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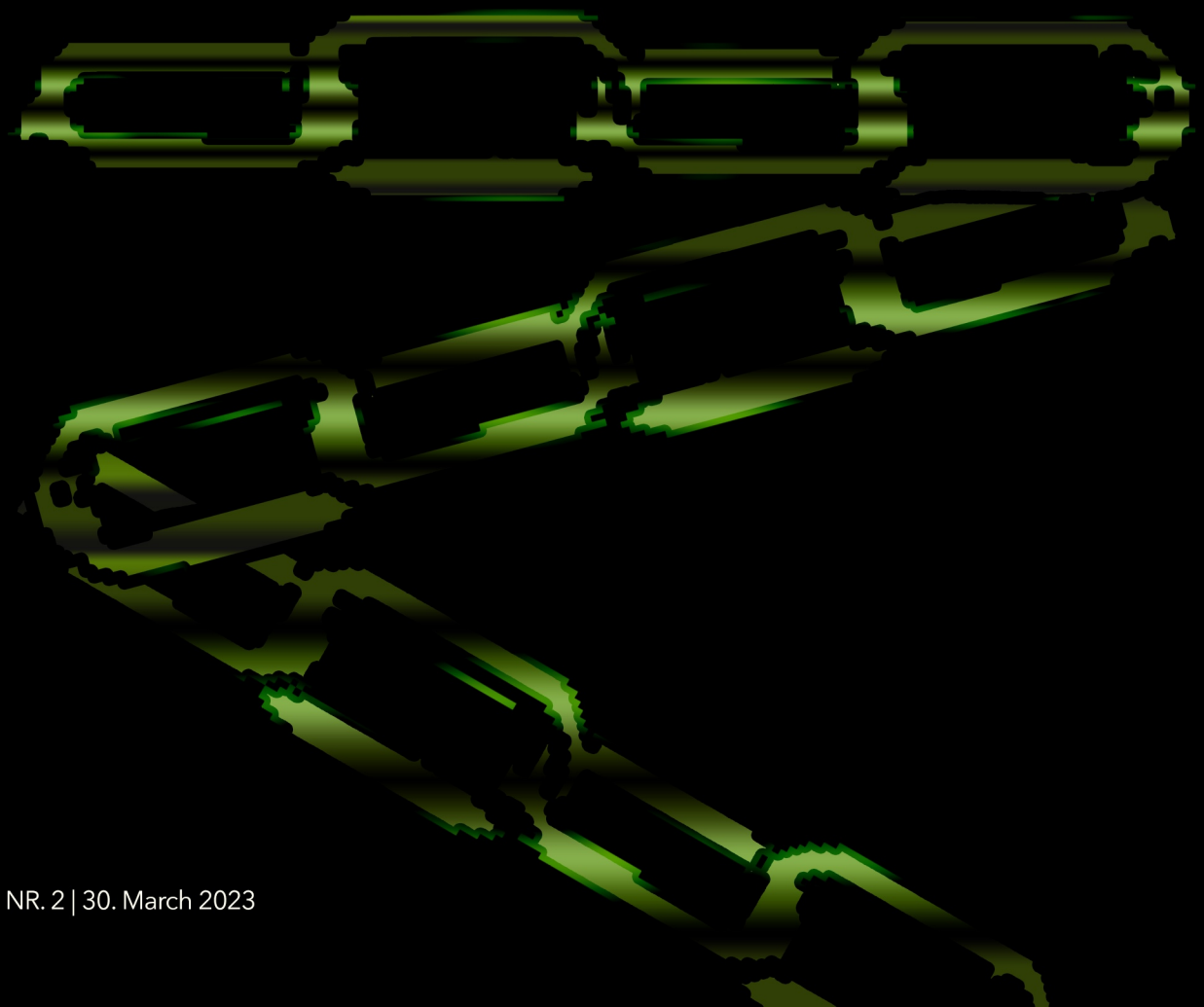
SNAPSHOT

Blockchain Technology in Sustainable Finance



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About the Sustainable Investment Club

The Sustainable investment Club (SIC) has been founded in 2020 at the University of St.Gallen (HSG) as an initiative to promote sustainability within the financial sector and to create awareness around this topic among the students.

