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## Article

# Impacting green credit development on economic growth post-COVID-19 pandemic in vietnam

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# Impacting Green Credit Development on Economic Growth Post-COVID-19 Pandemic in Vietnam

Quang Minh Nguyen  and Le Thi Thuy Hang 

## ABSTRACT

The economy's growth contributes to the general development of social life but also severely impacts the environment. Since many countries worldwide are moving towards green growth, credit policies to serve green growth goals play a critical role. Many countries with different levels of development globally have pursued green credit policies, becoming a common development trend and an essential component of countries' sustainable development strategies. The use of green credit enables the bank to mitigate environmental and social risks associated with its commercial operations. Vietnam is slowly adopting this trend, but it still encounters several challenges and requires effective solutions to further stimulate this influx of capital. Thus, the article explores factors influencing Vietnam's green credit development and economic growth. This research applied the structural equation model (SEM) from surveying 750 commercial bank managers and collected it by convenient sampling. The data collection period was from September 2021 to December 2021. The study employed several methodologies to assess the dependability of Cronbach's alpha, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM) in order to evaluate the research hypotheses. The findings indicate that three factors have a significant impact, at a level of 1.0 percent, on the development of green credit and economic growth. Finally, the article novelty had several policy recommendations for developing green credit and economic growth in Vietnam.

**KEY WORDS:** green, credit, development, economy, and growth.

**JEL Classification:** G00, G18, O10, O38.

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## 1. Introduction

The circular economy is considered an inevitable choice in economic growth and the effective use of resources for sustainable development. The term circular economy has been developing from individual enterprises to the whole economy in the waste reuse cycle, considering waste as a resource and a connection between activities. The economy forms a revolution in the economy (Chen, 2019). It is necessary to have an adequate financial support mechanism to meet the financial needs for the industrialization of the market economy (Kangshi et al., 2019).

In addition, the funding policy encourages and ensures the result of a knowledge-based economy, transforming the economy into a new model. The industrial transformation of the circular economy needs market-oriented green finance. Studies have shown that the lack of green financing is one of the significant barriers to establishing and managing a recycling program. Meanwhile, the development of the market economy also creates favorable conditions to promote reform and innovation in the financial sector.

On the other hand, it is the main link for nurturing and implementing innovation in the financial sector. For example: For banking and financial

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institutions, the provision of financial support services for the Circular economy will increase the scale and diversification of products and services; Meanwhile, businesses can reduce costs thanks to preferential interest rates, extended credit terms, and increased loan levels, and loosened repayment conditions. Investment acts that do not comply with the principles of equitization had restricted by not lending, raising interest rates, and forcing debt repayment. This factor will support the development of the knowledge economy from many different levels.

Many countries in the world, including Southeast Asian countries, have declared global sustainable development goals, which set the goal of building a development investment fund to eliminate poverty, reduce poverty, and promote economic growth combined with environmental regeneration. The Paris Agreement on Climate Change shows the transition to a low-carbon and, ultimately, zero-carbon economy and emphasizes the urgency and role of financial institutions and regulators in raising capital for these new economic models. Specifically, according to the State Bank, by June 2019, credit outstanding for green projects reached about VND 317,600 billion, medium and long-term loans accounted for 76% of green credit's outstanding loans, interest rates for short-term green fields were 5-8%/year, and medium - long-term loans were 9-12%/year.

From September 2016 to June 2020, the percentage of green credit had a significant rise, increasing from 1.5% to 4.1% of the total outstanding loans in the entire economy. The majority of outstanding loans in green credit are allocated to green agriculture, which comprises 45% of the total. Renewable energy and clean energy make up 17% of the loans, while sustainable water management in urban and rural regions accounts for 11% and 5% for sustainable forestry. This represents a substantial local financing source for Vietnam's green growth, considering the requirement of USD 30.6 billion in green finance by 2020. Moreover, the substantial greening in credit flows will contribute to the decision to restructure the economy towards green growth and sustainable development. This factor has a profound social foundation and practi-

cal significance for forming a wealth-saving society resource, improving economic growth quality and efficiency, and creating sustainable development.

Therefore, the authors had some policy recommendations for several policy recommendations for developing green credit and economic growth in Vietnam. Through a survey of the State Bank of credit institutions on green growth and green credit, credit institutions' understanding of green credit showed that it had improved significantly. More precisely, 19 credit institutions have formulated plans to control environmental and social risks, while 13 credit institutions incorporate ecological and social risk management considerations into the evaluation process for green lending. In addition, twelve financial institutions have developed lending products and banking services specifically tailored for green companies and sectors. They have focused on the bank's mobilized capital to extend loans for these sectors with a primary duration.

## 2. Literature Review

### 2.1. Green Credit (GC)

Green credit refers to credit provided by financial institutions for consumption, investment, manufacturing, and commercial purposes, while ensuring that it does not pose any threats to the environment and helps in preserving the ecosystem. Overall demeanor. In addition, green credit encompasses various dimensions, such as: (a) Utilizing credit policies and instruments, such as loan terms, interest rates, and loan amounts, to facilitate environmentally sustainable green investment initiatives that aim to mitigate carbon emissions; (b) Restricting, ceasing, or even rescinding credit provision for projects that contravene regulations pertaining to ecological environmental protection; (c) The bank exercises oversight over loan utilization for projects carrying environmental risks and mitigates such risks through credit policies (Masukujjaman et al., 2016). Green credit brings excellent benefits in environmental protection and economic development tasks, improving people's living standards (Weng et al., 2015). Green credit is an inevitable direction of the global financial industry

and Vietnam's banking industry. By reducing bad debts, improving financial stability and market reputation, encouraging sustainable development, and achieving green growth strategy, green credit helps firms executing economic development projects and the banking system's sustainable development (Zibo et al., 2021; Wei & Jinhua, 2014).

### 2.2. *Green Economic Growth (EG)*

The different definitions of green growth reflect that each country and organization has other visions of green growth. This factor follows their government's and organizations' conditions, mission, and orientation (Soundarrajan & Vivek, 2016; Qinglong & Ya, 2020). In addition, green economic growth is a new development model that ensures environmental and climate sustainability growth. Emphasis was on addressing the challenges at the source while ensuring the creation of the necessary channels for resource distribution and access to essential goods for human needs. Green economic growth was achieved by saving and using resources and energy efficiency to reduce climate change and environmental damage. This factor creates a growth-driving impact on innovation through research and green technologies, creates new job opportunities, and achieves harmony between economic development and environmental protection (Jianguo & Fanli, 2019; Chao et al., 2021).

