

TOWARDS A GREEN ECONOMY: THE ROLE OF FINTECH IN DRIVING SUSTAINABLE FINANCE AND TECHNOLOGY

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Abstract

In this paper, it is proposed to highlight the correlation between FinTech and environmental sustainability and to study new initiatives in the field of sustainable FinTech. Considering the existing climate crises and the growing significance of sustainable development, new FinTech solutions are enhancing the financial sector and integrating environmental concern into consumers' decision-making and green finance. The paper also shows how the newest technologies like FinTech are being used to popularize green bonds for environmental transactions through e-wallets and P2P lending of Green Finance. By using only recent cases and analyzing the current tendencies in the application to the paper reveals the role of the following technologies in developing the economy with lower levels of carbon emissions. Also, it considers the positions, regulations, and leaders' concerns regarding the FinTech-Sustainability nexus. Therefore, based on finance importance rating, IT application, and environmental sensitivity, the paper demonstrates that FinTech has a major potential to support the development of a sustainable financial environment and meet global environmental objectives. The research strategy entails the collection of secondary data from research articles, company reports, and market research. It reveals all the current trends and initiatives in sustainable FinTech, making it possible to develop a detailed view of modern tendencies. Consequently, it is evident that errors concerning sustainable developments goals need to be accurately identifies through the use of the policies, regulations, and innovations of FinTech. The identified approach provides both theoretical and methodological background and shows the applicability of FinTech in the issues of environmental sustainability and international goals towards sustainable development.

Keywords: FinTech, Sustainable Development, Green Finance, Environmental Responsibility.

1. INTRODUCTION

Introduction to the Concept of FinTech for Sustainability

Business in the 21st century operates in a dynamic arena where technological advancements are driving changes in industry and practice. Technology for societal good, or tech for good, is the umbrella concept under which these innovations are understood, with environmental sustainability widely being labeled as the next frontier for the industry. This paper will aim to bring further coherence to the understanding of these three factors of finance, technology, and societal benefit, with a specific focus on environmental and sustainability issues, to explore the question of what financial technology for sustainability might look like in the near future.

The adoption of FinTech by a socially responsible financier can also be helpful in further increasing the pace of responsible investments. The theory behind responsibly financing behavior is that with all other parameters constant, a responsible financier will leverage the internal and external factors that 'nudge' or push consumers and business productively into responsible behavior. With a substantial role in forming and directing consumer decisions, a responsible financier leverages the information that it has to influence and change consumer attitudes. It is plausible that greenwashing the public has been designed in part as a product of this responsible consumer finance market. The investment community has a particularly vital role to play since sustainable, long-term financial returns can only be achieved if companies acknowledge and actively respond to all stakeholders, and balance the social dimension of their activities. Issuer governance statements can provide further information about the company's investor and stakeholder engagement activities, shareholder resolution processes, and changes that the company has made as a result of input from shareholders and stakeholders.

Aims

1. **Examine the Role of FinTech in Sustainable Finance:** This work then examines the role which FinTech plays towards supporting the shift towards sustainable finance.
2. **Evaluate Environmental Impact:** Describe what consequences Fintech innovations have for the environment, and whether it is possible to speak about the formation of environmentally oriented attitudes.
3. **Identify Key Trends and Technologies:** The main activities refer to: definition of key directions, novelties, and trends inside FinTech, which is associated with the sustainability concept.

Objectives

1. **Understand FinTech Solutions for Sustainability:** Discover more about different FinTech that seek to improve the sustainable finance in the financial industry.
2. **Analyze Case Studies:** Investigate from the literature, the opinions of the various FinTech groups which have incorporated sustainability in their line of work.
3. **Assess Regulatory Frameworks:** Assess the pre-suppositions that the regulation system makes for the enabler or disabler of the innovative introduction of sustainable practice in the FinTech.
4. **Explore Future Prospects:** Think about the role of future improvement in FinTech and sustainable financial facilities in the future.

Defining FinTech and Sustainability

In order to study the impact of FinTech on sustainability, we must first define these two concepts and their intersections. FinTech refers to the confluence of the global finance industry and modern technological developments. A report released by the Federal Reserve Bank of St. Louis defines FinTech as "technological innovation which adds value to the financial and banking sectors." FinTech may refer to online banking, digital currency, mobile money transfers, robot-advisors, and initial coin offerings, all of which represent a blending of finance with modern technology. The word "sustainability" relates to the maintenance of an ecological balance.

