
Surviving the Cryptojungle: Perception and Management of Risk and Trust Among Cryptocurrency (Non)Users

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Abstract

With the massive growth of cryptocurrency markets in recent years, came an influx of new users and investors, which pushed the overall number of owners into millions. At the same time, the number of distinct cryptocurrencies exploded to over 2,000! In this burgeoning and chaotic “cryptojungle”, new and unexplored incentives and risks drive the behaviour of users and non-users of cryptocurrencies. While previous research has focused almost exclusively on Bitcoin, other proof-of-work Blockchains, cryptocurrencies, and utility tokens have been ignored.

We specifically focus on their perception and management of risks and trust and present findings from an interview study of cryptocurrency users and non-users (N=16). Our results suggest that associated risks and mitigation strategies might be specific (among other factors) to a particular cryptocurrency and its usage. Further, we identify inadequacies in mental models of both users and non-users that might lead to skewed risk perceptions or dangerous errors.

Introduction

Cryptocurrencies have come a long way since the introduction of Bitcoin in 2009 [8]. With the massive growth of cryptocurrency markets in the recent years, came an influx of new users. While the overall number of users is difficult to measure, the University of Cambridge estimates between

2.9 and 5.8 million overall owners of cryptocurrencies as of 2017 [5]. As for the number of distinct cryptocurrencies, it exploded to over 2000. To put the pace of the cryptocurrency market growth into perspective one can look at the overall market capitalization just in recent years. In early 2016 it was around \$7 billion, in March 2017—nearly \$25 billion, and it reached over \$400 billion in March 2018.

Despite prior research on security risks in the Blockchain domain, little is known how cryptocurrency users actually perceive and manage the risks. The main focus in literature has been on identifying potential attack vectors and risk scenarios [6, 4], without taking the respective end users into account. While Sas et al. [9] presented some risks experienced by users, risk perception and mitigation, as well as techniques for building trust in cryptocurrencies and exchanges, have not been investigated any further. Addressing this knowledge gap will inform the development of more effective technology support for cryptocurrency users.

Understanding the perceptions of the risks associated with cryptocurrencies among informed non-users is also vital. Gao et al. [3] were the first to study non-users of cryptocurrencies and their level of technical understanding of Bitcoin. By further investigating the risk perception, one could identify risks that potentially prevent informed non-users from purchasing cryptocurrencies.

We believe that the understanding gained from our investigations will play an important role in the design of future cryptocurrency wallets and exchange platforms. The findings could also help in clearing misunderstandings of non-users, which could eventually facilitate adoption of cryptocurrencies and ease the onboarding process.

Research Goals and Problem Statement

Bitcoin and alternative cryptocurrencies have gained an increasing interest from various domains and research communities in the past couple of years. Contrary to the early beginnings, where users of cryptocurrencies were mostly cypherpunks and computer experts, a cryptocurrency holder nowadays can be anyone [1]. Payment processors, exchanges, and wallets lowered the entry barriers to the cryptocurrency domain, but exposed such users to new risks at the same time [7].

Previous research suggests that usability challenges with Bitcoin can lead to the increase in security risks, including monetary loss, and a false sense of security. For example, Eskandari et al. [2] found that misunderstanding of metaphors employed in the design of Bitcoin wallets might lead to an increase in security risks, ultimately leading to monetary losses. In a study by Krombholz et al. [7], 22% of participants reported that they have lost Bitcoin either due self-induced errors or security breaches.

By further investigating the mental models of risk and trust of users and non-users, one would be able to address potential inconsistencies that could lead to such dangerous errors. It is therefore of interest to understand the behavior of users when it comes to the protection of their cryptocurrencies. By expanding the study beyond Bitcoin, and investigating security behaviors regarding cryptocurrencies in general, one might understand what factors influence users in their decision making and identify potential differences and similarities across cryptocurrencies.

Methodology

To investigate risks associated with cryptocurrencies, as perceived and managed by users and non-users, we conducted semi-structured interviews. We recruited 16 partic-

ipants from the metropolitan region of our university, with 8 users and 8 non-users. Some interviews were in-person and other via telephone. Grounded Theory was applied, and three researchers coded each interview independently. Results were discussed and added to a shared codebook, once the researchers converged on codes. An interview guide was followed, ensuring consistency across participants. The following broad research questions were investigated.

- **RQ1:** What are the current usages of cryptocurrencies?
- **RQ2:** How do owners manage their cryptocurrencies?
- **RQ3:** What is the perception towards cryptocurrency-related risks?
- **RQ4:** How do owners manage the risks?
- **RQ5:** What factors influence the users' security behavior?

Results

Several themes emerged when we probed our participants more deeply about perceived and experienced risks in the cryptocurrency domain. Users have identified security risks that could directly lead to monetary losses, such as using corrupted hardware wallets, Initial Coin Offerings (ICOs) by questionable companies, and scam coins.

Non-users, on the other hand, were concerned with potential implications that a cryptocurrency involvement would bring. Just to name a few, our participants were concerned with a social stigma associated with cryptocurrencies, as well as the hassle of the onboarding on exchanges.

Our findings suggest that perceived risks depend on the respective cryptocurrency as well as the individual's reasons and motivations behind the use of it. The perceived severity appears to be linked to the amount that the user invested in the cryptocurrency. Further, despite users being concerned with a variety of risks, our participants themselves only experienced a very small subset.

Lastly, we identified inadequacies in mental models of our participants. Most of them were not necessarily aware of the underlying cryptography and even the meaning of private and public keys, while some non-users had a skewed risk perception. For example, the latter were concerned with governments tracing potential cryptocurrency transactions back to them.

While the implications differ, both users and non-users are affected. For users, the misunderstandings can lead to monetary losses, and non-users might decide against an involvement because of assessing risks inadequately.

Conclusion

We conducted semi-structured interviews to discover more about behavior, handling as well perception and management of risk and trust among cryptocurrency users and non-users. We found that unreliable information is used to build trust in cryptocurrencies and that perceived risks are dependent on the respective asset, its storage option, as well as the amount invested. Further, inadequate mental models seem to be prevalent for both users and non-users and can lead to skewed risk perceptions and dangerous errors, potentially resulting in monetary losses.

To truly understand risks in the Blockchain domain, one therefore needs to study cryptocurrencies beyond Bitcoin, as they expose users to new risks and challenges. To reduce risks, both users and non-users need to be educated,

and governmental involvement is needed to combat pyramid schemes and unregulated ICOs, that were created in bad faith.

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