Int. j. adv. multidisc. res. stud. 2025; 5(5):1259-1266

Received: 03-09-2025
Accepted: 13-10-2025

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

The Role of Financial Technology (Fintech, Blockchain) in Promoting Green Finance

[1] Hoang Thi Tham, [2] Nguyen Thi Binh
[1, 2] Hanoi University of Natural Resources and Environment, Hanoi, Vietnam

DOI: https://doi.org/10.62225/2583049X.2025.5.5.5104
Corresponding Author: **Hoang Thi Tham**

Abstract
Along with the development of the Fourth Industrial Revolution (Industry 4.0), more and more consumers are using Fintech products and services. The term “Fintech” is used for all businesses using the internet, mobile phones, cloud computing technology and open-source software to improve the efficiency of banking and investment activities. The emergence of Fintech has changed the face of the financial services industry with advantages in speed, simplicity, efficiency, security, privacy and potential. This has allowed Fintechs to share more with customers, giving them control and decision-making power in financial transactions and investment activities. This article provides an overview of the current state of Fintech in Vietnam, from which to make some recommendations to government agencies, especially the State Bank, regarding the development of Fintech in Vietnam.

Keywords: Fintech, Blockchain, Green Finance

1. Introduction

Currently, mobilizing green financial resources faces many challenges, because environmentally friendly projects often have high costs, long loan terms and low profit margins. In addition, assessing the impacts of loan projects on the environment also takes a lot of time, effort and cost due to the scarcity of information. This makes investors and credit institutions often not enthusiastic about funding such projects. In the capital market, only nearly 1% of bonds in the world are "labeled" green and only nearly 1% of assets held by institutional investors are environmentally friendly assets (Stockholm Green Digital Finance, 2017) [7]. In response to practical requirements, the explosion of financial technology (Fintech) brings great opportunities to accelerate the development of green finance. Fintech not only helps improve access to capital for sustainable projects but also enhances transparency, efficiency and the ability to monitor green capital flows. Blockchain platforms can help verify the legitimacy and effectiveness of green projects, making green bonds and green credit more attractive. Artificial intelligence (AI) and big data can be used to analyze environmental risks, forecast the long-term impacts of projects and support financial institutions in making more accurate funding decisions. In addition, IoT (Internet of Things) technology also allows real-time monitoring and measurement of the environmental impact of projects, thereby improving the transparency and accountability of businesses receiving green capital.

However, the combination of green finance and financial technology in Vietnam still faces many barriers when the legal framework has not kept up with the development of digital financial models, the green finance data system is still scattered, there is no interconnection mechanism to create a comprehensive green financial ecosystem, along with that, the awareness of businesses and investors about the benefits of green finance is still limited, leading to a fear of accessing green financial products applying technology, the incentive mechanisms, attracting investment are still poor, traditional banks and financial institutions are still hesitant with new financial models. Therefore, research on green financial development based on the application of financial technology in Vietnam is an urgent requirement to clarify the role of financial technology in promoting green finance, assess the current implementation status in Vietnam, analyze existing barriers and challenges. From there, propose appropriate policy implications to maximize the potential of Fintech in promoting green finance, contributing to realizing Vietnam's sustainable development goals in the coming period.

2. Theoretical basis

2.1 Green finance

Green Finance is a concept that encompasses financial activities that support projects, businesses and economic activities that are beneficial to the environment, contribute to reducing greenhouse gas emissions and promote sustainable development. According to the definition of UNEP, green finance includes all financial and investment decisions that promote sustainable development while minimizing negative impacts on the ecosystem.

In the global context, green finance has become an important trend, especially after countries committed to reducing emissions and moving towards green growth models. According to Rakić and Mitić (2012), green finance is a combination of new technologies, financial products and services with improved energy efficiency, reduced emissions and environmental pollutants, helping to grow the green economy in a low-carbon direction. Ly Thi Thuy (2024) defines green finance as the process of mobilizing and allocating capital from financial institutions, businesses and individuals to finance projects and activities that have a positive impact on the environment and society, towards sustainable development.