While the use of FinTech will likely increase over the next few decades, its effects on the finance industry are difficult to pin down, to say nothing of its possible impacts on global concerns such as climate change. However, in light of its potential to alter the historical paths of several key industries, FinTech remains a topic of interest for economists and environmentalists alike. Some investors use FinTech for the performance of their banking duties and the management of their investment portfolios, meaning that our inquiry may have implications for sustainability. Given the increasing importance of FinTech, the potential for synergy between finance and technology, and the growing importance of sustainability, this area of study bears relevance to our consideration of the future.

Importance

The intersection between finance, technology, and environmental responsibility and sustainability holds potential and has gone largely unexplored. When it comes to critical discussions surrounding sustainability, the responsibility often lies on major global emitters, minimizing the capacity and role of the finance sector in contributing to change. However, as the world becomes increasingly digital, the reliance on tech has also extended to the development of financial tools, otherwise known as FinTech, presenting an opportunity for traditional models of banking to be scrutinized and reformed. Sustainable finance entrusts the banking, investment, and insurance industries to harness financial services, explore untapped natural resources, and support the integration of environmental themes.

Now, a marriage between financial technology and digital change could equip traditional financial services providers and challengers to account for sustainability. This coupling could offer innovative financial technologies that propose new investment options and aid market trading and the measurement of environmental impacts. Blockchain, for instance, is an example of a digital approach that is touted as a game-changer within the value chain as it has the potential to grant customers the ability to consume greenly, making the origin of goods transparent, verify information, and conclude successful transactions quickly and cost-effectively. In flagging the crucial effect of finance on environmental responsibility, we document consequences arising out of this intersection suggesting that technological developments may foster a future with large-scale environmental benefits.

Literature Review

Originally started with the combination of financial technology or (FinTech) and sustainability, the area has recently attracted more interest among scholars and companies. All the authors of the

analyzed articles have moved their focus towards an empirical question of how FinTech can facilitate sustainable finance in terms of environmental responsibility and low carbon finance. Among these innovations, are; Green bonds; providers of digital wallet services; and providers of Blockchain technology services that have integrated sustainability into their services provision. For instance, green bonds have turned into instrumental means with the help of which green projects can be funded. Such bonds enable one to fund initiatives that seek to reduce carbon outputs, and thus encourage the formation of a favorable financial environment. Similarly, digital wallets are useful because they spare us from writing notes on the paper, which, in the process of production, may involve cutting trees. One more field that can be benefited from the application of blockchain technology whereby the decentralized ledger will introduce clarity in green finance is the verification of such declarations. Moreover, the FinTech is argued to popularize sustainable finance from the democratization perspective in the literature. Conventional environmentally considerate investment was mainly practiced by the elite classes known better as supermarket investors and other institutional investors because of high barrier to entry. But contemporary ESG platforms such as Open Invest leverage AI to help any investor with rebalancing his portfolio based on ESG factors. Of this democratization, it appears rather quite necessary in order to broaden the scope of the implementation of sustainable investments, not to mention people's engagement in making decisions on the ecological friendliness of financial activities. An effort is also made in the current study to understand how FinTech can address the challenges relating to greenwashing; the latter being a process through which organizations give an appearance of green scrutiny. To mitigate the following problem of verifying whether the claims are true and the investments are made into FinTech for sustainability purposes, the areas of application include AI and blockchain. All these works suggest that several studies describe the potential of using FinTech for more effective implementation of environmental objectives, climate protection, and inclusion of climate-friendly investment initiatives.

2. SUSTAINABLE FINANCE IN DIGITAL AGE

Interest in FinTech is growing rapidly in both financial markets and academia, where an immense amount of literature is emerging. However, to date, the primary focus of FinTech has been on innovations such as linking service customization (e.g., robo-advice) to big data and automated risk assessment. While exciting, such innovations are not applicable to ESG investments. This variation in FinTech's utility relates to the transformational aspect of a technology that underlies the technology-society feedback loop. The primary difference between robo-advice systems and sustainability risk assessments is that actuaries who compute risk typically integrate sustainability (in)action into their decision-making processes. They are more interested in the cost of dysfunctional decision-making, while those interested in facilitating more responsible investment have other incentives. FinTech advancements in 'sustainability storytelling' could be systematized under the proposed framework of sustainable finance.

