

Factors affecting the development of green banks in Vietnam

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ABSTRACT

Green banking encourages sustainable economic development and stimulates environmentally friendly activities. The objective of this study is to assess determinants of green banking adoption in Vietnam. Data of the study was collected through a survey of officials and employees at commercial banks in Vietnam. The results of correlation and regression analysis indicate that the influence of macro factors on the level of green banking is the strongest, followed by the bank's financial capacity, government's supportive policies and green investment needs of business organizations. Conversely, the capacity of officials and the bank leader awareness on green banking do not significantly affect the level of green banking adoption in Vietnam.

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1. Introduction

Encouraging green banking is one of the pillars of green financing strategies in numerous countries to stimulate green growth towards sustainable development. Green banks are understood as banks that provide services associated with environmental commitments, conservation of natural resources and nature, or implementation of community benefit programs, or investment in production loans, green, clean (Singh & Singh, 2012; Drobnjaković, 2013; Lalon, 2015; Alzgool, 2019; Nguyena et al., 2019). Although there has been some researches on green banking and green banking development. However, these studies only stop at proposing green banks in terms of providing green banking financial services (Kaeufer, 2010; González et al., 2008) and the impact of providing green banking services to the efficiency of banking activities as well as contribute to environmental protection, ensure green and sustainable growth (Yang & Ahmed, 2009). There have been a number of studies showing the factors affecting the development of green banks, including: policies and regulations of the state related to green banks (Hoen, 2014); macro factors (Eyraud et al., 2013; Romano et al., 2017); green strategy of business organizations (Adelphi, 2016); bank size, financial resources of the bank, bank ownership (Barner and Han, 2013); green strategy of the bank (Ritu, 2014; Le et al., 2020); quality of human resources for green projects (Peter et al., 2005; Adelphi, 2016); perception of bank leaders on green banking development (Ritu, 2014; Ritchie, 2010). However, these studies mainly approach from a qualitative perspective and consider the impact of factors individually. There does not appear to be any comprehensive study of the factors affecting green banks using quantitative tools, especially in the case of developing countries. Therefore, the objective of the study is to apply

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the correlation and regression analysis method to assess the impact of factors affecting the level of green bank development in Vietnam.

2. Literature review

2.1. Government's supportive policies for green bank development

The government's supportive policies is an important determinant of green bank development (Hoen, 2014). Hee (2010) indicated that financing for green businesses and technology and developing green financial products contribute to the impact of green banks. In addition, UNEP (2009) argued that investors participating in green projects always face policy risks due to the uncertainty of environmental regulations and laws in now and future. Therefore, the study is going to test the hypothesis as follows:

H1: Government's supportive policies has a positive influence on the development of green banks.

2.2. Macro factors

Macro factors play a decisive role in promoting green investment and the development of green banks. Eyraud et al. (2013) pointed out factors such as: GDP per capita/USD, long-term nominal interest rates, relative prices of international crude oil, preferential prices of clean energy (feed-in tariffs), carbon pricing mechanisms and population are factors that create economic growth, thereby promoting green investment through a solid financial system. Romano et al. (2017) looked at environmental, social and economic factors to analyze the impact of applying green policies to renewable investments in developing countries and develop. Research by the authors has shown that the application of green policies in countries with different levels of economic development will have different effects. UNEP (2009) identified the risk groups that investors face when participating in green projects such as: (i) macroeconomic risks (problems of inflation or rising interest rates; (ii) political risk (political violence, possession or conversion). Therefore, the study is going to test the hypothesis as follows:

H2: Macro factors are positively affecting green bank development

2.3. Green investment needs of business organizations

Business organizations' needs and strategies have a direct impact on the development of banks in the green sector (Hee, 2010). Adelphi (2016) pointed out two main difficulties in Cambodia, China, India, Myanmar and Vietnam in the process of developing green finance: lack of green products and services from banks and lack of demand from businesses. Adelphi (2016) pointed out that those countries are having difficulty creating any green investment needs among domestic enterprises. Small businesses in particular often lack qualified accounting documents, information or collateral to receive loans. In many cases, these businesses often lack the knowledge to evaluate the significance of which green investment they will make. Besides, investing in eco-friendly equipment requires very high upfront costs and the conversion of old production methods. Therefore, green investment poses a big capital challenge for banks and business organizations in countries, especially developing countries. The study is going to test the hypothesis as follows:

H3: The demand for green investment by business organizations has a positive influence on the development of green banking.

