

## THE RISE OF GREEN FINTECH: IMPLEMENTING SMART CONTRACT AND SUSTAINABLE FINANCIAL SERVICES WITH AI AND IOT

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### Abstract

The union of sustainability and financial technology (FinTech) has promoted green fintech, which turns out to be an innovative field covering modern technologies to address challenges in environment with financial solutions. This study is based on systematic review of evolution of green fintech based on transformative roles of “Internet of Things (IoT), Artificial Intelligence (AI) and smart contracts to develop sustainable services. With an in-depth insight of case studies and recent studies, this study examines how ESG assessments can be improved by AI, enabling sustainable strategies and promoting sustainable lending practices. This study investigates the applications of AI in supply chain transparency, monitoring in environment and integrating smart grid, focusing on sustainable finance. This study explores implementing smart contracts for sustainability, along with their potential in carbon credit trading, green bonds, and renewable energy sectors. This study addresses major challenges ahead of green fintech, such as, privacy issues, data quality, and regulatory issues, proposing future research directions. It is found that integrating smart contracts, AI and IOT in green fintech can promote the shift towards sustainable economy by embedding environmental concerns into financial decision-making at every level. This study contributes to the rising literature on sustainable finance, offering knowledge for policymakers, practitioners, and researchers. It requires multifaceted approach to deal with socio-economic, regulatory, and technological challenges, making a way for more advanced and sustainable financial environment.

**Keywords – Sustainable Finance, Internet of Things, Smart Contracts, Artificial Intelligence, Supply Chain Transparency, Fintech**

### 1. Introduction

The relationship between environmental sustainability and FinTech have led to a rise in green fintech, i.e., a new paradigm in finance industry. This innovative field has the junction of urgent environmental and technological needs, offering novel solutions to more pressing challenges (Nassiry, 2019). Fintech has literally transformed different aspects of financial services, i.e., from payments to investment strategies. P2P lending platforms, mobile banking apps, and online assistants have been very common, redefining both industry practices and customer expectations (Lee and Shin, 2018). On the other hand, global community has been aware of important need for environmental protection and sustainable growth. Paris Agreement (2015) has set ambitious goals to minimize greenhouse gas emissions and reducing rise in global temperature, focusing on the urgent climate action. Green fintech has become the convergence of those trends, using innovations to address challenges related to environment with financial systems. This field covers different applications, i.e., from AI-based investment platforms to carbon credit trading platforms (Arner et al, 2020). Green fintech, AI, and IoT have created more transparent, efficient, and eco-friendly financial systems. The possible effect of green fintech goes beyond financial industry. By promoting the flow of capital for sustainable businesses and projects, these approaches are very helpful to move to carbonless economy. With tools for managing and measuring effects on environment, green fintech can enable people and businesses to make more informed decisions related to carbon footprint (Nishant et al, 2020). However, implementing and developing green fintech solutions have a lot of challenges. Issues like energy consumption of technologies, data privacy, inclusivity, and regulatory compliance should be addressed well (Truby et al, 2022). In addition, rapid technological pace often outdoes regulations, forming the need for forward-thinking and adaptive policies (Buckley et al, 2020). This study explores the landscape of green fintech, focusing on IoT, AI, and smart contracts. It examines how to apply these technologies in sustainable finance, determining future directions.

