

Digital Green Bonds and ESG-Linked FinTech Platforms: Democratizing Sustainable Finance in Emerging Economies

Ruchi Jain¹, Pardeep Singh²

¹Assistant Professor, Aryabhata College, University of Delhi, New Delhi – 110021

Email: ruchi@aryabhatacollege.ac.in

²Assistant Professor, Aryabhata College, University of Delhi, New Delhi – 110021

Email: pardeepsingh@aryabhatacollege.ac.in

Abstract

Convergence and digital finance and sustainability convergence has generated new institutional solutions, which comprise digital green bonds and ESG-linked FinTech solutions. They are not merely the financial products, but hypothetical constructions of the flow of financial resources, the democratization of the capital markets, the mechanisms of incorporating environmental and social governance into financial flows, and the restructuring of institutional standards in the emerging economies. This paper is devoted to building a theoretical perspective on these innovations, in the framework of the financial inclusion theory, the institutional innovation theory, and sustainability transition frameworks. It argues that digital green bonds and ESG-related platforms are transformational engines that increase participation, transparency, and bringing about systemic transitions towards low-carbon economies. The analysis puts these instruments into a wider argument of how these instruments are juxtaposed in the context of sustainable finance.

Keywords: Digital Green Bonds, ESG, FinTech, Climate Finance

1. INTRODUCTION

In the past, the financial system was closed and access had control over the capital markets to only the institutional investors, the business enterprises and the rich individuals. This exclusivity is due to structural inequalities, absence of infrastructural facilities, as well as fragmentation of regulations in emerging economies. At the same time, sustainability necessities and climate change require mobilization of financial resources (including global funding) like never before.

The theoretical dilemma is to balance the inclusivity and sustainability. Institutional innovations that can help overcome this challenge are presented in the form of digital green bonds and FinTech platforms that are based on the ESG criteria. They exploit digital technologies, including blockchain, distributed ledger systems, and artificial intelligence to lower transaction costs, increase transparency and expand

participation. Better still, they represent a normative reconfigured finance whereby ecological and social sustainability become part of an allocation of capital.

The theory of these instruments in this paper is theorized as the mechanisms of democratization in sustainable finance. It places them within the conceptual debate on financial inclusion, institutional innovation and sustainability transitions that they represent a paradigmatic shift in the architecture of the capital markets in emerging economies.

2. LITERATURE REVIEW

2.1 Green Bonds and Climate Finance

The theorization of green bonds is that it is a hybrid instrument internalizing environment-related externalities into monetary valuation (Flammer, 2021). They are another normative deviation of the conventional bonds through earmarking proceeds to climate-friendly projects. Their mentioned signaling role is emphasized in the literature since issuers show commitment to sustainability, thus improving the elements of legitimacy and reputational capital.

Academics believe that green bonds have a signaling purpose. Issuers show their commitment to sustainability and thus develop increased reputational capital and legitimacy on the part of investors and regulators (Tang and Zhang, 2020). The latter signaling is especially crucial in the developing economies, where the lack of institutional trust may often shatter investor confidence.

2.2 ESG Integration in Capital Markets

The conceptualization of ESG integration is that institutional innovation is a process that redefines fiduciary duty. Kotsantonis and Pinney (2022) posit that by considering the ESG factors, it is becoming more material to the investment decisions, similar to the neoclassical assumptions of profit maximization. The literature also emphasizes the conflict between the voluntary disclosure of ESG practices and the use of competitive regulatory frameworks, which place the integration of ESG practices in wider contexts around institutional legitimacy.

Scholars are in discussion as to whether ESG integration is a real change or mere superficial adaptation to the environment. Some of them state that ESG factors are becoming more and more material to a risk assessment procedure and a portfolio allocation decision, and thereby transforming investment rationality (Friede, Busch, and Bassen, 2015). Some argue that there is still little integration of ESG, and that it is rather a marketing tool instead of a meaningful re configuration of finance (Dyck et al., 2019).