2.4. Financial capacity of the bank

Due to the nature of the green project, it requires sufficient funding, long enough to solve the problem of expected profits and risks as well as arising problems related to the amount and duration of investment. Therefore, the financial capacity of the bank is the decisive factor for the development of green banks. The investment cost, scale, and payback period of the project are considered as a barrier in the development of green banks. Beck and Levine (2004) argued that the ratio of green loans to the private sector to GDP affects green bank development. In addition, factors such as rank, size and ownership of banks are the key factors that help banks have a vision and thereby develop a plan to implement green financial development (Barner & Han, 2013; Biswas & Das, 2018). Therefore, the study is going to test the hypothesis as follows:

H4: The financial capacity of banks has a positive influence on the development of green banks.

2.5. Perception of bank leaders on green banking development

IFC (2015) pointed out that one of the barriers to green banking development in developing countries is the lack of stakeholder knowledge on how to convert existing banks into green banks. like the benefits of green banking. Besides, according to Masukujjaman (2016), the lack of leaders and practical cases of green bank development were also barriers to the development of banks in developed countries. Ritchie (2010) argued that in many banks, financial institutions and investors, the general understanding of the financial impact of environmental risks remains ambiguous, even without developing the capacity to identify and quantify credit risks that may arise from green projects and therefore often underestimate the risks of "brown"

investments and overestimate the risks of green investment opportunities. Green projects, therefore, face significant competition from polluting but high-profit projects. G20 (2016) argued that a better understanding of environmental risks is necessary to minimize risks and allow for more effective implementation of environmental factors in the decision-making process and therefore promote financial activities for green investment. Therefore, the study is going to test the hypothesis as follows:

H5: Perception of bank leaders on green bank development has a positive effect on green bank development.

2.6. Capacity of bank officials and employees

The staff's ability to evaluate the green financial project plays an important role in influencing the financing of the project and therefore it is a factor affecting the development of green banks. Green project sponsors (green banks) often lack professional knowledge to determine whether the investment loan for a green technology activity is justified and assess the impact of the loan to the environment (Adelphi, 2016). Banks are also often reluctant to take risks in providing financing for technology activities that have not yet fully demonstrated the benefits of implementation. Therefore, the study is going to test the hypothesis as follows:

H6: The capacity of bank officers and employees positively affects the development of green banks.

3. Research methodology

3.1. Research model

The model of the research was built on the basis of inheriting previous studies on the groups of factors affecting the development of banks, green banks and criteria for measuring the development of green banks. This study examines the factors affecting the development of green banks including: Government's supportive policies for green bank development (CSHT); macro factors (YTVM), green investment needs of business organizations (NCDTX), financial capacity of the bank (NLTC), perception of bank leaders on green banking development (NTLD), and capacity of bank officials and employees (NLCB). In order to assess the level of green bank development, Kaeufer (2010) introduced a Green Bank model with 5 levels, namely: level 1: Performing extra activities, by sponsoring events. "Green" and participate in public activities; level 2: Separate project development and business activities, in which the bank develops separate green products and services (only a small proportion) to add to the list of banking products traditional; level 3: Systematic business activities in which most of the bank's processes and products comply with the "green" principle, the bank's organizational structure is designed to support impact. "Green" above 4 senses: people, processes, principles and goals; level 4: Initiative for strategic ecosystem balance, green banking is not limited to single businesses but is expanded to networks, alliances, community dialogues, or ecosystem to achieve the sustainability of social - environmental and financial factors; and Level 5: Initiative for balanced ecosystem initiative, in which green banking activities are similar to Level 4, but are actively and purposefully implemented rather than applied deal with external changes such as the strategic reach initiative at level 4. Thus, only at levels 4 and 5, the green bank model can be expressed at the bank's long-term business strategy, meeting meet both social and environmental standards, ensuring sustainable development and having spillover effects on other economic sectors in the green growth model. Fig. 1 presents the research model.

