

The role of public policy, CSR and customer engagement towards green banking at commercial banks in Ho Chi Minh City

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Abstract. The current study aims to focus on the role of public policy, corporate social responsibility, customer engagement and perceived environmental value in promoting green banking. This study analysed and evaluated the importance of public policy, corporate social responsibility and customer engagement in green banking using a dataset of 368 individuals who are customers at commercial banks in Ho Chi Minh City. Utilising basic quantitative research statistical analyses such as Cronbach's alpha reliability assessment, exploratory factor analysis, measurement model and partial least squares structural equation modelling from SPSS and SMART PLS software, the research results indicate that (1) Public policy positively influences Corporate Social Responsibility (CSR); (2) CSR positively influences customer engagement and perceived environmental value and green banking; (3) customer engagement positively influences the perceived environmental value and green banking and (4) perceived environmental value positively influences green banking. Theoretically, this research could significantly contribute to the advancement of the academic field of CSR especially in the landscape of dynamic business environments by responding to the call for more extensive research on CSR and green banking highlighted in previous studies. The results suggest managerial implications for both sides of the government and commercial banks to contribute to the sustainable development of green banking.

Keywords: Commercial banks, Corporate social responsibility, Customer engagement, Green banking, Perceived environmental value, Public policy.

1 | INTRODUCTION

Public policy shapes and influences the banking industry as much as the economy (Nelson, 2008). This policy typically consists of monetary and financial policy rules that impact interest rates, exchange rates and money supply along with actions taken by the government and regulatory authorities to keep an eye on the country's financial and economic activity. Variations in these regulations may affect banks' lending, profitability and risk management operations. A favourable setting for investments for banks could be produced by public policy through economic growth and investment stimulation including tax breaks, investment assistance laws and rules about economic infrastructure (Wirba, 2023). Besides, public policy produces guidelines and standards for controlling bank operations with the purpose of preserving and ensuring the financial system's stability and transparency which helps lower risks and increase customer and investor trust (Wirba, 2023). Generally, public policy significantly impacts economic development and the business environment for banks (Nelson, 2008; Wirba, 2023). Consequently, public policy has a significant impact on CSR. These consist of mandates or incentives that urge businesses to participate in CSR endeavors such as offering goods and services that improve the community, preserve the environment and enhance social justice or equity as well as additionally providing financial assistance or tax breaks to businesses that participate in CSR (Nelson, 2008; Wirba, 2023).

On the other hand, CSR has become an essential strategy for businesses seeking to develop lasting relationships with consumers and improve their sustainable development (Carroll & Shabana, 2010). The incorporation of CSR tenets with the digitalization within the banking industry commonly known as "green banking" has gained more attention in recent times (Mehta & Handriana, 2024).

Organisations are struggling with pressures for ecologically sustainable development in an era characterized by increasing environmental awareness. This responsibility is particularly clear in the banking industry where businesses are expected to provide exceptional financial services and demonstrate a strong commitment to CSR especially environmental management. Consequently, banks will promote increased customer engagement with the bank. The convergence of these motivations has created a multidimensional research field, exploring the complex interaction between CSR, customer engagement, perceived environmental value and green banking (Mehta & Handriana, 2024).

Green banking which promotes environmentally friendly practices in banking activities has become increasingly popular (Chen, 2022). These issues include digital efforts to minimize environmental pollution in alignment with sustainable environmental protection trends (Xie, Bagozzi, & Gronhaug, 2015). This transformation is changing the operational practices of banks with the banks themselves playing an active role in environmental and social protection. Recently, the engagement of banks with their social and environmental responsibilities in the banking industry has gradually formed trends in green banking and digital green banking (Sun et al., 2020).

In the banking sector, after the financial crisis of 2008, researchers focused on CSR (Ettinger, Grabner-Kräuter, Okazaki, & Terlutter, 2021). Although previous studies explore the links between CSR and customer engagement, there is still a lack of research focus on the impact of green banking.

There is still limited research effort that aims to explore the role of public policy, CSR and customer engagement in fostering the adoption of green banking especially within an emerging economy such as Vietnam despite the increasing attention of academics and researchers to the research topic of CSR across different sectors. Based on this gap, the current study is motivated to focus on the role of public policy, CSR, customer engagement and perceived environmental value in promoting green banking. In specific, this paper identifies and analyses the impact of public policy on CSR, the impact of CSR on customer engagement and perceived environmental value and green banking, the influence of customer engagement on perceived environmental value and green banking. Most importantly, this study provides fresh insights into the impact of public policy on CSR, thus forming the foundation for later studies examining factors influencing green banking. The research questions are stated as the following:

1. What is the relationship between the CSR of a bank and customer engagement?
2. How is the CSR of a bank correlated to customer engagement, perceived environmental value and green banking, the influence of

customer engagement on perceived environmental value and green banking?

3. How is customer engagement correlated to perceived environmental value and green banking?
4. What is the relationship between perceived environmental value and green banking?