With the SIC, we have set the goal of changing the status quo and increasing the students' awareness on the topics of Sustainability and Finance

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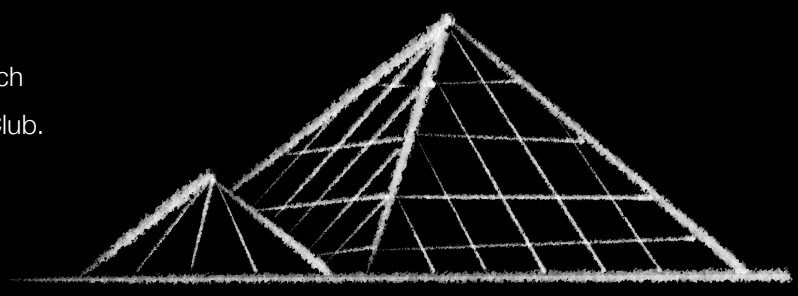

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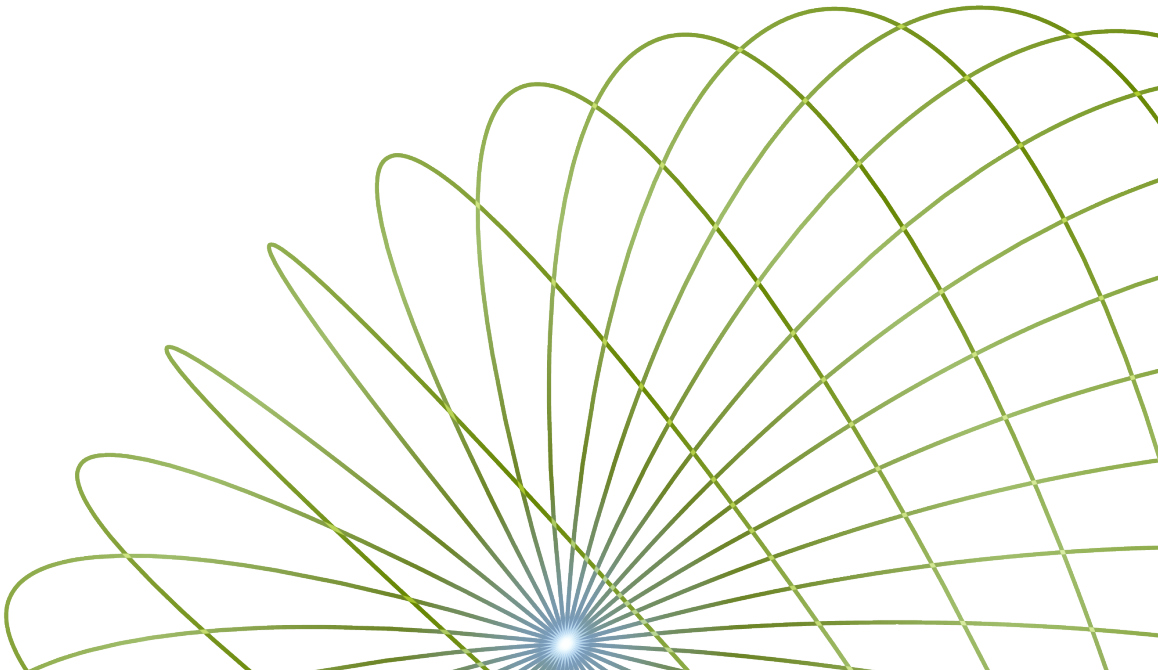
Blockchain Technology in Sustainable Finance

Introduction

In recent years, there has been a significant surge in the interest surrounding sustainable finance, alongside the growing fascination with blockchain technologies. As it is quite commonly known that certain blockchain technologies consume large amounts of energy and hence can often have a negative impact on the environment it is pertinent to explore the feasibility of combining these two subjects, and how blockchain technology can facilitate the transition towards a more sustainable world through sustainable finance. Against this backdrop, this article delves into the practical applications of blockchain technology in enhancing sustainable finance. By examining the potential benefits and risks, this article aims to shed light on the possibilities of leveraging blockchain technology in achieving sustainable finance objectives.

In order to discuss the role of blockchain technology in sustainable finance, the terms sustainable finance and blockchain technology are briefly explained in the following part.



