



# An Empirical Study of a Decentralized Identity Wallet: Usability, Security, and Perspectives on User Control

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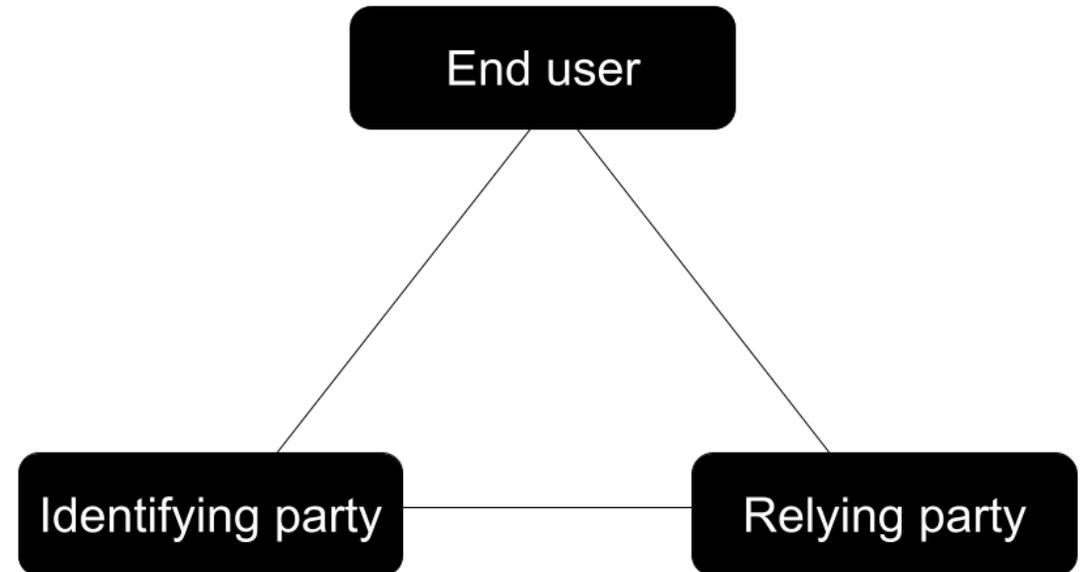
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# Identity Online

- Challenges
  - Identity fraud
  - Lack control over collection and use of personal information
- User centric identity
  - European Digital Identity
  - Microsoft
- Identity wallets
  - Everynym, LISSI, uPort



# Problem and Research Question



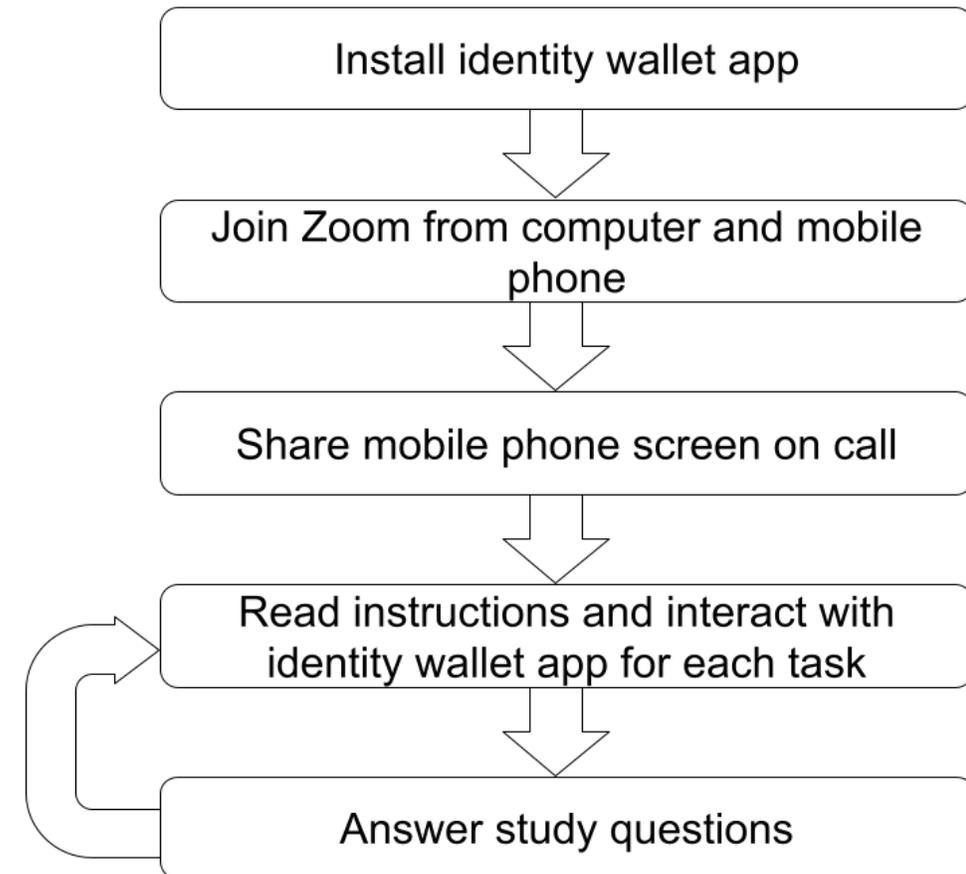
- Identity wallets combine multiple security and privacy processes
  - Complex to understand and use
- Perception that control over disclosure of personal data will drive user acceptance
  - Untested
- Few trials or experiments focused on the user experience