The study has revealed the roles of Public Policy (PP), CSR and customer engagement in relation to green banking at commercial banks, specifically: (1) Public Policy positively influences CSR; (2) CSR positively influences customer engagement (EN), perceived environmental value and green banking (GB); (3) customer engagement positively influences perceived environmental value and green banking and (4) perceived environmental value and green banking positively influence green banking.

Theoretically, this research could significantly contribute to the advancement of the academic field of CSR especially in the landscape of dynamic business environments over time by investigating the roles of public policy, CSR, and customer engagement in promoting green banking. This research responds to the call for more extensive research on CSR and green banking highlighted in previous studies. This also sets the inspiring stage which encourages further theoretical developments in CSR and suggests additional empirical research on how public policy, CSR and customer engagement influence green banking in emerging economies like Vietnam.

The paper structure is designed with the following sections: introduction, theoretical framework and research hypotheses, research methodology, research results and conclusion.

2 | THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

Public policy is the policy of the state, arising, existing and developing together with the emergence, existence and development of the state. Public policy plays an important role in nation-building and development. This article discusses the nature, role and significance of public policy. The basic role of public policy is manifested in its effectiveness as the primary tool for the state to fulfil its functions and tasks, maintain the existence and development of the state, develop the socio-economic and serve the people (Wirba, 2023).

CSR is a rule-based activity undertaken voluntarily by entrepreneurs to help businesses contribute to social goals as a humanitarian enterprise, acting for the community by participating and supporting voluntary activities or performing ethical activities (Mehta & Handriana, 2024). CSR involves the interaction between organisations and society where organisations benefit from the social benefits (such as utilising infrastructure, transportation and industry development for business cooperation, etc.) and in return, organisations have obligations to society (Lacey, Kennett-Hensel, & Manolis, 2015). According to Carroll and Shabana (2010), CSR includes economic, legal, ethical and philanthropic responsibilities. Subsequent studies expand these areas to include various fields such as social and cultural issues, employee welfare, environment and product safety. However, CSR is a list of the efforts and reputation of an organisation related to their social engagement or stakeholders' perception of their environmental and social responsibility (Xie et al., 2015).

Customer engagement has emerged as an important concept in contemporary marketing acting as a bridge for organisations to connect and maintain long-term relationships with customers (Zainol, Omar, Osman, & Habidin, 2016). Customer engagement enhances performance and provides organisations with a real competitive advantage (Brodie, Hollebeek, Jurić, & Ilić, 2011). Accordingly, the strong relationship between customers and organisations is manifested in interaction where customers interact to maintain a strong relationship with the organisation becoming an integral part of developing the relationship between the two parties. It is understood to be an outward expression of behaviours that go beyond mere financial transactions.

In today's era, green banking is used as a powerful tool to minimize environmental harm, including various strategies such as paperless transactions, remote banking services and the development of environmentally friendly financial products. In essence, green banking which involves financial institutions using digitalization to coincide with the decrease of environmental degradation is essentially the highest level of cooperation between technical advancements and sustainability goals. According to studies carried out within this area, green banking can improve an organization's standing with the public, retain customers and improve overall sustainability (Agrawal & Bhatia, 2019). Plenty of studies have identified the obstacles and opportunities related to the advancement of green banking and its potential to lessen the environmental effect of banks.

2.1 | Research Hypotheses

2.1.1 | The Relationship between Public Policy and Corporate Social Responsibility

The development and promotion of CSR in the banking sector is heavily influenced by public policy. Government and regulatory regulations and policies have a significant impact on how banks carry out and improve their CSR initiatives (Nelson, 2008; Wirba, 2023).

Public policy constantly establishes legal mandates or benchmarks for banking operations, including CSR. Banks may be required to proactively engage in CSR activities such as offering financial products and services that benefit the community, preserving the environment and advancing sustainable development through legislation protecting customers, managing financial risks and financial reporting (Nelson, 2008).

Public policy may additionally provide incentives or support to banks so they can get involved in CSR initiatives. Tax regulations may provide deductions or tax breaks for banks that engage in community or environmental improvement projects (Nelson, 2008; Wirba, 2023).

Therefore, the author proposes the following hypothesis:

H₁: Public policy positively influences the CSR of banks.

2.1.2 | The Relationship between Corporate Social Responsibility and Customer Engagement

According to earlier research, companies that practice social responsibility frequently draw in and keep consumers which raises customer engagement (Bhattacharya & Sen, 2004). CSR consists of variety of activities such as commitments to philanthropy, equal employment opportunities, community support, ethical corporate practices, environmental sustainability and the establishment of permanent relationships with customers (Maignan & Ferrell, 2004). CSR initiatives contribute to trust and engagement among consumers. They also positively correlate with customer loyalty. Customer engagement has been viewed as a key idea in the area of marketing literature as a means of creating consumer value and understanding modern marketing strategies (Zainol et al., 2016).

