

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Information Technologies



Bachelor Thesis

UI specification of iOS Cryptocurrency Wallet App

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BACHELOR THESIS ASSIGNMENT

Mariia Zoteeva

Systems Engineering and Informatics
Informatics

Thesis title

UI Specification for Crypto Wallet

Objectives of thesis

The goal of this bachelor thesis is to create a user interface specification for the iOS mobile crypto wallet application and its functional prototype. The resulting interface should help the user perform various types of transactions with digital-assets. The prototype is going to be tested with real users in order to validate the proposed solution, and all the necessary changes are going to be made. Moreover, the interface should comply with common usability standards for iOS mobile operating systems and ensure efficient and user-friendly interaction.

Methodology

The methodology of the bachelor thesis is based on a detailed analysis of existing solutions, which will be performed on the basis of the study of professional literature and existing software solutions. The knowledge gained from the study will be evaluated and based on them the current state of crypto wallets, their pros and cons will be defined. Comparing the differences and shortcomings of the existing crypto wallets will create a list of functionalities that the new crypto wallet should enable. A UI specification will be created for it as well. The created UI specification will be subjected to qualitative testing on a selected sample of respondents. Based on the results of the usability testing, an overall evaluation will be performed and possible modifications of the solution will be proposed.

The proposed extent of the thesis

30-40

Keywords

UI specification, Interaction Design, mobile app, iOS, crypto, wallet, user experience, user interface, Design Thinking, design system

Recommended information sources

Josef Pavlíček, Cookbook of interaction design for HCI and ID, Online material:
https://docs.google.com/presentation/d/1nblJgEX5mS6kl_cRx6CeKuhd-fzz-kyYn_j03vMLkH4/edit?usp=sharing

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Declaration

I declare that I have worked on my bachelor thesis titled "UI specification of iOS Cryptocurrency Wallet App" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on date of submission

30.11.2021

Acknowledgement

I would like to thank Ing. Josef Pavlíček, Ph.D. for his advice and support during my work on this thesis.

Title of Bachelor Thesis in English

Abstract:

The result of this bachelor's thesis is an UI specification for a crypto wallet iOS application. Low-fidelity wireframes are built based on the logic design and captured in a separate chapter of this Bachelor Thesis.

The first part of this work includes theoretical foundation, its application is to be found in the following chapter. The UI specification is used when creating a functional prototype of the application. The prototype is tested, and the proposed solution is modified according to the usability testing outcomes.

Keywords: UI specification, Interaction Design, mobile app, iOS, crypto, wallet, user experience, user interface, Design Thinking, design system.

Title of Bachelor Thesis in Czech

Abstract:

Výsledkem této bakalářské práce je specifikace uživatelského rozhraní pro iOS aplikaci kryptopeněženky. Low-fidelity wireframy jsou sestaveny na základě logického návrhu a zachyceny v samostatné kapitole této bakalářské práce.

První část této práce obsahuje teoretický základ, jehož aplikaci naleznete v následující kapitole. Specifikace uživatelského rozhraní se používá při vytváření funkčního prototypu aplikace. Prototyp je testován a navržené řešení je upraveno podle výsledků testování použitelnosti.

Keywords: UI specifikace, Interakční design, mobilní aplikace, iOS, krypto, peněženka, uživatelská zkušenost, uživatelské rozhraní, Designové Myšlení, design systém.

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1. Introduction

Cryptocurrencies have been controversial since their beginning: while being strongly condemned by crypto critics, the world of crypto has seen a stunning rise, to the delight of crypto enthusiasts and supporters. Respectively, the vertiginous rise of cryptocurrencies has created new challenges for governments and central banks.

The cumulative market cap of cryptocurrencies reaches roughly 3 thousand billion U.S. dollars in November 2021 seriously affecting the world of finance. Large companies have begun allocating cash to digital assets, ecommerce sites have started accepting bitcoin and ethereum payments. More and more people are investing money in cryptocurrency by means of holding multiple crypto wallets.

A crypto wallet is a digital wallet that stores users' private keys in the blockchain network. The most common and important types: web, desktop, and mobile wallets. These forms of wallets are generally considered relatively secure and easy-to-use.

As more people turn to crypto, development of a cryptocurrency wallet with great UX and an aesthetic minimalistic interface has evolved to become relevant. Content, usability, and visual design are core constructs in users' perception and evaluation, therefore, it plays a major role in the app promotion marketing.

2. Objectives and Methodology of Thesis

2.1 Objectives

The aim of this bachelor thesis is to create a user interface specification for the iOS mobile crypto wallet application and its functional prototype. The resulting interface should help the user perform various types of transactions with digital-assets. The prototype is going to be tested with real users in order to validate the proposed solution, and all the necessary changes are going to be made. Moreover, the interface should comply with common usability standards for iOS mobile operating systems and ensure efficient and user-friendly interaction.

The application should allow user to perform the following functions:

- hold accounts in various crypto assets;
- buy and sell cryptocurrency
- deposit and withdraw fiat funds to various types of bank cards;
- send and receive supported cryptocurrencies;
- keep track of the market dynamics of cryptocurrencies;

The **subject** of this UI specification is a functional prototype of the application presenting the basic principles of interactive design and following the guidelines and requirements of the chosen platform.

2.2 Methodology

The methodology of this work is based on a detailed analysis of existing solutions, which is based on the exploring of a knowledge base, that includes professional literature, scientific publications and study guides, and a detailed overview of the services, which store the public and private keys for cryptocurrency transactions. This approach will help determine all the necessary features and functionalities for the new platform. All the data obtained is to be captured into the UI specification. In the context of this work, the high-fidelity prototype is going to be tested with real users in order, evaluated and modified.

3. Theoretical Part

3.1 Analysis of selected solutions

3.1.1 Coinomi

Coinomi is a multicurrency cryptocurrency wallet, for both mobile & desktop, that enables the user to send and receive over different cryptocurrency assets. The integration with ShapeShift and Changelly allows Coinomi to quickly convert between altcoins within the wallet.

Crypto currency can be bought with fiat currency (euros or U.S. dollars) directly from Coinomi using bank cards.

The main wallet will all the assets owned by the user can be found in the Overview section. There is a convenient sorting by asset name and balance on the account.

There is a possibility to contact customer support, edit application settings: manage notifications, change the interface language, hide balances from the Overview menu, select a preferable fiat currency. Functions for receiving (Receive) or sending (Send) cryptocurrency are also available.

Talking about UI, Coinomi has a clear and simple interface, understandable even for an inexperienced user.

3.1.2 Exodus

Exodus Wallet is a multicurrency desktop wallet and exchange. There are versions for Windows, Linux and Mac.

It's convenient to work with the app: information about the currencies is displayed on charts and graphs. A lot of metrics can be monitored, including the all-time highest balance, daily top gainers and "losers". Overall interface is clear and user-friendly.

There are helpful tooltips and video tutorials explaining particular UI elements. There is a distributed exchange that doesn't accept fiat currencies, so it's needed. The user has to own cryptocurrency and transfer it to Exodus wallet to start trading.

3.1.3 Trust Wallet

Trust Wallet is the official crypto wallet of the cryptocurrency exchange Binance. The interface of the app is clear, convenient and easy-to-use on various mobile platforms.

Coins are conveniently sorted into groups on the main screen: "Coins", "Finance", "Collectibles". In the Settings, you can set a PIN code for login, enable or disable Push-notifications (warnings about all performed transactions). It's possible to select a preferable fiat currency in which the balance will be displayed.

The functionality includes sending and receiving various cryptocurrencies. In addition, it is possible to purchase cryptocurrency using a credit card. Import from other wallets is supported. The wallet is simple, user-friendly and can be used even by a newbie.

3.2. Design Thinking Process

3.2.1 What is UX?

«UX» stands for «User Experience». In terms of an application, UX eventually determines how the user interacts with the application. Therefore, the user experience has to be intuitively understandable and perceptive. In other words, UX defines how easy or difficult it is for the user to interact with the user interface.

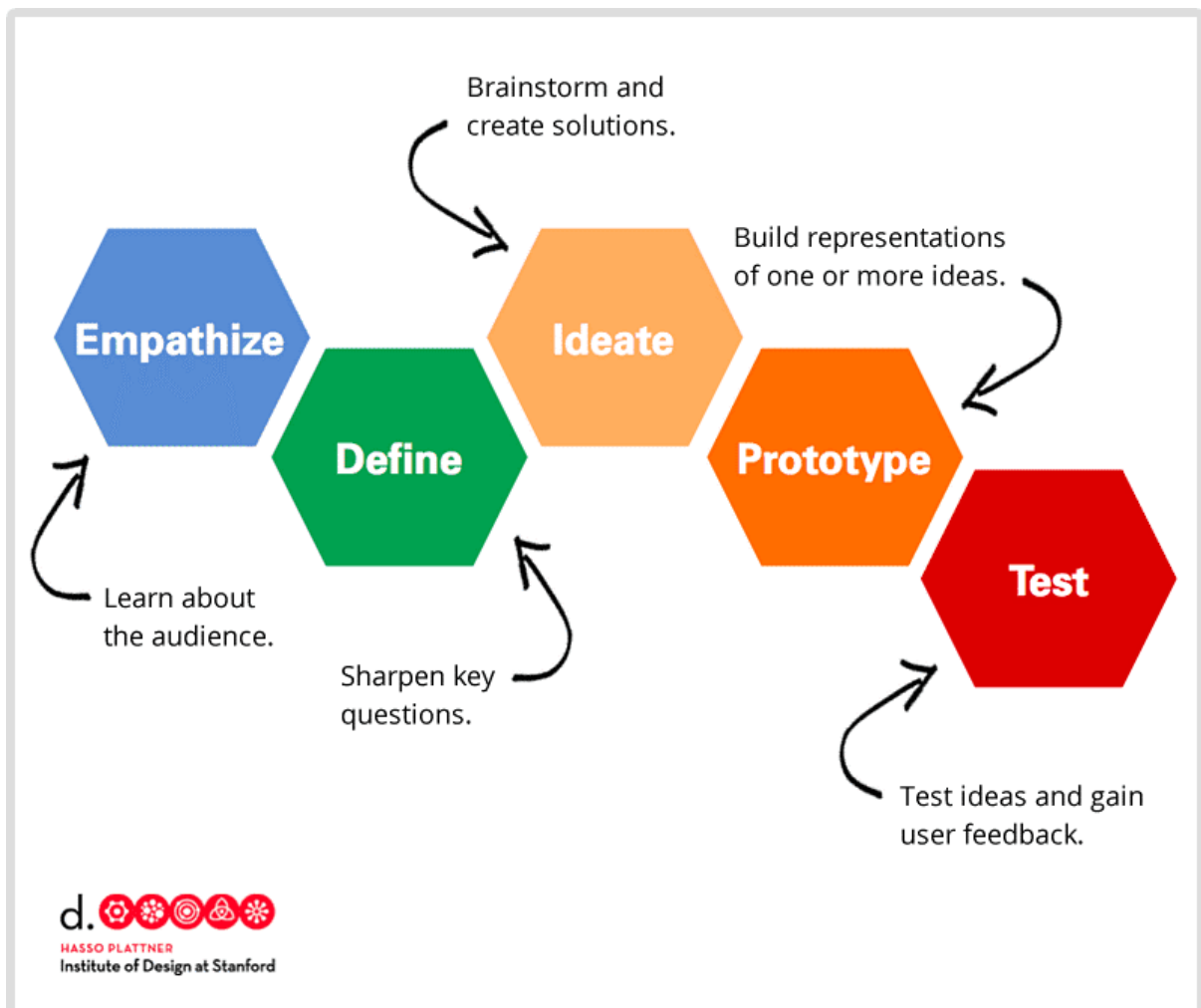
“The UX design process consists of five key phases: emphasize/discover, define, ideate, prototype, and test/validate.” (Babich, 2021)

3.2.1 Design Thinking Process in UX

The idea of design thinking was formulated by Herbert Simon in 1969 in the book “The Sciences of the Artificial”. (Simon, 2019)

Interaction Design Foundation formulates Design Thinking: (What is Design Thinking?, 2021)

“The technique in which we seek to understand the user, challenge the assumptions, and redefine the problem in order to find non-obvious alternative solutions of the problem.”



Picture 1 - Design Thinking

Source: (Plattner, 2021)

Anyone who applies design thinking subordinates their research and work to the interests of the individual, not the interests of the company, project manager, or bureaucracy.

The main purpose of design thinking is to go beyond received ideas and existing stereotypes when solving a problem, that is to say, "to think outside the box." The problem solving process consists of five stages: empathize, define, ideate, prototype, test.

3.2.2 Emphasize

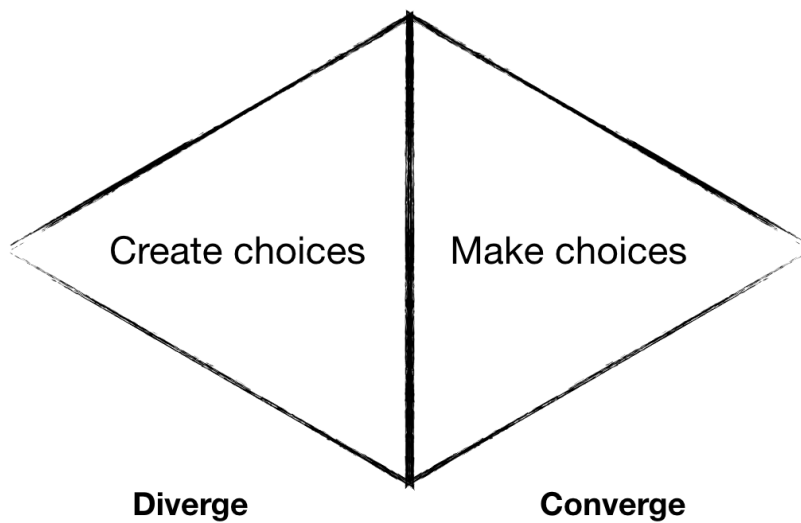
Emphasize phase is the first phase of design thinking in terms of UX. The main difficulty of this stage is that we have to search when you do not fully know what you are looking for, it is like choosing a gift.

This stage usually includes:

- **Stakeholder interviews:** interviewing key stakeholders to gather insights about business goals.
- **Competitor analysis**
- **User interviews:** interviewing people of the target audience for better understanding of their environment, needs and wants, fears and motivations, as well as behavioral patterns.

Interview is a qualitative research method that gives us an answer to the question “Why?” by providing a deeper understanding of the insights that are not obvious from the first glance, by revealing something completely new.

Brown describes design thinking as the sequence of the diverging and converging of solutions. In the diverging phase, we are gathering ideas, i.e. creating choices, while in the converging phase, choices are made. (Brown, 2010) In the Emphasize stage, lines of inquiry diverge as the problem is being explored, its understanding is expanding during the research of its context. (Rosalia, 2020)



Picture 2 - Diverging and converging in design thinking

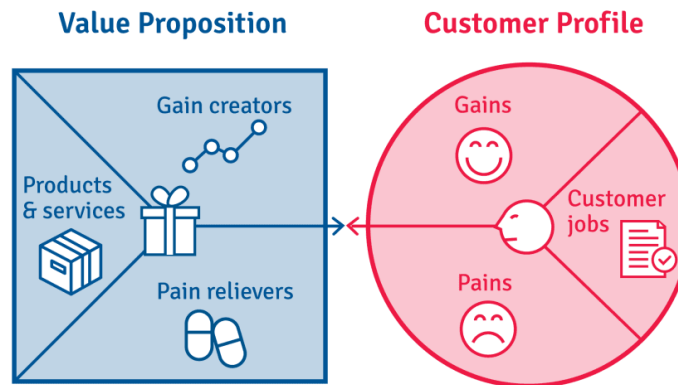
Source: adapted from Brown.

3.3.3 Define

During the Define phase, the information gathered during the Emphasize phase is organized, analyzed and, based on the performed analysis, the core user problems are identified.

On this stage the goals, objectives, and UX strategy should be specified. It's important to identify the target audience and define what requirements they have using the data from the user research. It helps create user personas, and later on, develop an effective user experience. The Define stage is a good example of the converging phase described above.

Value proposition mapping: *VPM* includes exploring the core aspects and value propositions of the final product: what it is, who will use it, and why they will use it. This method helps the designers and stakeholders reach a consensus on the product and user and business needs that it will meet.



Picture 3 - Value Proposition Mapping

Source: Osterwalder et al., 2015.

Creating user personas. Personas are fictional characters that represent the different user types for your product. As you design your product, you can reference these personas as realistic representations of your target audience. (Cooper, 2004)

In other words, *personas* are generalized portraits created from observations about real users. A well-built persona includes 3 main elements: motives and pain points (why?), goals (for what?), and sometimes tasks (how?), which can be interpreted as an application of jobs to be done theory. Typically, user personas include name, age, gender, hobbies and story. A detailed profile may be complemented with occupation, user category, user goals, pain points, personality description and typical socials or applications used.

3.3.4 Ideate

In the third step of the Design Thinking process, designers generate ideas and create potential solutions. There is already an understanding of users and their needs (empathy stage), analysis and generalization of observations (definition stage), and, finally, a person-centered problem statement has been formulated.

This stage usually includes:

- **Brainstorming.**
- **Creating scenarios.** *User Scenarios* are short stories about user personas trying to achieve their goals while interacting with a product.

- **Building User Flows.** *User Flow* is the order of actions that a user performs on a site or using an application. It assures that all processes have a logical end. Typically, when building a *User Flow*, there is no emphasis on UX, but on the possible levels of solution. The main task is to show the process of UI with the product.
- **Building Information Architecture.** *Information Architecture* is the process of information organization, which includes its structuring, laying out, and navigating in order to find and manage the required data. For example, *Information Architecture* determines the data is logically grouped, structured and interrelated.

3.3.5 Prototype

The Ideate stage generates a variety of potential solutions. (Ambrose and Harris, 2010) Based on them, a prototype can be created.

Prototype is a dynamic product model that simulates user interaction with an interface and makes it possible to quickly get feedback from the target audience during further testing.

“Central principle of Design Thinking is: build prototypes that can be experienced.” (Brenner and Uebernickel, 2016)

Prototypes themselves can be split into two groups according to their resolution:

- *Low-fidelity* (test functionality rather than the visual): sketches, paper mockups
- *High-fidelity* (visually close to the real product): functional prototypes, programmable interfaces

User scenarios should be taken into account when building a prototype. This is important for further testing. If the latter has multiple questions during the use of the prototype, then this means that the use cases need to be revised and reworked.

Basic user scenarios should be taken into account when designing a prototype. This is important for further testing. If during prototype testing, respondents have problems with performing the tasks, it means that the use cases need to be revised and reworked.

(Ambrose and Harris, 2010)

Creating a Design System. Prototyping can be greatly accelerated if a design system is created. This approach ensures product consistency and helps create a unified visual style for the product.

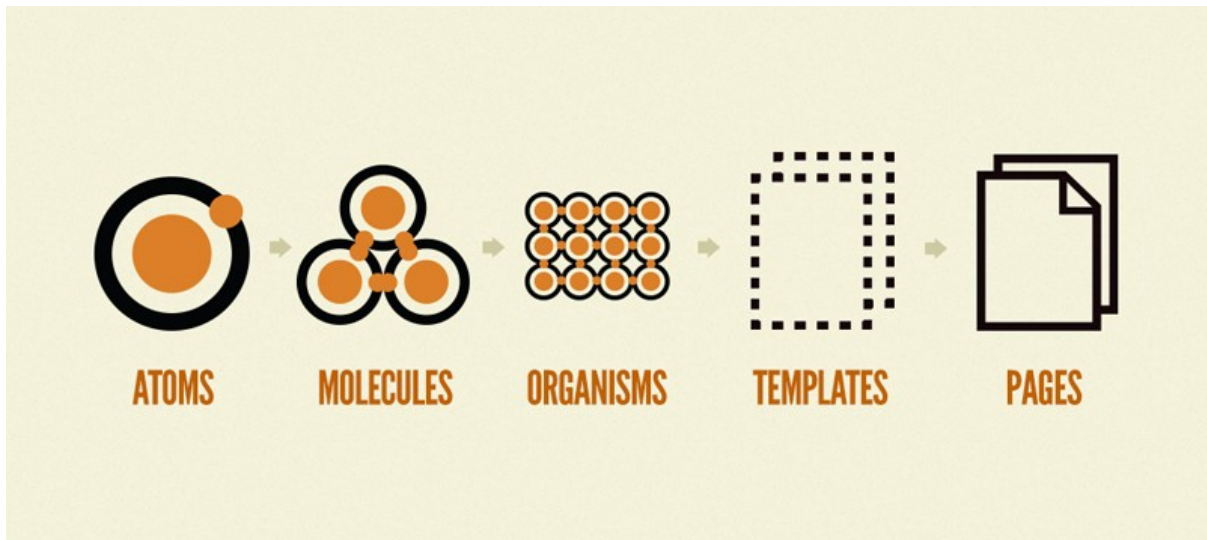
Design System is a combination of product creation rules, not a simple library of components. It implies a global approach and understanding the elements on a different level - from small to big, and focuses on establishing guidelines for color, typography, grids and layout.

Atomic Design. Inspired by chemistry, Brad Frost came up with a unique methodology of constructing design systems in 2013 and firstly introduced it in the book “Atomic Design”. (Frost, 2016)

“All matter is composed of atoms. Those atomic units bond together to form molecules, which in turn combine into more complex organisms to ultimately create all matter in our universe. Similarly, interfaces are made up of smaller components. This means we can break entire interfaces down into fundamental building blocks and work up from there. That’s the basic gist of atomic design.” (Frost, 2016)

There are five distinct levels in atomic design:

1. *Atoms* – the basic and the smallest building blocks of all interfaces.
2. *Molecules* – groups of atoms forming the smallest unit of a compound.
3. *Organisms* – blocks of molecules forming a complex, distinct section of an interface; standalone reusable elements.
4. *Templates* – groups of organisms stitched together forming a basic layout of the page
5. *Pages* – similar hierarchy level as the previous one representing real accurate content instead of placeholders used in *Templates*; the effectiveness of the design system is reviewed at this stage.



Picture 4 - Atomic Design

Source: Frost, 2016.

Atomic Design approach gives great control over the designed components and makes coding easier for the developer team. Moreover, it helps save time when it comes to the implementation of corrections promoting consistency and scalability of the system. Therefore, *Atomic Design* is an efficient method for iterative development.

3.3.6 Test

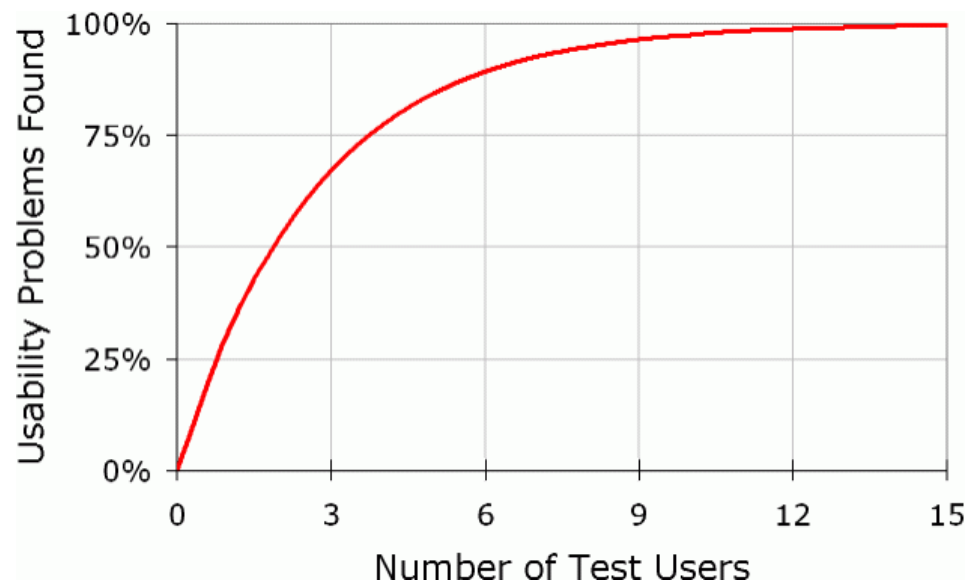
The final stage of *Design Thinking* is the Test stage. The prototypes are tested to see how well they solve the problem. During this step, the product is adjusted and polished, so it better meets user requirements. Technically, the Test stage is a so-called revision of previous stages in order to get the best results for the final product.

There are, however, two types of data that can be collected in a user-testing study: qualitative and quantitative.

- Qualitative data: consisting of observational findings that identify design features easy or hard to use (Budiu, 2017)
- *Quantitative data*: in form of one or more metrics (for example, task completion rate) that reflect whether the tasks were easy to perform (Budiu, 2017)

“Researchers will need to use qual methods to supplement quant data in order to understand the specific usability issues in an interface.” (Budiu, 2017)

The best results come from testing no more than 5 users and running as many small tests as you can afford.



Picture 5 - User Testing Diminishing

Source: Nielsen, 1993.

The goal of the Test stage is to improve the design. The usability problems identified after the first testing session, are to be fixed in a redesign.

4. Practical Part

This chapter includes the practical part of this bachelor's thesis and is designed as a demonstration of the applicability of the theoretical basis for application design.

4.1. Motivation

The motivation for the project is to create a multicurrency e-wallet for iOS that allows users to buy, sell and transfer their cryptocurrency assets, as well as to store and exchange them. This app is aimed to help accelerate the world's transition to cryptocurrency usage.

4.2. Objectives

The main objective of this bachelor thesis is to create a crypto wallet that is easy to use and exceeds the expectations of even the most experienced traders. The UX attributes that will support the success of the desired results are identified as follows:

- simple and intuitive interface
- effective onboarding
- convenient widgets
- minimal design

4.3. Personas

The profile of a typical user was created based on the analysis of the users of the competitor platforms and cryptocurrency forums. Using the Telegram groups, 95 participants were interviewed. The respondents were asked about their preferences, goals, pain points, behaviours and context of use. Based on the gathered data, main market segments were identified and synthesized into user personas.

4.3.1 Primary persona (A)

Name: Sam L.

Age: 32

Gender: male

Occupation: software engineer

Category: crypto enthusiast; tech geek

Socials: Telegram, GitHub, reddit, Twitter, YouTube

Story. Sam is exceptionally skilled with and enthusiastic about technology. He got fascinated about blockchain and crypto about 5 years ago. He initially got into the crypto industry by his close contact with tech and open source innovation, and luckily managed to build a capital through investments. Like many others, he first invested in Bitcoin and Ethereum and then started to diversify. Sam is very suspicious about new ICOs and most NFTs. He has seen many ups and downs and is now interested in new projects that bring real value to the crypto community. He often tries out new wallets and exchanges keeping his main holdings in hardware wallets. However, he is not picky in terms of UX, his main priority is good functionality and ecosystem structure. Sam keeps up with the crypto news through Telegram and Reddit.

Goals.

- to securely and safely use crypto as everyday payment
- to solve the faults of the monetary and governmental system with crypto

Pain Points.

- speculations with crypto
- lack of adoption of cryptocurrencies and integration between the platforms

Personality.

- **Introvert** - Extrovert
- **Analytical** - Creative
- **Busy** - Time Rich
- **Messy** - Organized
- **Independent** - Team Player

4.3.2 Secondary persona (B)

Name: Monika S.

Age: 25

Gender: female

Occupation: head of influencer marketing

Category: ambitious rookie;

Socials: Instagram, YouTube, Twitter, LinkedIn, Medium

Story. Monika is an LA-based influencer marketing lead. She is passionate about her career, being a recent college graduate, she is eager to save money and looking for opportunities in the crypto world. She first heard about Bitcoin and blockchain in 2018 and

started to explore investments into crypto. She trades small amounts of the most popular coins, casually researching new coins, especially NFTs. Monika is used to managing her budget with her smartphone and making payments using ApplePay. She is quite demanding when it comes to good UX design.

Goals.

- to get ahead at work
- to get full financial independence
- to save up for a mortgage

Pain Points.

- complicated navigation of investment tools
- lack of saving opportunities
- high security risks

Personality.

- Introvert - **Extrovert**
- Analytical - **Creative**
- **Busy** - Time Rich
- Messy - **Organized**
- Independent - **Team Player**

4.3.3 Additional persona (C)

Name: Bill D.

Age: 49

Gender: male

Occupation: investor

Category: experienced investor;

Hobbies:

Socials: Bloomberg, Koyfin, Coin Market Cap, Amibroker, LinkedIn, Reuters

Story. Bill has been investing in stocks, precious metals and real estate over the years. In 2015 he invested significant amounts of money in BTC and was impressed with his returns. Now, Bill carefully researches new opportunities. He is interested in new technologies but treads carefully. Due to his experience, he is aware of sore spots of the most popular platforms, and therefore, it is important for him to use a trusted service with great customer service. Bill prefers desktop over mobile apps. He knows a lot about economics

theory and politics, reads financial newspapers a lot and is extremely careful about KYC, AML, and tax issues.

Goals.

- to keep up with the growth of new tech
- to spend more time with his family
- to wisely reinvest his savings into the most liquid cryptocurrencies

Pain Points.

- complicated features of investment tools
- poor customer support

Personality.

- **Introvert** - Extrovert
- **Analytical** - Creative
- **Busy** - Time Rich
- Messy - **Organized**
- **Independent** - Team Player

4.4. Login

4.4.1 Use case

As a new user, the user expects:

- to view basic information about the currently running application
- to register by creating a username and password

As a registered user, the user expects:

- to log in easily
- to use an alternative login method for a quicker access
- to request to reset password in case it's forgotten

Use case: Login

Description: The user can log into the system

Precondition: The user's account must exist

Post condition: -

Normal Flow	
Actions of the Actor	Actions of the System
	1. The system shows a Splash screen (1) and automatically redirects the user to the Login screen (2) after a few seconds
2. The user inserts their email and password and confirms the input by pressing a Login button	3. The system checks whether the user's credentials match the credentials in a database of authorized users.
	4. The system grants access to the user and redirects the user to the Home screen (10) .

Table 1 - Login Use Case (Normal Flow)

Exception Flow: Email/Password entered is invalid	
Actions of the Actor	Actions of the System
	4. The system displays the Login Failed screen (3) with one of the error messages "Email not found, please try again", "Password wrong, please try again", "Unexpected error, please try again later"

Table 2 - Login Use Case (Exception Flow)

Alternative Flow: PIN used	
Actions of the Actor	Actions of the System
	1. The system shows a Splash Screen

	(Picture 6) and automatically redirects the user to the PIN Screen (Picture 10) after a few seconds
	2. The system waits for the user to input their PIN.
3. The user inserts their PIN	
	4. The system grants access to the user and redirects the user to the Home Screen (Picture 15).

Table 3 - Login Use Case (Alternative Flow)

Exception Flow: PIN failed	
Actions of the Actor	Actions of the System
	4. The system displays the PIN Failed Screen (Picture 10) and waits for the user to retype their PIN code.

Table 4 - Login Use Case (Alternative Flow 2)

4.4.2 Scenario

The system displays to the user :

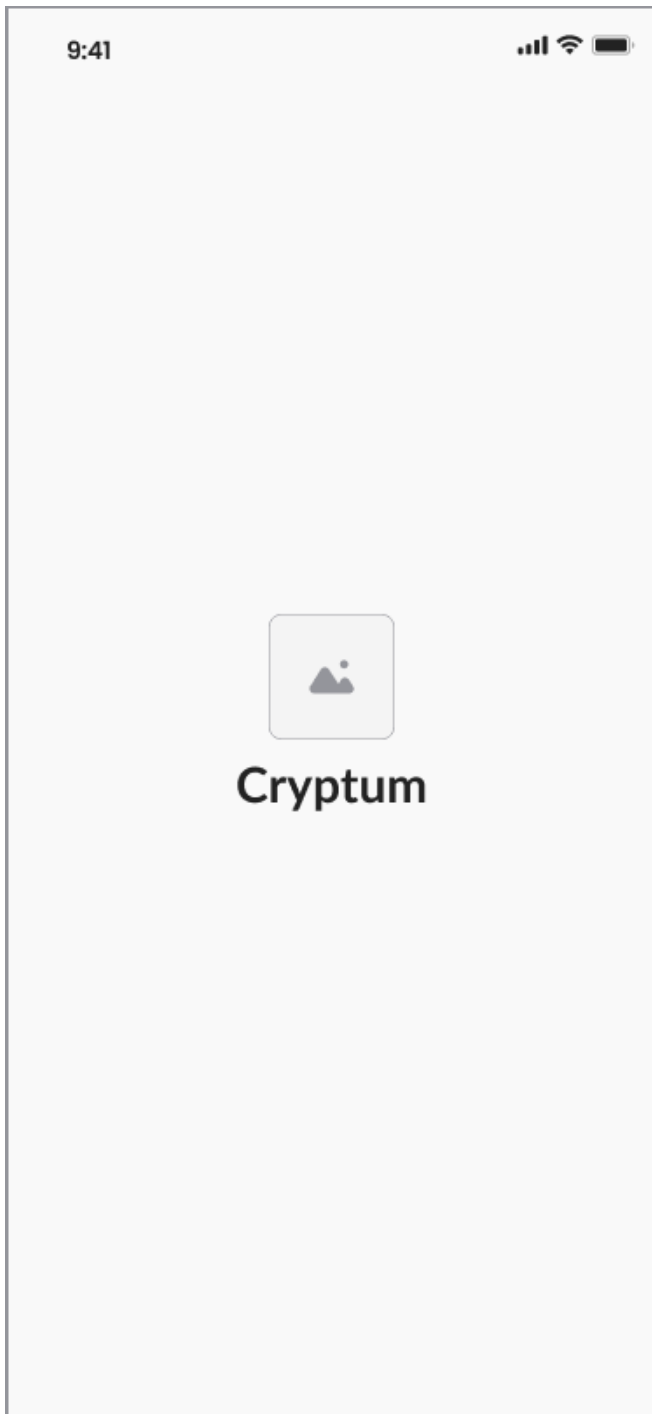
- splash screen with the logo and the application name;
- an input field to insert user's email;
- an input field to insert user's password;

- a button to log in;
- a link to reset password;
- a link to switch to sign up;
- a multiselect to remember the user on the current device

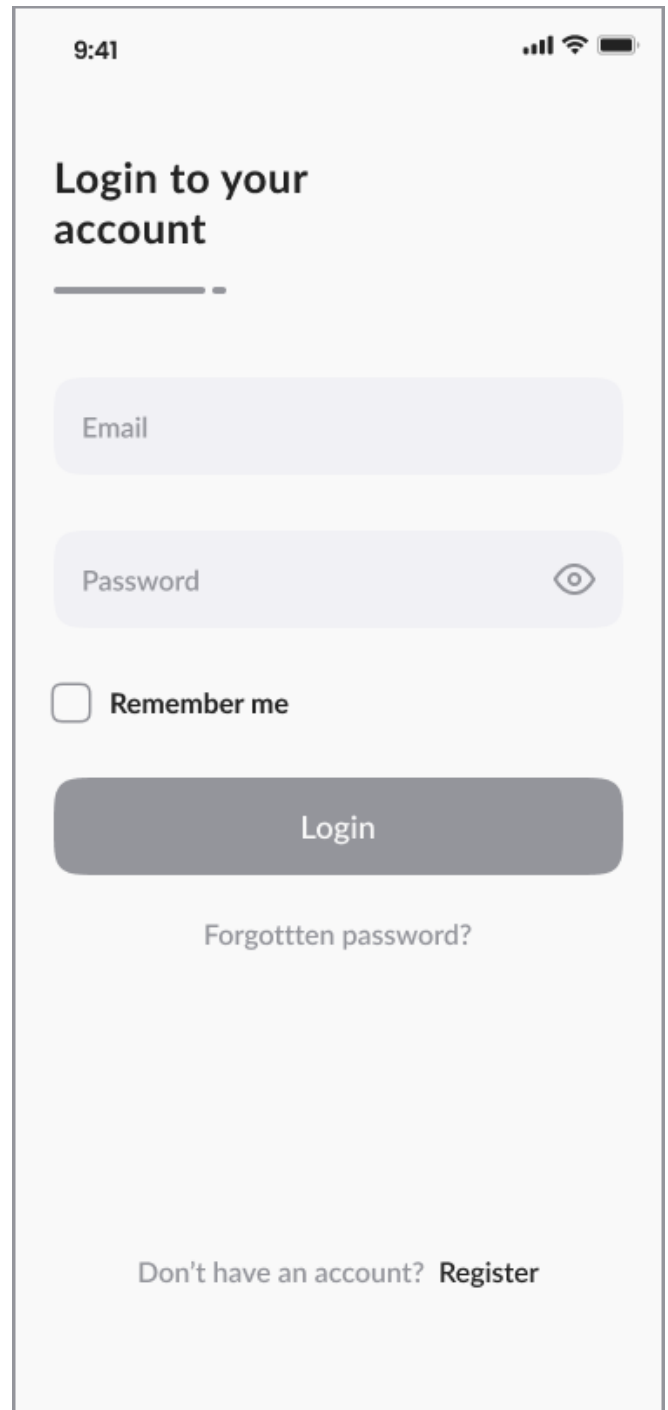
The system is waiting for the user's choice.

After a successful login to the account, the system displays the Home Screen (Picture 15) of the application.

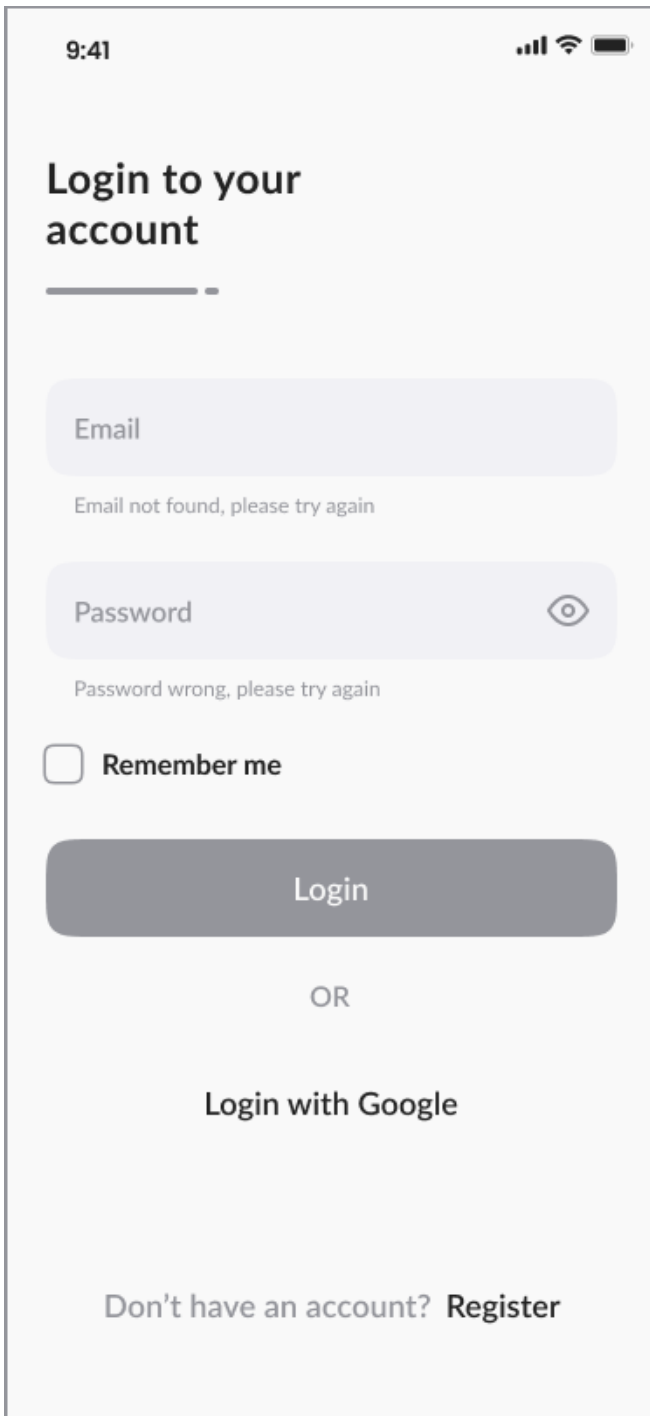
4.4.3 Wireframe



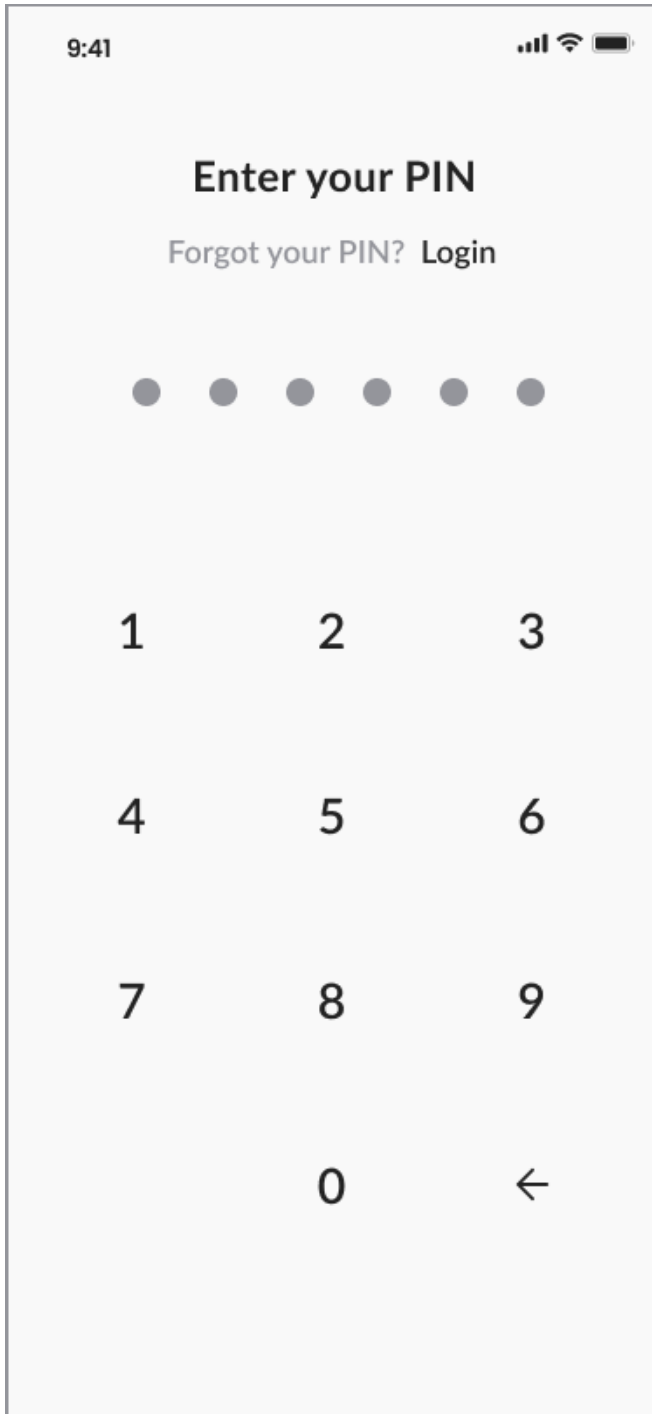
Picture 6 - Wireframe - Splash Screen



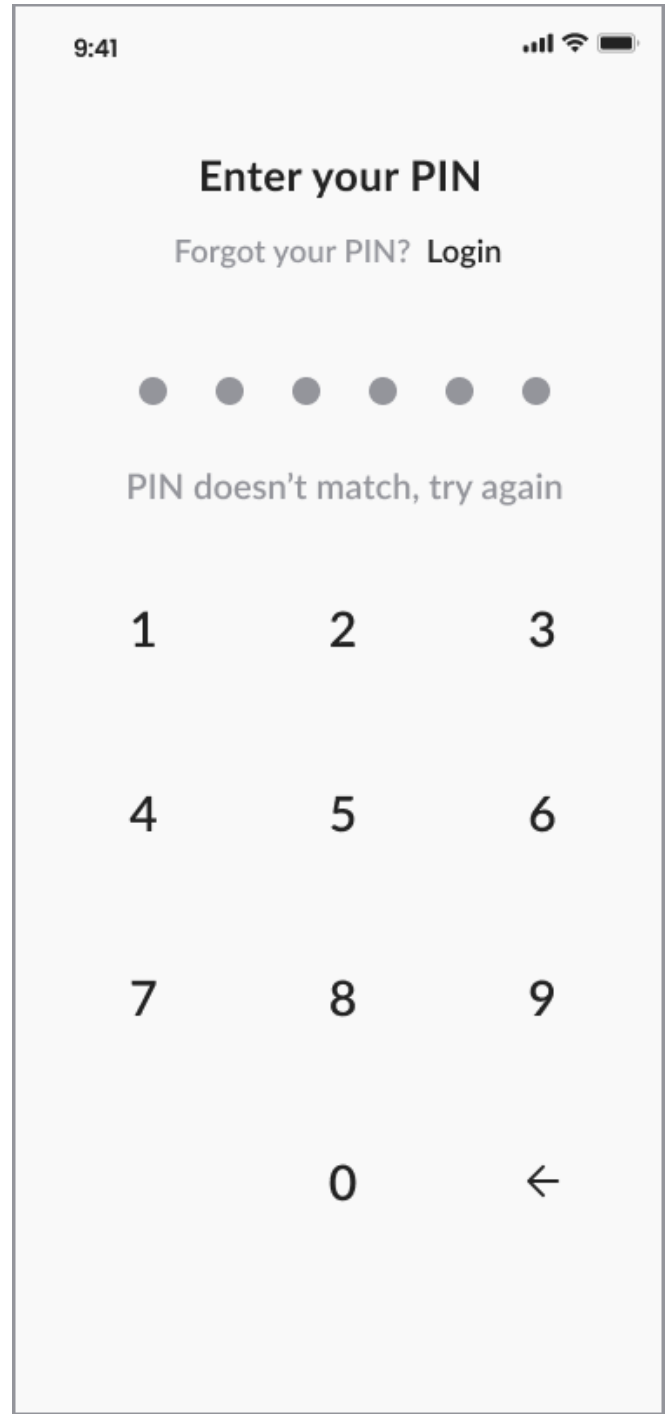
Picture 7 - Wireframe - Login Screen



Picture 8 - Wireframe - Login Failed Screen



Picture 9 - Wireframe - PIN Screen



Picture 10 - Wireframe - PIN Failed Screen

4.4.5. Sign Up

4.5.1 Use Case

As a new user, the user expects:

- to register using an email and password;
- to set up a quick and secure way to login;

As a registered user, the user expects:

- to switch to log in;

Use case: Sign Up

Description: The user can sign up into the system

Precondition: The user's email must not be already in use

Post condition: -

Normal Flow	
Actions of the Actor	Actions of the System
	1. The system shows a Sign Up Screen (Picture 11) and waits for the user to respond.
2. The user inserts their email and password, agrees with the Terms and Conditions and confirms the request by pressing the Register button	3. The system recognises already in use email addresses in order to prevent the creation of duplicate user entries.
	4. The system displays a Verify Email Screen (Picture 12) and waits for the user to confirm the registration via email
5. The user opens their mailbox by choosing the Check my inbox option and completes the sign-up process by clicking the confirmation link.	6. The system shows a Set PIN Screen (Picture 13)
7. The user creates a PIN code and inputs it	8. The system displays the Successfully

twice, confirms the operation by clicking the <i>Continue</i> button when finished.	Registered Screen (Picture 14).
9. The user clicks the <i>Let's go</i> button displayed on the screen.	10. The system grants access to the user and redirects the user to the Home Screen (Picture 15).