### 2.3. *Legal Framework (LF)*

The legal framework on green credit is incomplete and incomplete; Lack of regulations on appraisal, criteria, and risk management assessment mechanisms. The assessment of green growth criteria of banks is still confusing, and the determination of support payment for projects is still slow (Ai et al., 2020). Prime Minister's Decision No. 1393/QĐ-TTg (2012) on "Approval of the National Strategy on Green Growth in the period 2011-2020 and vision to 2050" has helped to establish the most stringent legal framework for green credit activities in our country, alongside the Law on Environmental Protection (2014) and the Law on Natural Resources Tax (2009), both of

which were approved by the National Assembly. Furthermore, Directive No. 03/2015/CT-NHNN (2015), issued by the State Bank (SBV), aims to promote green credit growth while managing environmental and social risks in granting activities credit. This directive was put in place to implement the National Action Plan on green growth, which states that, beginning in 2015, the banking sector's credit extension activities should prioritize environmental protection, energy and resource efficiency, environmental quality, human health, and sustainable development (Biswas & Das, 2018; Bing et al., 2011).

### 2.4. *Management Capacity at Commercial Banks (MC)*

Vietnam actively participates in multilateral and bilateral economic and financial cooperation forms, the Vietnamese commercial banking system will face enormous competitive challenges from banks in the area. Especially in the context of Industry 4.0 comprehensively affects the financial - banking system, encapsulated in product supply and distribution channels, banking management methods, and customer relations (Cui et al., 2018; Drobnjaković, 2013). In addition, improving governance, management capacity, and transparency in the operations of credit institutions is one of the contents and requirements set out in the banking industry development strategy. Faced with that reality, credit institutions must strengthen the management, operating capacity, and operational efficiency of the banking system and focus on handling issues related to bank ownership and operations of state-owned commercial banks. Regarding the issue of expanding foreign ownership in the banking sector, the research team found that consideration should be given to creating favorable conditions for foreign investors to reasonably increase ownership of banks domestically, to form large-scale institutions, and to better governance capacity (Haiyang, 2017; Hoen, 2014).

### 2.5. *Supporting Policies (SP)*

Green credit is a financial instrument used to fund programs, projects, and initiatives that promote environmentally friendly practices and encourage

individuals and organizations to make the most of renewable energy sources. Research has indicated that the absence of sufficient funding specifically allocated for environmentally-friendly initiatives is a major obstacle in the development and operation of a recycling program. They were preoccupied with ecological concerns. Green credits typically fund initiatives and projects that are anticipated to have a distinct and beneficial effect on the environment. As a result, they sometimes come with advantageous interest rates and extended repayment periods compared to ordinary loans for other projects (Lalon, 2015; Masud et al., 2018). Meanwhile, the development of green credit also creates favorable conditions to promote reform and innovation in the financial sector. Supporting policies, on the one hand, encourage and ensure the development of green credit, and transforming the economy into a new model, on the other hand, are the main link to nurturing and implementing innovation in the field of green finance (Nejati et al., 2014; Sa, 2020).

### ***2.6. The Relationship Between Green Credit (GC) and Green Economic Growth (EG)***

One green financial instrument is green credit, which helps fund eco-friendly programs, projects, and initiatives; it also encourages individuals and companies to recycle and reuse materials; and it shows that people care about environmental problems. Specifically, projects and initiatives backed by green credit funds are typically eligible for extended payment terms and advantageous interest rates because of the good effect they are predicted to have on the environment (Xiaowei et al., 2021; Yu et al., 2018). The industrial transformation of the green credit economy needs market-oriented green finance. Studies have shown that a lack of green financing is one of the significant barriers to establishing and managing a recycling program (Zhang et al., 2021).

### ***2.7. Research Hypotheses***

The green credit market in Vietnam has made significant progress in recent years, thanks to the backing of the government, agencies, branches, and international financial institutions. Nevertheless,

there are several obstacles that hinder the progress of green credit initiatives.

Currently, there is a lack of statewide consensus on the standardized norms and definitions for green fields and their respective classifications. This poses challenges for commercial banks in the process of selecting, appraising, evaluating, and monitoring when issuing green credit. Simultaneously, the green sector currently lacks a comprehensive legal framework for evaluating environmental impact measurement tools that can aid in the formulation of policies and the creation of green credit products. Additionally, business plans must adhere to stringent ecological protection requirements and navigate intricate loan procedures. If the bank's green credit products do not offer interest rate support or other favorable procedures, clients will have little incentive to utilize them due to these constraints.

Furthermore, the recent laws aimed at promoting the growth of green credit have failed to address the issue of securing adequate capital for commercial banks to effectively execute green credit. Investing in green industries/fields often involves medium and long-term capital with a lengthy period of time until the investment is fully recovered, whereas credit institutions usually provide short-term money. Currently, investing in environmentally beneficial industries and sectors, particularly renewable energy, energy conservation, and efficiency in Vietnam, often entails a lengthy period of time for recouping the investment, substantial upfront costs, and considerable market risks. Therefore, there is a need for incentives in terms of loan conditions and costs.

Furthermore, the financial institutions' knowledge and ability to offer green credit products is currently in its early stages and remains restricted. Furthermore, the personnel working in credit institutions, foreign bank branches in Vietnam, and bond-issuing enterprises lack comprehensive and structured training in evaluating, assessing, and managing environmental risks, as well as reporting information in credit granting and bond issuance activities in accordance with international standards. Several financial institutions lack a dedicated department or board that is responsible

for assessing projects, analyzing environmental and social risks, and monitoring and evaluating the performance of cash flow generated by green credit sources in the future. Thus, the authors formulated the following study hypothesis.