Enhancing the business's image and reputation is one way that CSR positively affects customer engagement. Customers are looking to businesses for compassion and support as they become more conscious of social and environmental issues. Businesses can attract attention and loyalty from customers by demonstrating an engagement to CSR through specific actions (Bhattacharya & Sen, 2004).

Furthermore, CSR can also create a positive and encouraging environment from the customer's perspective. When customers see the businesses they support both as a provider of products and services and also as a partner in improving society and the environment, they tend to increase their engagement and loyalty to that business. This can lead to increased sales and long-term customer relationships (Bhattacharya & Sen, 2004).

Therefore, the author proposes the following hypothesis:

H₂: The CSR of a bank positively influences customer engagement.

2.1.3 | The Relationship between Corporate Social Responsibility and Perceived Environmental Value and Green Banking

CSR is becoming an increasingly indispensable part of the business strategy for organisations worldwide. One notable benefit of CSR is its positive impact on the perceived environmental values of both communities and organisations (Chu, Chen, & Gan, 2020; Leenders & Chandra, 2013; Lin & Chang, 2013).

Dhamayanthi and Teresa (2018) identify factors influencing the implementation of green banking in Malaysia and emphasize the necessity for banks to enhance their CSR role in significantly promoting green banking.

CSR can foster perceived environmental values within the community. Organisations both contribute to environmental improvement and also foster a collective sense of environmental responsibility within the community by engaging in social activities such as environmental clean-ups, planting or organizing events to raise awareness about environmental protection (Chu et al., 2020; Lin & Chang, 2013). Customers who view a company as sincerely dedicated to environmental responsibility are more inclined to interact with and support that company making perceived environmental value (PEV), a crucial element in influencing customer behaviors and attitudes (Lin & Chang, 2013).

Porter and Linde (1995) assert that appropriate environmental regulations can drive innovation within organisations, thereby enhancing their competitiveness and operational efficiency. Similarly, Chen (2022) and Kam-Sing and Tong (2012) affirm that CSR indeed plays a role in promoting increased awareness of environmental value and green banking.

The role of CSR in promoting green banking can be supported by the theory of legitimation which explains the rationale after the corporation's action of disclosing CSR to obtain positive and lethargic value from the community. Legitimacy is a corporate management system focused on aligning with society, government, individuals and community groups. This theory posits that an organisation is an integral part of the community, and thus must adhere to social norms. This adherence such as disclosing CSR can help the company to enhance its legitimacy (Dewi & Dewi, 2017).

Therefore, the author proposes the following hypotheses:

Hypothesis H₃: CSR of the bank positively influences perceived environmental value.

Hypothesis H₄: CSR of the bank positively influences green banking.

2.1.4 | The Relationship between Customer Engagement and Perceived Environmental Value

Customer engagement is a critical part of promoting *perceived environmental value* by endorsing and supporting products and services from organisations committed to environmental protection, generating positive pressure to drive actions and decisions affecting the environment (Jabbour, Jugend, de Sousa Jabbour, Gunasekaran, & Latan, 2015; Khashe et al., 2015; Mehta & Handriana, 2024).

One method in which customer engagement influences perceived environmental value positively is by developing market demand for environmentally friendly products and services. Consumers with a high awareness of sustainable manufacturing, transportation and consumption of goods not only develop a market for them but also encourage suppliers to upgrade their social and environmental standards throughout the supply chains (Blok, Wesselink, Studynka, & Kemp, 2015; Mehta & Handriana, 2024; Wesselink, Blok, & Ringersma, 2017).

Besides, people and organisations are more likely to support environmental protection initiatives and laws only if they are aware of the effects of their decisions and actions on the environment (Mehta & Handriana, 2024; Wesselink et al., 2017).

When organisations recognize that perceived environmental value is both an important factor in customer choice as well as a business and social opportunity, they tend to promote measures and strategies actively, thus supporting environmental protection (Khashe et al., 2015; Mehta & Handriana, 2024; Wesselink et al., 2017).

Therefore, the author proposes the following hypothesis:

H₅: Customer engagement positively influences perceived environmental value.

2.1.5 | The Relationship between Customer Engagement and Green Banking

Customer engagement is essential to the promotion of green banking by generating positive pressure and influencing the bank's business strategy. Customers these days assess banks not only on the financial goods and services they provide but also on their commitment to sustainable development and environmental protection (Agrawal & Bhatia, 2019; Mehta & Handriana, 2024). Demanding and mandating financial products and services that have a positive environmental impact is one way that customer engagement positively promotes green banking. Consumers are prioritizing more and more banks that offer green project-supporting products and services such as energy-efficient house loans and credits for green technology companies. Banks are being forced by a growing need to create and provide environmentally friendly goods and services that encourage digitalization and sustainability in their business operations (Maignan & Ferrell, 2004; Mehta & Handriana, 2024). Furthermore, banks are prompted to integrate environmentally friendly and sustainable procedures into their business strategies through customer engagement. Customers impose tremendous pressure on financial institutions to advance social and environmental standards in their business operations by patronizing and selecting environmentally conscious banks (Bhattacharya & Sen, 2004; Mehta & Handriana, 2024).