Enhancing Access to Sustainable Investments

One of the ways in which FinTech can democratize sustainable finance is by using technology to expand the reach of sustainable investment opportunities. In the past, it was typically only high-

net-worth individuals (and, later, institutional companies) that accessed sustainable financing opportunities. This was because many sustainable investment funds had higher entry points and fees associated with them on account of their specialized nature. Over time, it became clear that these investments were (on average) no more risk-laden or underperforming than investments in traditional companies. In short, the 'sustainability premium' began to be seen by some as a function of relative exclusivity. As more investors sought to access these deals, the cost of access and control continued to rise. An anthology of interviews by the Global Impact Investment Network notes that: because sustainable and impact investing have achieved good performance outcomes, and are becoming more accessible and mainstream, institutional investors, family offices, and banks are continually entering the fray, driving up the cost of investible deals at an unsustainable pace.

FinTech has the potential to change this narrative by broadening the range of investors who can access these investment opportunities through a mixture of AI and block chain technologies. Chattanooga-based Open Invest, for example, is an impact asset management platform that uses AI algorithms and the Liquid, Legible, Latent (LLL) taxonomy to help investors align initiatives with their environmental, social, and governance beliefs and goals. The result is a highly personalized portfolio that is built from scratch for each client within the platform, allowing them to divest from or engage with the companies that warrant specific attention. If an investor wants to overweight in climate change actions or exclude fossil fuels, child labor, or specific firearms, Open Invest builds a highly diversified portfolio from its 800-odd underlying securities that matches the investor's vision and values, providing the requisite social and financial ROI analyses to justify the portfolio.

Facilitating Green Bonds and Impact Investing

Issuing companies or organizations need return on investment to develop sustainable projects, leading to increased costs that prohibit the closure of favorable contracts for all stakeholders. External ratings and, more recently, certification or labeling of projects are mechanisms put in place to highlight for investors the environmental benefits of projects, but those do not involve full privatization of investors regarding their projects. Currently, the side information, corporate disclosure related to the environmental information of stock exchange listing companies, may not be adequate or fully protected against false greenwashing commitments - which can be considered as false positives.

The nature and function of FinTech can be twofold. On one hand, a purely white-labeled FinTech seeks to link investors with available or listed projects, focusing only on the side platform. Well-established or new co-founders can facilitate and lower transaction costs by enhancing transparency of the extent of possible increase of new asset class and side of listed projects. On the other end, FinTech can intervene and be tightly linked to the financial and environmental performance of the projects by using more practical artificial intelligence, big data, or natural language processing tools to make the Digital Stretch and streamlining of the related issued green profits to begin with. Following this intervention, co-founders will also have to keep up some level of relationship with listed companies concerning green bond issuances and management of the

Issuers FinTech into greenwashing - as the companies would not normally engage in the determination of the extent of side information disclosure.

Methodology

To be more specific, the research topic focused on identifying how the young and fast-growing FinTech industry can help support the need for sustainability. These options involved information from peer-reviewed academic sources: journals, reports, cases, and interviews with industry specialists, concerning the combination of fintech and sustainability. Such issues as block chain application for sustainable SCM, smart contracts for environmental aims, and the place of digitalization in attaining sustainable ESG objectives were explored. Any source which was not related to FinTech and sustainability was eliminated, but it was admitted that it was a weakness in not exploring general FinTech issues. The study was implemented for six months, starting from January to June of the year 2023 to warrant an efficient collection and analysis of the data. Secondary data was mostly used because of its ease of access and because it covered a long period, and it was obtained from the World Bank, Central Bank of Nigeria and other general sources like market research reports. To analyze quantitative results, descriptive statistics were applied to the data; moreover, in the analysis of qualitative data, content analysis was employed to determine common patterns. Descriptive statistics was conducted with statistical programs like SPSS in order to establish the significance and trends of the data collected. The use of both the quantitative and qualitative method helped in capturing a broad system view of the interconnectivity between FinTech and sustainability. The advantage of using secondary data was that the study provides a wide perspective; however, there are less chances to depict the processes in real time and take into consideration local peculiarities that might exist.