2.3 FinTech and Financial Inclusion

FinTech is hypothesized to be a disruptive innovation rearranging financial intermediation (Arner et al., 2020). It reduces transaction cost, increases access and decentralizes the financial service provision. Its use in financial inclusion especially in the emerging economies where penetration into the traditional banking system is poor, is accentuated in the literature. The use of FinTech in the sustainability of finance, is a kind of convergence between ecological responsibility and the digitalization of democrats.

Theoretically speaking, FinTech incorporates the financial inclusion theory. Fair development is predetermined by access to inexpensive financial services (Demirgüç-Kunt et al., 2018). FinTech increases access by other marginalized groups, such as ethnic minorities, which have limited access to traditional forms of banking, such as credit, savings, and investments.

3. THEORETICAL FRAMEWORK

As the three lenses of the paper are interrelated, three theoretical lenses have been utilized in this paper:

3.1 Financial Inclusion Theory:

The availability of financial services is theorized as a pre-condition to fair development (Demirgüç-Kunt et al., 2018). Digital green bonds and ESG-linked sites enhance the inclusion of a greater number of people through reduced barriers to entry and by allowing the marginalized to gain increased influence by participating in the process of making investment decision. Theoretically, financial inclusion theory brings to the fore the redistributive opportunities of digital finance. These tools, by increasing accessibility, redistribute opportunities of wealth creation, participation in sustainability. They are also able to uphold the concept of empowerment where the marginalized groups access their financial decision making. The theory however also highlights challenges, including the digital divide, where the populations lacking digital access are at risk of being excluded (Ozili, 2020). Financial inclusion theory, therefore, offers a positive prism through which to examine the concept of digital sustainable finance as well as a cautionary warning about the negative aspects of digital sustainable finance.

3.2 Institutional Innovation Theory:

Institutions are subject to change owing to innovations which create new governance frameworks and norms (North, 1990). The digital finance instrument is one of the exhibits of institutional innovation that inserts sustainability in financial systems and remodels the logic of capital allocation. In this sense, digital green bonds are not new products; they are institutional innovations which change the logic of capital allocation. Having introduced sustainability standards into the issuance of bonds, they transform the structures of governance, replacing the orientation of finance in its maximization profits with in ecological responsibility. Likewise, ESG-based fintech platforms can be seen as new institutional forms that incorporate sustainability analytics with financial intermediation and thus reconfigure the criteria of financial rationality.

3.3 Sustainability Transition Framework:

The theorizing of systemic transitions towards low-carbon economies is called the Sustainability Transition Framework (Geels, 2002). Such transitions are facilitated by digital green bonds and platforms that are ESG-linked, making financial systems respond to the sustainability imperatives. In this light, digital green bonds are niche innovations, disrupting regime-level operations of traditional finance. This is because by introducing sustainability by issuing bonds, they destabilize the logic of capital markets that have avenues through which systemic transitions can be facilitated. Likewise, ESG-linked platforms are niche innovation, which introduces sustainability into the digital financial ecosystem, thereby challenging

regime level practices of financial intermediation. Sustainability transition framework also focuses on the landscape level pressures, which may include climate change, regulatory requirements and societal pressures of sustainability. These pressures present spaces of possibility of niche forms of innovation to diffuse and redefine regime level practices. Landscape stressors like climate vulnerabilities and developmental demands present a promising setting upon which digital sustainable finance innovations can cultivate.

4. DIGITAL GREEN BONDS: A THEORETICAL MODEL

Digital green bonds hypothetically may exist on three conceptual planes: transparency, accessibility and normativity.