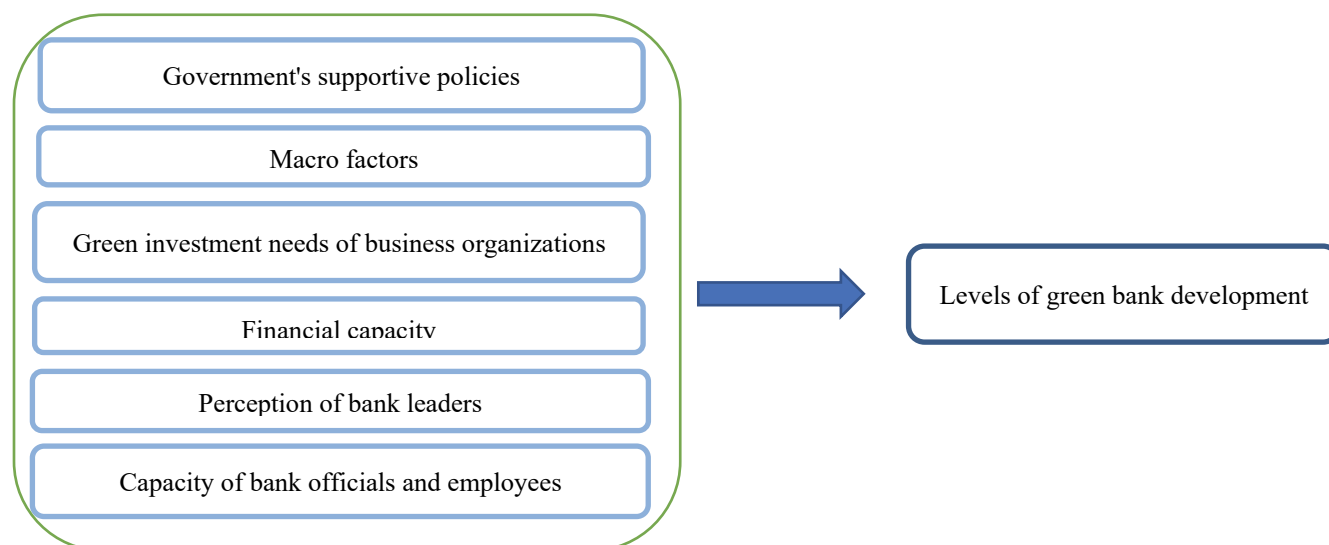


Fig. 1: Research model

3.2. Quantitative research method

3.2.1. Sample design and sampling methods

In this study, the sample was selected using a random sampling method. The survey subjects of this study are managers (directors, branch deputy managers, heads, deputy heads) and experienced staff working at commercial banks in Hanoi. Banks selected for the survey were Vietcombank, Vietinbank, Techcombank, Seabank, BIDV, Agribank, MB - Bank, VP - Bank, LienVietPostBank, SeABank, Construction Bank, etc. The data collection is done through survey questionnaires. Survey forms are sent directly or via email. The total number of votes issued in the study was 170, and the number of valid votes was 155. According to Tabachnick and Fidell (2012), for multivariate regression analysis: the minimum sample size to achieve is calculated by the formula of $50 + 8 \times m$ (m : number of independent variables). The study has 6 independent variables, so the minimum sample size was: $50 + 8 \times 6 = 98$ observations. Thus, the total number of samples in the study is 155 completely in accordance with the requirements set out and ensures the representativeness of the whole.