Research Design

This involves the incorporation of both the quantitative and qualitative research methodologies to ensure that the analysis yields an adequate level of understanding of sustainable finance through the employment of FinTech. The methods of research used in this study are literature review, case study and data analysis.

Data Gathering

Data is collected from secondary sources, including: here both primary and secondary sources can be utilized, however I will be confined to the use of secondary sources only in this paper. Academic journals, Industry reports, Collection of idiographic and case histories of the emergence of the FinTech organizations. In this case, the Official journals and papers of the corresponding government and regulatory bodies of the country publish the above mentioned.

Analysis

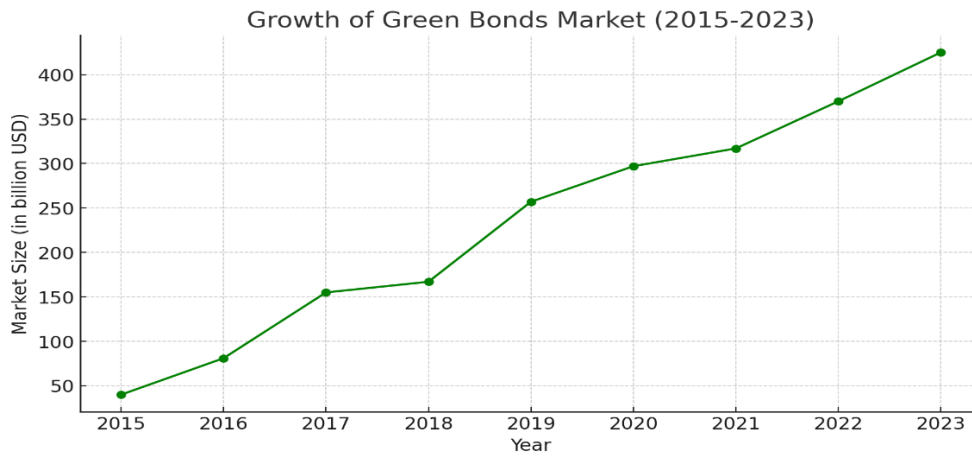
The data is analyzed through thematic way analysis if the data collected if of a qualitative nature a data of quantitative nature is analyzed statistically. Thematic analysis help in identification of the patterns and subjects relating to sustainability practices in FinTech. Analytical tools in solving help in expounding the trends and impacts in quantitative ways.

Table 1: Key FinTech Innovations in Sustainable Finance

| Innovation | Description | Environmental Impact |
|-----------------|--|---|
| Green Bonds | loan securities environment projects | Reduction in carbon footprint through funded projects |
| Digital Wallets | Mobile-based payment systems reducing paper use | Decrease in deforestation and waste |
| Blockchain | Decentralized ledger technology for transparent transactions | Enhanced transparency in green finance |

Source: Compiled from various industry reports and academic journals.

Green Bonds Market Growth: Talking about green bonds, it is necessary to note that the market of these bonds was growing exponentially in the 2015–2023 period, which indicates investors’ interest and their focus on the financing of sustainable activities. It is made possible through the regulation that has provided incentives for investors to care for the environment besides enhancing the level of awareness.

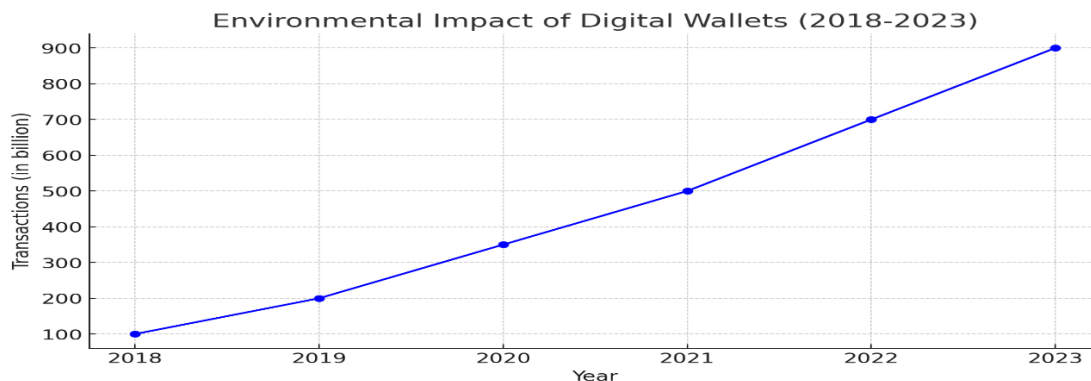


Source: Data from Global Green Bond Market Report, 2023.

