – Digital money becomes abstract, making it easier to overspend recklessly.

To counteract these risks, digital payment interactions should be designed to help users recognize manipulative mechanisms and develop a stronger sense of value for money.

This leads us to the following vision statement:

VISION STATEMENT

"In situations that evoke naïve behavior, I want people chasing empowerment to resist addictive mechanisms by developing healthy financial habits and tools from childhood."

Figure 43 Illustration situation 3: undesirable interaction

5.7.3 INTERVENTION 3:

UNDESIRABLE INTERACTION

The interaction analogy used for the design of this intervention is:

Teaching/learning healthy eating habits as a child

Learning how to eat well requires incremental exposure, hands-on guidance, and opportunities to make and correct mistakes.

1. WANTING THE BEST FOR YOUR CHILD
Parents want to set their children up for a healthy future. They understand that good nutrition plays a key role in long-term well-being and take responsibility for shaping their child's eating habits from an early age.

2. SETTING THE RIGHT EXAMPLE
Children learn by observing the behaviors of those around them. When parents consistently choose balanced meals and demonstrate mindful eating, they create a model for their children to follow, reinforcing healthy habits naturally.

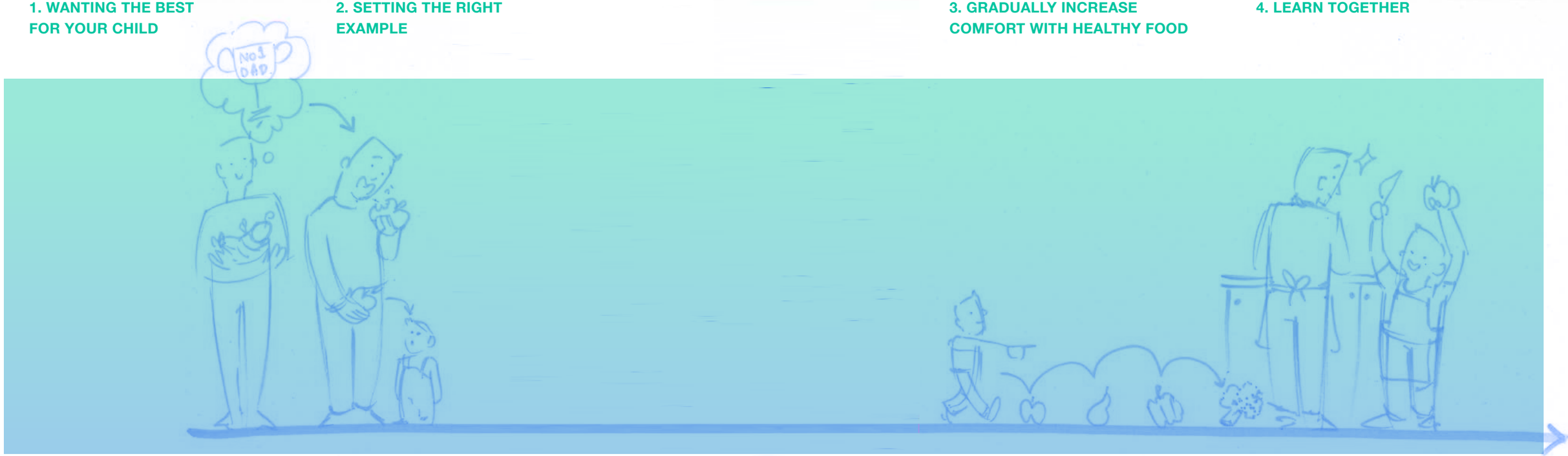


Figure 44 Illustration situation 3: desirable interaction

LEARNING TO USE DIGITAL PAYMENTS

3. GRADUALLY INCREASE COMFORT WITH HEALTHY FOOD
New foods and eating habits are introduced progressively, ensuring that children have time to adjust. Instead of overwhelming them with strict rules, small steps, like tasting a new vegetable or learning to balance treats with nutritious meals, help build familiarity and confidence.

4. LEARN TOGETHER
Healthy eating is not just about enforcing rules; it's a shared experience. Parents and children explore nutrition together, discussing food choices, cooking as a team, and making decisions collaboratively. This fosters independence while ensuring guidance is available when needed.

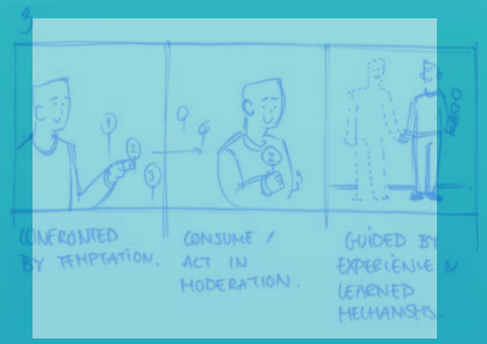
INTERACTION QUALITIES
From this analogy, the following qualities define the desired interaction:

1. **ADAPTIVE** – Adjusts to the child's level of understanding and experience.
2. **EMPOWERING** – Encourages learning and responsibility independently.
3. **FORGIVING** – Allows mistakes to become learning opportunities rather than irreversible failures.

5.7.3 INTERVENTION 3:

Thus, the desired interaction can be described as:

Children learn how to handle digital money/ payments through as D€ guides children to be aware of risks around payments in a forgiving way and caring way, like a parent would.



Right: figure 45 Illustration situation 3: desirable interaction

CONCEPT
From this, we arrived at the following concept direction:

A banking and payments application with limited but evolving functionalities, designed to support children in developing financial skills. The learning process is structured around active parent-child interaction, ensuring that financial education is both guided and adaptive.

To enhance independent learning and reduce reliance on parental involvement, the application integrates a "payments buddy": a digital guide that assists children in navigating financial decisions.

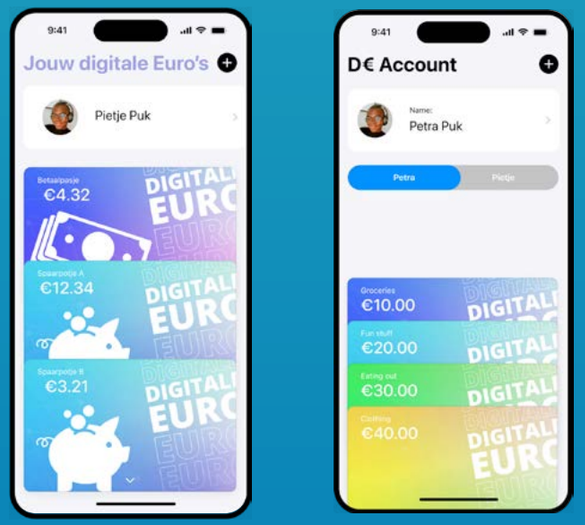


Figure 46 Overview main function intervention 3: learning digital payments in the digital euro Simplified children's version left, connected parents version right

LEARNING TO USE DIGITAL PAYMENTS

CONCEPT SCENARIO:

SET UP:
The digital euro learning application works with parent and child. They have to set up the app together and are continuously connected through the process parents can always observe and supervise the payment activities of their children. Outside the app, in the real world, children are guided by their parents, but in the app, the children are guided by the digital euro. Depending on their age and skills information is presented to them in an accessible way. Thereby empowering children to learn "independently" and receive feedback as suits them.

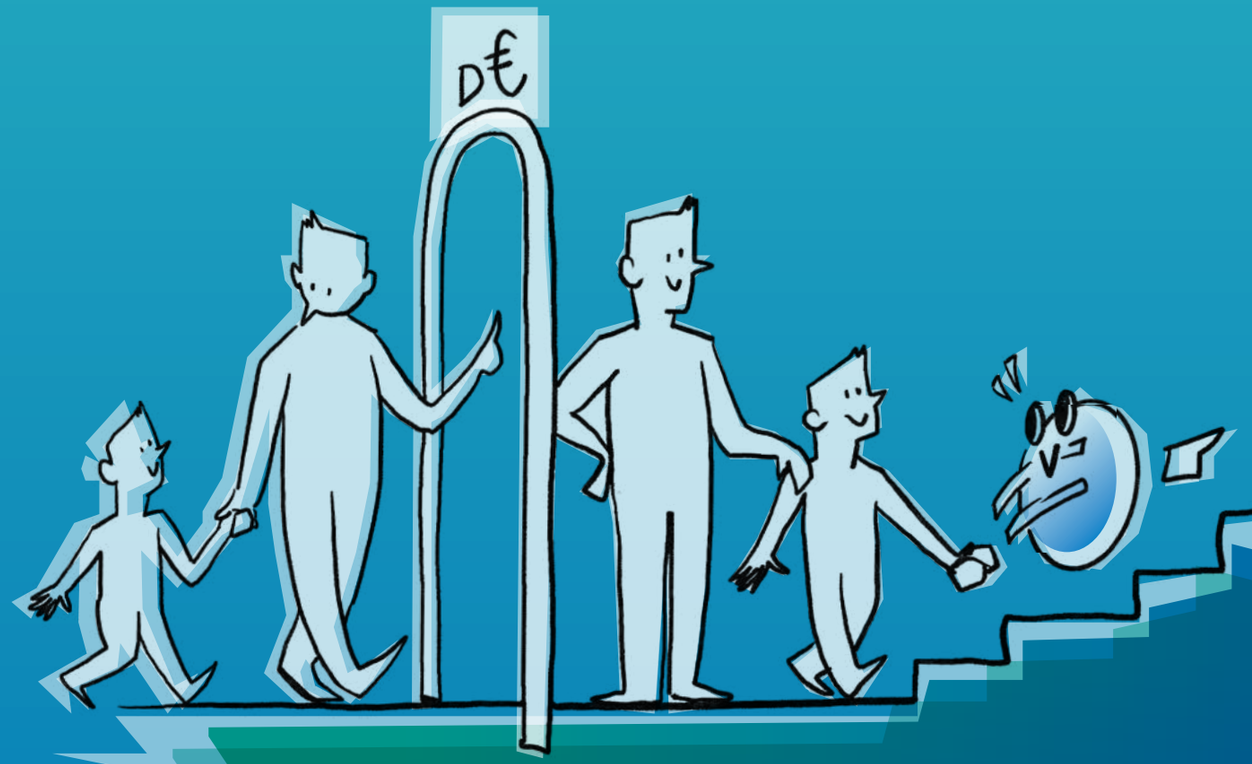


Figure 47 Overview set up intervention 3: learning digital payments

5.7.3 INTERVENTION 3:

PAYMENT BUDDY:
There are disparities in financial knowledge that often persist across generations as parents are the primary source of financial education for many childresn (Abbenes, n.d.). By integrating regular, structured financial education through the payment buddy feature, this intervention aims to bridge this gap, ensuring that financial knowledge is accessible to all children regardless of their family background.

NEXT STEPS:
To develop an effective financial education framework, it is essential to investigate age-appropriate learning methods and determine which payment features should be introduced at different developmental stages. Younger children may benefit from hands-on, gamified learning experiences that introduce fundamental concepts like earning, saving, and spending, while teenagers may require more practical financial tools that prepare them for real-world transactions. Additionally, special attention should be given to teaching about addictive financial mechanisms, such as impulsive spending triggers and gamified financial platforms. This requires engaging yet critical education strategies that help users recognize and resist manipulative design patterns, fostering healthy financial habits from an early age.

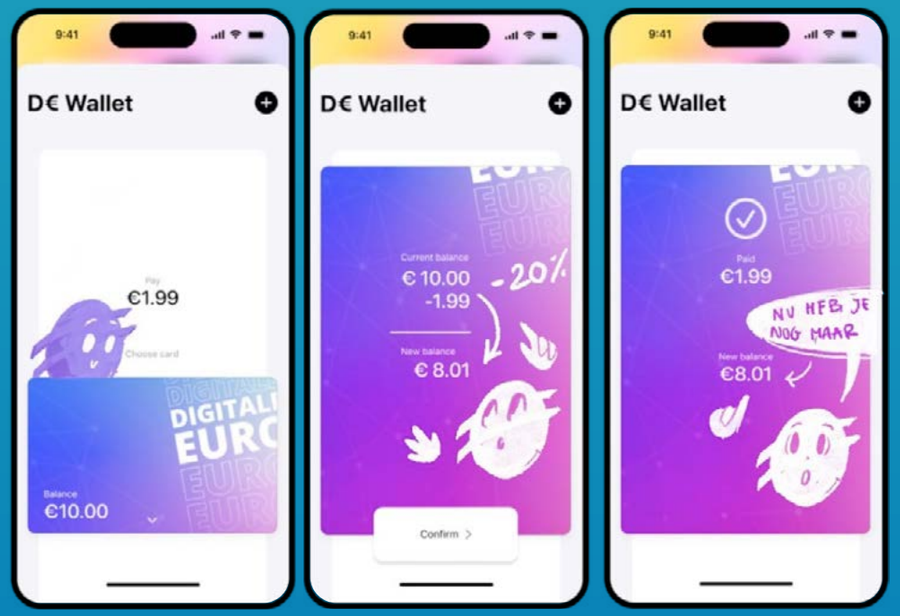


Figure 48 Overview “buddy-function” intervention 3: explorations buddy function in D€ application

LEARNING TO USE DIGITAL PAYMENTS

Figure 49 Overview “buddy-function” intervention 3: explorations buddy function in D€ application

5.7.3 INTERVENTION 4:

UNDESIRABLE INTERACTION

SITUATION DESCRIPTION:

Trust attitude: Naive

Feeling of Agency: Chasing empowerment

Behaving naively while feeling empowered can cause individuals to lose sight of the broader infrastructure and stakeholders behind digital payments. This lack of awareness poses a risk for society at large, as increasing dependence on external parties may leave the public payment infrastructure reliant on companies that do not always act in the public's best interest. Without careful consideration, everyday transactions may inadvertently support organizations that weaken European sovereignty or channel money into industries that do not align with consumers' values.

Figure 50 Illustration situation 4: Naive and overly empowered

TANGIBLE VALUE FOR DIGITAL PAYMENTS

UNDESIRABLE INTERACTION:

Consumers are overconfident about the resilience and costs of payments due to the high-quality Dutch digital payment infrastructure. Payments are fast, appear inexpensive, and are widely accessible. As a result, people do not consciously choose payment providers or consider who they are transacting with and at what cost.