3.2.2. Data analysis

In order to test the scale models and assess the model's suitability in practice, as well as analyze the impact of factors affecting green bank development in Vietnam, the research uses the Exploratory factor analysis (EFA) and regression analysis, with the following steps: (i) analyzing the reliability of the scale using Cronbach Alpha's reliability coefficient; (ii) Exploratory factor analysis; (iii) correlation analysis; (iv) regression analysis.

4. Analytical results of factors affecting the development of green banks in Vietnam

4.1. The statistics of the demographic characteristics

The questionnaire in the official study was sent to experts who are currently leaders, officials working at banks in Hanoi and Ho Chi Minh City. The characteristics of the collected sample are described in Table 1. Specifically, 155 surveyed professionals have college degree or higher (accounting for 100%), of which 47.7% have postgraduate degrees, 58.7% specialize in female survey participants. The proportion of experts who participated in the survey with a leader of a department or higher accounted for 59.4%, of which 92 experts had working time at the current position less than 5 years (accounting for 59.4%), 63 experts had time working at current position for over 5 years (accounting for 40.6%); 63.2% of experts have worked > 10 years at the current bank; over 80% of experts have more than 10 years of experience in finance and banking. The percentage of experts participating in the survey accounts for over 65%.

Table 1

Descriptive analysis results

Position	Frequency	Percentage	Working duration at the current position	Frequency	Percentage
Board of manager	35	22.6	<5 years	92	59.4
Department leader	57	36.8	5-10 years	38	24.5
Staff	63	40.6	>10 years	25	16.1
Working duration at the bank	Frequency	Percentage	Working duration in finance and banking	Frequency	Percentage
<5 years	27	17.4	<5 years	5	3.2
5-10 years	30	19.4	5-10 years	22	14.2
>10 years	98	63.2	>10 years	128	82.6
Gender	Frequency	Percentage	Age	Frequency	Percentage
Male	64	41.3	<40	103	66.5
Female	91	58.7	40-50	41	26.5
Degree	Frequency	Percentage	>50	11	7.1
Undergraduate	81	52.3			
Postgraduate	74	47.7			

4.2. Testing the reliability of the scales

After collecting the data, the study analyzed the reliability of the scales in the model using Cronbach's alpha coefficient. Non-conforming variables excluded from the scales are variables with a correlation coefficient of the total and/or have Cronbach's Alpha if Item Deleted is greater than the Cronbach's Alpha value of the scale, including: CSHT7, YTVM4, NCDTX 10, NCDTX 8, NCDTX 9, NCDTX 4, NLCB1, CD1.10, CD1.9, CD1.8, CD1.7, CD2.9, CD3.12, CD3.13, CD3.2, CD3.8, CD4 .10, CD4.8, CD4.7, CD4.9, CD5.9, CD5.2, CD5.1. The value of the remaining variables in the scales is highly reliable with the total correlation coefficient > 0.3 and Cronbach's Alpha coefficient => 0.8.

4.3. Exploratory factor analysis

In this study, the factor extraction method used was "Principal Factoring" with the "Promax" rotation. The scale is accepted when $0.5 \leq \text{KMO} \leq 1$; Sig coefficient. = 0.000 of the Bartlett test indicates that observed variables are statistically significant; The total extracted variance is $\geq 50\%$ and the factor load factor ≥ 0.5 proves the appropriate reliability for factor analysis.

