The State or Private Enterprise? — The Shift in Users' Preference for the Provider of an Identity Wallet

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Abstract

This paper presents the results of user studies based on a developed concept which allows multiple digital identities to be stored in one app. These identities in the so-called *identity wallet* are managed independently by the user, and the user alone decides which data should be sent to any external service. The concept was implemented in two prototypes (low and high-fidelity) and evaluated over a two-year-period (from 2020-2022) in three user studies with a total of 44 participants, focusing on trust in this concept. The purpose was to potentially determine a change in trust in the concept over time. Users mentioned the wallet provider as a key influencing factor on trust. In 2020, about half of the participants favored the government as the provider, with the remainder favoring a private company. In May 2022, the high-fidelity prototype was used for the study. This time the majority of participants preferred the government as the provider of the wallet.

This trend was confirmed in a study in November 2022 with the low-fidelity prototype, where a majority of participants were in favor of the state as the provider as opposed to only a small number favored a company to take this role. This result interestingly differs from that of the study in 2020 with the same low-fidelity prototype, even though the study was carefully replicated. This suggests a temporal shift in users' preference in the provider of the wallet.

1 Introduction

An identity wallet enables users to use multiple digital identities from different sources (e.g., ID card, driver's license, library card, etc.) in one app and manage them independently [5] [3] [6]. This gives the user control over the data and allows them to decide for themselves which data should be shared with a service, such as to identify themselves online (e.g. as a proof of age, without disclosing other information) [5]. To give users an idea of what is behind an identity wallet and how it can be used, a concept of a wallet was developed as a prototype (both low-fidelity and high-fidelity). Three research questions had to be investigated:

RQ1: What conditions must be met for users to trust the concept of an identity wallet?

RQ2: What influence does the format of the prototype (low-fidelity or high-fidelity) exert on users' trust in the concept?

RQ3: To what extent does user trust change over time?

To answer these questions, three user studies were conducted over the course of 2 years (between 2020 and 2022) with a total of 44 people. In addition to the finding that all individuals were able to create a digital identity and showed great willingness to use an identity wallet, as the wallet gave them the impression of control over their data, the results also showed that *wallet operators* play a major role in the extent to which users trust the concept.

In 2020, the first user study was conducted with a low-fidelity prototype. Here, slightly more than half of the participants considered the government as the right wallet operator. The rest preferred a company as the operator. In 2022, the study was repeated with a high-fidelity prototype of the wallet. Here, a large majority favored the state as operator; only one person favored a company. In order to rule out that the change in the users' preference of the operator of the wallet was influenced by the high-fidelity prototype, the study from 2020 was replicated with the low-fidelity prototype at the end of 2022. Once again, the majority favored the state as operator and a small number wanted a company.

2 User study

To investigate the research questions (see section 1) in the context of trust towards the concept , three user studies were

conducted with a total of 44 participants between 2020 and 2022. Participants aged 18 to 56 were recruited via the TestingTime platform[1]. Experts in security, UX/UI, or usability were excluded. The digital, interactive prototype was made available to participants via a link, and they were asked to share their screen in an online session so they could be observed operating the prototype. Participants were given tasks to solve using the prototype. After each task, they were interviewed to obtain further details about their perception and understanding of the prototype. During these tasks, the think aloud method [7] was used. A final interview was then conducted to determine the trust in the concept based on collected impression (see appendix 7 for the study guideline)[2].

3 Results and Discussion

All 44 people stated that they trust the concept of the wallet. However, this trust seems to be dependent on the "right" wallet operator (see RQ1 in section 1). In 2020, the low-fidelity wallet prototype was used in the study with 16 people. 9 out of 16 participants preferred the state as the wallet operator. Several participants of this group justified their position with the fact that the state already provides national identity documents, and therefore it would be reasonable for the state to play a significant role in this type of solution as well. Others, however, stated that companies were only interested in the data, which is why these would not be an option for wallet operators. The remaining 7 out of 16 participants preferred a private company to operate the wallet. Their reasoning was similar, with the difference that they saw the state as the party only interested in the data. Therefore, they felt more comfortable that a private company is responsible for the digital identity. In 2022, the concept of the wallet was revised with the findings from the 2020 user study and a high-fidelity prototype was developed. This study used the same methodology as described in section 2. Here, 12 people were surveyed. 11 out of 12 now wanted the government to be the operator and only one person wanted a company. The reasoning remained the same: The state is already responsible for national identity documents, so these should also be managed by it. However, the argument about the company changed. The new argument was that the state is not considered competent, which is why a company would rather be trusted to implement a wallet.

Since there was this strong change, a third study was conducted to determine what brought the difference between the opinions regarding trust. To rule out the possibility that the change in feedback was caused by the design of the prototype, the study from 2020 was replicated exactly with the same conditions and the same prototype. Hereby only the time of the survey and the interviewed persons changed (however, the persons were acquired under the same conditions as in 2020

(see section 2)). The result confirms the findings from 2022 (see RQ3 in section 1), with the majority favoring the state as operator (13 out of 16). Only 3 out of 16 preferred a company. Of the 13 people who preferred the state, 3 stated that they could also imagine a cooperation with a company. However, these three people wanted the state to take the lead role, as it ensures that the rules are followed (e.g. with regard to the GDPR [1]). The company is responsible for the executive role and is therefore not forced to operate its business model by selling the data, since the state provides the financial support.