Dutch consumers do not necessarily see the appeal of D€, however, achieving the policy vision for D€ requires a minimum level of adoption to ensure public financial resilience and sovereignty.

This leads us to the following vision statement:

VISION STATEMENT

"In such situations that evoke naive behavior, I want people who are overly empowered to recognize how public payments can contribute to healthy local economies."

Figure 51 Illustration situation 4: undesirable payment interaction

5.7.3 INTERVENTION 4:

UNDESIRABLE INTERACTION

The interaction analogy used for the design of this intervention is:

Purposely choosing to buy local groceries over going to a chain-supermarket

Consumers are often encouraged to buy local produce because of its positive impact on local communities and the environment. This behavior shift is largely driven by awareness and intentionality, as people recognize the values behind their choices.

1. LEARNING LOCAL IS BETTER
People become aware of the benefits of shopping locally through advertisements, social networks, or direct interactions with merchants. They recognize that choosing independent stores supports their community, aligns with sustainability goals, or reflects their personal values.

2. CONSCIOUSLY CHOOSING TO CHANGE BEHAVIOR
Once aware, individuals may begin to see themselves as people who make ethical, value-driven choices.

TANGIBLE VALUE FOR PUBLIC PAYMENTS

As a result, they deliberately opt to shop at local markets instead of large supermarkets that do not align with their principles.

3. FEELING OF REWARD FOR DOING THE BETTER THING
Making a purchase that aligns with one's values creates a sense of self-actualization. The act of supporting local businesses provides both tangible benefits to the community and an intrinsic reward, reinforcing the motivation to continue this behavior.

INTERACTION QUALITIES
From this analogy, the following qualities define the desired interaction:

1. **INTENTIONAL** – Encourages users to make deliberate choices based on their values.
2. **VALUE-DRIVEN** – Helps people align their behavior with their personal beliefs.
3. **COMMUNITY-ORIENTED** – Reinforces the collective impact of individual decisions.

1. LEARNING LOCAL IS BETTER

2. CONSCIOUSLY CHOOSING TO CHANGE BEHAVIOR

3. FEELING OF REWARD FOR DOING THE BETTER THING

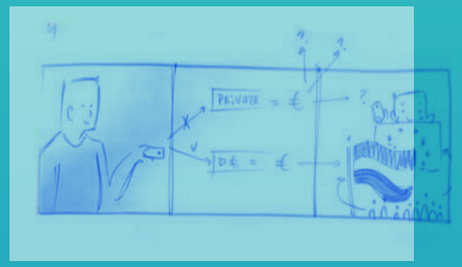
Figure 52 Illustration situation 4: desirable interaction

5.7.3 INTERVENTION 4:

Thus, the desired interaction can be described as:

Consumers make decisions between means of payment based on the impact payments decisions can have for our local area and local communities.

Right: figure 53 Illustration situation 4: desirable interaction



TANGIBLE VALUE FOR PUBLIC PAYMENTS

CONCEPT
From this desired interaction, the following concept was designed.

Making the digital euro value tangible for consumers by connecting the digital euro identity with benefits/value for small merchants.

The interaction analogy indicates that people may choose to deliberately adapt their payment behavior if they know it benefits something they value. By providing value to small business owners, people may choose to pay with D€ over other methods. Especially if the merchant is a sympathetic figure, such as “mom and pops with a local supermarket” or “a kid with a web-store selling homemade crafts”.

In the market driven conditions which employs volume drives prices, (digital) payments are expensive for small merchants since they cannot negotiate effectively. The focus on the amount of payments a merchant handles benefits large businesses exclusively. Thus, here is an opportunity to actually provide value to merchants: cheaper digital payments.

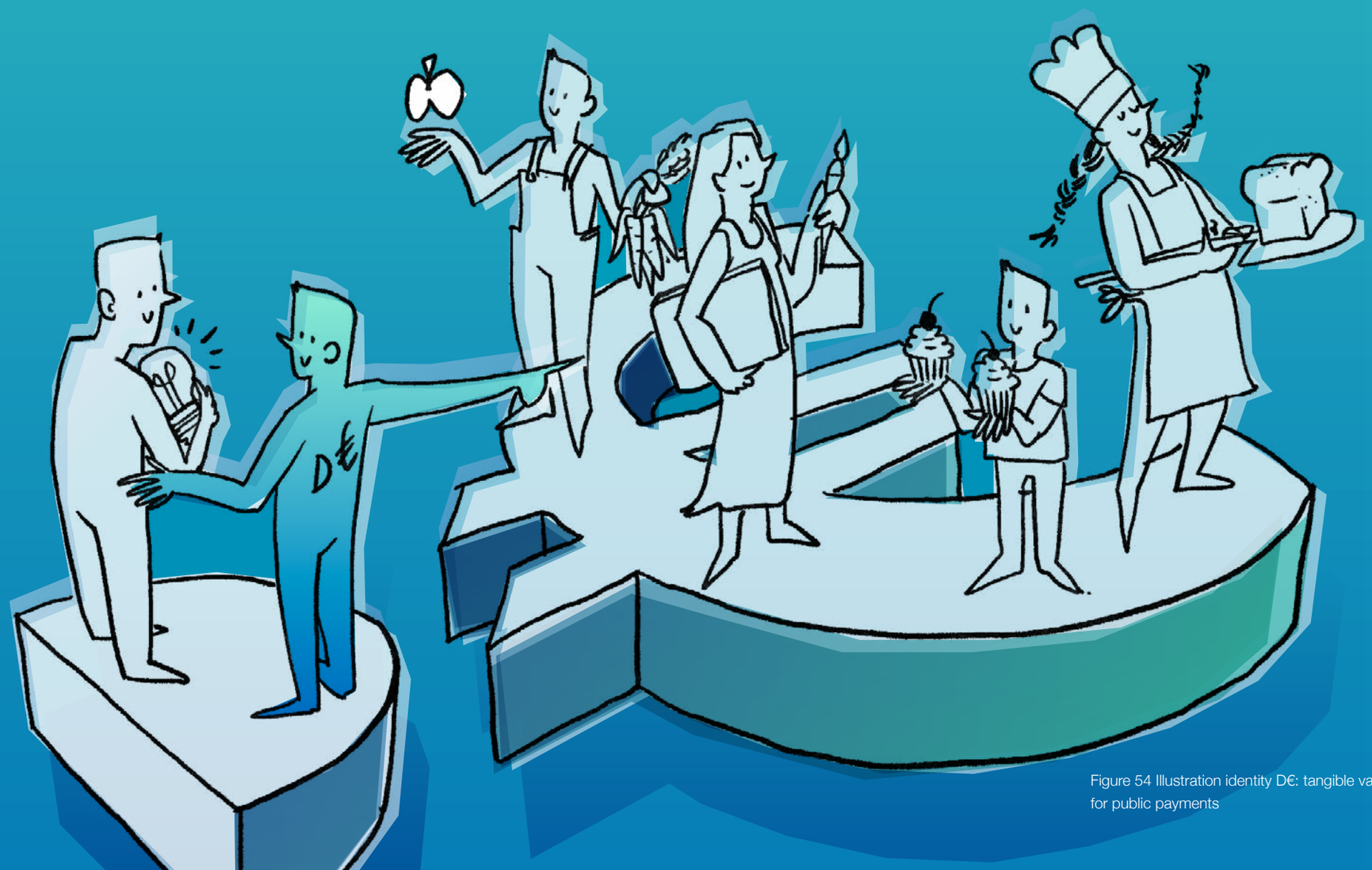


Figure 54 Illustration identity D€: tangible value for public payments

Figure 55 Concept marketing: communicating to people that D€ is a good product for small merchants

5.7.3 INTERVENTION 4:

In order to connect the digital euro to value for merchants, there needs to be actual value for merchants. This is most efficiently done through the reduction of payment fees. At the event “Een digitale euro for iedereen”, which I attended at the beginning of this project, the merchant representative indicated that high costs would be the primary reason for merchants to resist the digital euro. Thus, if it is the cheapest option, it will likely be favored by the merchant.

This could be done through two routes:

1. D€ PROVIDES A PLATFORM FACILITATING “POOLING” OF PAYMENTS
In the current concept of the digital euro, it is expected that digital euro payments will go through commercial banks. If small merchants in a local area like a town, or a shopping center, can connect their payments, they could collectively go to a selection of banks and negotiate for the best offer. Through the digital euro app they can connect with small merchants in their area.

2. CAPPING D€ FEES FOR SMALL MERCHANTS
In a different structure, a cap on the payment fee is introduced for small merchants and adopted into law. This would mean that if you have a small amount of payments you will be charged less for payment services, thereby forcing banks to offer good prices to small merchants as well.

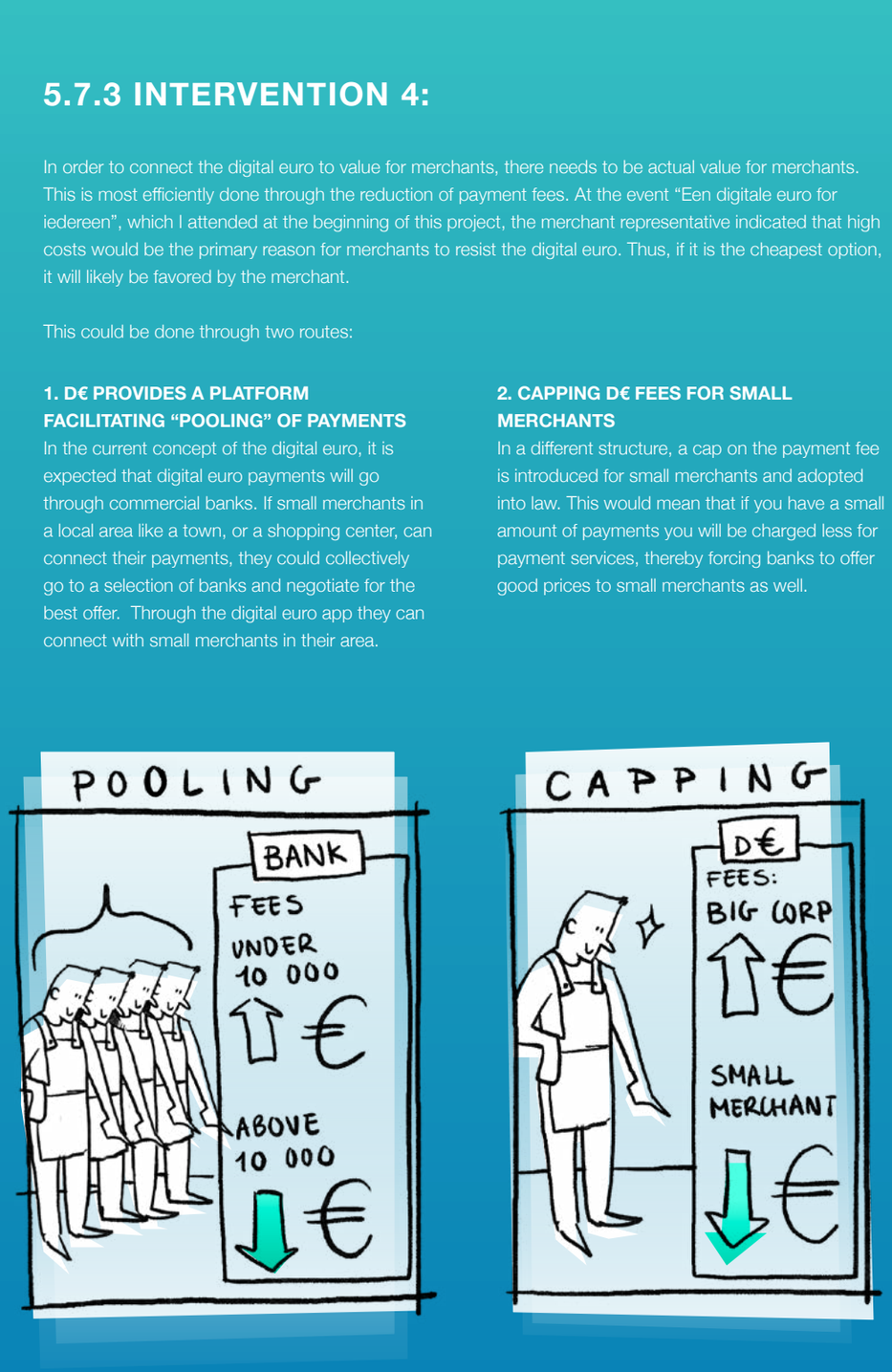


Figure 56 Illustration intervention 4: Pricing strategies D€

TANGIBLE VALUE FOR PUBLIC PAYMENTS

CONCEPT SCENARIO:

1. A SUPPLEMENT, NOT A REPLACEMENT
The digital euro doesn’t replace the other means of payment. If the merchant or customer wishes to continue using cash or private means of payment, this is no problem. If the digital euro is cheaper for the merchant, this will be their favored means.

2. COMMUNICATE VALUE
Through the merchant (or marketing campaigns) it becomes clear that D€ provides value to the merchant: choosing to pay with D€ supports their local business as it saves them in cost.

3. DO SOMETHING GOOD
Paying with the Digital Euro is a small effort. By helping your local merchant, small business, entrepreneur you do something good for your community, helping you feel good.

Figure 57 concept scenario intervention 4

The communication strategy for this intervention should be refined through user testing. Slogans such as “€ollective Payments via D€” or “Buy Local, Pay Local” emphasize the local and collective value of D€, but their effectiveness remains uncertain without further validation.

From a whole different perspective further research for this intervention should include an analysis of the economic effects this could have as it disrupts the current functioning of the payments market. When it involves the capping of payment fees, it should be investigated at what rates the cap should be set, and how “small merchant” is defined. E.g. Limited number of payments, or limited number of employees?
As this intervention could significantly impact the payments market, thorough economic analysis and stakeholder consultation are essential before potential regulatory adoption.

6. DELIVER

This final chapter focuses on concluding the design process and refining the key outcomes of this thesis. According to the Design Council, the *deliver* phase involves testing different solutions on a small scale, discarding those that prove ineffective, and refining those with potential (Design Council, 2005).

