

1. Introduction

In recent years cryptocurrencies has significantly risen in popularity thanks to the new emerging technologies, and some say it may become the new *financial revolution* and the future of finance. This statement may be arguable, but cryptocurrency technology most certainly brought a lot of new opportunities, however it also brought many problems with it. In order for it to become the future of finance, society should address all of these arising issues as they may be very concerning. The objective of this literature review is to analyze the existing studies to explain why cryptocurrencies are important, identify main issues that cryptocurrency technology has, and discuss potential solutions.

2. Literature review

At the beginning I think it is important to understand the history behind cryptocurrencies in order to continue with further analysis. Limba et al. (2019) conducted a research where they discussed the theoretical insights of cryptocurrencies. According to their study Bitcoin was the first cryptocurrency that was created in 2008 by a person named Satoshi Nakamoto. It came into existence thanks to the creation of *Blockchain Technology* which allows making secure transactions without having any intermediaries. At the beginning no one looked at it seriously, but then it started attracting more attention and many authors proposed that it may have a large growth potential and could be considered a *disruptive technology*. The authors analyzed different opinions and views on this technology and concluded that generally cryptocurrencies have all the required features of a currency, and they have many advantages over regular currencies such as: (a) lack of financial intermediaries; (b) instant transactions; (c) low costs; and (d) trusted and secure system. From this it could be said that this technology truly could change the world, but it is important to not forget about the issues.

Limba et al. (2019) presented one of the main issues which is that cryptocurrency technology may be widely used in criminal activities due its nature. Kethineni & Cao (2020) go into more details regarding usage of cryptocurrencies in criminal activities. Their study shows that cryptocurrency technology created a large opportunity for criminals due to it having features such as: (1) decentralization of authority; (2) cross-border accessibility; (3) anonymity; (4) security. As the result, cryptocurrencies became very popular in criminal activities ranging from Ponzi schemes and extortion to money laundering and tax evasion. In addition to that the authors discussed how cryptocurrencies were used by oppressive governments and illegal organizations to bypass regulations. This shows that cryptocurrencies already being maliciously used and in the long-term they may pose a large threat.

Another important drawback of cryptocurrencies are environmental issues. Mohsin (2021) were researching the environmental costs of cryptocurrency technology, specifically Bitcoin and other proof-of-work cryptocurrencies. According to their study proof-of-work mining is a race between cryptocurrency miners that involves high-powered machines solving high complexity arithmetic problems for a reward of some amount of cryptocurrency. The first machine to solve the given arithmetic problem wins. The mining process is required for the cryptocurrency network to securely function, as it allows determining the validity of transactions through complex cryptographic algorithms. Due to high intensity power usage, proof-of-work based cryptocurrency networks consume a very significant amount of energy. This energy may not usually come from a renewable source which may be concerning due to negative environmental impact. Moreover, the other concerning impact is electronic garbage that is left after mining operation. This especially applies to Application-Specific Integrated Circuits (ASICs) which are specifically made to efficiently compute mining algorithms and can not be used for general purpose computing. They are also not reusable and rapidly become out of date. These

factors contribute to huge amount of electronic waste from cryptocurrency mining operations. In my opinion it is important to minimize such operational costs for cryptocurrencies and appropriate response from the authorities is needed.

All mentioned authors agree that in order to solve these main issues there should be an appropriate response from the authorities. Kethineni & Cao (2020) in their research were analyzing the legal status of cryptocurrencies, and they argued that key issue that contributed to the rise in popularity of cryptocurrencies in criminal activity is insufficient regulation from governments. Similarly, Limba et al. (2019) were also researching the legal status of cryptocurrencies in Baltic States and concluded that due to unclear legal status of cryptocurrencies it may be considered a loophole in legal financial regulations. In terms of environmental issues Mohsin (2021) also argues that these problems could be solved with different environmental implications of the technology and appropriate regulations.

Unlike the cryptocurrency crime issue that is still an unsolved problem as discussed previously, the environmental costs are already being reduced. There was a recent development in ASIC resistant cryptographic algorithms which promise to remove any computational advantages for ASICs (Asanuma & Isobe, 2022; Ren & Devadas, 2017). I think if enough cryptocurrency networks would switch to such algorithms it would make average consumer hardware more competitive and viable in mining operations, and possibly reduce the need of manufacturing new hardware for mining in general. Furthermore, this would even further decentralize the networks and make it more secure. According to study by Saleh (2021) there was also recent development in creating a new protocol which is called proof-of-stake that is supposed to replace proof-of-work and be significantly more efficient while preserving security. In my opinion if these technologies continue to develop these environmental issues could be fixed in the near future.

3. Conclusion

This literature review have discussed why cryptocurrency technology is important and may have a positive effect on the financial system, while also identifying and describing several key important issues of cryptocurrency technology. In addition to that I reviewed several author opinions on possible solutions for these issues and proceeded by discussing what changes are being made to make the cryptocurrency ecosystem more environmentally friendly. The goal of this study is to show that cryptocurrency may bring some significant benefits, but there are also concerning issues that are possible to overcome. This research may be continued by researching successful regulations of cryptocurrencies by the authorities.

4. Acknowledgement

In accordance with the *Statement on the Application of Artificial Intelligence in Teaching at Masaryk University* (April, 2023) the author declares that during the creation of this work the following products and services that include artificial intelligence were used: (1) LanguageTool (<https://languagetool.org/>), that has been used for spellchecking, grammar checking, and other provided features.

5. References

- Asanuma, T., & Isobe, T. (2022). A Proof of Work based on Preimage Problem of Variants of SHA-3 with ASIC Resistance. *Journal of Information Processing*, 30, 75-83. <https://doi.org/10.2197/ipsjip.30.75>
- Kethineni, S., & Cao, Y. (2020). The rise in popularity of cryptocurrency and associated criminal activity. *International Criminal Justice Review*, 30(3), 325-344. <https://doi.org/10.1177/1057567719827051>

- Limba, T., Stankevičius, A., & Andrulevičius, A. (2019). Cryptocurrency as disruptive technology: theoretical insights. *Entrepreneurship and Sustainability Issues*, 6(4), 2068-2080. [https://doi.org/10.9770/jesi.2019.6.4\(36\)](https://doi.org/10.9770/jesi.2019.6.4(36))
- Mohsin, K. (2021). Cryptocurrency and its impact on environment. *International Journal of Cryptocurrency Research*, 1(1), 1-4. <https://doi.org/10.51483/IJCCR.1.1.2021.1-4>
- Ren, L., & Devadas, S. (2017). Bandwidth Hard Functions for ASIC Resistance. In Y. Kalai, & L. Reyzin (Eds.), *Theory of Cryptography* (pp. 466–492). Springer International Publishing. https://doi.org/10.1007/978-3-319-70500-2_16
- Saleh, F. (2021). Blockchain without Waste: Proof-of-Stake. *The Review of Financial Studies*, 34(3), 1156–1190. <https://doi.org/10.1093/rfs/hhaa075>