- **Transparency:** The easily verifiable allocation of funds, carried out through the issuance of the securities, based on the blockchain is likely to reduce the information asymmetry and increase the legitimacy. Transparency is not an aspect that is always merely technical but an endeavour of normativity of responsibility. It contextualises digital green bonds concerning wider discursive issues of institutional legitimacy in which trust is the keystone to adoption (Suchman, 1995).
- **Accessibility:** The accessibility implies that participation is democratized and that retail investors gain access to investments in sustainability. Accessibility is a redistributive principle, increasing the opportunities into wealth creation and sustainability participation. It places digital green bonds in the dialogue of financial inclusion and social justice.
- **Normativity:** Recurrence of sustainability requirements changes the rationale of capital allocation making finance less about profit maximization and more about ecological accountability. Normativity places digital green bonds in the discussion of the re-legitimation of the institutions, where finance is one redefined to become a collective ecological responsibility.

These dimensions combined theorize digital green bonds as the institutional innovation which reorganizes the capital market architecture.

4.1 Digital Green Bonds in Emerging Economies

Digital green bonds are considered to be especially theoretically important in the emerging economies. These economies have severe climate exposure, lack of infrastructures, and social-economic inequalities. Conventional capital markets have a way of marginalizing certain groups, and thus contributing to inequality. Digital green bonds help to democratize the access to sustainability-oriented investments due to their reduction of entry barriers and increased transparency.

In the theoretical perspective, digital green bonds reflect the ideal contextual adaptation. They also ensure that global innovations are moved to the local context and this is aligned with the institutional theory of innovation which emphasizes on the path dependency (North, 1990). As an example, the sovereign green bonds issued by State Bank of India depending on the regulatory principles of SEBI can be defined as an adaptation of international standards to domestic standards of regulation. Likewise, blockchain-based pilots in China are also used to achieve a convergence of digital technologies into the local financial environments.

Digital green bonds also have the principle multi-level alignment of the sustainability transition framework (Geels, 2002). They work with niche innovations (blockchain-based issuance) to be compatible with regime-level practices (bond markets) and landscape-level pressures (climate change, regulatory mandates). This alignment makes them be in systemic dynamics of change, which determine their success.

4.2 Challenges and Critiques

Digital green bonds in spite of their potential to transform have theoretical challenges. The greenwashing remains in the jeopardy phase where issuers do not adequately discern benefits to the environment. This further raises questions on issues of legitimacy and accountability. Digital divides also present a challenge, in which population that is not digitally accessible is at the risk of being left out. Furthermore, regulatory fragmentation brings about uncertainty and it diminishes adoption.

These issues show the dialectical issue between innovation and stability. Digital green bonds are opportunities to be transformative, yet are also ways of solving structural constraints. Their achievement will be based on regulatory harmonization, digital infrastructure, as well as normative legitimacy.

5. ESG-LINKED FINTECH PLATFORMS: CONCEPTUAL ANALYSIS

ESG-linked FinTech solutions reflect a marriage between two radicalisers: the development of digital financial technologies and binding environmental, social, and governance (ESG) principles into capital markets. These platforms act as digital ecosystems integrating sustainability analytics, a crowdfunding system and a system of decentralized finance (DeFi). They have also theoretical importance because they rearrange financial rationality, redistribute and embed normative commitments into digital finance.

5.1 Defining ESG-Linked FinTech Platforms

At the outset, ESG-related FinTech platforms refer to digital-based infrastructures facilitating the investment in a sustainability-oriented project because they entail integration of ESG measures into a financial decision-making process. They contrast to traditional FinTech solutions in two main aspects:

1. **Normative Orientation:** ESG-related platforms introduce normative criteria of sustainability into the traditional FinTech node that focuses on efficiency, reduction in costs and inclusion. They cannot be considered as neutral intermediaries; they actively influence their investment flows toward the projects, which are in accordance with the ESG standards.
2. **Analytical Integration:** ESG-linked platforms are those platforms that incorporate sustainability analytics into their operations. To put the consideration of ESG in investment decisions, they use data-driven tools to measure the environmental impact, social responsibility, and the quality of governance. This two-fold orientation places ESG-linked platforms in institutional innovation theory, in which new institutional forms emerge that redefine governance structures and forms (North, 1990).

5.2 Theoretical Dimensions of ESG-Linked Platforms

Instead, three dimensions of theorization of such systems exist: the decentralization, integration, and democratization.