Table 5 - Sign Up Use Case (Normal Flow)

Exception Flow: Resend Mail	
Actions of the Actor	Actions of the System
5. The user opens their mailbox by choosing opens their mailbox by choosing the <i>Check my inbox</i> option, clicks the <i>Resend email</i> button in the app and completes the sign-up process by clicking the confirmation link in their inbox.	

Table 6 - Sign Up Use Case (Exception Flow)

Exception Flow: PINs don't match	
Actions of the Actor	Actions of the System
7. The user creates a PIN code and inputs it twice, confirms the operation by clicking the <i>Continue</i> button when finished.	8. The system displays a <u><i>PINs do not match</i></u> message and waits for the correct input.

Table 7 - Sign Up Use Case (Exceptional Flow 2)

Exception Flow: Passwords don't match

Actions of the Actor	Actions of the System
2. The user inserts their email and password, agrees with the Terms and Conditions and confirms the request by pressing the Register button.	8. The system displays a <u>Passwords don't match</u> message and waits for the correct input.

Table 8 - Sign Up Use Case (Exceptional Flow 3)

Exception Flow: Mail already in Use	
Actions of the Actor	Actions of the System
2. The user inserts their email and password, agrees with the Terms and Conditions and confirms the request by pressing the Register button.	8. The system prompts the user to use a different email address by showing a corresponding message: <u>The email you have chosen is already in use. Please choose a different email.</u>

Table 9 - Sign Up Use Case (Exceptional Flow 4)

Alternate Flow: No PIN used	
Actions of the Actor	Actions of the System
	1. The system shows a Sign Up Screen (Picture 11) and waits for the user to respond.
2. The user inserts their email and password, agrees with the Terms and Conditions and confirms the request by pressing a Register	3. The system recognises already in use email addresses in order to prevent the creation of duplicate user entries.

button.	
	4. The system displays Verify Email Screen (Picture 12) and waits for the user to confirm the registration via email
5. The user opens their mailbox by choosing the Check my inbox option and completes the sign-up process by clicking the confirmation link.	6. The system shows a Set PIN Screen (Picture 13)
7. The user chooses the Skip option.	8. The system displays the Successfully Registered Screen (Picture 14)
9. The user clicks the Let's go button displayed on the screen.	10. The system grants access to the user and redirects the user to the Home Screen (Picture 15).

Table 10 - Sign Up Use Case (Alternate Flow)

4.5.2 Scenario

The system displays to the user :

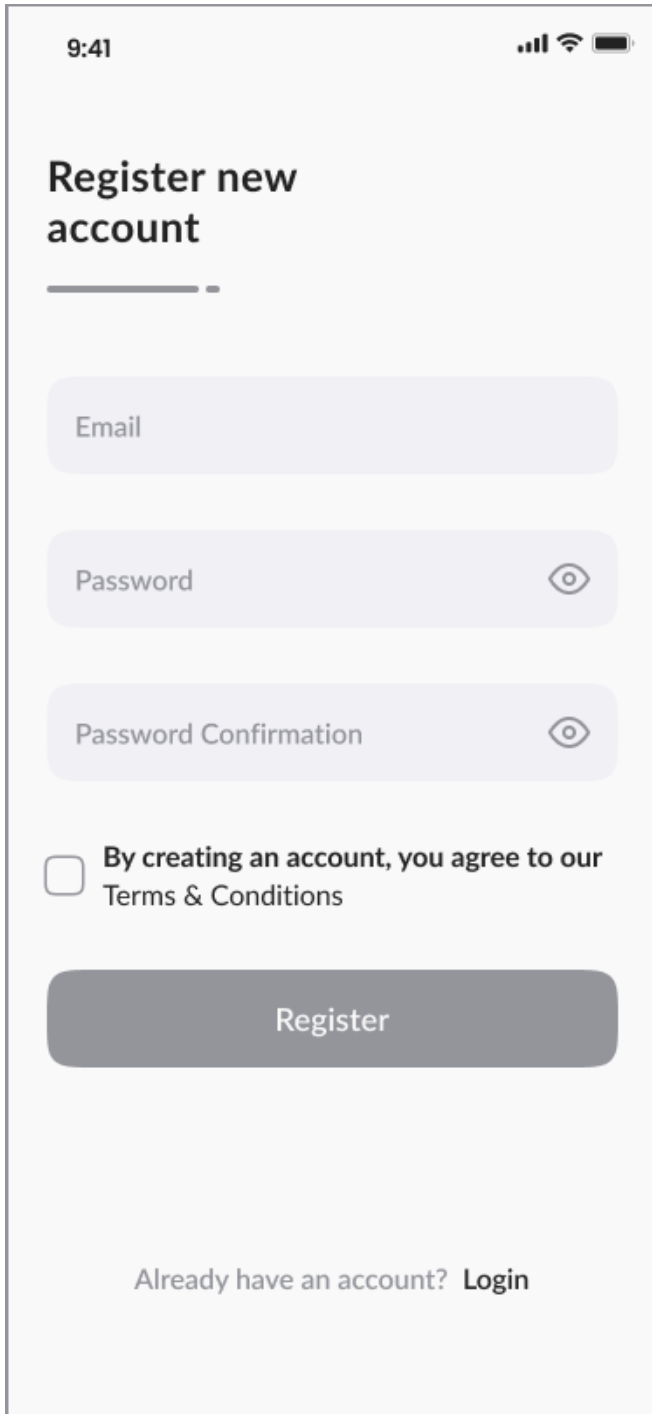
- a button to register;
- an input field to insert user's email;
- an input field to insert user's password;
- an input field to reconfirm user's password;
- a multiselect to confirm the agreement with the terms and conditions of the app
- a link to view the Terms and Conditions;

- a link to switch to log in;

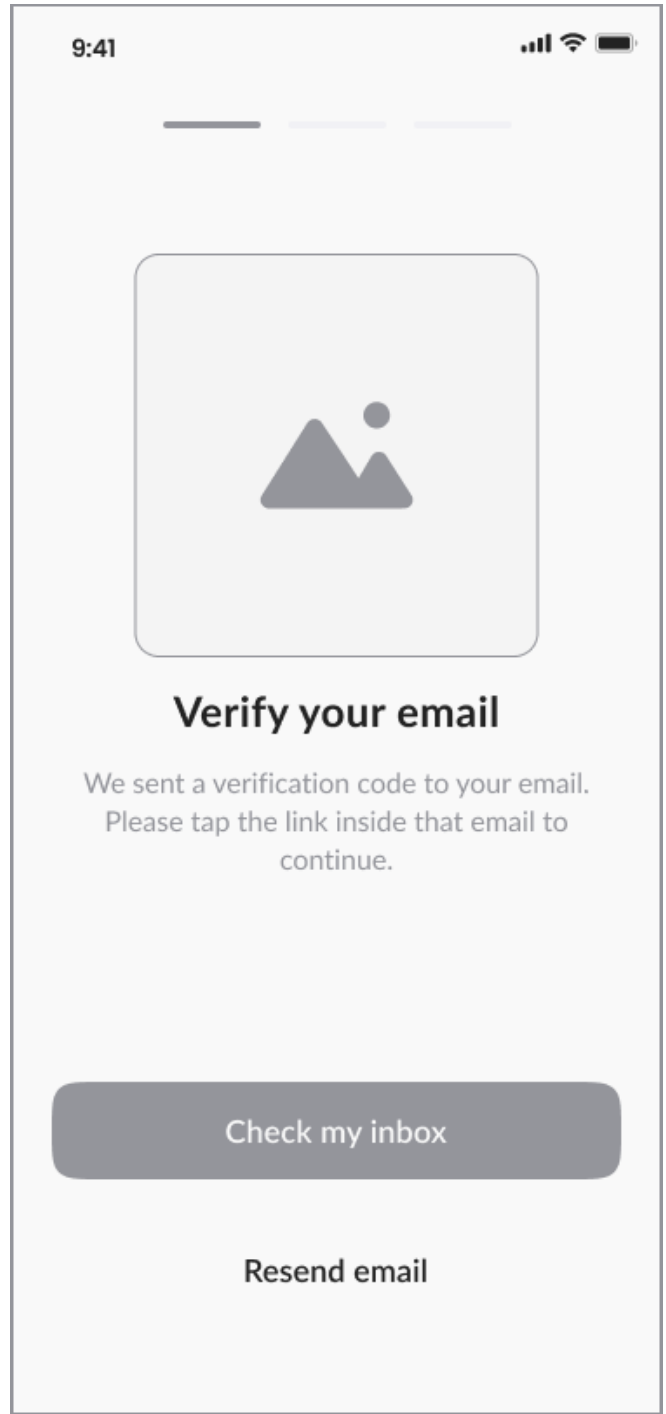
The system is waiting for the user's choice.

After a successful registration to the account, the system displays the Login Screen (Picture 8) of the application.

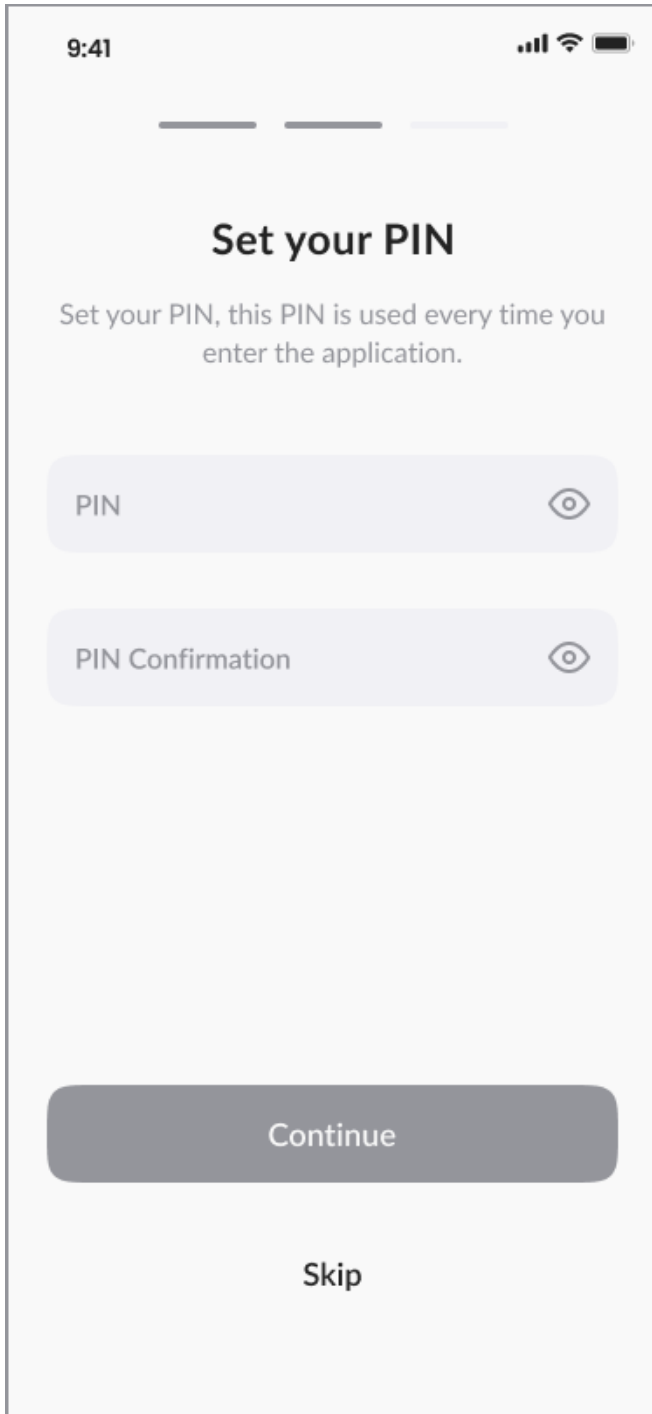
4.5.3 Wireframe



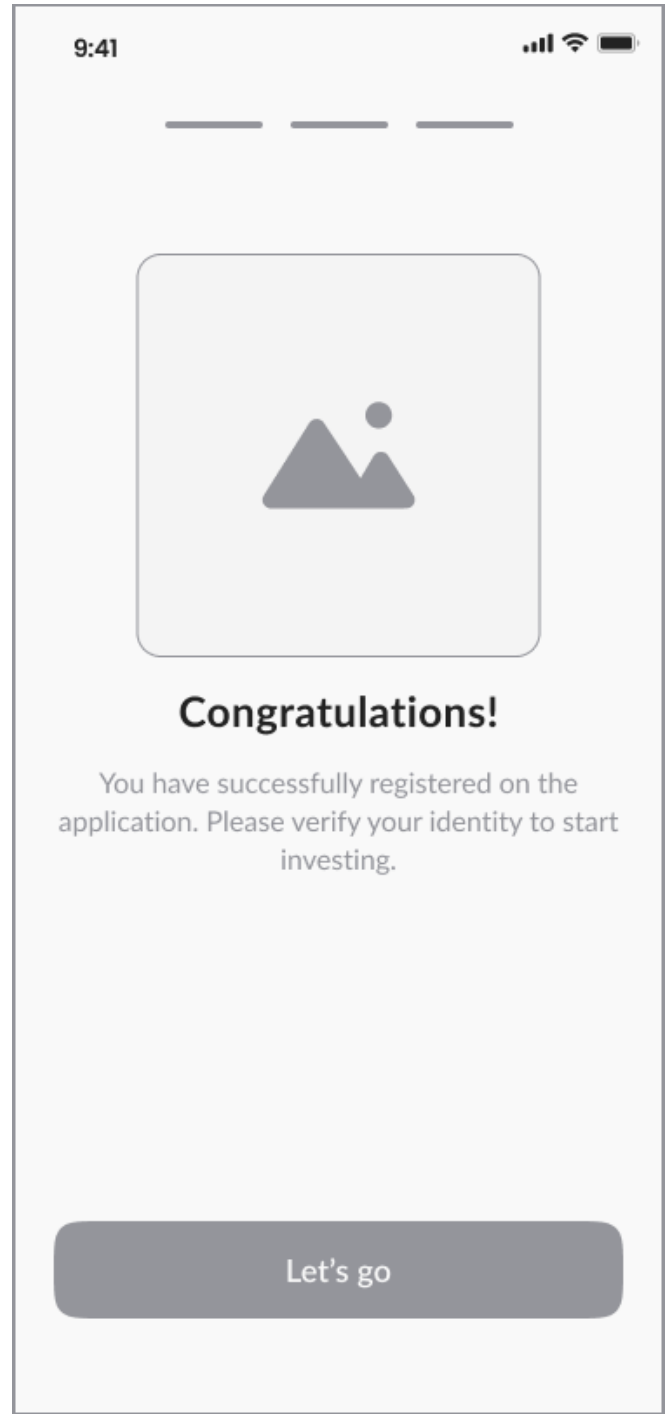
Picture 11 - Wireframe - Sign Up



Picture 12 - Wireframe - Verify Email



Picture 13 - Wireframe - Select PIN



Picture 14 - Wireframe - Successfully Registered

4.6. Home

4.6.1 Use Case

On the Home Screen (Picture 15) the user expects:

- to track current total balance and balances of the owned assets
- to hide balances of the user's portfolio for improved security
- to quickly access their wallet and asset dynamics and price
- to withdraw and deposit funds
- to view transaction history
- to perform search requests
- to scan QR codes for instant operations
- to explore news and events on the crypto markets
- to get notifications
- to manage their profile and settings

4.6.2 Scenario

On the Home Screen (Picture 15), the system shows:

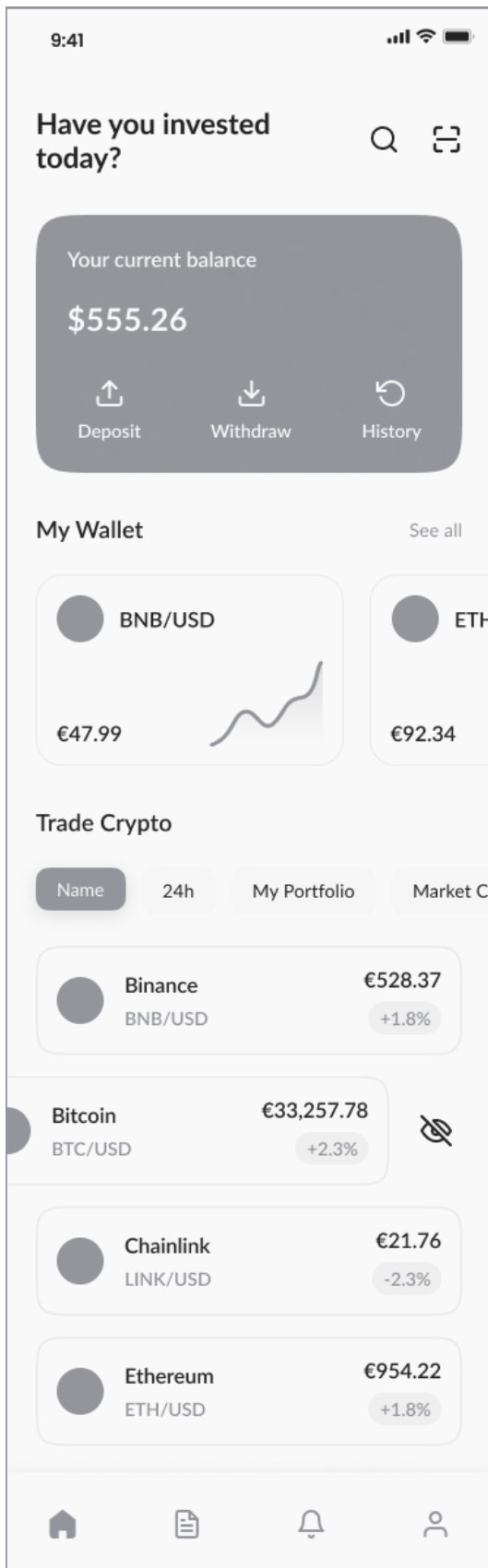
- Navigation bar with “Home”, “News”, “Notifications” and “Profile” icons
- Main title with “Search” and “Scan” icons
- Current balance of the account
- Button “Withdraw”
- Button “Deposit”
- Button “History”
- “My Wallet” section with assets owned by the user
- List of other crypto assets in “Trade Crypto” section

The system waits for the user to select any of the components listed above.

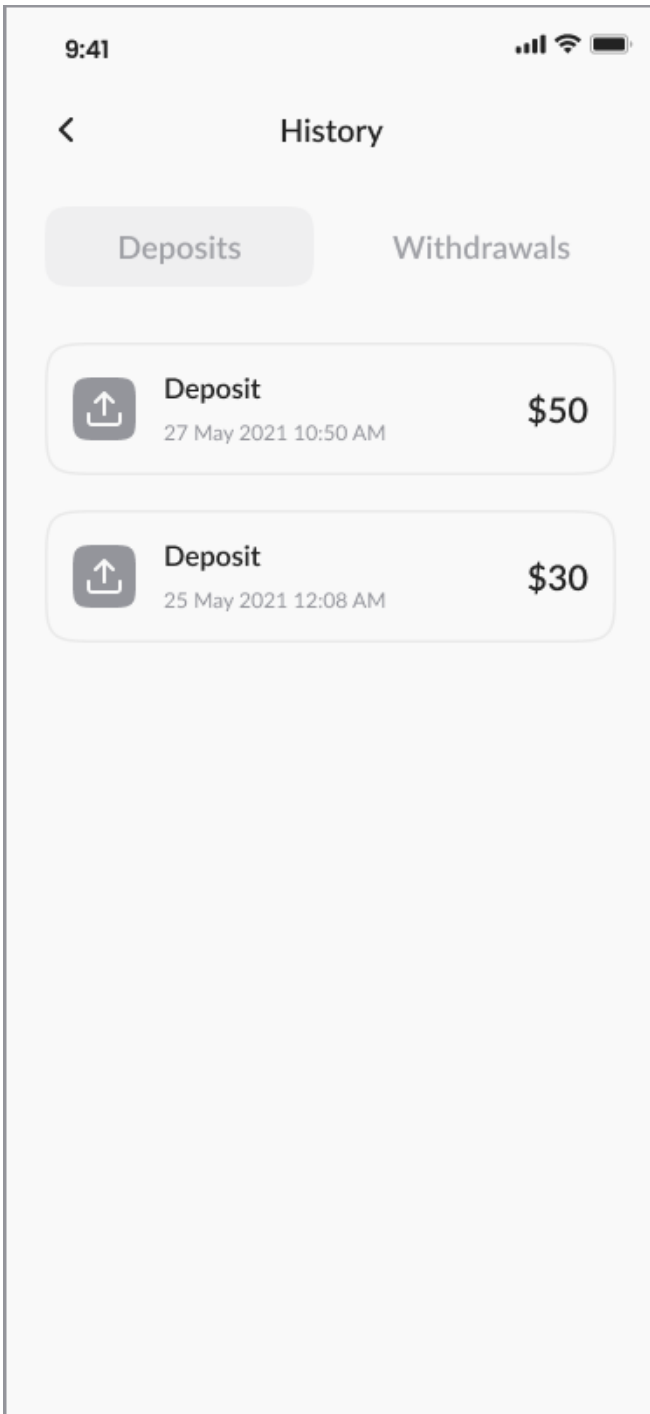
If the user selects:

- element “News” from Navigation bar, the system displays the list of all articles (chapter 4.11)
- element “Notifications” from Navigation bar, the system displays the list of all notifications (chapter 4.9)
- element “Profile” from Navigation bar, the system shows the user account section with settings (chapter 4.12)
- “Search” icon, the system
 - Opens a text field for entering a search request
 - Hides the main title and “Scan” icon
 - Waits for the user to enter
 - Shows the results corresponding to the text request
- “Scan” icon, the system opens a camera to scan QR-code for performing a quick transaction
- “History” button, the system shows the Transaction History Screen (Picture 16) with a list of all transactions sorted by Deposits and Withdrawals
- asset in Trade Crypto section, the system opens the Crypto Detail (Picture 17) (chapter 7)
- “Withdraw” button, the system redirects to the withdrawal procedure (chapter 8)
- “Deposit” button, the system redirects to the deposit procedure (chapter 8)
- an asset in My Wallet section, the system shows the Wallet Detail Screen (Picture 31) with balance overview (chapter 10)
- “See all” link in the Wallet section, the system shows the Wallet Screen (Picture 32) (chapter 9)

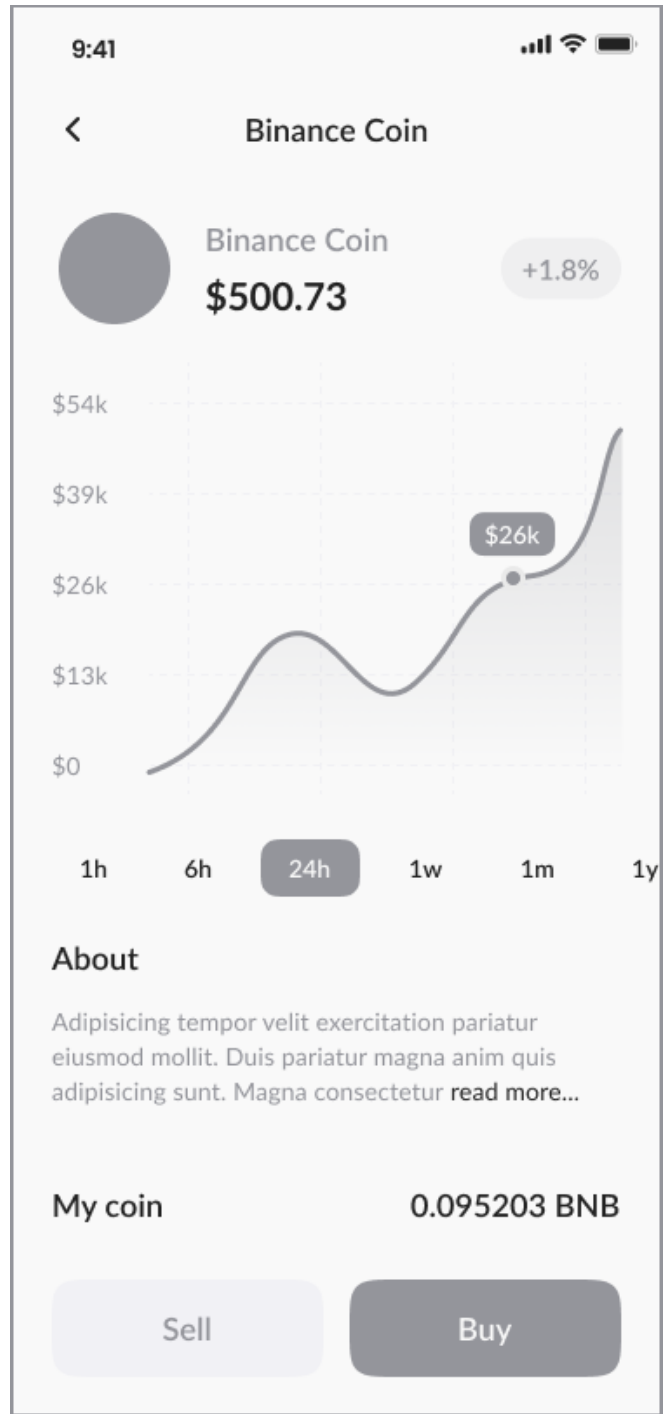
4.6.3 Wireframe



Picture 15 - Wireframe - Home Page



Picture 16 - Wireframe - Transaction History



Picture 17 - Wireframe - Crypto Detail

4.7. Crypto Detail (Buy & Sell)

4.7.1 Use Case

The user expects:

- to know the actual crypto price
- to explore the dynamic of the coin over various time periods
- to find out basic info about crypto asset
- to go back to Home page
- to view the wallet balance
- the ability to buy and sell crypto

Use case: Buy Crypto

Description: The user can buy cryptocurrency and store it on a cryptocurrency wallet

Precondition: The user's must have a linked bank account; The user must pass Account Verification;

Post condition: The user must have non-zero balance on their wallet

Normal Flow	
Actions of the Actor	Actions of the System
	1. The system shows a Crypto Detail Screen (Picture 17) and waits for the user to take an action.
2. The user clicks on the Buy button.	3. The system displays Buy Screen (Picture 18).
4. The user inserts the amount in fiat or crypto and confirms the input by clicking	5. The system opens Purchase Preview Screen (Picture 19).

the <i>Next</i> button.	
6. The user checks out the data and confirms the purchase by clicking the <i>Buy Now</i> button.	7. The system shows a Success Purchase Screen (Picture 20) to inform the user about the result of the operation.
8. The user clicks the <i>Back to Homepage</i> button to go back to the Home Screen (Picture 15).	9. The system displays the Home Screen (Picture 15).

Table 11 - Buy Use Case (Normal Flow)

Exception Flow: Purchase Failed	
Actions of the Actor	Actions of the System
	7. The system shows a Failed Purchase Screen (Picture 21) to inform the user about the result of the operation.
8. The user clicks the <i>Back</i> button.	9. The system redirects the user to Buy Screen (Picture 18).

Table 12 - Buy Use Case (Exception Flow)

Use case: Sell Crypto

Description: The user can sell cryptocurrency and receive funds on the attached bank account

Precondition: The user's must have a linked bank account; The user must pass Account Verification;

Post condition: -

Normal Flow	
Actions of the Actor	Actions of the System

	1. The system shows a Crypto Detail Screen (Picture 17) and waits for the user to take an action.
2. The user clicks on the Sell button.	3. The system displays the Sell Screen (Picture 22).
4. The user inserts the amount in fiat or crypto and confirms the input by clicking the Next button.	5. The system opens the Sale Preview Screen (Picture 23).
6. The user checks out the data and confirms the purchase by clicking the Sell Now button.	7. The system shows the Success Sale Screen (Picture 24) to inform the user about the result of the operation.
8. The user clicks the Back to Homepage button to go back to the Home Screen (Picture 15).	9. The system displays the Home Screen (Picture 15).

Table 13 - Sell Use Case (Normal Flow)

Exception Flow: Sale Failed	
Actions of the Actor	Actions of the System
	7. The system shows the Failed Sale Screen (Picture 25) to inform the user about the result of the operation.
8. The user clicks the Back button.	9. The system redirects the user to the Sell Screen (Picture 22).

Table 14 - Sell Use Case (Exception Flow)

4.7.2 Scenario

The system displays to the user the Crypto Detail Screen (Picture 17), where there is:

- an asset price,
- asset dynamics over various periods of time
- daily change in percent
- a small description of the selected cryptocurrency
- the wallet balance
- a button to buy cryptocurrency;
- a button to sell cryptocurrency;
- a back button

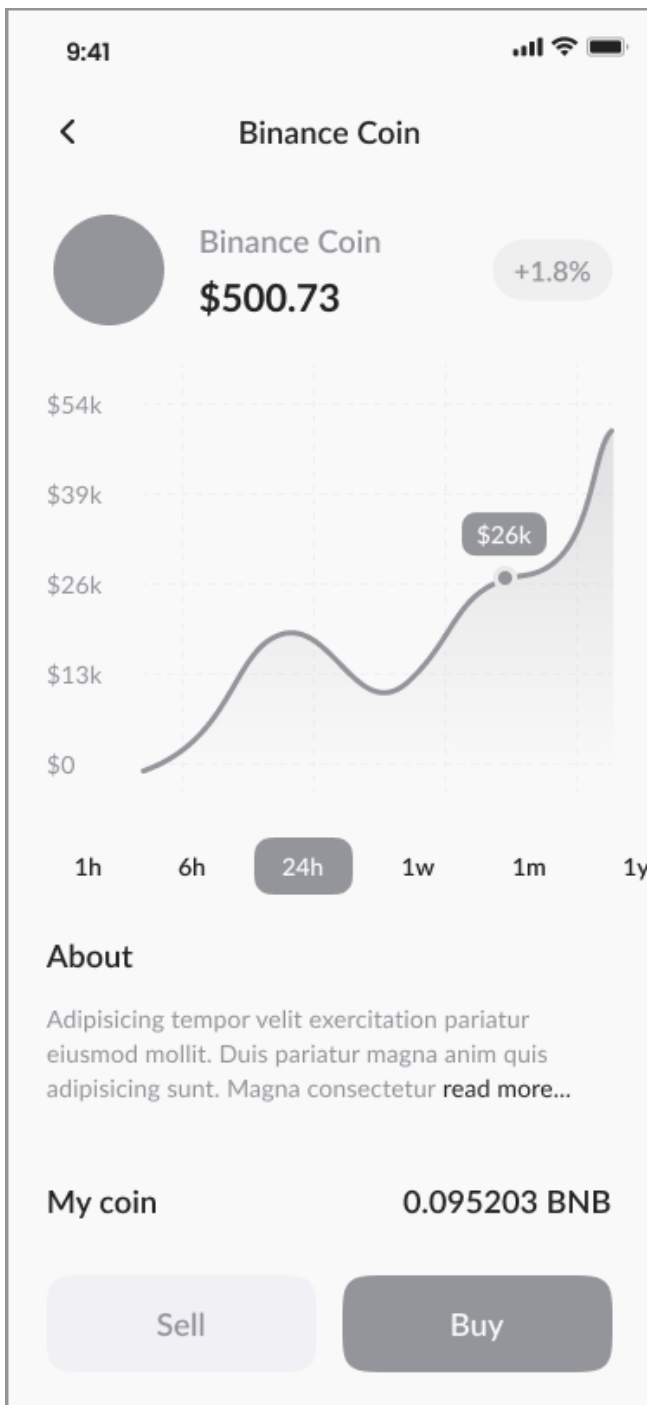
The system is waiting for the user's choice.

There are 3 possible scenarios:

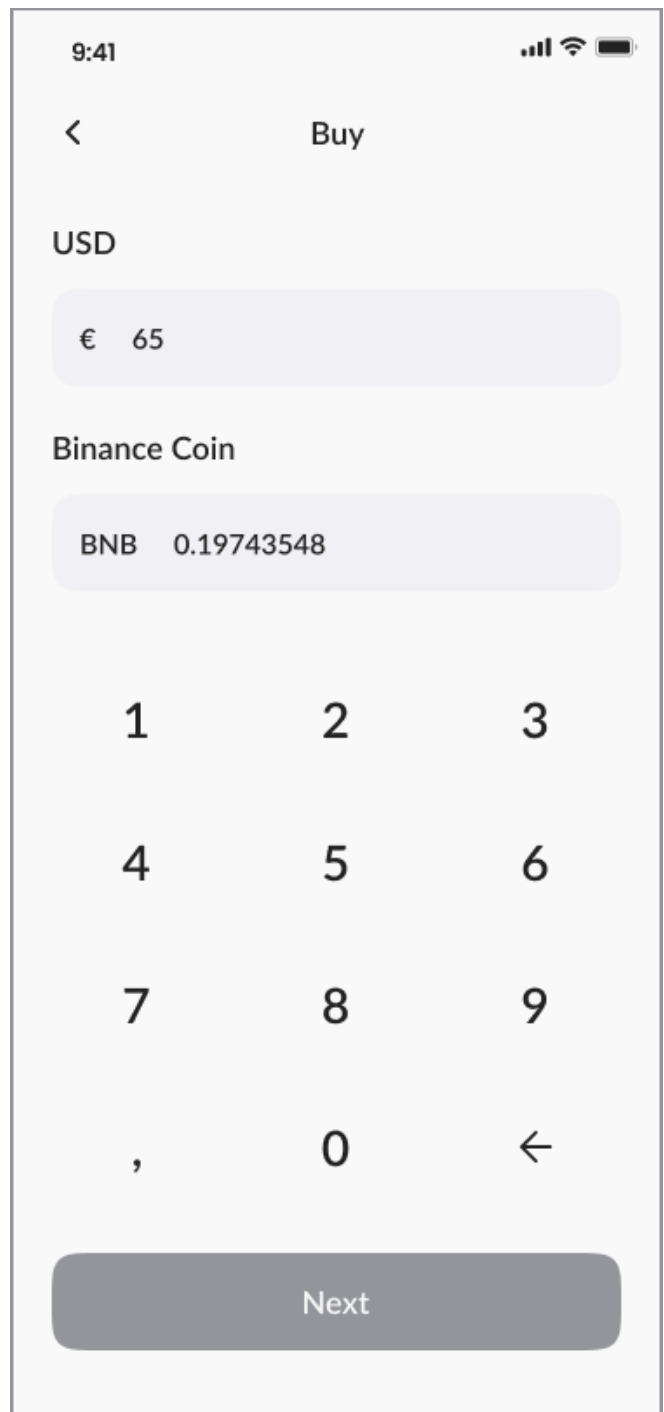
- 1) **Back** button is selected, the system redirects the user to the Home Screen (Picture 15).
- 2) **Buy** button is chosen, the system starts the operation of crypto purchase and displays the Buy Screen (Picture 18), where these elements are present:
 - a text field for entering the amount in cryptocurrency
 - a text field for entering the amount in fiat
 - a decimal keyboard
 - a button next
- 3) **Sell** button is chosen, the system starts the operation of crypto sale and displays the Sell Screen (Picture 22), where these elements are present:
 - a text field for entering the amount in cryptocurrency
 - a text field for entering the amount in fiat
 - a decimal keyboard
 - a button next

After successfully performing a transaction, the system displays the page with the results of the operation and a button to return to the main page of the application (Picture 15).

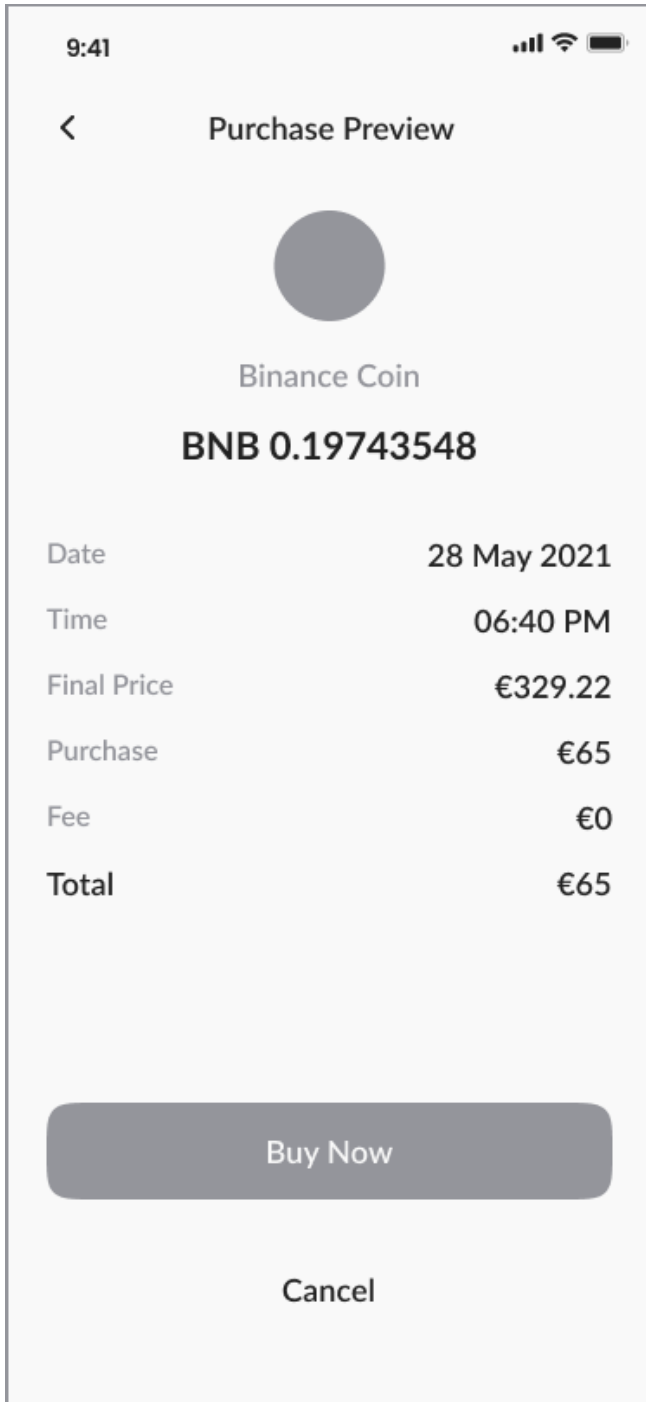
4.7.3 Wireframe



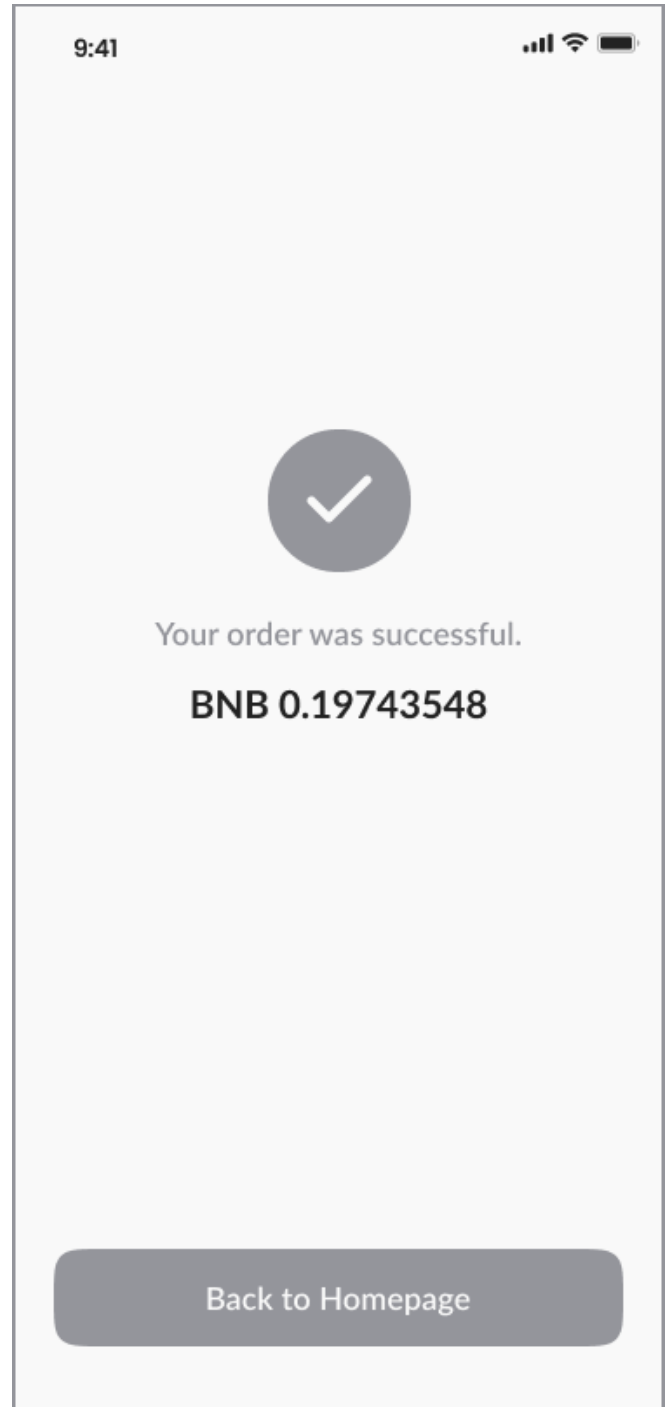
Picture 18 - Wireframe - Crypto Detail



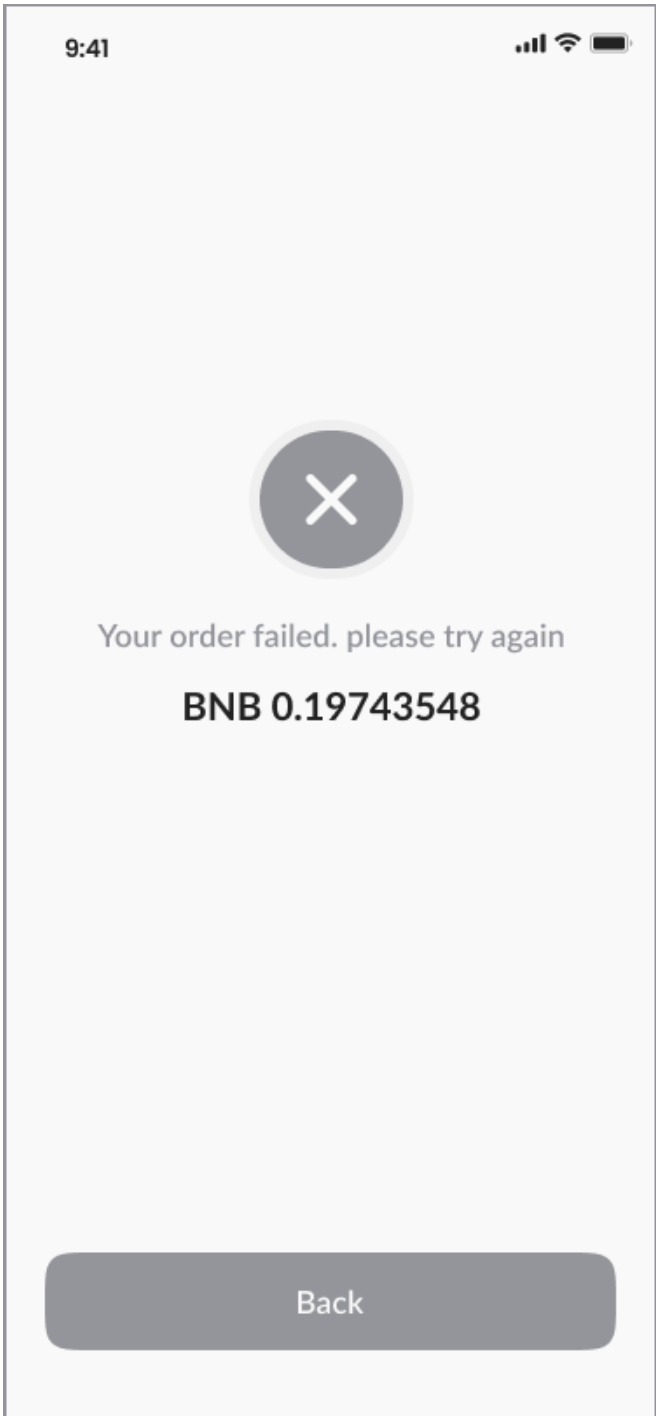
Picture 19 - Wireframe - Buy



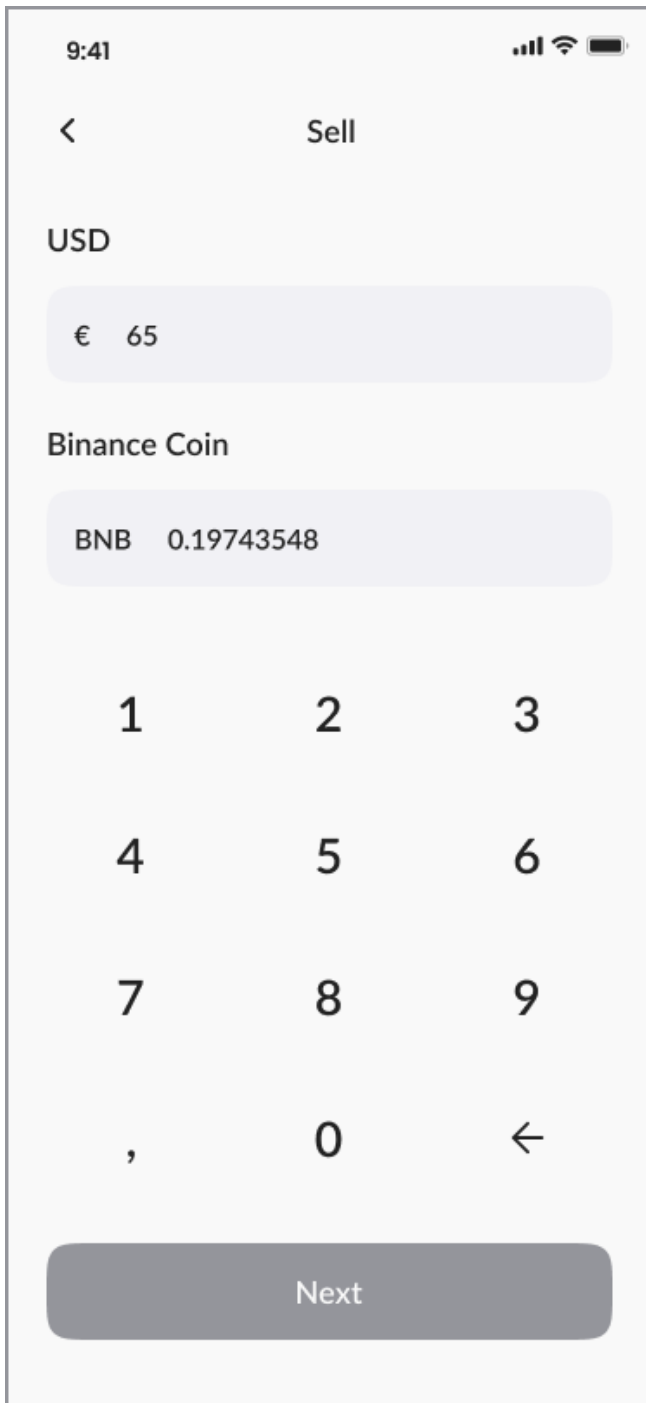
Picture 20 - Wireframe - Purchase Preview