In this chapter we aim to finalize answering the final research question: *"How can DNB intervene in the challenges emerging from this evolving relationship through the design of the digital euro?* Several subquestions are explored:

1. How are the research outcomes of this thesis perceived by those at DNB involved with payments?
2. How should DNB intervene in payments in the future?
3. What actionable steps can DNB take to implement the findings of this research?

Based on these insights, four project briefs and a roadmap outlining next steps were developed. These outputs aim to reduce barriers for future work, making it easier to pursue further research and implementation.

DELIVER CONTENTS **P**

6.1 VALIDATION APPROACH

This thesis investigates how the relationship between society and payments is evolving toward 2035. Because the designed interventions are intended to shape future payment interactions, direct validation with users at this stage would be unrepresentative: the social context in which these interventions would operate does not yet exist. Therefore, it was decided to validate the outcomes of this project with policy advisors from DNB.

CONTINOUS VALIDATION

As described earlier in Chapter 1.7, this project followed a process of continuous co-creation with two policy advisors from DNB's Digital Euro team. Throughout the project, weekly meetings served as some form of "micro-validations," allowing the work to be assessed as it was being developed. These discussions focused primarily on three key aspects: desirability, viability, and feasibility. These are three qualities of the design relevant for innovation (Chasanidou et al., 2015) Over the course of the project, these weekly sessions took place 25 times, providing valuable iterative feedback and ensuring alignment with the broader goals and constraints of DNB.

In addition to these ongoing discussions, the project featured three structured validation moments, involving all supervisors of this thesis:

1. **KICKOFF MEETING:** Validating the initial project scope and research intent.
2. **MIDTERM REVIEW:** Assessing the developed framework and the decision to focus on a vision for responsible digital financial inclusion.
3. **GREENLIGHT MEETING:** Evaluating the four proposed interventions for responsible digital financial inclusion, refining their direction, and determing the time allocated for their development.

These moments allowed for structured reflection at critical moments in the project, ensuring that the research and design direction remained both relevant and actionable.

FINAL VALIDATION

To assess the overall validity of the framework, vision, and designed interventions, a fourth validation moment was introduced. This consisted of a series of interviews with relevant DNB policy advisors involved in the Dutch payment infrastructure who had not been directly involved in this project. By gathering perspectives from advisors inside and beyond the Digital Euro team, this final validation aimed to understand how the thesis findings would be received within DNB and whether the proposed interventions were relevant to the broader payment infrastructure, not just the Digital Euro initiative.

The following chapter outlines the approach and outcomes of this series of interviews.

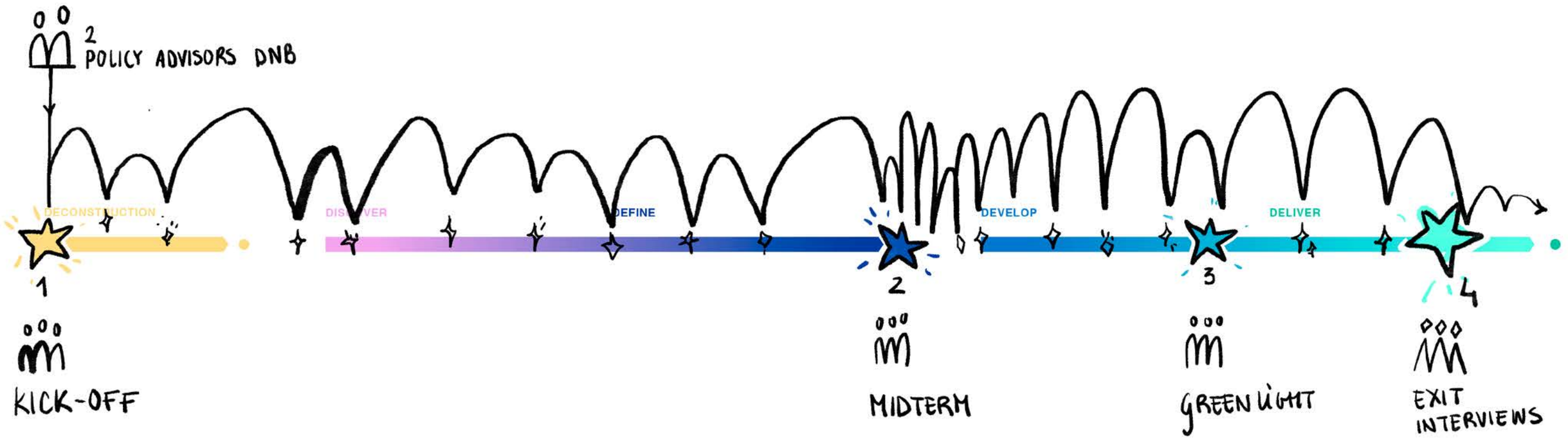


Figure 58 Visualisation validation with policy advisors from DNB along the course of this project

6.2 INTERVIEWS DNB

To evaluate the vision and concept directions developed in this project, a series of interviews was conducted with members of DNB's Retail Payments and Research department: the team I joined for my graduation internship and where I developed this thesis.

To ensure a more objective perspective, the interviews excluded those who were actively involved in the project: Huib Klarenbeek, Anneloes van Gent, and Menno Broos.

The goal of these interviews was to assess the effectiveness of key aspects of the thesis. The discussion focused on three areas:

1. Emerging challenges and vision
2. Design analogy and interventions
3. Design project approach

Following a 20-minute presentation, interview questions were discussed. Key quotes from these interviews are highlighted on the right. For detailed slides and interview transcriptions, refer to Appendix H.

VISION
The vision was well received. Sophie specifically noted that framing digital financial inclusion as "responsibly including" places accountability on organizations rather than individuals. This is in line with how DNB manages the payment infrastructure currently.

INTERVENTIONS
While not yet ready for immediate implementation and adaptation, the illustrations and design presentations were seen as inspiring by all interviewees, achieving their intended purpose.

APPROACH
The research/design methodology was positively received. While the ViP methodology can be challenging to grasp, interviewees appreciated the context clusters, framework, and interaction analogy approach as valuable tools.

VISION: "Saying 'responsible' in the vision statement creates a sense of ownership of the problem, which is missing in the current payment infrastructure."

INTERVENTIONS "The first three interventions are relevant not only for the digital euro, but for payments in general. We should see what we can do with that when making new policy."

APPROACH "The framework with 12 situations and the dimensions are very interesting to me."

1. SOPHIE COHEN TER VAERT

Head Of Department Payments Policy at DNB

VISION "I understand the vision and see the relevance of the design analogy. It really makes the project come to life"

INTERVENTIONS "The interventions are an interesting mirror for us. It is nice that they don't completely shatter our ideas, but concretely support things that we value."

APPROACH "It is great to see how you started with a very wide domain, and translated it into 4 actionable directions for further developement here."

2. MARIE CLAIRE BROEKHOFF

Researcher and Policy Advisor at the Nederlandsche Bank, work includes writing the new *vision on payments* for DNB

VISION "I'm very enthusiastic about the vision, and the research about societal movements which support it."

INTERVENTIONS "'a healthy version of payments has created interesting interventions, but I would be apprehensive to market it like that."

APPROACH "The fact that this project doesn't identify groups of people, but rather situations and attitudes is very inspiring to me."

3. RIA ROERINK

Researcher and Policy Advisor at the Nederlandsche Bank, work includes writing the new vision on payments for DNB and the digital euro

6.3 REFLECTION ON RESPONSIBILITY IN PAYMENTS

As mentioned by Sophie Cohen ter Vaert in the previously outlined interviews, *"Saying 'responsible' in the vision statement creates a sense of ownership of the problem, which is missing in the current payment infrastructure."* This highlights a recurring theme in discussions throughout this thesis: What is DNB responsible for in this domain, and what should they be responsible for?

DNB's activities are driven by a strict mandate. They identify four key objectives they aim to achieve through their activities (De Nederlandsche Bank, n.d.-a):

1. Trustworthy financial institutions
2. Stable prices
3. Resolution for struggling financial institutions
4. A well-functioning payment infrastructure

Managing the payment infrastructure is only one of these tasks. One of DNB's key tasks is the support of the cash payment infrastructure. On the digital side DNB's efforts are primarily focused on the efficiency, reliability, and inclusivity of the payment infrastructure. While consumer protection from risky financial situations, such as those identified in this thesis, is studied, it is not prioritized (Maatschappelijk Overleg Betalingsverkeer, 2024).

With the rise of frictionless payments and their growing influence, people are increasingly questioning how this debate should be interpreted. Naudts and Eijlander discuss this topic in a recent paper (2024): *"Rapid digitisation has paved the way for a plethora of innovative payment methods, aimed at eliminating payment frictions. Frictionless payments are at a crossroads of public policy objectives, including innovation, customer convenience, sustainability, consumer protection, and financial inclusion."*

In their paper, Naudts and Eijlander (2024) explore the issue of user consent in payments, noting that consent is not always explicit. A single accidental tap or an unintended card connection can trigger a payment. From a public policy perspective, they argue, it is essential to preserve the element of choice and recognize that some innovative payment methods may come at the expense of users. The introduction of the digital euro is an example of this policy at play: Offering the choice for a product not driven by profit, prioritizing the needs and protection of the consumer.

Fortunately, DNB has already taken some action, as financial law has increasingly expanded the extent of banks' duty to act in the best interest of their consumers (Naudts & Eijlander, 2024). The interpretation of legal obligations has evolved to adopt a broader, more comprehensive view. At this crossroad in the development of payment systems, DNB and other policymakers must assess the extent to which consumer protection falls within their mandate, before the impact of these payment innovations reaches a critical point.

Figure 58 Responsible digital financial inclusion

6.4 PARTNERS FOR FURTHER DEVELOPMENT

As discussed previously, DNB's mandate for intervention in the Dutch payment infrastructure is limited. If it is DNB's desire to intervene upon payments more strongly as is outlined in the future visions A, B and C, presented in this thesis, they have 2 options:

1. Adjust DNB's mandate to fully include responsible digital financial inclusion.
2. Partner with parties who are responsible for the aspects outside the mandate of DNB.

Since this thesis presents a wider vision for the future of payments, we acknowledge that DNB is not the sole actor capable of addressing these challenges. In the table on the right, key stakeholders are identified, along with their respective responsibilities and potential opportunities for intervention.

As you can see on the right, challenges A and B start with the adaptation of private banks. In this thesis some of the challenges emerge as a result of the privatization of payments. Seeing as the way these products are currently designed by private organizations, it is not weird that addressing the problem at the source would be the most effective course of action. If private parties don't seem to solve these problems, DNB and other parties overseeing the payment infrastructure could and should intervene.

Challenge C addresses public trust in payment infrastructure as a whole. This challenge is more systemic in nature and, therefore, requires involvement from institutions that rely on widespread public trust. These institutions are not driven by profit but by public interest.

NAIVE	PRAGMATIC	CYNIC
VISION A: RESPONSIBLE DIGITAL FINANCIAL INCLUSION	**VISION B: EXPERIENCING IMPACT THROUGH PAYMENTS**	**VISION C: TRUSTWORTHY PAYMENT INFRASTRUCTURE**
PRIVATE BANKS AND PAYMENT PROVIDERS: Given the payment infrastructure doesn't dramatically change, access to digital payments goes through private banks. As the closest point of contact they should ensure responsibel digital financial inclusion.	**PRIVATE BANKS AND PAYMENT PROVIDERS:** Private banks can improve their financial services and offer value through this emerging need. For example through offering financial products that make "political consumerism" more convenient or financial tools improving the impact people experience over the course of their own lives.	**AUTHORITY FINANCIAL MARKETS (AFM)** AFM is already active in investigating and monitoring the activities of financial services that are generally untrustworthy (Autoriteit Financiële Markten, 2021). Investigating how payment providers who offer trustworthy means of payment can better communicate and support this would be a valuable venture.
AUTHORITY FINANCIAL MARKETS (AFM) In the Netherlands, they are partly responsible for consumer protection in the payment infrastrcure (AFM, 2020). They will intervene if problems arise from the products developed by the market through writing and enforcing law. If the private banks don't change their products, AFM should intervene and push them to change the way payment products are designed.		**MINISTRY OF FINANCE (MINFIN)** Especially larger organizations like MinFin would be served by high rates of trust, supporting not only their own organisation, but the broader government and institutions.
MAATSCHAPPELIJK OVERLEG BETALINGSVERKEER (MOB) MOB is a discussion platform between organizations in the payment infrastructure (MOB,2024). One of their tasks is to make agreements about a safe, reliable, efficient and inclusive payment infrastructure between stakeholders. As the connecting party they should push stakeholders to prioritize responsible digital financial inclusion.		**CONSUMENTENBOND** As an independent consumer advocacy group, Consumentenbond could be a key partner in investigating, designing, and communicating trustworthy payment solutions to Dutch society.

Figure 60 Overview potential partners for development of each vision on payments

6.5 ROADMAP OVERVIEW

So far, the evaluation has primarily focused on the development of Emerging Challenge A: Responsible Digital Financial Inclusion. The interventions designed in this thesis are centered around the Digital Euro, and their implementation roadmap can align with the horizons set by the European Central Bank's D€ process.

However, as this project considers digital payments more broadly, the further development of Challenges A, B, and C can also be positioned on a parallel roadmap, ensuring a more complete approach to shaping the future of payments for the Netherlands.

NOW: 2025

HORIZON 1: AGREEMENT D€

HORIZON 2: LIVE D€

VISION 2035

DESIGN DIGITAL EURO

INVESTIGATION PHASE - ±18 MONTHS

Until there is political consensus for D€, ECB remains in the investigative and preparative phase. At this time, political consensus it is expected around summer 2026 earliest. This gives DNB the opportunity to continue developing their vision around responsible digital financial inclusion.

IMPLEMENTATION PHASE

After a decision has been made that the digital will come, the European Central Bank will start building the product. This time period includes building the initial product as well as a series of pilots across (all) euro zone states.

IMPROVEMENT PHASE

After the digital euro is live in it's full form, ECB will continue testing and improving the product. By keeping sight on the vision developed in this thesis, the vision for 2035 can be achieved.