4.3.1. Exploratory factor analysis for independent variables

After analyzing Cronbach's Alpha, six factors (independent variables) with 41 observed variables were included for exploratory factor analysis (EFA). The results in Table 2 show that the KMO coefficient equal to $0.5 < 0.812 < 1.0$ proves the conformity of the EFA model; Bartlett test value is significant for Sig. = 0,000 indicates that the observed variables are correlated with respect to the total number of observations. The results of factor rotation matrix (11th time) in Table 3 show that all the remaining observed variables in the model have Factor Loading > 0.5 . The results of EFA analysis showed that 06 factors explained $51,725\% > 50\%$ of the variation of the data set. Therefore, the independent variables in the research model achieve convergent and discriminant values. Inappropriate independent variables (not guaranteed convergence and discrimination) are excluded from the model, including: NTL11, NTL10, NLTC7, NTL8, NCDTX5, NLTC6, NTL7, NCDTX6, CSHT1, CSHT2

Table 2

KMO and Bartlett's Test for independent factors (11th time)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.812
Approx. Chi-Square	2216.463
Bartlett's Test of Sphericity	df
	465
	Sig.
	.000

Table 3

Rotation Component matrix for independent factors (11th time)

	Factors					
	1	2	3	4	5	6
CSHT3						.804
CSHT4						.593
CSHT5						.610
CSHT6						.671
YTVM1	.652					
YTVM2	.790					
YTVM3	.809					
YTVM5	.707					
YTVM6	.586					
YTVM7	.664					
NCDTX1					.584	
NCDTX2					.840	
NCDTX3					.625	
NCDTX7					.610	
NLTC1			.706			
NLTC2			.831			
NLTC3			.798			
NLTC4			.700			
NLTC5			.501			
NTLD1		.516				
NTLD2		.677				
NTLD3		.755				
NTLD4		.760				
NTLD5		.673				
NTLD6		.647				
NTLD9		.555				
NLCB2				.615		
NLCB3				.803		
NLCB4				.627		
NLCB5				.667		
NLCB6				.625		

4.3.2. Exploratory factor analysis for dependent variables

After analyzing Cronbach's Alpha, five factors (dependent variables) with 36 observed variables were included for factor analysis. From Table 4, KMO test coefficient calculated from the sample (11th time) is $0.5 < 0.752 < 1.0$. Thus, the sample size of the survey is eligible to conduct factor analysis. Bartlett test value is significant for Sig. = 0,000 indicates that the observed variables are correlated with respect to the total number of observations.

Table 4

KMO and Bartlett's Test for dependent factors (11th time)

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.752
	Approx. Chi-Square	1647.484
Bartlett's Test of Sphericity	df	325
	Sig.	.000

To identify key factors, the study uses a factor extraction method based on Eigenvalue values. The result from EFA analysis (11th time) indicates that five factors explain 50,674% > 50% of the variation of the data set. Table 5 shows that all observed variables have Factor Loading > 0.5, the independent variables in the research model achieve convergence and discriminant values. The non-conforming dependent variables (which do not guarantee convergence and discrimination) are excluded from the model, including: CD2.5, CD2.4, CD2.10, CD3.9, CD5.4, CD5.3, CD3.1, CD3.4, CD1.4, CD3.3.

Table 5

Rotation Component matrix for dependent factors (11th time)

	Factors				
	1	2	3	4	5
CD1.1			.624		
CD1.2			.651		
CD1.3			.685		
CD1.5			.714		
CD1.6			.842		
CD2.1		.836			
CD2.2		.628			
CD2.3		.748			
CD2.5		.597			
CD2.7		.624			
CD2.8		.595			
CD3.5				.576	
CD3.6				.830	
CD3.7				.714	
CD3.10				.643	
CD3.11				.695	
CD4.1	.605				
CD4.2	.735				
CD4.3	.803				
CD4.4	.679				
CD4.5	.716				
CD4.6	.786				
CD5.5					.707
CD5.6					.688
CD5.7					.761
CD5.8					.623

4.3.4. Assessment of green bank development levels in Vietnam

To determine the level of development of green banks in Vietnam, the study conducted in-depth interviews with 20 banking experts and managers currently working at banks. Most of the opinions agree with the view that the level of green bank development in Vietnam is reaching level 3. This means that banks operate systematically, in which most of their processes and products comply with the "green" principle, the organizational structure of the bank is designed to support the "green" impact on four senses: people, processes, principles and goals.