### 1. Literature Review

The rise of green fintech leads to significant growth of finance sector, which aligns innovation with environmental challenges. To gain proper understanding of the importance of development, it is worth knowing driving forces. Integrating Green Fintech and IoT in smart cities have a transformative approach for managing resources to address the sustainability issues and inefficiencies posed by significant urban growth. With real-time processing of data and interlinked sensors, IoT approaches enable proper management and monitoring of urban resources like water, energy, transportation and waste. On the other hand, green fintech uses innovations for sustainability, such as green banking, green investments, and carbon credit trading. Adaramola et al (2024) explored the synergy of green fintech and IoT to improve resource management in smart cities, providing financial incentives for green practices, dynamic models, and enhanced transparency. They conducted case studies from Singapore and Amsterdam and found practical benefits and applications of integration. Irrespective of challenges based on costs, data privacy, and regulatory models, Green Fintech and IoT redefines urban resource planning, reduces carbon footprint, efficiency, and better quality of living for city dwellers. Juned and Usmani (2025) delve into significant role of AI, blockchain, and other latest technologies in redefining green finance. They examined symbiotic relationship between technology and finance and explored advancements playing a vital role in promoting responsible financial practices and sustainability. The study gives an insight to current landscape of environmental challenges for sustainable financial services. Then, it examines roles of AI, blockchain, and other technologies related to green finance, focusing on their potential and unique capabilities. This study explores ethical thoughts related to AI in green finance and synergies for responsible AI applications and reducing biases. This study discovers the interaction between combined potential and technologies to redefine the landscape of finance sector. For instance, integrating AI and blockchain could create smart contracts to enforce and execute sustainable agreements automatically. This fusion can reduce costs, rationalize processes, and amplify the effect of green finance. Megat et al (2024) investigated the adoption of financial technology on sustainability and sustainable growth of SMEs. The root cause is that Malaysian businesses are uncertain in fully adopting this technology, irrespective of rising attention of exposure of fintech in business sectors. This study fills the much-needed research gap among the potential for fintech and their implementation with two theoretical methods – Upgraded version of Technology Acceptance Model (TAM) for fintech and “Research-based view (RBV)” model for sustainable growth. Along with it, this study offers empirical understanding for sustainable growth. Dixit and Jangid (2025) examines how to solve major challenges related to fintech by combining smart contracts, blockchain, and machine learning in context of transparency, security, and operational performance. The study considers the impact of these technologies on legal frameworks, compliance with regulations, and ethical misunderstanding. The research approach analyzes studies over ten years on blockchain in fintech, focusing majorly on smart contracts, decentralized ledgers, and ML for data analysis. Findings of the study have been presented visually with data visualizations and diagrams showing improvements in security, operations, and cost efficiency. Chatterjee (2025) explores the combination of smart contracts, blockchain, and ML to address transparency, operational efficiency, and security challenges in fintech. It discovers the inferences of those technologies for regulatory models, ethical governance, and compliance. Blockchain offers immutable and decentralized ledger to improve security and transparency in transactions. Smart contracts are known to save operational costs, automate processes, and improve accessibility to populations.

#### 1.1. Research Objectives

- To discuss the recent developments in context of Green Fintech, Digitalization and Sustainable Development Goals
- To explore the implementation of IoT, AI, and Smart Contract for providing sustainable financial services

#### 2. Methodology

This chapter outlines research approach and methods adopted to discuss existing studies on integration of smart contracts, blockchain, and machine learning in Fintech industry. The methodology covers research approach, keywords used, databases, and inclusion and exclusion criteria for data collection.

#### 2.1. Research Approach

This study adopts systematic review approach, which prioritizes peer-reviewed articles published in respected journals. This study will focus on integration of smart contracts, IoT and machine learning in green fintech. Sources were based on relevance of research approach, impact factor

and methodological rigor of journals. This survey also includes grey literature, including white papers and industry reports to capture practical implications and emerging trends. It provides balanced depiction of practical and academic knowledge. It is based on systematic review to provide in-depth review of technological applications in green finance. Databases were searched on the basis of combination of keywords in abstract, title, and complete text. The review is based on journal articles, academic papers, and research papers with thorough research on Google Scholar, Scopus and other databases.

**2.2. Databases adopted**

The study was conducted with various reputable databases to ensure diverse and in-depth collection of studies. Here are some of the primary databases –

- **SpringerLink** – It is an inclusive resource for scientific documents like books and journals in different domains.
- **IEEE Xplore** – It is a major digital library for research in technology and engineering.
- **Science Direct** – It is a prominent database to collect peer-reviewed articles in technology, science, and medicine.
- **Google Scholar** – This is the official search engine particularly for finding scholarly literature across several disciplines and formats.

**2.3. Keywords used**

Some of the keywords used are Green Technology, Green Finance, Machine Learning, Sustainability, Risk Management, Artificial Intelligence, Crowdfunding, Smart Contract, AI, and IoT. Articles published from 2013 to 2025 were selected for research purposes.