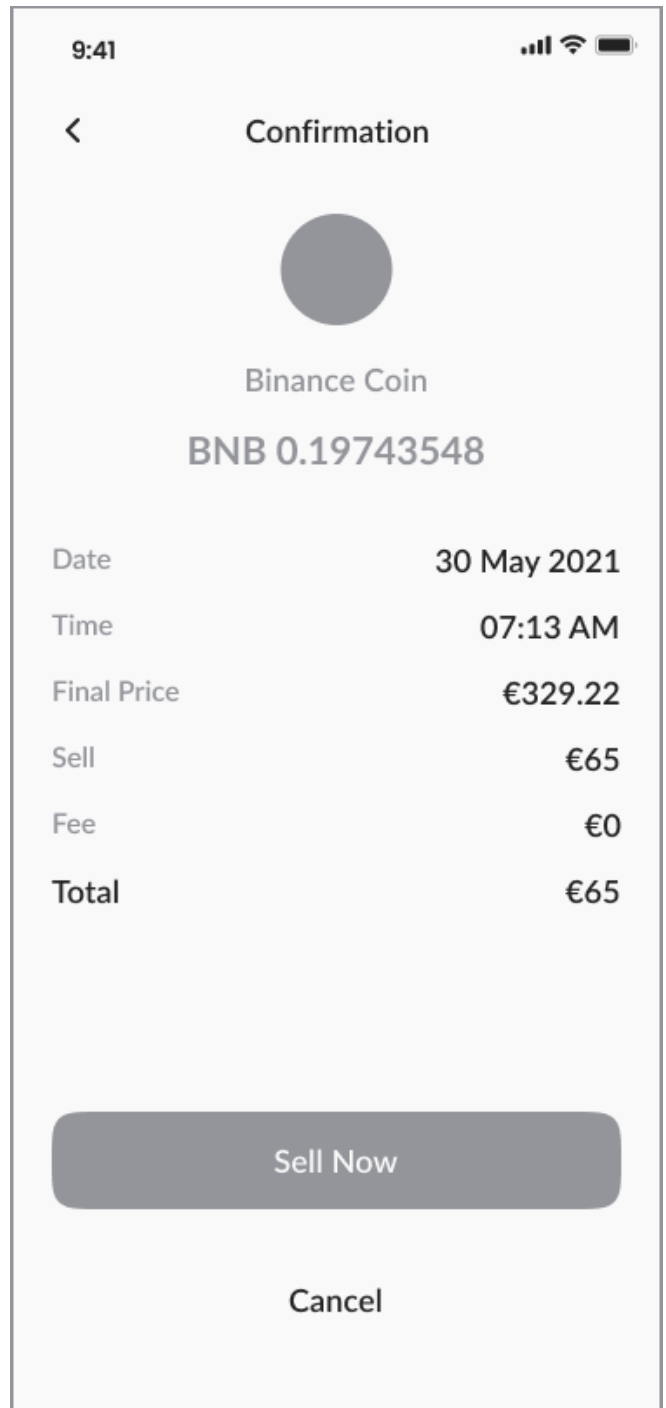
Picture 21 - Wireframe - Success Purchase



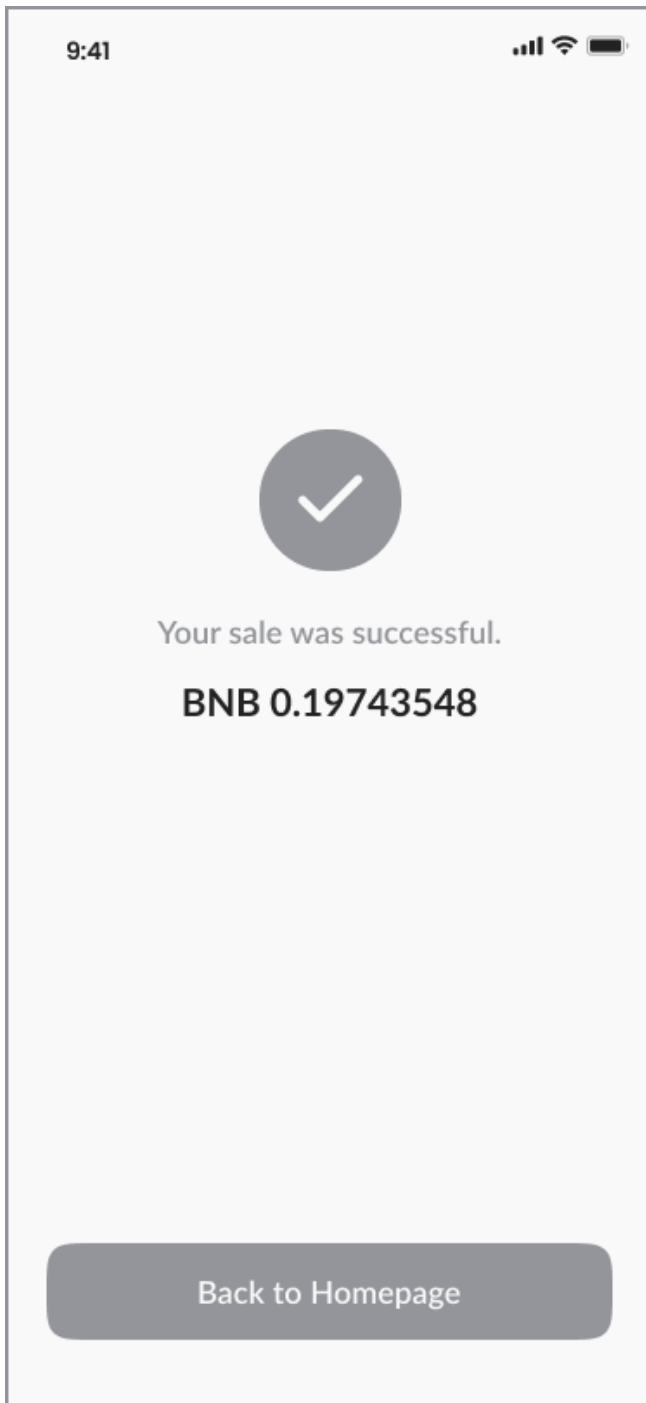
Picture 22 - Wireframe - Failed Purchase



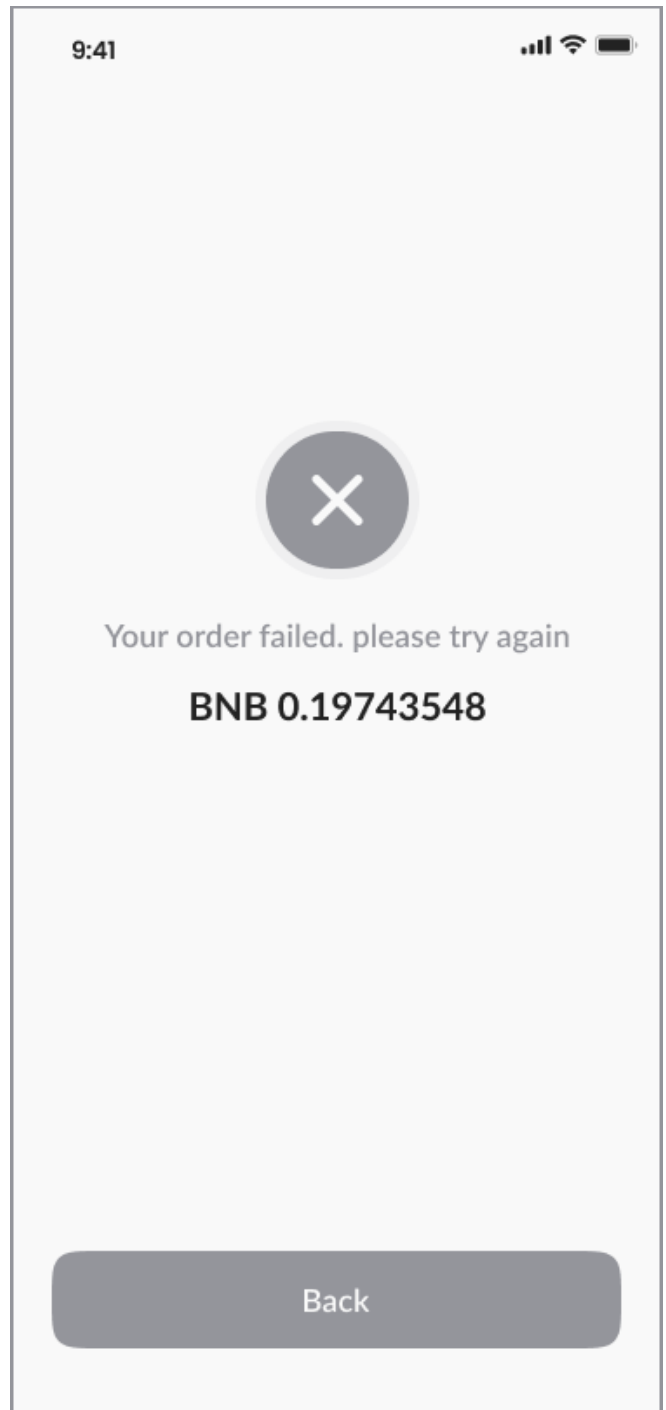
Picture 23 - Wireframe - Sell



Picture 24 - Wireframe - Sale Preview



Picture 25 - Wireframe - Success Sale



Picture 26 - Wireframe - Failed Sale

4.8. Withdraw & Deposit

4.8.1 Use Case

The user expects:

- to be able to deposit or withdraw funds on their account
- to see the list of linked bank accounts and quickly access its number
- to explore the procedure of deposit/withdrawal and find all the necessary instructions
- to input the value of the operation
- to see info regarding the transaction duration

Use case: Withdraw Funds

Description: The user can withdraw funds from their account

Precondition: The user must have non-zero balance on their wallet; The user's must have a linked bank account; The user must pass Account Verification;

Post condition: -

Normal Flow	
Actions of the Actor	Actions of the System
1. The user selects Withdraw option on the Home Screen (Picture 15)	2. The system shows the Withdraw Screen (Picture 26) and waits for the user to take an action.
3. The user enters the amount of funds to be withdrawn.	
4. The user selects an account to receive funds.	
5. The user confirms the request by clicking a Continue button	6. The system displays the Withdraw Preview Screen (Picture 27) and waits for the user to reconfirm.

7. The user confirms the correctness of the request by pressing a Withdraw button	8. The system informs the user about the successfully performed operation by showing the Success Withdraw Screen.
9. The user clicks a Go to Homepage button	10. The system redirects the user to the Home Screen (Picture 15)

Table 15 - Withdraw Use Case (Normal Flow)

Exception Flow: Withdraw Failed	
Actions of the Actor	Actions of the System
	8. The system informs the user about an unsuccessful operation request by showing a Failed Withdraw Screen.
8. The user clicks the Back button.	9. The system redirects the user to the Home Screen (Picture 15).

Table 16 - Withdraw Use Case (Exception Flow)

Use case: Deposit Funds

Description: The user can deposit funds to their account

Precondition: The user's must have a linked bank account; The user must pass Account Verification;

Post condition: -

Normal Flow	
Actions of the Actor	Actions of the System
1. The user selects the Deposit option on the Home Screen (Picture 15).	2. The system shows the Deposit Screen (Picture 28).
3. The user selects a virtual account for a	

deposit and copies the account address.	
4. The user goes back by clicking on the Back icon in the top left corner	5. The system redirects the user to the Home Screen (Picture 15).

Table 17 - Deposit Use Case (Normal Flow)

4.8.2 Scenario

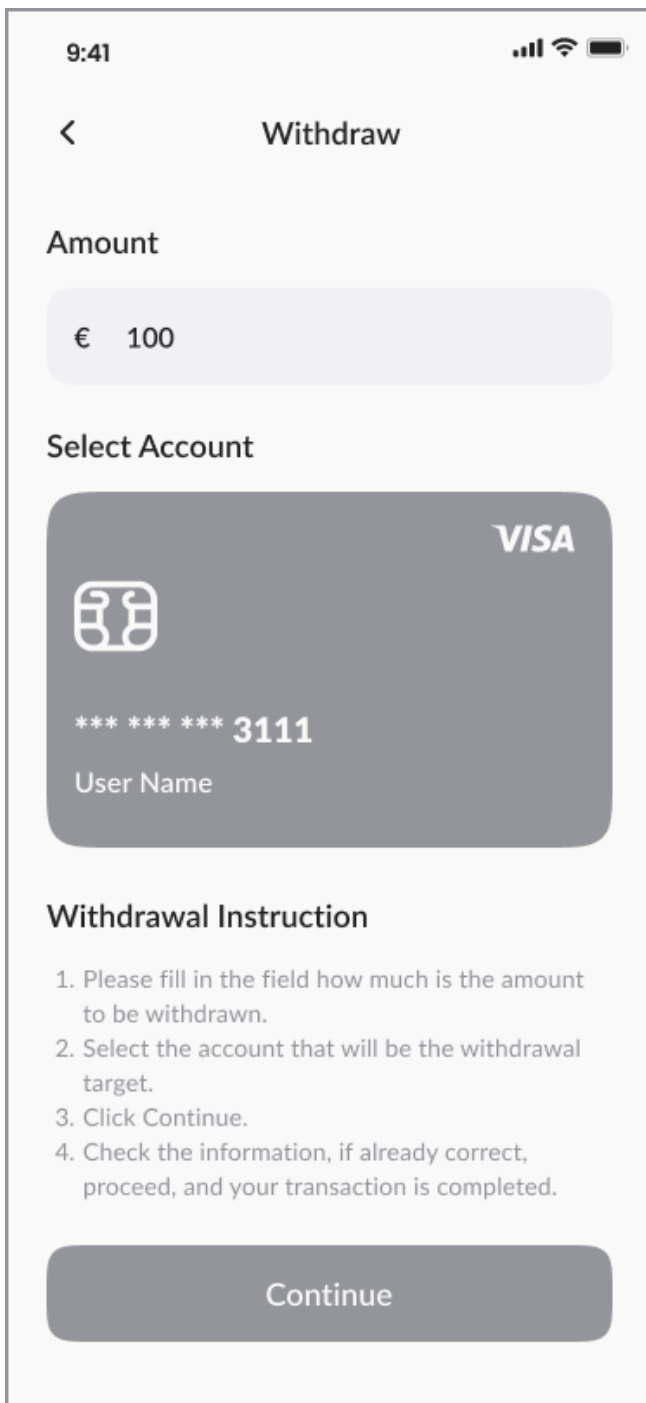
The system shows the Withdraw Screen (Picture 26) and the Deposit Screen (Picture 28) when selecting the corresponding buttons on the Home Screen (Picture 15). These screens contain:

- a text field to enter the amount (for withdrawal operation)
- a selector for choosing a linked account
- instructions for the operation
- a button to confirm the operation (for withdrawal operation)

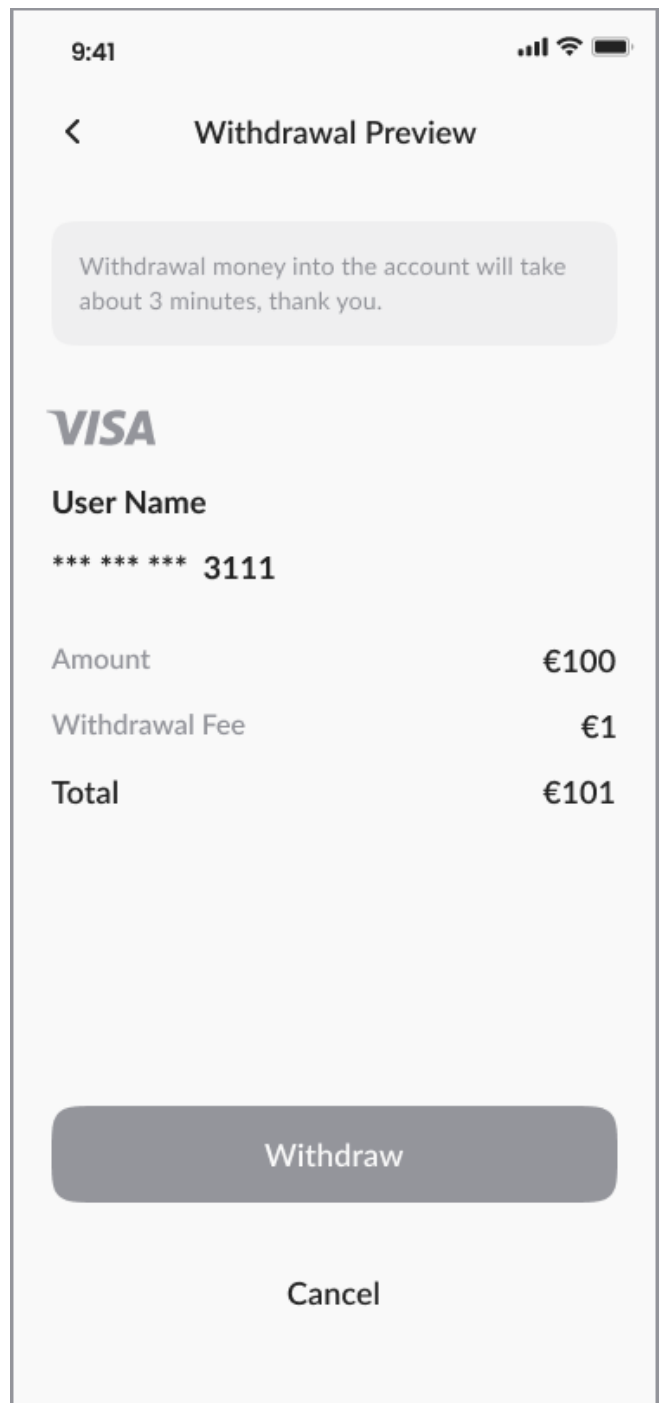
When performing a withdrawal operation, there are listed below elements on the Withdrawal Preview Screen (Picture 27):

- a message on the operation duration
- summary of the operation
- a button **Cancel** to cancel the withdrawal request
- a button **Withdraw** to confirm the operation

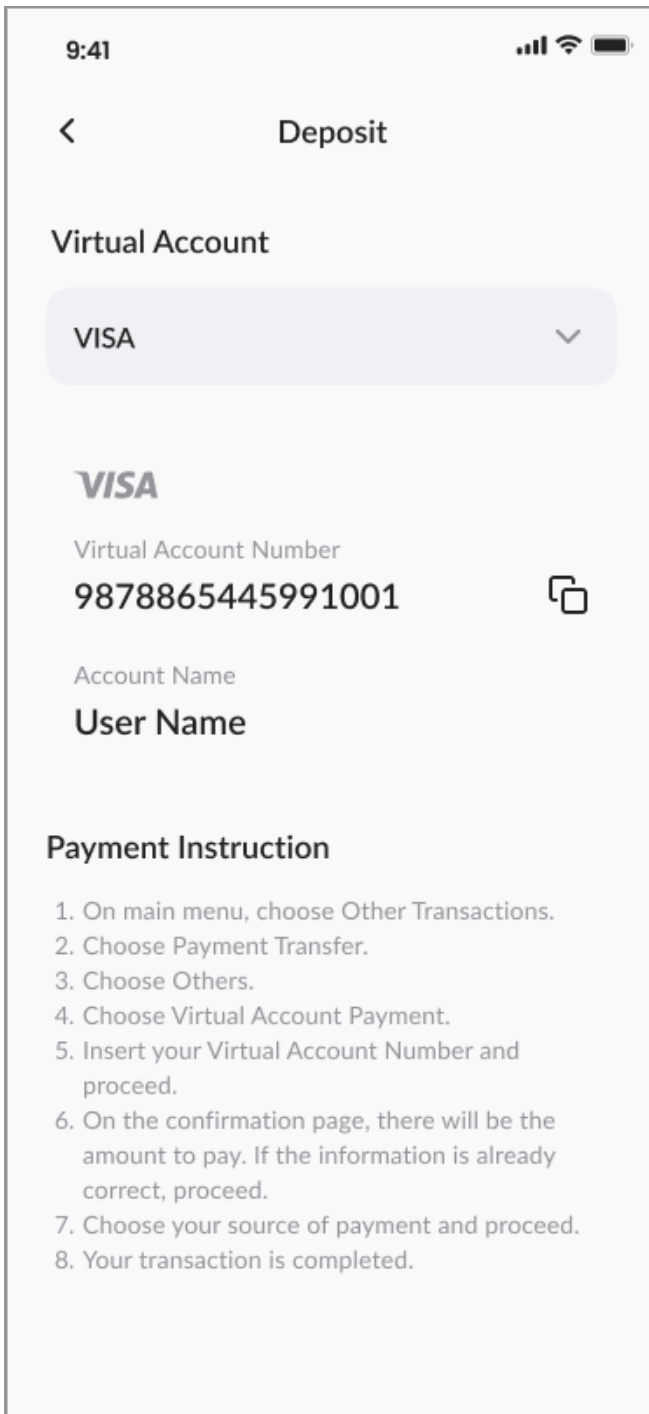
4.8.3 Wireframe



Picture 27 - Wireframe - Withdraw



Picture 28 - Wireframe - Withdrawal Preview



Picture 29 - Wireframe - Deposit

4.9. Notifications

4.9.1 Use Case

In the Notifications section, the user expects:

- to track all the notifications in the app sorted by date

- to differentiate between unread and read notifications
- to quickly mark all notifications as read
- to be able to modify notification settings
- to receive any system messages

4.9.2 Scenario

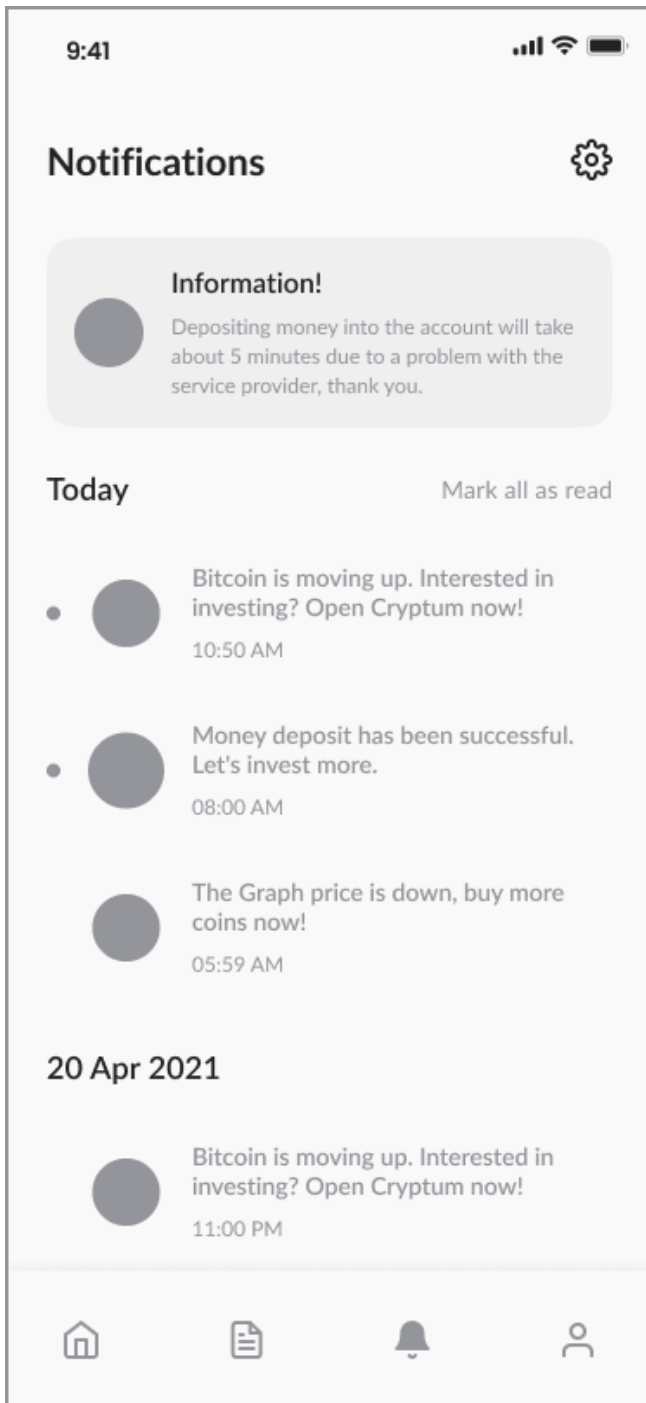
When selecting a “*Notifications*” icon on the navigation bar, the system displays the Notifications Screen (Picture 29) with:

- a list of all system notifications (where unread are marked with a dot)
- a link to mark all as read
- a popup with important technical or security information
- an icon “Settings” to manage notification settings

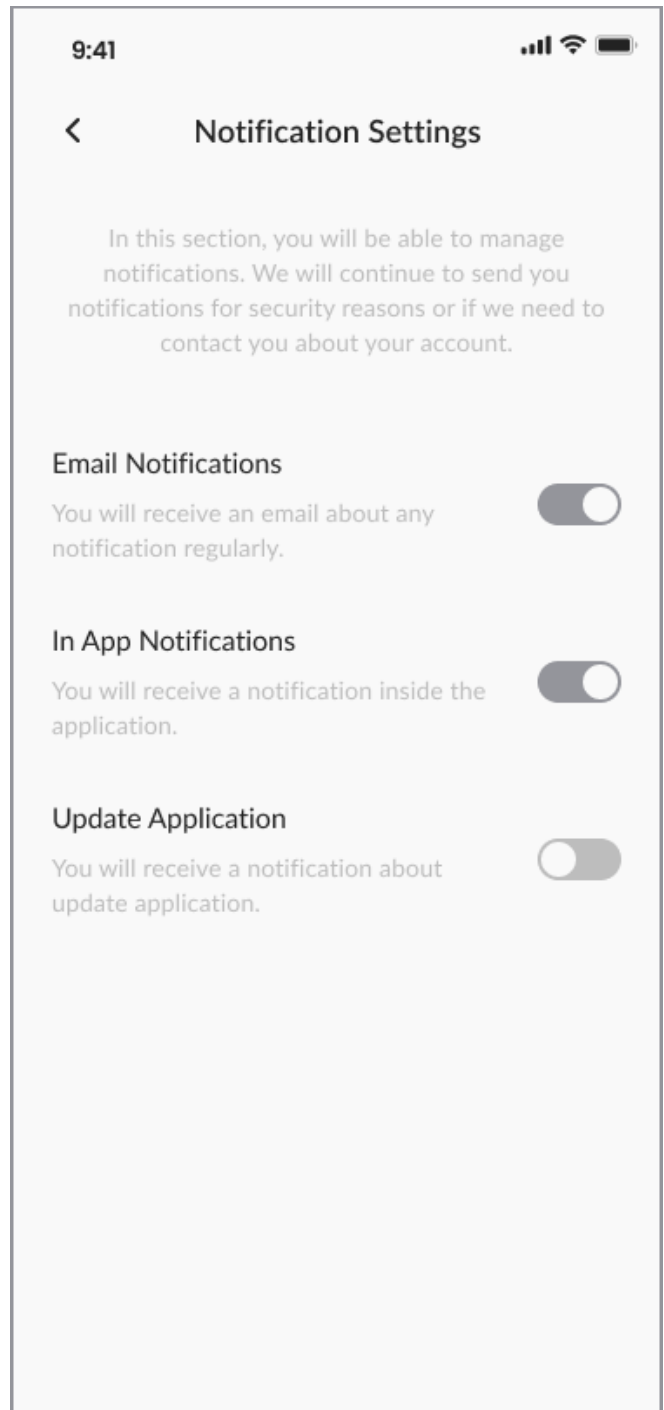
In case the option “Settings” is selected, the system shows Notification Settings Screen (Picture 30), where these elements can be found:

- a description of the section
- a **Back** button to go back to the Notifications (Picture 29)
- a switch to turn on/off email notifications
- a switch to turn on/off in-app notifications
- a switch to turn on/off auto update of the app

4.9.3 Wireframe



Picture 30 - Wireframe - Notifications



Picture 31 - Wireframe - Notifications Settings

4.10. Wallet

4.10.1 Use Case

In the Wallet section, the user expects:

- to see the total balance representing a sum of all asset balances
- to know the balance of each wallet (asset) in crypto and converted to fiat
- to go through the transaction history for each asset
- to quickly buy or sell any asset

4.10.2 Scenario

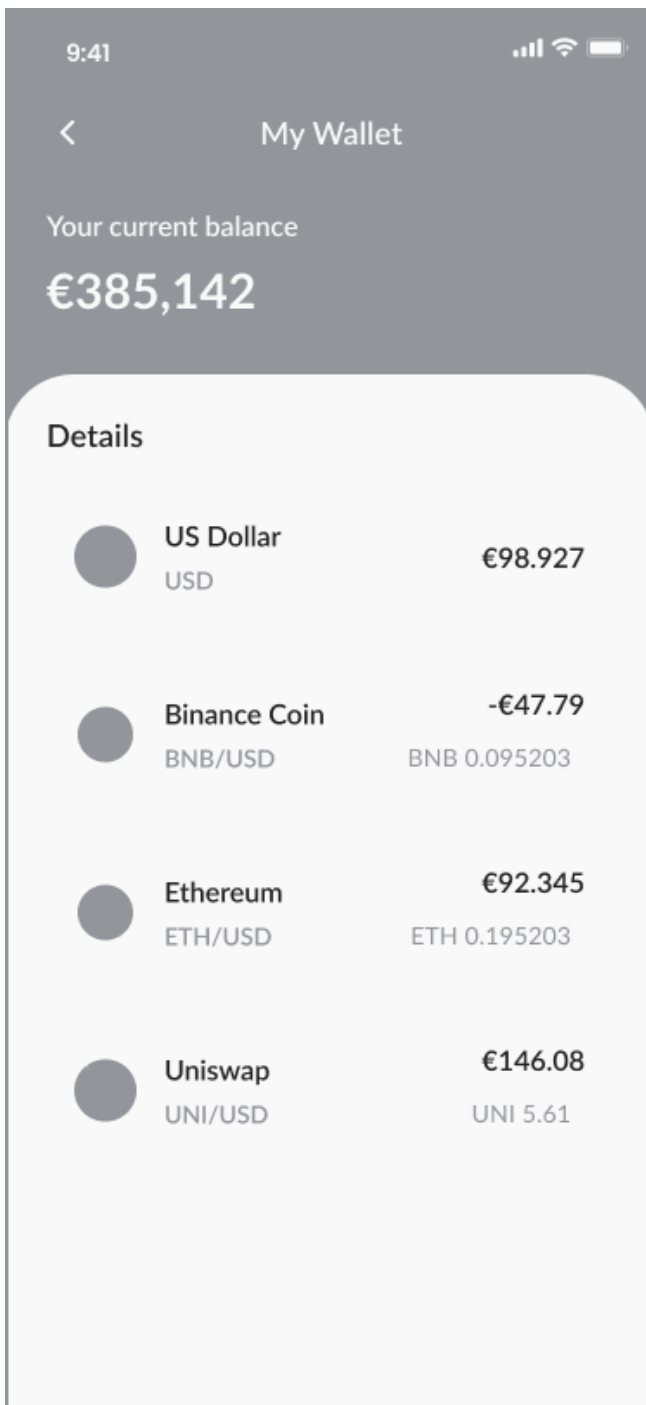
When selecting a “*See all*” link in My Wallet section on the Home Screen (Picture 15), the system displays the Wallet Screen (Picture 31) with:

- total current balance
- a back button to return to the main page
- cards corresponding to a particular asset forming a user portfolio with its actual balance

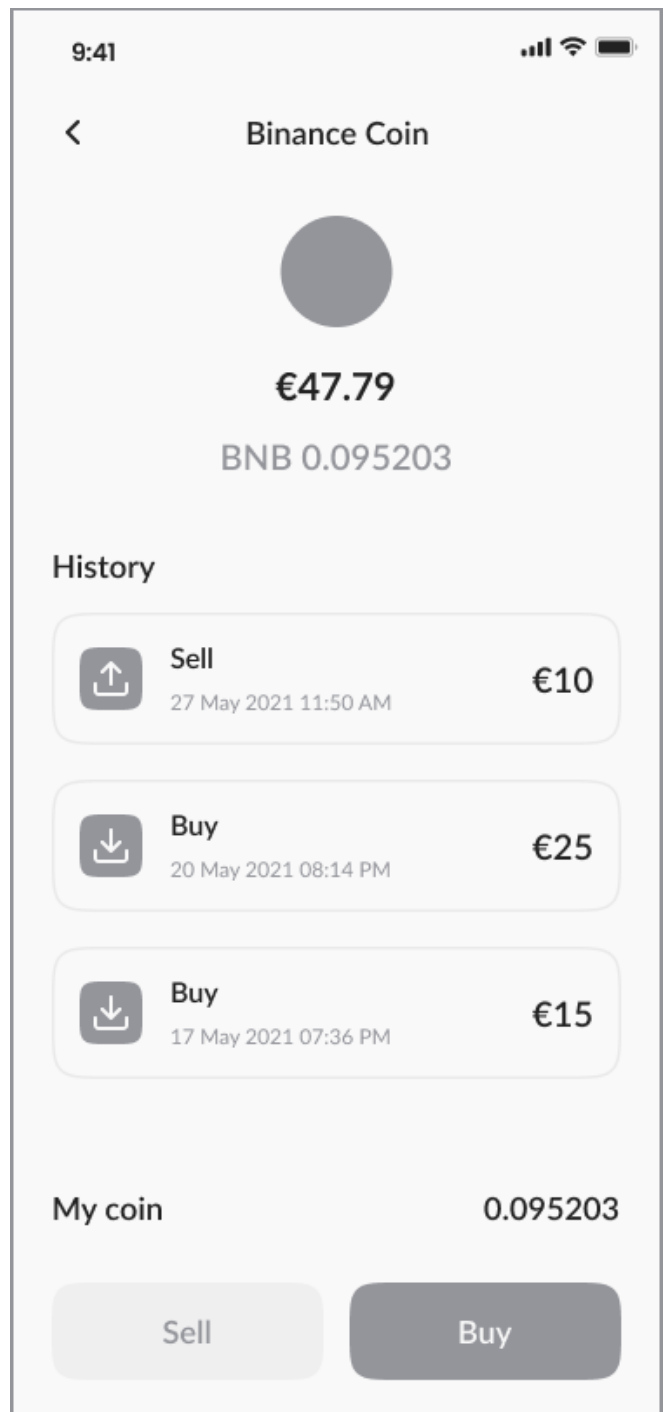
If any of the assets is selected, the system opens the Wallet Detail Screen (Picture 32), where the elements listed below are displayed:

- a name of the coin
- current wallet balance represented in both, fiat and crypto
- a back button to return to Wallet Screen (Picture 31)
- a History section, where the cards representing each transaction are shown, as well as:
 - transaction amount (value)
 - transaction date and time
 - transaction type
- a button to buy the selected asset
- a button to sell the selected asset

4.10.3 Wireframe



Picture 32 - Wireframe - Wallet



Picture 33 - Wireframe - Wallet Detail

4.11. News

4.11.1 Use Case

In the News section, the user expects:

- to see the list of the latest crypto news
- to be able to sort and filter news across different sections and coins
- to read a particular article and browse the related photos
- to see the posting date of each article and its source

4.11.2 Scenario

When selecting a “*News*” icon on the navigation bar, the system displays the News Screen (Picture 33) with:

- a slider with the top news (with the posting date, source and tags)
- a list of all articles with the posting date, source and tags
- an icon “Filter”

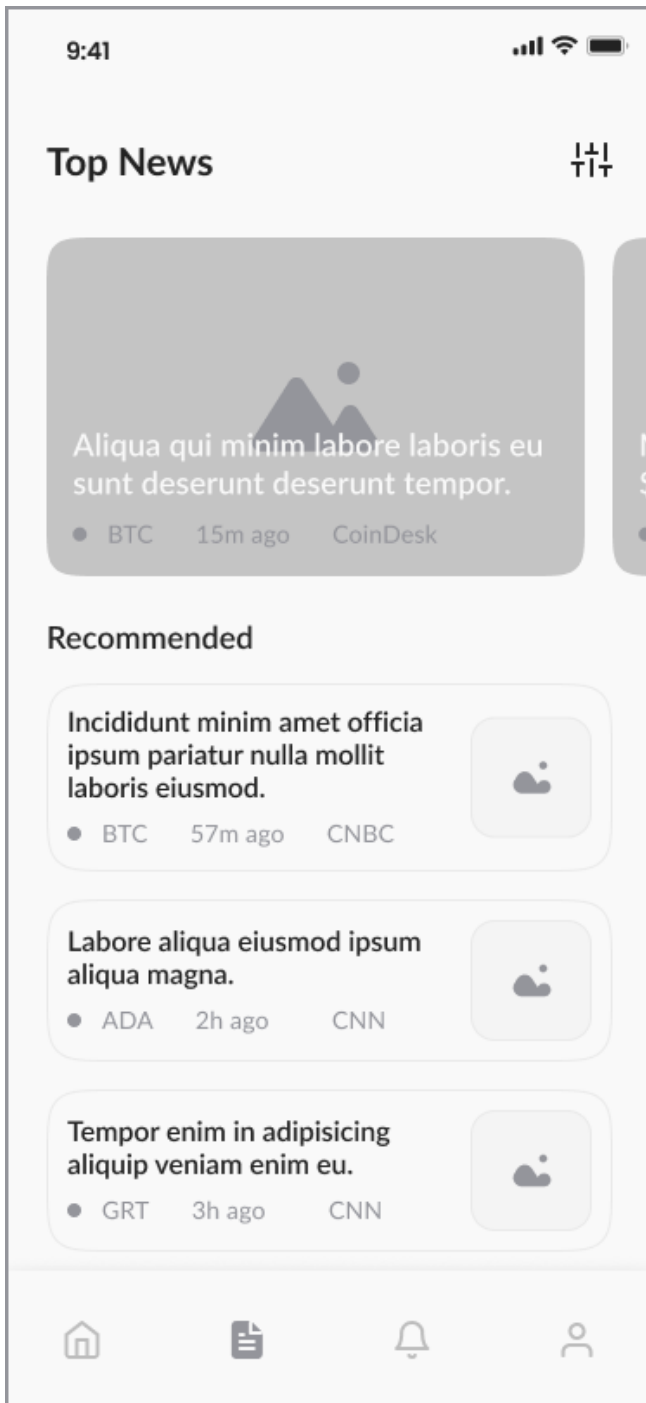
In case the icon “Filter” is selected, the system shows a dropdown represented on the News Sort & Filter Screen (Picture 34), where these elements can be found:

- a slider with a tab for news sorting (Latest, Trending, Recommended)
- a list with multiple choice items for coin/topic selection

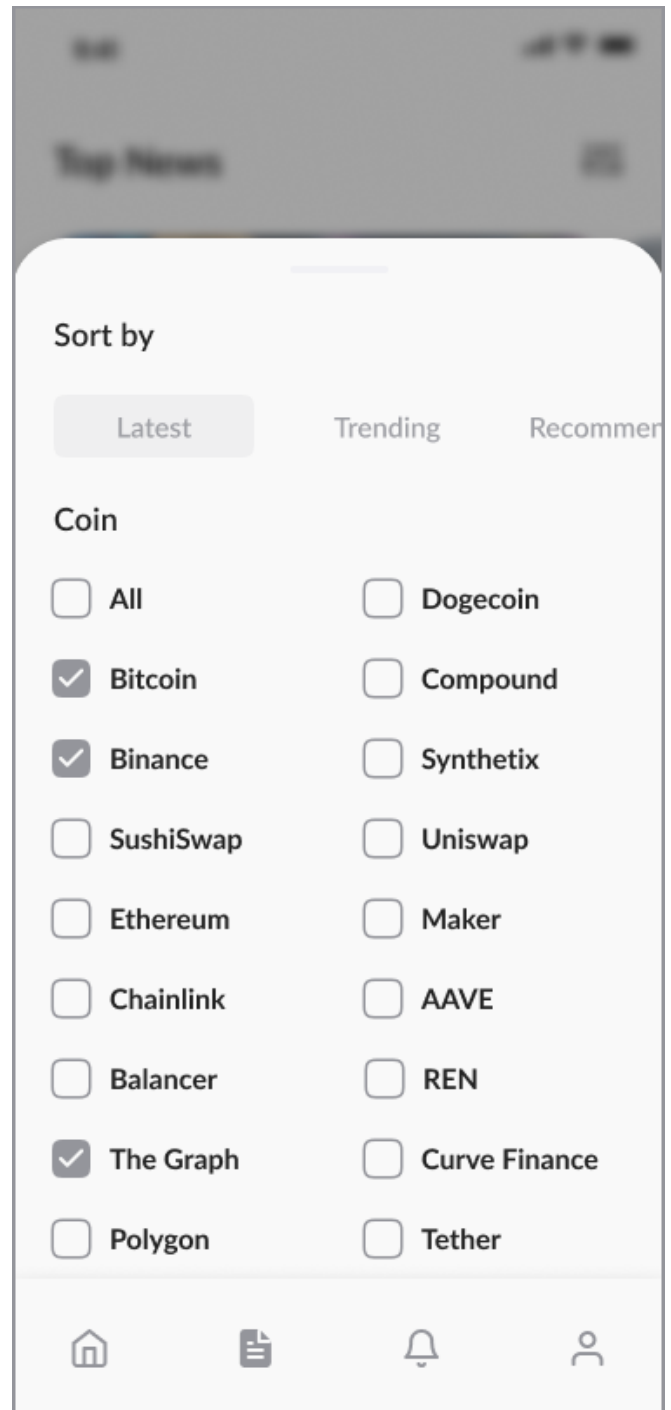
When the dropdown is hidden, the system shows the News Screen (Picture 33) all the articles filtered and sorted. If a particular article is selected, the system displays the News Detail Screen (Picture 35), with these elements:

- a back button to go back to the News Screen (Picture 33)
- a “Share” button for external sharing
- photos/pictures related to the article
- content of an article
- posting date, source and tags

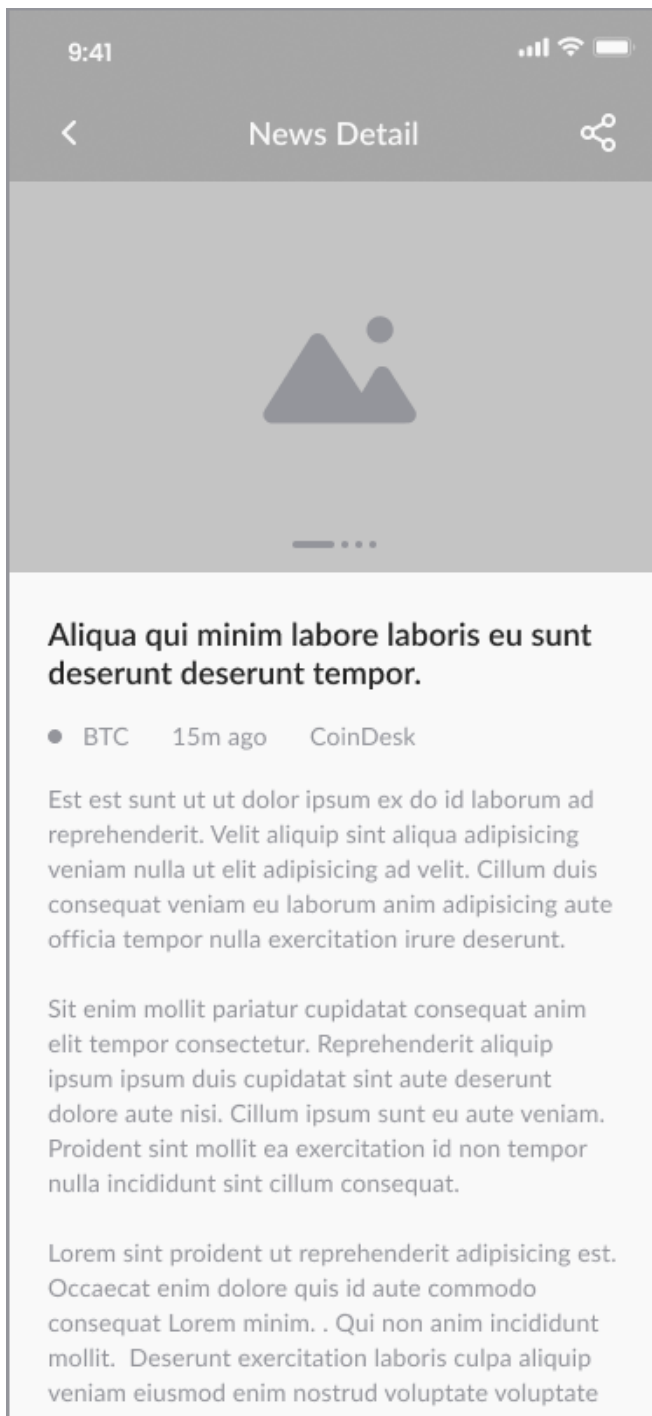
4.11.3 Wireframe



Picture 34 - Wireframe - News



Picture 35 - Wireframe - News Sort & Filter



Picture 36 - Wireframe - News Detail

4.12. Profile

4.12.1 Use Case

In the Profile section the user expects:

- to find info about the account being currently in use
- to access to personal data and to have an ability to modify it

- to set up the notification settings
- to be able to log out from the application
- to verify the user account
- to track the linked payment methods and to add new payment methods
- to change language of the application
- to contact customer support
- to find the answers on frequently asked questions
- to see some contact details (email address, website link etc.) and external links
- to manage account security
- to join a referral program

Use case: Edit Profile

Description: The user can edit his personal details and email

Precondition: -

Post condition: -

Normal Flow	
Actions of the Actor	Actions of the System
1. The user selects a Profile option from the navigation bar on the Home Screen (Picture 15)	2. The system shows the Profile Screen (Picture 36) and waits for the user to take an action.
3. The user selects an item Personal Details by clicking on it.	4. The system opens a Personal Details Screen (Picture 37) with the text fields for a full name, an email and a wallet address.
5. The user inputs the data and confirms the operation by clicking a Save button.	6. The system redirects the user to the Profile Screen (Picture 36).