Simply put, green finance is "cash flow for a sustainable future", prioritizing investment in environmentally friendly fields such as renewable energy, clean production, forest protection and climate change adaptation instead of investing in projects that cause pollution or unsustainable resource exploitation. According to Le Mai Trang and colleagues (2024), green finance aims at the synchronous development of the financial sector in parallel with environmental improvement and economic growth, which is the process of increasing the level of financial flow (from banking, microcredit, insurance and investment) from the public, private and non-profit sectors into sustainable development priorities.

2.2 Financial technology (Fintech) and the application of financial technology to develop green finance

Financial technology (Fintech) is the combination of technology and financial services to optimize the processes of providing, managing and accessing financial products. This is a set of technology-based financial innovations that improve or replace traditional financial services (Schueffel, 2016). The Basel Committee on Banking Supervision (BCBS, 2018) defines Fintech as technology-based financial innovations that create new business models, applications, processes, products that have a specific impact on financial markets and institutions, as well as financial services.

According to Thakor (2020), Fintech is the application of digital technologies such as artificial intelligence, blockchain, and big data to the financial sector to improve customer experience, optimize banking operations, and create new financial business models. According to Ly Thi Thuy (2024), Fintech is an innovative financial technology business model that provides a variety of financial services in an automated manner through the use of the Internet, with the potential to fundamentally change the financial services industry. Popular Fintech applications today include electronic payments, digital banking, blockchain, artificial intelligence (AI), big data, smart contracts, and crowdfunding platforms.

Thus, Fintech not only helps improve the operational efficiency of financial institutions but also opens up many new opportunities for businesses and individuals to access capital and financial services in a more convenient, faster and transparent way. Especially in the current context, the process of mobilizing green financial resources faces many challenges, because environmentally friendly projects often have high costs, long loan terms and low profit margins. In addition, assessing the impacts of loan projects on the environment also takes a lot of time, effort and cost due to the scarcity of information, making investors and credit institutions often not enthusiastic about funding. Therefore, Fintech plays an important role in promoting green finance by improving transparency, reducing transaction costs and optimizing investment capital flows into sustainable projects. Fintech helps flexibly and creatively apply advanced technologies to the financial sector, designing and providing digital financial products and services. The emergence of Fintech has had a significant impact on almost every area of the financial industry from payment deposits, savings deposits, payments, insurance, securities, credit to financial risk management.

The role of financial technology in green financial development can be mentioned as:

(1) Fintech helps reduce transaction costs and improve operational efficiency. The application of financial technology helps optimize transaction costs, minimize the cost of collecting and analyzing information for the credit granting process and connecting related resources. Thanks to Fintech, financial transactions are processed quickly, limiting complicated paperwork procedures, while improving the ability to circulate capital flows. Digital payment platforms, smart contracts and digital banking applications help optimize processes, minimize manual errors, thereby increasing the efficiency of capital use in green finance.

(2) Fintech reduces information asymmetry and improves risk management capacity. One of the major challenges of green finance is the lack of transparency in assessing the "green" level of businesses and projects. Fintech helps solve this problem by collecting, analyzing and processing data in real time, supporting financial institutions in assessing the environmental risks of green loans. Technologies such as Big Data and Artificial Intelligence (AI) help banks and investors easily identify businesses that comply with sustainable development standards, and detect early violations of environmental protection. This helps minimize risks in financing green projects.

(3) Fintech enhances transparency and accountability. Blockchain technology plays an important role in enhancing transparency and traceability of green financial products. With the ability to store immutable data, blockchain helps ensure that green capital is used for the right purposes, limits fraud and increases investor confidence. In addition, blockchain is also applied in the issuance and trading of green bonds, asset securitization, as well as the development of derivative financial instruments to help prevent risks. In particular, this technology is being applied to increase liquidity in the carbon credit trading market, contributing to creating a more transparent and efficient green financial ecosystem.

(4) Fintech promotes more inclusive green finance. Currently, green finance mainly focuses on large organizations such as governments, banks, and large enterprises, while small businesses, households, and individuals still face many difficulties in accessing green

capital. Fintech helps to narrow this gap by providing digital financial platforms, making it easier for people to access green financial products such as loans for energy-saving projects, investing in renewable energy, or participating in the carbon credit market. Green Crowdfunding platforms also help connect environmental projects with individual investors, thereby expanding community participation in green finance.