**2.4. Inclusion and Exclusion Criteria**

Table 1 lists research criteria adopted for this study.

**Table 1 – Research Criteria**

Inclusion Criteria	Exclusion Criteria
 Published between 2013 and 2025	 Published before 2013
 Published in English	 Published in other languages
 IoT, AI & smart contracts in finance sector	 Not related to finance sector
 Published in peer-reviewed journals	 Not in peer-reviewed journals
 Available in full text	 Partial or incomplete studies

**3. Data Analysis**

Green FinTech, Digitalization and Sustainable Financial Services Analysis

**Table 1: Recent Developments in Green Fintech, Digitalization and SDGs Sample Size = 80 respondents (bankers, fintech professionals, researchers)**

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean Score
Green FinTech is increasing sustainable financial investments	28	30	12	7	3	3.91
Digitalization improves financial inclusion and sustainability	26	32	11	8	3	3.88
FinTech solutions support achievement of SDGs	24	31	15	7	3	3.83
Green finance platforms encourage environmentally responsible investments	22	33	13	9	3	3.78
Government policies support sustainable fintech innovations	18	29	17	11	5	3.55

**Interpretation:**

The results indicate a positive perception of Green FinTech and digitalization in promoting sustainable development. Most respondents agreed that digital financial technologies facilitate green investments and financial inclusion, which contribute toward achieving Sustainable Development Goals (SDGs). The highest mean score (3.91) indicates strong agreement that Green FinTech is increasing sustainable financial investments.

**Table 2: Implementation of IoT, AI and Smart Contracts for Sustainable Financial Services Sample Size = 80 respondents**

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean Score
AI improves risk assessment in sustainable financial services	27	29	13	7	4	3.85
IoT enables real-time monitoring of green financial projects	23	31	14	9	3	3.78
Smart contracts increase transparency in financial transactions	25	30	12	9	4	3.79
Integration of AI, IoT and blockchain can enhance sustainable finance	28	32	10	7	3	3.94
Financial institutions are ready to adopt these technologies	17	26	19	12	6	3.45

**Interpretation:** The findings reveal strong acceptance of emerging technologies in sustainable finance. Respondents believe that AI improves risk assessment and decision-making, while IoT enables monitoring of financial and environmental activities in real time. Smart contracts were also perceived as improving transparency in financial transactions. The highest mean score (3.94) shows strong agreement that integrating AI, IoT and blockchain technologies can significantly enhance sustainable financial services.

**2.5. Digitalization and Sustainable Development Goals – Platforms of Green Fintech**

Modern studies have observed a prolonged co-integration among economic development, financial growth, and innovation (Qayyum et al, 2025). Green Fintech is among the factors contributing to stable financial bodies in developing countries. Adopting Green Fintech enables financial systems to come up with sustainability under the impact of innovation of digital finance (Vuong et al, 2025). Green finance is the concept referring to open innovation while using technology in financial services for supporting sustainable growth and green economy, such as, digital

platforms and tools to promote green investment (Singh, 2022). This concept has come from joint efforts by financial bodies. Supervisors and government bodies, Fintech, and global organizations have integrated digital solutions for sustainable growth in finance. Digital tools are widely used to achieve sustainability goals (Figure 1). Green finance is well-regarded as the multidimensional concept covering the whole range of solutions for financial intermediation, adopting target risk management, and regulatory functions for generating positive impacts in the environment (Tamasiga et al, 2022). Digitalization has opportunities inherent in chains of green digital finance and they promote sustainable growth to achieve “Sustainable Development Goals (SDGs) in the UN (Mpofu, 2024). With green financial services integrated in service delivery and production chains, green financial technologies can help achieve different SDGs like clean and affordable energy, industry innovation, decent economic growth, responsible production and consumption, sustainable communities, partnerships and climate action for the goals (UN Sustainable Development, 2024). Some of the major areas of green Fintech growth are new applications of blockchain in all areas of sustainability in the environment, with support from eco-friendly and socially responsible policies, and governments and regulators encouraging the growth of green products (Wasan et al, 2021; Mejia-Escobar et al, 2020). Green Fintech enables green finance, belonging to sustainable finance. But there is a lack of research gap on green fintech and green finance (Puschmann and Quattrocchi, 2023).