Table 18 - Edit Profile Use Case (Normal Flow)

Use case: Verify Account

Description: The user can verify their account to be able to perform transactions.

Precondition: -

Post condition: The user can perform operations of withdrawal, depositing, buying or selling crypto.

Normal Flow	
Actions of the Actor	Actions of the System
1. The user selects a Profile option from the navigation bar on the Home Screen (Picture 15).	2. The system shows a Profile Screen (Picture 36) and waits for the user to take an action.
3. The user selects an item Account Verification by clicking on it.	4. The system opens a Verification - Phone Screen (Picture 38).
5. The user inserts their phone number and selects the messenger using a radio button.	
6. The user confirms the request for sending a one-time password by clicking a Send OTP button	7. The system redirects the user to the Verification - ID 2 Screen (Picture 41).
8. The user clicks a Take photo button	9. The system opens a camera represented on the Verification - ID 3 Screen (Picture 42) and waits for the user to take an action.
10. The user takes a picture of their document fitting it into a border.	11. The system shows the Verification - ID 4 Screen (Picture 43).
12. The user clicks a Next button.	13. The system shows the Verifying Screen (Picture 44).
	14. After receiving a positive response from BE, the system shows a Continue button at the bottom of the screen.
15. The user selects a Continue button.	16. The system shows the Verification - Success Screen (Picture 45).

17. The user clicks a Let's go button.	18. The system redirects the user to the Home Screen (Picture 15).
---	--

Table 19 - Verify Account Use Case (Normal Flow)

Use case: Add a Payment Method

Description: The user can link a payment method to their account

Precondition: -

Post condition: The user has at least one payment method stored in their account

Normal Flow	
Actions of the Actor	Actions of the System
1. The user selects a Profile option from the navigation bar on the Home Screen (Picture 15).	2. The system shows the Profile Screen (Picture 36) and waits for the user to take an action.
3. The user selects an item Accounts by clicking on it.	4. The system opens the My Account Screen (Picture 47).
5. The user clicks an Add New Account button.	6. The system redirects the user to the Add Account Screen (Picture 48) with a selector, 2 text fields and a button Add Account
7. The user selects a bank, inputs their account number and name, afterwards confirms the correctness of the data by clicking an Add Account button.	8. The system shows the My Account Screen (Picture 47) with a new payment method displayed.

Table 20 - Add Payment Use Case (Normal Flow)

Use case: Change Password

Description: The user can change their password

Precondition: The user must know their current password

Post condition: -

Normal Flow	
Actions of the Actor	Actions of the System
1. The user selects a Profile option from the navigation bar on the Home Screen (Picture 15).	2. The system shows the Profile Screen (Picture 36) and waits for the user to take an action.
3. The user selects an item Account Security by clicking on it.	4. The system opens the Account Security Screen (Picture 51).
5. The user selects an item Change Password by clicking on it.	6. The system opens the AS Change Password 1 Screen (Picture 52).
7. The user inputs their old password in the text field and clicks a Next button.	8. The system opens the AS Change Password 2 Screen (Picture 53).
8. The user inputs a new password in the text field, reconfirms the password and clicks a Save button	9. The system redirects the user to the Profile Screen (Picture 36).

Table 21 - Change Password Use Case (Normal Flow)

Use case: Chat with Customer Support

Description: The user can contact customer support.

Precondition: -

Post condition: -

Normal Flow	
Actions of the Actor	Actions of the System
1. The user selects a Profile option from the navigation bar on the Home Screen (Picture 15).	2. The system shows the Profile Screen (Picture 36) and waits for the user to take an action.

3. The user selects an item Help Center by clicking on it.	4. The system opens the Help Center Screen (Picture 54).
5. The user selects an item Live Chat by clicking on it.	6. The system opens the Help Center Live Chat Screen (Picture 56).
7. The user inputs the message in the text field using a keyboard and clicks a Send button.	
8. When the conversation is finished, the user clicks a Back button.	9. The system redirects the user to the Help Center Screen (Picture 54).

Table 21 - Chat Support Use Case (Normal Flow)

Use case: Logout

Description: The user can log out from the app.

Precondition: The user must be signed in.

Post condition: The user is signed out.

Normal Flow	
Actions of the Actor	Actions of the System
1. The user selects a Profile option from the navigation bar on the Home Screen (Picture 15).	2. The system shows the Profile screen (Picture 36) and waits for the user to take an action.
3. The user selects a button Log out at the bottom of the screen.	4. The system logs the user out and shows the Login Screen (Picture 8).

Table 22 - Logout Use Case (Normal Flow)

4.12.2 Scenario

On the the Profile screen (Picture 36), the system shows:

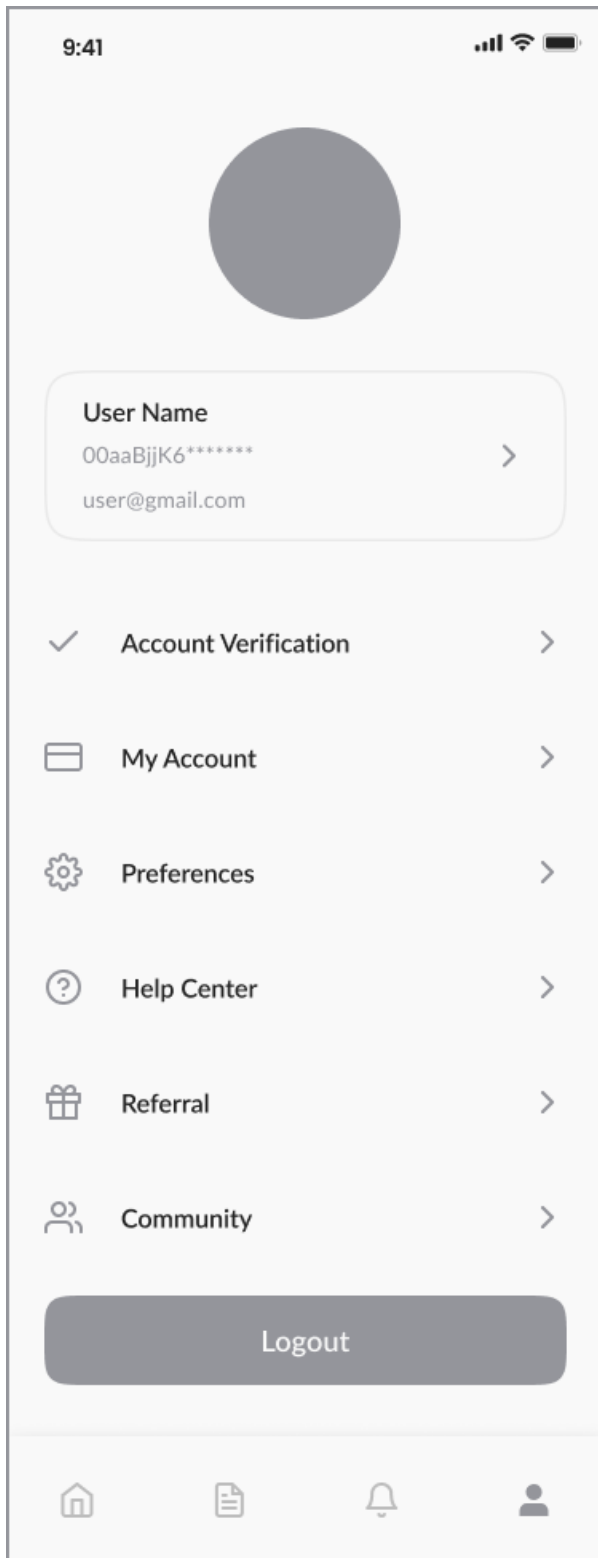
- Navigation bar with “Home”, “News”, “Notifications” and “Profile” icons
- Item “Personal details” with user name, email address and wallet address
- User profile picture
- Link “Account Verification” (available for non-verified users). In case of a verified user, the link is not displayed, and the label “Verified” is displayed close to the user profile picture.
- Link “My Account”
- Link “Preferences”
- Link “Help Center”
- Link “Referral”
- Link “Community”
- Button “Logout”

The system waits for the user to select any of the components listed above.

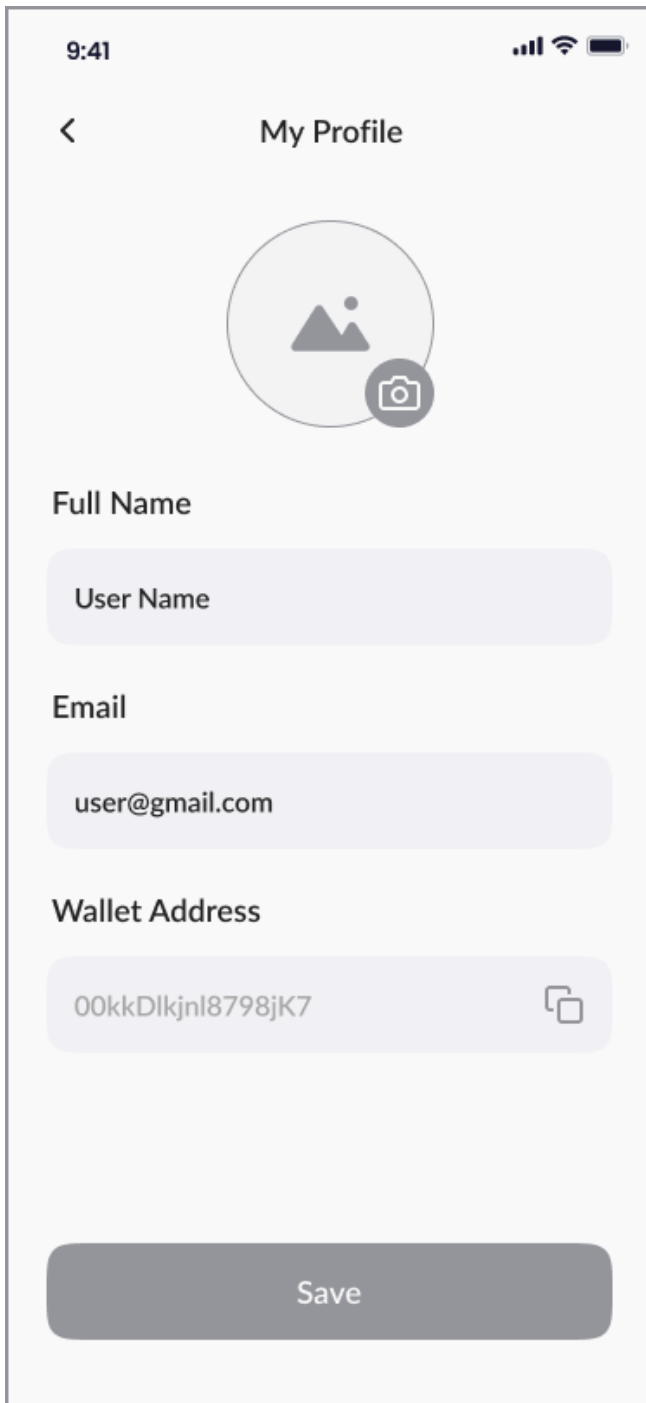
If the user selects:

- element “News” from Navigation bar, the system displays the list of all articles (chapter 4.11)
- element “Notifications” from Navigation bar, the system displays the list of all notifications (chapter 4.9)
- element “Home” from Navigation bar, the system shows the Home Screen (Picture 15) (chapter 4.6)
- item “Personal Details”, the system displays the Personal Details Screen (Picture 37)
- Link “Account Verification”, the system shows the Verification - Phone Screen (Picture 38)
- Link “My Account”, the system displays the My Account Screen (Picture 57)
- Link “Preferences”, the system displays the Preferences Screen (Picture 49)
- Link “Help Center”, the system displays the Help Center Screen (Picture 54)
- Link “Referral”, the system displays the Referral Screen (Picture 46)
- Link “Community”, the system shows the Community Screen (Picture 58)
- “Logout” button, the system finishes the session and displays the Login Screen (Picture 8)

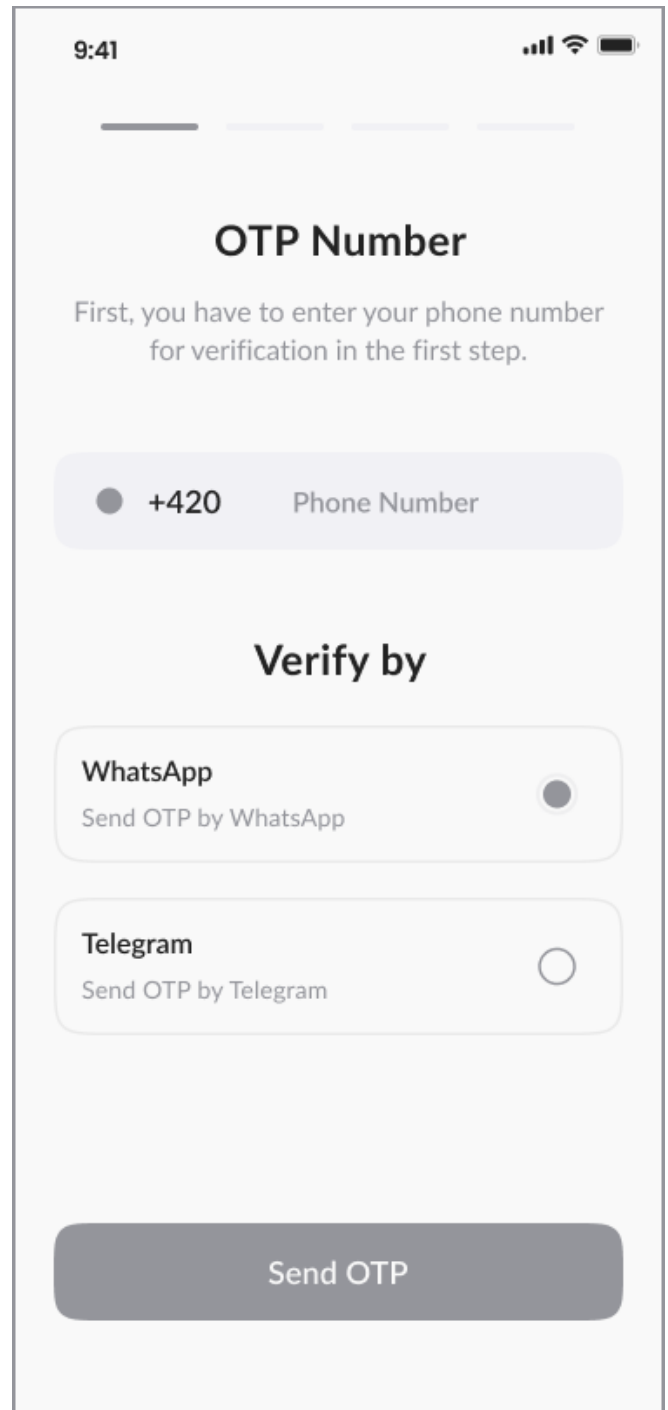
4.12.3 Wireframe



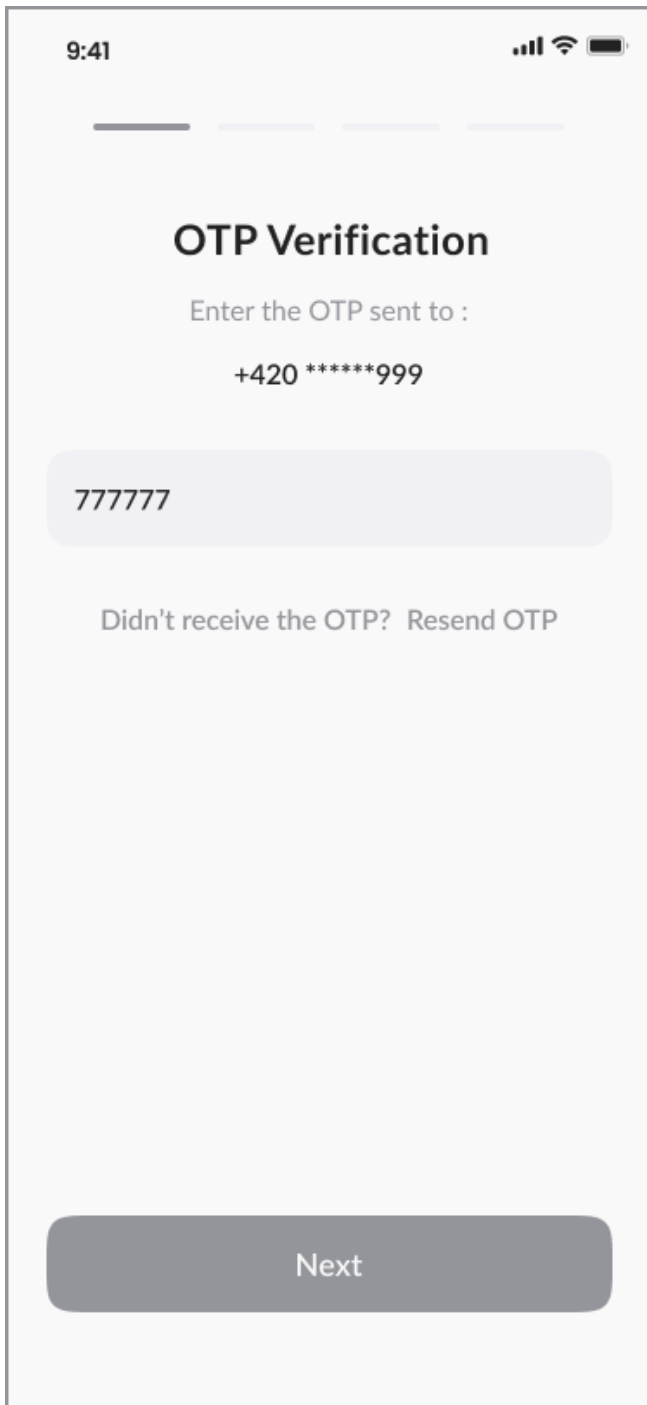
Picture 37 - Wireframe - Profile



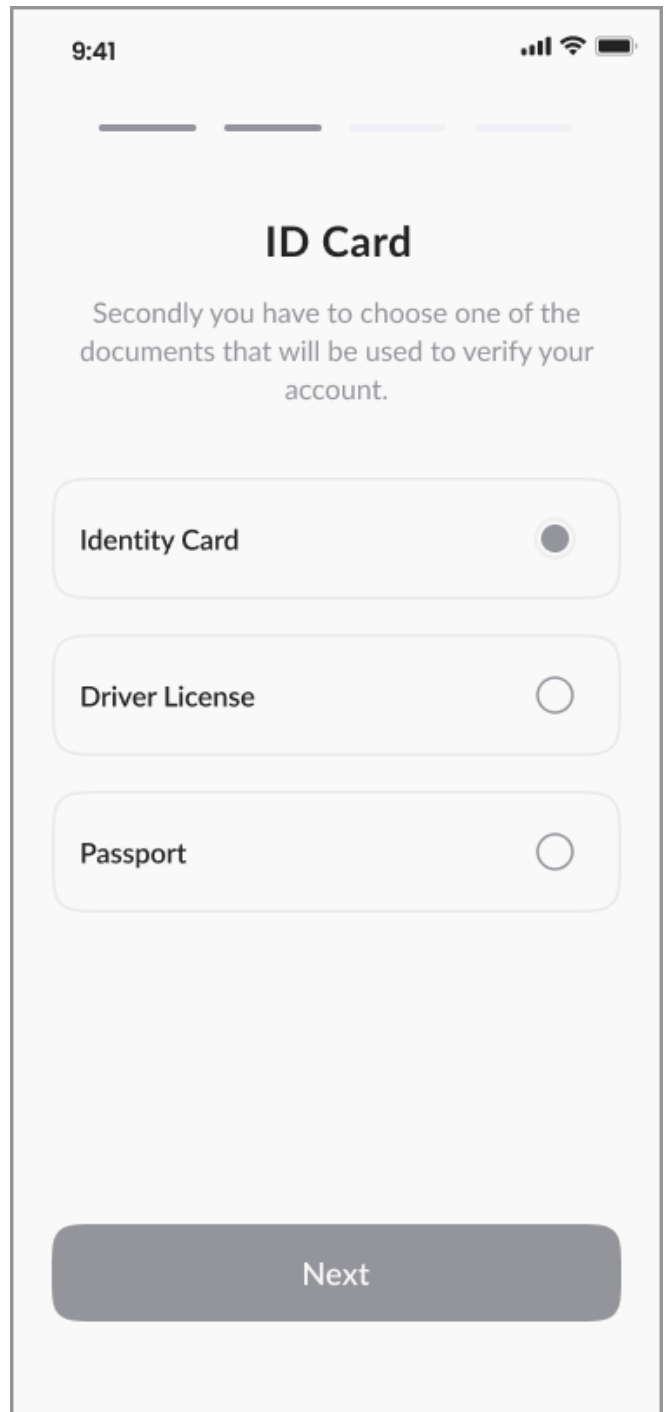
Picture 38 - Wireframe - Personal Details



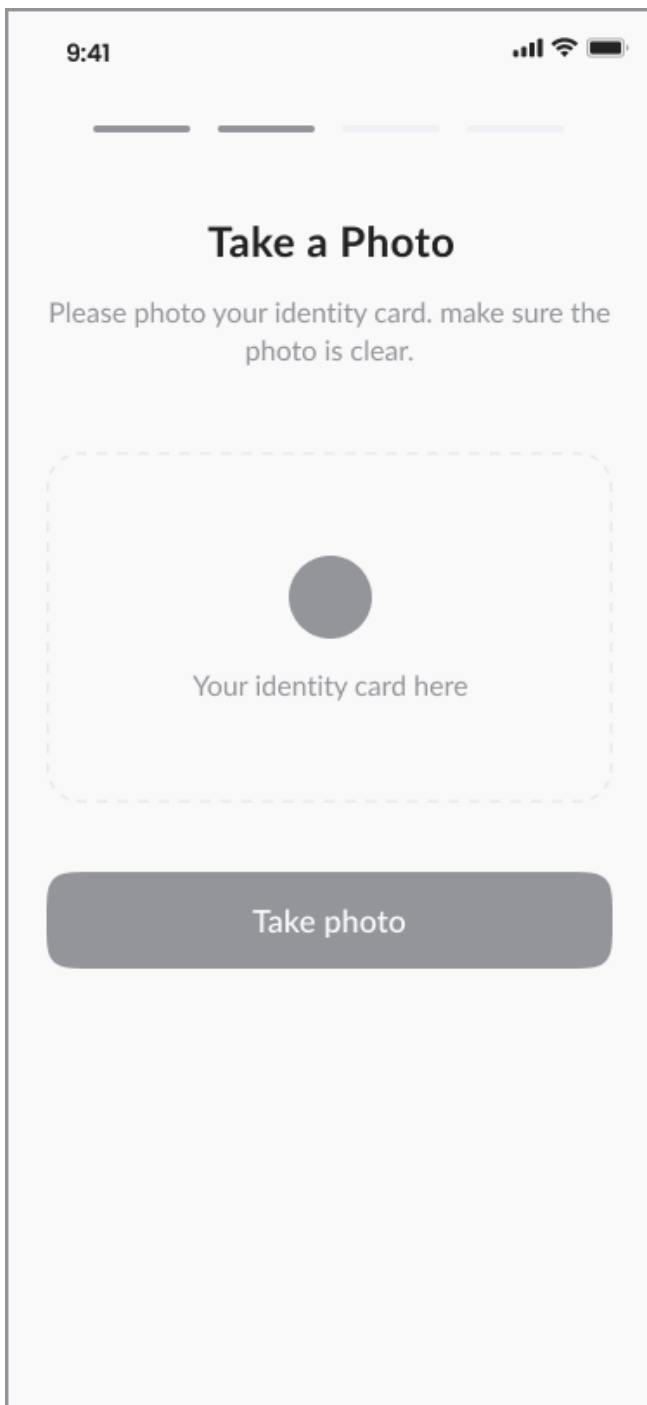
Picture 39 - Wireframe - Verification - Phone



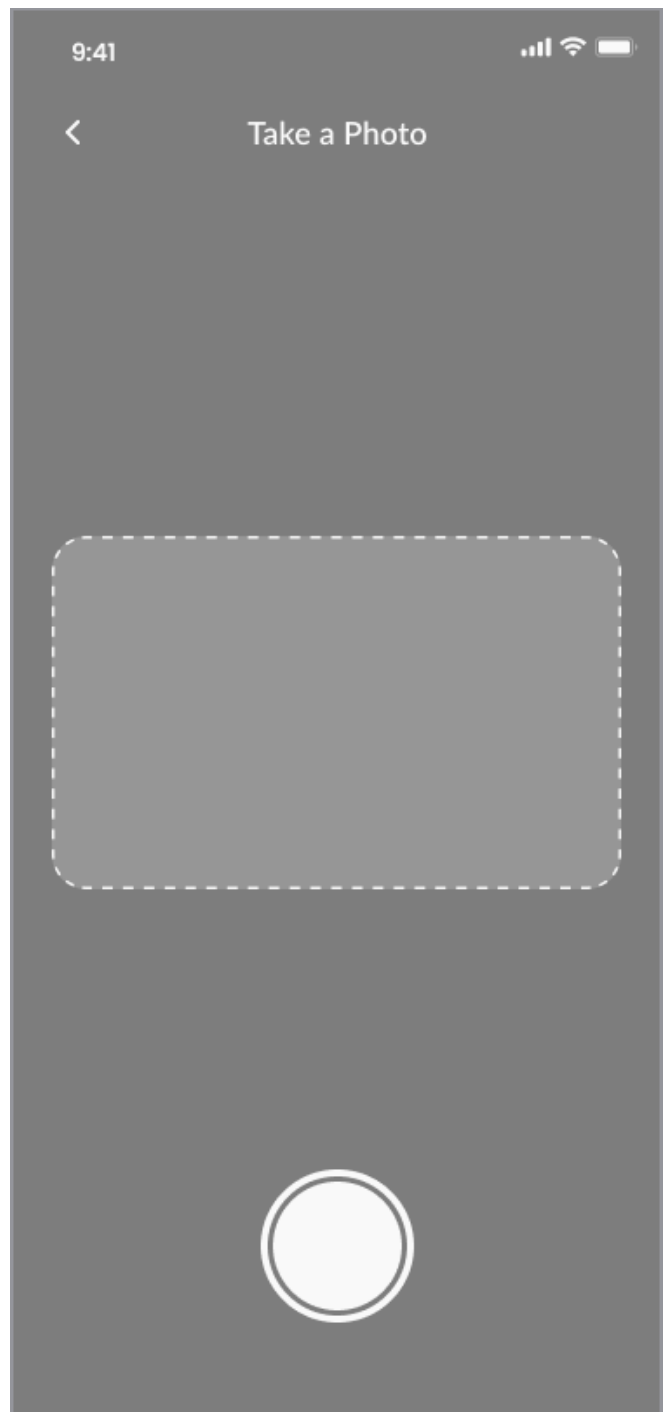
Picture 40 - Wireframe - Verification - Phone 2



Picture 41 - Wireframe - Verification - ID 1



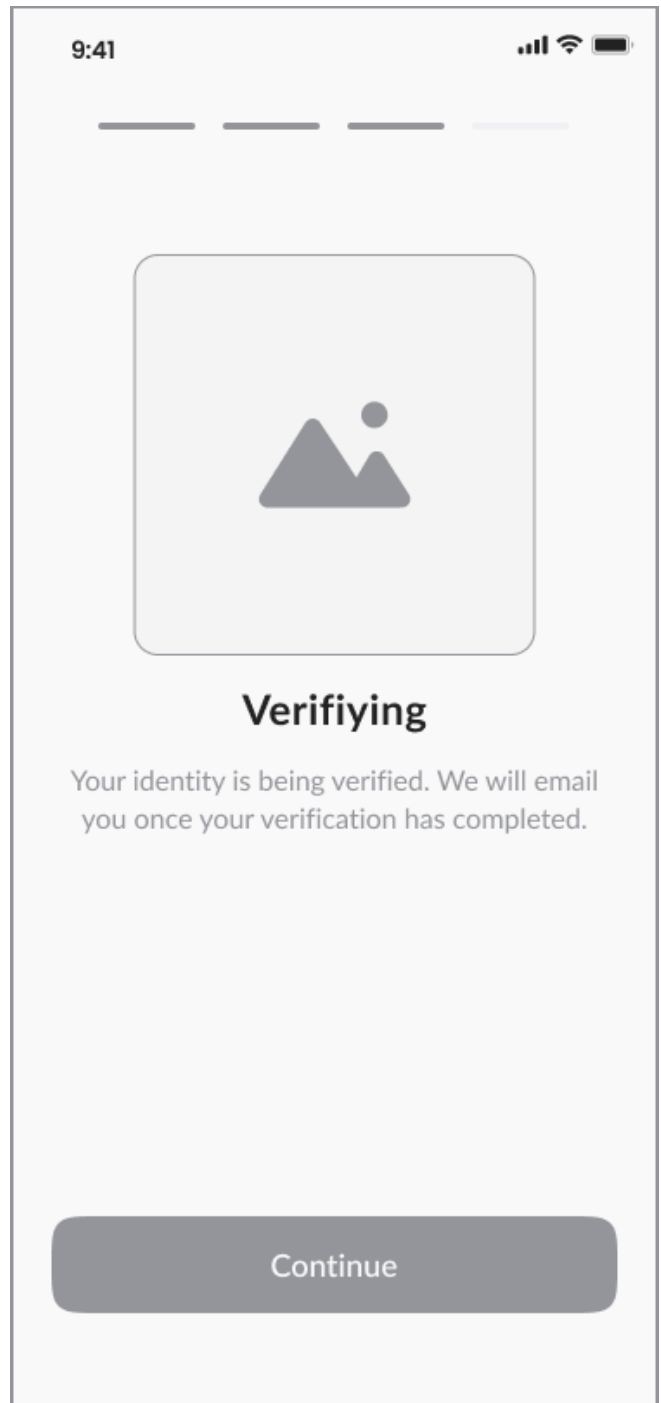
Picture 42 - Wireframe - Verification - ID 2



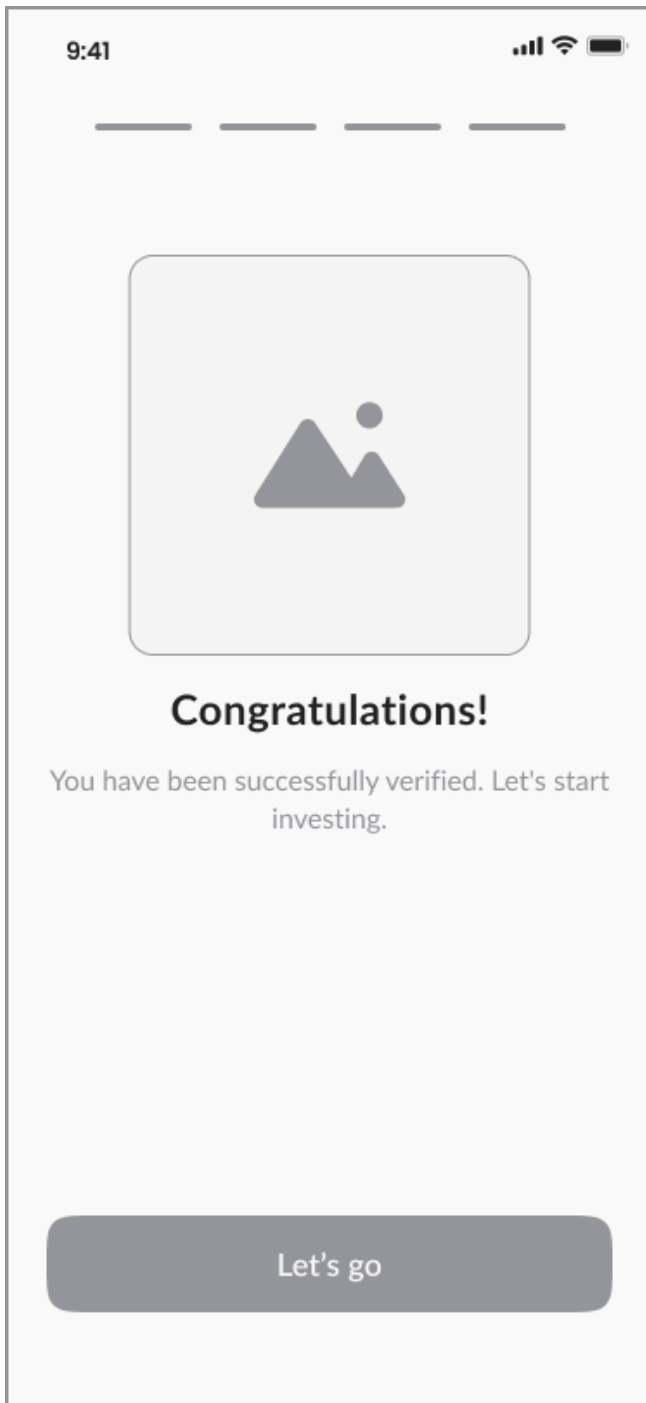
Picture 43 - Wireframe - Verification - ID 3



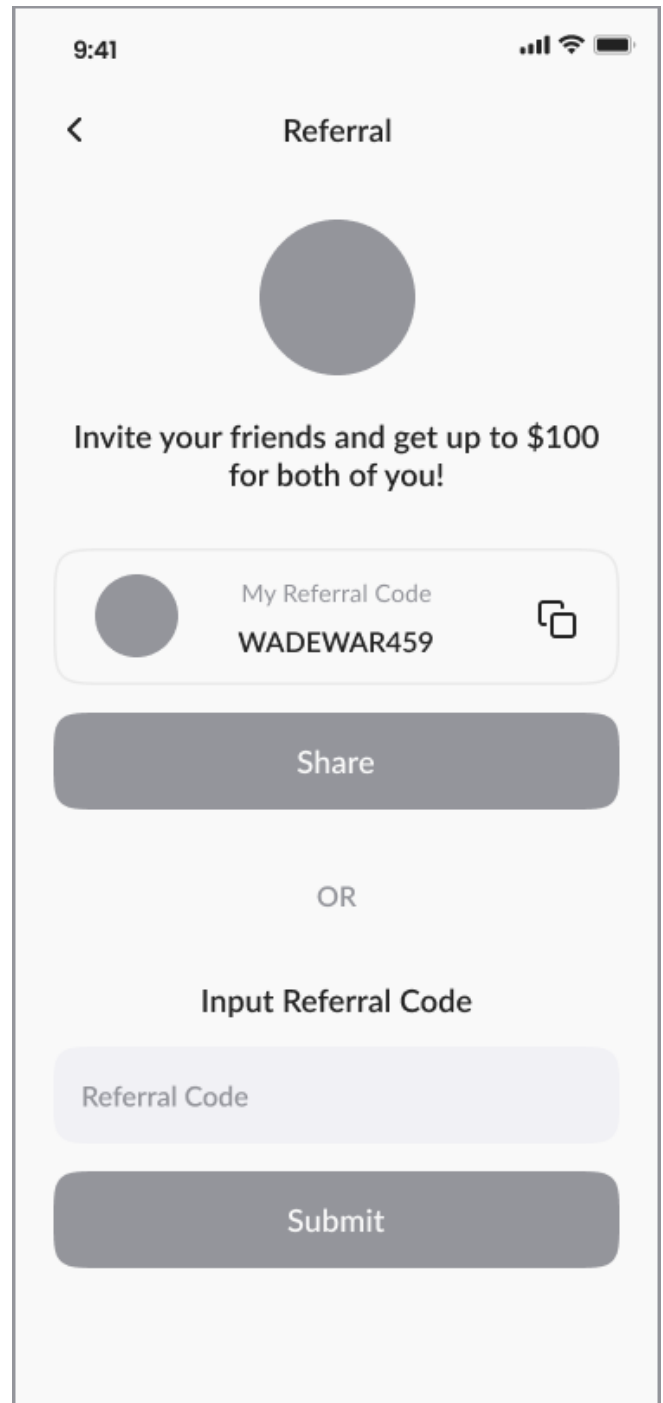
Picture 44 - Wireframe - Verification - ID 4



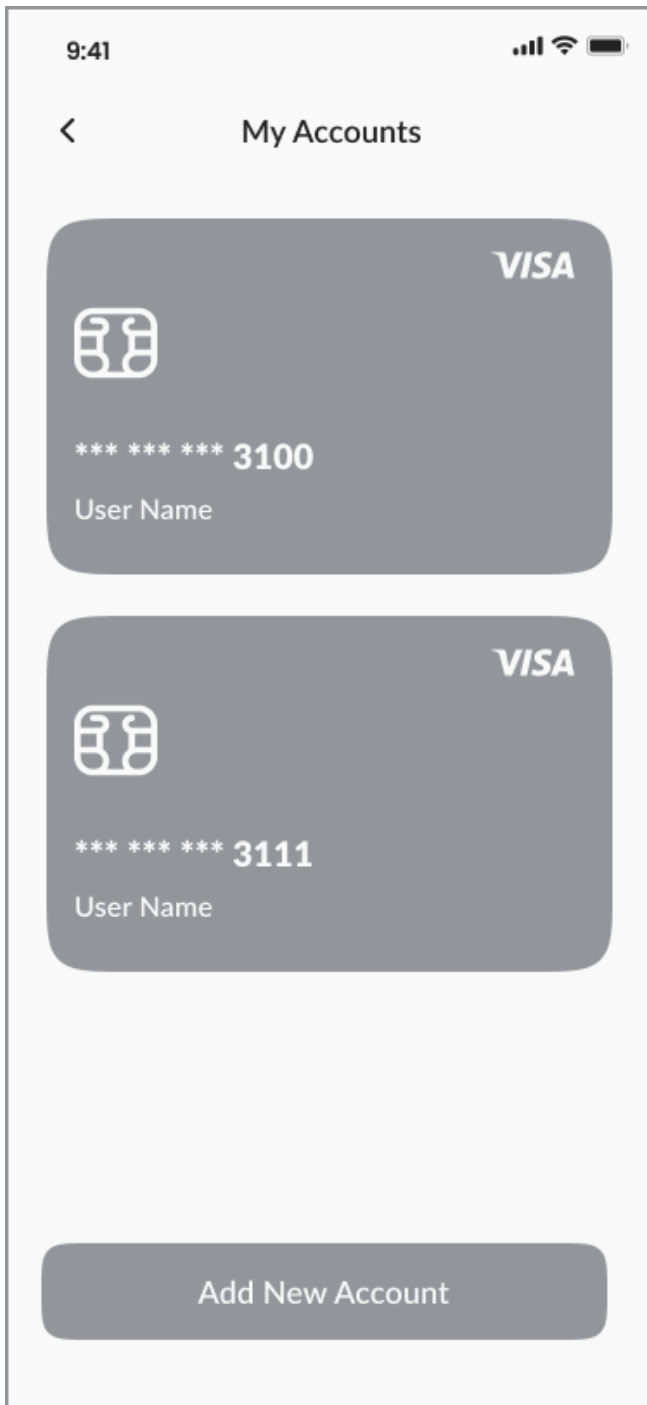
Picture 45 - Wireframe - Verifying



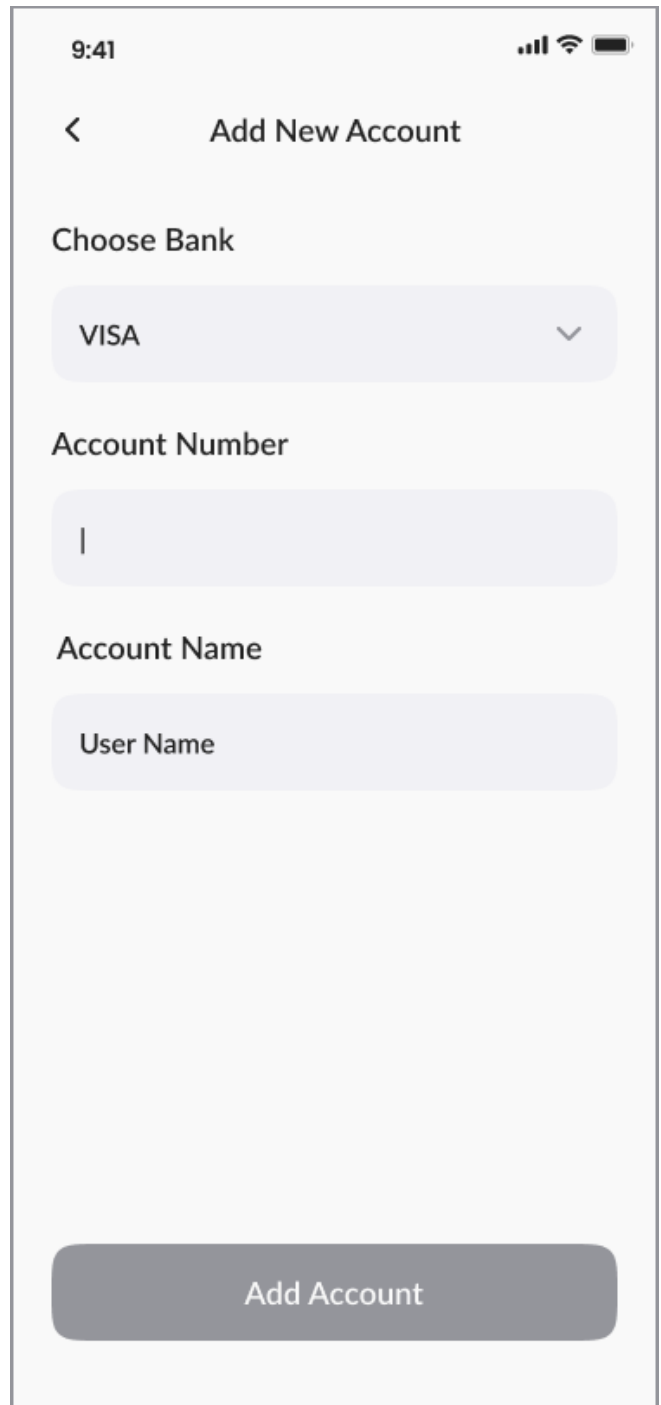
Picture 46 - Wireframe - Verification - Success