RESPONSIBLE DIGITAL FINANCIAL INCLUSION

- 1. TANGIBLE DIGITAL PAYMENTS
- 2. TRANSPARENT DIGITAL PAYMENTS
- 3. LEARNING DIGITAL PAYMENTS
- 4. TANGIBLE VALUE FOR PUBLIC PAYMENTS

A

D€

DESIGN DUTCH PAYMENTS

The challenges and vision statements developed in this thesis are relevant to digital payments as a whole, not just the Digital Euro. The framework and vision statements serve as starting points for rethinking and redesigning the Dutch payment infrastructure in a broader sense.
While the Digital Euro is not the focus of the design here, it is possible that the insights and interventions proposed here could influence its design and implementation in the future.

NO D€?
The digital euro is still pending political and ECB approval. Even if the project would not materialize these visions remain valuable for the payment infrastructure in general. The visions and emerging challenges are then especially relevant to address, as there is no digital form of public money.

RESPONSIBLE DIGITAL FINANCIAL INCLUSION

A

IMPACTFUL PAYMENTS

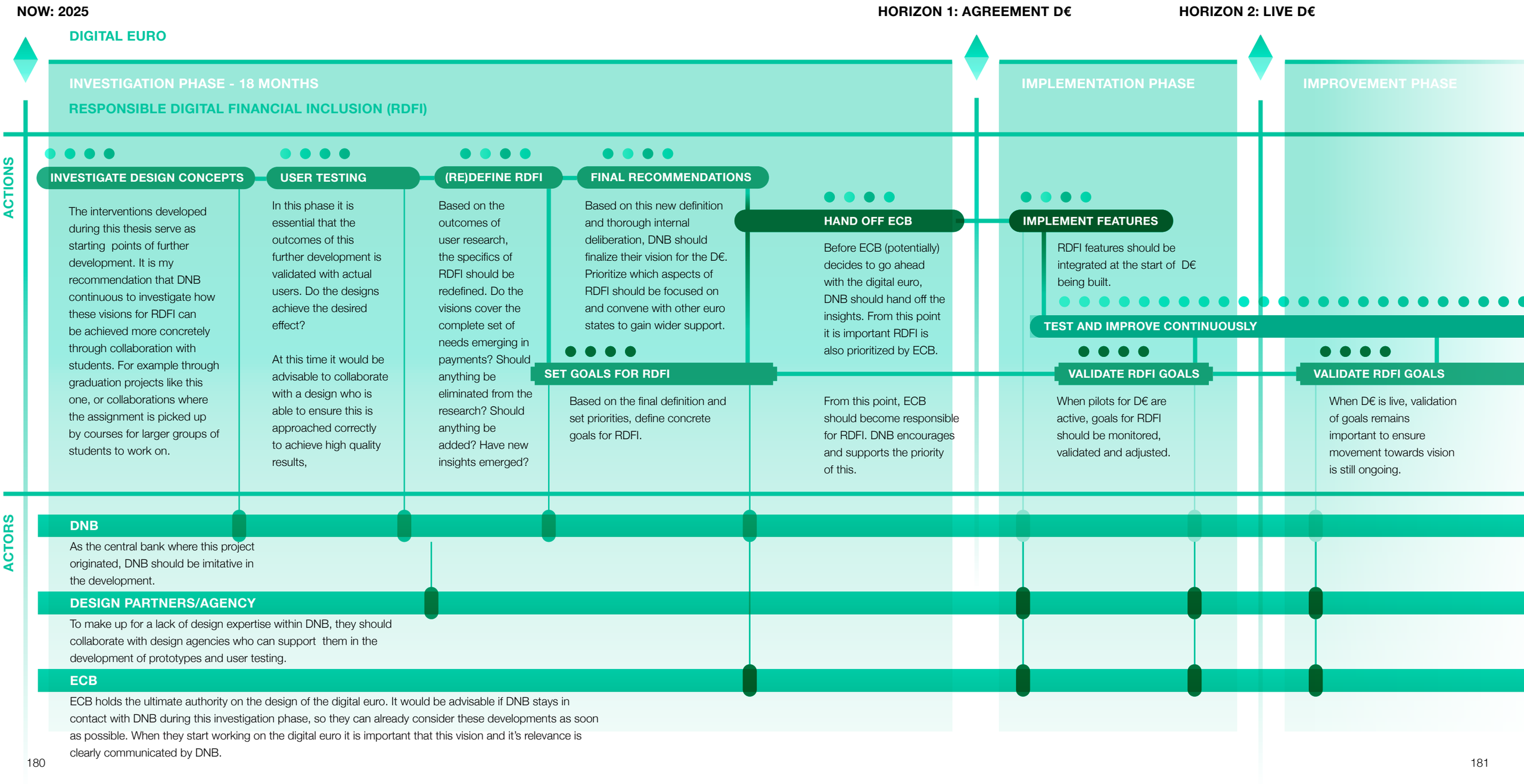
B

TRUST IN PAYMENTS

C

6.6 ROADMAP DIGITAL EURO

In order to address the development of challenge A (with focus on the digital euro) in more detail, this roadmap outlines the next steps in the development and relevant stakeholders/collaborators with this process.



6.7 DELIVER CONCLUSIONS

Insights from the interviews indicate interest in continuing this project. Both the vision and the designed interventions were seen as inspiring and valuable. They are relevant not just for the development of the digital euro, but for digital payments in the Netherlands in general.

The first step in the roadmap for the digital euro is to continue developing the concepts identified in this thesis. One way this could be done is through collaborations with students as was done with me with the writing of this thesis.

Thus a series of project briefs was developed which can be found in appendix I. Each project brief is based upon one of the four designed interventions to support DNB in continuing this work. These briefs incorporate feedback from interviews as well as personal reflections and questions that arose during the development of the interventions.

Each project brief follows the Tu Delft project brief format, which also served as a foundation for this thesis (see Appendix A).

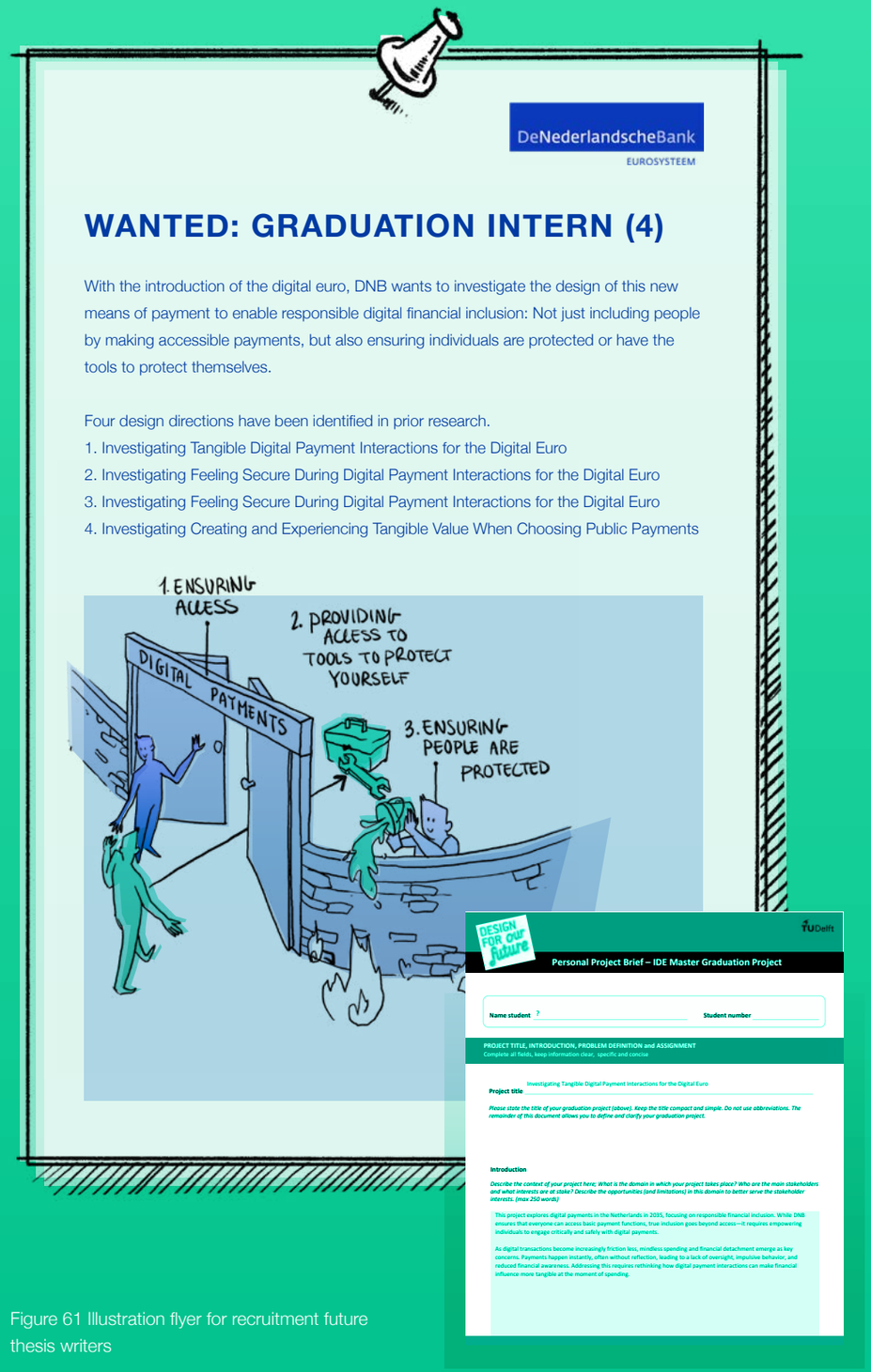
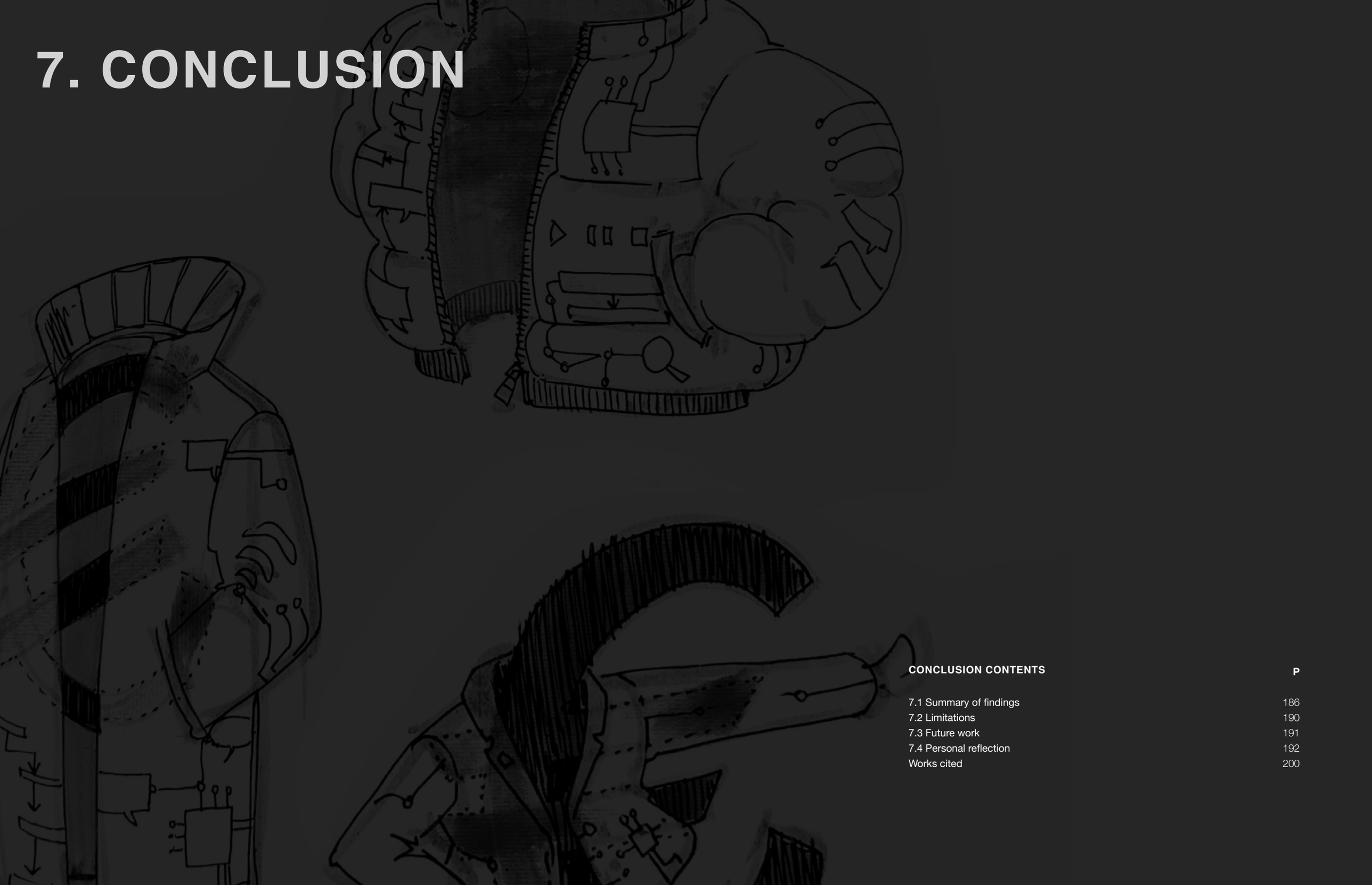


Figure 61 Illustration flyer for recruitment future thesis writers

7. CONCLUSION



CONCLUSION CONTENTS **P**

7.1 SUMMARY OF FINDINGS

RESEARCH AIM AND APPROACH

This thesis is structured around answering three consecutive research questions to guide the design direction of the Digital Euro, based on the changing relationship between society and payments.
To achieve this, the Vision in Design (ViP) methodology was applied, re-framing the concept of digital payments in the future and identifying strategic design directions that align with societal needs. The process involved:

Analyzing the current relationship between society and payments in the Netherlands.
Exploring how this relationship is likely to change by 2035 and Developing future visions.
Translating one of them into four concrete interventions, illustrating how DNB could intervene to create a desirable future payment landscape.

FINDINGS PER RESEARCH QUESTION

RQ1*: What are the main design challenges in the current relationship between society and payments?*
This question focuses on understanding the existing payment landscape, the rise of contactless and frictionless payments, and their impact on society. Based on the analysis, three challenges were identified:

1. **LIMITED ACCESSIBILITY DUE TO RELIANCE ON PRIVATE MONEY**

Private payment systems prioritize profit, leaving some groups under-served.