(5) Fintech promotes competition in the green financial market. Financial technology changes the structure of the traditional financial market, creating a more competitive environment. Thanks to Fintech platforms, not only large banks but also startups and small financial institutions can participate in providing green financial products. This helps increase the diversity of capital sources, reduce dependence on a few traditional financial institutions and create incentives to promote innovation in the green financial sector.

(6) Fintech aims to reach potential investors. Fintech helps financial institutions and businesses easily reach investors interested in green finance through online trading platforms, artificial intelligence applications and big data analysis. These tools help personalize investment proposals, suitable for each investor's risk appetite and financial goals. At the same time, Fintech platforms also help investors access more detailed information about green projects, thereby increasing private sector participation in sustainable finance.

(7) Fintech changes consumer behavior in a sustainable direction. Financial technology applications not only change the way people invest but also influence their consumption behavior. Digital banking applications can provide information on the carbon footprint of each transaction, making users more aware of the environmental impact of their financial decisions. Some platforms offer financial incentives, such as preferential interest rates or cashback programs for environmentally friendly transactions, thereby encouraging consumers to engage in green financial activities.

(8) Fintech improves financial literacy on green finance. Financial technology not only helps provide green financial products but also plays an important role in raising financial awareness and knowledge among consumers and businesses. Fintech platforms can provide online courses, green investment simulation tools and detailed information on the environmental impact of financial decisions. As a result, both individual and corporate investors can better understand the benefits and opportunities of green finance, thereby making financial decisions in line with sustainable development goals.

However, in addition to the great benefits, the application of financial technology in green financial development still faces many difficulties, such as: limitations in the legal framework and support policies: The legal system and regulations for green finance and Fintech in many countries, including Vietnam, are still incomplete. Regulations on recognition, assessment and risk control for green financial products applying technology are not yet synchronized, causing difficulties for implementation in practice. In addition, support policies such as tax incentives and investment incentives in green financial technologies are still not strong enough to promote the participation of businesses and investors.

The use of financial technology in green finance means a heavy reliance on digital platforms, big data and automated trading systems. This poses risks of cyber attacks, personal information leaks and financial data misuse. Without strong security mechanisms, green financial transactions can become targets of cyber attacks, affecting the confidence of investors and users.

While technology like blockchain can help increase transparency, in practice, determining and evaluating whether a project is truly "green" or not is still controversial. Currently, there is no common standard system to determine the "green" level of businesses and projects, leading to the risk of greenwashing, that is, businesses claiming to be environmentally friendly but in reality do not fully meet the criteria for sustainable development.

Despite the potential of Fintech to attract investment capital for green finance, startups in this field still face difficulties in raising capital due to high risks, unclear profits and long payback periods. Moreover, traditional financial institutions are still hesitant to fund green Fintech projects due to the lack of data on long-term financial performance.

The application of Fintech in green finance requires businesses, investors and consumers to have knowledge of financial technology as well as understanding of green financial products. However, the level of awareness of green finance and the ability to access financial technology of many individuals and businesses, especially in developing countries, is still limited. This hinders the expansion of the market and attracting widespread participation in the green financial ecosystem.

Fintech-based green financial products such as carbon credit trading, green bonds or renewable energy investments are still relatively new and vulnerable to economic, political and policy changes. Without appropriate risk management mechanisms, investors may lose confidence in green financial products, leading to a decline in market liquidity.

3. Technology trends in the banking and finance sector

Digital transformation

One of the most important trends in technology for the banking industry is the shift to digitalization. With the advent of online and mobile banking, customers can now access a variety of banking services from the convenience of their smartphones or computers. This digital transformation not only improves the efficiency and speed of banking operations, but also enhances the overall customer experience.

The emergence of financial technology (Fintech)

The rise of fintech startups has disrupted the traditional banking landscape, offering innovative solutions in areas such as peer-to-peer lending, robo-advisory services, and digital wallets. These fintech companies leverage technology to streamline processes, reduce costs, and provide personalized financial services to customers. As a result, traditional banks are facing increased competition and are forced to innovate and adapt to stay relevant in the digital age.