The legal framework (LF) positively affects green credit (GC): Investing in green sectors, particularly in renewable energy, conservation, and energy efficiency in Vietnam at present typically entails a lengthy period of time for recouping costs and substantial upfront investment. Given the elevated market risk, credit institutions typically rely on short-term sources of money that are gathered based on the prevailing cost of commercial capital in the market. Consequently, the price of this capital tends to be high. The research offers green industries/fields with long-term and advantageous interest rates. Credit institutions should be provided with assistance in obtaining long-term, advantageous sources of funding or implementing a framework for sharing interest rates among credit institutions. Based on the above analysis, the authors had the following legal framework (LF) scales: LF1: Lack of regulations on appraisal. LF2: criteria and risk management assessment mechanism. LF3: the assessment of the green growth criteria of banks is still confusing. LF4: the determination of support payment for projects is still slow. Therefore, the authors presented the hypothesis H1 as follows:

H1: The legal framework (LF) positively affects green credit (GC).

Management capacity (MC) positively affects green credit (GC): Transparency and governance capacity will be more urgent, especially credit development in commercial banks. They were strongly improving governance capacity to meet international standards and best practices in the market to apply the achievements of Industry 4.0 to products, services, and processes. Banks must synchronously deploy information technology and environmental transformation projects in their operations. Based on the above analysis, the authors had the management capacity (MC) scales following: MC1: Leadership skills through success in changing systems and people. MC2: Planning skills throughout the implementation of the plan.

MC3: Problem-solving skills based on classifying the problem, finding the solution, and choosing the optimal solution. MC4: Good communication skills realize the power of relationship, which comes from good communication skills (Haiyang, 2017; Hoen, 2014). Thus, the authors presented the hypothesis H2 as follows:

H2: Management capacity (MC) positively affects green credit (GC).

Supporting policies (SP) positively affect green credit (GC): Providing financial support services for the green economy will increase the scale and diversification of products and services. Based on the above analysis, the authors had the following supportive policies (SP) scales: SP1: banking and financial institutions. SP2: Supporting businesses can reduce costs thanks to preferential interest rates. SP3: the banks extended credit terms, increased loan levels, and relaxed repayment conditions. SP4: Government also needs to have appropriate policies for developing green credit in the coming time (Singh & Singh, 2012; Sumei, 2021). Thus, the authors presented the hypothesis H3 as follows:

H3: Supporting policies (SP) positively affect green credit (GC).

The green credit (GC) positively affects green economic growth (EG): The development of the market economy also creates favorable conditions to promote reform and innovation in the financial sector. The relationship between finance and economic growth is very close. On the one hand, the funding policy encourages and ensures the development of a knowledge-based economy, transforming the economy into a new model. On the other hand, it is the main link for nurturing and implementing innovation in the financial sector (Zhou et al., 2021). Thus, the authors presented the hypothesis H4 as follows:

H4: The green credit (GC) positively affects green economic growth (EG)

In Vietnam, green credit activities have also been implemented in recent years and have achieved encouraging results in many fields, including energy saving, renewable energy, clean agriculture,

and high-tech agriculture. However, there are still many problems with the theoretical framework and challenges in implementing this new growth model. Through assessing the current status of green credit activities in Vietnam in recent times and the factors affecting green credit, the study has proposed several recommendations to promote green credit development next time. This is also a new point of the study compared to previous studies that only analyzed qualitatively and did not quantify through the research model.

Based on the green credit theory and previous studies, the authors proposed a model to study the factors affecting green credit (GC) and green economic growth (EG) in Figure 1.

### 3. Methodology and Data

Implement qualitative and quantitative research methods using data, techniques, and research methods of both qualitative and quantitative schools, addressing each specific objective.

The qualitative research was used in the following order: (a) Find out new factors and relationships between green credit development and green

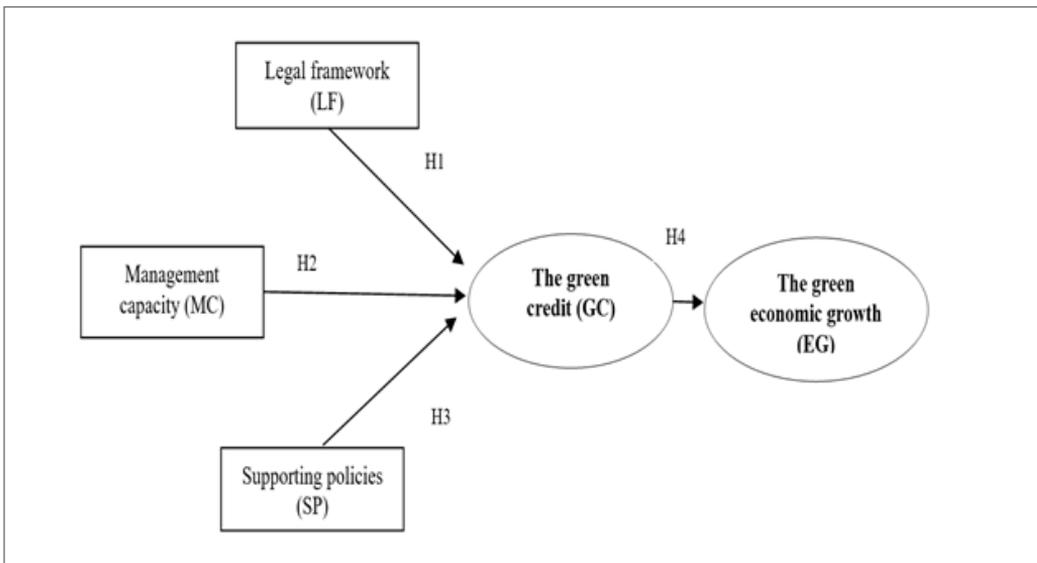
growth, (b) Adjust the scale of each element of the model to suit the banking industry. Then, combine quantitative exploratory research with the SEM testing tool to predict relationships with small sample size requirements (Hair et al., 2018).

The authors used quantitative research to quantify and measure relationship levels, test models, and hypotheses following two stages. (a) the authors used preliminary research to complete the questionnaire and adjust the research model, and (b) the authors used formal research to conclude by collecting and analyzing information from the market and using statistical methods to process data (Hair et al., 2018). The authors implemented the research process in 2 stages: (a) Building the scientific theory shown in Step 1; (b) The scientific theory test shown in step 2 and step 3 diagrammed, as shown in Figure 2.

