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# CONDUCTING A USABILITY EVALUATION OF DECENTRALIZED IDENTITY MANAGEMENT SOLUTIONS

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# Agenda

- The Challenges of Decentralized Identity Management
- Our approach: End User Study of DIDM solutions
- Discussion and Conclusions



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# The Answer To Digital Identity Lies Within Blockchain Technology

Antony Welfare Forbes Councils Member

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ASIA ANALYSIS  
HIGHLIGHTING KEY AREAS ACROSS ASIA



## Security Think Tank: The case for blockchain based identity

What are the best and most effective ways information security professionals can

### Blockchain for Digital Identity EU Parliament (Blockchain for Europe)

Publiziert am August 30, 2020 von Ralf Keuper

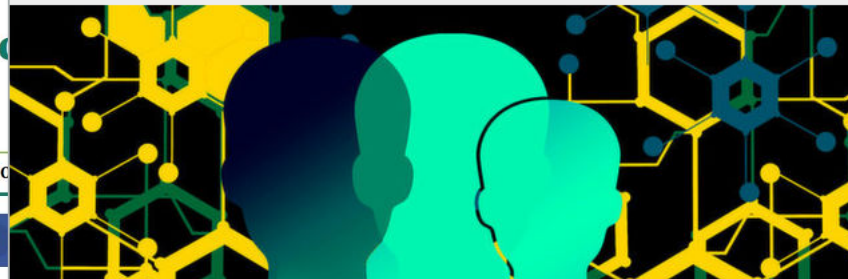


## Blockchain-based identity: An effective tool to support global innovation

February 28, 2019



ZWERKE PLATTFORMEN APPLIKATIONEN IDENTITY- UND ACCESS-MANAGEMENT SECURITY



### Modernes Identity and Access Management Selbstbestimmte Identitäten dank Blockchain

21.05.19 | Autor / Redakteur: Thomas Maurer / Peter Schmitz

## Transforming digital identity into trusted identity

Learn how IBM Blockchain Trusted Identity™ is joining forces with others to build the internet's long missing, decentralized identity layer.

# Decentralized Identity Management

- New approaches to identity management based on technologies such as blockchain and distributed ledgers are promoted as a chance to allow users to fully own and manage their identity without having to rely on a third party.
- Despite being often called the future of digital identity management, **Decentralized Identity Management (DIdM) is still facing a number of challenges, especially usability**

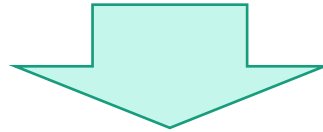
## Research questions:

- **How well do users understand the new technology?**
- **What usability hurdles can be found in DIdM solutions?**
- **How important is a high level of privacy in identity management for users?**

# Our Study

## Approach

- Critically assess the current promises, intentions and practices of DIdM solutions with the focus on the usability aspects



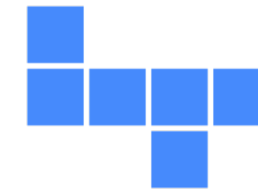
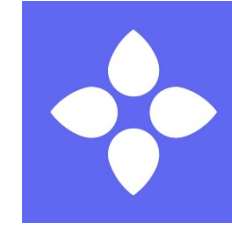
- Analyze available **DIdM solutions** in regard to **user mental models** and overall **usability** of the systems

- Carry out usability for end users
  - Mental model: how a user **thinks** a system works
  - Does not have to be how the system **actually works**
  - System has to meet the mental models of users to be **intuitive**
  - **Not matching** user mental models: errors in use, low acceptance rate, frustration
    - **Prevents adoption** of innovations



# Market Overview of Decentralized Identity Solutions

Large number of projects, initiatives, start-ups



# Market Overview of Decentralized Identity Solutions

## Requirements

### ■ Requirements for digital wallets to be suitable for user testing

- Blockchain / DIdM as the core technology
- Minimal level of technology readiness (at least TRL 7) that includes wide functionality (to be able to carry out at least 3 scenarios for user testing)
  - Availability of the wallet for both iOS and Android platforms
  - Availability of demo
  - Interface in English and/or German

e·ernym

### ■ According to the requirements, **only three options were available:**

- Connect.Me by Evernym
- SmartWallet by Jolocom
- uPort ID by uPort

 u·port

 JOLOCOM

# End-user Tests

## Methodology

- **Moderated individual remote user tests** that combined direct observations and structured interviewing of end-users
- **Usability and user experience** evaluation methods
- Documentation and testing process:
  - Pre-questionnaire (demographics and the experience with similar technologies)
  - 8 tasks completed in the app
  - User Experience Questionnaire (UEQ, to get the impression of users)
  - Post-questionnaire (whether the users liked the app, what the users think of the concept)
- Demographics:
  - **18 participants** (6 per digital wallet, 9 male and 9 female end users, mostly under 30 years old, mostly tech-savvy)