2. **FINANCIAL LITERACY STRUGGLES**

As payments go digital, many struggle to manage their finances (Maatschappelijk Overleg Betalingsverkeer, 2024).

3. **TRUST CONCERNS DUE TO DIGITALIZATION**

Invisible providers and data-driven transactions raise privacy and control concerns.

RQ2: *Which design challenges emerge as a result of the changing relationship between society and payments in the Netherlands by 2035?*
To investigate the future relationship, 14 context clusters were identified, representing key themes likely to impact the interaction with payments in 2035. By structuring these clusters along two dimensions*, Agency and Trust Attitude*, three emerging challenges were formulated based on 12 identified payment situations and consequently translated to 3 vision directions:

	EMERGING CHALLENGES	VISIONS
A.	**UNSAFE FINANCIAL BEHAVIOR** Naive trust leads people to overlook risks in payments.	**RESPONSIBLE DIGITAL FINANCIAL INCLUSION** Payments should empower individuals to make informed financial decisions, ensuring they understand risks and can navigate digital transactions safely.
B.	**FEELING STAGNANT AND INSIGNIFICANT** A pragmatic view of financial power leaves individuals feeling powerless.	**EXPERIENCING IMPACT THROUGH PAYMENTS** Payment systems should allow individuals to see and influence the broader effects of their financial choices, fostering a sense of agency and contribution to society.
C.	**LOW TRUST IN OTHERS AND INSTITUTIONS** Cynic trust attitudes erode at the foundations of institutions trying to maintain wide welfare and financial stability.	**TRUSTWORTHY PAYMENT INFRASTRUCTURE** A reliable, transparent, and publicly governed payment system should reinforce trust in financial institutions and ensure stability for all users.

7.1 SUMMARY OF FINDINGS

RQ3: *How can DNB intervene on the challenges emerging from this changing relationship through the design of the Digital Euro?*
To demonstrate how DNB can leverage this framework, visions, and identified payment situations, Challenge A (Responsible Digital Financial Inclusion) was selected and translated into four interventions centered around the design of the digital euro. By re-framing the Digital Euro as the “healthy version of digital payments,” four interventions were designed to promote responsible financial habits

1. TANGIBLE DIGITAL PAYMENTS – Making digital money feel real and impactful through a payment app which communicates the impact of payments during the payment interaction.

2. SECURE DIGITAL PAYMENTS – Ensuring a safe and controlled payment experience by providing a moment for reflection during the payment experience and securely communicating information though your own device.

Each intervention reflects some principles of healthy financial habits, emphasizing security, transparency, and financial education, thereby addressing needs emerging from the framework.

3. LEARNING DIGITAL PAYMENTS – Gradually building financial competence during childhood through a payment app specifically designed for children, to learn as they grow.

4. TANGIBLE VALUE FOR DIGITAL PUBLIC PAYMENTS – Strengthening the perceived value of public money through providing value for sympathetic merchants, and strengthening the digital euro identity as payments for the public.

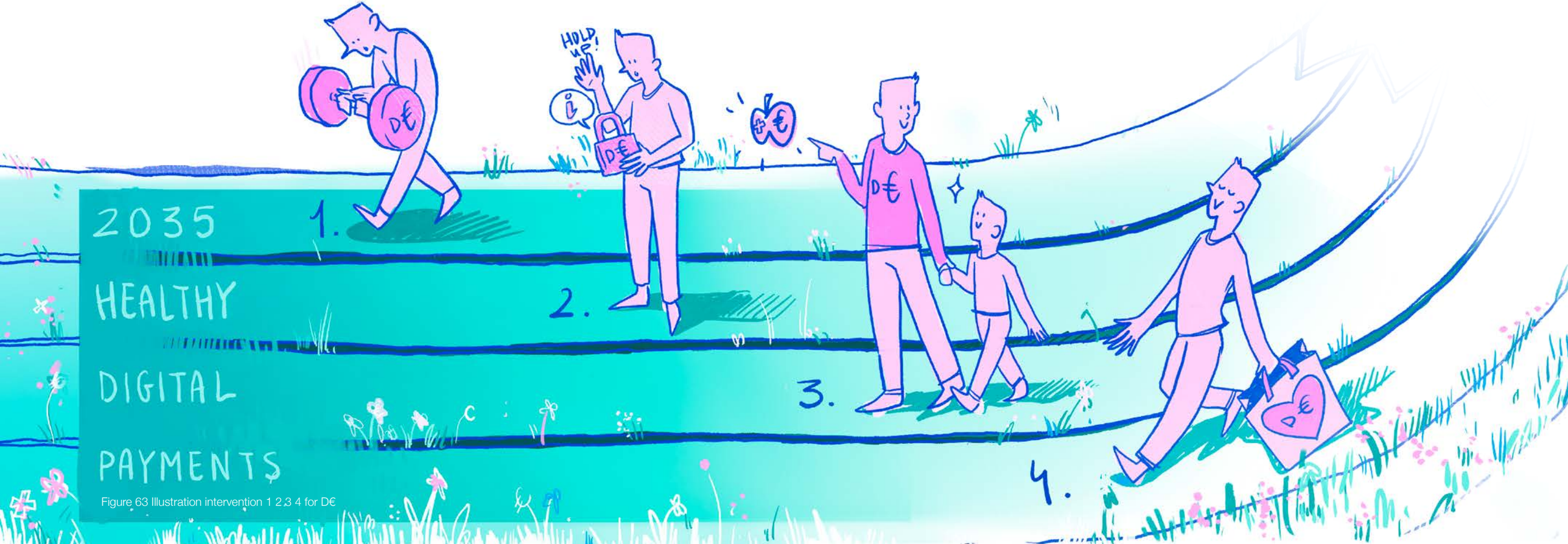


Figure 63 Illustration intervention 1 2 3 4 for D€

7.2 LIMITATIONS

EMPHASIS ON DESIGNER POSITION
A strength and a weakness is the Vision in Product (ViP) methodology inherent emphasis on the designer's perspective. While input from the Digital Euro team guided the direction, the conclusions drawn extend to payments on a much broader scale. Ideally, this balance could have been refined by involving a wider range of perspectives earlier in the process.

LIMITED USER TESTING & EVALUATION
This project did not actively involve regular users (people who pay) throughout the research or design phases. Instead, insights were gathered by attending events and engaging with stakeholders representatives and actors in the payment infrastructure. The final concepts—being highly futuristic and conceptual—were not tested with users. Future work should explore co-creation with end-users to validate and refine these ideas and to determine whether the desired effect can be achieved through these interventions.

CONCEPTUAL NATURE OF THE INTERVENTIONS
The interventions presented in this thesis serve as starting points rather than fully developed designs. While they illustrate a strategic direction, the next steps for implementation remain open-ended. Further development will require defining concrete steps for how these interventions can evolve into real-world applications.

SCOPING TO IN-STORE PAYMENTS
In the deconstruction of current payments it was decided to primarily focus on in-store payments. The designed interventions are also visualized and imaged in this context. Next to in-store payments, e-commerce and person to person payments are also interesting use cases to analyze and design for. It would be valuable to investigate how the designed interventions can be applied to this domain of payments as well.

7.3 FUTURE WORK

Given the vast scope of rethinking and redesigning the payment infrastructure—a system deeply embedded in daily life—many areas remain unexplored and offer valuable opportunities for further investigation

Following the roadmap outlined in this thesis, the most direct next steps include:

FURTHER DEVELOPMENT OF INTERVENTIONS 1–4 WITHIN THE CONTEXT OF THE DIGITAL EURO
These interventions serve as conceptual starting points, but refining them into actionable designs requires further research, prototyping, and user testing. Each of the chapters presenting the designed interventions outlines a series of recommendations for next steps in the design process.

RESEARCH INTO POLITICAL AND REGULATORY IMPLICATIONS
The digital euro represents a change in the payments landscape as the ECB tries to ensure to continued existence of central bank money in light of the diminishing use of cash. It would be valuable to investigate the broader consequences of DNB/ECB becoming active in the market of digital payments? Should the outcomes of this thesis, focusing on the interventions for the digital euro also be translated to law for private means of payment? Should private payment systems continue to exist if they do not serve the public interest? How does this intervention align with broader economic policies? Many questions remain unanswered when looking at the political implications of the vision for *responsible digital financial inclusion*.

EXAMINATION OF DNB'S MANDATE
Ensuring the availability of central bank money is within the mandate of DNB. Considering how the design visions reach not only the digital euro, but rather the total payments ecosystem, we need to re-examine DNB's mandate. Intervening on the private side of the payment infrastructure I may not traditionally fall within DNB's responsibilities. Should this mandate be expanded, or should certain responsibilities be transferred to other institutions in order to achieve the vision of *responsible digital financial inclusion*?

BROADER EXPLORATION OF VISIONS A, B, AND C
While this thesis focused on the digital euro, the challenges identified apply to the entire payment ecosystem. Investigating these visions in the context of digital payments in general could yield insights beyond the scope of DNB's role, requiring collaboration with banks, financial regulators, and consumer advocacy groups. Several decisions were made to narrow the scope of this thesis to fit within the available time. However, further research could provide a more comprehensive understanding of how payments should evolve in the future at a broader scale:

COMPARATIVE RESEARCH ACROSS THE EURO-ZONE
This study focused on the Netherlands, where digital payments are already highly developed. However, the relationship between society and payments is not uniform across Europe. Investigating whether similar challenges arise in other Euro-zone countries could provide valuable insights for designing inclusive payment solutions at a broader scale. This is especially relevant for the design of the digital euro, as it is intended as a pan-European product.

INVESTIGATING THE RELATIONSHIP WITH MONEY RATHER THAN PAYMENTS
This thesis concentrated on payments, but throughout the research process, it became evident that the broader relationship between society and money is also evolving. Payments are the means through which money flows, but they are not the same thing. Exploring how financial behaviors, perceptions of value, and economic participation are changing would be valuable. While DNB may not be the ideal partner for this research, institutions like NIBUD, which focuses on financial education and money management in the Netherlands, could be key stakeholders in this area.

7.4 PERSONAL REFLECTION

At the start of this project, my main goals were to get more comfortable with Vision in Product design (ViP) and explore how sketching could support each phase of the process. I chose payments and the digital euro as the topic of my graduation thesis because I believed its conceptual and abstract nature would be an interesting challenge in terms of visualization.

Now, looking back, three key learning points stand out:

1. THE ROLE OF VISUALIZATION IN VIP

Throughout this project, sketching and visualization played a key role, but its function changed depending on the phase:

DECONSTRUCT

Sketching user journeys and stakeholder maps helped me understand the complexities of payment systems. It also made it easier to validate my findings with DNB experts. The nature of these sketches was very rough. Drawing arrows between conceps and creating high volumes of illustrations to fuel discussion and exploration.

DISCOVER

I structured 14 context clusters based on the gathered context clusters. Using visual metaphors and sketches to define them more clearly. This helped me confidently communicate my findings during the midterm presentation. These clusters also represent new “meaning” generated by the combination of context factors. Leveraging metaphors in the visualisations helps communicate this value as it connects the cluster with a concept that already has meaning: something people recognise.

DEFINE

Synthesising thes clusters into a framework was one of the biggest challenges in this proejct. Writing out the 12 payment situations felt overwhelming and chaotic. Through illustrating each situation and connecting to visual metaphors, they started making sense individually and as a whole. The visualisations also inspired intersting conversations about my actual intended definitions and the way they were communicated.

FINAL THOUGHTS ON VIP & VISUALIZATION

ViP forces you to rethink concepts from the ground up, and visualization was invaluable throughout this process. Text helped define things precisely, but sketches communicated meaning faster and more intuitively. Looking back, my visualizations act as shortcuts to memory, bringing me straight back to the thinking behind each decision.
This project reinforced my belief in visual thinking not just for ideation, but as a tool for structuring complexity, engaging stakeholders, and shaping impactful design directions.

DEVELOP

Visualizing here was especially helpful in defining the (un)desirable interactions. Given this projects future oriented approach, these situations don’t yet exist, so through visualising they became more tangible and comprehensible.
Furthermore, the developed interventions are left at an conceptual stage due to the time limitations in this project. Sketching brought these abstract concepts to life and illustrates how they provide value to payments.

DELIVERING

Here, sketching was more about presentation than exploration. Well-executed visuals made the final results more engaging and convincing. Reactions from DNB were enthusiastic about the manifestation of these ideas and the way they were presented.