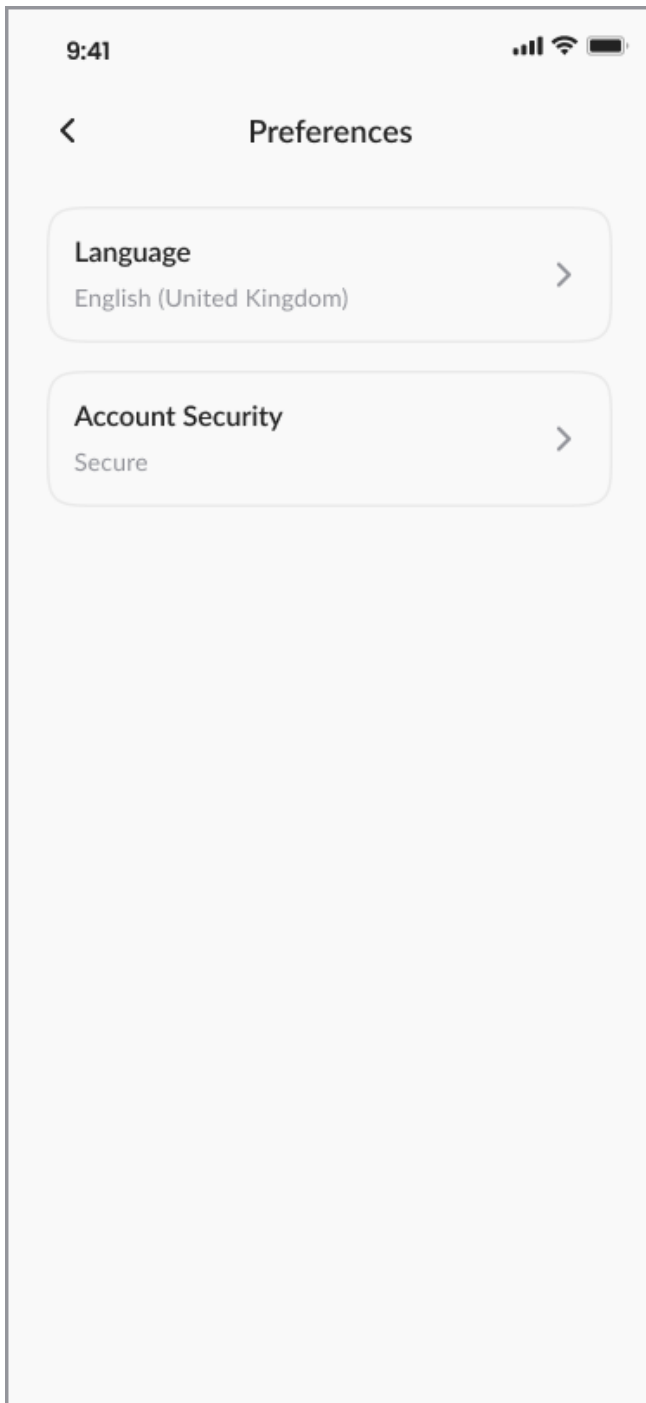
Picture 47 - Wireframe - Referral



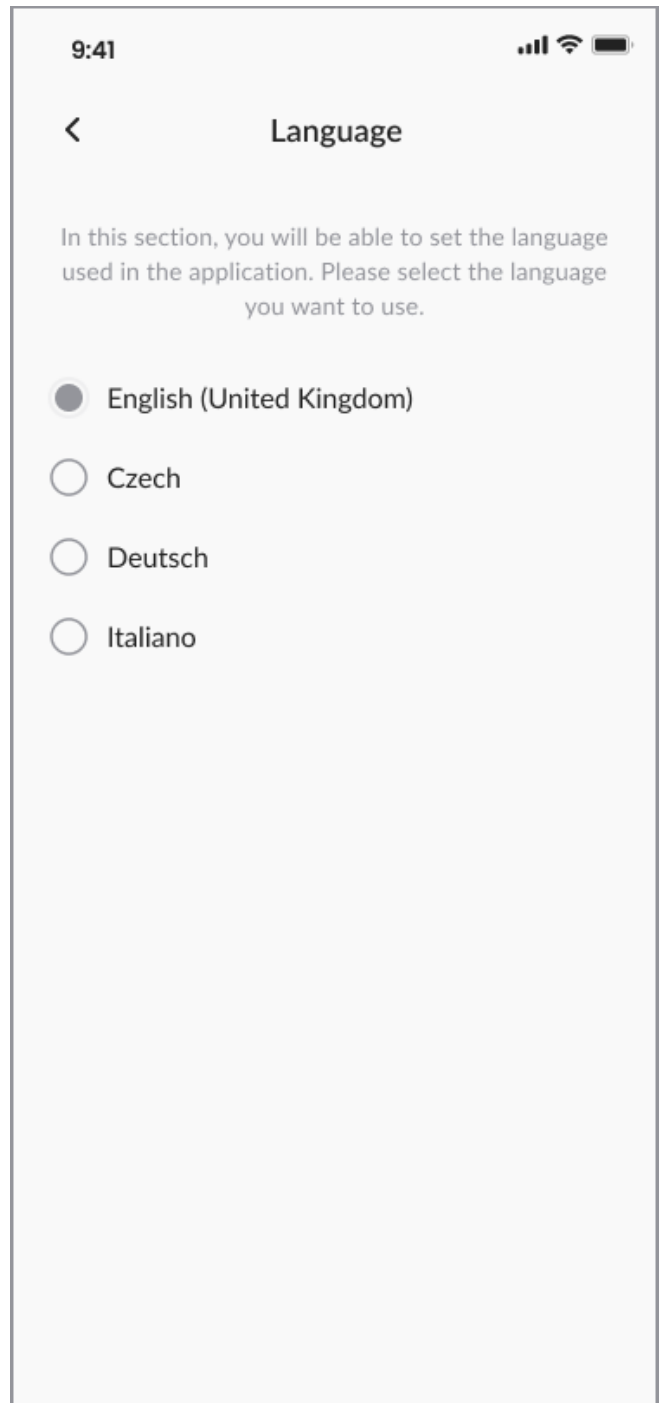
Picture 48 - Wireframe - My Account



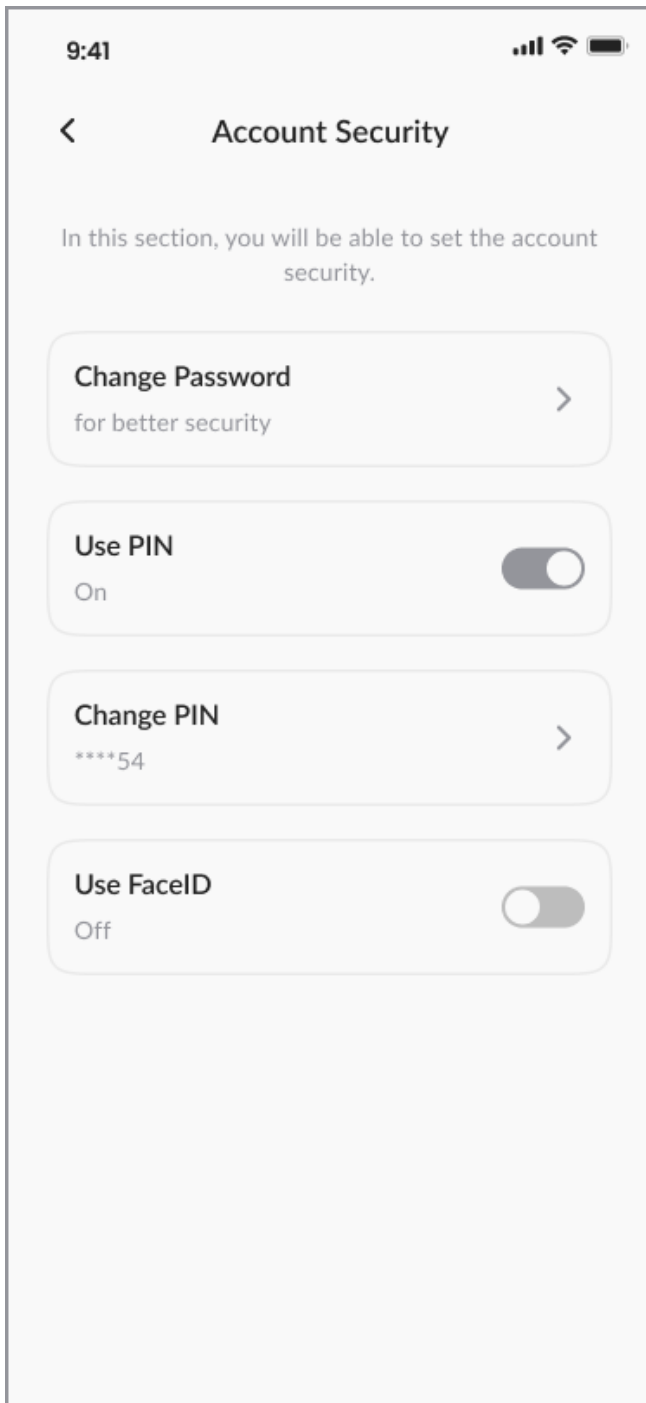
Picture 49 - Wireframe - Add Account



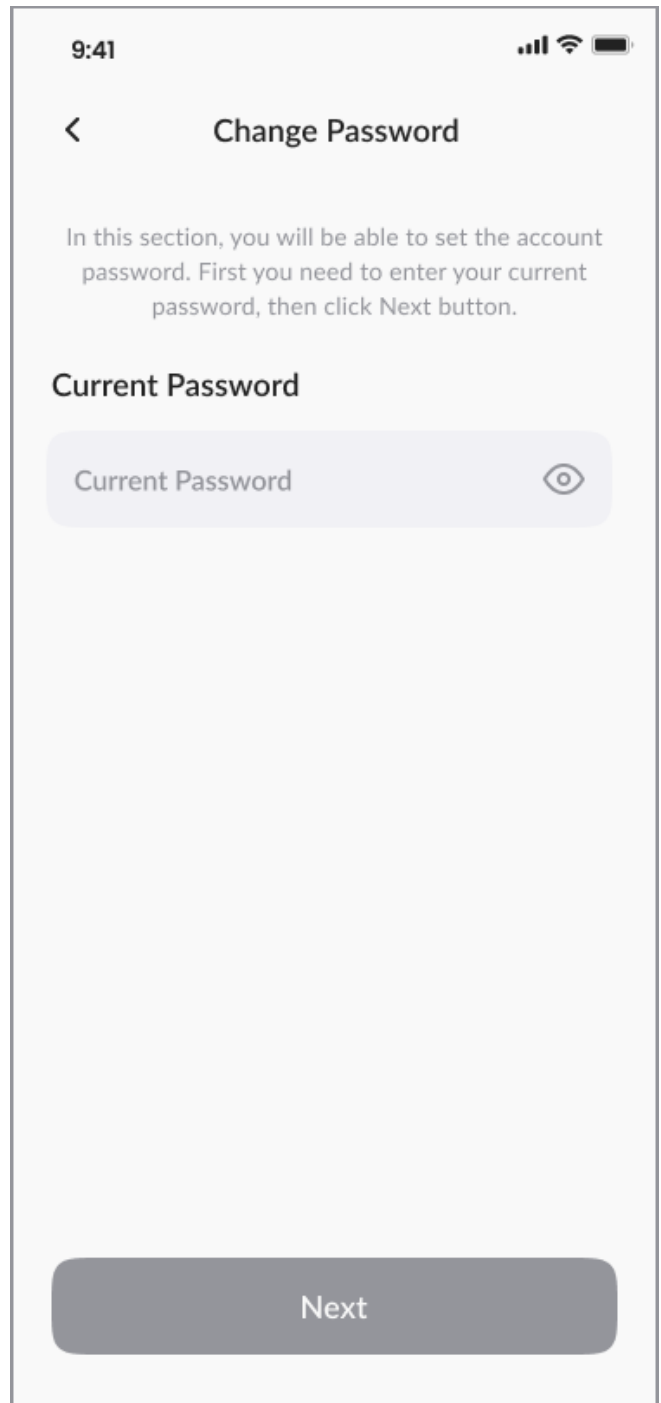
Picture 50 - Wireframe - Preferences



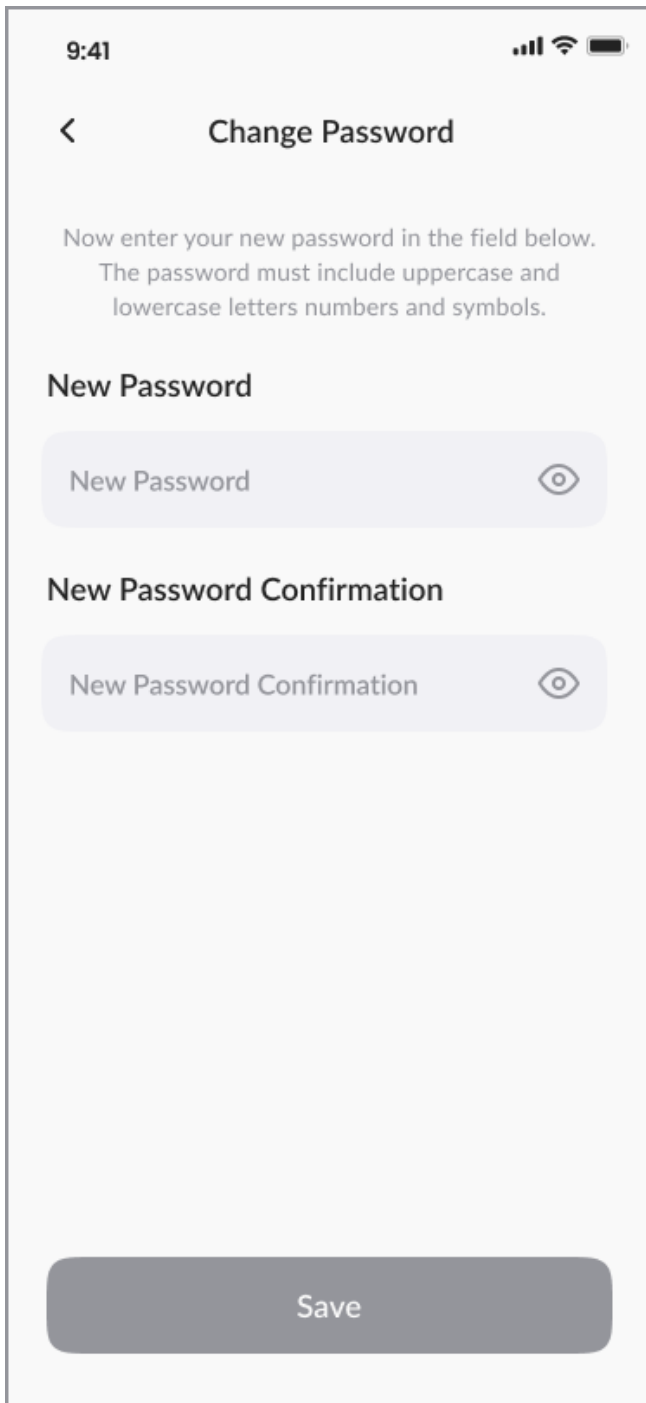
Picture 51 - Wireframe - Language



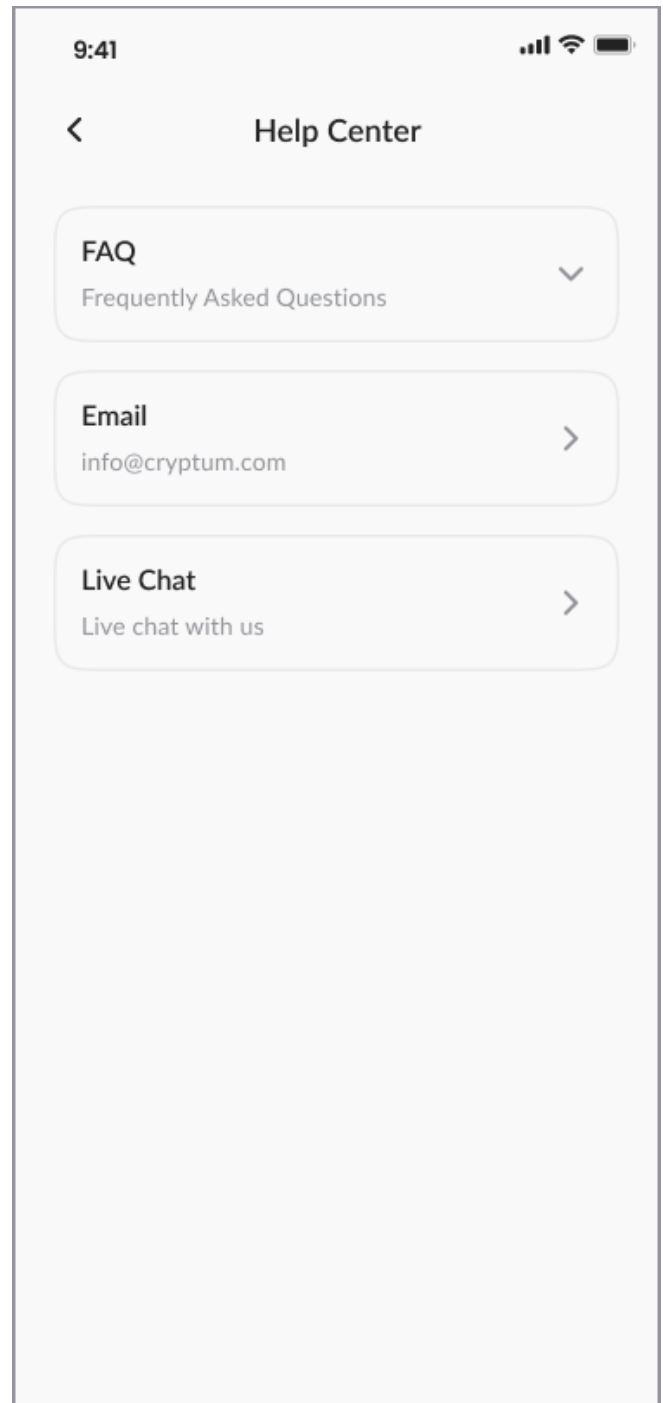
Picture 52 - Wireframe - Account Security



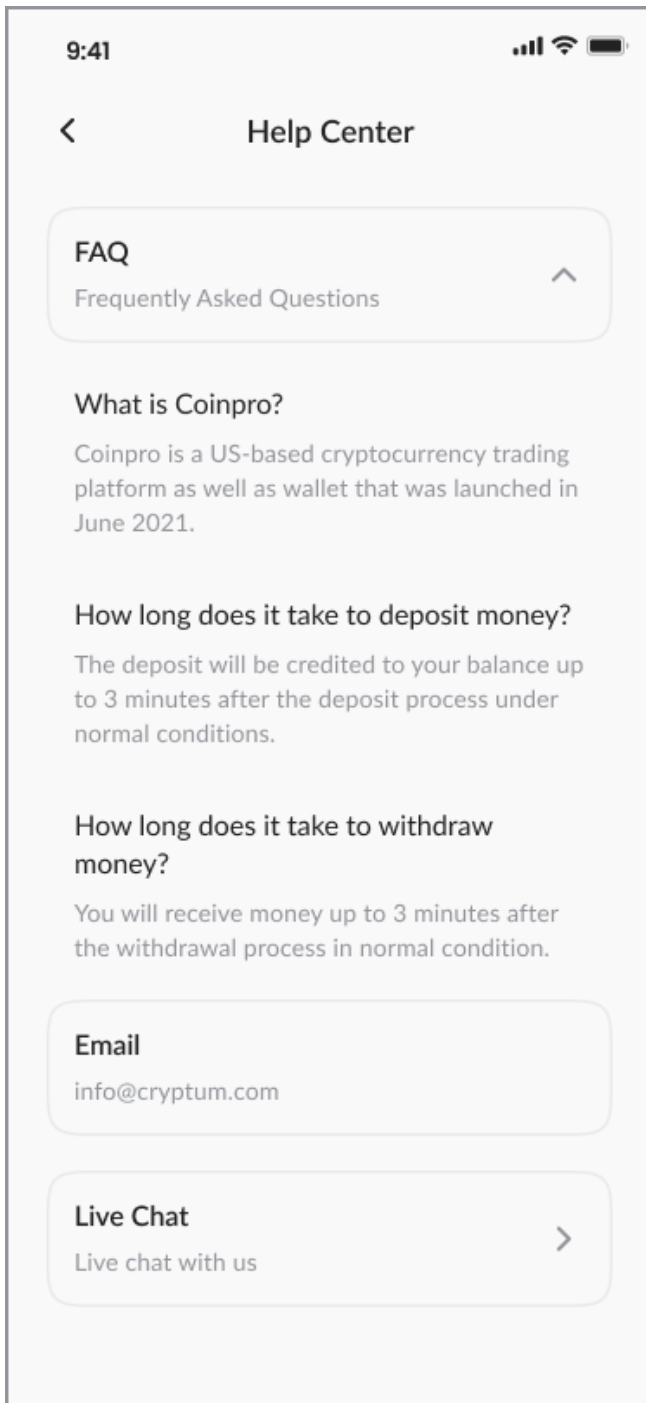
Picture 53 - Wireframe -AS Change Password 1



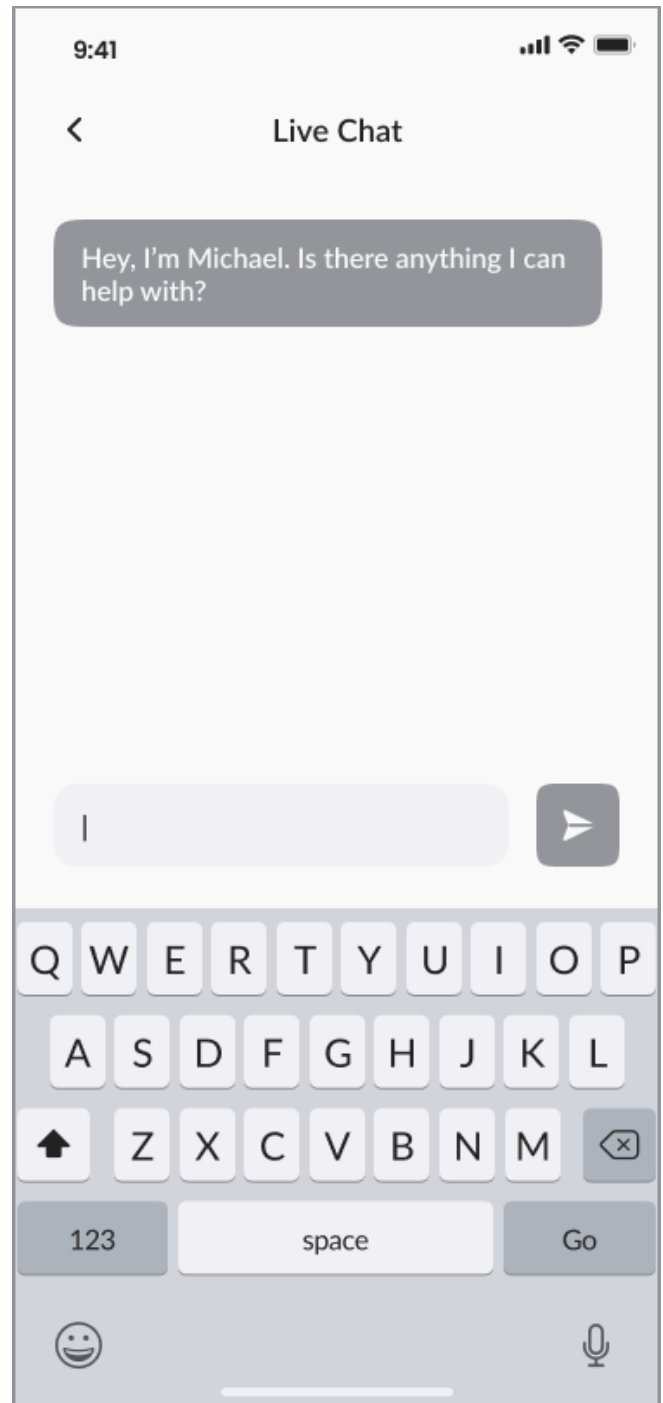
Picture 54 - Wireframe - AS Change Password 2



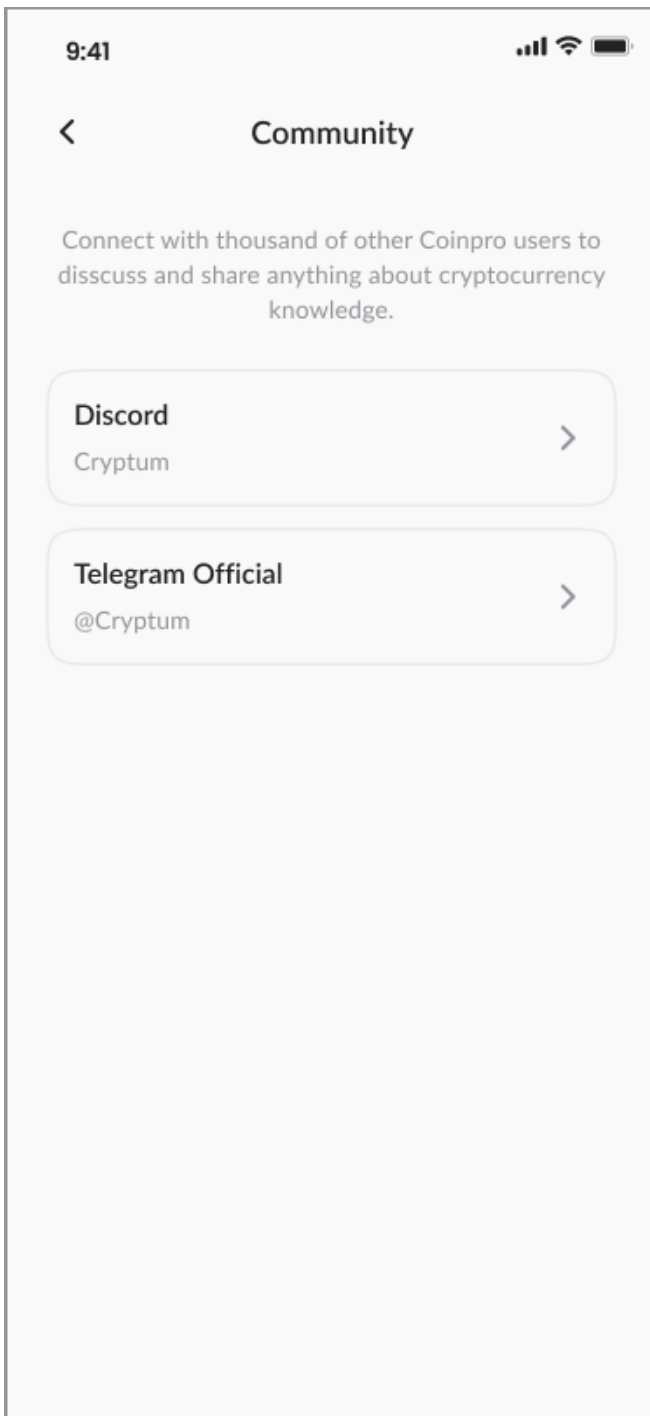
Picture 55 - Wireframe - Help Center



Picture 56 - Wireframe - Help Center - FAQ



Picture 57 - Wireframe - Help Center - Live Chat



Picture 58 - Wireframe - Community

4.13. Functional Prototype

One of the main goals of this thesis was to create a functional prototype of the application. The prototype was created in Figma. A reference to the prototype is given in the appendix

(Appendix 1 - Functional prototype of the application).

4.13.1 Design System

High-fidelity prototype for the application was designed in the resolution of 375x812 px. The grid is built based on 8s (multiple of 8px).

Color Scheme.

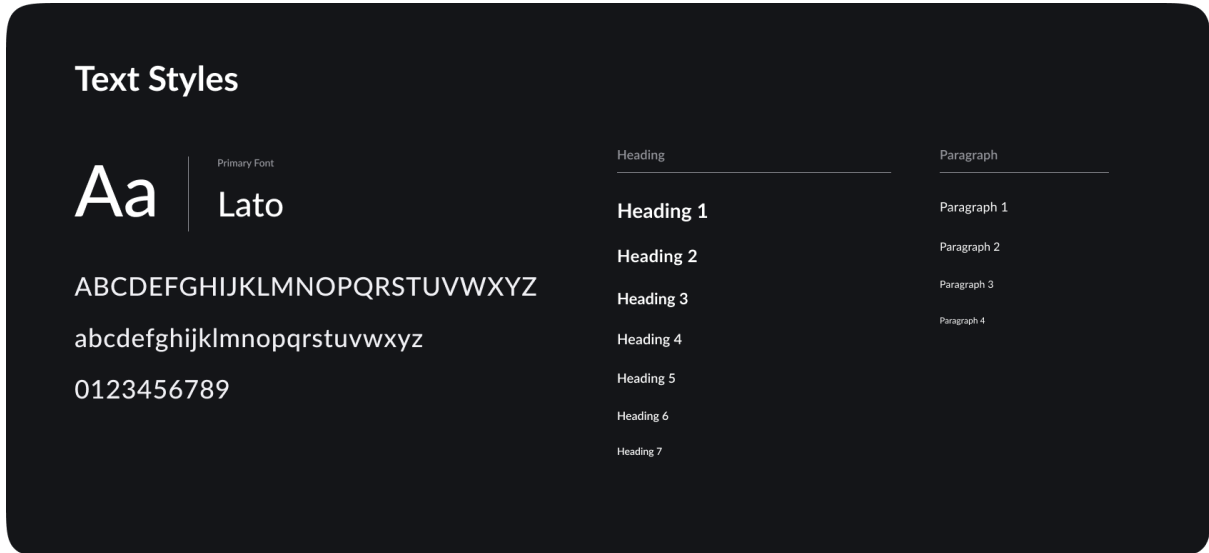
The visual solution for the application was selected in a way that it looks modern and sharp, still conveying trustworthy and professional motives. Moreover, the color palette does not look too business-related to meet the expectations of amateur investors. Another important point was to ensure the design has sufficient contrast between text and background colors.



Picture 59 - Color Scheme

Typography.

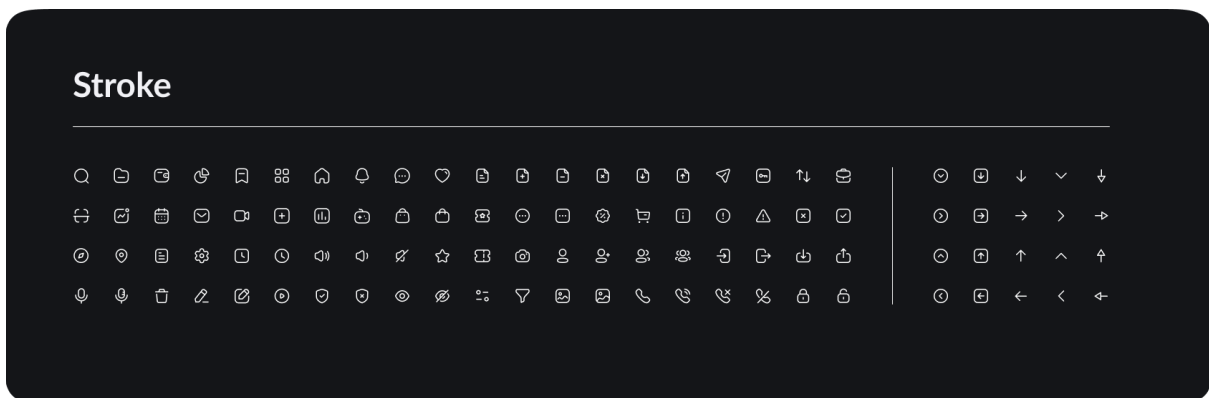
Lato font family was chosen as the only typeface for the whole application. It's a sans-serif typeface with clean distinctive characters and open shapes that works perfectly even with smaller font sizes and is legible enough not to compromise readability.



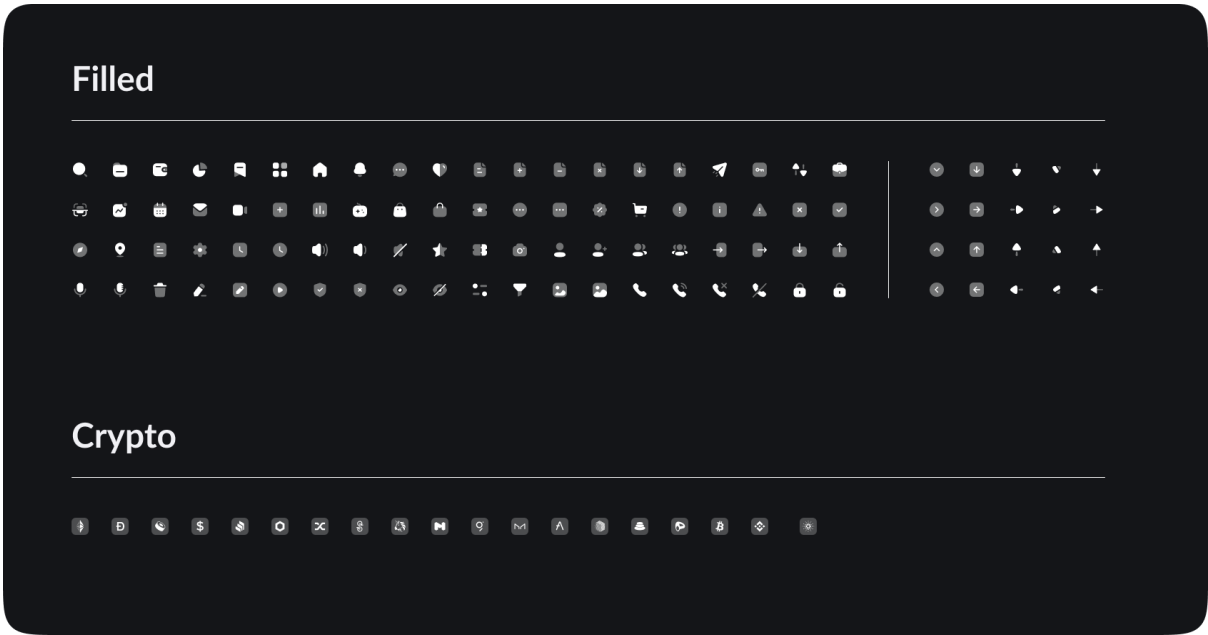
Picture 60 - Wireframe - Typography

Icons.

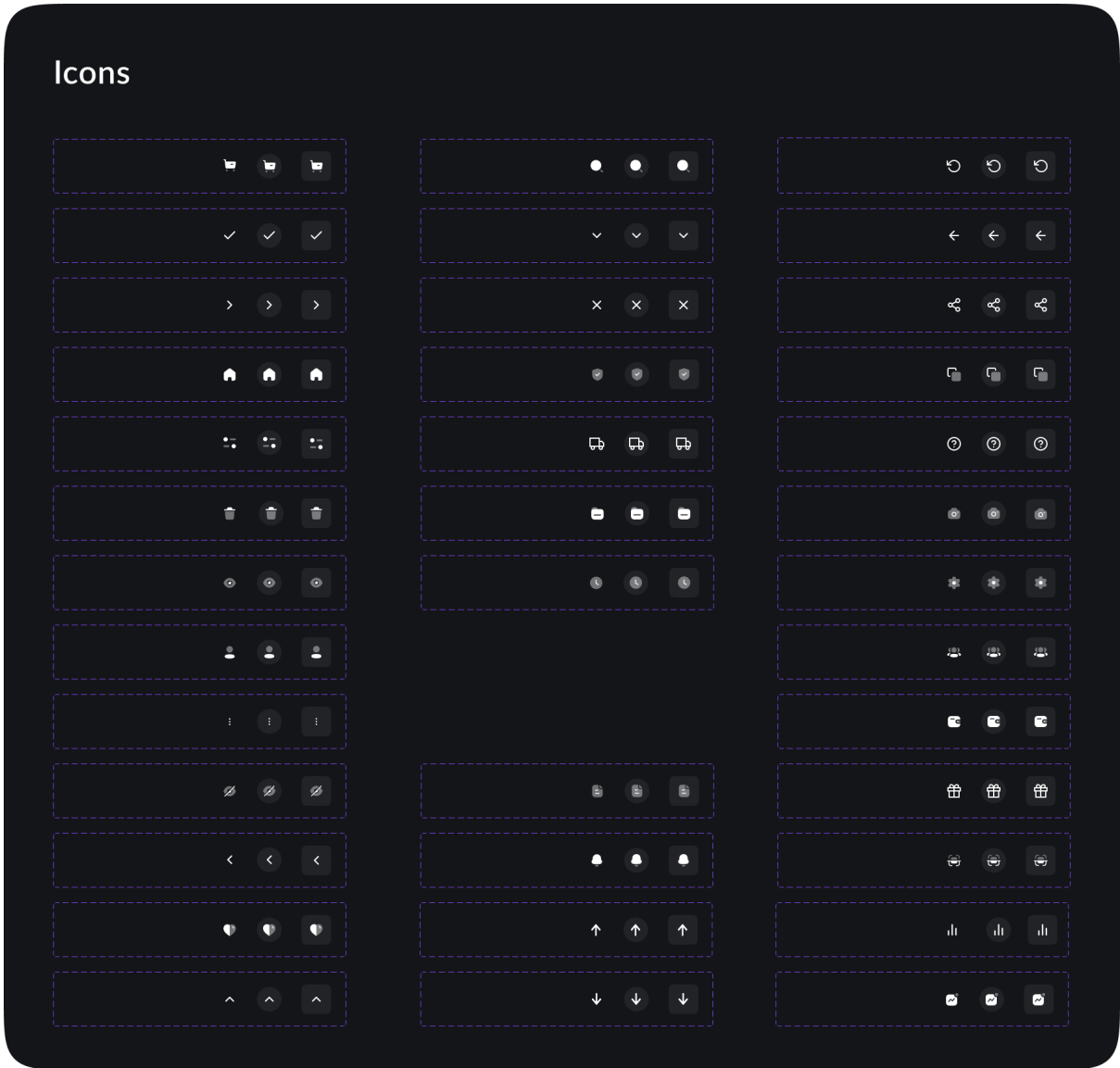
Icons, that are fundamental part of each design system, relate directly to the chosen grid. All the icons are built at 24px with 2px safe area from each side (assuming 1.5px stroke weight). Filled versions of an icon set were created as follows.



Picture 61 - Wireframe - Icons Stroke



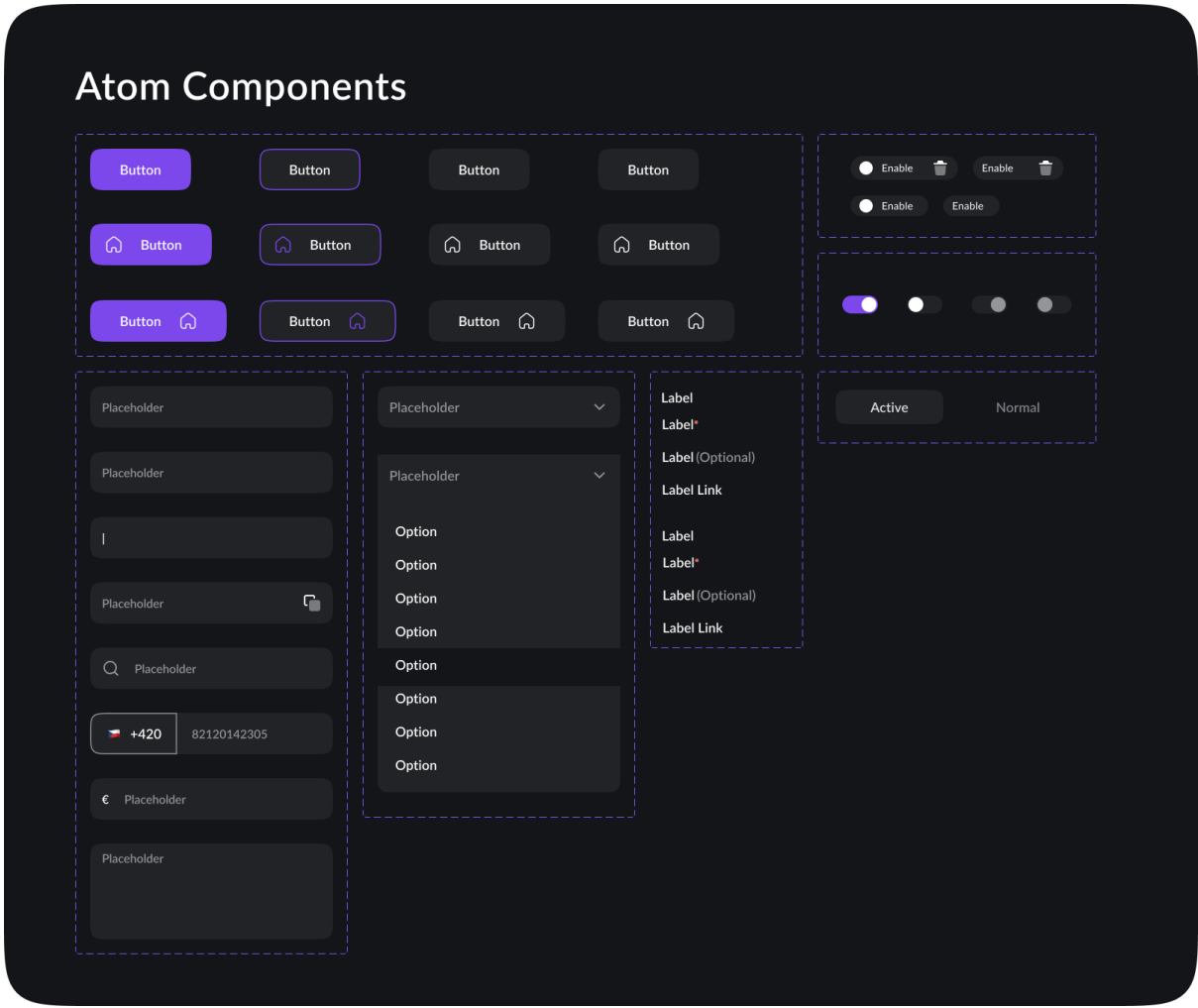
Picture 62 - Wireframe - Icons Filled



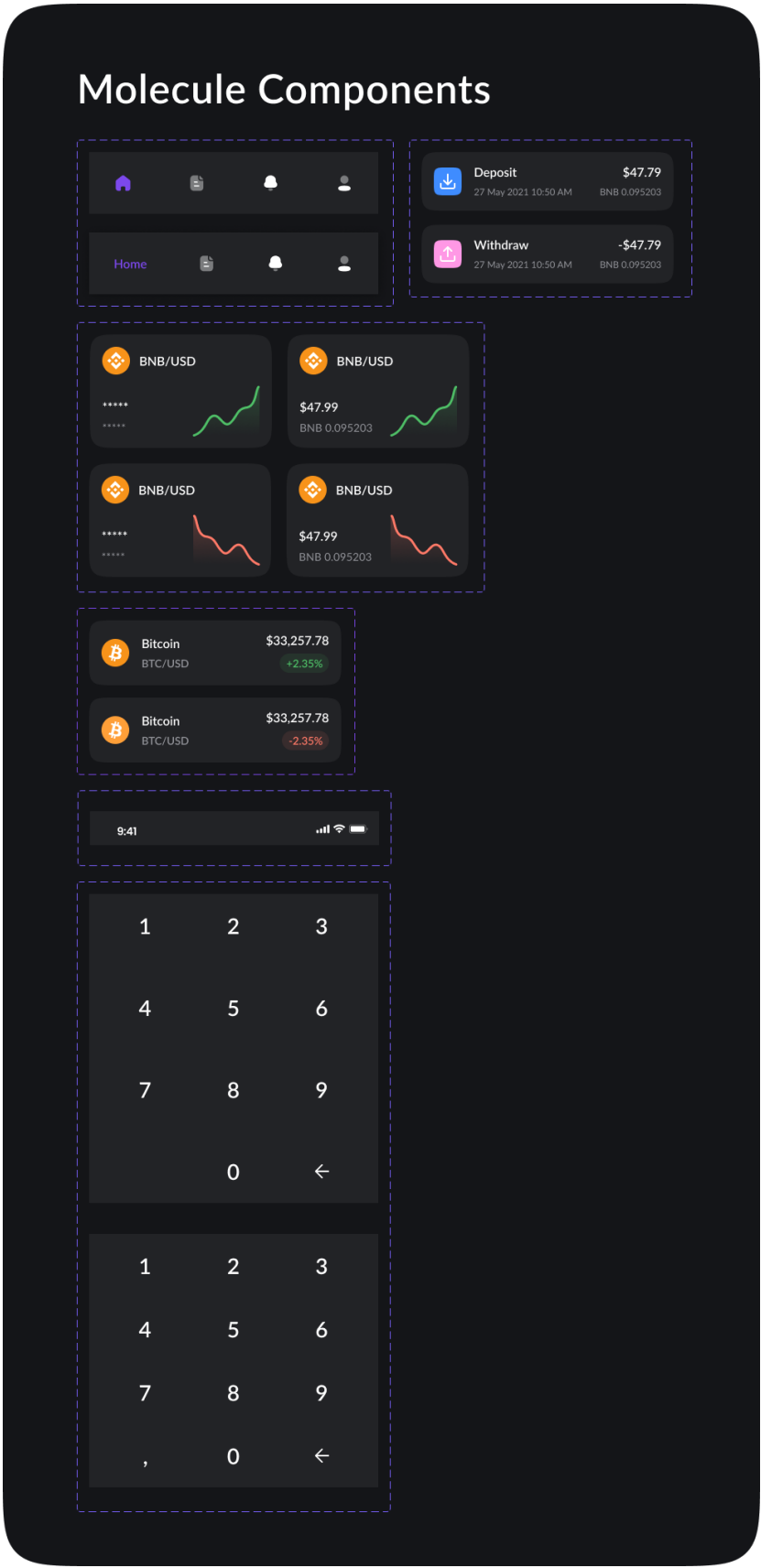
Picture 63 - Wireframe - Icons States

Components.