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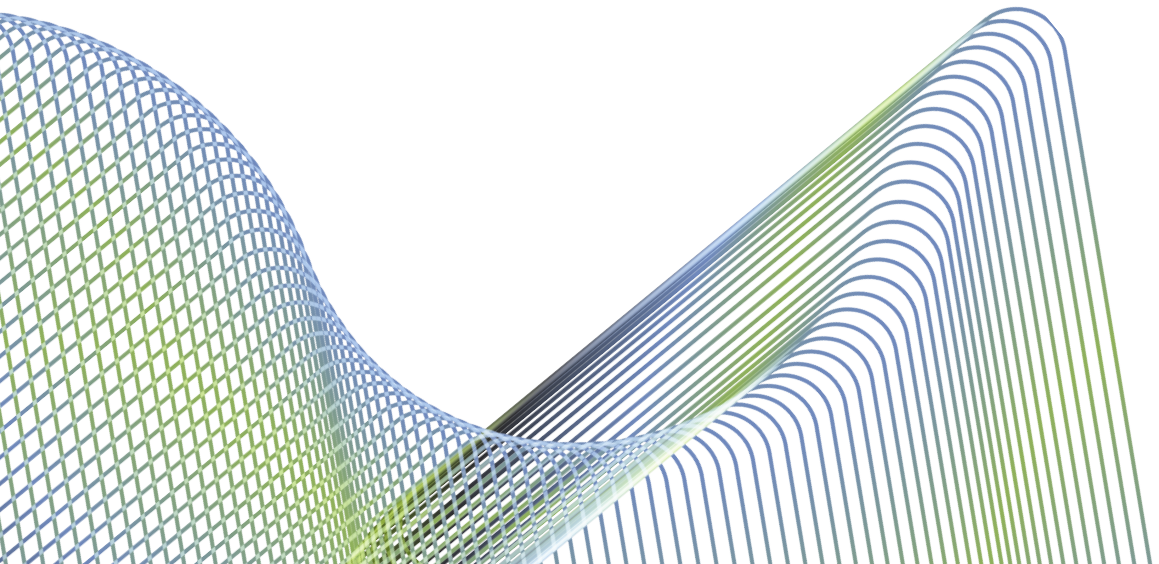
Sustainable Finance:

In a previous article of the Sustainable Investment Club, the term sustainable finance was defined as follows:

"Within the EU context, sustainable finance is understood as doing finance in a way that supports economic growth, whilst reducing the pressure onto the environment, and simultaneously considering social and governance aspects." (Sustainable Investment Club, 2021)

Blockchain Technology:

According to IBM a blockchain is a secure and unchangeable record-keeping system that allows businesses to track transactions and assets. It can keep track of physical things like cars and land, as well as non-physical assets like patents and branding. This technology reduces risks and lowers costs for everyone involved in the network. (IBM, n.d.)