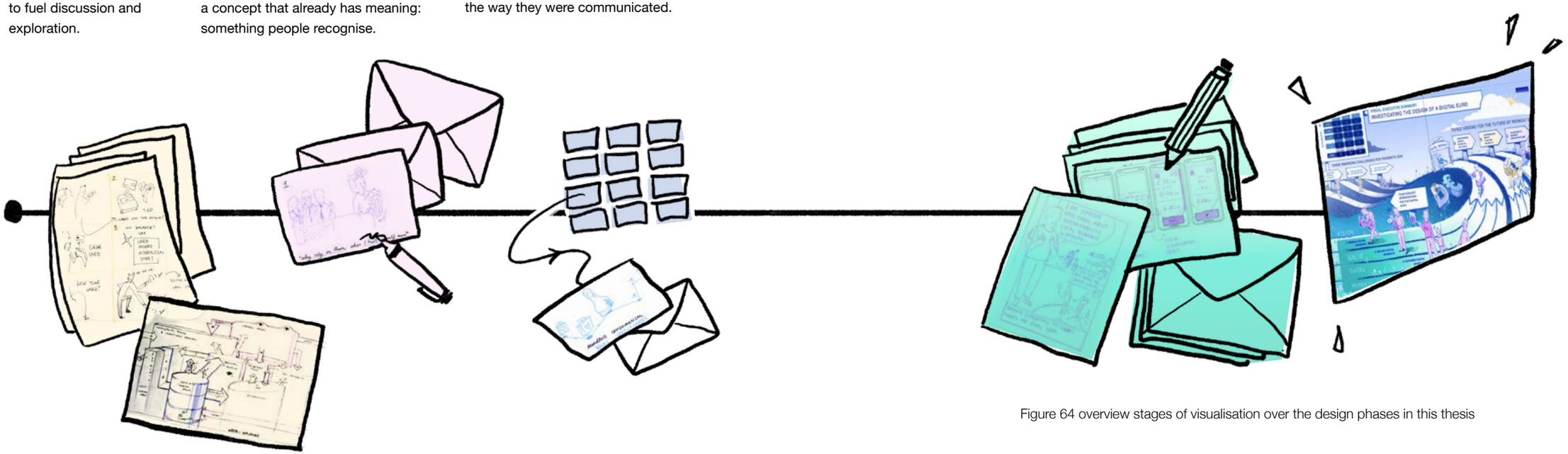
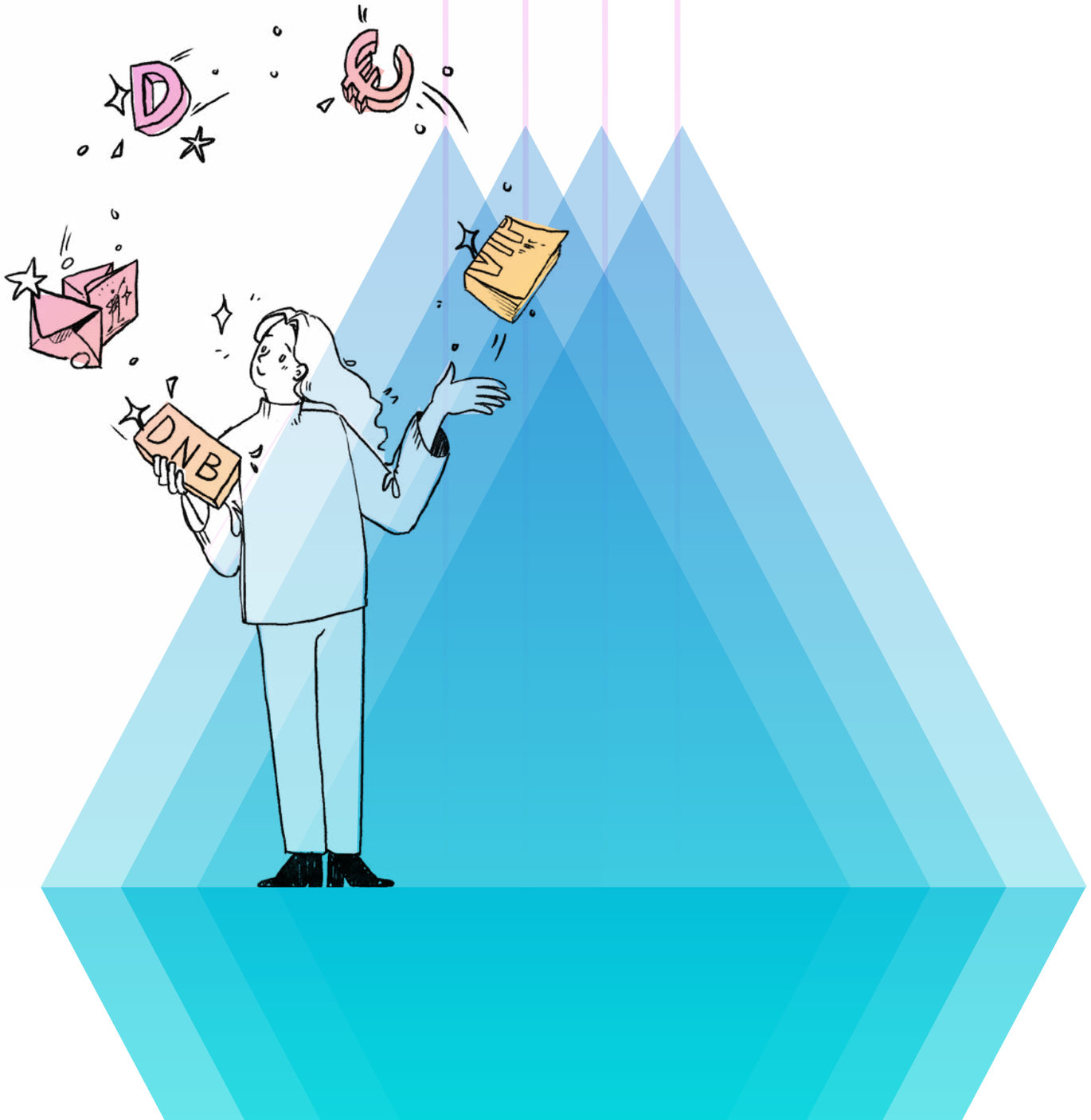


Figure 64 overview stages of visualisation over the design phases in this thesis

7.4 PERSONAL REFLECTION



2. MAKING THE ABSTRACT TANGIBLE
Digital payments, and money itself, are highly abstract concepts. It fascinates me how we, as a society, collectively believe in the existence and continuous functioning of something so intangible as money, which is nowadays reduced to a digital balance, unbacked by any tangible product with intrinsic value.

Throughout this project, I actively tried to make things more tangible. Research and design often stay digital, hidden away in neat Miro boards, but turning it into something physical to hold, improved my feeling of control over the project. I printed and cut out my context factors into cards, and the moment I could hold my work, it started to feel real: tangible.

I kept this approach throughout: sorting findings into envelopes, moving notes around, and sketching everything on paper before digitizing. While this did create challenges when translating my work into a formal report, it helped me keep control over the complexity of this project during the process.

7.4 PERSONAL REFLECTION

3. DEVELOPING A STRONG OPINION ON PAYMENTS AND MONEY

I chose this topic for my graduation theiss because it aligned well with ViP and visualisation rather than a personal passion for finance. As the project progressed, I became heavily invested in the topic. Payments are everywhere, shaping daily life in ways I hadn't realized before. Through conversations at DNB and with anyone willing to listen to me, I started forming a strong opinion on how people handle money and how payment infrastructures (should) work.

At some point, my focus even shifted too much toward money itself, rather than payments. I had to consciously redirect my work back to the scope of payment infrastructure. I believe developing strong perspectives as I immerse myself in a topic ultimately strengthening my personal values and directing me to focus on more meaningful design.

My strong position did not go unnoticed at DNB. One of my supervisors remarked, "Ze heeft een beetje dominee in zich" ("She has a bit of a reverend inside her"). In an institution like DNB, where political neutrality is important, personal values are often kept at arm's length. But if you ask me, policy advisors at DNB should be given more space to preach—to advocate for decisions based on their own values, rather than staying purely neutral as most of them seem to only want the best for the people they work for.

Now that we've reached the conclusion, I am pleased to present my results. While my opinions and worldview as a designer have certainly influenced the development of the visions and interventions, I hope to have also provided a clear and comprehensive overview of the evolving relationship between society and payments.

Thank you for reading.

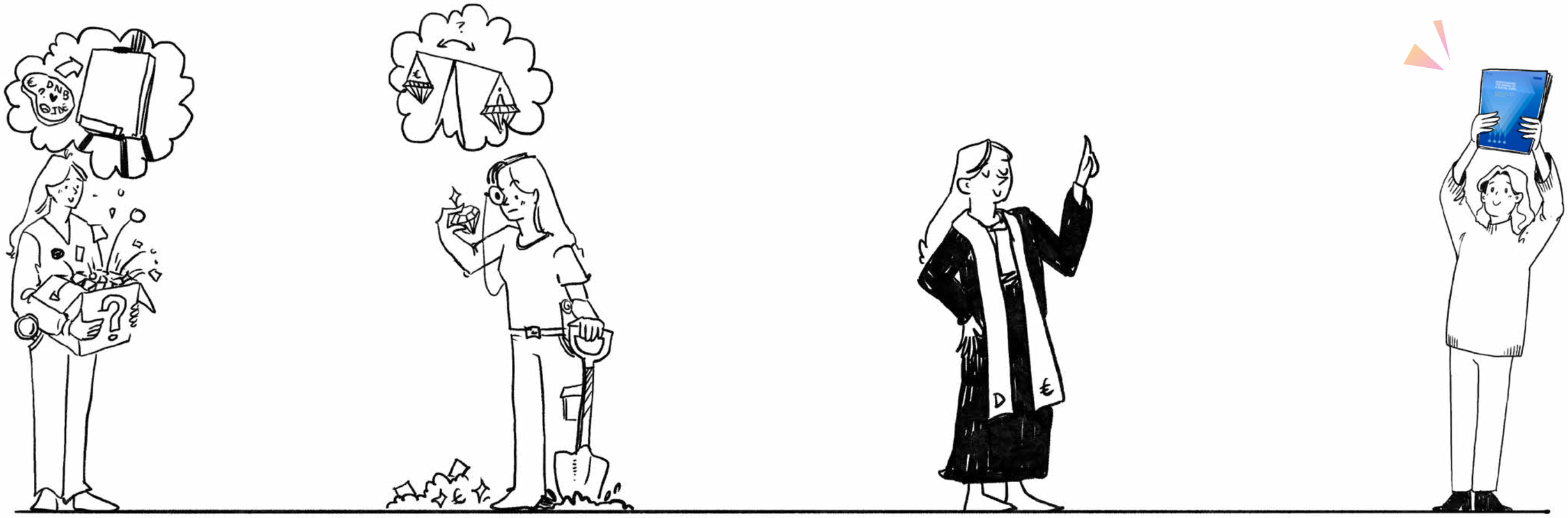


Figure 65 progression as my role as designer along the progression of this thesis.

WORKS CITED

A

Abbenes, A. (n.d.). Waarom praten over geld zo lastig is (maar wél heel belangrijk) : NN. Retrieved October 21, 2024, from https://www.nn.nl/Beter-met-geld/Praten-over-geld.htm

Abreu, E. S. &. M. (2013). Financial literacy, financial behavior and individuals' over-indebtedness. ideas.repec.org. https://ideas.repec.org/p/ise/isegwp/wp112013.html Acquisti,

A., Brandimarte, L., & Loewenstein, G. (2020). Secrets and likes: the drive for privacy and the difficulty of achieving it in the digital age. Journal of Consumer Psychology, 30(4), 736–758. https://doi.org/10.1002/jcpy.1191

Alarcon, G. M., Lyons, J. B., & Christensen, J. C. (2016). The effect of propensity to trust and familiarity on perceptions of trustworthiness over time. Personality and Individual Differences, 94, 309–315. https://doi.org/10.1016/j.paid.2016.01.031

Alessandro, M., Lagomarsino, B. C., Scartascini, C., Streb, J., & Torrealday, J. (2021). Transparency and Trust in Government. Evidence from a Survey Experiment. World Development, 138, 105223. https://doi.org/10.1016/j.worlddev.2020.105223

Antras, P. (2024, October 24). We gaan een prijs betalen voor deglobalisering, waarschuwt Harvard-econoom. FD.nl. Retrieved October 24, 2024, from https://fd.nl/economie/1535107/we-gaan-een-prijs-betalen-voor-deglobalisering-waarschuwt-harvard-econoom

Armstrong, M. (2024, June 5). Earth Overshoot Day is coming sooner and sooner. Statista Daily Data. https://www.statista.com/chart/15026/earth-overshoot-day-comes-sooner-every-year/

Atlantic Council. (2024, September 16). Central Bank Digital Currency Tracker - Atlantic Council. https://www.atlanticcouncil.org/cbdctracker/

Autoriteit Financiële Markten. (2021). The pitfalls of 'finfluencing.' In afm.nl. Retrieved September 23, 2024, from https://www.afm.nl/~/profmedia/files/publicaties/2021/pitfalls-of-finfluencing.pdf?sc_lang=en

B

Bail, C. A., Argyle, L. P., Brown, T. W., Bumpus, J. P., Chen, H., Hunzaker, M. B. F., Lee, J., Mann, M., Merhout, F., & Volfovsky, A. (2018). Exposure to opposing views on social media can increase political polarization. Proceedings of the National Academy of Sciences, 115(37), 9216–9221. https://doi.org/10.1073/pnas.1804840115

Betaalvereniging. (2024). Betalen aan de kassa 2023. In betaalvereniging.nl. BetaalVereniging. Retrieved January 15, 2025, from https://www.betaalvereniging.nl/wp-content/uploads/Factsheet_Betalen_aan_de_kassa_2023.pdf

Beugelsdijk, S., De Hart, J., Van Houwelingen, P., & Versantvoort, M. (2019). Denkend aan Nederland. Publieksmagazine. https://www.narcis.nl/publication/RecordID/oai%3Ascp.nl%3Acdcbb1ff-7a6f-4bd0-a825-f31776f590c4

Biology of Addiction. (2024, June 17). NIH News in Health. Retrieved October 3, 2024, from https://newsinhealth.nih.gov/2015/10/biology-addiction

Brännlund, A., & Szulkin, J. (2023). How does a growing wealth gap affect voting? – Evidence from Sweden. Electoral Studies, 85, 102647. https://doi.org/10.1016/j.electstud.2023.102647

Braren, S., PhD. (2023, July 26). The evolution of social connection as a basic human need — social creatures. Social Creatures. https://www.thesocialcreatures.org/thecreaturetimes/evolution-of-social-connection

Brunner, K., Jonas, M., & Littig, B. (2021). Capitalism, consumerism and democracy in contemporary societies. In Routledge eBooks (pp. 163–177). https://doi.org/10.4324/9780429024085-15

Business Research Insights. (2024, September 2). STOCK TRADING TRAINING MARKET REPORT OVERVIEW. businessresearchinsights.com. Retrieved September 23, 2024, from https://www.businessresearchinsights.com/market-reports/stock-trading-training-market-113299

C

Casad, B. J., & Luebering, J. (2024, September 13). Confirmation bias | Definition, Examples, Psychology, & Facts. Encyclopedia Britannica. Retrieved September 23, 2024, from https://www.britannica.com/science/confirmation-bias

CBS. (2022, June 29). Belastingen - Materiële welvaart in Nederland 2022. Belastingen - Materiële Welvaart in Nederland 2022 | CBS. https://longreads.cbs.nl/materiele-welvaart-in-nederland-2022/belastingen/ CBS. (2024, May 30). Households today. Cbs.nl. Retrieved October 21, 2024, from https://www.cbs.nl/en-gb/visualisations/dashboard-population/households/households-today

Center for Global Development. (2024, April 23). The perils of a declining labor force [Video]. cgdev.org. Retrieved September 20, 2024, from https://www.cgdev.org/blog/perils-declining-labor-force

Centraal Bureau voor de Statistiek. (2023, December 6). Loonverschil tussen mannen en vrouwen in 2022 iets afgenomen.