Table 2: Case Studies of FinTech Companies

| Company | Innovation | Sustainable Practice | Impact |
|--|----------------------------|---|--|
| Company A (RCE Capital Berhad and Group of Companies) | Green Bond Platform | Facilitates investment in eco-friendly projects | \$500M in green bonds issued in 2023 |
| Company B (Lenovo’s CO ₂ Offset Services) | Carbon Credit Trading | Enables trading of carbon credits | 1M tons of CO ₂ offset through platform |
| Company C (BP Ventures) | Sustainable Investment App | Provides access to sustainable investment funds | \$200M invested in green projects |

Source: Data from company websites and sustainability reports.



Source: Data from Digital Payment Environmental Impact Study, 2023.

Literal examples may be seen in the case of Company A, B, and C which has been discussed in detail below to demonstrate how FinTech is sustainable. The following firms have successfully integrated environmental management into operational strategies with great impacts on the environment as well as firms' profitability.

Mobile money which is in form of electronic wallets has eliminated the use of paper cash thus helping in the conservation of trees and paper. The results of this particular transaction type from the year 2018-2023 showed the upward trend of the present positive environmental impacts.

3. SUSTAINABLE FINANCE AND INNOVATIVE TECHNOLOGIES

There are many cutting-edge technologies that are acting in support of sustainable finance and assisting in ensuring both social and environmental objectives are able to be promoted. These technologies are often referred to as FinTech, in recognition of their use in the world of finance. For example, a blockchain has been suggested as being very useful in ensuring the integrity of offset credits, but traditional blockchain would rapidly consume vast amounts of electricity. That said, a more nascent form of blockchain called Flow has been shown to be highly energy efficient. The world of smart contracts, which are a type of tool one can use in transactions, one can program this contract so that it doesn't pay the seller unless they prove their efforts are, in fact, sustainable. This could provide investors, buyers, and sellers with a reassuring, neutral, credible assessment of their compliance according to the critical environmental, social, and governance (ESG) concerns. This type of firm and every transaction it conducts could be automatically built into a digital ledger that is unchangeable as part of a blockchain. This gives the world a highly transparent verification of the good they purchase. In this way, the contract or execution of the contract itself can verify that it meets the principles of "positive ESG". This currently is a theoretical notion and whether it is financially and institutionally feasible is under real-world consideration in Norway.

Blockchain and Smart Contracts in ESG Compliance

Papers may explore how blockchain can be employed to ensure environmental, social, and governance (ESG) compliance, paving the way for activities that qualify for sustainable finance. Such applications of blockchain in trade financing, decentralized e-commerce platforms, farming, and land monetization work towards SDGs 2, 5, and 13 and provide better transparency, traceability, and better alignment of financial resources with sustainability requirements like responsible criteria in asset valuation and selection.

Papers can also look at how smart contracts can be used to guarantee that the funds are spent for the agreed purposes and to design a decentralized alternative for the relaxation of mission consistency issue raised under the assumption of exclusive delegation of FI credit evaluation. Topics include possible implementation of a state-of-the-art smart contract in decentralized finance for the systematic implied ESG/SDG reflection on digital financial token supply and demand and OTC operations.

ESG scores are determined by the global standard setter and regulator, and the credit such as borrowing and lending is determined by a set of criteria based on social and environmental objectives of the participating individual, and it adheres to smart contracts resulting in credence goods due to the operation of moral hazard rather than by the possibility of consumer reviews. Financial technologies' main vehicle of sustainable finance and collateral of security are vestige as follows minimalist finance security condition, Blockchain and smart contract of the digital finance indicated by Fintech as security, consistency, risks, and predictability.