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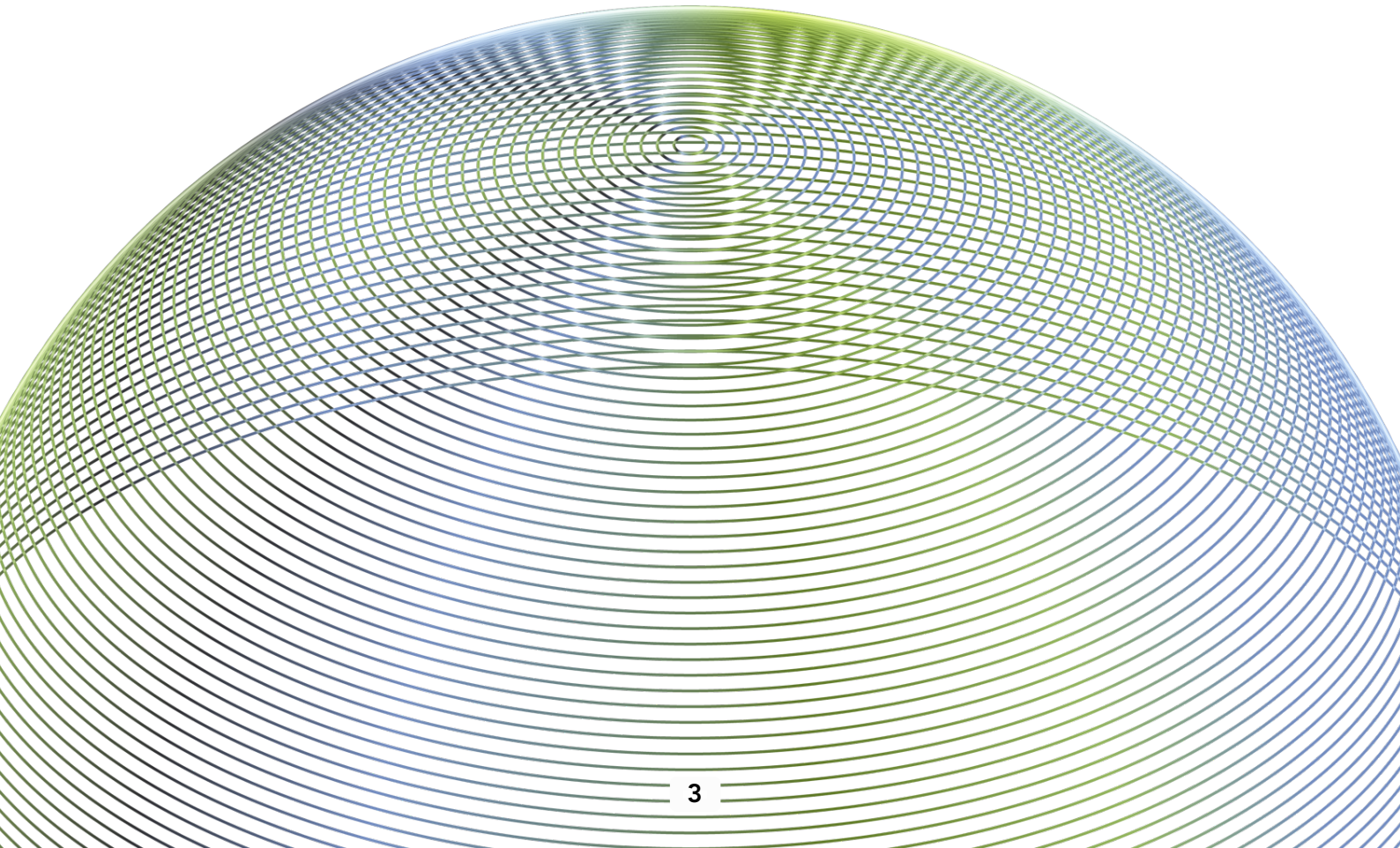
The Role of Blockchain Technology in Sustainable Finance

In this chapter, we explore the various ways in which blockchain technology can be applied in sustainable finance. Specifically, we examine how blockchain technology can play a vital role in achieving sustainable finance goals. As such, we will examine how blockchain technology can be leveraged to improve each of the three Environmental, Social and Governance (ESG) categories.



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Environmental:

Blockchain technology has the potential to transform the way we conduct financial transactions, leading to economic benefits and environmental sustainability. One way this can be achieved is by improving carbon emissions trading. For example, blockchain can create a secure system for tracking and controlling the flow of carbon credits. This would increase transparency and reduce the risk of fraud. Another way blockchain can promote sustainability is by streamlining clean energy trading. By eliminating intermediaries, blockchain can reduce transaction costs and make it easier for clean energy producers to connect with buyers. In addition, blockchain can help improve the monitoring and reporting of greenhouse gas emissions reduction. With blockchain technology, emissions data can be recorded and verified in a tamper-proof way. This can help increase trust and accountability in emissions reduction efforts. Overall, blockchain technology has the potential to create a more sustainable and efficient financial system by facilitating clean energy trading, improving carbon emissions tracking, and promoting transparency and accountability in environmental efforts. (McCormack et al., 2021)

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Social:

Blockchain technology has the potential to facilitate financial inclusion in economically disadvantaged regions grappling with poverty, underdevelopment, and inequality. For example, blockchain technology can improve financial inclusion through the use of digital currencies. By providing a secure and transparent platform for financial transactions, blockchain technology enables people in remote areas to send and receive money without having to rely on traditional banking services. Furthermore, it can play a crucial role in the healthcare sector, supporting data tracking, patient management, and monitoring of clinical trials. (McCormack et al., 2021, Naderi, 2021)