Therefore, the author proposes the following hypothesis:

H₆: Customer engagement positively influences green banking.

2.1.6 | The Relationship between Perceived Environmental Value and Green Banking

Perceived environmental value is an important factor to take into account when examining the interaction among CSR, customer engagement, and green banking. The term perceived environmental value (PEV) has several meanings; it captures the attitudes, opinions, and levels of

comprehension that customers have about environmental concerns as well as how committed an organization is to environmental stewardship (Trivedi, Mattupalli, Eversole, & Leach, 2021). PEV is essential in shaping customer attitudes and behavior because consumers are more likely to support and engage with a company they perceive to be really committed to environmental stewardship (Lin & Chang, 2013).

Perceived environmental value has a major role in supporting green banking especially in the context of the arising shift in the economy towards sustainable and environmentally friendly growth. Among other factors, PEV has a positive impact on green banking by creating community and pressure from customers (Babiak & Trendafilova, 2011; Trivedi et al., 2021). Banks must adapt by delivering goods and services that are environmentally friendly to contribute to environmental preservation efforts. Examples of such offerings comprise developing digital financial technology and giving preferential loans for green projects (Saeed et al., 2019).

Vidyakala (2020) studies the influence of environmental practices such as training and energy-saving measures on the daily functions of green banks emphasizing the importance of raising public awareness of green banking services. Thus, perceived environmental value is one of the issues worth considering when increasing green banking. Sharma and Choubey (2022) develop a conceptual model and demonstrated that perceived environmental value also influences green banking. Furthermore, perceived environmental value plays a crucial role in promoting banks' adoption of green and sustainable principles in their business operations. This includes integrating environmental and social standards into credit processes, investing in environmentally beneficial projects and supporting the development of digital technologies to optimize banking operations in an environmentally friendly manner (Khashe et al., 2015; Wesselink et al., 2017).

Therefore, the author proposes the following hypothesis:

H₇: Perceived environmental value positively influences green banking.

3 | RESEARCH METHODOLOGY

The study applies specific methods as follows:

Qualitative research involves synthesizing theories and findings from previous researchers related to the author's research topic to propose hypotheses and build a research model. Next, the author discusses ideas with 10 experts to refine and supplement the measurement scales as well as the research model to make them more suitable for the research context.

Quantitative research is conducted by the author through basic statistical analysis methods such as Cronbach's alpha reliability assessment, Exploratory Factor Analysis (EFA), a measurement model and Partial Least Squares Structural Equation Modelling (PLS-SEM) from survey data of 400 customers at commercial banks in Ho Chi Minh City, yielding 368 valid responses. The quantitative research results reflect the specific roles of public policy, CSR and customer engagement, perceived environmental value in green banking at commercial banks. Table 1 presents the measurement scales of the factors in the research model.

Table 1: The scales of factors in the research model

No.	Factors	Code	Scales	Source
1	Public policy (PP)	PP1	Government policies are encouraging banks with social responsibilities.	Nelson (2008) and Wirba (2023)
2		PP2	Government are offering tax incentives for organisations contributing to environmental improvement.	
3		PP3	Government regulations require environmental protection in business operations.	
4	Corporate social responsibility (CSR)	CSR1	Banks are complying fully with legal regulations when operating.	Maignan and Ferrell (2004), Wirba (2023) and Mehta and Handriana (2024)
5		CSR2	Banks are adhering to legal regulations in providing products and services.	
6		CSR3	Banks are adhering to ethical principles in their work.	
7		CSR4	Banks are actively participating in social activities and serving the community.	
8	Customer engagement (EN)	EN1	You are willing to provide feedback for the development of green banking products and services for the bank.	Bhattacharya and Sen (2004) and Brodie et al. (2011)
9		EN2	You are interested in the green banking products and services of the bank.	
10		EN3	You want to introduce the bank's green banking products and services to friends and family.	
11		EN4	You prioritise using green banking products and services over other products and services of the bank.	
12	Perceived environmental value (PEV)	PEV1	The bank is environmentally conscious by maintaining cleanliness in the workplace.	Lin and Chang (2013), Jabbour et al. (2015) and Mehta and Handriana (2024)
13		PEV2	The bank cares about environmental issues.	
14		PEV3	The bank values environmental protection activities.	
15		PEV4	The bank encourages employees to enhance their environmental awareness.	
16		PEV5	The bank participates in clean green programs in the area.	
17	Green banking (GB)	GB1	The bank maximises electronic transactions to reduce unnecessary paperwork.	Dhamayanthi and Teresa (2018), Agrawal and Bhatia (2019) and Mehta and Handriana (2024)
18		GB2	The bank encourages customers to use electronic transactions to minimise unnecessary documents.	
19		GB3	The bank applies modern equipment to meet customer transaction needs.	
20		GB4	The bank regularly introduces and advises on digital products and services to customers.	
21		GB5	Remote banking services are developing increasingly (e.g. online transfers, online deposits, etc.)	