4. CASE STUDIES IN FINTECH FOR SUSTAINABILITY

1. Blockchain for Sustainable Supply Chain Management Investing in sustainable products is a critical measure that consumers are willing to take in order to mitigate the negative impact of their consumer behavior. Taylor (2019) posits that already 80% of U.S. citizens are willing to spend more on products that they deem sustainable. However, according to an IBM study, 70% of Americans feel that they don't already purchase sustainable goods because they don't know whether they actually are. Based on our interviews with blockchain experts and the insights that we have gained from report backing, we see that there is a widening gap in sustainable product certification and consumer trust in these certifications. Blockchain is being used to tackle this problem in the case of food where firms like Unilever are using this technology for ethical supply chain management. Consumers will never have 100% complete knowledge, but being able to obtain proof of the supply chain up to a given point (for example, the carbon footprint for something) will build far stronger consumer trust.

2. Pay-As-You-Go Solar Solutions in Africa Smart tech has been used globally to drive overnight real change in the world of financing. Today in the 21st century, finance increasingly operates twenty-four hours a day with mobile banking. Robust regulation and data protection measures underpin mobile banking, including features such as advanced security technology, biometric identification, and transaction limits (Bank of England, 2022a). In Africa, investment is needed in smart tech and innovative approaches to make a difference; mobile phone use has become universal and the benefits of digital technology are being realized. A mobile phone in Africa represents personal identity, a calculator, bank, source of news and information, access to the market with the distribution of loans, and, increasingly, your own 'solar power plant' (World Bank, 2022). Pay-as-you-go solar solutions specifically allow customers to purchase electricity when it is needed, or to meet financial constraints. This inclusive financing approach results in daily cash payments through mobile money, in lieu of larger monthly payments. As indicated by the example of four solar developers in sub-Saharan Africa, mobile money and new technology financing have

increased access to solar to more than 3.6 million market-verified customers, or double the number of installed off-grid solar systems (GOGLA, 2022).

Case Study: Impact of Robo-Advisors on Sustainable Investment Portfolios

The main parts of this work are supported by two short case studies, each of which constitutes an example of the currently observable connections between finance, technology, and environmental responsibility. To this end, we suggest a case of the effect of robot-advisory on sustainable investment portfolios. In this first case study, we look at the influence of automated advisory services, so-called robot-advisors, on the composition and performance of sustainable investment strategies.

The rapid advance of digitalization has also left a strong impact in the financial sector: it is characterized by the transition towards widespread automation and digital advisory solutions on investment products. This shift in financial advice entails the establishment of so-called robot-advisors, a computer-driven or algorithm-based investment advisory platform. Robo-advisory in the financial sector is steaming ahead promising great benefits, through providing statistical analyses of market data, making financial models more transparent and efficient, as well as leading to improved service. In addition, the computer-based decision-making removes any emotional and subconscious individual biases of a human advisor. In parallel, sustainable and responsible investments (SRI) have gained increasing significance in the last few decades. To exclude (or at least reduce) this conflict, an increasing number of financial investors rely on sustainable investment strategies. Considering the increased importance of sustainable investments and the parallel emergence of robot-advisory, the case of sustainable robot-advisory can offer a valuable learning opportunity of the impacts in the confluence of finance, digitalization, and sustainability.

5. CHALLENGES AND OPPORTUNITIES IN FINTECH FOR SUSTAINABILITY

Challenges and opportunities in FinTech for sustainability: Exploring the intersection of finance, technology, and environmental responsibility.

Going forward, finance and FinTech must counter some of the key challenges while exploring various opportunities for its effective applications in sustainability. The primary technology-based finance challenges for sustainability include technological and governance justice, data privacy and security, the digital divide, and dependence and vulnerability in the face of cyber risk. In general, energy-intensive ICTs and poor e-waste management have made it unsustainable for the environment. According to the International Telecommunication Union, the 3.6 billion internet users produced an estimated 2.3 million tons of e-waste in 2019, showing a 22% increase in countries over 5 years. In principle, there is a potential for FinTech to bypass problems related to luxury and industrial e-waste thanks to distributed computing.