# Analysis of End User Tests

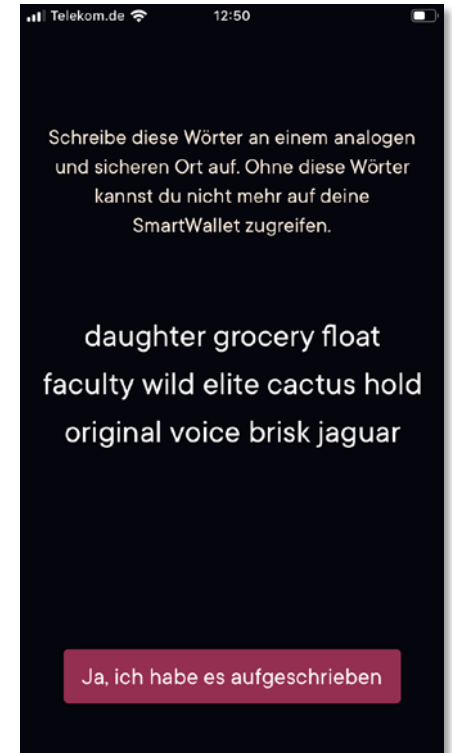
## User Mental Models

- The **existing identity solutions are not as intuitive and easy to use** as they claim to be.
- Test subjects had a **trouble understanding the necessity and importance of backing up** their **keys** (“seed/recovery phrase”).
- It was **unclear** to most of the test subjects **how and where their data is saved**.
- The ability of users to **‘learn as you go’** in completing similar tasks was an issue.

# Analysis of End User Tests

## Usability Problems

- The **backup and restoration** functionality
  - not fully implemented (Jolocom – for credentials),
  - not very convenient (manually saving a .zip-file, writing down the mnemonic key phrase)
  - relied on a server(s) under control of a single entity (“Evernym Cloud”) and thus **contradicting the whole decentralized and user-controlled aspect of the DIdM approach.**



# Discussion

*According to its advocates, the main benefit of DIdM is to put the **users in full control of their identities**.*

## However

- With more control comes **more responsibility** to manage and use these identities and credentials.
- Our results show that the **mental models** of the users **do not align** with those of the developers.
- Users quite often form a **different understanding** that is shaped by the traditional solutions they are currently using.
- Another problem is the **immature development** of the available solutions (unlike advertised).

**Does the perceived benefit** of more user control and privacy **outweigh the drawbacks?**

**It is essential for developers of DIdM to address the current usability problems.**

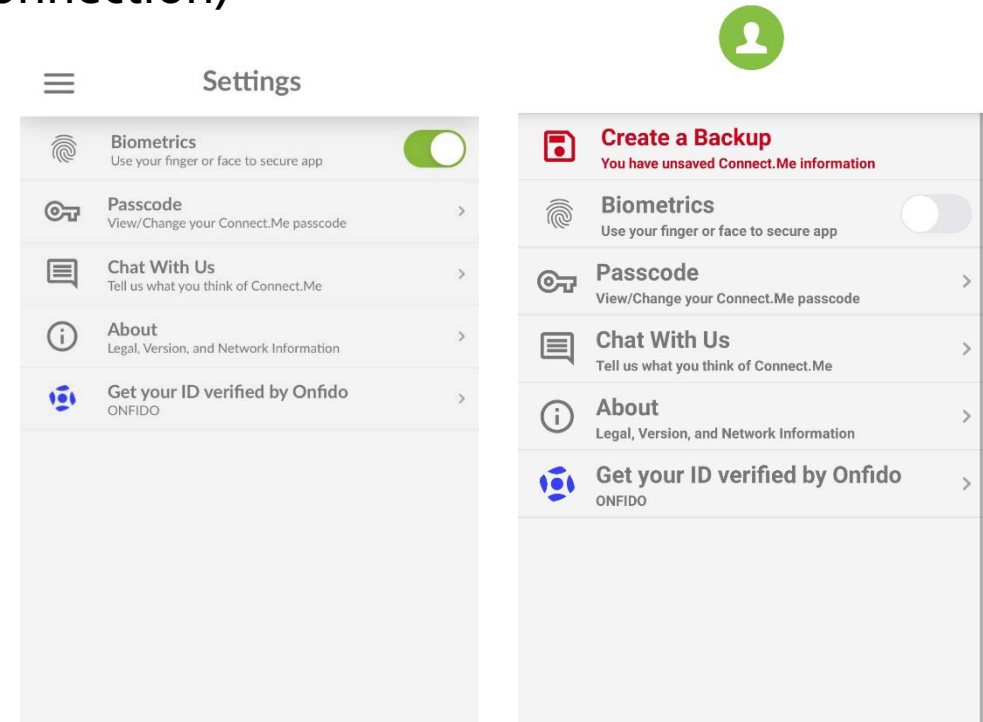
# Limitations

## ■ User study:

- Limited user sample (18 participants, mostly younger than 30, tech-savvy, speak a high level of English)
- Testing set up (at home, no distractions, good internet connection)

## ■ Limited Maturity of DIdM products:

- Evaluated April to June 2020
- Only three wallets were mature enough for user tests
- Products were constantly changing their functionality
- Defined demo scenarios provided by solutions



# Conclusion

- The new **concept** of decentralized identity is **not explained well enough** to the end users.
- The importance of the functionalities to **backup and recover** the account as fundamental step in the identity lifecycle does **not** seem to be **understood** by the developers.
- The **usability** of DIdM solutions and **current state of the technology** might **deprive end users of experiencing** the entire range of **claimed privacy and security benefits**.



**To our knowledge the existing market does not yet offer Blockchain-based DIdM solutions with usability mature enough to be accepted and securely used by end users.**



- The **results** will be used to build a **user-friendly prototype** and to give **design guidelines** to DIdM solution developers aiming to increase the adoption potential of their products



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