Data analytics and AI

Data science and artificial intelligence (AI) have become indispensable tools for banks in analyzing customer behavior, detecting fraud, and making data-driven decisions. Colleges offering graduate degrees in Data Science are at the forefront of teaching these cutting-edge technologies to future data scientists working in the banking sector. By

harnessing the power of data analytics and AI, banks can gain valuable insights into customer preferences, identify patterns, and predict market trends, allowing them to offer tailored products and services.

Blockchain and Cryptocurrency

Blockchain technology, best known for cryptocurrencies like Bitcoin, smart contracts, etc., has the potential to revolutionize banking operations. Blockchain provides secure and transparent record keeping, reduces the risk of fraud, and improves the efficiency of transactions. Furthermore, cryptocurrencies have become popular as alternative forms of digital money, providing faster and cheaper cross-border payments. Colleges are equipping students with the knowledge and skills to understand and utilize blockchain technology in the banking sector.

FinTech promotes green financial development

Green finance includes financial products and services, from green bonds, green credit, sustainable investment funds, to insurance services related to environmental risks. This concept is increasingly focused on in the context of climate change and the need to transition to a green economy. The role of Green FinTech in developing green finance is demonstrated through the following activities:

Green FinTech with green bond issuance

According to the International Capital Market Association (2021), a green bond is any bond that raises capital used exclusively to finance or refinance, in whole or in part, eligible green projects that are consistent with the standards of the Green Bond Principles. Green bond issuance is strongly supported through Green FinTech activities.

Green bond issuance faces major challenges including the complexity and high costs associated with verifying the environmental impact of projects and the uncertainty regarding the quality and returns of bonds. Furthermore, monitoring and managing these emerging assets is also difficult. Green FinTech will help provide solutions to these problems. For example, blockchain infrastructure with decentralized immutable ledgers and smart contracts can enhance transparency and traceability throughout the life cycle of green bonds. These technologies enable project data recording, effect certification, allowing investors to evaluate the environmental performance of underlying projects (Dorfleitner and Braun, 2019), thereby helping to build trust among investors, attracting more capital into the green bond market.

Financial intermediaries optimize bond issuance with the help of data analytics and artificial intelligence technologies. Data analytics can help identify market trends, investor preferences, and pricing insights.

Fintech platforms enable individual investors to participate in green bond investments and popularize access to sustainable finance. For example, Alipay, a dominant fintech platform in China, offers a variety of green bond products to individual investors, incentivizing investors to invest in green bonds. By attracting a wider audience, fintech can mobilize more capital for green projects and create a more inclusive and sustainable financial ecosystem. Fintech can also improve the liquidity of green bonds by facilitating efficient matching between investors and issuers, thereby improving market efficiency.

Green FinTech with green credit

Green credit focuses on providing finance to activities and projects that contribute to sustainable growth while minimizing environmental risks. Green FinTech helps digitize the green credit granting process, reducing paperwork and processing time. This can reduce transaction and credit management costs, helping to reduce green credit lending interest rates. This allows businesses and individuals to easily access green credit at lower costs, thereby promoting sustainable projects and business activities. Through this, financial institutions are creating loan products that encourage businesses to adopt sustainability, such as: HSBC's Green Hub, Lloyds Bank's Clean Growth Finance Initiative and Barclays Group's Green Loan program. These loans provide investments in energy-saving technology and sustainable operations at low interest rates. Green FinTech solutions that provide digital green loans to unlisted assets such as small and medium-sized enterprises (SMEs) use classification algorithms and open banking SME transaction data to calculate digital carbon credits. Carbon footprint calculations of SMEs for green lending are also being gradually automated through these solutions that use algorithms to analyze SME spending and determine the carbon footprint for each spend. The algorithms analyze purchases based on supplier codes and purchase categories to automatically assign carbon footprints.

Green FinTech with green investment

Green FinTech promotes green investing through Green FinTech solutions such as Robo Advisors that leverage ESG data from large data providers. This data source mainly includes corporate disclosures and text data generated through social media data collection, press information and expert reports, as well as public records of environmental fines and data generated from surveys conducted by ESG providers.

Investors on platforms typically have a wide range of green investment options from ESG lists such as clean energy and smart transportation, and algorithms then compile and maintain portfolios based on company-collected data and ESG data. Instead of leveraging environmental and climate databases to design their own green metrics, green digital investment solutions primarily leverage existing indices, ESG-labeled ETFs, and company scores from large data providers, thereby reducing the cost of data collection but still allowing platforms to offer ESG investment options at a lower cost than personalized investment advice options.