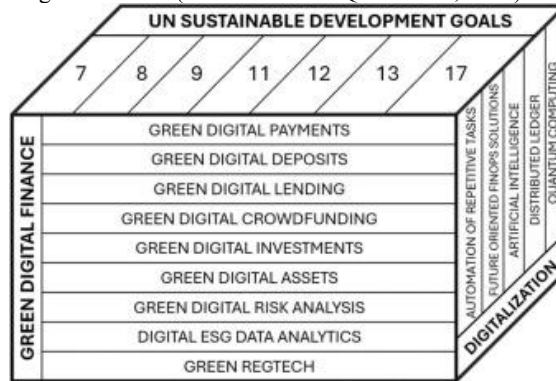


Figure 1 –Aligning Green Digital Finance with UN SDGs and Digitalization

Source - Puschmann and Quattrocchi (2023)

Green finance promotes effective decision-making and data analysis while using open innovation to ensure transparency, accessibility, and efficiency of financial system to make effective climate change and environmental protection reforms (Hyun, 2022). Open-source computing has been a conceptual framework and strong tool for open engineering (Yun et al, 2020). Green digital finance embraces new innovative applications and is still evolving. Currently, it covers digital banking, green investments, Fintech, reporting tools, sustainable lending, and regulatory tech. Figure 2 illustrates the types of Green Fintech platforms.

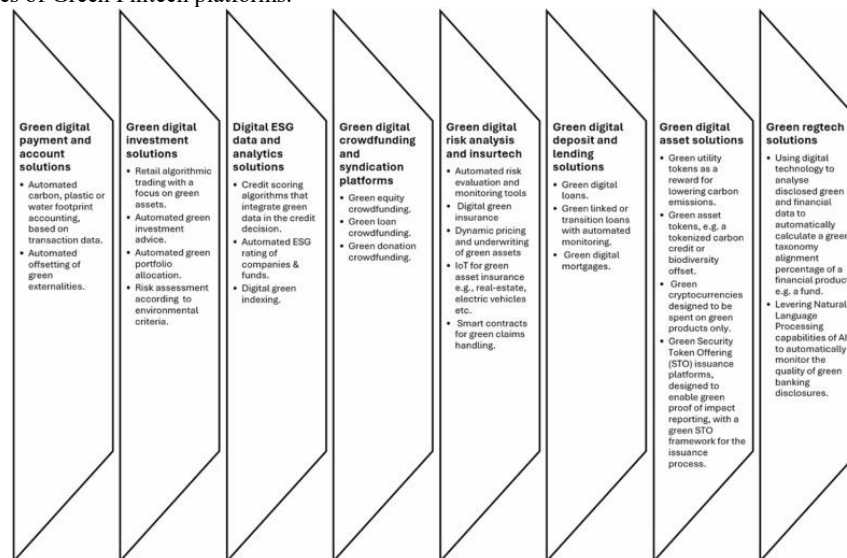


Figure 2 – Types of Green Fintech platforms

Source – GDFA (2024)

Green fintech offers an exclusive range of online solutions for transitioning traditional systems to green principles. It provides open innovations to promote business-to-consumer (B2C) and business-to-business (B2B) interactions in financial services, benefitting reduction of carbon emissions in future and resource efficiency (Thanapongporn et al., 2024). With modern technologies, Green Fintech can address challenges related to carbon footprint with financial solutions (Elias et al, 2024). Digital platforms consist of core areas to ensure proper functioning of financial intermediation like appealing resources in executing transactions in financial market with least carbon footprint. Blockchain can redefine how financial services are offered to the public and promote new ways to provide financial services (Furnari and Lener, 2022). With tokenization and cryptocurrency of rewards, indirect reward financing enables new financing options for sustainable “security token offering (STO)”. Overall, green finance includes using open technologies to boost investments in sustainable projects, including crowdfunding for green projects, verifying investments and blockchain-based tracking, complying with sustainable standards and using AI in investments for managing environmental and financial risks. In the financial sector, digital innovation can play a vital role in reducing carbon emissions and SDGs by promoting green consumption and energy production. Building innovation, improving strategic partnerships in digital infrastructure, and collaboration are needed for deep data analytics (Angreani et al, 2024).