Using the methodology of Atomic design, atomic and molecule elements (components) of the design system were created and grouped into a component library.

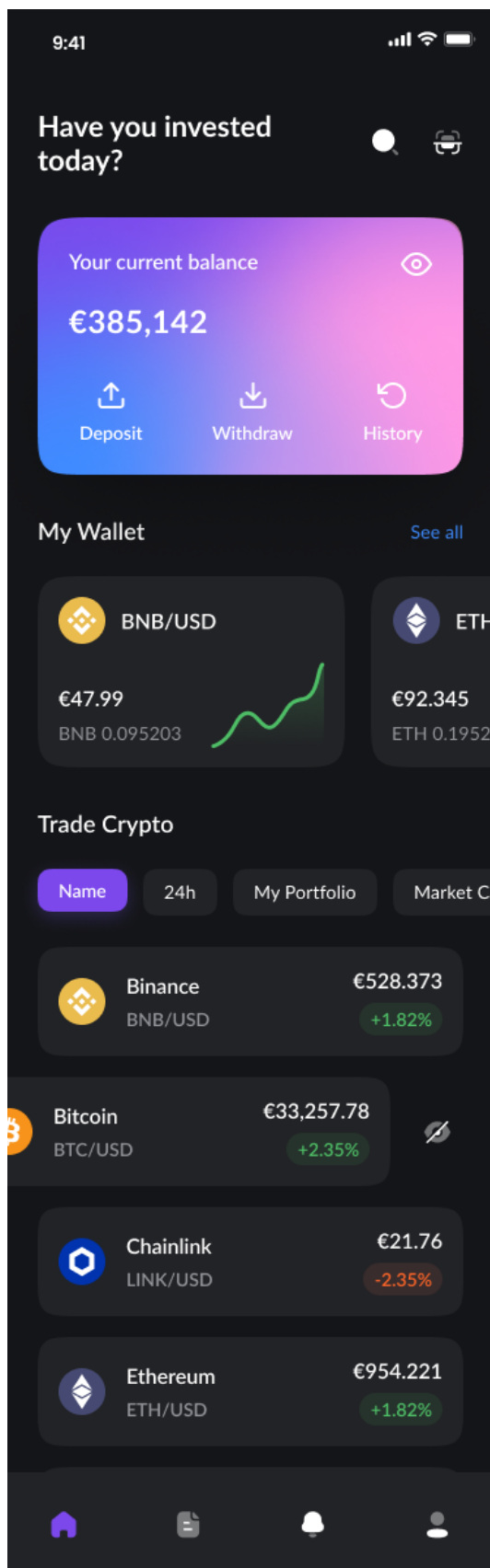


Picture 64 - Wireframe - Components Atom

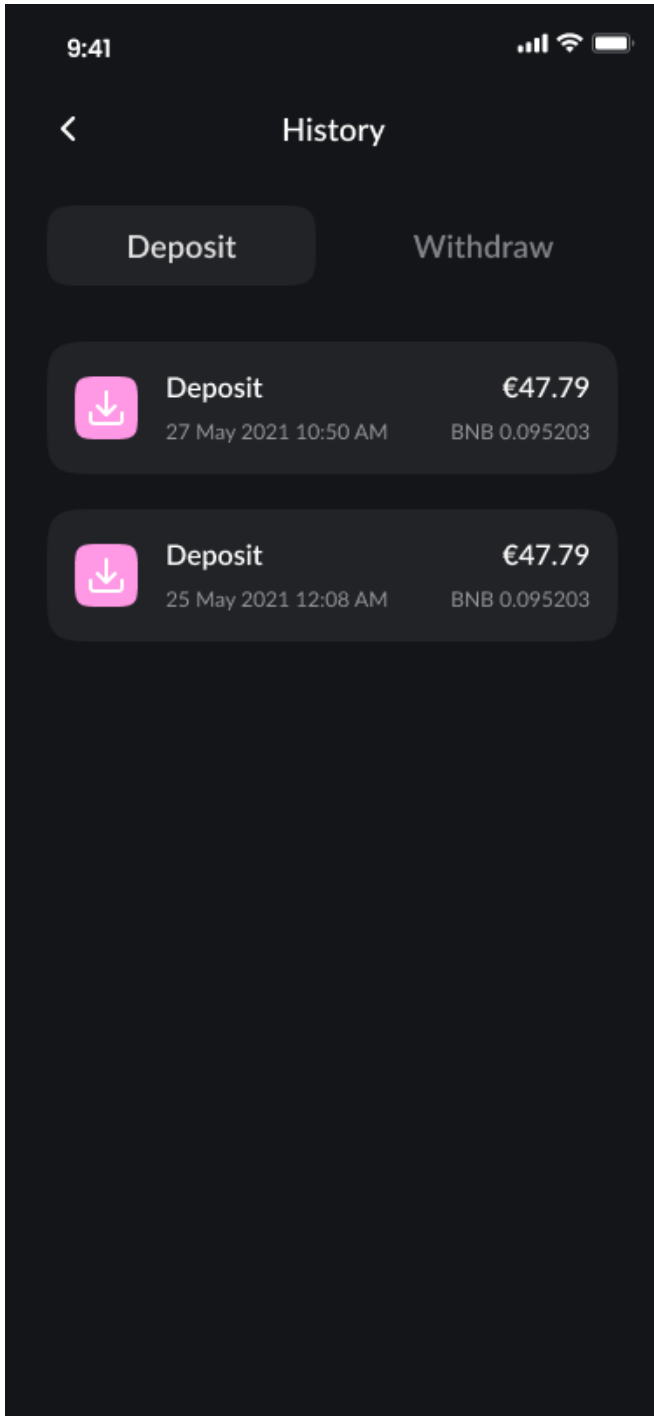


Picture 65 - Molecule Components

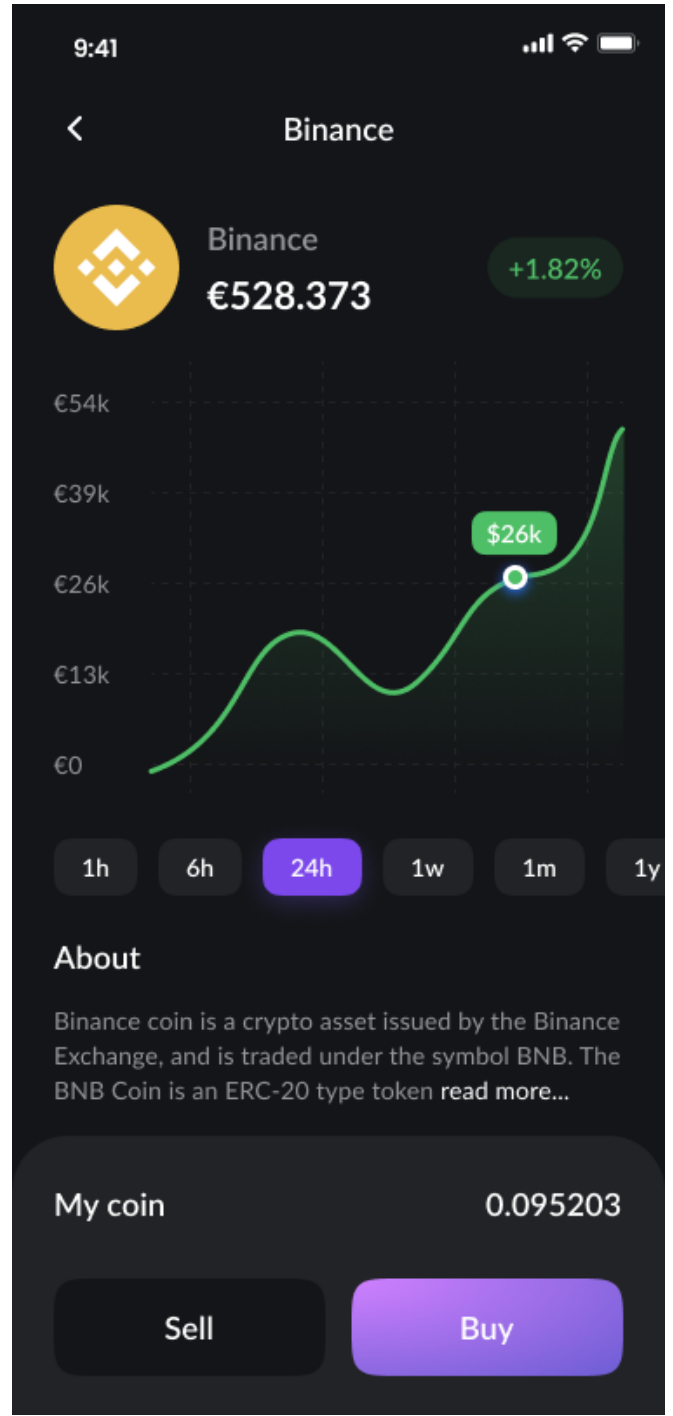
4.13.2 High-fidelity prototype



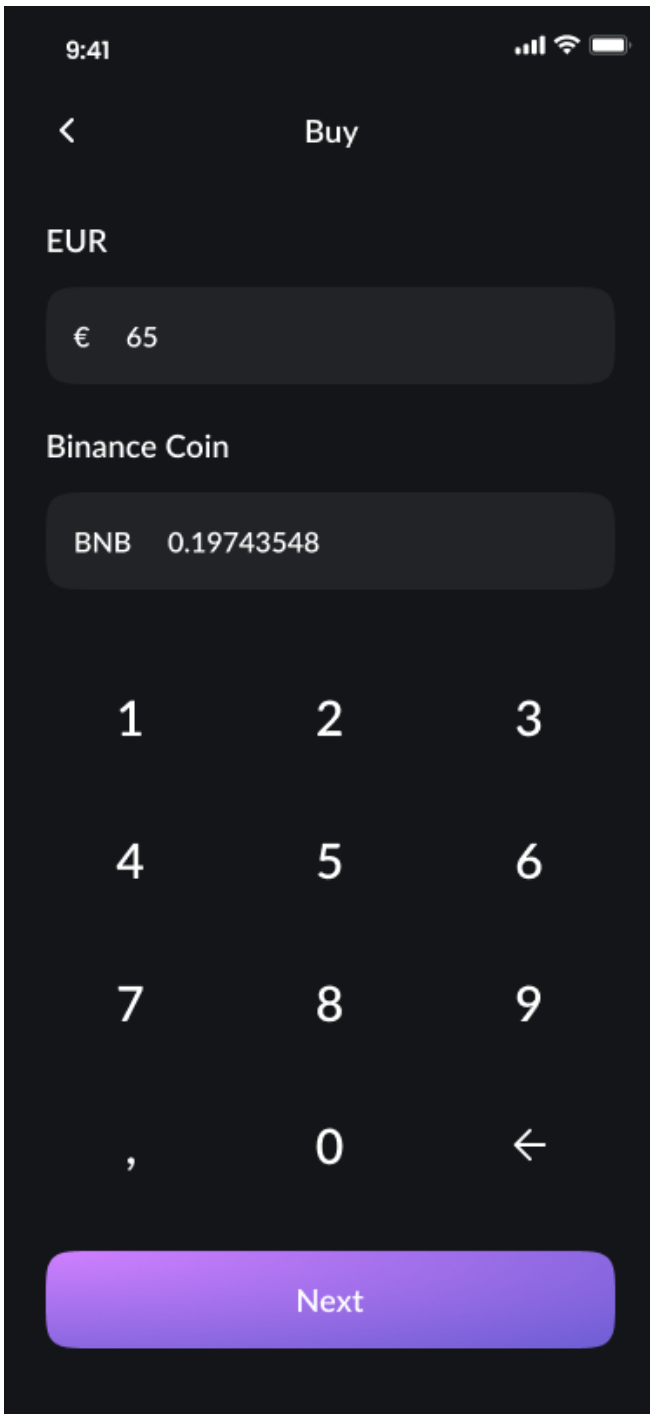
Picture 66 - Prototype - Home Page



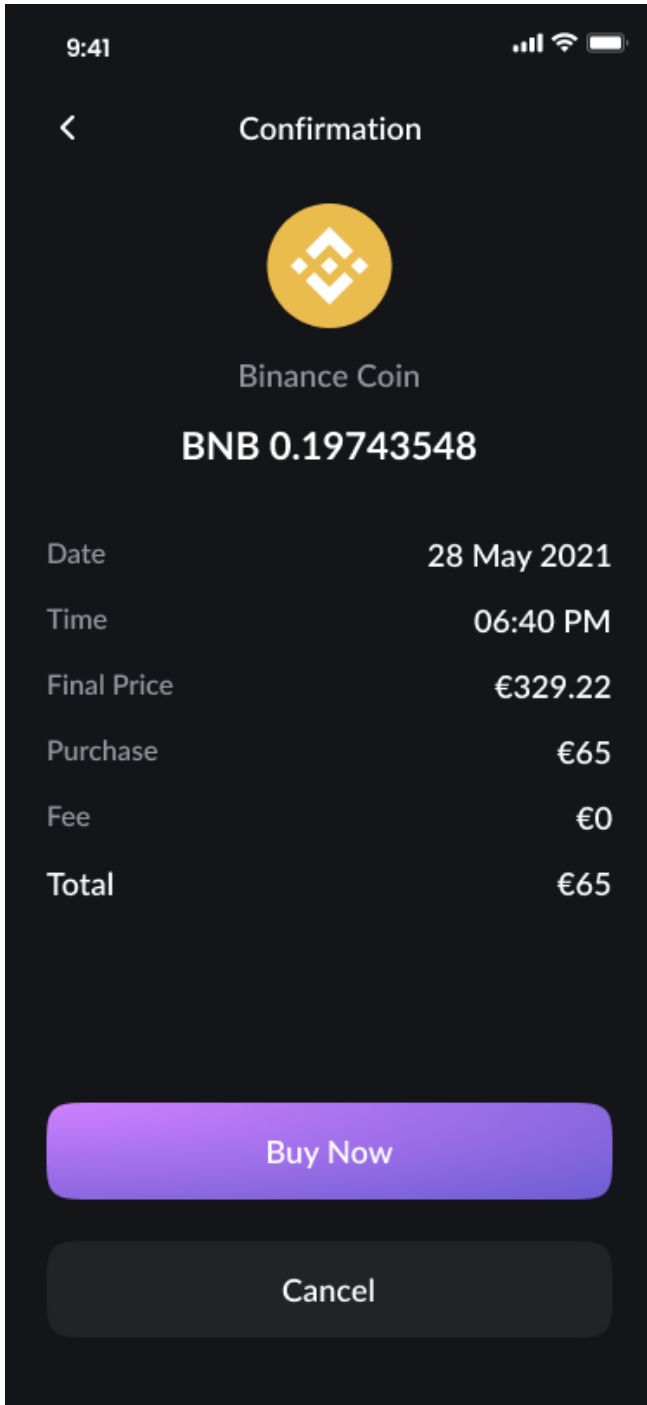
Picture 67 - Prototype - Transaction History



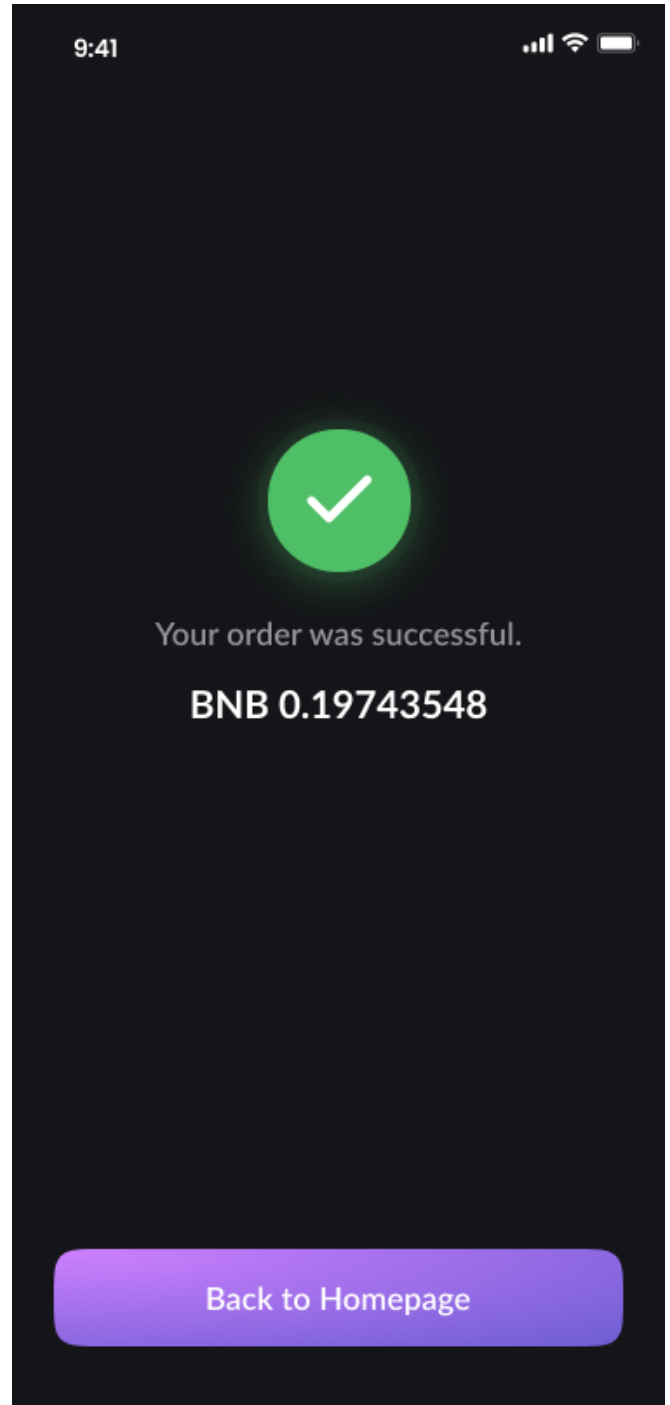
Picture 68 - Prototype - Crypto Detail



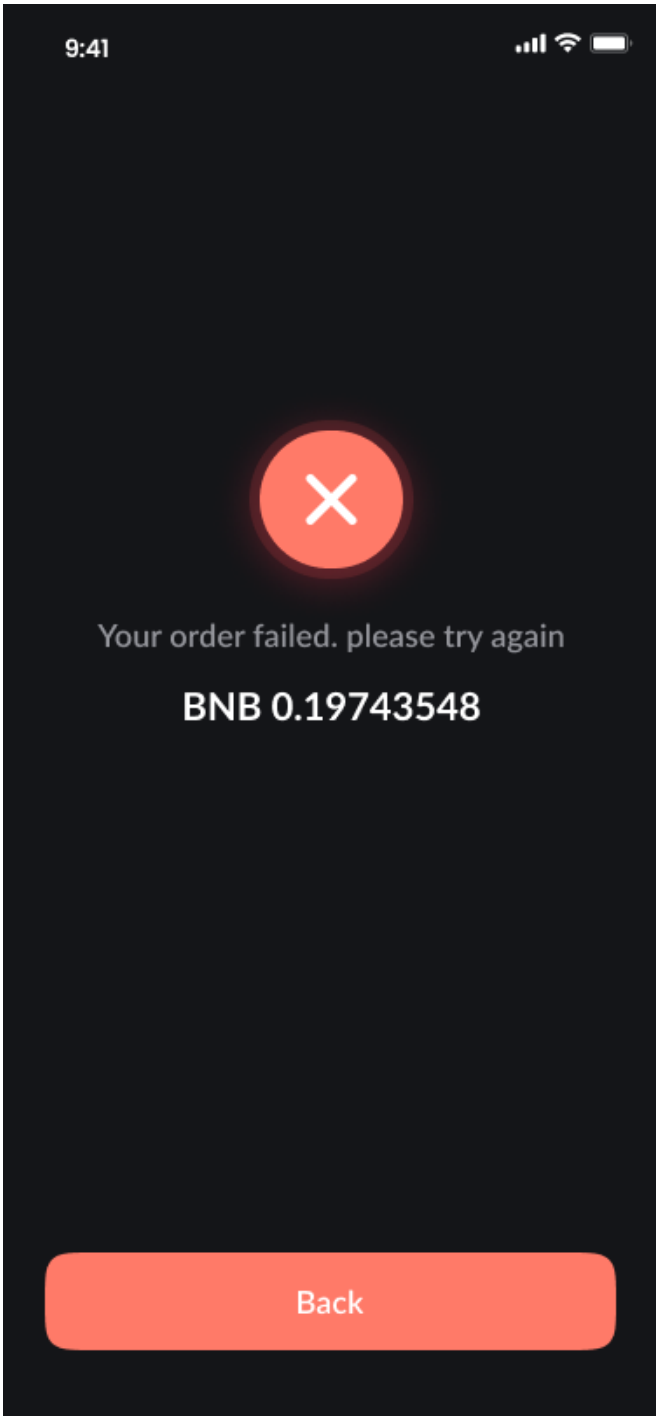
Picture 69 - Prototype - Buy



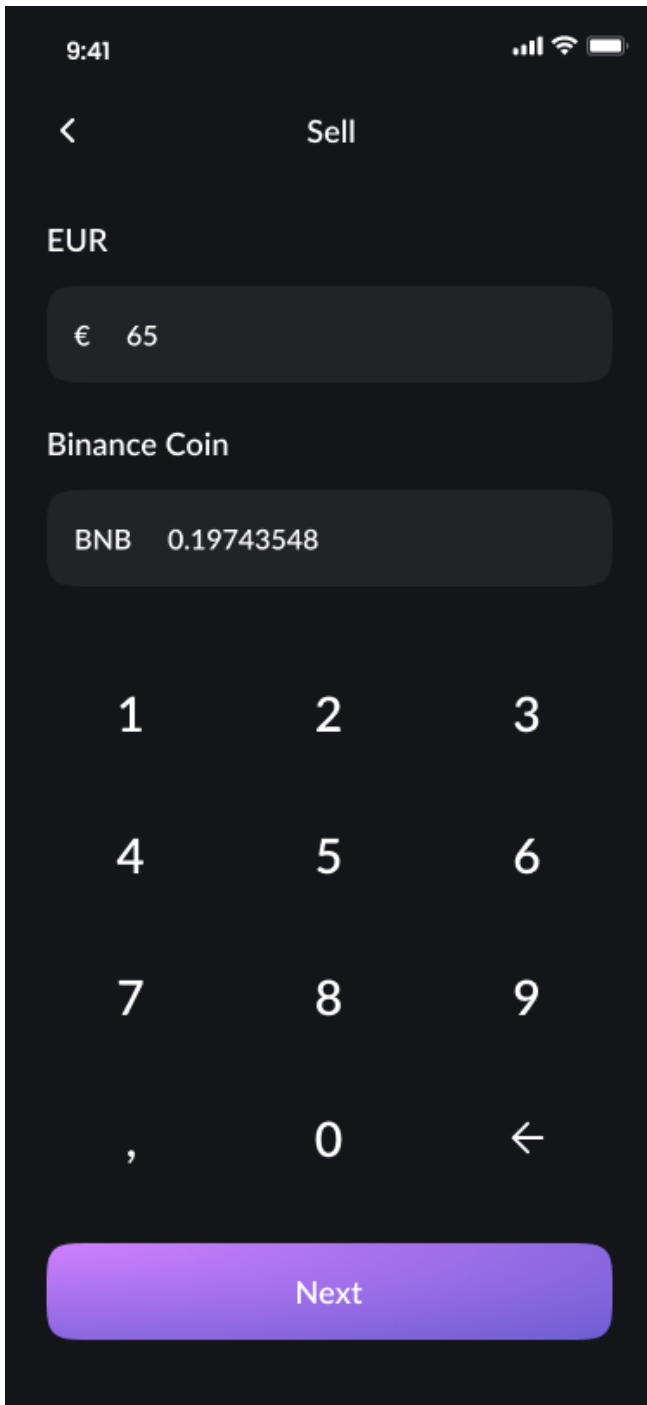
Picture 70 - Prototype - Purchase Preview



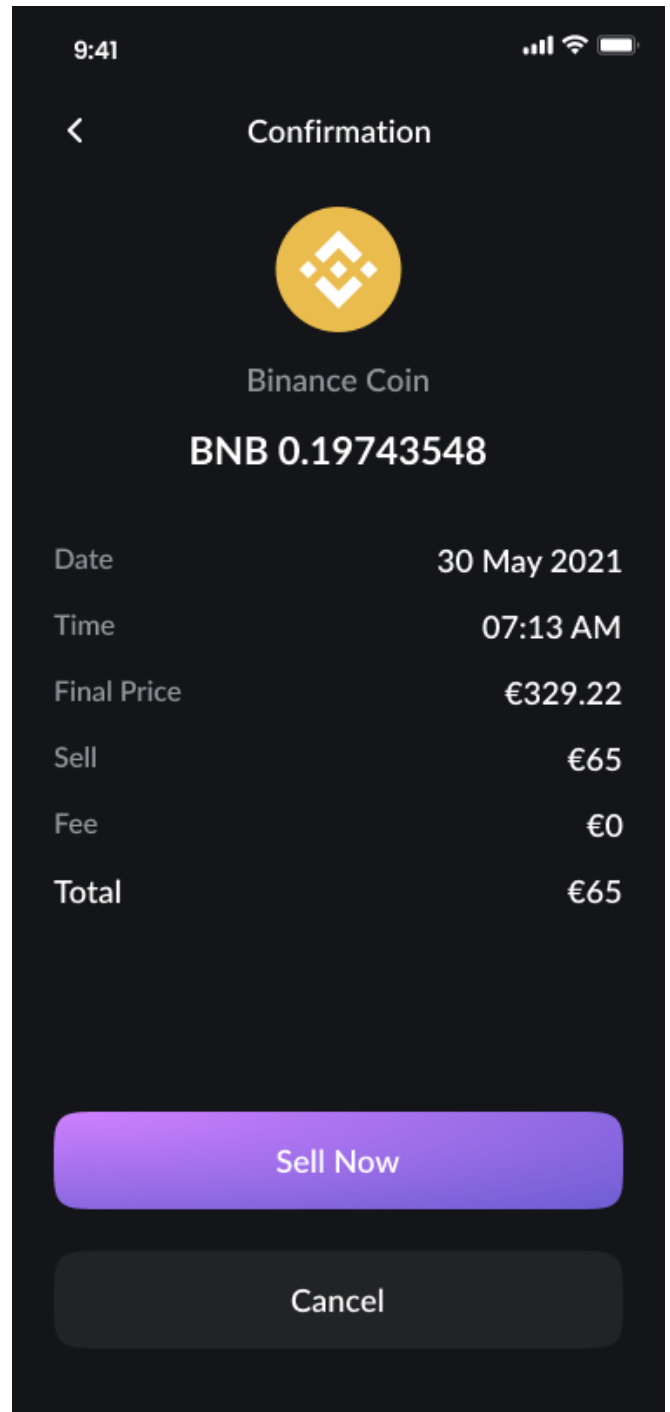
Picture 71 - Prototype - Success Purchase



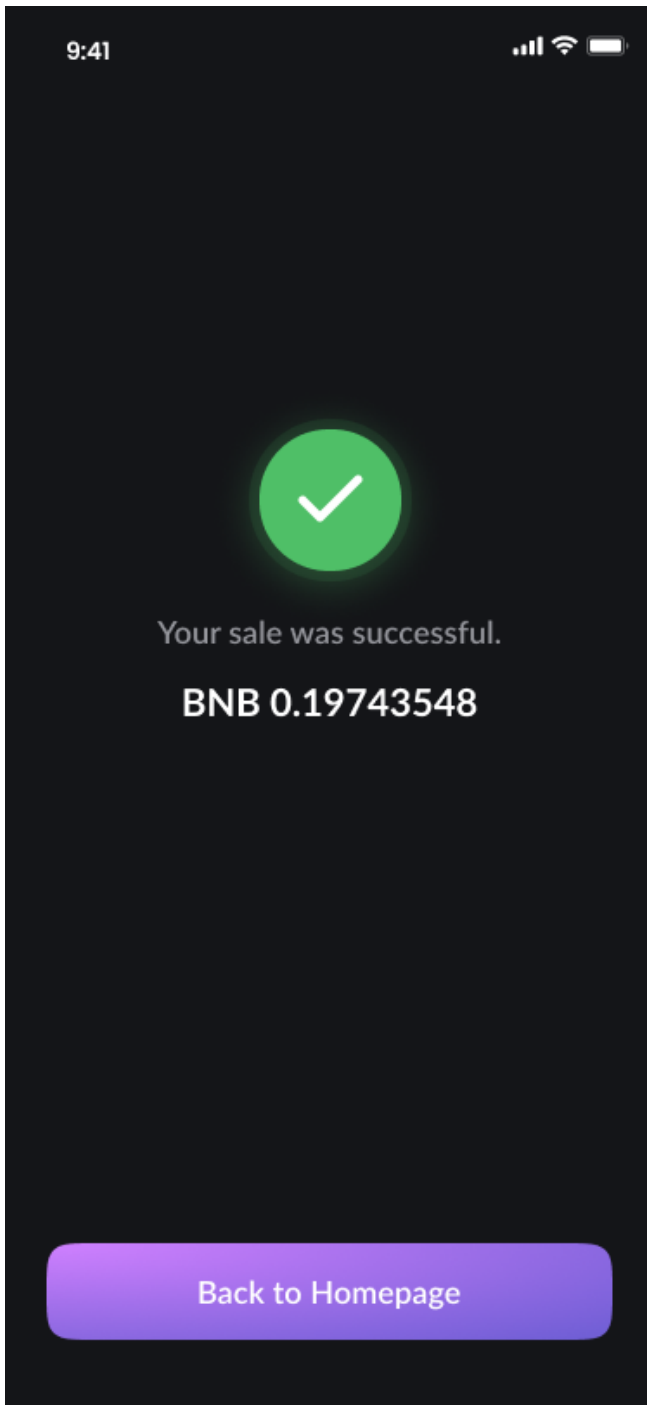
Picture 72 - Prototype - Failed Purchase



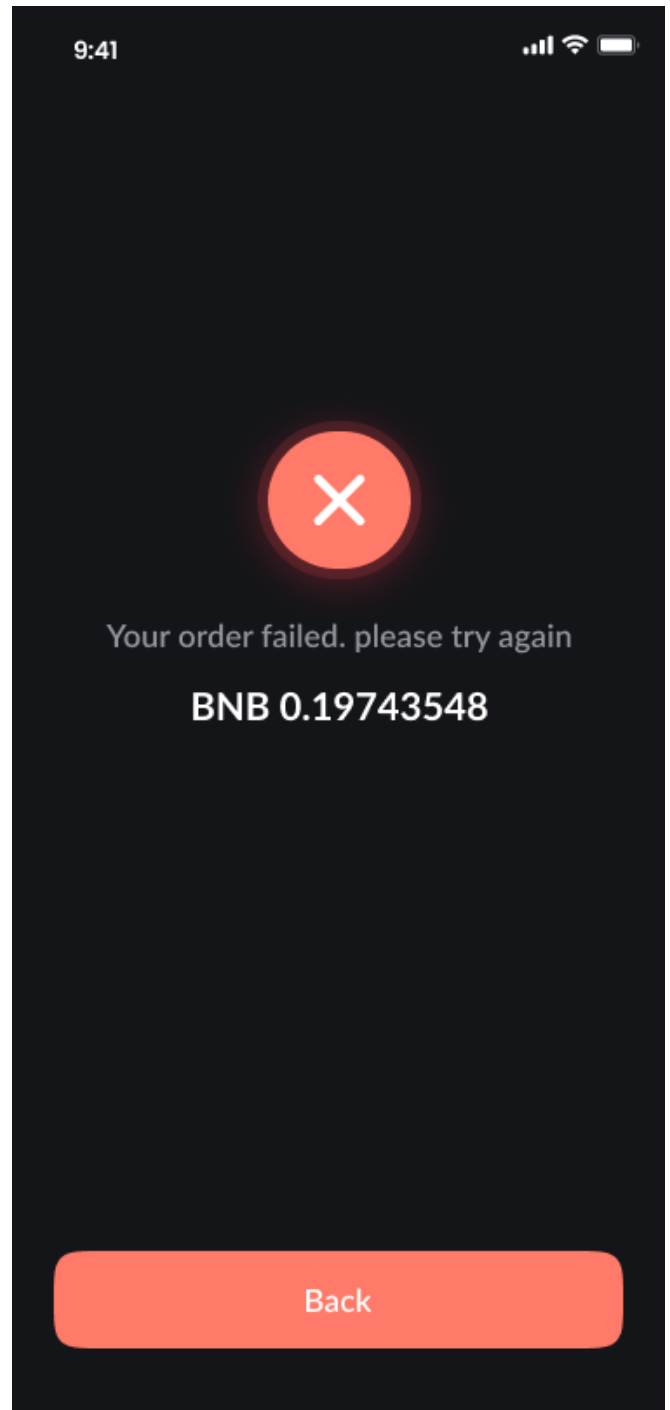
Picture 73 - Prototype - Sell



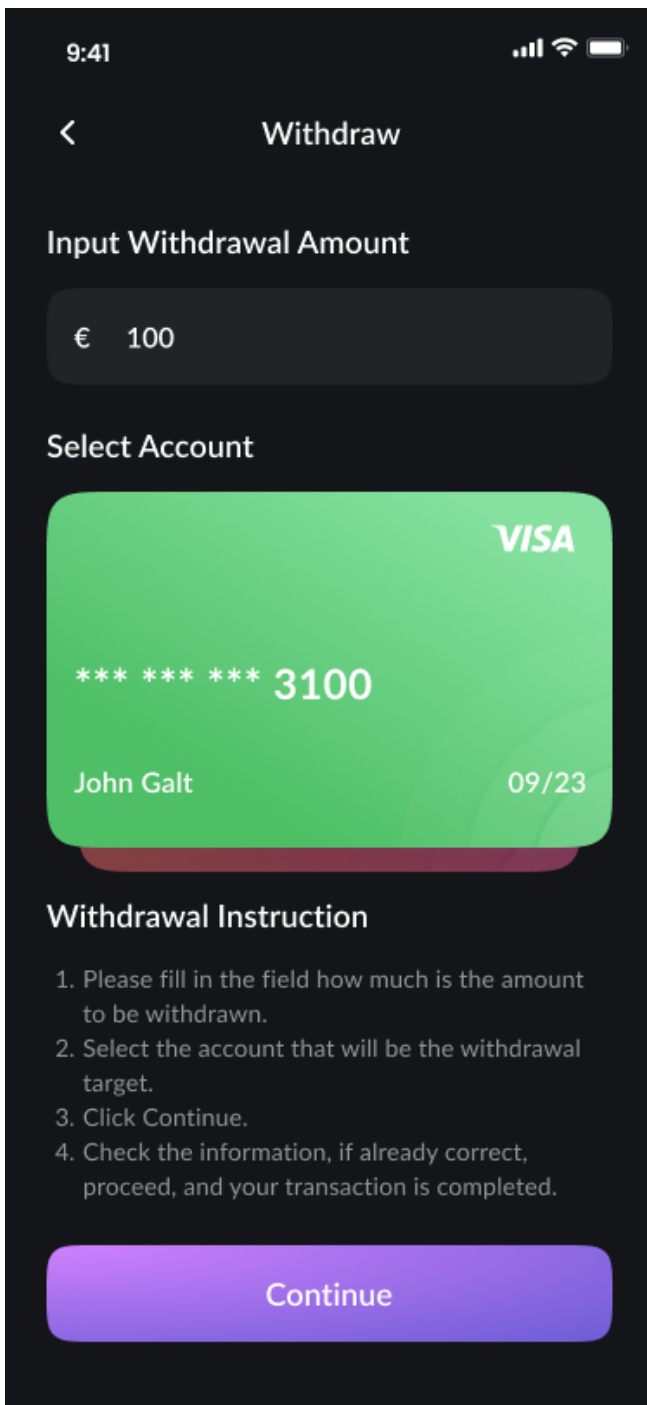
Picture 74 - Prototype - Sale Preview



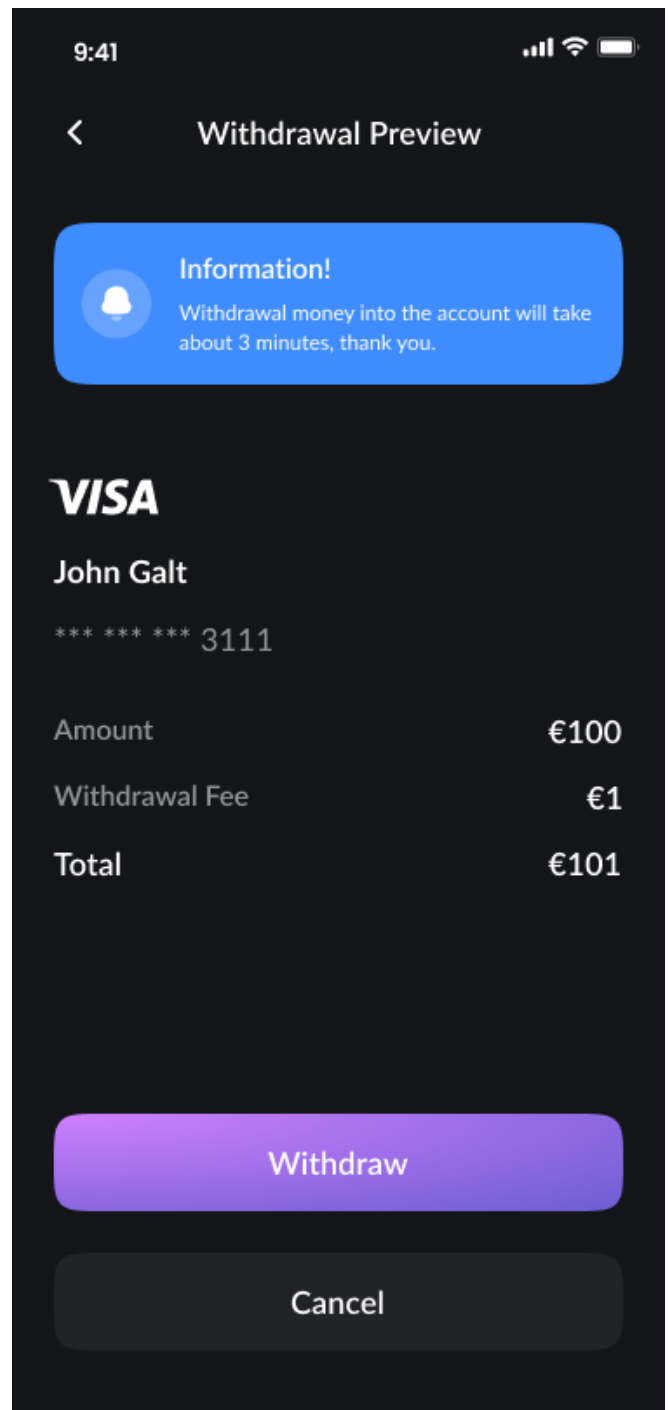
Picture 75 - Prototype - Success Sale



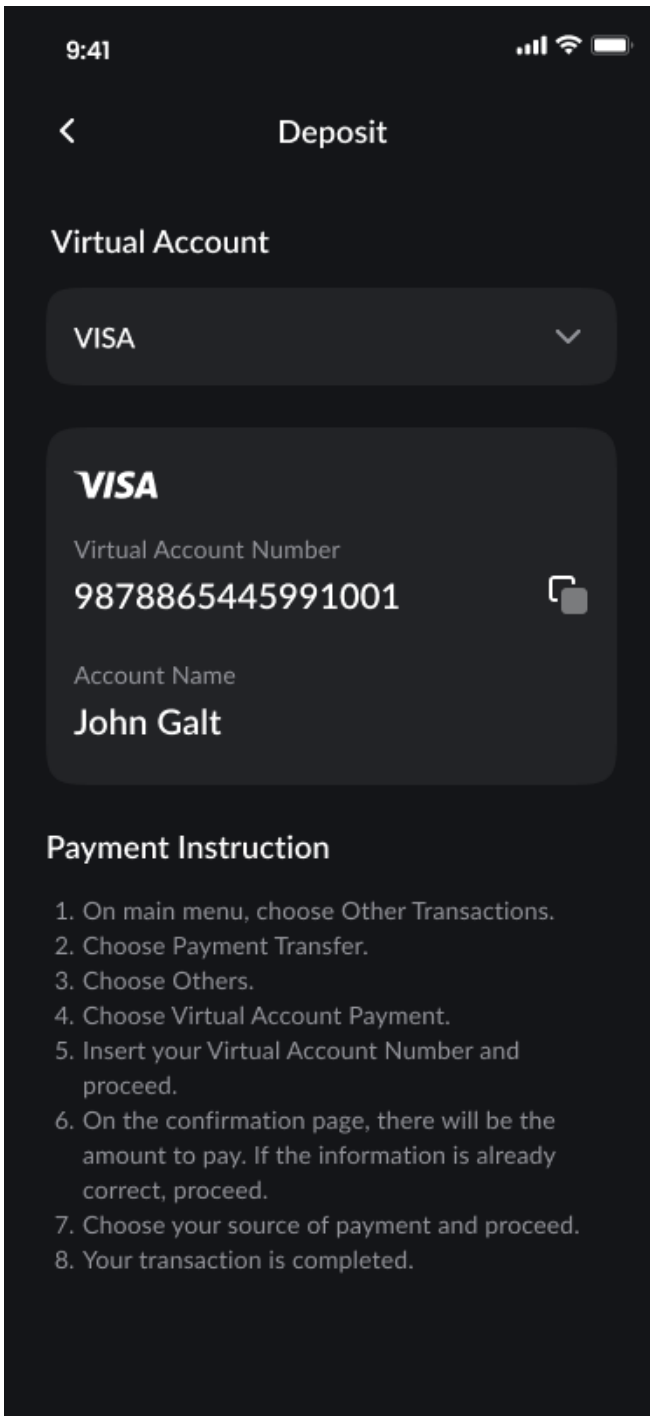
Picture 76 - Prototype - Failed Sale



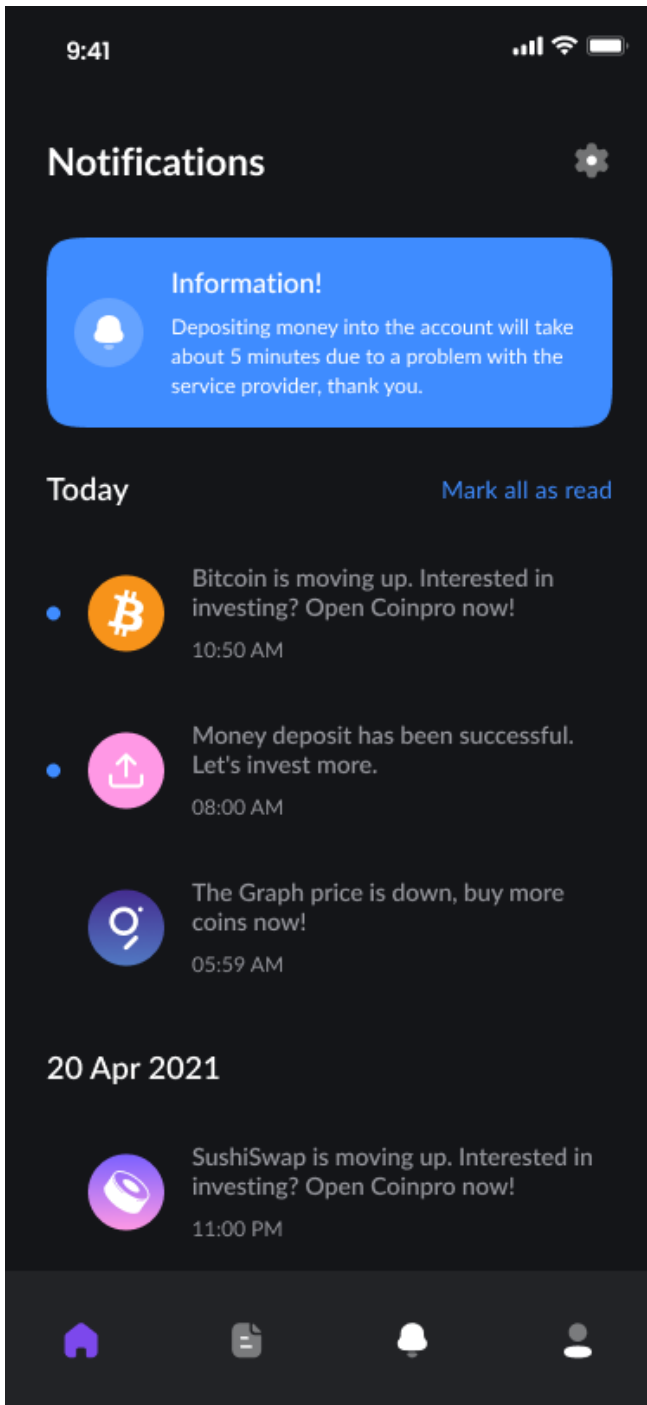
Picture 77 - Prototype - Withdraw



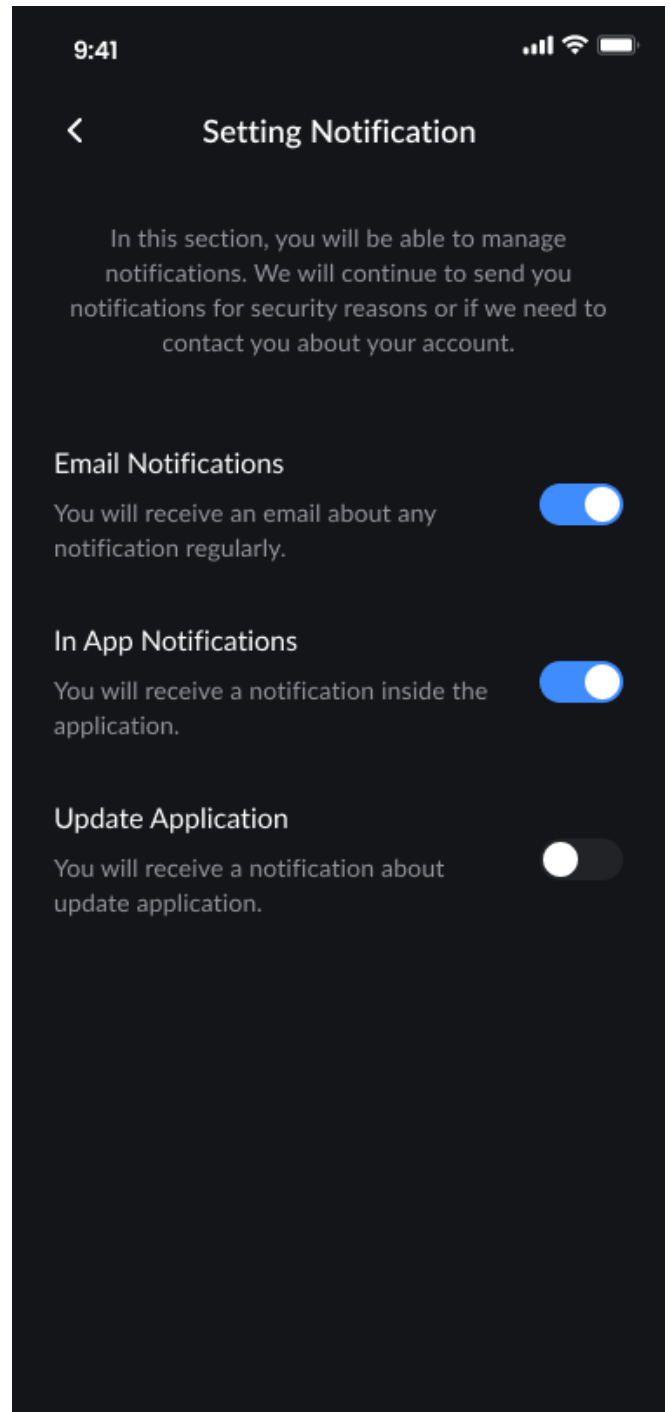
Picture 78 - Prototype - Withdrawal Preview