Green digital crowdfunding and collaborative platforms offer collaborative fundraising services, whereby funds are raised in small batches from multiple individuals or entities to fund green businesses, green projects, or green transformation assets such as financing energy-efficient real estate renovations. These web-based online platforms connect fund users with donors. The level of automation on crowdfunding platforms can range from manual input updates to fully automated due diligence and processes.

Green investment options are becoming more popular among the general public as the barriers to raising green capital can be removed through FinTech applications. These technologies make it easier for the general public to access new sources of finance, especially those provided by private investors. Resource mobilization is also facilitated by providing decentralized systems that avoid conventional

intermediaries such as banks or other financial institutions, thereby reducing costs and inefficiencies. In addition, blockchain technology also enables efficient monitoring, reporting and authentication.

Green FinTech with insurance services

Solutions that leverage AI and IoT data capabilities and satellite imagery to facilitate modeling, forecasting, and prediction of climate and natural risk scenarios, thereby helping insurers understand and assess climate and natural risks and price these risks. The insurance industry can leverage real-time warning insurance technology solutions as well as predictive analytics to mitigate or prevent risks using sensor systems. Smart contracts enable the simplification of the climate or natural insurance process including underwriting and payments. Blockchain technology in Green FinTech improves transparency in claims processing and policy management. Smart contracts, stored on the blockchain, can automatically execute insurance terms based on specific conditions without the need for intermediaries. This increases transparency, reduces the risk of fraud, and enhances customer trust. In addition, Green FinTech facilitates insurance companies to create products that support sustainability efforts, such as insurance incentives for companies and individuals who adopt environmentally friendly practices. These incentives can range from lower premiums for sustainable practices to specific green insurance policies for renewable energy projects. By providing user-friendly digital platforms, Green FinTech reduces the use of paperwork and allows customers to access insurance services remotely. This not only reduces environmental impact but also improves the customer experience, as users can quickly and conveniently access policies and manage claims.

Green FinTech drives social goals

Green FinTech plays a key role in driving financial inclusion, aiming to make the benefits of digital banking and financial services accessible to all segments of society. Fintech platforms are providing digital payment solutions and mobile banking services to unbanked populations who otherwise have limited access to financial services. Green FinTech has been a transformative force in driving financial inclusion, leveraging technology to create innovative solutions that meet the needs of customers that traditional banks do not reach. FinTech companies are harnessing the power of the Internet, mobile technology and data analytics to support the provision of a wide range of financial and banking services that are easily accessible, affordable and user-friendly. Fintech platforms enable microfinance institutions to provide small loans to small businesses and households in developing countries that do not have access to traditional banking services. By leveraging technology, these platforms can reach underserved populations, allowing them to start or expand their businesses and improve their livelihoods. Increased access to financial resources can empower individuals and communities, contributing to poverty reduction and economic development.

Green FinTech with the goal of protecting the environment

FinTech companies have many positive impacts on the environment, reducing carbon consumption through the expansion of the sharing economy model, encouraging green consumption. For example, the sharing economy in the peer-to-peer food sector of FinTech companies in London, aims to prevent food production waste and greenhouse gas emissions, reduce waste generation and water consumption in online food distribution (Makov *et al*., 2020). Monitoring technology with big data analytics realizes rural development, serving as an important approach to financing smallholder farmers and increasing investment in agribusiness. In addition, Green FinTech can support efficient financial intermediaries, monitor and select green projects and calculate their environmental impact (Yang *et al*., 2020).

Green FinTech provides green digital account and payment solutions that help facilitate the promotion and guidance of green consumption. Green FinTech solutions design classification algorithms that can determine the carbon, plastic, or water footprint of each spending type and payment amount. Most of these calculations use average environmental footprint or carbon emissions data by industry type, providing carbon points per dollar spent on items from each industry. This information is linked to trade category codes such as “food and beverage” or “clothing,” allowing a given amount spent to be converted into an estimate of grams of carbon emitted per dollar. Green FinTech solutions also provide automated recommendations to customers on how they can reduce their carbon footprint by changing their spending habits. Customers can track their own carbon footprint against the national average.