4 Limitations and Future Works

As also mentioned by Kostic and Poikela [4], the results further indicate that the discussion about the Corona Warn App[3] 2020[4] in Germany may have influenced the results regarding trust in the state. Since the Corona Warn App as a state app has been heavily discussed in the German media and distinct opinions have been formed here between supporters and opponents, it can be assumed that this may also have had an effect on the question of whether or not the state should act as the operator of such an app.

In this study, the design of the prototype showed no influence on the results regarding trust in the state or a company as operator (see RQ2 in section 1). Since the study took place exclusively in Germany and wallets are also becoming more and more relevant in other EU countries [2], participants with other nationalities should be taken into account in future studies. In addition, in order to gain more validity, trust in the wallet concept and the different wallet operators will be evaluated in larger-scale, quantitative user studies in the future.

5 Conclusion

This paper presents an app concept with multiple identities (identity wallet) and three user studies with both a low-fidelity and a high-fidelity prototype to determine the trust in the concept of a wallet. The results suggest that this is highly dependent on the operator of the wallet. The first study in 2020 revealed two distinct opinions, where about half of the participants were in favor of the government, the rest in favor of a company as the operator of the wallet. From 2022, the two user studies showed a majority in favor of the state as the wallet operator.

6 Acknowledgement

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[1]TestingTime plattform: https://www.testingtime.com/en/

[2]The study was originally conducted in German and translated into English for this publication.

[3]official COVID-19 app for digital contact tracing in Germany

[4]https://www.bundesregierung.de/breg-de/themen/corona-warn-app accessed on May 25, 2023

[5]ONCE project website https://once-identity.de/

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[6] Sebastian Sartor, Johannes Sedlmeir, Alexander Rieger, and Tamara Roth. Love at first sight? a user experience study of self-sovereign identity wallets. 2022.

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7 Appendix

Guideline for the user study

Task 1 - Set up the app

"Your first task is to set up the app. So start the ID Wallet app now and follow the instructions!"

Questions:

1. You have now set up your app. Has it been made clear to you what the scope of functions of the app you have set up is?

2. Was it clear to you what the PIN / PW or fingerprint should be set for?

3. What is your opinion on the use of the fingerprint, e.g. for authentication?

4. Do you prefer to use the locking mechanism from the smartphone or set a new password?

Task 2 - Creating a digital ID card

"You have set up your ID Wallet. Because you want to identify yourself to another service, you now need a digital identity."

Questions:

1. Can you please briefly recap in your own words what you have just done?

2. You now have a digital ID card: What impression does the app give you of where your identity is stored?

3. What is your impression of what you can now do with this digital ID card?

4. What do you hope to be able to do with the digital ID card?

5. What data has now been collected through the process?

Task 3 - Creating a digital driver's license (web to app communication)

"You have discovered the service that you can save not only the ID card but also the driver's license digitally on the smartphone. To do this, you call up the service via your PC in a web browser. Your task now is to create the digital driver's license."[6].

Questions:

1. Can you please briefly recap in your own words what you have just done?

2. To apply for the digital driver's license, you first had to identify yourself. Was it transparent to you here what data the Bund.de website requires from you for identification?

3. The identification was successful. The Bund.de website apparently received the requested data. Was it clear which data you sent to the Bund.de website?

4. What impression did you have of what you had identified yourself with?

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[6]Note: This and the following task were alternated in each user study to rule out the possibility that the second use case was only understood based on the previous one

5. What impression were you given of how you obtained the digital driver's license?

6. In the process, you had to scan a QR code twice. What impression were you given of what these two QR codes were used for (What do you see as the difference)?

Task 4 - Registration to the library app (app to app communication)

"In addition to a digital ID card, you can also enter data manually and save it to your ID Wallet." (Show the participant what is already stored in the Wallet).

"For your work, you need a book as a basis for your research and have discovered a library where you can also create a digital library card and store it in your Wallet. Your tasks now is to create this card."

Questions:

1. Can you please briefly recap in your own words what you have just done?

2. A provider usually wants some data from you for identification purposes. Was it transparent to you here what data the library needs from you for identification?

3. The identification was successful. It appears that the library received the requested data. Was it clear what data you sent to the library?

4. The data you were able to send was divided into two groups. What do you see as the difference [verified and editable]?

5. (If the person looked more closely at the service) What was your motivation to learn more about the service?

6. Was it clear how the library received the data?

7. Did you have any concerns about sending this data / your data to the service?

8. (If the answer was yes) What would help dispel the concerns?

9. What impression were you given about how you got the digital library card?

Task 5 - Saving a vehicle key (app to app communication)

"You are on vacation and have rented a vehicle there, which you have already booked. The service now offers you a service that no longer forces you to have your car key with you. Your task now is to test this new service."

Questions:

1. Can you please briefly recap in your own words what you have just done?

2. Did it become clear to you where the key was stored?

3. How would you use this key now?

Final interview

Questions:

1. What is your overall impression of such an application?

2. Do you use similar applications in real life? (If 'yes': which ones?, if 'no': why not?)

3. Would you use this application in real life? (If 'yes: why? What do you see as the benefits? If 'no': Why not?)

4. Are you ready to trust such an application? What would influence your willingness?

5. Regardless of whether you would use the application: What do you see as the advantage in using such an app?

6. What do you think about the idea of an identity stored on your smartphone?

7. And how about the key and ID being stored together?

8. You have tested the application interacting both via a website and via an app. Which variant do you prefer?

9. Do you prefer web or app applications in general?

10. Which applications in general or in particular would motivate you to use the ID Wallet for this purpose?

11. Finally, I would like to ask you a few questions about your general usage behavior: Do you use the apps that are installed on your device more often, or do you install apps more often via platforms like Google Play or the Apple Playstore?