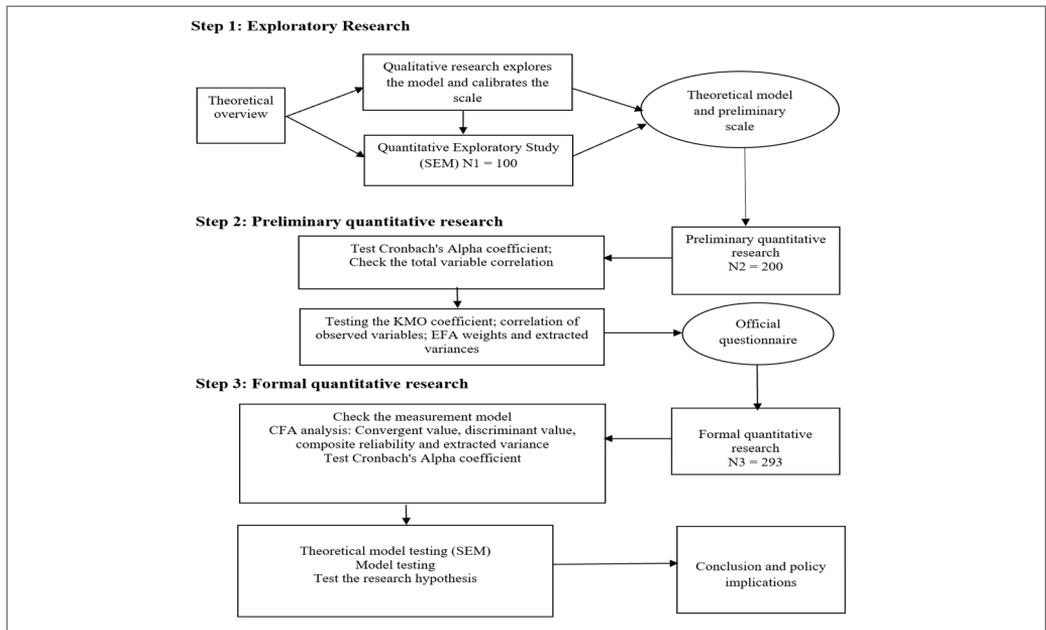
#### Step 1. Exploratory research

The authors summarized previous studies on green credit and growth and then identified research objectives to be achieved. Exploratory research was carried out as follows: Qualitative research explores the model and calibrates the scale

**Figure 1**  
*The Research Model for the Factors Affecting Green Credit and Green Economic Growth*



**Figure 2**  
*The Research Process for the Factors Affecting Green Credit and Green Economic Growth*



by conducting one-on-one discussions with experts in the banking sector.

Then, the authors carried out an exploratory study using a quantitative research method with a model testing tool using SEM techniques, a partial least squares structural model to predict the relationships in the model with the requirement for a small sample size (Hair et al., 2018). The results of the exploratory research are combined with the theoretical summary to propose a theoretical model of the article, build a scale of the factors in the model, and complete the survey questionnaire used in step 2 down here.

**Step 2. Preliminary quantitative research**

The data had gathered for initial testing of the scale. A preliminary test of Cronbach's alpha coefficient: The purpose is to check the reliability and correlation coefficient with the total variable. If the observed variable has a correlation coefficient with a full minus 0.3, it is excluded from the research factor (Hair et al., 2018). Exploratory factor analysis (EFA): to examine the relationship between variables of many different aspects to discover observed variables that load many factors or are

under variance elements from the beginning. The EFA analysis's two values are the discriminant and convergent values. The result of the preliminary test of the scale by EFA is to remove some unsatisfactory observed variables (Hair et al., 2018). The scale of factors meets the requirements through preliminary testing, conducting the design of the official survey to collect market information used in step 3 below.

**Step 3. Formal quantitative research**

The authors used the survey to collect market information to test theoretical models and research hypotheses. The work: Sampling method, sample size, survey subjects, and data processing.

Sample size: The larger the study size/sample size, the more representative the population's characteristics will be, but if a large sample size is selected, it will take a lot of effort, money, and time to collect data. Therefore, it is crucial to choose an adequate sample size depending on the type of study. The sample size must ensure the rule of the ratio of 5:1. The sample size must ensure the percentage of at least five observations/1 measurement variable (Hair et al., 2018). In this study, the analysis of CFA

and SEM had used because the research model is complicated, so the sample size is large enough to get better CFA and SEM results.

The sample size investigated in the official study is 750 bank managers, which is still sufficient. Another way to determine sample size is to use a 10:1 ratio of ten observations to 1 measure (Hair et al., 2018). Therefore, all 19 observed variables had measured for four factors in the research model in this study.

Sampling method: The research sample would be objective and highly representative. However, due to difficult implementation conditions, the authors used a convenience sampling method in this study (Hair et al., 2018).

## 4. Research Results and Discussion

### 4.1. Research Results

In Vietnam, the significance of green credit is recognized, as stated in Directive No. 03/CT-NHNN issued on March 24, 2015. The State Bank of Vietnam has urged commercial banks to actively support green finance for projects that have explicit goals in environmental preservation, hence fostering ecologically sustainable corporate practices. In recent years, the term "green credit" has gained recognition within the financial and banking industry. The data indicates that there has been an increase in green credit in Vietnam between 2015 and 2019.

The scale: The published data shows that the outstanding green credit has increased steadily over the years. By June 2019, the green credit due balance reached VND 317,600 billion, up 29% compared to the end of 2018. As of December 31, 2021, the total green credit outstanding balance reached VND 447,624.13 billion, an increase of 28.09% compared to 2020. The proportion of green credit excellent in the total credit balance for the economy reached 4.28%, an increase of 0.5 percentage points compared to 2020 (3.78%). On average, in 2018-2021, the total outstanding green credit has reached a growth of 22.98% per year. In particular, in 2021, the growth rate of green credit outstanding loans is higher than in 2019 and 2020, despite the heavy impact of the COVID-19 pandemic. Specifically, lending interest rates have been applied by credit

institutions for short-term green fields from 5-8 %/year and medium and long-term from 9-12%/year.