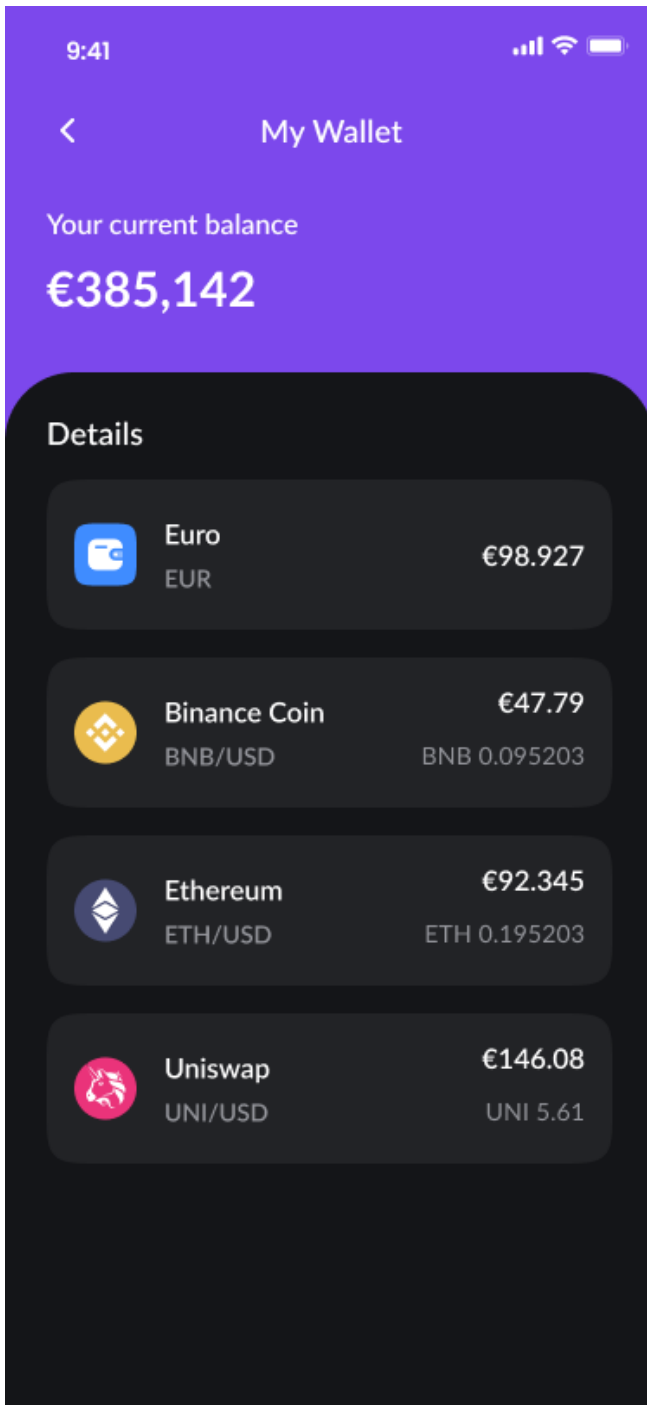
Picture 79 - Prototype - Deposit



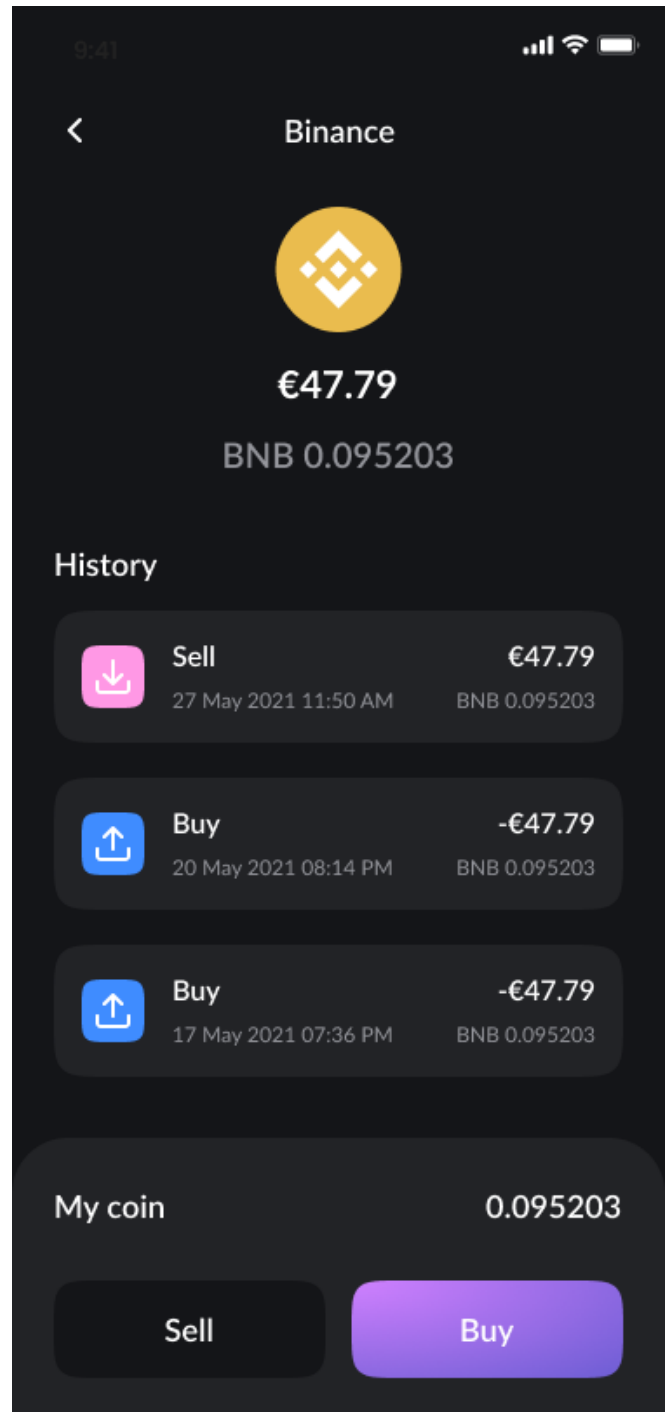
Picture 80 - Prototype - Notifications



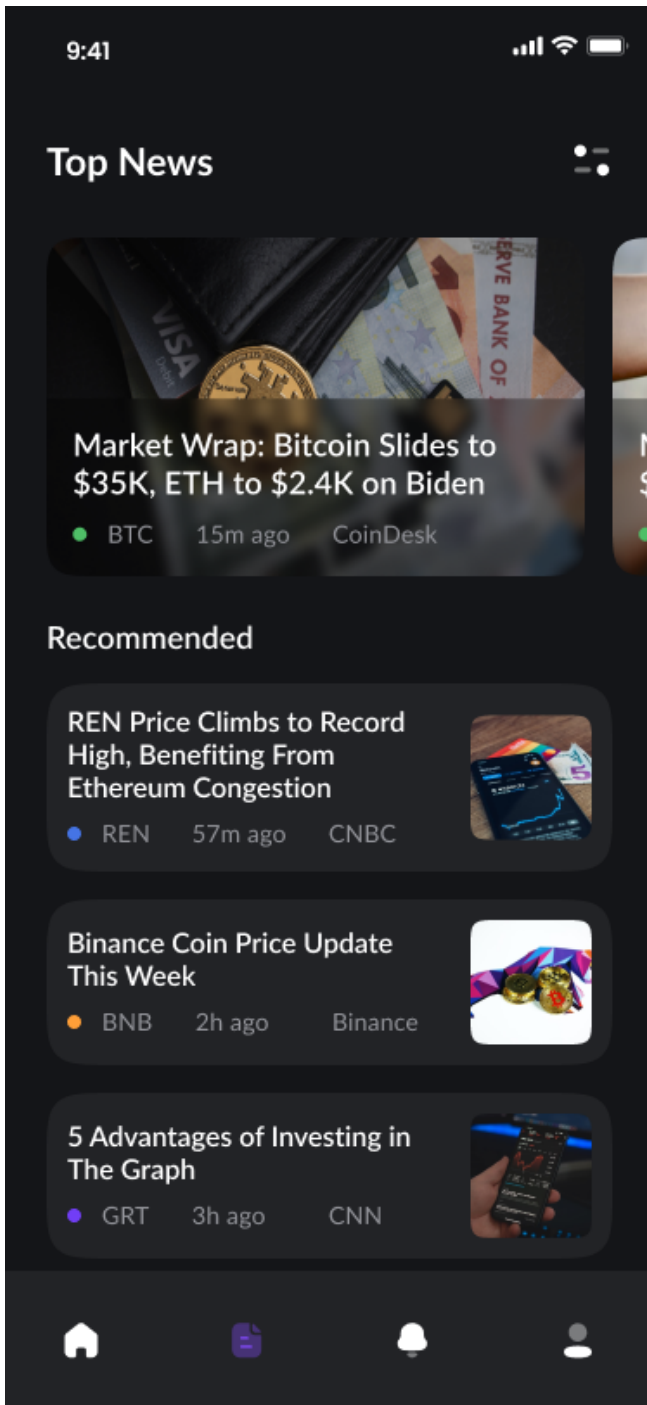
Picture 81 - Prototype - Notifications Settings



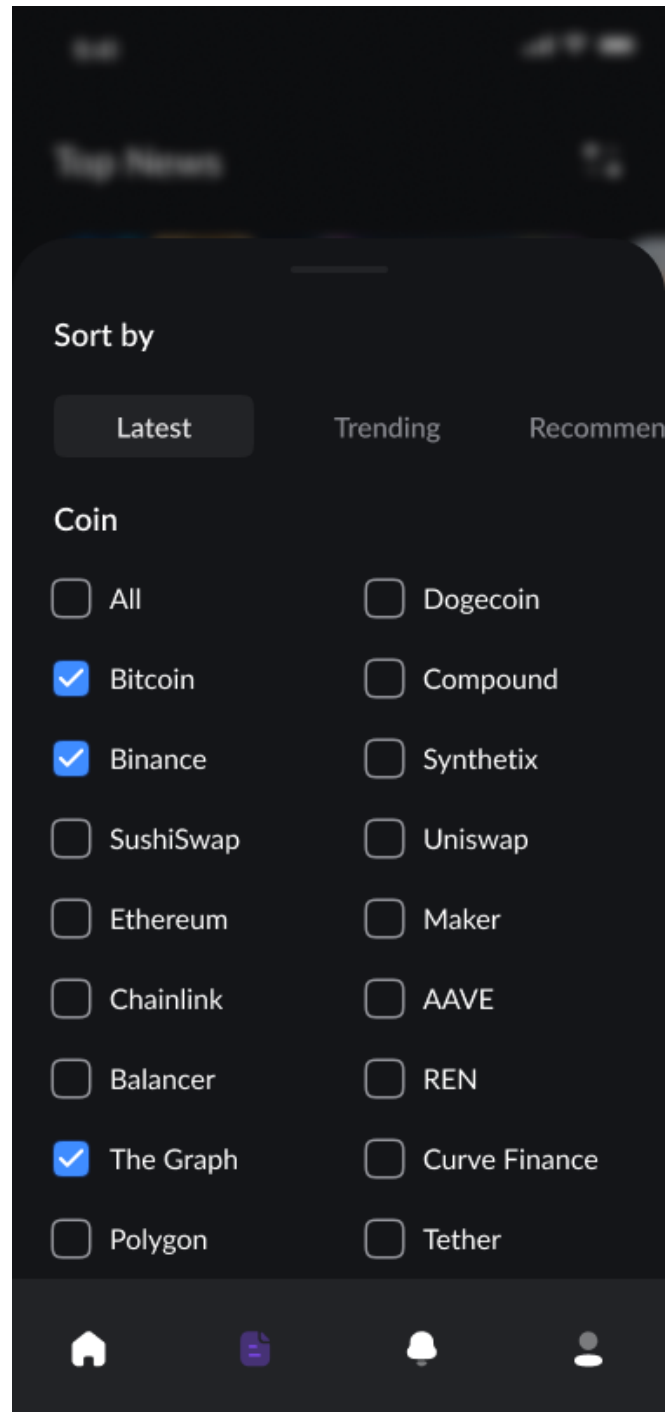
Picture 82 - Prototype - Wallet



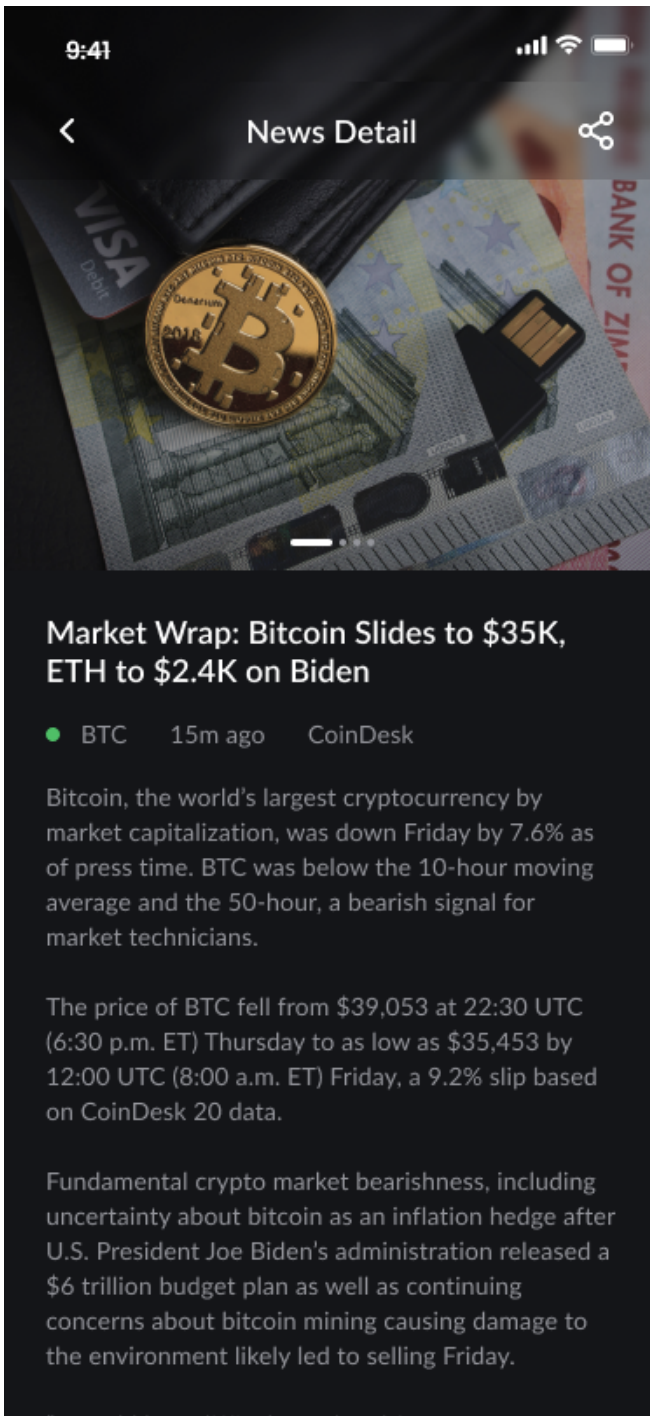
Picture 83 - Prototype - Wallet Detail



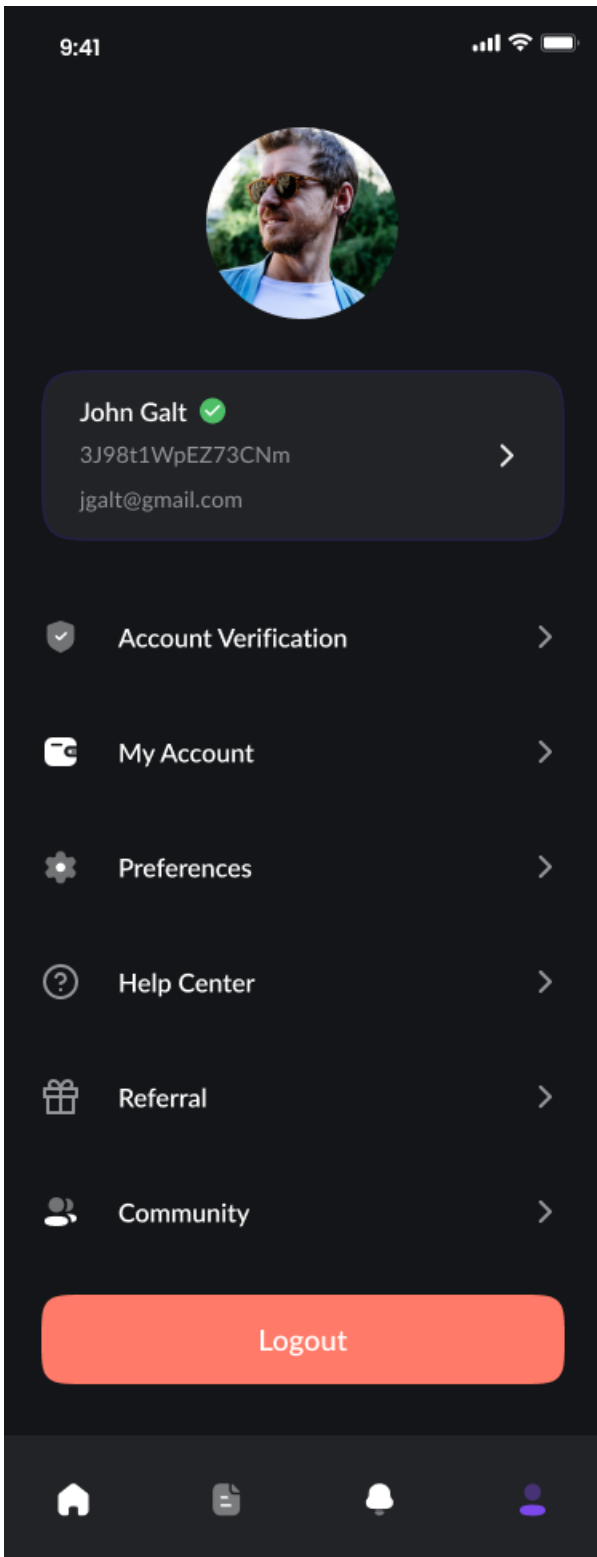
Picture 84 - Prototype - News



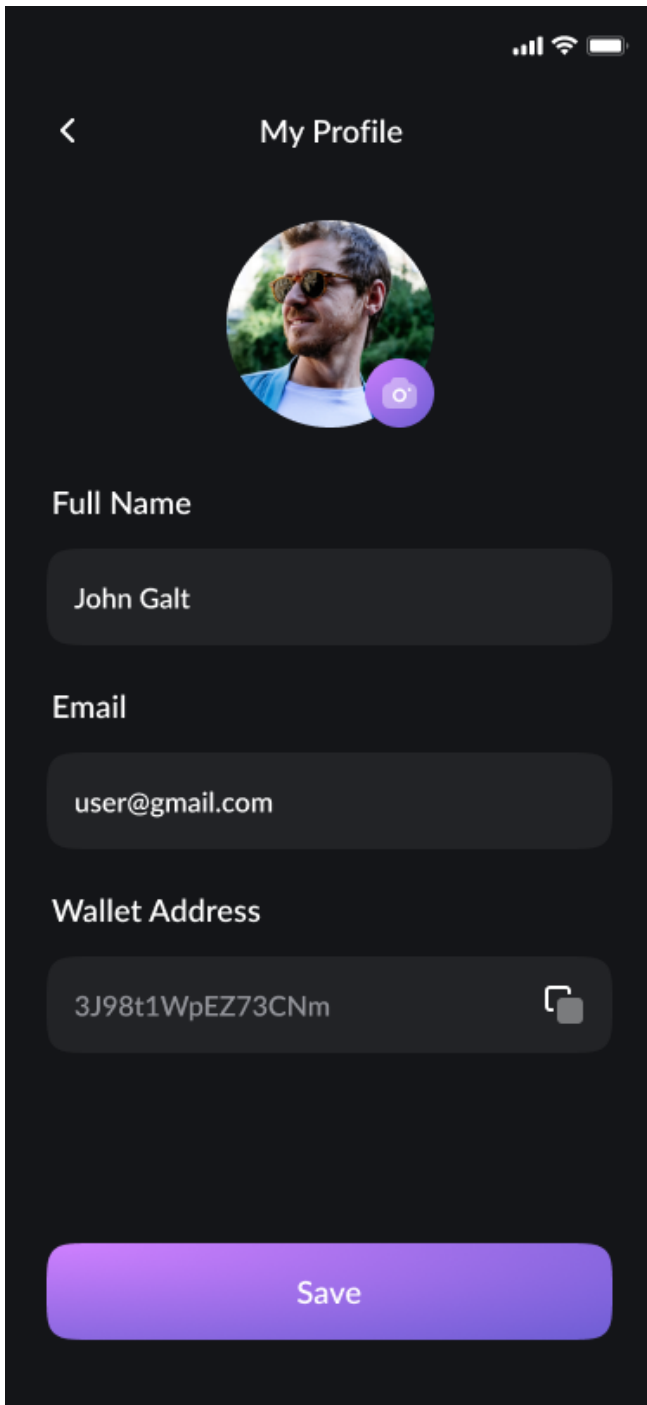
Picture 85 - Prototype - News Sort & Filter



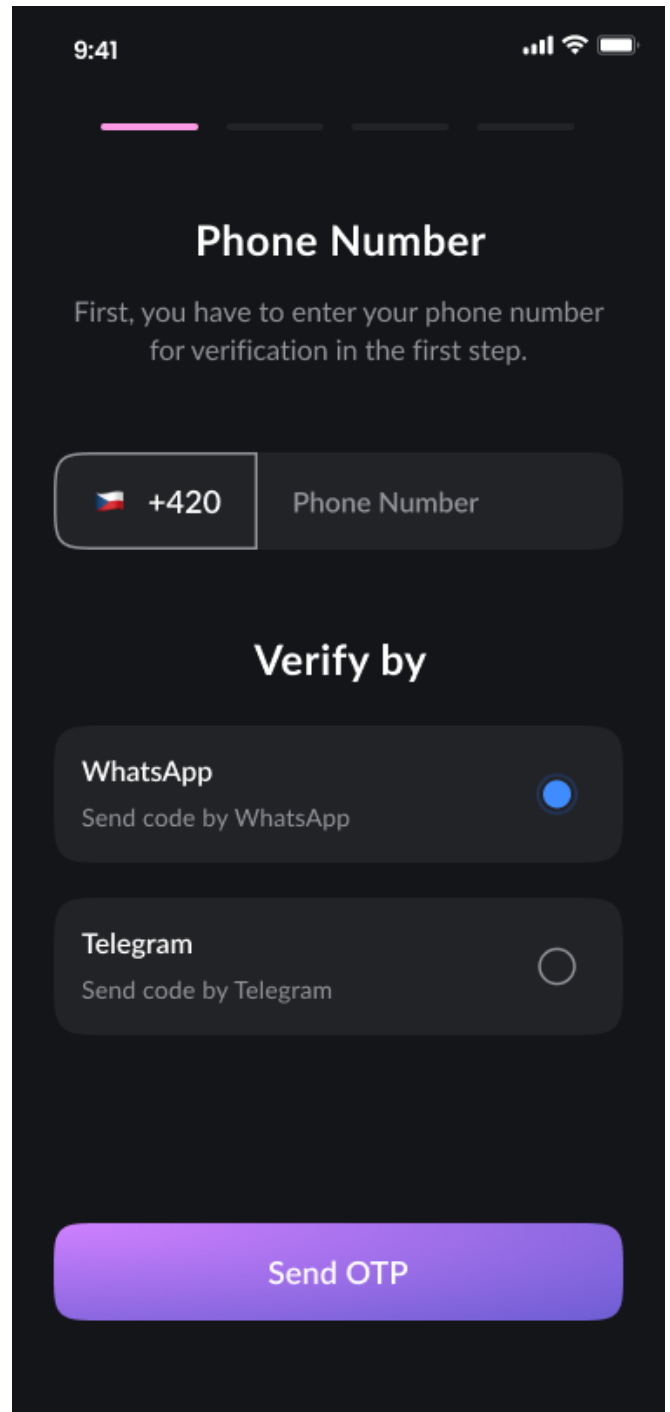
Picture 86 - Prototype - News Detail



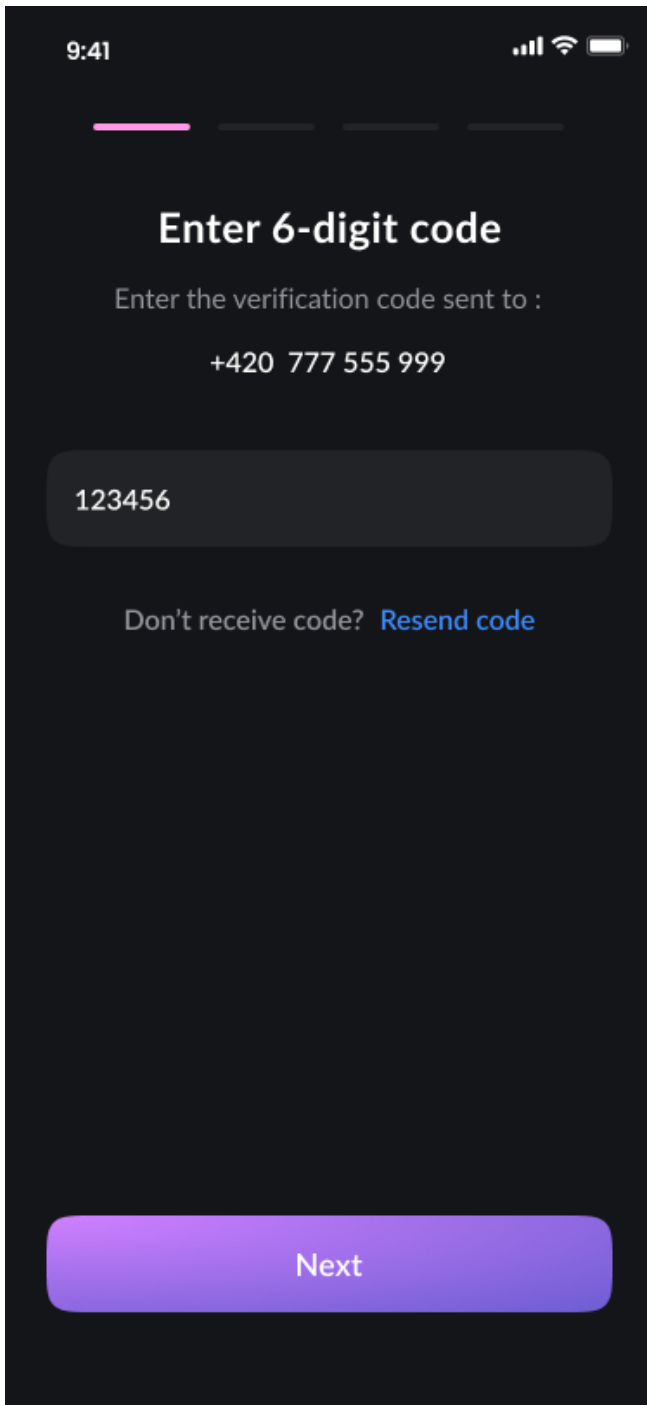
Picture 87 - Prototype - Profile



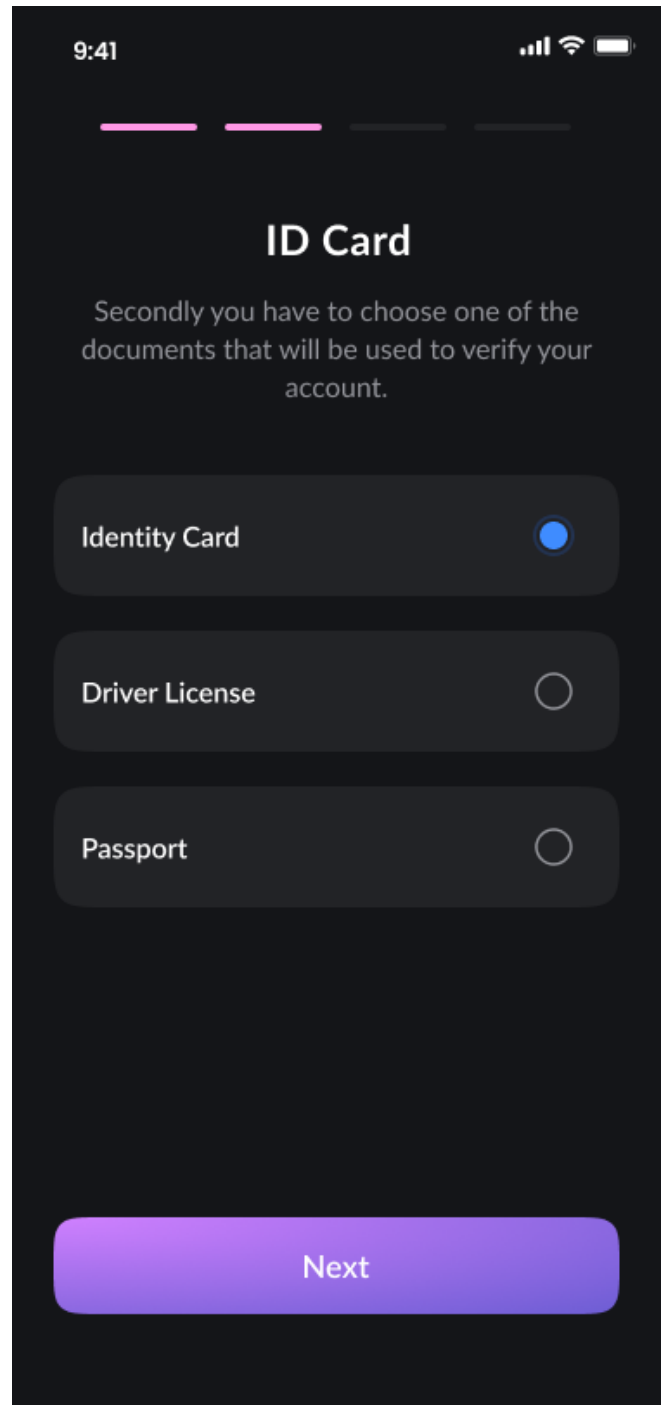
Picture 88 - Prototype - Personal Details



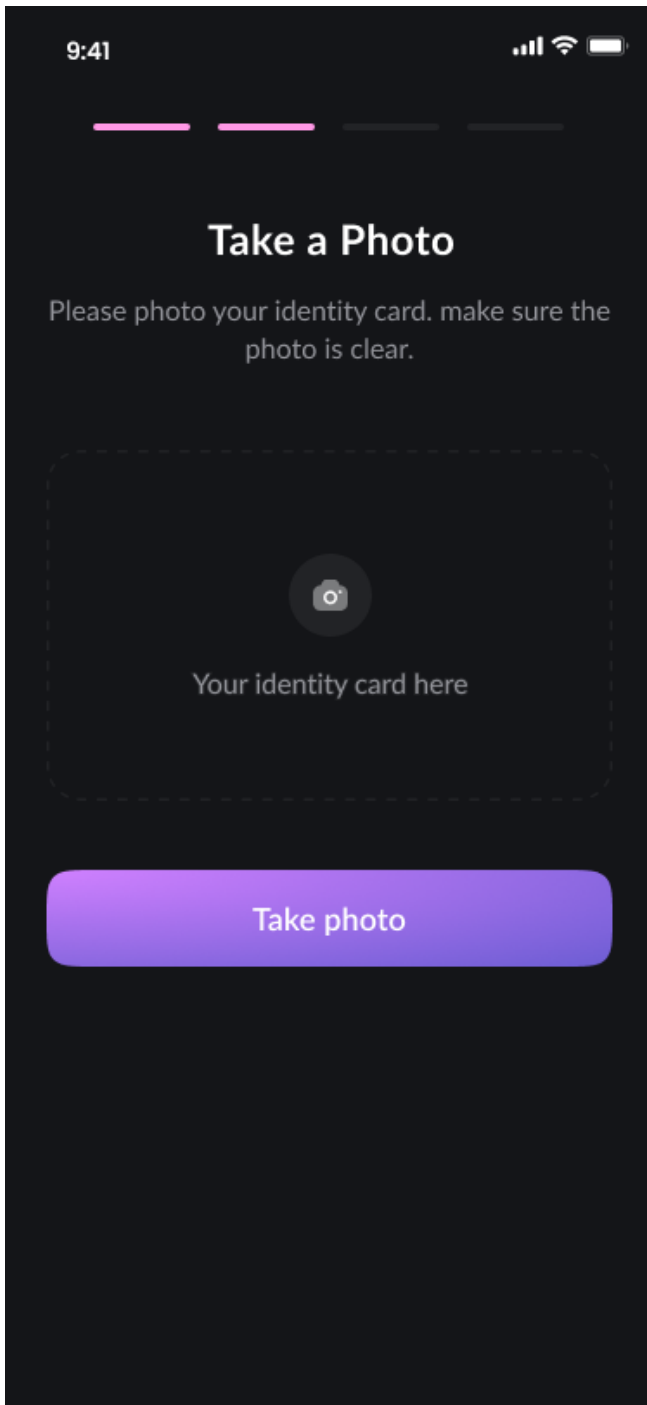
Picture 89 - Prototype - Verification - Phone



Picture 90 - Prototype - Verification - Phone 2



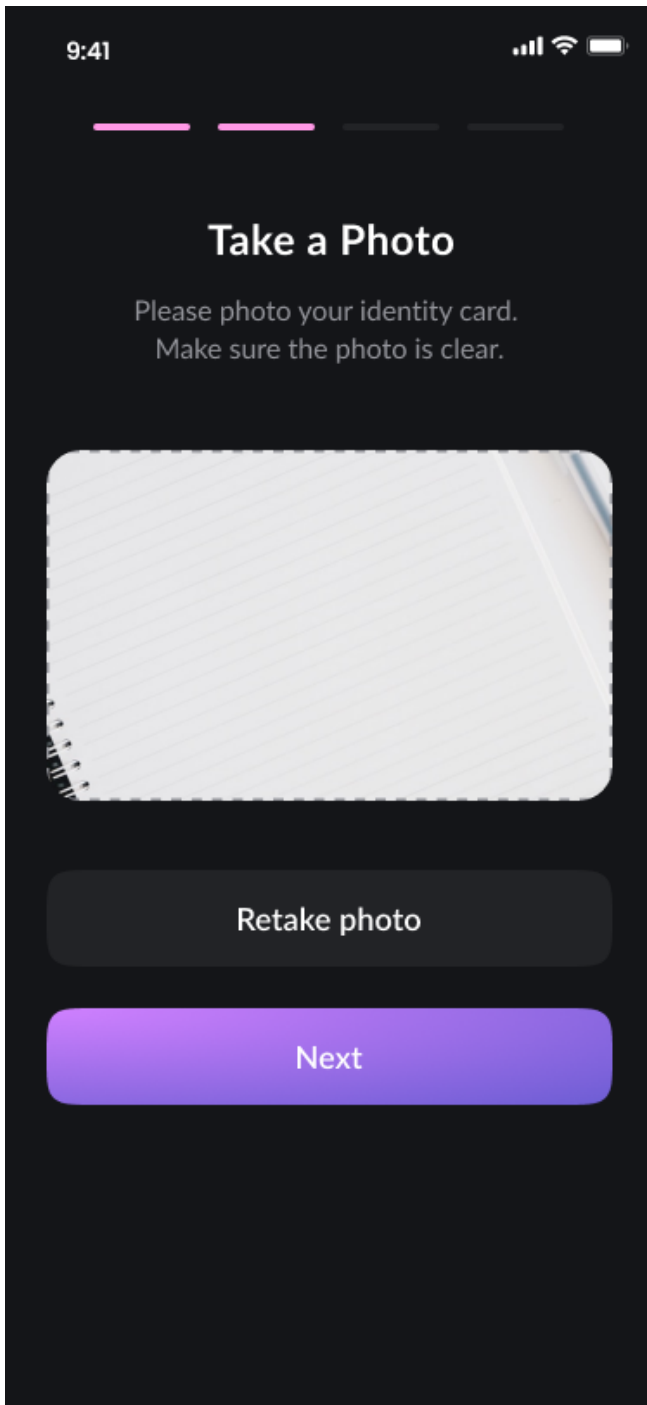
Picture 91 - Prototype - Verification - ID 1



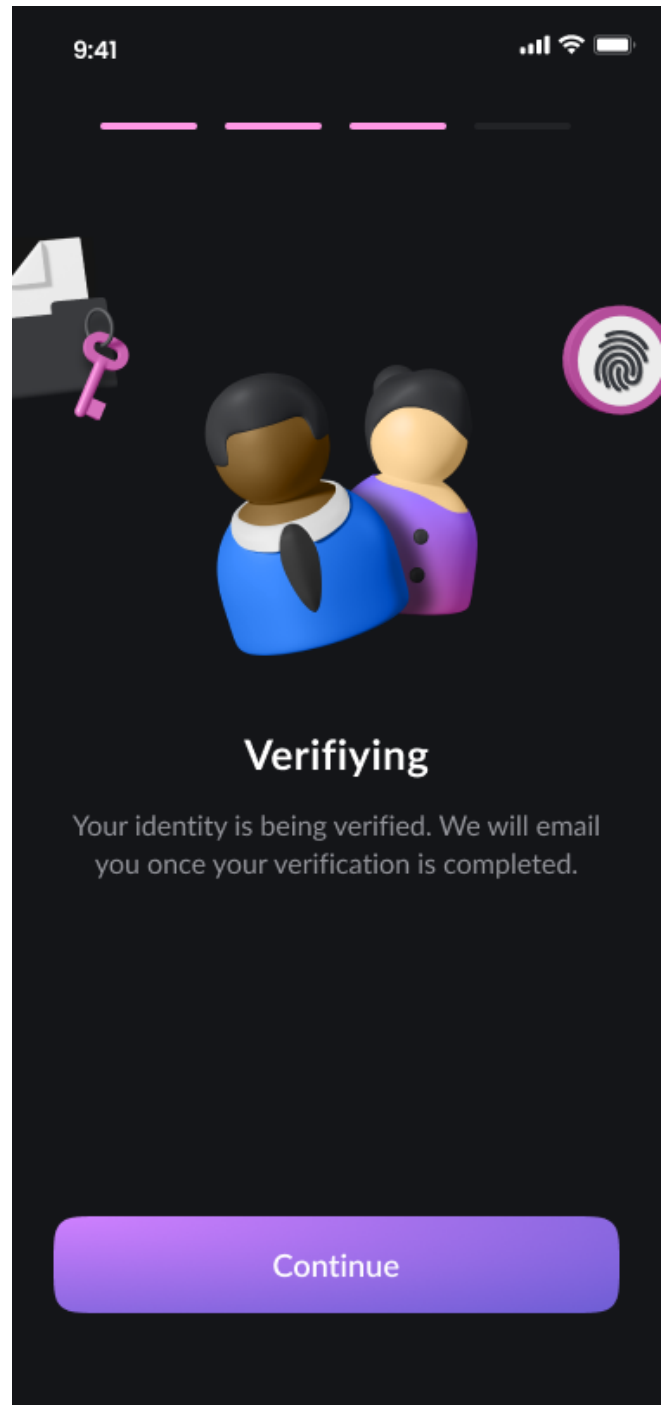
Picture 92 - Prototype - Verification - ID 2