Governance:

The use of blockchain technology can be beneficial to governance by providing fairness, transparency, and security. Smart contracts can facilitate fair and unbiased exchange of assets, while transparency can allow for better collaboration between organizations and policymaking. Blockchain's immutability and encryption can improve security and prevent fraud, and privacy concerns can be addressed through anonymization and permission controls. (McCormack et al., 2021)

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Risks and Challenges

The aim of this chapter is to illuminate the potential risks and challenges associated with blockchain technology, both in general and specifically in the context of sustainable finance.

Lack of Standardization:

Blockchain technology faces a significant obstacle in the form of a lack of standardization, which makes it difficult for different networks to communicate with each other. This lack of standardization means that each network has its unique set of rules, protocols, and consensus mechanisms, which can make it challenging to achieve interoperability between networks. Without interoperability, different networks cannot communicate with each other seamlessly, which can hinder the adoption of blockchain technology in finance. The lack of standardization in blockchain technology also makes it challenging for regulators to create policies and regulations. The various blockchain networks available currently lack international standards, which can pose a risk to the financial market. This lack of standardization could lead to a fragmentation of the market into disparate networks that operate on different blockchains. As a result, it can be difficult for regulators to create policies and regulations that apply to all blockchain networks uniformly. This can create regulatory uncertainty, which can hinder the adoption of blockchain technology in finance. (Eliaçık, 2022)

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Blockchain Trilemma:

The concept of the "Blockchain Trilemma" is based on a common understanding that decentralized networks can only offer two of the following benefits at any given time: decentralization, security, and scalability. This means that it is difficult to achieve all three benefits simultaneously within a blockchain system. For example, increasing scalability may require sacrificing decentralization or security, and enhancing security may limit scalability or decentralization. Achieving the right balance between these qualities is a complex and ongoing challenge for blockchain developers. (Blockchain Trilemma: Scaling and Security Issues | Gemini, n.d.)

In the following part we take a brief look at the scalability and security Aspects of the “Blockchain Trilemma”.

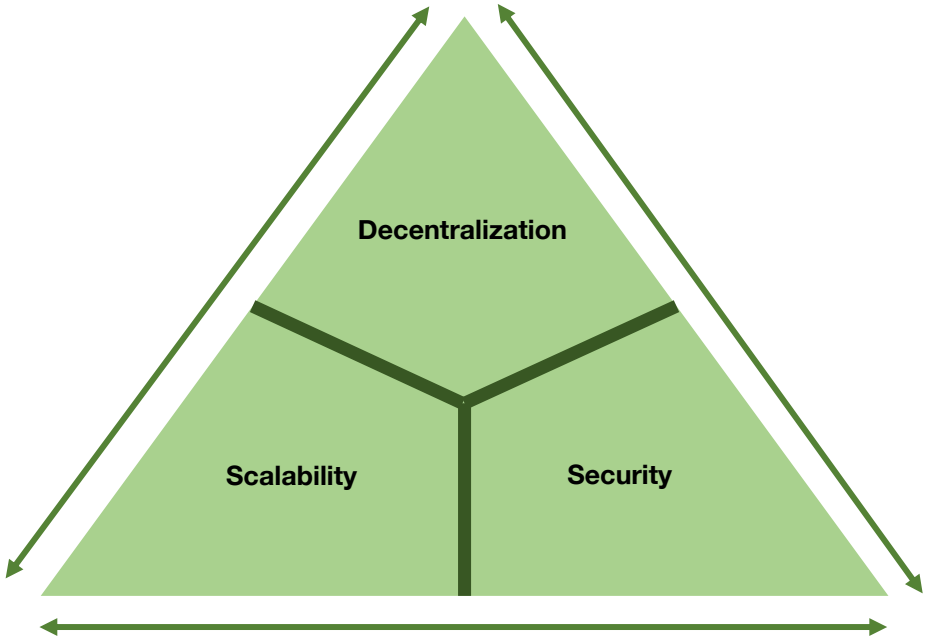

Figure 1: Blockchain Trilemma (own illustration)

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Scalability:

One of the key challenges posed by the "Blockchain Trilemma" is scalability. In the context of blockchain technology, scalability refers to the ability of a blockchain system to support a large number of transactions and accommodate future growth. (Blockchain Trilemma: Scaling and Security Issues | Gemini, n.d.)