**RQ** – What are the user-centered privacy and security challenges facing decentralized identity wallets?

# Study Protocol



- Carry out three tasks
  - Make a connection
  - Obtain a credential from the identity provider
  - Build an identity proof
- Semi-structured interview with mental model scale
- System Usability Scale





# Participants

- Mix of professionals, students, and retired individuals
- 15 male, 15 female
- 17 based in the US; 13 in the UK
- Had an Android phone, version 10 and above

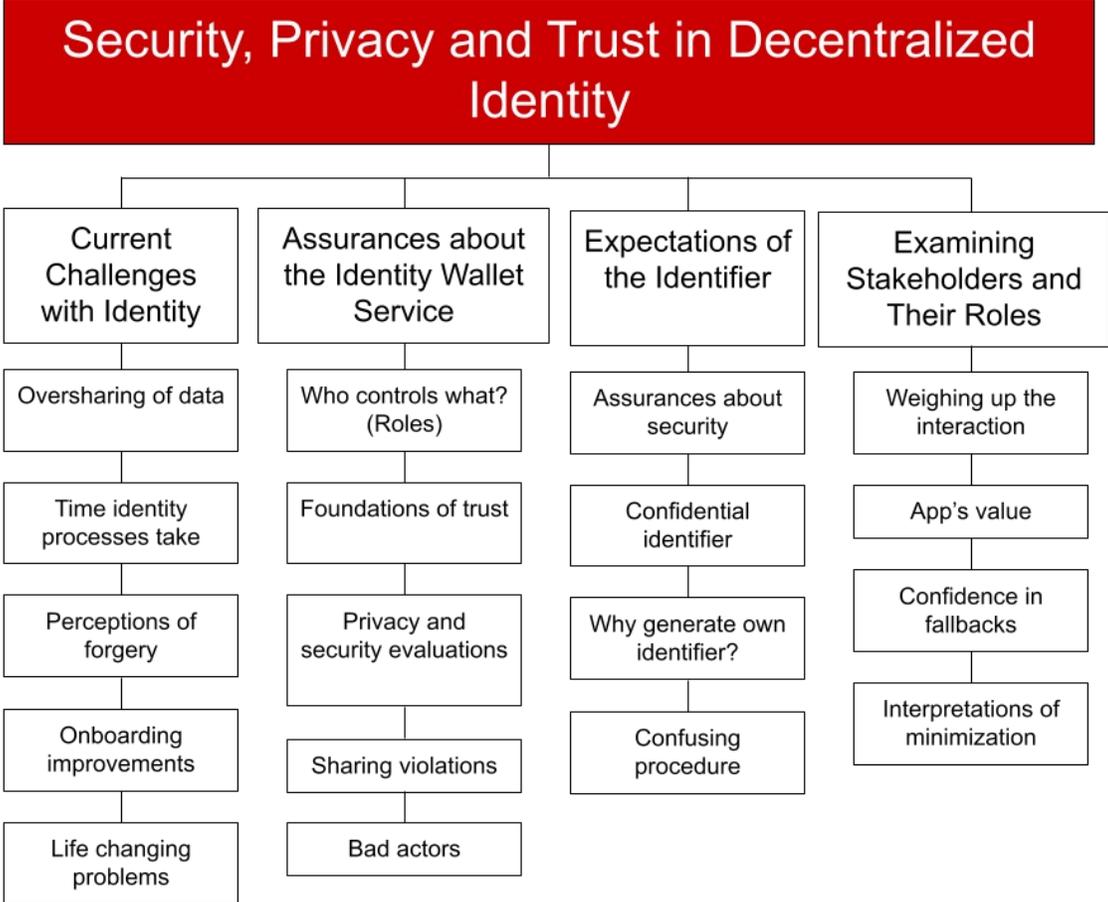
# Results



- User journey issues
  - QR codes – e.g., focusing phone camera
  - Misunderstanding regarding security and privacy
  - Uncertainty around device switching
  - Authentication challenges
- SUS
  - ‘Acceptable’ - 71



# Qualitative Results - Overview



### **Resigned to oversharing data**

*“You know I work in information technology already and part of me says the idea that you keep your information secure and people not knowing it is a **ship that has probably already sailed.**” [P22]*

### **Comfort while oversharing data**

*“Because it **doesn't happen as often,** I'm comfortable sharing that information.” [P16]*

## **Current Challenges with Identity**

### **Convenience and ease of use**

*“It's no longer, oh, yeah, like I need a copy of your driver's licence, proof of address and utility bill. Here's your account details and that's it. Oh my god that **used to take like a week.**” [P14]*

### **Life changing problems**

*“And so, when I bought my first House you know 10-12 years ago. They were not able to give me my the keys after the closing had to wait a few days, I think, was three or four days, because **my name comes up in some kind of watch list or something.**” [P10]*

### **User does not perceive that they are in control**

*“I think Alpaca Bank are deciding what this Bank of Carpathia can know about me, so I would say **they are in control** because they’re the ones that are divulging information to the second party involved. So, I would think that they could potentially withdraw your social security number if that’s what they chose to do.” [P23]*

### **Fear of bad actors**

*“Oh man, I can see just a whole **new breed of hackers**. Oh God, as we speak they're breeding.” [P11]*

# Assurances about the Identity Wallet Service

### **Foundations of trust**

*“I don't know if I **trust my device** as being as secure as like potentially you know, the **bank's devices or network or their security** is probably more enhanced than just my phone.” [P10]*