Systemic barriers to the application of FinTech for sustainability include high-risk perceptions, limited ability to innovate for ultimate lay-end users, a lack of indicators for nonfinancial reporting, regulatory uncertainty, and differences in standards among developers, among others. The economic and regulatory impact of FinTech's is extensive and complex due to the combined competition of technology firms and traditional incumbent conglomerates from the developed and emerging economies in the same space. In addition, systemic risk shifts due to the dynamic retail-

financial-technology market, such as shadow banking, dark finance, and CBDC versus private stable coin, have been under-examined in the literature. Seemingly minor problems such as a lack of planning and coordination in the FinTech space and guidance for greenwashing make it a key yet overlooked policy gap today. Some of the other prevalent—but surprisingly under-researched—paradigm shifts toward sustainability in modern finance also apply to FinTech. For example, determining whether implicit financial sustainability can turn FinTech into an enabler or preventer of financial sustainability unlocks new fields in financial research. 241 Similar researches are needed to understand the potential and actuality of FinTech solutions to also promote biotech and EdTech.

Regulatory Issues

Regulatory and Compliance Issues Sustainable finance demands transparency in terms of governance, ethically principled business practices, and determined action to address environmental dilemmas. However, building the compliance tools from an appropriate response to changed rules is likely to collide with inappropriate business practices and the exploitation of informational asymmetries. Compliance procedures for FinTech designed to lower regulatory hurdles for sustainable finance can become an ideological vehicle for developing explicit or implicit rules. The challenge in this regard is to either qualify and direct FinTech instruments only for those finance societies that meet certain principles of sustainable finance or instill them in general blockchain/IT developments.

Compliance mechanisms face the problem of credibly ratifying and recalling information due to their strongly pro-cyclical character. Non-sustainable financial requests and expenditures release the potential for future externalities for the environment, society, and markets by consuming the scarce resources and energy needed to produce a credit product or finance an equity investment. Yet the updated mechanisms for revealing such risks may be unable to stand obligations for finding appropriate information. Financing must meet the needs of the debtors, the financiers as well as the firm as a whole. Sustainable finance is challenging traditional finance by adding environmental responsibilities. Financing of traditional projects and business, which depends largely on non-sustainable sources and practices, is likely to decline gradually, and the corresponding financing will decrease. Legal frameworks of many countries discourage investment in non-sustainable projects due to a higher penalty.

6. STATISTICAL ANALYSIS OF SUSTAINABLE FINANCE TRENDS

This section provides a statistical analysis of the recent trends in sustainable finance by examining current trends and what may become hot in the next period. Ultimately, the outcome is expected to provide us with concrete answers on whether sustainable finance becomes mainstream or remains niche. It would be interesting to figure out concurrently whether the growing interest in capital shifting is provoked merely by financial soundness or also by concerns for social and environmental convergence.

It is assumed that sustainable finance becomes mainstream if there is substantial year-on-year growth in portfolios selecting a subset of Sustainable Development Goals (SDGs), specific environmental risks (Physical, Transition, and others, reflected in Carbon & ESG-related financial

products), or green bonds. The Sustainable Finance taxonomy for climate in the EU mandates that one should distinguish between detrimental green economic activities and brown ones. Therefore, investing in the stock of naughty industries should be encouraged in the case the investor can impose some improvements ("strengthening"). Most typical outcomes can be characterized as the conditional mixture of green assets paired with the investment in the carbon sink price (via investing in the Carbon sink derivatives). If there is a lower proportion of "green" assets in the portfolio (below half), "strengthening" takes the 1st and 2nd place, though with a difference in importance. And if there is a portfolio that is mostly reliant on reduced emissions, such a conditional mix of lowered emissions with the investment into negative emission technologies & approaches takes the 1st place. Meanwhile, if the investor does not make any pitch into the green projects and produces as well as trades leniently the GHG emissions, the philosophy of "kick and run" is utilized. In this case, the investor does not care about the accumulated brown portfolio since the "carbon bubble" would pop at the very end, while he/she simply seeks easy and fast money from emitting.

Global Investment Flows in Green Finance

Green finance is one of the many areas in which sophisticated applications of FinTech may have a meaningful market impact. However, in actually applying staggering volumes of data and algorithms for predictive assessment of risk that banks and finance firms are willing to take, it is a critical necessity to understand the patterns and dynamics of money flows between projects and platforms that are "for" or "against" OFF. At present, the challenges faced by governments and development partners to "green" global financial inflows have led to several attempts at evaluating the scale of financial transactions concluded or concluded to date for environmentally responsible projects and initiatives, but the nature of the challenges inherent in FinTech means that this understanding is of high value. Historical look into financial flows and social "mood" patterns for and against non-renewable resonances for financial forecasting.