**2.6. Implementing Smart Contract, IoT and AI for Sustainable Financial Services**

IoT, AI and Smart Contract are redefining the finance sector by offering real-time information and enabling interlinked, smart systems. In terms of green fintech, these technologies are very important in improving sustainability and enabling more accurate assessments of environmental impact. This section covers implementation of these technologies for sustainable financial services.

**2.6.1. Implementing IoT for Finance Sector**

IoT devices are very important for environmental monitoring in real-time, offering important insights needed for sustainable initiatives. These devices transmit and gather data on several parameters, enabling more informed risk assessment and decision-making in finance industry (Bibri, 2018). One of the major applications in monitoring environment is climate risk tracking. Across various geographical locations, IoT sensors deployed can track sea levels, weather patterns, and other critical indicators in real-time. This constant stream of data is helpful for financial bodies to track climate risks accurately on investments. For example, insurance companies and banks can rely on this information to determine the possible effect of climate change on agricultural investments or real estate in coastal regions, enabling them to make underwriting and lending decisions (Kshetri, 2021). Tracking carbon emissions is another important area where significant effect can be made by IoT. IoT devices can report and measure carbon footprint from different sources, such as, industrial buildings, processes, and transportation. It promotes more accurate offsetting and carbon accounting, which is needed for financial bodies dedicated to minimize carbon footprint (Jia et al, 2023). Immediate adjustments are made in real-time nature of data in operations and reducing emissions and promoting more accurate reporting for “environmental, social, and governance (ESG)” initiatives. In this age of natural resource management, valuable data is available in IoT sensors for conservation and sustainable agriculture projects. These sensors can track soil conditions, water usage, and forest cover, providing knowledge to provide better practices for resource management (Saiz-Rubio & Rovira-Más, 2020). For instance, IoT devices can optimize irrigation in agriculture, enhancing crop yields, and minimizing water waste. Sensors can track changes in forestry and biodiversity, promoting efforts for conservation and helping more effective resource allocation. IoT plays a vital role in developing smart grids, which are important to integrate green energy sources and enhancing energy efficiency. IoT is used by smart grids in various keyways to improve effectiveness and sustainability of energy consumption and distribution. For IoT in smart grids, one of the key applications is demand response. Real-time communication is enabled by IoT devices between energy consumers and providers, reducing peak loads and optimizing power distribution (Alonso et al, 2021). This 2-way system of communication enables more efficient use of energy and prevention of grid overloads. For example, smart meters may offer real-time data on power consumption, enabling utilities for supply adjustment on the basis of demand instead of estimates. The advancement of IoT is redefining management of buildings, ushering in new age of sustainable urban development and energy efficiency. This transformation is not just incremental, but it also represents a significant change in how to operate and conceptualize over built setting (Bahl et al, 2024). Energy optimization is at the core of this revolution. Powered by IoT sensor network, smart building systems redefine patterns of energy consumption. These systems dynamically and constantly monitor to adjust heating, lighting, and cooling in real-time, responding to the needs of occupants and environmental conditions (Dong et al, 2019).

**2.6.2. Implementing Smart Contract**

Self-executing contracts or smart contracts with agreement terms have been written directly into code. These have been the strong tool in green fintech. By enforcing and automating agreements without mediators, smart contracts can cut costs, improve transparency, and comply with sustainable initiatives. As blockchain powers smart contracts, it has redefined the dynamics of finance sector by making operations smoother, approving security, and transparency. As it is possible to encode the agreements with self-enforced agreement terms, they enabled improved efficiency in various processes. A case in point is settlement of transactions and completely automated payment which reduces dependence on intermediaries and improves transactional process. Smart contracts can help in lending and borrowing across peers by setting provisions to specify the course of loan, including providing collateral at any time in decentralized finance systems (Li et al, 2024).