Data is not available online due to the data privacy requirement. However, it could be shared upon request.

The minimum sample size is determined as 4 or 5 times the number of variables based on the number of variables in the research model and following the sample size theory for studies applying exploratory factor analysis (EFA) (Hoang & Chu, 2008). Therefore, according to this study, the minimum sample size is $5 \times 21 = 105$ samples. However, the author conducted a survey of 400 samples and collected 368 valid samples to ensure persuasiveness and increase reliability. Table 2 presents descriptive statistics results as follows:

Table 2: Descriptive statistics results

Variables	Classification	N	%
Gender	Male	196	53.3
	Female	172	46.7
Education level	Intermediate, college	24	6.5
	University	235	63.9
	Postgraduate	109	29.6
Age	Below 30 years old	69	18.8
	From 30 to 40 years old	139	37.8
	From 41 to 50 years old	114	31.0
	Above 50 years old	46	12.5
Source: SPSS analysis results.			

Out of the 479 individuals surveyed, 172 females were accounting for 46.7% and 196 males accounting for 53.3%. The most common educational level was university comprising 63.9%. The most common age group was between 30 and 40 years old accounting for 37.8%.

4 | RESEARCH RESULTS

The actual Cronbach’s alpha reliability assessment is the first step in conducting the PLS-SEM structural model. With 21 variables from 5 factor groups included in the analysis (including: Public Policy, CSR, customer engagement, perceived environmental value and green banking), all variables meet the requirements with the total variable correlation coefficients exceeding 0.3. Additionally, all Cronbach’s alpha coefficients are above 0.7 from 0.786 (public policy) to 0.930 (customer engagement). Table 3 presents the results of Cronbach’s alpha assessment as follows:

Table 3: Results of Cronbach’s alpha

Factors	The initial number of variables	Cronbach’s alpha	The number of valid variables
Public policy (PP)	3	0.786	3
Corporate social responsibility (CSR)	4	0.905	4
Customer engagement (EN)	4	0.930	4
Perceived environmental value (PEV)	5	0.898	5
Green banking (GB)	5	0.916	5
Source: SPSS analysis results.			

Thus, the study has 21 appropriate variables belonging to 5 factors to be included in the exploratory factor analysis (EFA) to explore the measurement structure of the 5 factor groups: Public policy, CSR, customer engagement, perceived environmental value and green banking after evaluating the reliability of Cronbach’s alpha. The results of exploratory factor analysis (EFA) are presented in Table 4.

Table 4: Results of exploratory factor analysis (EFA)

KMO value		0.939
Bartlett’s test	Chi-square	5,506.510
	df	210
	Sig.	0.000
Source: SPSS analysis results.		

The Exploratory Factor Analysis (EFA) with a Kaiser-Meyer-Olkin (KMO) measure of 0.939, greater than 0.5 confirms that the EFA results are entirely appropriate for exploring the structure of the scales. Additionally, the Bartlett’s test has a Chi-Square value of 5,506.510 with a Sig. coefficient less than 5% indicating that the EFA results are statistically significant.999999.

Table 5: Results of factor rotation

	Components				
	1	2	3	4	5
GB5	0.885				
GB4	0.884				
GB2	0.878				
GB1	0.832				
GB3	0.770				
PEV5		0.854			
PEV3		0.851			
PEV4		0.837			
PEV1		0.813			
PEV2		0.801			
EN3			0.921		
EN2			0.914		

	Components				
	1	2	3	4	5
EN1			0.894		
EN4			0.869		
CSR4				0.909	
CSR1				0.856	
CSR2				0.825	
CSR3				0.814	
PP2					0.853
PP3					0.843
PP1					0.812
Eigenvalue	9.758	1.997	1.639	1.326	1.202
% of variance	46.468	9.508	7.804	6.317	5.725
Cumulative %	46.468	55.976	63.780	70.097	75.822
Source: SMARTPLS analysis results.					

Furthermore, the results of the exploratory factor analysis (EFA) indicate a stopping point at the fifth factor with an eigenvalue of 1.202 which is greater than 1 affirming that the variables included in the analysis are organised into 5 factor groups. The total variance explained at the fifth factor is 75.822% > 50% demonstrating the extent of the data variation explained to be 75.822%.

Furthermore, as seen in Table 5, the factor rotation findings demonstrate that the 21 variables evaluated are precisely categorized into 5-factor groups: Public policy, CSR, customer engagement, perceived environmental value and green banking.

Next, the authors proceeded to use SMARTPLS software to implement a SEM model.