Regarding the composition: Concerning the lending system, the majority of outstanding loans are categorized as medium and long-term credit, making up 76% of the total green credit. Short-term green loans have interest rates ranging from 5-8% per year, while medium and long-term loans have rates between 9-12% per year. In terms of sectoral allocation, green credit loans are mostly directed towards green agriculture, which constitutes 45% of the total outstanding green credit. Renewable energy and clean energy make up 17%, while sustainable water management in urban and rural regions accounts for 11%. Lastly, sustainable forestry represents 5% of the total. Currently, commercial banks have given appropriate consideration to green financing. Several banks have introduced advantageous credit initiatives for both corporate and individual clients to get loans for the purpose of executing projects that incorporate environmentally friendly elements. Regarding green credit products: Vietnam aims to raise the proportion of renewable energy sources to 21% of the overall installed capacity in order to address the surging energy demand and achieve a 25% reduction in greenhouse gas emissions by 2030. The increasing interest from investors in creating renewable energy projects is driven by this outcome. Several banks have implemented substantial loan packages to facilitate the growth of the green energy sector.

Table 1 indicates that the average value is less than 3.0. This analysis indicates that the "green" industry continues to face challenges related to ambiguous incentive mechanisms, substantial investment expenses, extended durations for recouping expenditures, elevated market risk, and accessible investment costs. Furthermore, the businesses associated with sustainable development, such as solar power, wind power, and waste-to-energy, are relatively new. However, the existing processes and rules lack sufficient appeal to attract money from financial institutions. Consequently, the lending rates for green projects have not yet been provided with optimal incentives and have significantly decreased in comparison to other sectors.

The standards and definitions of green categories

**Table 1**

*Descriptive Statistics on the Factors Affecting Green Credit and the Green Economic Growth*

Code	N	Minimum	Maximum	Mean	Std. Deviation
GC1	735	1.00	5.00	3.3837	0.96379
GC2	735	1.00	5.00	3.2844	0.99561
GC3	735	1.00	5.00	3.2340	1.00662
MC1	735	1.00	5.00	3.0422	0.99432
MC2	735	1.00	5.00	3.0503	0.99941
MC3	735	1.00	5.00	3.0680	0.97838
MC4	735	1.00	5.00	3.0707	0.99886
EG1	735	1.00	5.00	2.3401	0.65089
EG2	735	1.00	5.00	2.3769	0.62050
EG3	735	1.00	5.00	2.3687	0.66550
EG4	735	1.00	5.00	2.3932	0.67595
LF1	735	1.00	5.00	3.0680	0.98254
LF2	735	1.00	5.00	3.0476	1.00091
LF3	735	1.00	5.00	3.0680	0.97977
LF4	735	1.00	5.00	3.0599	1.01041
SP1	735	1.00	5.00	2.3524	0.66412
SP2	735	1.00	5.00	2.3932	0.62134
SP3	735	1.00	5.00	2.3823	0.66600
SP4	735	1.00	5.00	2.4136	0.68485

Source: Data processed from SPSS 20.0

**Table 2**

*Testing Cronbach's Alpha for the Factors Affecting the Green Credit and Green Economic Growth*

Code	N	Cronbach's Alpha
Legal framework (LF)	4	0.967
Management capacity at commercial banks (MC)	4	0.967
Supporting policies (SP)	4	0.889
Green credit (GC)	4	0.919
Green economic growth (EG)	3	0.894

Source: Data processed from SPSS 20.0

**Table 3**

*Testing KMO and Bartlett's Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.844
	Approx. Chi-Square	13600.347
Bartlett's Test of Sphericity	df	171
	Sig.	0.000

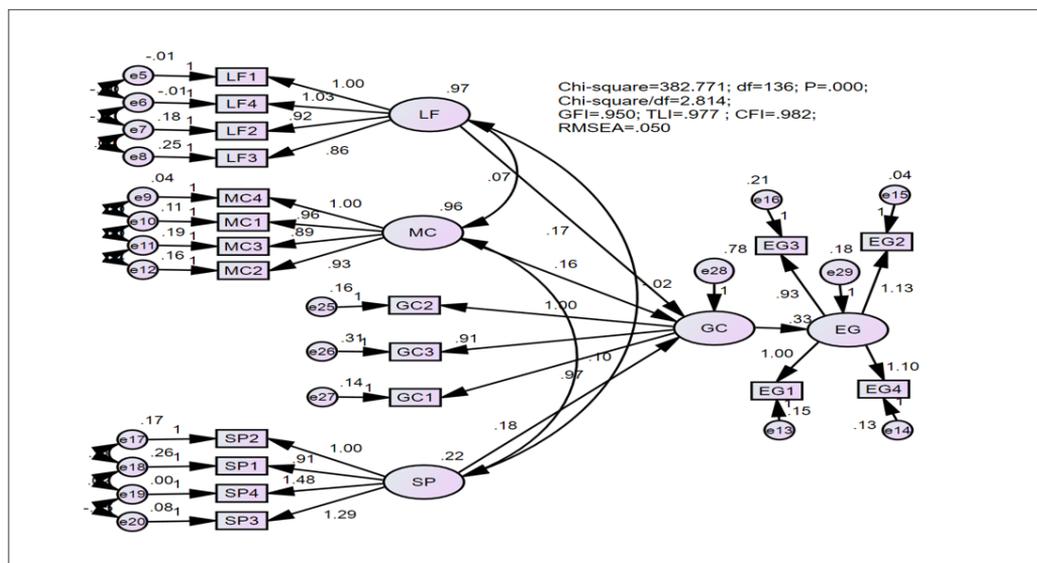
Source: Data processed from SPSS 20.0

**Table 4**  
*Testing Relationships for the Factors Affecting the Green Credit and Green Economic Growth*

	Relationships		Estimate	S.E.	CR.	P	Results
GC	<---	LF	0.168	0.037	4.608	***	Accepted
GC	<---	MC	0.156	0.037	4.280	***	Accepted
GC	<---	SP	0.183	0.068	2.689	0.007	Accepted
EG	<---	GC	0.331	0.022	15.275	***	Accepted

Source: Data processed from SPSS 20.0

**Figure 3**  
*Testing SEM Model for the Factors Affecting the Green Credit and the Green Economic Growth*



and sectors are universally applicable nationwide. These findings provide challenges for commercial banks when it comes to choosing, assessing, analyzing, and overseeing the implementation of green loans. However, the green sector currently does not have a set of legislative guidelines for evaluating instruments that quantify environmental effect. These guidelines are necessary to facilitate the creation of policies and products that promote the growth of green credit. In addition, company strategies must adhere to stringent requirements for environmental conservation and navigate complex credit pro-

cesses. If the bank does not provide interest rate assistance or other preferred measures, clients will have reduced reliance on the bank's green credit products due to these regulations. Loans have been prioritized for green initiatives.