Centraal Bureau Voor De Statistiek. https://www.cbs.nl/nl-nl/nieuws/2023/49/loonverschil-tussen-mannen-en-vrouwen-in-2022-iets-afgenomen

Charlton, B. G. (1997). The inequity of inequality. Journal of Health Psychology, 2(3), 413–425. https://doi.org/10.1177/135910539700200309 Cherry, K. C. (2023, November 13). What is the negativity bias? Verywell Mind. https://www.verywellmind.com/negative-bias-4589618

Conneely, A. (2024, May 28). Young teens have fewer friends than a decade ago - ESRI. RTE.ie. https://www.rte.ie/news/2024/0528/1451631-children-esri/

Corning, P. (2015, May 21). The Fairness Instinct and the Social Contract | Institute for the Study of Complex Systems. https://complexsystems.org/publications/the-fairness-instinct-and-the-social-contract/

Cuperus, R. (2024, October 24). 'Het politieke midden is weg, kapot.' FD.nl. Retrieved October 24, 2024, from https://fd.nl/samenleving/1534735/rene-cuperus-het-politieke-midden-is-weg-kapot

Currie, S. R., Hodgins, D. C., Williams, R. J., & Fiest, K. (2021). Predicting future harm from gambling over a five-year period in a general population sample: a survival analysis. BMC Psychiatry, 21(1). https://doi.org/10.1186/s12888-020-03016-x

D

De Beckker, K. (2022, August 10). Maak van financiële educatie een structureel onderdeel in het curriculum. FD.nl. Retrieved December 11, 2024, from https://fd.nl/opinie/1447846/maak-financiele-educatie-vast-onderdeel-van-het-onderwijscurriculum

De Leeuw, D., & Muselaers, N. (2022, December 8). Politieke fragmentatie neemt verder toe. ESB. Retrieved October 10, 2024, from https://esb.nu/politieke-fragmentatie-neemt-verder-toe/

De Nederlandsche Bank. (n.d.-a). Missie en taken. dnb.nl. Retrieved January 8, 2025, from https://www.dnb.nl/over-ons/missie-en-taken/

De Nederlandsche Bank. (n.d.-b). Waarom komt er misschien een digitale Euro? DNB.nl.

De Nederlandsche Bank. (2019). DNB 2025 Visie en Strategie DNB. In dnb.nl. Retrieved October 30, 2024, from https://www.dnb.nl/media/nemf3ldp/web_132725_ia_dnb2025.pdf

De Nederlandsche Bank. (2022a). Visie op betalen 2022-2025. In dnb.nl. Retrieved October 31, 2024, from https://www.dnb.nl/media/srbpoxwg/dnb-visie-op-betalen-2022-2025.pdf

De Nederlandsche Bank. (2022b, November 17). Vertrouwen in DNB is gebaat bij meer kennis over de taken en verantwoordelijkheden van DNB. dnb.nl. Retrieved September 20, 2024, from https://www.dnb.nl/algemeen-nieuws/nieuws-2022/vertrouwen-in-dnb-is-gebaat-bij-meer-kennis-over-de-taken-en-verantwoordelijkheden-van-dnb/

De Nederlandsche Bank. (2023a). Digitalisering van het betalings verkeer: een uitkomst voor de één, een uitdaging voor de ander. In dnb.nl. Retrieved November 11, 2024, from https://www.dnb.nl/media/twyi3pla/impact-digitalisering_nl_web.pdf

De Nederlandsche Bank. (2023b, February 19). Lager vertrouwen in centrale bank en overheid door hoge inflatie. dnb.nl. Retrieved September 20, 2024, from https://www.dnb.nl/algemeen-nieuws/nieuws-2023/lager-vertrouwen-in-centrale-bank-en-overheid-door-hoge-inflatie/

De Nederlandsche Bank. (2024a). DNB Strategie 2025-2028. In dnb.nl. https://www.dnb.nl/media/nemf3ldp/dnb-strategie-2025-2028.pdf

De Nederlandsche Bank. (2024b, July 29). Spending money hurts, but less if you're a teenager paying cash. dnb.nl. Retrieved September 23, 2024, from https://www.dnb.nl/en/general-news/news-2024/spending-money-hurts-but-less-if-you-re-a-teenager-paying-cash/

De Nederlandsche Bank. (2024c, September 5). Buitenlandse banktegoeden Nederlandse huishoudens in twee jaar tijd verdubbeld. dnb.nl. Retrieved September 12, 2024, from https://www.dnb.nl/algemeen-nieuws/statistiek/2024/buitenlandse-banktegoeden-nederlandse-huishoudens-in-twee-jaar-tijd-verdubbeld/

De Vries, T., & Verhage, S. (2024, December 10). Financiële geletterdheid maakt jongeren weerbaarder in de moderne wereld. FD.nl. Retrieved December 11, 2024, from https://fd.nl/opinie/1539511/financiele-geletterdheid-maakt-jongeren-weerbaarder

Deleanu, I., Van Esch, F., & Galema, R. (2019). De culturele dimensie van cryptovalutahandel. TPEdigitaal, 13(2), 79–96. https://dspace.library.uu.nl/handle/1874/388785

Design Council. (2005). The Double Diamond - Design Council. Retrieved January 8, 2025, from https://www.designcouncil.org.uk/our-resources/the-double-diamond/?utm_source=chatgpt.com

Doelman, E. (2024, June 20). Minderjarigen kunnen straks niet meer met Klarna betalen: "Zij zien deze apps niet als aangaan van een schuld" - Zorg+Welzijn. https://www.zorgwelzijn.nl/minderjarigen-kunnen-straks-niet-meer-met-klarna-betalen-zij-zien-deze-apps-niet-als-aangaan-van-een-schuld/

Donald, D. (2024, September 11). How the FT thinks about making payments as frictionless as possible | FT Strategies - Media consultancy from the Financial Times. ftstrategies.com. Retrieved January 16, 2025, from https://www.ftstrategies.com/en-gb/insights/how-the-ft-thinks-about-making-payments-as-frictionless-as-possible-for-its-consumers

E

ESB. (2023, July 16). Kinderen overtreffen hun ouders minder vaak in inkomen. Retrieved September 19, 2024, from https://esb.nu/kinderen-overtreffen-hun-ouders-minder-vaak-in-inkomen/

ESPAS - Global Trends to 2030. (n.d.). Retrieved October 21, 2024, from https://ec.europa.eu/assets/epsc/pages/espas/chapter2.html#sec7 ESPAS - Global Trends to 2030. (2019, April). Retrieved September 18, 2024, from https://ec.europa.eu/assets/epsc/pages/espas/chapter1.html

European Central Bank. (2023, November 7). Digital Euro Glossary. ecb.europa.eu. Retrieved January 19, 2025, from https://www.ecb.europa.eu/euro/digital_euro/timeline/profuse/shared/pdf/ecb.dedocs220420.en.pdf

European Central Bank. (2024, August 23). FAQs on a digital euro. Retrieved November 25, 2024, from https://www.ecb.europa.eu/euro/digital_euro/faqs/html/ecb.faq_digital_euro.en.html

European Commission. (2023a). European Financial Stability and Integration Review 2023. In finance.ec.europa.eu. Retrieved September 23, 2024, from https://finance.ec.europa.eu/system/files/2023-06/european-financial-stability-and-integration-review-2023_en_0.pdf

European Commission. (2023b, October). Demographic change in Europe. Europe.eu. Retrieved September 20, 2024, from https://europa.eu/eurobarometer/surveys/detail/3112

Eurostat. (2022, August 24). Consumption of on-line news rises in popularity. Eurostat. https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220824-1

F

Fact.Mr. (2024, May 16). Cryptocurrency Market Size and Share | Industry - 2034. Retrieved October 21, 2024, from https://www.factmr.com/report/cryptocurrency-market

FD. (2024, September 27). In de wereld van AI zijn we nergens zonder Europa. FD.nl. Retrieved October 1, 2024, from https://fd.nl/opinie/1531772/in-de-wereld-van-ai-ben-je-nergens-zonder-europa

Fellinger, S. (2023, December 29). Mag je een betaalverzoek sturen voor 50 cent? Alle etiquette op een rij. RTL Nieuws & Entertainment. https://www.rtl.nl/nieuws/editienl/artikel/5426622/tikkie-etiquette-66-miljard-euro-verstuurd-abn-amro-betaalverzoek

Follow the Money - Platform voor onderzoeksjournalistiek. (2023, April 14). De ontrafeling van ons geldstelsel. Follow the Money - Platform Voor Onderzoeksjournalistiek. https://www.ftm.nl/waterwerk

Frattari, M. (2024, April 30). Is the dumb phone making a comeback? Exploring the rise of smartphone fatigue. visermark.com. Retrieved October 2, 2024, from https://www.visermark.com/post/is-the-dumb-phone-making-a-comeback

G

Geers, S. (2020). News Consumption across Media Platforms and Content. Public Opinion Quarterly, 84(S1), 332–354. https://doi.org/10.1093/poq/nfaa010

Giesler, M. (2022, May 27). Payment frequency impacts consumer spending. Journal of Consumer Research. https://consumerresearcher.com/pay-frequency

Global Footprint Network. (2022). Open data platform. footprintnetwork.org. Retrieved September 23, 2024, from https://data.footprintnetwork.org/#/countryTrends?cn=2002&type=earth

Global Market Insights Inc. (2023). Stock trading and Investing applications Market size - by platform type, operating system, end user, Growth potential, Reginal Analysis & Global Forecast, 2023 - 2032. Retrieved September 23, 2024, from https://www.gminsights.com/industry-analysis/stock-trading-and-investing-applications-market

Gold, A. (2024). The psychology of secrets: My Adventures with Murderers, Cults and Influencers. Pan Macmillan. Grant, P. (1983). Literature of mysticism in Western tradition. Springer.

H

Harari, Y. N. (2014). Sapiens: A Brief History of Humankind: The multi-million copy bestseller. Random House.

Hartley, J. (2023, July 24). 12 Psychological Principles that Might Surprise (or SHOCK) You! Achology. https://achology.com/psychology/12-psychological-principles/

Hayes, A. (2024, July 6). What is riba in Islam, and why is it forbidden? Investopedia. Retrieved September 26, 2024, from https://www.investopedia.com/terms/r/riba.asp

Hekkert, P., & Van Dijk, M. D. (2011). VIP Vision

in design: A Guidebook for Innovators. BIS Publishers.

Hornsey, M. J., & Pearson, S. (2024). Perceptions of climate change threat across 121 nations: The role of individual and national wealth. Journal of Environmental Psychology, 96, 102338. https://doi.org/10.1016/j.jenvp.2024.102338

I

International Monetary Fund. (2024, July 16). World Economic outlook Update, July 2024: The global economy in a sticky spot. IMF. Retrieved October 21, 2024, from https://www.imf.org/en/Publications/WEO/Issues/2024/07/16/world-economic-outlook-update-july-2024?cid=ca-com-compd-pubs_rotator

Ipsos. (2021, December 10). Het I&O Waardenmodel: welke waarden drijven burgers? Ipsos I&O Publiek. Retrieved January 29, 2025, from https://www.ipsos-publiek.nl/actueel/2520-2/?utm_source=chatgpt.com

J

Jiang, T. (2021, April 22). Are we innately selfish? What the science has to say - the decision lab. The Decision Lab. Retrieved October 4, 2024, from https://thedecisionlab.com/insights/society/are-we-innately-selfish-what-the-science-has-to-say

K

Kalim, F. (2021, March 5). The Subscription Economy has grown over 435% in 9 years (and the uptick is expected to continue). Media Makers Meet | What's New in Media. https://mediamakersmeet.com/the-subscription-economy-has-grown-over-435-in-9-years-and-the-uptick-is-expected-to-continue/

Kaul, I. (2003). Providing global public goods: Managing globalization. http://ci.nii.ac.jp/ncid/BA61739333

Kemme, D. M., Parikh, B., & Steigner, T. (2019). Tax morale and international tax evasion. Journal of World Business, 55(3), 101052. https://doi.org/10.1016/j.jwb.2019.101052

Kim, W. (2020, August 3). Boycotts are more popular than ever — but do they work? Refinery29. https://www.refinery29.com/en-us/2020/08/9935797/do-boycotts-really-work-cause-change

Kırcaburun, K., & Griffiths, M. D. (2018). Problematic Instagram use: the role of perceived feeling of presence and escapism. International Journal of Mental Health and Addiction, 17(4), 909–921. https://doi.org/10.1007/s11469-018-9895-7

Krank. (2019, April 2). Rosy Retrospection: a Psychological phenomenon. Southeastern University On-line. Retrieved October 3, 2024, from https://web.archive.org/web/20200221133533/https://on-line.seu.edu/articles/rosy-retrospection-a-look-at-the-psychological-phenomenon/

L

Lafont, E. (2022, February 24). Dunbar's number: Why we can only maintain 150 relationships. Retrieved October 1, 2024, from https://www.bbc.com/future/article/20191001-dunbars-number-why-we-can-only-maintain-150-relationships

M

Menga, M. (2024, January 17). The cost of climate change on households in the European Union - CMCC. CMCC. https://www.cmcc.it/article/the-cost-of-climate-change-on-households-in-the-european-union

Mercier, E., Latrille, P., Quétier-Parent, S., & Quemada Thibaud, A. Q. (2023). Barometric Study on poverty and Economic Precariousness. In ipsos.com. Ipsos. Retrieved September 20, 2024, from https://www.ipsos.com/en/29-europeans-say-they-are-currently-precarious-financial-situation

Meyer, J. (2016, June 28). The ignorant voter. Forbes. https://www.forbes.com/sites/jaredmeyer/2016/06/27/american-voters-are-ignorant-but-not-stupid/

Michael, A. (2024, February 7). Cryptocurrency Statistics 2024. Forbes Advisor Australia. https://www.forbes.com/advisor/au/investing/cryptocurrency/cryptocurrency-statistics/