Table 6: Results of outer loading

Variables	CSR	EN	GB	PEV	PP
CSR1	0.875				
CSR2	0.902				
CSR3	0.882				
CSR4	0.868				
EN1		0.874			
EN2		0.923			
EN3		0.926			
EN4		0.914			
GB1			0.870		
GB2			0.893		
GB3			0.867		
GB4			0.834		
GB5			0.868		
PEV1				0.868	
PEV2				0.857	
PEV3				0.839	
PEV4				0.831	
PEV5				0.815	
PP1					0.863
PP2					0.813
PP3					0.830
Source: SMARTPLS analysis results.					

J. J. F. Hair, Hult, Ringle, and Sarstedt (2016) argue that the outer loading coefficient needs to be greater than or equal to 0.7 for an observed variable to be considered of high quality. According to the results in Table 6, we observe that all observed variables meet this requirement as their outer loading coefficients are greater than 0.7. Therefore, all variables belonging to the 5 factor groups: Public policy, CSR, customer engagement, perceived environmental value and green banking satisfy the criteria for conducting PLS-SEM structural model analysis.

Table 7: Results of reliability and convergence

Factors	Cronbach's alpha	rho_A	Composite reliability	Average variance extracted (AVE)
CSR	0.905	0.907	0.933	0.778
EN	0.930	0.932	0.950	0.827
GB	0.917	0.919	0.938	0.751
PEV	0.898	0.900	0.924	0.709
PP	0.786	0.799	0.874	0.699
Source: SMARTPLS analysis results.				

Based on the results in Table 7, the Cronbach's alpha and Composite reliability values of the factors are all above 0.7, and the AVE values are all above 0.6. This indicates that the factors ensure reliability and convergence for inclusion in the PLS-SEM structural model analysis.

Furthermore, discriminant validity values demonstrate the distinctiveness of a structure when compared to other structures within the model. The traditional approach to assessing discriminant validity is to use the square root of AVE as suggested by Fornell and Larcker (1981) whereby the square root of AVE should be greater than the correlation coefficient between latent variables.

Table 8: Results of discriminant

Factors	CSR	EN	GB	PEV	PP
CSR	0.882				
EN	0.618	0.910			
GB	0.612	0.555	0.867		
PEV	0.576	0.526	0.574	0.842	
PP	0.361	0.402	0.246	0.314	0.836

Source: SMARTPLS analysis results.

Based on [Table 8](#), it is evident that the correlation coefficients between the factors are all smaller than the square root of the AVE values. This indicates that the factors ensure discriminant validity when included in the PLS-SEM structural model analysis.

[Table 9](#) presents the results of PLS-SEM model as follows:

Table 9: Results of the PLS-SEM model

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
CSR -> EN	0.618	0.616	0.041	15.228	0.000
CSR -> GB	0.322	0.327	0.061	5.294	0.000
CSR -> PEV	0.406	0.411	0.055	7.387	0.000
EN -> GB	0.209	0.206	0.059	3.527	0.000
EN -> PEV	0.275	0.271	0.057	4.829	0.000
PEV -> GB	0.278	0.276	0.059	4.741	0.000
PP -> CSR	0.361	0.362	0.044	8.155	0.000

Source: SMARTPLS analysis results.

The results of the PLS-SEM model indicate that the relationships between the factors all show Sig. (P values) smaller than 5%. Thus, the relationships between the factors are statistically significant.

Additionally, all regression coefficients are greater than 0 indicating positive relationships (positive effects) between the factors.

According to the results of the PLS-SEM model, the public policy factor positively influences CSR with a regression coefficient of 0.361. This conclusion is comparable to other studies that have shown the same outcome such as the research conducted by [Wirba \(2023\)](#).

Regression coefficients of 0.618, 0.406 and 0.322 for customer engagement, perceived environmental value and green banking respectively show that the CSR component has a favorable impact.

This finding can be corroborated with [Bhattacharya and Sen \(2004\)](#), [Dhamayanthi and Teresa \(2018\)](#) and [Chu et al. \(2020\)](#) when compared to earlier investigations.

Perceived environmental value and green banking are greatly affected by customer engagement with regression values of 0.275 and 0.209, respectively. This outcome agrees with the conclusions drawn by [Mehta and Handriana \(2024\)](#), [Khashe et al. \(2015\)](#) and [Wesselink et al. \(2017\)](#).

Finally, the perceived environmental value factor favourably predicts green banking with a regression coefficient of 0.278. This conclusion is thought to be comparable to the findings produced by [Trivedi et al. \(2021\)](#) and [Sharma and Choubey \(2022\)](#) when compared to previous studies.

Table 10: The results of a multicollinearity test

Factors	CSR	EN	GB	PEV	PP
CSR		1.000	1.884	1.618	
EN			1.740	1.618	
GB					
PEV			1.610		
PP	1.000				

Source: SMARTPLS analysis results.

Besides, according to [Hair, Risher, Sarstedt, and Ringle \(2019\)](#), VIF (variance inflation factor) < 3 suggests that the PLS-SEM model does not have a multicollinearity problem (refer to [Table 10](#) for the results of a multicollinearity test).