- **Decentralization:** These platforms transfer power out of the old financial intermediaries to online communities. With the help of blockchain and DeFi platforms, they make peer-to-peer transactions as they do not have to depend on banks and institutional investors. Decentralization goes beyond being a technical feature and is viewed as a normative commitment to democratize the process of financial decision-making.
- **Integration:** The ESG-linked platforms incorporate sustainability measures into investment decisions. This incorporation restructures the financial rationality where investment decisions are incorporated in larger ecological and social setups. It follows the transition framework of sustainability transition where niche innovation entails reliance on normative commitments as an inscription into efficiency at regime level (Geels, 2002).
- **Democratization:** The ESG-related platforms increase entry points and allow the fractional ownership of entities, enabling participation by more than institutional investors. Sustainability-driven investments can be available to retail investors, marginalized groups and communities. Democratization puts these platforms into a context of the financial inclusion theory, where access is the pre-condition to equitable development (Demirgüç-Kunt et al., 2018).

Collectively, these dimensions theorize the ESG-linked platforms as institutional innovations that remakes the architecture of capital markets.

6. DEMOCRATIZATION OF SUSTAINABLE FINANCE: A THEORETICAL PROPOSITION

Democratization of sustainable finance is not a purely technical process of opening up access; but a normative, institutional process, redefining the position of finance in society. The traditional capital market is a closed market, where the institutional investors, sovereign wealth funds as well as large corporations dominate the market. Retail investors, marginalized communities, and minor players in the economy have left out exclusions, especially in the emerging economies where structural inequalities and infrastructures are the problems that contribute towards exclusion. Digital green bonds and ESG FinTech enable financial systems to embrace an inclusive, transparent, and sustainable financial system.

6.1 Conceptualizing Democratization in Finance

The theorization of democratization in finance can be as a redistribution, re-legitimation, and reconfiguration process.

- **Redistribution:** Democratization redistributes access to financial opportunities, allowing the marginalized groups to experience sustainability-oriented investments. This concurs with the theory of financial inclusion, which stresses the aspects of access as a precondition to a fair development process (Demirgüç-Kunt et al., 2018).
- **Re-legitimation:** Democratization re-legitimizes finance making it a part of more general social and environmental contexts. By including sustainability into financial instruments, digital green

bonds, ESG-linked platforms increase normative legitimacy, which places finance as a means of shared ecological accountability (Suchman, 1995).

- **Reconfiguration:** It also reconfigures the architecture of capital markets, away from a centralized institution dominated systems towards a decentralized community run ecosystems. This fits into the institutional innovation theory where new forms of the institution will arise which will redefine governance structures and norms (North, 1990).

Collectively, these dimensions theorize the idea of democratization being a multi-dimensional process of democratizing finance as a multidimensional process that transforms finance into an inclusive, legitimate and reconfigured system.

6.2 Digital Green Bonds as Instruments of Democratization

By reducing barriers to entry, raising levels of transparency, and making it sustainable, digital green bonds make finance a more democratic and inclusive system that can support the vital needs of numerous individuals and the planet as a whole. Fractional ownership allows retail buyers to get in bond markets redistributing access. Transparency provides verifiable-allocation of funds based on blockchain, which improves the legitimacy. The sustainability criteria are integrated into smart contracts, restructuring the financial rationality.

Theoretically, digital green bonds reflect the inclusive institutional innovation principle. They are not technical tools and are institutional innovations that will institutionalize inclusivity and sustainability in financial systems. Their spread in new economies demonstrates the potential democratizing nature of digital finance.

6.3 ESG-Linked FinTech Platforms as Ecosystems of Democratization

Ecosystems of Democratization associated with the environment and its sustainability, ought to be linked to the ESG concept. Published FinTech platforms linked to ESG are a form of democratizing finance through the decentralization of intermediation, the integration of sustainability analytics, and widening of participation. Projects that anchor their sustainability projects on crowdfunding mechanisms make the ideas accessible to the communities in which the sustainability projects are expected to take place (Dawson, 2008, p.329).