4.3.5. Correlation and regression analysis results

4.3.5.1. Results of correlation analysis between dependent variables and independent variables

Table 6

Correlation between dependent and independent variables

		CD3	CSHT	YTVM	NCDTX	NLTC	NULD	NLCB
CD3	Pearson Correlation	1	.425**	.686**	.333**	.552**	.172*	.109
	Sig. (2-tailed)		.000	.000	.000	.000	.033	.177
	N	155	155	155	155	155	155	155
CSHT	Pearson Correlation	.425**	1	.459**	.087	.299**	.081	.130
	Sig. (2-tailed)	.000		.000	.282	.000	.318	.107
	N	155	155	155	155	155	155	155
YTVM	Pearson Correlation	.686**	.459**	1	.266**	.552**	.191*	.221**
	Sig. (2-tailed)	.000	.000		.001	.000	.017	.006
	N	155	155	155	155	155	155	155
NCDTX	Pearson Correlation	.333**	.087	.266**	1	.367**	.133	.482**
	Sig. (2-tailed)	.000	.282	.001		.000	.098	.000
	N	155	155	155	155	155	155	155
NLTC	Pearson Correlation	.552**	.299**	.552**	.367**	1	.191*	.287**
	Sig. (2-tailed)	.000	.000	.000	.000		.017	.000
	N	155	155	155	155	155	155	155
NULD	Pearson Correlation	.172*	.081	.191*	.133	.191*	1	.246**
	Sig. (2-tailed)	.033	.318	.017	.098	.017		.002
	N	155	155	155	155	155	155	155
NLCB	Pearson Correlation	.109	.130	.221**	.482**	.287**	.246**	1
	Sig. (2-tailed)	.177	.107	.006	.000	.000	.002	
	N	155	155	155	155	155	155	155

Table 6 shows that there is no linear correlation between the CD3 and bank staff's capacity (NLCB) because the sig. value between these two variables is greater than 0.05 (reaching value .177). Therefore, the variable NLCB should be removed from the research model. The Sig. value between the dependent variable CD3 and the remaining five groups of factors is less than 0.05, showing that the dependent variable CD3 and the group of independent variables have a linear relationship. In addition, the Pearson coefficient between these variables is positive, indicating a positive relationship. This means that the value of the independent variables increases, increasing the value of the dependent variable Level.

4.3.5.2. Regression analysis results between dependent variables and independent variables

The results of multiple regression analysis using the least square method in Table 7 show that there are 04 factors affecting the dependent variable of green bank development level including CSHT (at the 5% significance level), YTVM (at significance level of 1%), NCDTX (at significance level of 10%), NLTC (at significance level of 1%). The impact of NULD factor on the level of green bank development is not significant within the scope of the topic.

Table 7

Results of estimating the regression coefficient with the dependent variable of level 3

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.306	.378		.808	.420		
1 CSHT	.136	.064	.133	2.119	.036	.784	1.276
YTVM	.483	.073	.479	6.600	.000	.589	1.698
NCDTX	.106	.054	.118	1.957	.052	.853	1.172
NLTC	.169	.059	.202	2.891	.004	.635	1.575
NULD	.018	.066	.015	.266	.790	.949	1.053

a. Dependent Variable: CD3

Adjusted R Square = 0.538 (Table 8), means that the variables CSHT, YTVM, NCDTX and NLTC explained 53.8% of the variation of the green bank development dependent variable (Level 3). VIF (<10) and Durbin-Watson (1 <1,532 <3) values show that the model does not have multi-collinearity and there is no superlative autocorrelation between adjacent errors.