Consequently, the following might be used to summarize the research findings following the completion of the PLS-SEM linear structural model analysis: (1) Public policy has a positive influence on CSR; (2) CSR has a positive influence on customer engagement, perceived environmental value and green banking. (3) Customer engagement has a positive influence on perceived environmental value and green banking and (4) perceived environmental value has a positive influence on green banking.

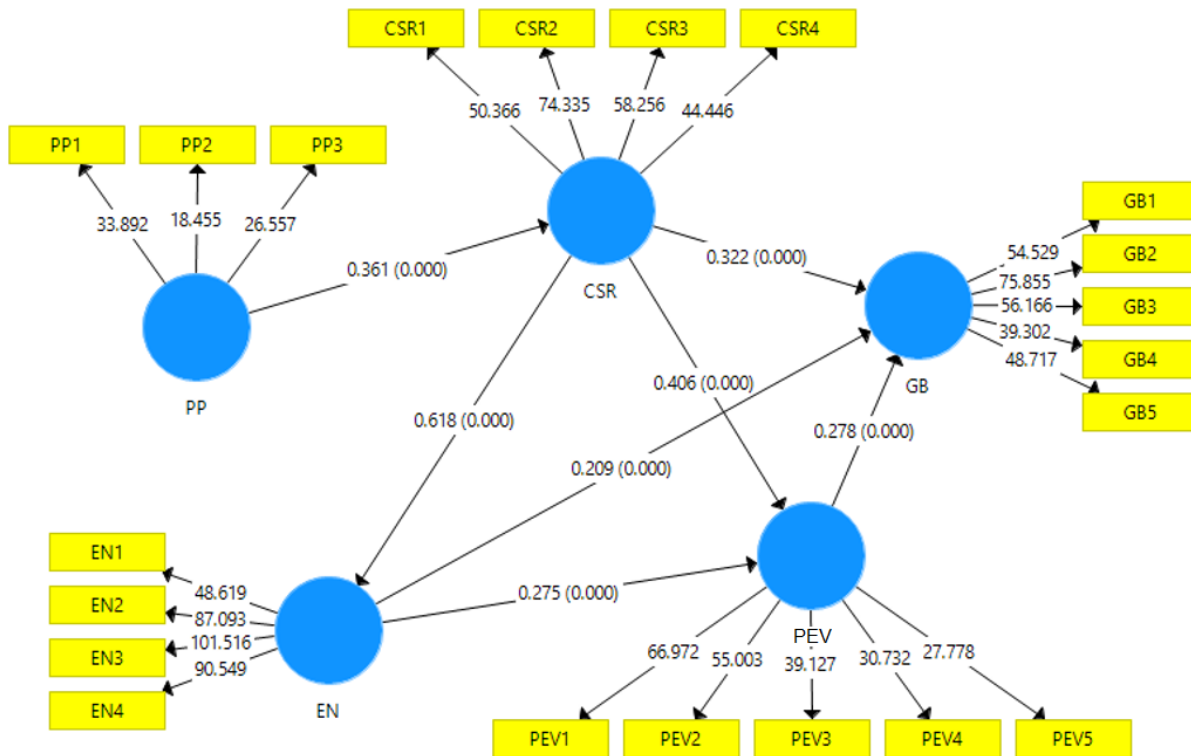


Figure 1: Results of the PLS-SEM model

Source: SMARTPLS analysis results

5 | CONCLUSION

This study ascertains the contributions that customer engagement, CSR, and public policy make to green banking at Ho Chi Minh City's commercial banks based on the combination of qualitative and quantitative research approaches. The researchers also carry out qualitative research to modify the scales and model to better suit the study setting. The study uses quantitative analyses including statistics, factor analysis and regression analysis using Partial Least Squares Structural Equation Modelling (PLS-SEM) with a dataset comprising 368 observations from customers of commercial banks in Ho Chi Minh City.

The main results of the study show the roles of Public Policy, CSR and customer engagement in green banking at commercial banks as follows: (1) Public policy positively influences CSR; (2) CSR positively influences customer engagement, perceived environmental value and green banking. (3) Customer engagement positively influences perceived environmental value and green banking. (4) Perceived environmental value positively influences green banking. The connection of these results highlighted the vital role of public policy in fostering green banking, especially through the mediating variable of CSR as well as the direct impact of CSR, customer engagement and perceived environmental value on green banking.

Based on the identified research gap as stated by previous studies (Ettinger et al., 2021; Mehta & Handriana, 2024), this research has the potential to notably develop the academic understanding of CSR, particularly within the ever-changing business landscapes over time by examining the influence of public policy, CSR, and customer engagement on the adoption of green banking. From a theoretical perspective, it underscores the demand for more thorough research on CSR and green banking as indicated by previous studies. This lays the groundwork for future theoretical advancements in CSR and excites further empirical research on the impact of public policy, CSR and customer engagement on green banking within developing nations such as Vietnam.