Re-legitimizing finance, ESG analytics incorporate sustainability in investment decisions. Digital infrastructure reduces the barrier to entry, to restructure financial ecosystems. Theoretically, ESG-based platforms reflect the concept of participatory institutional innovation. They are not only intermediaries but are ecosystems that facilitate participatory decision-making, placing finance in contexts of a broader debate of democracy and social justice.

6.4 Democratization in Emerging Economies

The theoretical importance of democratization of sustainable finance has a special role in the emerging economies. These economies have acute climatic vulnerability, infrastructural shortages and socio-economic imbalance. Marginalized groups are generally not included in traditional financial systems, and

thus inequality. By reducing the barrier to entry and increasing transparency, digital green bonds and ESG-linked platforms make access to sustainability-oriented investments more democratic. Theoretically, democratization in the emerging economies exemplifies the aspect of contextual justice. It puts finance into local contexts, with structural inequalities and climate vulnerabilities being addressed. It is in relation to the sustainability transition framework, where niche innovations generate systemic transitions in response to pressures at the landscape-level (Geels, 2002).

6.5 Challenges to Democratization

Regardless of their transformative potential, digital green bonds and ESG-linked platforms are burdened with issues to democratization. Digital divides pose a threat of leaving people that lack digital access, which demeans the spirit of inclusivity. The threat of undermining the legitimacy due to greenwashing poses doubt on accountability. The risk of regulatory fragmentation is of undermining reconfiguration, which in turn brings about uncertainty. These problems emphasize dialectical opposition of democratization and exclusion. Democratization cannot be automatic and it must be given wilful actions to ensure inclusivity, legitimacy and regulation harmonization.

7. POLICY AND REGULATORY IMPLICATIONS: THEORETICAL CONSIDERATIONS

On the one hand, the process of democratizing sustainable finance by digital green bonds and ESG-linked FinTech platforms is not only a technological one or a market-driven process; but will be largely conditioned by the policy- and regulation-influenced processes, on the other hand. Making regulation as an institutional framework that ensures both legitimacy and stability coupled with inclusiveness. The lack of a coherent regulation poses a threat of fragmentation, greenwashing and systemic instability with regard to innovations. In terms of the theoretical framework, the regulation can be analyzed in the framework of the institutional innovation theory, the legitimacy theory, and sustainability transition framework.

7.1 Standardization and Institutional Coherence.

One of the key regulatory questions in the sphere of sustainable finances is standardization (customary). The solutions addressing ESG and green bonds are more likely to be ravel and scatter in their definition, inconsistent disclose requirements, and special verification mechanisms. This kind of fragmentation undermines comparability, as it is considered a source of uncertainty to the investor and issuer (Baker et al., 2018).

Within the framework of institutional innovation theory, institutional coherence is critical when it comes to standardization. To attain the legitimacy and diffusion, innovations should be instilled in logical structures (North, 1990). Regulators are highly essential in attaining standardized definitions of the terms green and sustainable, so that digital green bonds and web-based platforms running on environmental standards work within a unified parameter space.

The sustainability transition framework also would have aligned standardization with niche innovations should be able to align niche innovations with regime-level practices to have a systemic impact (Geels,

2002). Niche innovations otherwise will only be marginal as they will not be able to restructure the regime level practices.

7.2 Legitimacy and Investor Protection

Financial innovations adoption is based on legitimacy. Investors should believe that digital green bonds and ESG-linked platforms actually bring about benefits in terms of sustainability. However, doubts about greenwashing, i.e. misrepresentation of environmental credentials, cast doubt on its credibility (Flammer, 2021).

In the light of the legitimacy theory, regulatory control is necessary which would ensure trust and accountability (Suchman, 1995). Rules should develop checking and disclosure procedures and sanctions against misrepresentation. Investor protection is not technical in the looser sense of the term but, rather, it is a demand of normativity or, as some critics might call it, a wish to satisfy a sense of accountability or justice.