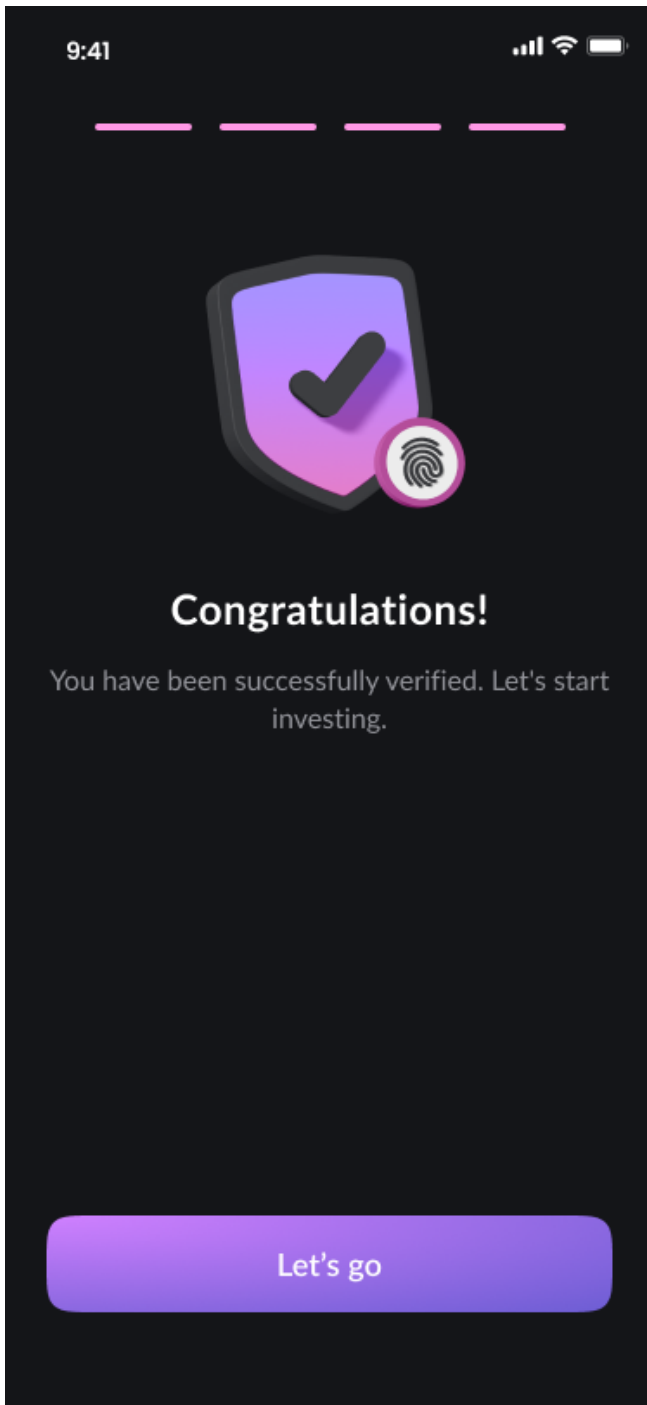
Picture 93 - Prototype - Verification - ID 3



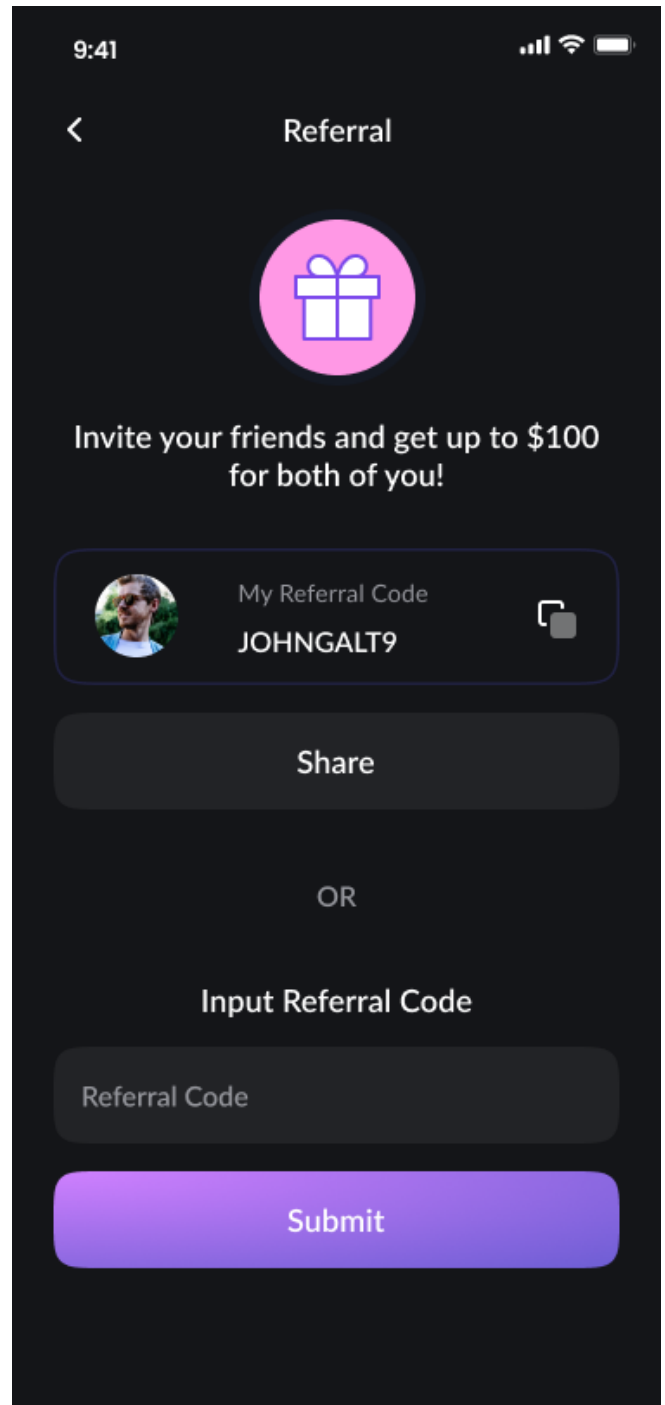
Picture 94 - Prototype - Verification - ID 4



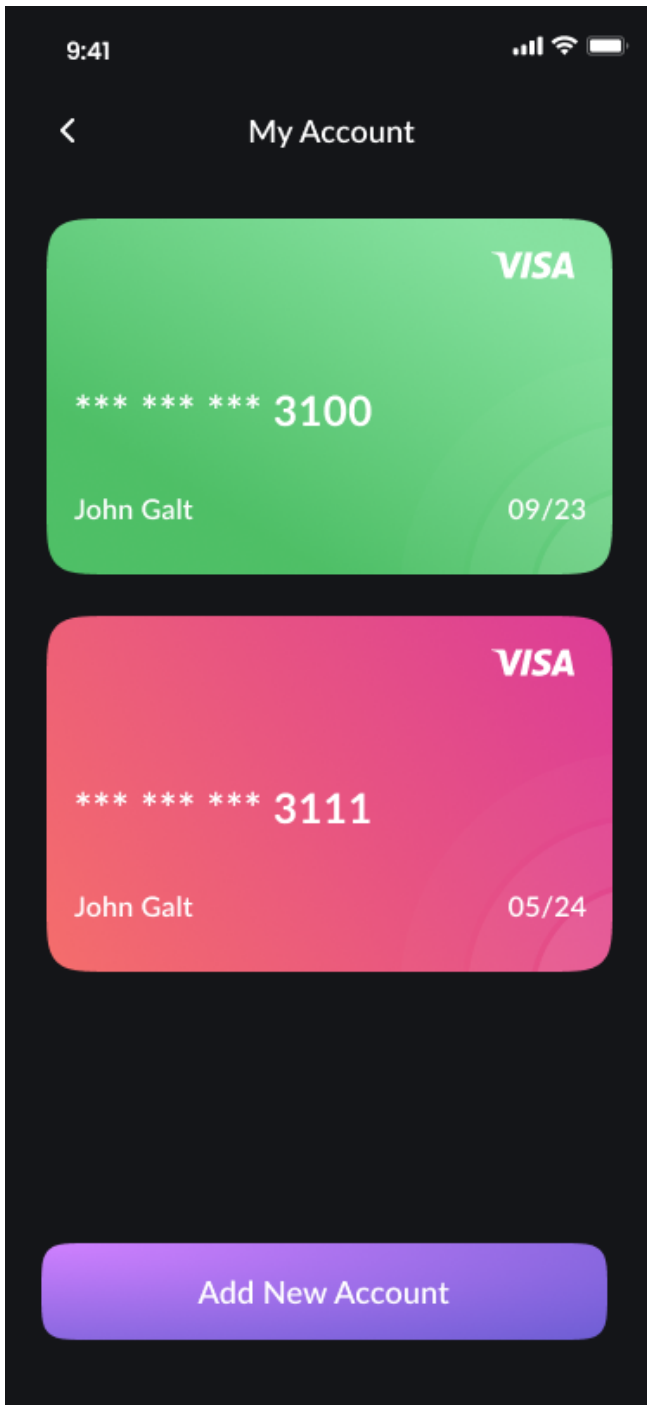
Picture 95 - Prototype - Verifying



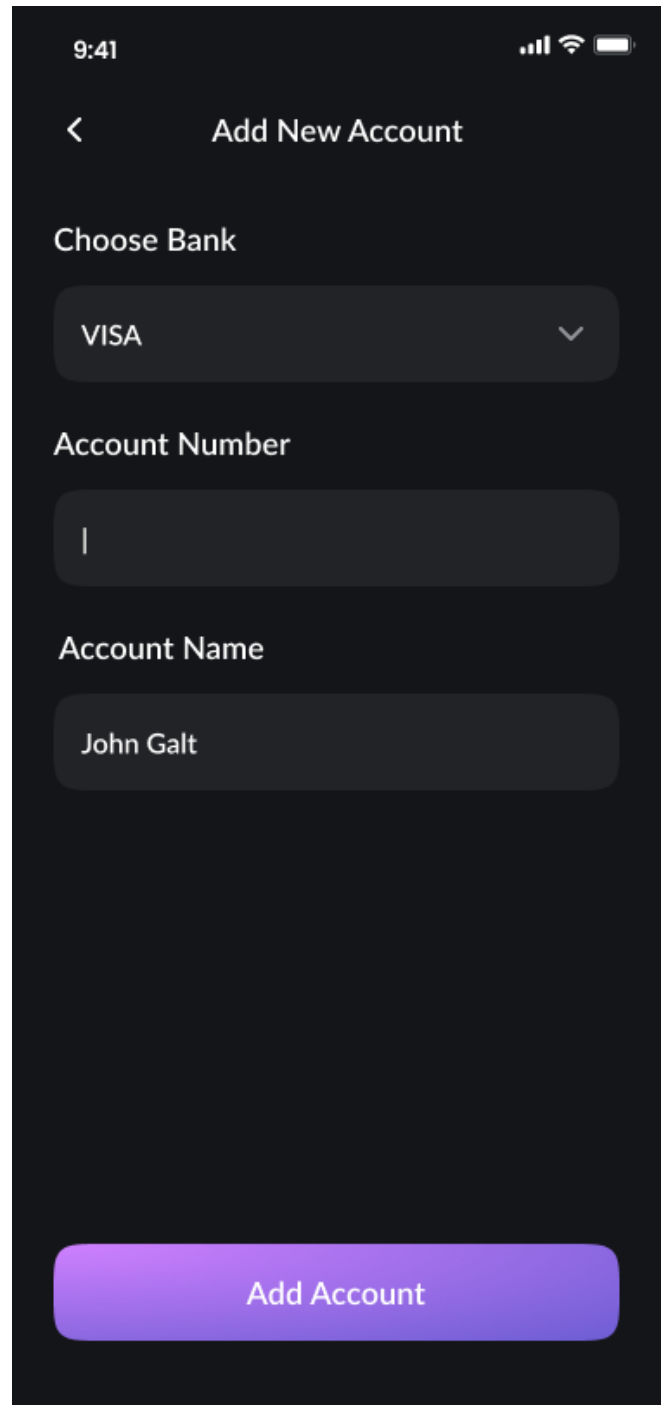
Picture 96 - Prototype - Verification - Success



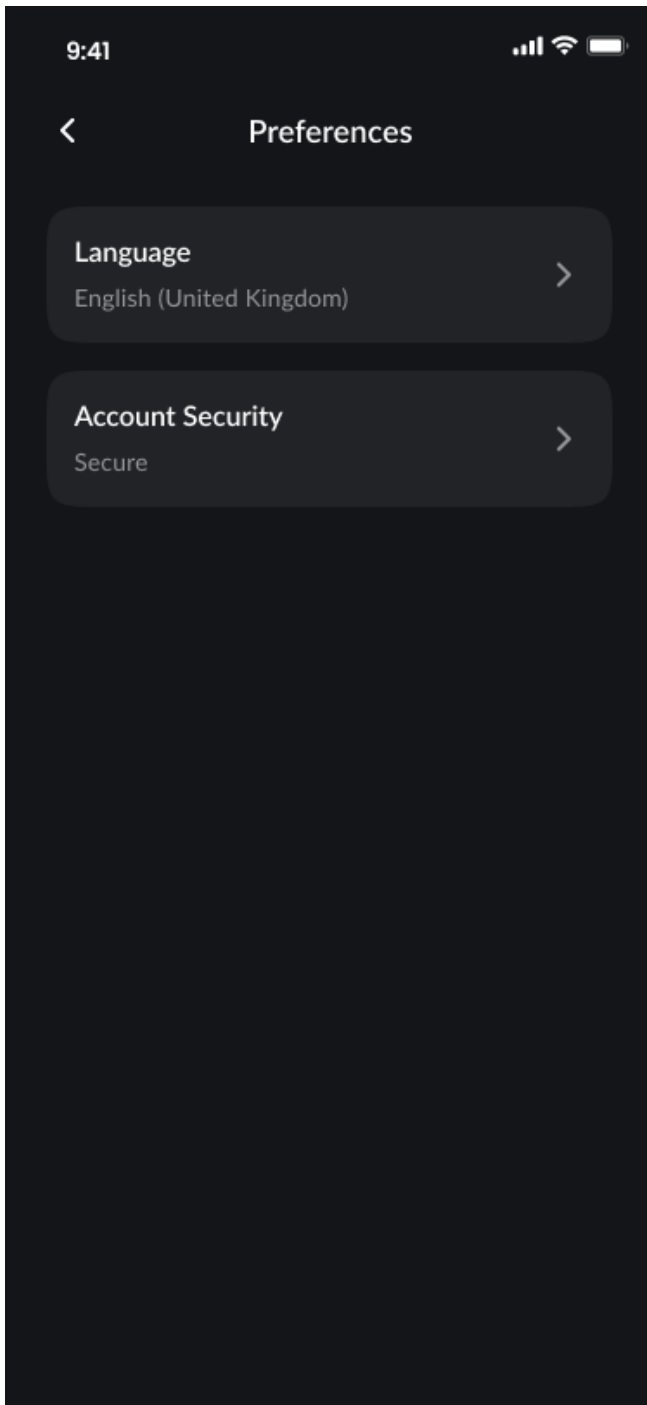
Picture 97 - Prototype - Referral



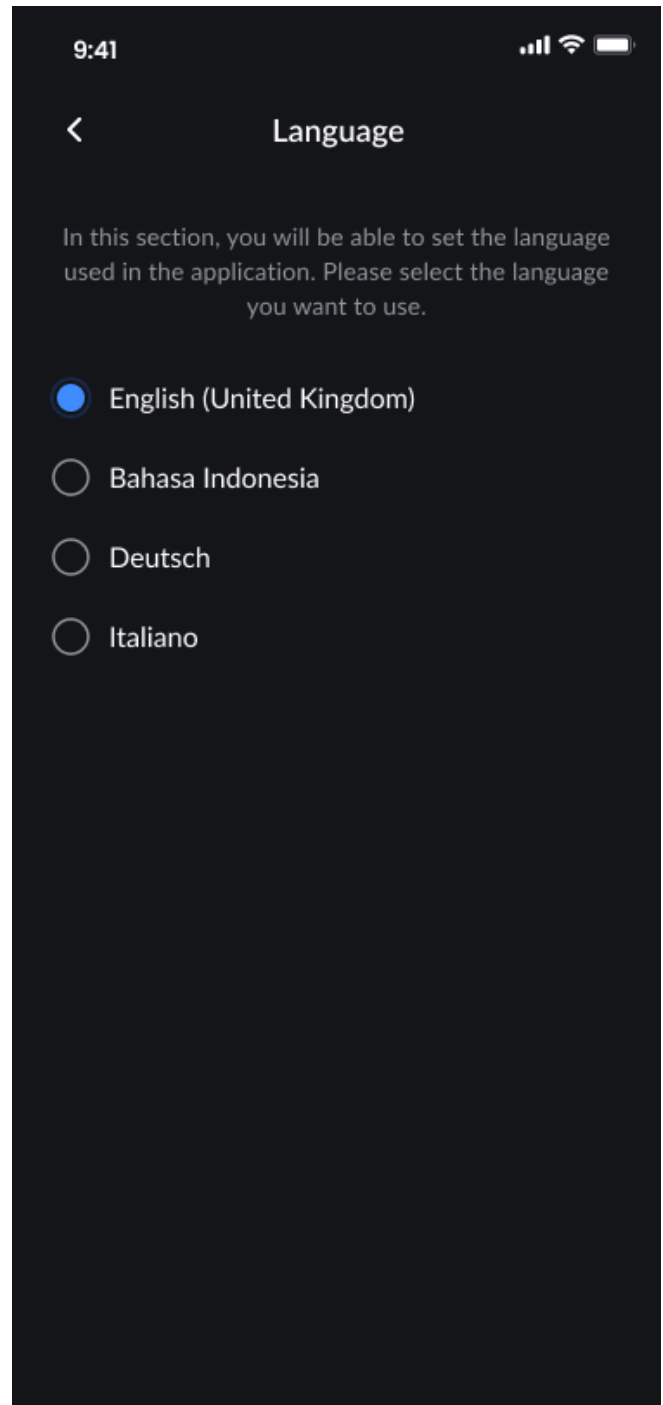
Picture 98 - Prototype - My Account



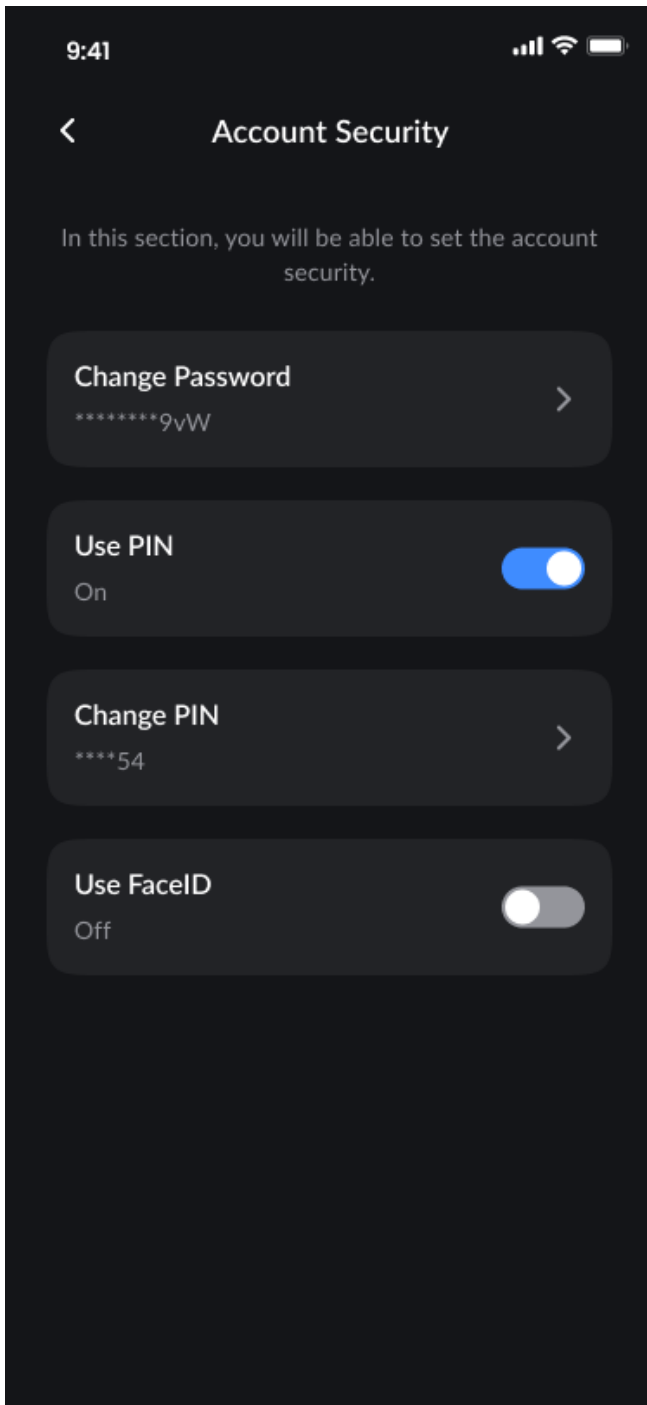
Picture 99 - Prototype - Add Account



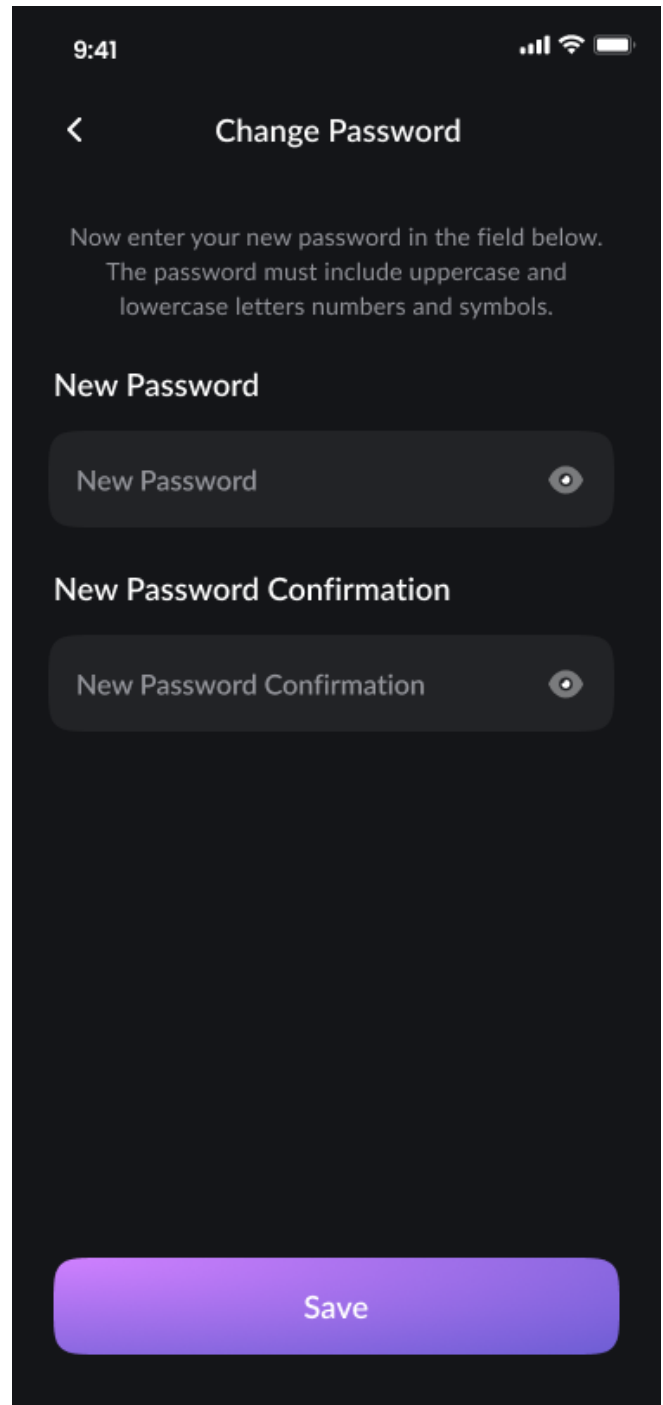
Picture 100 - Prototype - Preferences



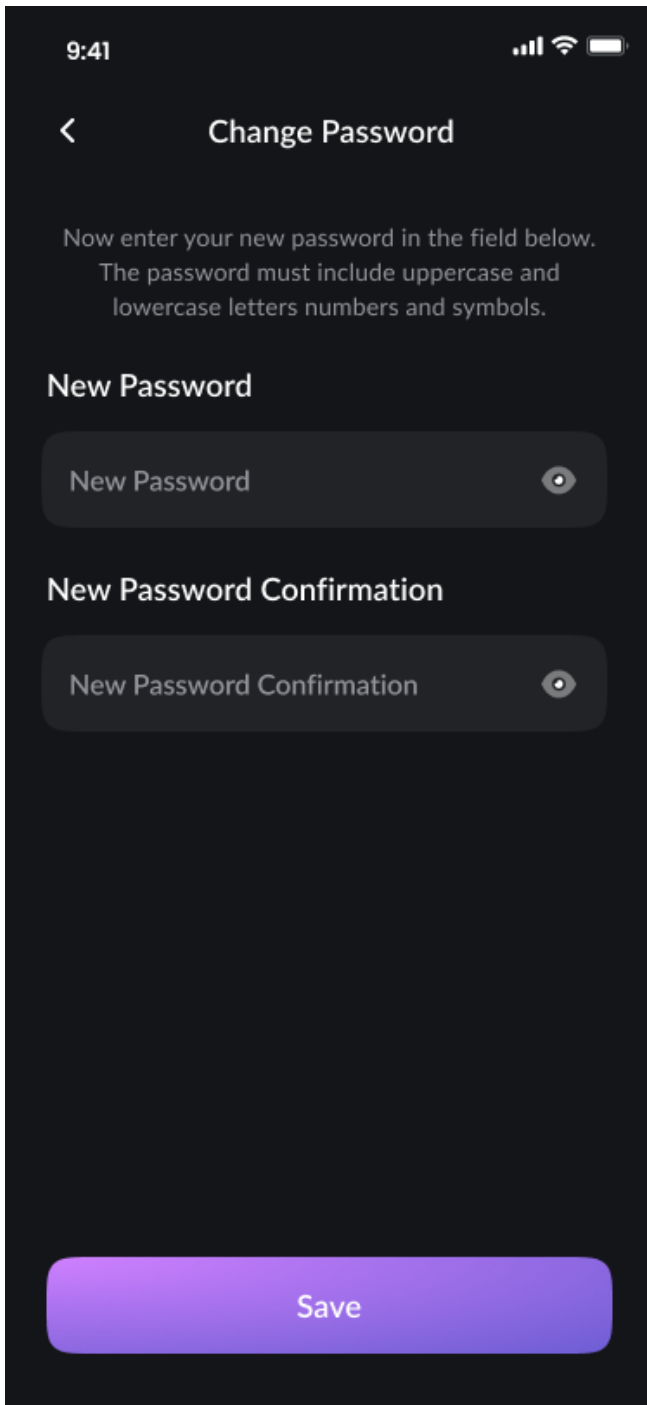
Picture 101 - Prototype - Language



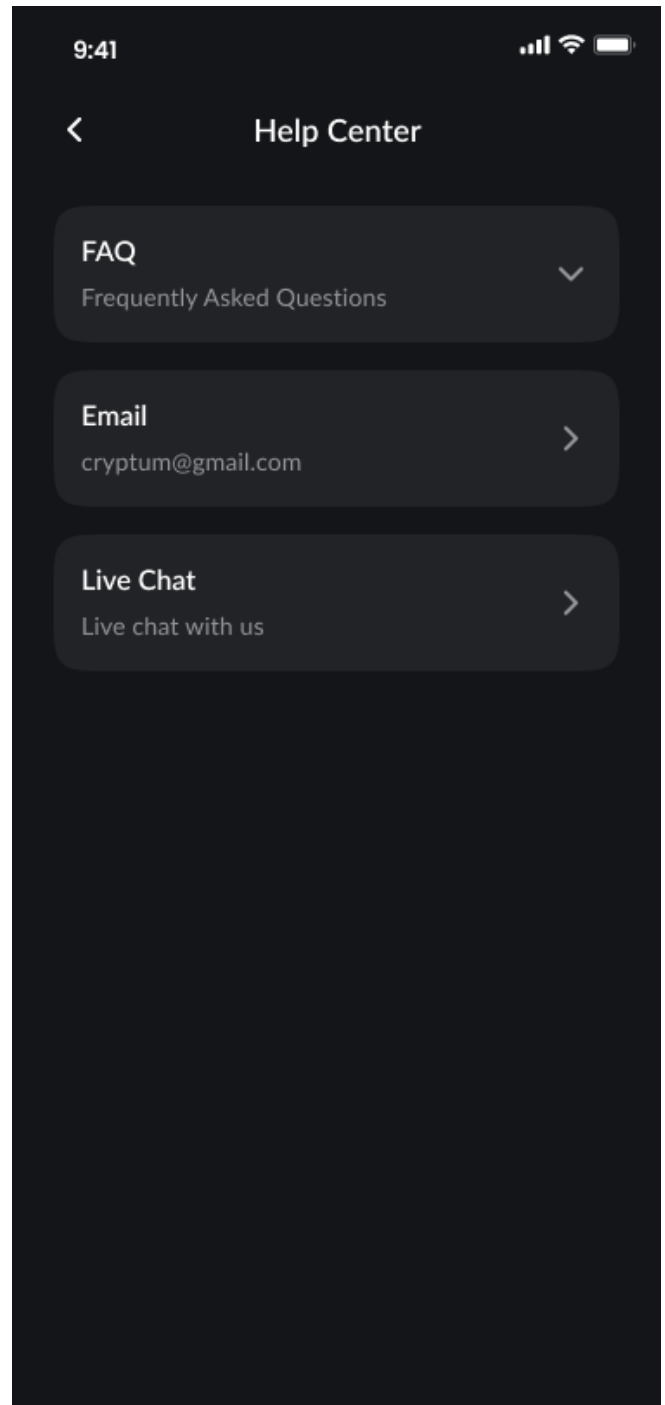
Picture 102 - Prototype - Account Security



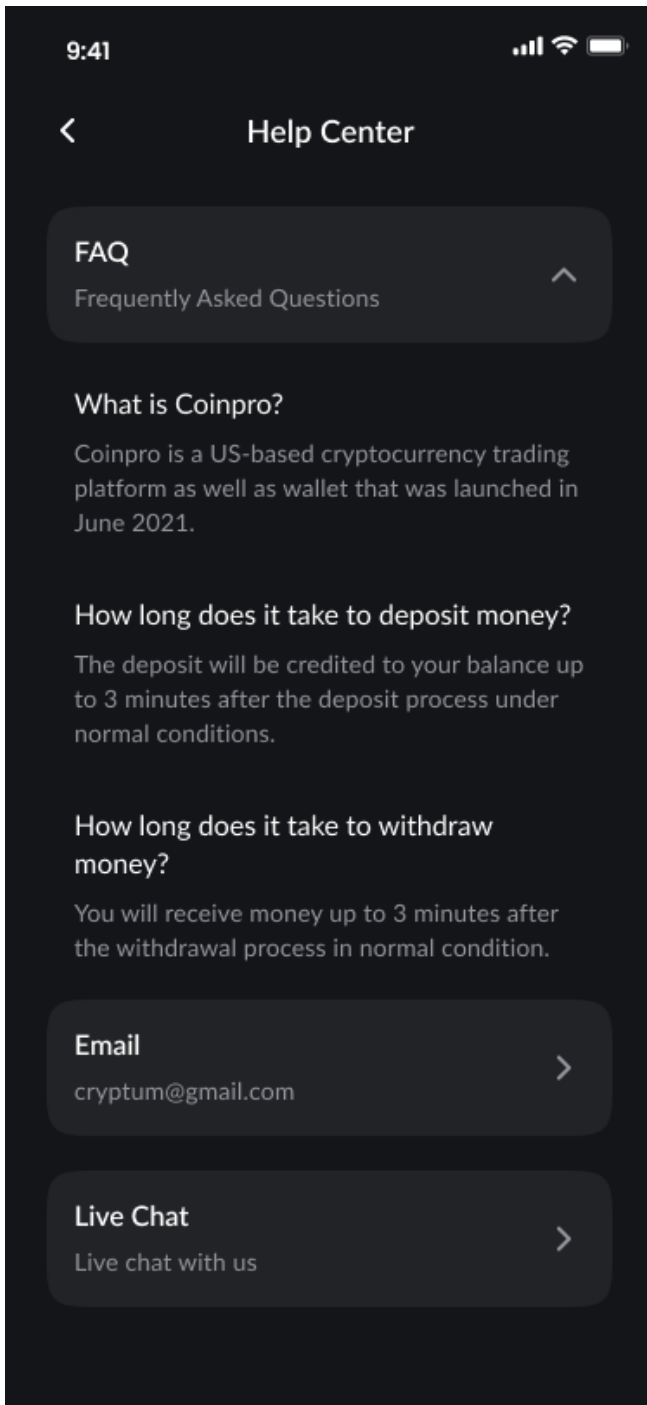
Picture 103 - Prototype -AS Change Password 1



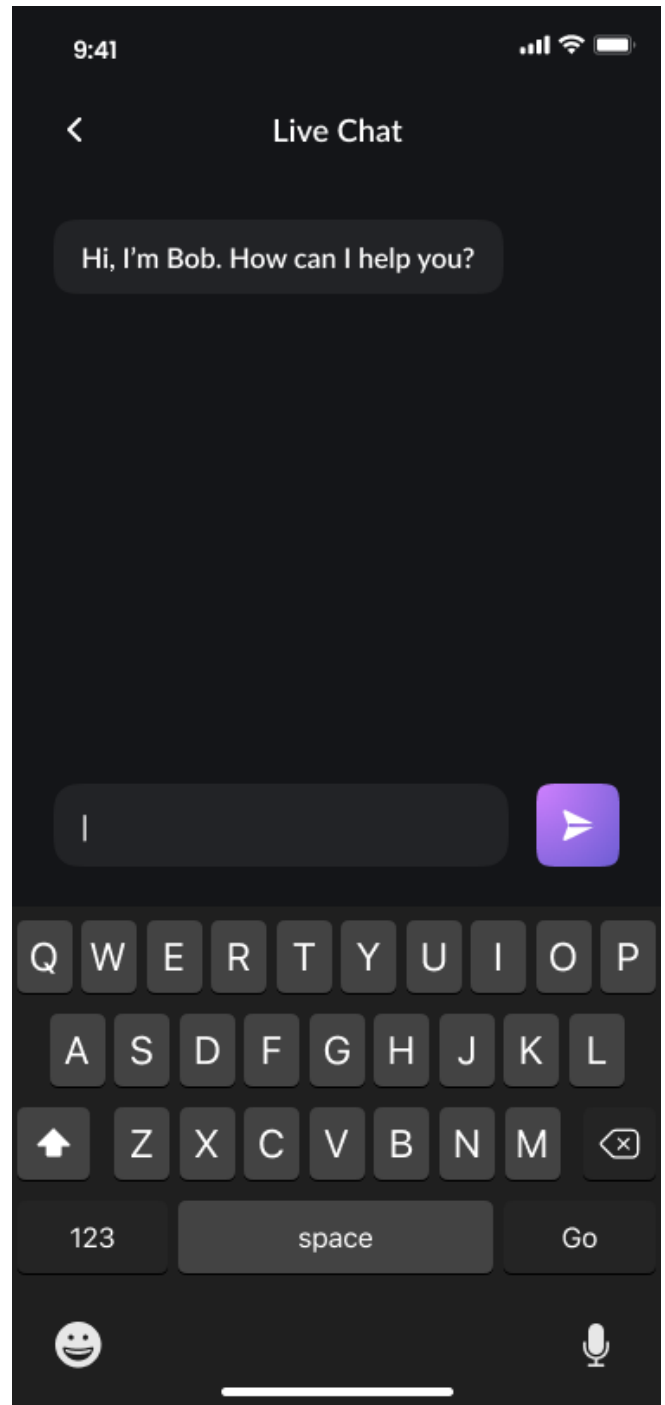
Picture 104 -Prototype - AS Change Password 2



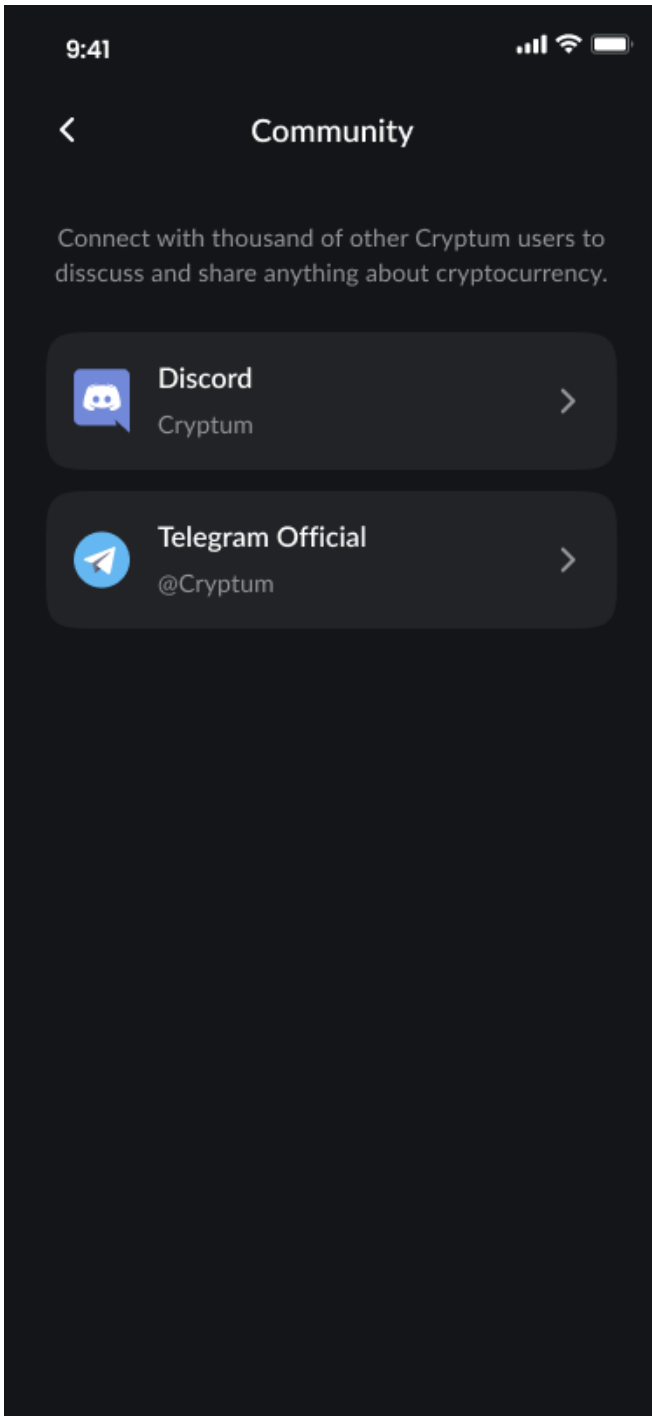
Picture 105 - Prototype - Help Center



Picture 106 - Prototype - Help Center - FAQ



Picture 107 - Prototype - Help Center Live Chat



Picture 108 - Prototype - Community

5. Qualitative & Quantitative Testing

In order to obtain feedback and identify potential problems of the proposed solution, the qualitative and quantitative testings were performed. The high-fidelity functional prototype was submitted for 5 participants, who meet the criteria of the target group, for testing using an iPhone XR and Figma Mirror app. Participants were asked to perform the assigned tasks set by the test scenarios, whereas each testing session, including the participants' comments and recommendations, was recorded. Afterwards, the participants were asked some general questions in order to get general feedback on the application usability and overall user experience with it. Session recordings showed how the users interact with the app, the problem areas were identified. Based on the achieved results, the changes were performed in order to improve upon the original solution.

5.1. Test Scenarios

- 1) Register and Login
- 2) Add a Bank Card
- 3) Buy *BNB* in the amount of *65 EUR*
- 4) Find payment details to *deposit 100 EUR* to the account balance
- 5) Search for the term "*Cardano*" in the app
- 6) Withdraw *100 EUR* on the *Visa 3100*
- 7) View the latest news about *Bitcoin*, go through the *most recent article*
- 8) Turn on *In-App Notifications*
- 9) Pass an Account Verification
- 10) Change password
- 11) Set language to *Italian*
- 12) Copy your wallet address
- 13) Log out

Moreover, the participants had access to the full functionality of the prototype. All the participants seized this opportunity as well.

5.2. Testing Results

User perception of the experience with the application was positive in 100% cases. The simplicity and the ease of use were highly appreciated by the respondents. Both, user experience and user interface, were rated positively overall by the participants. The most highly regarded features, according to the users, are well-structured navigation, efficient arrangement and layout of the elements and visual aesthetic. Moreover, it was found during the interview that the majority of participants find the prototype design “professional” and “neat”. 80% of respondents appreciated modern visuals and an appealing color scheme. The quality of content presentation was also rated acclaimed by the users.

The user testing findings are represented in the Table 1, whereas the evaluation of the task performance is as follows:

0% - the user didn't manage to perform the task

50% - the user faced some problems during the completion of the task, but managed to perform it

100% - the user performed the task quickly, without any problems

Users/ Scenarios	<i>User 1</i>	<i>User 2</i>	<i>User 3</i>	<i>User 4</i>	<i>User 5</i>	Total
<i>Scenario 1</i> Sign Up & Login	100%	100%	100%	100%	100%	100%
<i>Scenario 2</i> Add a Bank Account	100%	100%	50%	50%	100%	80%
<i>Scenario 3</i> Buy BNB	100%	100%	100%	100%	100%	100%
<i>Scenario 4</i> Deposit	100%	100%	100%	100%	100%	100%
<i>Scenario 5</i> Search “Cardano”	100%	100%	100%	100%	100%	100%
<i>Scenario 6</i> Withdraw	100%	100%	50%	100%	100%	90%
<i>Scenario 7</i> News	100%	100%	100%	100%	100%	100%
<i>Scenario 8</i>	100%	100%	100%	100%	50%	90%

In-App Notifications						
<i>Scenario 9</i> Pass an Account Verification	100%	100%	50%	50%	100%	80%
<i>Scenario 10</i> Change password	50%	100%	100%	50%	100%	80%
<i>Scenario 11</i> Set language	100%	100%	100%	50%	100%	90%
<i>Scenario 12</i> Copy wallet address	100%	100%	100%	50%	100%	90%
<i>Scenario 13</i> Log out	100%	100%	100%	50%	100%	90%

Table 1 - User Testing Evaluation

100% participants successfully completed the tasks assigned. The core premise is understandable and the overall concept of the product is clear. 38.5% (8/13) of scenarios were completed quickly and without any problems or participation of the moderator. Both, quantitative and qualitative testing sessions, show that all the participants enjoyed the overall experience related to the usage of the application. The testing outcomes show that there are no significant usability issues that hamper the UX.

Nevertheless, summative evaluation of the scenarios through task-completion rate reflects potentially problematic scenarios. The outcomes of the quant studies are analyzed and used during further interview sessions in order to identify main usability problems in an interface.

Some minor shortcomings in the functionality were revealed during the analysis of testing sessions. Consequently, a number of modifications were performed based on the finding of the user tests, and the original solution was modified, specifically:

- Add a “Quit” button on each step of the Account Verification procedure (chapter 12)
- Add a “Forgot password?” link during Login process (chapter 4)
- Split subsection “Preferences” (section “Profile”, chapter 12) into two separate subsections, “Language” and “Security”

- Add a phone number to the “Personal Details” subsection (section “Profile”, chapter 12), along with “Modify” button in order to enable phone number updates
- Rename subsection “My Account” (section “Profile”, chapter 12) to “Payment Methods”

6. Conclusion

The aim of this Bachelor Thesis was to create a user interface specification for the iOS mobile crypto wallet application and its functional prototype. Before the creation of a visual design, the knowledge base was formed using professional literature related to the thesis topic. Theoretical part also includes the detailed analysis of the existing solutions, including the description of the features and functionalities. Based on the analysis, all the necessary functions for the proposed solution were defined.

Practical part is dedicated to the creation of UI specification. For each functionality use cases and user scenarios were created, as well as low-fidelity wireframes illustrating these scenarios. High-fidelity wireframes and a functional prototype of the proposed solution were developed using a vector graphics editor and prototyping tool Figma. The mentioned prototype was subjected to usability testing with the respondents from a target audience. According to the testing outcomes, the prototype was modified in order to eliminate the shortcomings of the proposed solution and improve customer satisfaction.

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8. Appendix

Appendix 1 - Functional prototype of the application. Available at:
<<https://www.figma.com/file/akfFlcVATKVVoX7Qx9VzcX/Cryptum-App?node-id=1%3A3>>