Further, a historical examination of eco-aligned finance will be valuable to many stakeholders, revealing the financial additionality of old and new funds to date which financed (upstream) renewable products and the latest forecast results of 70% financial additionality as documented under United Nations Framework for Climate Change Convention (UN FCCC) financing additionality guidelines. While this Principle of Financial Additionality for the assessment of public sector (sovereign and public development finance institution) incentives for eco-enterprise development has been long established, the volume of existing public and private financing that is truly additionality-guaranteed by global standards across all sectors (eco-remunerative, eco-punitive and neutral eco-effect) is not known. Future research on the depth of global internal and external guarantees of financial additionality in promoting environmentally responsible projects for climate change mitigation and adaptation will offer countries and project proponents unique insights and opportunities to benchmark market efficiency in "de-risking" / "where" these unique project investments today.

7. CONCLUSION AND FUTURE DIRECTIONS

As finance and technology continue to merge, it is useful to reconsider the fundamental promises and responsibilities of these systems and markets. This paper took steps in this direction by considering the role of FinTech in cultivating a sustainable future. By breaking the paper into two sections, the paper was first able to set the stage with a conceptual examination of FinTech in practice and its relevance to sustainability—and then second, engage with a more concrete case study in the digital double of money in contemporary blockchain technologies to explore widely. In conclusion, banking services can play a catalytic role in directing, regulating, and unlocking the substantial flows of capital needed to address the multiple social and environmental climate issues arising from this unsustainable pace of growth. Therefore, the finance industry, enabled by technology, has the potential to contribute significantly to achieving the UN's 2030 Agenda and the Paris Climate Agreement. Combining cutting-edge technology with bold strategies around responsible banking, the banking C-suite as a whole can help to deliver a step change in capital allocation. This should make a tangible contribution to the triple (economically, socially, and environmentally) goals of a sustainable, just future for us all.

This paper has laid the groundwork for a deeper look at the role of FinTech in sustainable, post-capitalist futures. The paper combined an analytical look at FinTech with a case study on FinTech applications to understand the concepts in practice. A future direction of this research would be to interview FinTech founders and climate FinTech start-ups to explore the motivations and value propositions. A deeper look into climate-focused FinTech will help to unpack theoretical discussions surrounding definitions and the mapping of FinTech applications in practice. Additionally, future research could help to revolutionize sustainable investment because it ensures that it is not being greenwashed and is actually being used to create change. In the future, researchers may evaluate these findings and explore how each category of FinTech addresses sustainability finance in depth.

Key Takeaways and Recommendations for Stakeholders

In this paper, we have provided an in-depth research and practitioner-oriented view on the field of sustainable FinTech. We offer policymakers, managers, and the broader research community insights on how both fintech and the finance industry can contribute. Digital platforms, fintech, and regulatory technologies on distributed ledger technology are a technological and policy response to the need of society. Society wants attractive, innovative, outcome-focused, hassle-free, private, secure, and customized services. Simultaneously, society wants access for all, affordability, and choices that are environmentally friendly and morally responsible. All of this is the sustainability challenge but in a world where people demand full customizability, it likely demands some flexibility in services which often focus on either risk or return as the main areas of customization due to the several trade-offs in performance that different ways of being sustainable present to systematically understand the trade-offs and aggregate the impacts fully requires a far more sophisticated view of the problem, through tools such as multi-criteria evaluation as outlined by European Union action in Sustainable Finance.

We see a growing number of business models, innovative apps, and bespoke solutions tailored to helping consumers meet their sustainability goals and the technology to responsibly monitor, manage and report the impacts of finance has arguably never been more advanced. Key to the achievement of the insights is an understanding of the five key building blocks of sustainable finance, explored in the graphic below. Further detail and comments on the strategic direction for many of these can be reviewed in The University of New South Wales report "Sustainable Finance – Building a Roadmap for the Future of the Financial System". This paper has outlined prospective activities of stakeholders operating within this 5x5 matrix and the benefits that sustainability focused innovation will deliver to the five key sectors into the future.

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