4. The role of fintech in developing green finance

Currently, mobilizing green financial resources faces many challenges, because environmentally friendly projects often have high costs, long loan terms and low profit margins. In addition, assessing the impacts of loan projects on the environment also takes a lot of time, effort and cost due to the scarcity of information. This makes investors and credit institutions often not enthusiastic about funding such projects. In the capital market, only nearly 1% of bonds in the world are "labeled" green and only nearly 1% of assets held by institutional investors are environmentally friendly assets (Stockholm Green Digital Finance, 2017) [7]. These examples show that the development of green finance needs a push and Fintech has the potential to develop green finance in both breadth and depth, specifically because:

4.1 Fintech reduces transaction costs and improves operational efficiency.

The use of technology helps reduce transaction costs, the cost of collecting and investigating information for the purpose of granting credit or connecting related resources. Fintech also reduces transaction time, helps to use resources effectively and focus on creating value. Therefore, operational efficiency is increased. For example, in the field of green agriculture, big data is used to comprehensively monitor environmental conditions that affect the growth rate of crops, including: temperature, humidity and water content and use images to determine the growth status of crops. The collected data can be used for financial services such as agricultural insurance or green credit.

4.2 Fintech reduces information asymmetry and enhances risk management capabilities.

Fintech will enhance banks' risk awareness and risk management capabilities. Fintech applications that collect information will help banks assess the "green" level of

businesses and projects applying for loans, as well as help banks quickly identify violations related to environmental protection, causing risks to projects applying for loans. For example, advances in data science allow the analysis of publicly available climate data sets from multiple sources. Big data analytics helps evaluate and condense those data sets into "heat maps". These heat maps help quantify and analyze physical risks caused by climate change or extreme weather events. This is a useful tool for investors and banks to identify areas at high risk of climate change before making capital allocation decisions.

4.3 Role in information disclosure and transparency.

Blockchain technology provides real and immutable data and can ensure the authenticity and traceability of green products, thereby reducing information asymmetries. It is being used to develop green bonds, securitize assets, and develop financial derivatives to help hedge risks. Blockchain is also being used to increase liquidity in carbon emission reduction trading markets.

In addition, the use of blockchain-based smart contracts also simplifies the green bond issuance process, saving costs and time for the issuer (S. Mauderer, 2020) [6]. This will also make green bond issuance a viable option for a wider range of companies and project developers.

4.4 Fintech helps green finance become more inclusive.

Currently, the participants in the green financial market are usually governments, large companies and organizations. Fintech application will provide financial services to the population (including low-income residents, living in rural and mountainous areas), to small and micro enterprises and guide them to switch to an environmentally friendly lifestyle, consumption or production and business. Therefore, Fintech helps the scale of green finance to be expanded and used by more people.

5. Some applications of fintech in the field of green finance in the world

Many organizations around the world are actively applying Fintech to green finance development. New technologies, such as big data, artificial intelligence (AI), blockchain, cloud computing and the internet of things (IoT), have been applied to a number of green financial services, including: environmental, social and governance (ESG) analysis reports, environmental risk management, environmental benefit measurement, green credit, carbon finance, green bonds, energy trading, digital investment, insurance technology or consulting with the help of robots... According to the report of the Asian Sustainable Digital Finance Association (Sustainable Digital Finance in Asia, 2021) [8], some outstanding applications of Fintech in unlocking and mobilizing green financial resources that are being deployed include:

Green credit management system at Huzhou Bank (China)

The Green Credit Management System of Huzhou Bank uses big data, cloud computing, AI and machine learning to provide green credits. Specifically, the system uses AI and machine learning technology to evaluate the environmental friendliness of a project according to current national or local green standards. The system also builds a model to estimate environmental benefits based on project input factors. Notably, these estimates can change continuously according to changes in input parameters, so it will help the Bank regularly monitor environmental benefits in real time.

Using big data analysis and intelligent recognition technology, the system also has an environmental risk management function. The system can extract data such as the discharge license of the borrower or the safe production license to provide early warning of risk factors such as expired licenses. The system can also automatically update violations due to the environmental harmful behavior of the borrowing enterprise and provide environmental risk impact assessments and early warnings.