Institutional innovation theory as well is associated with legitimacy in that the innovations will need to be seen as legitimate by the stakeholders as a means of achieving the diffusion. Regulatory frameworks to secure the protection of investors improve legitimacy, enabling its adoption and diffusion of digital sustainable finance.

7.3 Global Convergence and Cross-Border Finance

Sustainable finance is globally by its nature. Climate change is a transnational issue and capital movements are beyond national boundaries. However, regulatory frameworks tend to be rather disjointed and pose the risk of regulatory arbitrage, where players take advantage of the lack of consistency in regulatory standards across jurisdictions (Kotsantonis & Pinney, 2022).

According to the sustainability transition framework, when considering systemic transitions, global convergence is imperative. Digital green bonds a niche innovation should be in line with the global standards in order to generate regime-level changes. Regulatory harmonization between jurisdictions is necessary so sustainable finance is within coherent global frameworks and to enable cross-border investment and cooperation.

Global convergence also concurs with institutional innovation theory, where institutional consistency in cross-contexts is necessary to be legitimate and diffuse. In the absence of convergence, the innovations will risk being broken down and, therefore, have no systemic effect.

7.4 Digital Infrastructure and Systemic Stability

Digital green bonds and platforms based on ESG are built upon digital infrastructures including blockchain, distributed ledger and artificial intelligence. These infrastructures lead to regulatory complexities associated with cybersecurity, data privacy and systemic stability.

Through the institutional innovation theory, digital infrastructures are new types of institutional forms, which need to be adapted by regulation. Strategies should guarantee interoperability, cybersecurity, and resilience, introducing a sense of stable in digital finance systems.

Systemic stability is also in line with the sustainability transition framework where transitions should strike a balance between innovation and resilience. Digital sustainable finance innovations should be institutionalized in the infrastructures of stability to enable them to bring about systemic effects.

7.5 Policy implications for Emerging Economies.

In the emerging economies, regulation systems experience certain challenges. Institutional weakness, inadequate infrastructures and social-economic inequalities contribute to regulation. However, such economies have acute climate vulnerabilities as well, hence the need to adopt sustainable finance.

Theoretically speaking, regulation in the developing economies reflects the concept of contextual adaption. The regulatory frameworks have to implement global norms to local situations so that inclusiveness and legality is achieved. As an example, the SEBI guidelines on green bonds as an example of the country-specific adaptation to universal codes to which domestic regulations are realigned.

Regulation that is evolving in emerging economies also reflects the principle of justice which places finance in the context of debates on justice and inclusiveness by broader societal standards. Regulation frameworks should also provide that democratization of sustainable finance has included structural inequalities so that the marginalized groups could be involved in the sustainability-driven investments.

8. CHALLENGES AND RISKS: THEORETICAL REFLECTIONS

Although digital green bonds and ESG-linked FinTech platforms represent potential transformations, their proliferation and uptake cannot take place without facing some challenges. The dialectical process of democratizing sustainable finance is both a process of tension between the processes of innovation and maintenance, as well as inclusion and exclusion, legitimacy and opportunism. To know the limits but opportunities of digital sustainable finance in a nascent economy, it is necessary to theoretically reflect on these issues.

8.1 Greenwashing and Legitimacy Crisis

Greenwashing, the distortion of environmental, or social benefits, is one of the greatest threats of sustainable finance. Issuers can issue bonds or projects as green or sustainably without any substantive basis, which harms trust and legitimacy among investors (Flammer, 2021).

The greenwashing is a legitimacy crisis on the basis of the legitimacy theory. To gain acceptance, innovations should be seen by the stakeholders as legitimate (Suchman, 1995). Greenwashing fatalistically negates such perception dismantling the trust and credibility.

Another point that institutional innovation theory brings to our fore is the significance that legitimacy has in diffusion. Digital green bonds and ESG-based platforms stand a risk to be viewed as a sham in a bid to meet global safety and sustainability targets (Hensemann 2). The importance of regulatory control, standardization of definitions and independent validation, therefore, becomes crucial to mitigate the prevalence of greenwashing and warrant its legitimacy.