Table 2 showed that Cronbach's alpha levels: greater than 0.8 are a reasonable scale. Through Cronbach alpha analysis for all scales have: The smallest Cronbach alpha coefficient is 0.889 (>0.6), so reliability had ensured; The correlation coefficient of the total variance in each factor is > 0.3 (more remarkable than the allowed standard); Al-

pha coefficient if excluding variables of the variables in each component are smaller than Cronbach's Alpha coefficient. After analyzing the reliability of Cronbach alpha, 05 components had excluded: Legal framework (LF), management capacity at commercial banks (MC), supporting policies (SP), Green credit (GC), and Green economic growth (EG). The variables measuring the above components are all used for the subsequent topic analysis because of the assurance of statistical reliability.

Table 3 showed that KMO coefficient = 0.844 (>0.5) and Barlett test with Sig = 0.00 (<0.05) indicates that EFA analysis is appropriate at Eigenvalues = 1.287 (>1.0), EFA has extracted five factors from 19 observed variables with a total extracted variance of 84.068% (> 50%) and no variables had excluded. Factor analysis showed that five elements explained 84.068% of the data set, and the analytical model was appropriate.

The results show that the research model is suitable and confirms a close relationship between the scales, green credit, and economic growth. Table 4 shows that all the factors affect green credit and economic growth. Besides, the theoretical model test shows that hypotheses H1, H2, H3, and H4 did accept at the statistical significance level of 1%. The authors summarized the factors that have a significant influence on green credit. The green economic growth in the order of decreasing level of impact on the green credit (based on the standardized beta coefficient): Supporting policies ( $\beta = 0.183$ ), Legal framework ( $\beta = 0.168$ ), and Management capacity at commercial banks ( $\beta = 0.156$ ).

Figure 3 displayed the evaluation of the magnitude of the variables influencing green credit and green economic growth, which consists of the following components: CMIN/DF = 2.814 (less than 5.0), GFI = 0.950 (more than 0.8), TLI = 0.977 (greater than 0.9), CFI = 0.982 (greater than 0.9), and RMSEA = 0.050 (less than 0.08). The structural equation modeling (SEM) analysis revealed that all three parameters significantly influenced the green credit at a significance level of 1%. Furthermore, these factors had a significant impact on green economic growth. Similarly, the authors conducted tests using Bootstrap's 50,000 samples to analyze the elements that influence green credit

and economic development. The result shows that the Bootstrap test had used to verify the model and evaluate the reliability of the estimates. Bootstrap is a method of repeated sampling with substitution, and this study has the number of repeated samples  $N = 50000$ . Table 5 presents Bootstrap results showing that all indexes have small absolute values, so the deviation is minimal. Therefore, the estimated indexes meet the test requirements.

#### 4.2. Research Result Discussion

The authors proposed some policy implications to develop green credit to promote the local economy in Vietnam.

(a) Based on the research results, supporting policies affect green credit with a 1% significance and a standardized beta of 0.183; this research result is consistent with previous studies (Zibo et al., 2021; Masud et al., 2018). There are no general national regulations on criteria and lists of green projects for industries/fields according to the economic subsector system, as a basis for credit institutions to determine green credit granting. This is also the reason why credit institutions do not have a basis to fully compile investment banking resources for the green sector. Therefore, Vietnam continues to develop and perfect the legal framework to guide the implementation of green credit for credit institutions, which sets out standards on green recognition, a list of green industries/fields for general application, unify and serve as a basis for credit institutions to select, appraise, evaluate and supervise when granting credit cards. Creating a relatively complete legal framework is necessary for enacting laws and institutions. In addition, it is essential to study and develop an appropriate interest rate policy when giving green credit to prioritize support on interest rates and conditions for accessing credit capital for eco-friendly investment projects. In addition, there should be regulations on risk prevention in projects granting green credit.

Besides, it is also required to improve the role of the central bank and Vietnam over the entire banking system must be accurate. In the long term, it is necessary to improve administrative reform and communication work so that the banking industry is always open, transparent, and clear, creating favorable customer conditions. We are completing the

legal framework on green credit, introducing green credit standards, and providing a list of green industries and fields for organizations to apply the specific guidelines on assessing of credit institutions.

In addition, banks continue building a mechanism to support credit institutions to access long-term and preferential capital sources for long-term credits and preferential interest rates for green industries and fields. Strengthen coordination among relevant ministries and sectors in mobilizing resources for green credit, such as the state budget and international preferential capital sources. Strengthen the implementation of solutions to develop the corporate bond market and green bonds. Research to establish funds related to green growth and use the fund's capital to support credit institutions in providing green credit. Consider offering preferential policies and mechanisms to encourage credit institutions to offer green credit. Besides, there should be a support mechanism for businesses and people to easily access green credit, such as support for interest rates, taxes, fees, land, technology, and markets. Besides, administrative procedures are needed to create a stable and transparent investment environment for businesses. The SBV continues to study and complete guidelines for environmental and social risk assessment for many industries that do not yet have policies in credit-granting activities of credit institutions.

(b) Based on the research results, the legal framework affects green credit with a 1% significance and a standardized beta of 0.168; this research result is consistent with previous studies (Ai et al., 2020; Biswas & Das, 2018). Financing from financial institutions is frequently prohibitively expensive and comes with lengthy repayment periods when invested in environmentally friendly sectors, such as renewable energy and green building. Credit institutions often struggle with short-term mobilized capital and the regulatory need that they maintain a medium-to long-term loan-to-capital ratio. Therefore, Vietnam continues developing green credit institutions to diversify capital sources for green credit through cooperation between banks in credit complexes, green bond markets, and medium and long-term capital sources for green credit from financial institutions and international governments. Commercial banks must actively research and develop green credit

policies, diversify green credit products in line with banking activities and national strategies, and meet international requirements.