Figure 3 – Components of Smart Contracts used in Fintech  
Source – Chatterjee (2025)

Integrating smart contracts into the realm of sustainability-based bonds and green bonds marks a significant step in sustainable finance. Along with making processes smoother, this innovative approach redefines the way we manage and structure these important instruments that can fund sustainable projects and incentivize sustainability (Schletz et al, 2020). Automation of coupon payments is at the core of this transformation. This feature adds a new aspect of accountability to bonds associated with sustainability. Usually, traditional bonds fixed interest rates, but bonds associated with sustainability bring a dynamic aspect by aligning interest rates to achieving specified ESG goals. This concept is brought to new heights of transparency and efficiency by smart contracts. An example is a large company issuing sustainable bond with goal of minimizing carbon emissions over 5 years by 30% (Chan, 2021). It is possible to program a smart contract to adjust the interest rate of the bond on the basis of overall growth of the company for this target. If company achieves the milestones of its annual emission control, smart contract could reduce interest rate automatically, rewarding for sustainability efforts. This evolution addresses long-term challenges to improve transparency, efficiency, and accessibility in a different way (Al Sadawi et al, 2021). Automation of verification is at the core of this revolution for offset projects. On the other hand, verifying the balanced projects can be subjective and time-consuming process, depending majorly on manual reporting and inspections.

**2.6.3. Implementing AI in Green Fintech**

Digital transformation has reshaped traditional banking systems in a way that they have scalable, agile, and cloud-based banks. Manual, low-scale, and traditional infrastructure couldn't support large-scale or real-time financial transactions (Guang-Wen & Siddik, 2023). Banks have been disruptive with advancement of cloud computing, enabling them to deploy on the scale financial services are powered by data and AI. These are needed for managing ESG green finance and compliance as ESC compliance and green finance have improved cybersecurity and real-time monitoring of transactions along with flexible storage of data (Zaid et al, 2024). Digital platforms and neobanks like Monzo, Revolut, and N26 have native infrastructure as per seamless integration of sustainable banking practices (Taghizadeh Hesary and Hyun, 2022). Similar to digital banking, AI has been the core of automated decision-making, sustainable investments, and enhanced fraud detection (Rahman et al, 2024). AI models are used to evaluate ESG risks and sustainability profile of investors, borrowers, and corporate bodies can be assessed with AI models (Geetha and Biju, 2024). When it comes to support climate risks, AI is helpful for financial bodies aligning with investment or credit issuance with eco-friendly and carbon resilient sectors (Fu et al, 2023). Virtual financial advisors and AI chatbots offer real-time knowledge on how customers act on carbon footprints (Mhlanga, 2022). As ML models can also detect fraud claims and anomalies in ESG reporting, greenwashing can be reduced in financial markets (Clark et al, 2018). Fintech has been the key pillar of successful projects in this age of sustainable finance. Big data, AI, and blockchain can be deployed to produce resilient, transparent, and data-based financial system. Using AI tools can model climate risk and offer ESG score for making informed decisions based on sustainability (Macchiavello & Siri, 2022). With the availability of “blockchain-based decentralized finance (DeFi)”, auditable and tamper-free ESG transactions, and green bond have been more reliable (Fu et al, 2023). Meanwhile, big data analytics take a lot of financial and environmental data to quantify the impacts of long-term sustainability in terms

of investment and lending (Geetha and Biju, 2024). Pilot zones related to green finance use ESG scoring based on big data to track compliance and promote sustainable initiatives (Xiao et al, 2024). ESG investing needs real-time data offering real-time updates on carbon markets, climate risk indicators and sustainability indices (Zaid et al, 2024). These systems enable asset managers and financial bodies to track ESG performance of organizations in real-time and guarantee that global standards are reflected in their investments. In addition, they can detect ESG-based fraud and greenwashing (Guang-Wen & Siddik, 2023). In addition, blockchain-based ESG has further gained trust of investors by protecting immutability and verifiability of sustainability claims with decentralized ledgers (Taghizadeh-Hesary & Hyun, 2022). Robo-advisory investment on ESG fills the gap related to inaccessibility to investment in ESG with automated, personalized green portfolio management for institutions and people (Rahman et al, 2024). These online tools are helpful to enhance sustainable strategies for investment along with meeting global environmental benchmarks. These days, credit scoring models are applied by AI to determine carbon footprints, sustainability activities and energy consumption of a borrower before loan is approved (Rahman et al, 2024). These models also cover non-financial factors related to ESG, such as, data based on corporate emissions, sustainability in supply chain, and efficiency of water usage to ensure funding going to sustainable initiatives (Guang-Wen & Siddik, 2023). AI analytics related to climate risk enable investors and banks to predict and run financial effects of climate disturbance on the basis of carbon and regulatory market indicators and historical weather (Zaid et al, 2024).