Table 8

R Square and Durbin-Watson coefficient

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Sig. F Change	Durbin-Watson	
					R Square Change	F Change	df1			
1	.734 ^a	.538	.523	.34568	.538	34.730	5	149	.000	1.532

a. Predictors: (Constant), NTLD, CSHT, NCDTX, NLTC, YTVM

b. Dependent Variable: CD2

The regression model reflects the impact of factors on the level of green bank development (Level 3) as follows: $CD = 0.306 + 0.133 * CSHT + 0.479 * YTVM + 0.118 * NCDTX + 0.202 * NLTC$. According to this equation, the effect of YTVM on the level of green bank development is strongest (+ 0.479), followed by NLTC (+0.202), CSHT (+0.133) and NCDTX (+0.118).

4.4. Conclusion and discussion

The empirical research results show that the level of green bank development in Vietnam is at level 3. It means that the bank's organizational structure is designed to support the "green" impact on four senses: people, processes, principles and goals. However, the score has not yet reached 4/5 - a low score, indicating that experts, bank managers have not completely agreed with the level of green bank development in Vietnam. This is entirely consistent with the reality that is happening in the Vietnamese banking system. At the moment, there is no bank in Vietnam that is truly considered a Green Bank, but only providing green services or lending activities in line with environmental commitments. Although in credit operations, banks have also considered environmental factors, impacts on emissions, air, water resources, living environment, etc. These services are a big part of building a green bank, however, with the reality in Vietnam, these services have not been widely developed and popularized and have not been strategized at commercial banks. Although the banks have investigated the regulations and guidelines of the Government, ministries and localities related to green growth, the current regulations are not specific and incomplete to be implemented green credit.

In addition, the research results also show that the macro factors (YTVM) has the largest impact on the development of green banks in Vietnam (standardized beta reaches + 0.479). This result is similar to that of Eyraud et al. (2013) and Romano et al. (2017). According to Eyraud et al. (2013) macro factors such as: GDP per capita/USD, long-term nominal interest rates, relative prices of international crude oil, Food tax assumption (FIT: feed-in-tariffs), carbon pricing mechanisms and population are factors that create economic growth, thereby promoting green investment through a solid financial system. Romano et al. (2017) pointed out a number of factors affecting green financial development such as Foreign Direct Investment (FDI), gross domestic product (GDP), electricity consumption, electricity price and net import. The financial capacity of the bank (NLTC) having the second largest impact on the development of green banks in Vietnam (standardized beta reaches + 0.202). This result is similar to the study of Barner and Han (2013). The authors argued that the size and ownership of banks are the key factors that help banks have a vision and from there develop a plan to implement green financial development.

Government's supportive policies for green bank development (CSHT) and green investment needs of business organizations (NCDTX) have an impact on the development of green banks in Vietnam with standardized beta is + 0.133 and +0.118, respectively. This result is similar to the findings of Hee (2010), Romano et al. (2017). Hee (2010) argued that the four components are financing green businesses and technology, developing green financial products and green investors, considering the environmental impacts of effective and effective lending decisions. The activities of the product markets that cause environmental waste are factors that influence green financial development. According to Romano et al. (2017), government intervention is mandatory for developing countries, while developed countries often have appropriate measures and policies in managing issues. environmental issues to be effective in operations and assigned to public organizations with the role of regulating policy strategy management.

The research results show that green bank development is an indispensable trend in the present and future period. In order to develop a green bank, besides the macro factors, the Government's policies should aim to encourage and create many incentives for "green" businesses or activities. On the other hand, there is also a need for a comprehensive system of documents and regulations with close links between agencies to create a favorable legal corridor for green banks to operate. Besides, the "demand" for green development is extremely important. Being aware of the importance of protecting the environment and protecting natural resources will stop businesses moving towards green production instead of chasing profit, creating large

carbon emissions and causing environmental pollution. Therefore raising awareness for businesses about the environment is important in Vietnam today

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