Minch, D. (2018). What Kind of God is Money Anyway? An Investigation into the Theological Structures of Capitalism and Gnosticism. Interdisciplinary Journal for Religion and Transformation in Contemporary Society, 4(2), 62–83. https://doi.org/10.14220/23642807-00402005

Ministerie van Volksgezondheid, Welzijn en Sport. (2022, June 27). SCP: Hoge verwachtingen van overheid in overgangsfase coronacrisis; daling politiek vertrouwen. Nieuwsbericht | Sociaal En Cultureel Planbureau. https://www.scp.nl/actueel/nieuws/2021/06/30/scp-hoge-verwachtingen-van-overheid-in-overgangsfase-coronacrisis-daling-politiek-vertrouwen

Money - Christianity. (n.d.). Christianity. Retrieved September 26, 2024, from https://www.christianity.org.uk/article/money

Monticelli, L., & Della Porta, D. (2018). The Successes of Political Consumerism as a Social Movement. The Oxford Handbook of Political Consumerism, 772–792. https://doi.org/10.1093/oxfordhb/9780190629038.013.33

Motivaction. (2024, August 28). Zó zouden Nederlanders het geld verdelen als minister van Financiën. Retrieved January 29, 2025, from https://www.motivaction.nl/actualiteiten/nieuwsberichten/zo-zouden-nederlanders-het-geld-verdelen-als-minister-van-financien

Mützel, S. (2021). Unlocking the payment experience: Future imaginaries in the case of digital payments. New Media & Society, 23(2), 284–301. https://doi.org/10.1177/1461444820929317

N

Nagel, J. (2024a, April 24). Central bank money in the 21st century. bundesbank.de. Retrieved January 19, 2025, from https://www.bundesbank.de/en/press/speeches/central-bank-money-in-the-21st-century--930948

Nederlandse Organisatie voor Wetenschappelijk Onderzoek. [NWO]. (2024, July 5). Vooraankondiging: onderzoek nodig naar de rol en dynamiek van waarden in transities | NWO. NWO. Retrieved January 29, 2025, from https://www.nwo.nl/nieuws/vooraankondiging-onderzoek-nodig-naar-de-rol-en-dynamiek-van-waarden-in-transities

Negri, F., Nicoli, F., & Kuhn, T. (2020). Common currency, common identity? The impact of the Euro introduction on European identity. European Union Politics, 22(1), 114–132. https://doi.org/10.1177/1465116520970286

Nibud. (2022, September 15). Rapport Financiële administratie in een digitaal tijdperk (2018) - Nibud. Retrieved October 21, 2024, from https://www.nibud.nl/onderzoeksrapporten/financiele-administratie-in-een-digitaal-tijdperk/

NOS. (2024, October 22). Pinnen op de pof? Tweede Kamer wil verbod. https://nos.nl/nieuwsuur/artikel/2541768-pinnen-op-de-pof-tweede-kamer-wil-verbod

O

Oostveen, M. (2024, September 22). Hoger opgeleiden lijken in hun opvattingen meer op elkaar dan mensen die lager zijn opgeleid. Volkskrant.nl. https://www.volkskrant.nl/wetenschap/hoger-opgeleiden-lijken-in-hun-opvattingen-meer-op-elkaar-dan-mensen-die-lager-zijn-opgeleid~be310945/

P

Earth Overshoot Day. (2024, July 5). Earth Overshoot Day. Retrieved September 20, 2024, from https://overshoot.footprintnetwork.org/newsroom/past-earth-overshoot-days/

Piff, P., & Robinson, A. (2024, September 10). Wealth can make us selfish and stingy. Two psychologists explain why. World Economic Forum. Retrieved October 10, 2024, from https://www.weforum.org/agenda/2016/10/wealth-can-make-us-selfish-and-stingy-two-psychologists-explain-why/

Pleij, H. (2019, February 15). Herman Pleij: Onze volksaard werkt voor en tegen het IBP. Artikel | Overheid Van Nu. Retrieved October 14, 2024, from https://www.overheidvannu.nl/actueel/artikelen/2019/02/15/herman-pleij-onze-volksaard-werkt-voor-en-tegen-het-ibp

Pomeroy, R. (2023, June 30). Teen friendship has suffered a seismic shift over the past 20 years — with depressing results. Big Think. https://bigthink.com/neuropsych/teen-friendship-decline-depression/

Pradeepa, S. (2023, July 3). What makes someone naive: 11 things that make you naivete. Believe in Mind. Retrieved November 27, 2024, from https://www.believeinmind.com/mindset/what-makes-someone-naive/

Precedence Research. (2023, January 20). Virtual Private Network (VPN) market Size, Report 2032. Retrieved September 23, 2024, from https://www.precedenceresearch.com/virtual-private-network-market

Priyanshu, A. (2024, April 4). What psychological effects do privacy violations have on individuals? | Privacy Engineering Program - Carnegie Mellon University. Retrieved October 1, 2024, from https://privacy-engineering-cmu.github.io/2024-04-04-Question-2-What-psychological-effects-do-privacy-violations-have-on-individuals/

ProDemos. (2023, November 23). Recordaantal gebruikers voor StemWijzer: 9,1 miljoen - ProDemos. Retrieved October 14, 2024, from https://prodemos.nl/nieuws/recordaantal-gebruikers-voor-stemwijzer-91-miljoen/

Prompt, S. (2023, September 19). The Psychology behind storytelling: Why we're wired for narratives. Medium. https://medium.com/@Steve_Prompt/the-psychology-behind-storytelling-why-were-wired-for-narratives-a78814d2e9cc

Putsch, R. W., III, & Joyce, M. (1990). Dealing with Patients from Other Cultures. Clinical Methods - NCBI Bookshelf. Retrieved October 14, 2024, from https://www.ncbi.nlm.nih.gov/books/NBK340/

R

Rathenau Instituut. (2024, August 29). Public trust in science | Rathenau Instituut. Retrieved October 10, 2024, from https://www.rathenau.nl/en/science-figures/impact/trust-science/public-trust-science

Research and Markets Ltd. (2024, August). Netherlands Buy Now Pay Later Business and Investment Opportunities Databook - 75+ KPIs on BNPL Market Size, End-Use Sectors, Market Share, Product Analysis, Business Model, Demographics - Q2 2024 Update. Research and Markets 2024. https://www.researchandmarkets.com/reports/5305021

Research Nester. (2024, June 13). Real-time Payments Market Size & Share, Growth Trends 2036. researchnester.com. Retrieved September 23, 2024, from https://www.researchnester.com/reports/real-time-payments-market/5157

Richards, V. (2019, March 29). What is snowplough parenting –And should you be concerned about it? HuffPost UK. https://www.huffingtonpost.co.uk/entry/what-is-snow-plough-parenting-and-should-i-be-concerned-about-it_uk_5c9cb114e4b072a7f605aebd?guccounter=1

Rijksdienst voor Ondernemend Nederland (RVO). (n.d.). Verbod contante betalingen boven € 3.000. ondernemersplein.kvk.nl. Retrieved December 5, 2024, from https://ondernemersplein.kvk.nl/verbod-op-contante-betalingen-boven-3000-euro/

Rivetz, J. (2014, June). I found it on the internet. . .: The WebMD phenomenon & the Patient-Provider Relationship. Union | Digital Works. Retrieved October 14, 2024, from https://digitalworks.union.edu/theses/592/

Roser, M. (2024a, March 18). How much economic growth is necessary to reduce aourworldindata.org/poverty-minimum-growth-needed

Roser, M. (2024b, March 18). What is economic growth? And why is it so important? Our World in Data. Retrieved September 20, 2024, from https://ourworldindata.org/what-is-economic-growth

S

Savage, M. (2018, April 7). Richest 1% on target to own two-thirds of all wealth by 2030. The Guardian. https://www.theguardian.com/business/2018/apr/07/global-inequality-tipping-point-2030

Schirm, S. A. (2022). Globalisation, divided societies and Nation-Centred economic policies in America and Britain. European Review of International Studies, 9(2), 240–269. https://doi.org/10.1163/21967415-09020008

Schmidt, N., Ruch, T. J., Decker, J., & Kolbe, L. M. (2012). Ecosia.org: The business case of a green search engine. In Springer eBooks (pp. 217–232). https://doi.org/10.1007/978-3-642-27488-6_13

Schraten, J. (2019). The economic sociology of digitalised payment services. Przegląd Socjologiczny, 68(2), 107–131. https://doi.org/10.26485/ps/2019/68.2/5

Semen, P. (2010). The Bible on Faith. Questa Soft. https://www.ceeol.com/search/article-detail?id=218692

Sociaal en Cultureel Planbureau. (2018). Publiek voorzien. SCP.nl. Retrieved January 30, 2025, from https://digitaal.scp.nl/publiekvoorzien/samenvatting/

Spraakmakers, KRO NCRV. (2023, August 16). Berichtgeving autonomen: "Ook een kleine groep kan veel schade aanrichten." NPO Radio 1. https://www.nporadio1.nl/nieuws/cultuur-media/ff941585-4991-4faa-8df8-53b945a6c59d/berichtgeving-autonomen-ook-een-kleine-groep-kan-veel-schade-aanrichten

Springford, J. (2024, March 9). Europe must choose: Multiculturalism or stagnation? Centre for European Reform. Retrieved October 1, 2024, from https://www.cer.eu/insights/europe-must-choose-multiculturalism-or-stagnation

Stake, J. E. (2006). The property 'instinct.' In Oxford University Press eBooks (pp. 185–204). https://doi.org/10.1093/oso/9780198570103.003.0010

Stellinga, B., De Hoog, J., Van Riel, A., & De Vries, C. (2021). Money and Debt: The public role of Banks. Springer Nature. Stringer, C. (2016). The origin and evolution ofHomo sapiens. Philosophical Transactions of the Royal Society B Biological Sciences, 371(1698), 20150237. https://doi.org/10.1098/rstb.2015.0237

T

Teachings of the Buddha. (n.d.). Buddhism and money. Retrieved September 26, 2024, from https://teachingsofthebuddha.com/Buddhism-and-Money

Tweede Kamer. (2024, September 24). Wijziging van de Wet ter voorkoming van witwassen en financieren van terrorisme in verband met het verbod op contante betalingen voor goederen vanaf 3.000 euro (Wet plan van aanpak witwassen). Tweede Kamer Der Staten-Generaal. https://www.tweedekamer.nl/kamerstukken/wetsvoorstellen/detail?cfg=wetsvoorstelde-tails&qry=wetsvoorstel%3A36228

V

Van De Keuken, T. (2018). De supermarktsurvivalgids: Hoe overleef je de tocht langs de schappen. J.M. Meulenhoff.

Van De Keuken, T. (2024). De mens is een plofkip: Hoe de voedingsindustrie ons ziek maakt. Thomas Rap.

Van Den Akker, M. (2020, May 29). How the Dutch Handle Money. Money on the Mind. https://www.moneyonthemind.org/post/how-the-dutch-handle-money

Van der Cruijsen, C., De Haan, J., & Roerink, R. (2020). Trust in Financial Institutions: a survey. In dnb.nl. Retrieved January 16, 2025, from https://www.dnb.nl/media/l2ofthn5/working-paper-no-693_tcm47.pdf

Van Der Cruijsen, C., De Haan, J., & Roerink, R. (2021). Trust in financial institutions: A survey. Journal of Economic Surveys, 37(4), 1214–1254. https://doi.org/10.1111/joes.12468

Van Dongen, M. (2021, November 10). Straattaal voor geld - Weet jij wat een Donnie of Millie is? Moneybob.com. https://www.moneybob.com/nl/straattaal-voor-geld/

Van Rooij, M. C., Lusardi, A., & Alessie, R. J. (2012). Financial literacy, retirement planning and household wealth. The Economic Journal, 122(560), 449–478. https://doi.org/10.1111/j.1468-0297.2012.02501.x

Van Veelen, A. (2022, December 9). Help, ik wil weg uit de wegwerpcultuur! NRC. https://www.nrc.nl/nieuws/2022/12/08/gezocht-een-uit-weg-uit-de-wegwerpcultuur-a4150717

Van Vugt, M. (2025, January 16). Ensie. https://www.ensie.nl/betekenis/betalingspijn

Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news on-line. Science, 359(6380), 1146–1151. https://doi.org/10.1126/science.aap9559

W

Wat vinden jonge mensen van de politiek? (2023, November 9). Eur.nl. https://www.eur.nl/media/115877

Waterworks of money. (n.d.). Waterworks of Money. https://www.waterworksofmoney.com/

Westberg, P. (2024, March 1). Visa and MasterCard: the global payment duopoly. Quartr. Retrieved December 5, 2024, from https://quartr.com/insights/company-research/visa-and-mastercard-the-global-payment-duopoly

World Bank. (2022, April 13). Financial inclusion. Retrieved October 28, 2024, from https://www.worldbank.org/en/topic/financialinclusion/overview

World Bank Group. (2024, January 9). Lebanon's Fragile Economy Pulled Back into Recession. World Bank. https://www.worldbank.org/en/news/press-release/2023/12/21/lebanon-s-fragile-economy-pulled-back-into-recession

Wormald, B. (2024, April 23). Europe. Pew Research Center. Retrieved October 7, 2024, from https://www.pewresearch.org/religion/2015/04/02/europe/

Y

Yeoman, I., & McMahon-Beattie, U. (2011). The changing meaning of luxury. In Palgrave Macmillan UK eBooks (pp. 72–85). https://doi.org/10.1057/9780230294776_7

Your Europe. (2022, January 1). Electronic & cash payments and rules on surcharges - Your Europe. Retrieved January 16, 2025, from https://europa.eu/youreurope/business/finance-funding/making-receiving-payments/electronic-cash-payments/index_en.htm

Z

Zamora-Pérez, A. & ECB. (2021, March 22). The paradox of banknotes: Understanding the demand for cash beyond transactional use. European Central Bank. Retrieved October 21, 2024, from https://www.ecb.europa.eu/press/economic-bulletin/articles/2021/html/ecb.ebart202102_03~58cc4e1b97.en.html

Zelizer, V. a. R. (1994). The social meaning of money. https://onlinelibrary.wiley.com/doi/pdf/10.1002/9780470755679.ch17