### **Separation of concerns**

*“I don't think that the Bank needs to have any idea that I'm doing something with a different bank. That that's my private business, so I **like that it kind of mentions that** and I think that's important.” [P3]*

## Identifier encodes identity

*“When I looked at the identifier I have here, it always shows a unique set of characters and **didn’t show my address, my birth date or any of that other information that’s usually shown on a physical ID.**” [P6]*

## Confidentiality

*“You **don’t give out your password**, so why would you go on sharing your unique code for your identifier.” [P16]*

# Expectations of the Identifier

## Confusing procedure

*“So I will say that I am used to things like these really long string of numbers and letters. But I think that would **probably throw off the average user.**” [P5]*

## Confusion about generating an identifier

*“Wait ... is it a ... **I’m not even sure** if it’s an identifier that I actually have to remember, or if it’s something that the app will automatically show me.” [P18]*

## Confidence in fallbacks

*“So, because, like, I mean at the end of the day, all these I’m assuming that all these data points are feeding into IdentiCorp’s like their, whatever, their database for something like that. So I think it’s the first, I think they are respon... like they are going to be the one that **I should reach out to instead of other organizations.**” [P13]*

# Examining Stakeholders and their Roles

## Unfamiliar process

*“I think it’s still a bit. It’s **definitely different than a lot of other apps** that are used, so there is a learning curve, especially for someone that, I think I’m pretty technologically competent and I think I would still have a bit of a difficulty with this here and there.” [P24]*

## Varying interpretations of minimization

*“If think if Carpathia wanted to know exactly how much I make a month, they would ask for it. ... And **I wouldn’t be able to say no.**” [P5]*

# Conclusions



- Perception of security
  - Trust in key actors in the study scenario instead of technical mechanisms
- User understanding of entities in control is a challenge
  - Complex technologies, hidden from users
- Complete user autonomy (and thus, responsibility) is unanticipated
- ID wallets need good usability
  - E.g., use terms that are easier to understand



Thank you!

Questions?

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