The application of Fintech has helped the Bank reduce operating costs, free employees from the burden of paperwork and shorten processing time compared to traditional management processes. This helps the Bank reduce costs and improve the quality of green lending management.

Arbol – a technology platform for weather risk insurance

Arbol – an insurance technology company based in New York, USA is a pioneer in building a parametric insurance market by combining blockchain technology, smart contracts and public data for fields such as: agricultural production, clean energy production or maritime sector... Arbol eliminates the traditional claim process, which can easily lead to delays, disputes and fraud. Instead, insurance contracts on the Arbol platform are paid quickly and fairly for objective risks related to unusual weather fluctuations.

The outstanding feature of the Arbol insurance contract is that the customer will be automatically paid a pre-agreed amount by the system whenever a weather index reaches a pre-agreed insurance threshold (e.g. rainfall below 125 ml in 3 months), without waiting for the damage caused by the weather events to be recorded.

Arbol contracts are encrypted, transparent, and cost-effective. The automated Arbol contract executes almost instantly upon confirmation from the Oracle data platform that a weather index has reached a threshold. Importantly, this threshold cannot be faked or tampered with by humans because it relies on blockchain technology. Furthermore, big data and blockchain help connect market participants quickly (e.g., a farmer in Laos with an investor in Switzerland). The encrypted contract can also be traded on a secondary exchange. Both of these create liquidity for the Arbol insurance contract, thereby increasing its appeal to insurance market participants.

Blockchain and emissions trading

CarbonGrid is a startup that tokenizes carbon emission reduction certificates (CERs) for resale via the blockchain. By tokenizing CERs, CarbonGrid selects quality projects, then allows households, small emitters, and companies to trade them to offset their emissions.

Through bundling and diversification, CarbonGrid allows market participants to purchase a diversified portfolio of small-scale offsets worldwide, or to concentrate their purchases in the locations and projects of their choice. Additionally, CarbonGrid can quickly provide market participants with certifications of their offsetting for disclosure in corporate governance reports or ESG analysis reports.

Green financial services platform for small and medium enterprises

A one-stop green financial service platform in Huzhou City, China, is developed on the basis of big data, cloud computing and other technologies to provide loans, equity financing and green credit rating services to small and medium-sized enterprises to support their green and sustainable development.

This platform sets standards for determining the "green" (environmental friendliness) of businesses and projects. Thanks to that, the system can classify and identify businesses and projects that meet green standards. In addition, this platform also consolidates information from 31 public agencies, such as: Huzhou Industry and Commerce Administration, Huzhou Taxation Bureau, Huzhou Environmental Protection Bureau, etc. to allow information sharing between agencies. This helps save costs and time searching for information, thereby creating links between green SMEs and interested banks and investors.

Since its launch in late 2018, the Huzhou one-stop green financial services platform has connected more than 16,000 small and medium-sized enterprises, 30 financial institutions and 80 investors. The platform has helped more than 13,000 green small and medium-sized enterprises obtain financing worth about 160 billion yuan from banks and find investors for 73 projects with funding worth more than 6.6 billion yuan. The platform has played an active role in applying Fintech to help small and medium-sized enterprises finance their green development by addressing the challenges of determining the environmental friendliness of a company or project, information asymmetry, improving the accessibility and efficiency of financial resources, and lowering the cost of borrowing.

In Vietnam, the total estimated investment capital demand for green growth in the 2021-2030 period is about 20-75 billion USD (Ky Thanh, 2020) [1]. To mobilize huge capital to meet green growth needs, Vietnam needs to effectively mobilize green financial resources from domestic and foreign individual and institutional investors. However, in reality, the green financial market in our country is still very rudimentary and in its early stages of formation.

Meanwhile, Fintech has been growing very strongly in Vietnam. Specifically, according to a report by Fintech News Singapore (2020) [3], the number of Fintech startups in Vietnam increased by more than 179% in the period 2017-2020. In which, payment services are still the largest segment. Peer-to-peer lending and cryptocurrency/blockchain are the two segments with the strongest growth in the past 3 years. Thus, the potential of applying Fintech to expand and develop green financial resources in Vietnam is huge.