Ensuring scalability is critical for the adoption of blockchain in sustainable finance, as it is essential to supporting large volumes of sustainable finance transactions. Therefore, it is crucial to develop blockchain solutions that can efficiently process a high volume of transactions while still maintaining the security and decentralization of the network. (Eliaçık, 2022)

Security:

Another challenge posed by the “Blockchain Trilemma” is security. Blockchain security involves protecting the network from unauthorized access, manipulation, and malicious attacks using cryptographic techniques. Malicious attacks such as phishing attacks, routing attacks, sybil attacks or 51% attacks hence are a great risk of blockchain technology in sustainable finance or generally financial markets. (What Is Blockchain Security? | IBM, n.d., Blockchain Trilemma: Scaling and Security Issues | Gemini, n.d.) Security risks in blockchain technology can undermine the integrity and trustworthiness of financial transactions, potentially leading to financial losses and reputational damage. This could hamper the adoption of blockchain technology in sustainable finance and other areas of the financial market, as security concerns are a critical consideration for investors and stakeholders.

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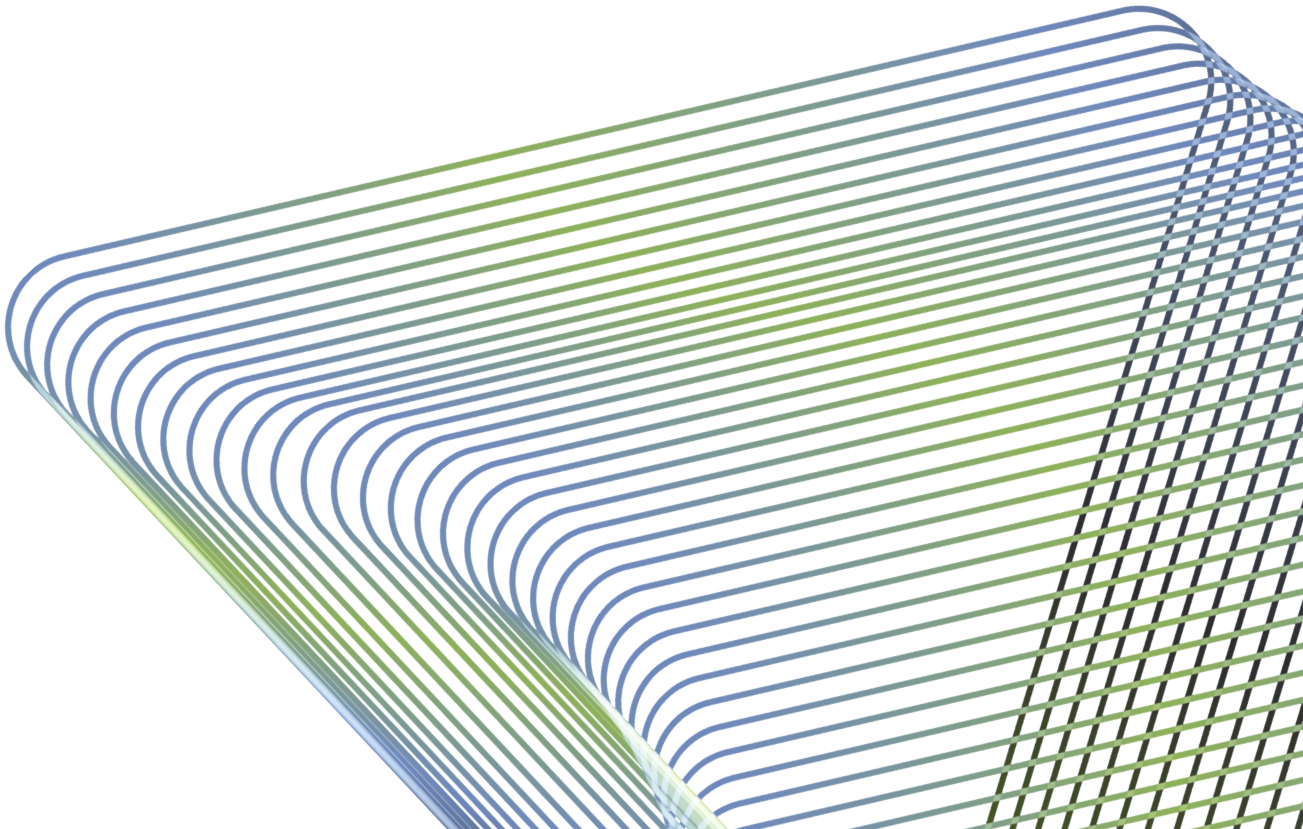
Regulatory Uncertainty:

As blockchain technology is a relatively new phenomenon, it holds the potential to be subject to new regulations that could either positively or negatively impact financial markets and sustainable finance. Recently, Frederiks et al. (2022) conducted a study on the two possible perspectives on regulatory uncertainty. The institutional view suggests that decisions dependent on potential future regulations should be postponed, while the resource-based view suggests that regulatory uncertainty can stimulate innovation and lead to positive outcomes. (Frederiks et al., 2022)

We hold the view that although regulatory uncertainty can stimulate innovation, it may not be beneficial for creating sustainable financial markets. This is because financial market participants (FMPs) may hesitate to adopt new technology in the face of regulatory uncertainty. Moreover, investors may become overly cautious and unwilling to invest in an environment with uncertain regulations.



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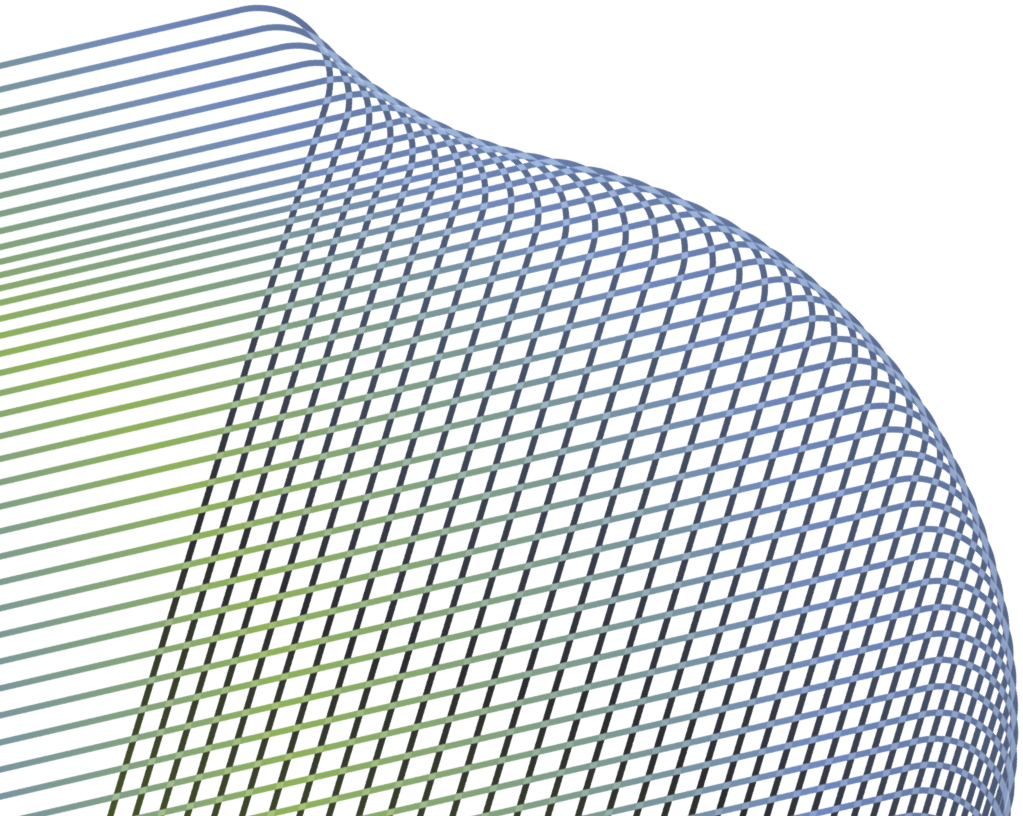
Energy Consumption:

One significant challenge associated with blockchain technology is its high energy consumption. However, this issue can be addressed, as demonstrated by Ethereum, which reduced its energy usage by 99.9% by transitioning from a proof-of-work (PoW) consensus algorithm, where participants are required to solve complex mathematical problems to validate transactions and create new blocks, to a proof-of-stake (PoS) algorithm, where the validation of transactions and creation of new blocks is based on the amount of cryptocurrency a participant holds / ”stakes”. One reason why PoW consumes more energy than PoS is that in PoW, multiple miners compete to solve the same block, resulting in wasted energy for miners who do not succeed in solving it first. (Mills, 2023). Nonetheless, it is important to note that while PoS significantly reduces energy consumption, it does not fully resolve all problems. For instance, it may lead to the centralization of power, which is another issue which would then need to be addressed.



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Conclusion

In conclusion, blockchain technology holds great potential for advancing sustainable finance goals. By leveraging its capabilities in the ESG categories, blockchain can promote environmental sustainability, facilitate financial inclusion, and improve governance. The technology's ability to enhance transparency, security, and fairness through smart contracts, improved monitoring, and encryption can pave the way for a more sustainable financial future. As the world continues to prioritize sustainability, the role of blockchain in sustainable finance is likely to become increasingly important.

While blockchain technology holds immense potential in sustainable finance, it also presents various risks and challenges. Lack of standardization, scalability and security are significant obstacles that need to be addressed to ensure the adoption of blockchain technology in finance. Ensuring scalability and security while maintaining decentralization is crucial, and the Blockchain Trilemma presents a challenge in achieving these simultaneously. Furthermore, regulatory uncertainty and high energy consumption are other concerns that must be considered. Nonetheless, with appropriate solutions and regulations in place, blockchain technology can significantly benefit sustainable finance and financial markets as a whole. Moving forward, it is essential that we continue to monitor and evaluate how the technology develops and how it can best be utilized to promote sustainable finance while mitigating risks.

The Bibliography

Blockchain Trilemma: Scaling and Security Issues | Gemini. (n.d.). Gemini. https://www.gemini.com/cryptopedia/blockchain-trilemma-decentralization-scalability-definition#section-what-is-blockchain-security

Eliaçık, E. (2022, May 30). *Blockchain Implementation Challenges And Solutions (2022) - Dataconomy*. Dataconomy. https://dataconomy.com/2022/05/blockchain-implementation-challenges/#Lack_of_standardization

Frederiks, A. J., Costa, S., Hulst, B., & Groen, A. J. (2022). The early bird catches the worm: The role of regulatory uncertainty in early adoption of blockchain's cryptocurrency by fintech ventures. *Journal of Small Business Management*, 1–34. https://doi.org/10.1080/00472778.2022.2089355

McCormack, U., Tear, L., Ajwani, N., & King & Wood Mallesons [KWM]. (2021). Using blockchain for sustainability and green finance. *Blockchain and ESG*. https://www.kwm.com/content/dam/kwm/insights/download-publication/hongkong/2021/blockchain-and-esg-blockchain-for-sustainability-and-green-finance.pdf

Mills, R. (2023, February 6). *Cryptocurrency's Energy Consumption Problem*. RMI. https://rmi.org/cryptocurrencys-energy-consumption-problem/

Naderi, N. (2021). Utilizing Blockchain Technology in International Remittances for Poverty Reduction and Inclusive Growth. *Economics, Law, and Institutions in Asia Pacific*, 149–163. https://doi.org/10.1007/978-981-16-1107-0_7

Naderi, N., & Tian, Y. (2022). Leveraging Blockchain Technology and Tokenizing Green Assets to Fill the Green Finance Gap. *Energy RESEARCH LETTERS*, *3*(3). https://doi.org/10.46557/001c.33907

What is Blockchain Security? | IBM. (n.d.). https://www.ibm.com/topics/blockchain-security

What is Blockchain Technology - IBM Blockchain | IBM. (n.d.). https://www.ibm.com/topics/what-is-blockchain

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