Moreover, it is necessary to quickly research and perfect the social-environmental risk assessment system in the credit appraisal process. Regularly monitor loans to detect improper loans or projects that threaten and cause severe environmental consequences. Strengthen staff training to ensure the appraisal work when granting green credit - facilitating and supporting businesses to access green credit through preferential interest rates, shortening loan procedures, or regulations on collateral. In order to boost the demand for green credit, policies are implemented simultaneously to facilitate firms' access to such credit. These policies include providing incentives on interest rates, taxes, fees, lending procedures, and collateral. The objective is to establish a conducive climate for corporations to allocate resources towards sustainable initiatives. In order to mitigate the risks associated with green projects, it is imperative to persist in the reform of administrative procedures and provide a transparent and conducive investment climate. Continue to research and apply measures to create real motivation for commercial banks to participate in green banking development.

Central banks globally have used several strategies to promote green credit and establish green banks. These measures include lowering the mandatory reserve ratio for green lending and expanding the overall loan portfolio for banks. Banks that have a substantial amount of environmentally friendly loans should implement a decrease in the interest rates for funds provided to banks. They should also conduct thorough evaluations of environmental risks when giving credit and raise the standards for the needed reserve ratio and liquidity. Banks provide loans to projects that cause substantial harm and destruction to the environment. This result is a good experience. Vietnam can refer to customers improving governance capacity, meeting international standards and best practices in the market, and applying the achievements of Industry 4.0 to products and services is also essential. Banks must synchronously deploy information technology and transformation projects as their operational processes. As in the case of Vietcombank, this bank has established an Implementa-

tion Committee and is studying to build a roadmap for digital banking transformation, initially developing and providing customers with many modern banking services.

The application of achievements of Industry 4.0 to banking activities is a trend and an indispensable requirement to create products and services that meet customer needs in the digital era, improve operational efficiency and competitiveness of commercial banks, and ensure sustainable development in the trend of international integration. To achieve these goals, commercial bank managers need to research and implement the following solutions: Firstly, it is necessary to develop a digital banking development strategy at the unit in the direction: that technology is ahead of banking operations, which clearly defines the digital banking model towards, roadmap and conditions and resources to invest in technology and change the type of business; management method changed when transforming from a traditional banking model to an intelligent banking model. Second, select the technology platform to be developed following the development strategy of each bank due to financial, human, and time constraints. Bank administrators must select suitable technology platforms at each step of development, based on the development plan and digital banking model. Furthermore, the pay structure in place is highly appealing to top-tier talent, particularly individuals with expertise in information technology and system control. This serves as a strong incentive for recruiting purposes. In order to satisfy the demands of implementing, operating, and controlling digital banks, it is necessary to conduct thorough screening, reorganize, train, and continuously retrain employees in traditional human resources.

(c) Based on the research results, management capacity affects green credit with a 1% significance, and the standardized beta is 0.156; this research result is consistent with previous studies (Cui et al., 2018; Haiyang, 2017). Building strategic business plans of credit institutions; Training human resources that require environmental expertise, researching and developing a variety of banking products and services to meet the requirements for granting green credit and mobilizing green finance. Therefore, Vietnam's developing green enterprises need to be aware of the

eco-economy that focuses on investing in research and applying environmental protection technology. Besides greening, businesses must also learn about green credit, loan conditions, and procedures and develop relationships with credit institutions to access capital for green investment opportunities. The number of businesses accessing green credit is still tiny. Small and micro-enterprises have limited financial resources and a lack of investment in recycling technology. In Vietnam, accounting had a few large, foreign-invested enterprises and multinational corporations.

Green economic initiatives typically need substantial capital investment and have a lengthy period of time before the initial investment is recovered. Additionally, these projects are also exposed to various dangers. Hence, it is imperative to examine supplementary legislation concerning risk requirements when credit institutions extend credit to green, ecologically sustainable company investment projects. When it comes to credit operations, the primary emphasis should be on activities such as lending, bank guarantee, and financial leasing. Furthermore, it is imperative to examine and establish a system of cooperation among financial institutions in providing green loans to guarantee sufficient financing for extensive green economic development initiatives.

Banks engage in research and development to establish a suitable interest rate policy for awarding green credit. They prioritize providing support in terms of interest rates and conditions for accessing credit capital for eco-friendly investment projects in markets. This includes offering preferred credits for projects aimed at reducing CO<sub>2</sub> emissions. In addition, it is important to generate and utilize environmentally friendly energy and goods. This may be achieved by initiatives aimed at conserving energy, water, and fuel, as well as efforts to minimize waste and pollution. Furthermore, it is crucial to invest in the construction and operation of renewable energy facilities, such as geothermal, bio-energy, hydropower, wind, and solar power. Regulations pertaining to risk mitigation in green credit initiatives.

## 5. Conclusion

The study has generalized some theoretical contents about green credit economic growth and

selected an appropriate research model from previous studies. Research results show three factors affecting green credit and economic growth with a significance level of 1 percent. This result is the basis to serve the process of planning the upcoming development strategy for the bank, helping the board of directors of commercial banks to have a view to choose the necessary solutions to improve green credit and, at the same time, contribute to sustainable economic growth. Research results showed that green credit is an opportunity and a challenge for businesses and banks. For businesses, green credit requires strict requirements from the bank to be eligible for funding.

Meanwhile, banks see this as an opportunity to expand their business and contribute to a more sustainable economy. Green credit is one of the critical links in implementing the national green growth strategy in the banking and financial system. Accordingly, the banking system is vital in mobilizing investment capital in green credit and supporting economic sectors to implement green growth projects to achieve sustainable economic development.

The limitations of the study and directions for further research: based on the results of this study, the article has made some specific contributions in both theoretical and practical aspects to the factors affecting the development of green credit. Based on the research results, the study also has inevitable objective limitations due to the time limit of research and survey data on managers. There are few banks due to the impact of the COVID-19 pandemic. This result is also the basis for further research directions. The research paper's subsequent development is to increase the survey sample size from different subjects. In addition, other factors such as risk management, financial capacity, and COVID-19 were added and compared with studies in other countries.