Through the above analysis, some lessons can be drawn to promote the application of Fintech in green finance in Vietnam, as follows:

Firstly, develop legal regulations and strategies to promote the application of Fintech in green financial development in Vietnam. The Government needs to orient, develop strategies and specify policies to link Fintech development to specific areas of the green financial market. In addition, perfect the legal corridor and use legal tools to ensure the application of Fintech in mobilizing and using green financial resources in the right direction, ensuring the interests of relevant entities. On the other hand, the Government needs to connect and mobilize the synchronous participation of resources, creating consensus among management units and economic components for the development of Fintech in the field of green finance.

Second, the Government and relevant ministries, departments and branches need to build a database system as well as mechanisms and methods to access and share information effectively, transparently and publicly between management agencies from the central to local levels and with market participants. Information is an extremely important input factor in developing Fintech applications in the green financial market. Information about businesses or projects that need to mobilize green financial resources will help credit institutions or investors more easily make decisions on funding those projects. From the perspective of control and management of lenders, investors or state management agencies throughout the process of investing, funding and using green financial resources, information about businesses and projects also plays a very important role. Therefore, one of the top priorities in deploying Fintech applications in mobilizing and using green financial resources is to ensure the ability to provide, store and access quality, transparent and public information sources to provide data to assess the greenness of a business, a project... In the coming time, Vietnam needs to soon complete and put into use a complete national database system on economic and financial information, standardize the format, as well as the content of the collected information. Next, it is necessary to build an effective mechanism for collecting, linking and sharing information between participants in the financial market in general and the green financial market in particular. This will create a foundation for businesses, organizations and individual investors to exploit information and apply Fintech to green financial activities.

Third, the system of credit institutions needs to play a pioneering role in promoting the development of Fintech applications in mobilizing and using green financial resources. Credit institutions, especially commercial banks with existing advantages in financial potential, credit information base as well as appraisal and management systems for loan projects, have a lot of potential to apply Fintech in green financial activities. The first area that credit institutions can participate in developing is green credit, which is one of the three main tools to mobilize green capital (along with green bonds and green stocks). Taking advantage of the existing system combined with support from the State in terms of legal corridors or incentives specifically for banks participating in green credit, commercial banks can completely pioneer in supporting businesses to borrow capital to invest in green projects. At the same time, during the pre-, during- and post-lending process, banks can use Fintech applications to assess the "greenness" of the borrowing business/project, check and control the loan disbursement process of the business to ensure the right purpose and efficiency, as well as consider the business's ability to repay the loan.

Fourth, private enterprises need to promote the application of Fintech in the green finance sector. In addition to pursuing profit goals, Vietnamese enterprises themselves also need to proactively research and innovate technology towards greening and environmental friendliness. In fact, private enterprises are always pioneers in implementing research and applying new technologies, including Fintech, to mobilize and use green financial resources, typically

Arbol. In addition, a new popular trend in the world is that enterprises disclose ESG. These trends help raise awareness of the board of directors, as well as support enterprises in mobilizing and orienting the use of green capital for green projects./.

6. References

1. Ky Thanh. Promoting the development of green financial market for Vietnam, 2020. Accessed from https://baodautu.vn/thuc-day-phat-trien-thi-truong-tai-chinh-xanh-cho-viet-nam-d121627.html
2. Financial Stability Board. Financial Stability Implications from Fintech, 2017.
3. Fintech News Singapore. 2020 Fintech Vietnam Report and Startup Map: Fintech Startups Tripled since 2017, 2020.
4. Höhne N, Braun N, Fekete H, Brandsma R, Larkin J, MGJ Den Elzen M. *et al*. Greenhouse gas emission reduction proposals and national climate policies of major economies, PBL Netherlands Environmental Assessment Agency, Bilthoven, the Netherlands, 2012.
5. Research center for Green finance development of Tsinghua University. Fintech facilitates the sustainable development of green finance in China: Cases and outlook, 2020.
6. Mauderer S. The role of fintechs in green finance, Keynote speech at the 4th German - Singaporean Financial Forum "Grün-Tech: How can fintechs and banks work hand in hand for sustainable finance", 2020.
7. Stockholm Green Digital Finance. Unlocking the Potential of Green Fintech, 2017.
8. Sustainable Digital Finance in Asia. Creating Environmental impact through banking transformation, 2021.