8.2 Digital Divide and Structural Exclusion

The other relevant obstacle is the digital divide. As digital finance reduces the barriers to entry, there are still populations that do not have access to digital finance. One group that is prone to structural exclusion is rural communities in emerging economies, women, and low-income groups (Ozili, 2020).

In terms of the financial inclusion theory, the digital divide is a structural imposition to inclusivity. To democratize finance, technological innovation is not the only contributor but infrastructural improvement and social empowerment. In the absence of dealing with the digital divide, digital sustainable finance risks re-enforcing preexisting inequalities, as opposed to reducing them.

The importance of inclusiveness in regard to the systemic transitions is also highlighted in the sustainability transition framework. Any kind of transition that does not involve the marginalized groups will be partial and unstable. There is therefore a need to address the digital divide to enable democratization of sustainable finance to be truly inclusive and equitable.

8.3 Speculative Volatility and Systemic Risk

Digital green bonds and platforms anchored in the ESG often have tokenization and decentralized finance infrastructures. Although these mechanisms can promote falling, the situation presents speculative volatility risks. Because tokenized assets are subject to bubbles, where the value rises solely due to price gains as well as speculative demand, tokenized assets face the risk of bubbles (Arner et al., 2020).

Based on the institutional innovation theory, speculative volatility is a factor posing a problem of stability. Innovations should be discreet with transformation and strength. Given that, innovations will put at risk the systemic trust and legitimacy.

The sustainability transition framework also places the significance of resilience in the system transitions. Destabilized transitions caused by volatility are at risk of reversed or undermined transitions. The areas of regulation, risk management and systemic defences are thus crucial to counter volatility and bring stability.

8.4 Regulatory Fragmentation and Arbitrage

The other influential challenge is regulatory fragmentation. Lack of standardisation between jurisdictions poses risks of regulatory arbitrage, where participants take advantage of discrepancies to maximise profit at the expense of a sustainable environment (Kotsantonis and Pinney, 2022).

In the light of the institutional innovation theory, fragmentation compromises institutional coherence. The innovations should be incorporated into consistent structures in order to be legitimate and diffuse. Consensus in regulation across borders is thus indispensable in order to provide consistency and avoid arbitrage.

Multi-level alignment is also important as included in the sustainability transition framework. To become systemic in the sense of niche innovations, they must be integrated with regime-level practices, landscape-level pressures. Fragmentation compromises this alignment, and hinders the transformative potential of digital sustainable finance.

8.5 Ethical and Social Risks

Besides technical and regulatory risks, there are ethical and social risks to digital sustainable finance. Potential issues of justice and accountability concern these issues of data privacy, surveillance and algorithmic bias. Data-oriented analytics-driven platforms that relate to ESG may recreate biases, diminishing inclusiveness and fairness (Zuboff, 2019).

Normative legitimacy will be undermined due to ethical hazards, in the perspective of the legitimacy theory. Not only can the finance be efficient and sustainable, it has to be just, responsible as well. Ethical risks thus need to be addressed so as to ensure that democratization of sustainable finance is in tandem with the greater social values.

9. CONCLUSION

Digital green bonds and ESG-related FinTech platforms, as an institutional innovation, have been identified with an exploration of their theoretical terms and conditions alongside their correlation with the concept of democratization, transparency, and inclusiveness in sustainable finance. They are not technical tools, but conceptualized tools that remake the architecture of capital markets, introduce sustainability to rationality of financial decision-making, and open the participation of other than the elite investors.

To-the-one-hand, digital green bonds and ESG-linked FinTech platforms, are not only financial innovations, to-the-other-hand, they are conceptual catalysts of the democratisation of the concept of sustainable finance in the emergent economies. They bring out transparency, accessibility and normativity taking financial rationality out of the box, placing the field of finance within the context of more general arguments about sustainability, justice and institutional change.