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## References

- Ai, H., Hu, S., Li, K., & Shao, S. (2020). Environmental regulation, total factor productivity, and enterprise duration: Evidence from China. *Business Strategy Environment*, 29(6), 2284-2296. <https://doi.org/10.1002/bse.2502>.
- Bing, Z., Yan, Y., & Jun, B. (2011). Tracking the implementation of green credit policy in China: Top-down perspective and bottom-up reform. *Journal of Environmental Management*, 92(4), 1321-1327. <https://doi.org/10.1016/j.jenvman.2010.12.019>.
- Biswas, T., & Das, M. (2018). Selection of hybrid vehicle for the green environment using multi-attributive border approximation area comparison method. *Management Science Letters*, 8(2), 121-130. <https://doi.org/10.5267/j.msl.2017.11.004>.
- Chao, X., Yuming, Z., & David, T. (2021). Green credit policy and corporate access to bank loans in China: The role of environmental disclosure and green innovation. *International Review of Financial Analysis*, 77(4), 35-46. <https://doi.org/10.1016/j.irfa.2021.101838>.
- Chen, Q. (2019). Has China's green credit policy been effectively implemented? An analysis of loan scale and cost based on two highs and one surplus enterprise. *Journal of Contemporary Finance and Economics*, 1(2), 117-130. [http://cfejxufe.magtech.com.cn/Jwk3\\_ddcj\\_en/EN/Y2019/V0/I2/117](http://cfejxufe.magtech.com.cn/Jwk3_ddcj_en/EN/Y2019/V0/I2/117).
- Cui, Y., Geobey, S., Weber, O., & Lin, H. (2018). The impact of green lending on credit risk in China. *Sustainability*, 10(6), 208-216. <https://doi.org/10.3390/su10062008>.
- Drobnjaković, M. (2013). Green banking. *Journal of Economic Development, Environment, and People*, 2(2), 29-39. <https://doi.org/10.11648/j.ijefm.20150301.15>.
- Hair, J., Anderson, R., Tatham, R., & Black, W. (2018). *Multivariate data analysis*. Prentice-Hall.
- Haiyang, Q. (2017). Research on the economic growth effect of green finance. *Economic Research Reference*, 3(8), 53-59.
- Hoen, H. V. (2014). Globalization and institutional change: Are emerging market economies in Europe and Asia converging? *Economics, Management, and Financial Markets*, 9(4), 44-66.
- Jianguo, F., & Fanli, L. (2019). Study on the relationship of green finance and sustainable economic

- development: Empirical analysis based on 30 provincial panel data in China. *Journal of the China University of Petroleum*, 35(1), 14-20.
- Kangshi, W., Xuran, S., & Fengrong, W. (2019). Development of green finance, debt maturity structure, and investment of green enterprise. *Financial Forum*, 24(7), 9-19.
- Lalon, R. M. (2015). Green banking: Going green. *International Journal of Economics, Finance, and Management Sciences*, 3(1), 34-42.
- Masud, A. K., Hossain, M. S., & Kim, J. D. (2018). Is green regulation effective or a failure: A comparative analysis between Bangladesh Bank (BB). *Sustainability*, 10, 1-19. <https://doi.org/10.3390/su10041267>.
- Masukujjaman, M., Siwar, C., Mahmud, M. R., & Alam, S. S. (2016). Bankers' perception of green banking: Learning from the experience of Islamic banks in Bangladesh. *Malaysian Journal of Society and Space*, 12(2), 144-153.
- Nejati, M., Amran, A., & Ahmad, N. H. (2014). Examining stakeholders' influence on micro, small, and medium-sized enterprises' environmental responsibility and its outcomes. *Management Decision*, 52(10), 2021-2043. <https://doi.org/10.1108/MD-02-2014-0109>.
- Qinglong, H., & Ya, W. (2020). Decomposition analysis of pm2.5 emission differences between regions of china based on socio-economic factors. *Quantitative and Technical Economics Research*, 37(6), 169-185. <https://doi.org/10.13653/j.cnki.jqte.2020.06.009>.
- Sa, X. (2020). International comparison of green credit and its enlightenment to China. *Green Finance*, 2(1), 75-99. <https://doi.org/10.3934/GF.2020005>.
- Singh, H., & Singh, B. P. (2012). An effective & resourceful contribution of green banking towards sustainability. *International Journal of Advances in Engineering Science and Technology*, 1(2), 41-45.
- Soundarrajan, P., & Vivek, N. (2016). Green finance for sustainable green economic growth in India. *Agricultural Economics*, 62(1), 35-44. <https://doi.org/10.17221/174/2014>.
- Sumei, L., Shenghui, Y., & Guangyou, Z. (2021). Does green credit improve the core competence of commercial banks? Based on quasi-natural experiments in China. *Energy Economics*, 100(4), 1-11. <https://doi.org/10.1016/j.eneco.2021.105335>.
- Wei, N., & Jinhua, S. (2014). An empirical study on the dynamic relationship between green finance and macroeconomic growth. *Seeker*, 14(8), 62-66.
- Weng, H. H., Chen, J. S., & Chen, P. C. (2015). Effects of green innovation on Environmental and Corporate Performance: A Stakeholder Perspective. *Sustainability*, 7(5), 4997-5026. <https://doi.org/10.3390/su7054997>.
- Xiaowei, M., Weiwei, M., Lin, Z., Yi, S., Yuping, S. & Huangxin, C. (2021). The impact of green credit policy on energy-efficient utilization in China. *Environmental Science and Pollution Research*, 28(1), 52514-52528. <https://doi.org/10.1007/s11356-021-14405-4>.
- Yu, P., Weifeng, X., & Guoqiao, Y. (2018). Green credit investment, green industry development, and regional economic growth: a case study of Huzhou city, Zhejiang province. *Zhejiang Social Sciences*, 18(3), 45-53.
- Zhang, Q., Xu, L., Wang, K., & Shi, X. (2021). What effect did the green credit policy have on China's energy or emission-intensive firms? *International Journal of Emerging Markets*, 9(4), 325-334. <http://hdl.handle.net/10453/152092>.
- Zhou, G., Liu, C., & Luo, S. (2021). Resource allocation effect of green credit policy: Based on DID Model. *Mathematics*, 9(15), 1-28. <https://doi.org/10.3390/math9020159>.
- Zibo, Y., Xiqing, S., & Maoyuan, X. (2021). Research on the impact of green finance development on green total factor productivity. *Journal of Statistics and Decision Making*, 21(3), 139-144.