Figure 4 – Sustainability Banking driven by Innovative Fintech Services

Source – Gupta (2025)

### 3. Discussion and Conclusion

Blockchain, AI, big data, and decentralized ledger are some of the promising platforms redefining the digital landscape of sustainable finance that combines innovation in fintech to boost transition to climate-based banks. With technological advancements, compliance with ESG has been automated and it is possible to build real-time models for climate risk analysis and sustainable financial products can be exposed to different user groups. Responsiveness, efficiency, and accuracy of sustainable decision-making have been enhanced by using predictive climate and AI-based risk management. Blockchain technology has been prevalent to revolutionary rise in traceability and transparency of issuing green bond in the ESG disclosure and spot carbon markets. Big data analytics (BDA) has enabled fraud detection in financial organizations, based on data-based investment strategies. Based on the convergence of IoT, AI, and smart contract, green fintech has been evolved to redefine the landscape of green finance. These approaches enable more accurate assessments of ESG, promoting sustainable strategies, redefining regulatory compliance, and improving green lending in finance sector. AI can identify complex patterns and process big data, which are highly important to quantify and understand factors related to sustainability. IoT fills the gap between digital and physical worlds, offering real-time data. It is important to track carbon footprints and verify green practices. Smart contracts enforce sustainability contracts, automate and improve efficiency and transparency in green programs. Green finance promotes investment in eco-friendly projects related to sustainability with Fintech. Financing is very vital to achieve SDGs and innovative approaches provide support needed in financing, risk management, and investment decision-making. Level of technology application and efficient digitalization in some EU nations has not been reached successfully. Most important gaps lie in digital transformation of organizations and digital skills. In context of financial activity, more organic and wider integration of green finance comes from the knowledge of consistency in specific time perspective, when the effect of economic activities on the risks and climate is related to climate change. Hence, for green finance, ideal framework is required to fulfill SDGs. Public engagement and involvement are needed along with open innovation approach to improve the effect of green finance on sustainable goals, focusing on mechanisms to adopt open innovation in interactions related to stakeholders, offering collaboration with open platform models for sharing knowledge. It is revealed that regulators related to EU must come up with glossary of sustainable products, their criteria, characteristics, and parameters of compliance, come up with green finance, and compliance parameters.

#### 3.1. Future Research Directions

Looking at the future, constantly developing green finance can enhance the transition to greener global economy. By pursuing the research directions, finance sector can make the most of technology and bring positive change to society and the environment. Along with creating new services or financial products, green fintech is also related to reimagining the role of finance fundamentally. As these technologies are adopted most widely and mature, they can embed considerations related to sustainability into every decision, i.e., from individual decisions of customers to long-term corporate investments.

#### 3.2. Recommendations

Powered by IoT, AI, and smart contracts, rise of green fintech presents significant opportunity to address pressing issues related to environment and promote sustainable growth. A multi-stakeholder, coordinated approach brings together tech companies, financial bodies, policymakers, global organizations and academia to make the most of this potential. It is recommended for regulators and policymakers to prefer the growth of adaptive models which can stay ahead of rapid advancements. Adopting specialized sandboxes can experiment while managing risks for green fintech innovations. In the same way, efforts will be needed to standardize the frameworks for sustainability reporting to improve comparability and data quality to address the challenges observed in the analysis. Financial bodies must invest majorly in IoT and AI to improve risk assessment, ESG analysis, and sustainable strategies. Traditional institutions can integrate modern solutions by working with innovative startups into their current offerings. These institutions should develop inclusive fintech products to fulfill the needs of underserved communities.

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