They are pervasively capable of transforming but this should be modelled upon the legacies of legitimacy, inclusivity as well as the ability to multiply the levels of multi-level alignment. To ensure that the process of democratization of sustainable finance is indeed inclusive, legitimate and stable the aforementioned issues must be dealt with: greenwashing, digital divides, volatility and regulatory fragmentation.

To sum up, digital sustainable finance is a paradigm shift of the role of finance in the society. It does not create a strictly limited perspective of finance as the instrument/ tool of profit-maximization, but as a tool/instrument to shared ecological responsibility and social justice. This paradigm shift is not only based on a developmental need dependent on the structural inequalities in the emerging economies, but also a normative one.

REFERENCES:

1. Arner, D. W., Barberis, J., & Buckley, R. P. (2020). FinTech and RegTech: Impact on regulators and banks. *Journal of Banking Regulation*, 21(4), 1–14. <https://doi.org/10.1057/s41261-019-00104-3> ([doi.org in Bing](#))
2. Baker, M., Bergstresser, D., Serafeim, G., & Wurgler, J. (2018). Financing the response to climate change: The pricing and ownership of U.S. green bonds. *NBER Working Paper No. 25194*. National Bureau of Economic Research. <https://doi.org/10.3386/w25194>

3. Chen, Y., & Volz, U. (2022). Blockchain-based green bonds: Innovations in sustainable finance. *Sustainability*, 14(12), 1–15. <https://doi.org/10.3390/su14127023>
4. Climate Bonds Initiative. (2025). *Green bond market summary 2024*. London: CBI. Retrieved from <https://www.climatebonds.net>
5. Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution*. Washington, DC: World Bank. <https://doi.org/10.1596/978-1-4648-1259-0> ([doi.org in Bing](#))
6. Dyck, A., Lins, K. V., Roth, L., & Wagner, H. F. (2019). Do institutional investors drive corporate social responsibility? International evidence. *Journal of Financial Economics*, 131(3), 693–714. <https://doi.org/10.1016/j.jfineco.2018.08.013> ([doi.org in Bing](#))
7. Flammer, C. (2021). Corporate green bonds. *Journal of Financial Economics*, 142(2), 499–516. <https://doi.org/10.1016/j.jfineco.2021.01.010> ([doi.org in Bing](#))
8. Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210–233. <https://doi.org/10.1080/20430795.2015.1118917> ([doi.org in Bing](#))
9. Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case study. *Research Policy*, 31(8), 1257–1274. [https://doi.org/10.1016/S0048-7333\(02\)00062-8](https://doi.org/10.1016/S0048-7333(02)00062-8) ([doi.org in Bing](#))
10. Kotsantonis, S., & Pinney, C. (2022). ESG integration in investment management: Myths and realities. *Journal of Applied Corporate Finance*, 34(2), 1–12. <https://doi.org/10.1111/jacf.12491>
11. North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511808678> ([doi.org in Bing](#))
12. Ozili, P. K. (2020). Advances in financial inclusion. In *Financial Inclusion: Challenges and Opportunities* (pp. 1–20). Springer. https://doi.org/10.1007/978-3-030-38785-9_1 ([doi.org in Bing](#))
13. Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3), 571–610. <https://doi.org/10.5465/amr.1995.9508080331> ([doi.org in Bing](#))
14. Tang, D. Y., & Zhang, Y. (2020). Do shareholders benefit from green bonds? *Journal of Corporate Finance*, 61, 101427. <https://doi.org/10.1016/j.jcorpfin.2020.101427> ([doi.org in Bing](#))
15. Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. New York: PublicAffairs.

JEL Classification Codes

Journal of Economic Literature (JEL) codes for this paper are:

16. **G23**: Non-bank financial institutions; Financial instruments; Institutional investors
17. **O16**: Financial markets; Saving and capital investment; Corporate finance and governance
18. **Q56**: Environment and development; Sustainability; Environmental accounts and accounting
19. **G28**: Government policy and regulation
20. **O33**: Technological change: Choices and consequences; Diffusion processes