The authors suggest managerial implications for both sides of the government and commercial banks to contribute to the sustainable development of green banking based on the enhancement of different variables such as public policy, CSR and customer engagement as follows based on the results achieved from the research model:

Referring to the government, implementing management implications for public policy involves

The government can establish specific policies and legal regulations requiring banks to carry out CSR activities. Clearly defining CSR goals and standards will help banks to understand their responsibilities better and provide the motivation to fulfil them. Furthermore, the government can create reward mechanisms and recognition for banks with outstanding achievements in CSR implementation. This will incentivize and encourage banks as well as other organisations in the business community to engage positively in CSR activities. Legal regulations will govern the behaviour of commercial banks when considering the environmental aspects of projects before disbursement and will monitor the environmental impacts of lending projects closely, potentially halting lending for projects with serious environmental consequences. The government also needs to enact regulations on coordination mechanisms between commercial banks and ministries and sectors regarding sharing information on the environmental impacts of production and business activities of enterprises. This information can then serve as the basis for commercial banks to make credit decisions. The government should continue to develop and update a list of specific priority sectors and industries to support or restrict the green banking development strategy to provide credit facilities for commercial banks during their operations.

The government can establish a recommendation and monitoring system to assess and monitor banks' CSR implementation in accordance with legal regulations. This ensures that commercial banks comply with regulations and assess the effectiveness of their CSR activities. The government needs to specify regulations for commercial banks regarding issuing annual reports on CSR or enhancing the assessment of how a project impacts the environment and society such as reviewing environmental and social risks when appraising lending projects, restricting lending to projects with high environmental risks and closely monitoring the environmental and social risks of ongoing projects. The government also needs to stipulate specific timelines for commercial banks and the innovation of internal operations towards increasing environmental friendliness, including energy and water conservation, enhancing the use of information technology in banking operations such as reports, documents, and electronic materials or

handling waste according to green processes. Regulations for commercial banking activities also need to include targets for the proportion of green loans in the total credit outstanding serving the green banking objectives of Vietnam in the future.

The government can provide tax incentives or financial support to banks for implementing projects and activities beneficial to the community and the environment. Commercial banks have preferential sources of capital to provide credit to businesses investing in energy-saving projects or using green technologies through refinancing or capital recapitalization activities. This both enhances CSR and also promotes the sustainable development of the economy.

Referring to commercial banks, implementing management implications for corporate social responsibility involves the following:

Banks always adhere to all legal regulations in their operations. All activities are conducted following procedures and legal standards from verifying customer identities to financial transactions. This ensures transparency, fairness and safety for both the bank and its customers.

Banks commit to complying with all legal regulations when providing products and services to customers. All processes and policies are established based on clear and transparent legal foundations to ensure fairness and safety for both the bank and its customers. According to current legal regulations and standards, this includes verifying customer identities, managing financial risks and protecting personal information.

Banks also respect and implement ethical principles in all activities as well as complying with legal regulations. This includes transparency, honesty and fairness in transactions with customers and partners. Banks also commit to ensuring the safety of the customers and protecting their interests as well as contributing to the sustainable development of the community. In this way, banks build and maintain long-term trusted relationships with all stakeholders.

Additionally, banks are both businesses and also active members of the community. Banks contribute to building and developing the community such as by supporting education, healthcare and local economic development by participating in social activities. This helps to strengthen relationships and trust between banks and the community, fostering sustainable development for all.

Referring to the commercial banks, implementing management implications for customer engagement involves

Banks always welcome and acknowledge customers' feedback on green banking products and services. This helps the bank to understand customers' needs and desires, thereby developing and improving products and services to reflect the most sustainable and green values. This collaboration helps to create a positive and trustworthy financial environment.

Banks always pay special attention to their green banking products and services. They emphasize developing financial solutions to support projects and businesses that have a positive impact on the environment as well as focusing on providing energy-saving and environmentally friendly financial products.

Banks are both financial partners and also companions. They are willing to support customers in introducing their green banking products and services to their friends and family. This demonstrates the bank's engagement in spreading the message of environmental protection and sustainable development, creating a supportive community that values green initiatives.

Banks commit to supporting customers who prioritize using green banking products and services. Banks encourage and motivate customers to choose these products and services, thereby supporting environmental protection goals and promoting sustainable development by providing incentives and favourable policies. This reflects the bank's engagement in building a better future for the environment and the community.

6 | LIMITATIONS

This study has certain limitations such as a relatively small sample size and a research scope despite striving to improve the research to the best of our ability due to limitations in time and other research. Therefore, subsequent studies could increase the sample size and expand the research scope to other provinces and cities as well as more commercial banks in different provinces and cities to increase the applicability of the research results.

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Institutional Review Board Statement:

The Ethical Committee of the Ho Chi Minh University of Banking, Vietnam has granted approval for this study (Ref. No. 030524).

Transparency:

The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests:

The authors declare that they have no competing interests.

Authors' Contributions:

Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

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