The central bank roles to drive sustainable banking in Thailand: Focus on green loan policy

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PRUKPRAKARN, Tanaracht

THESIS

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KDI School of Public Policy and Management

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Committee in charge:

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ABSTRACT

THE CENTRAL BANK ROLES TO DRIVE SUSTAINABLE BANKING IN THAILAND

: FOCUS ON GREEN LOAN POLICY

By

Prukprakarn, Tanaracht

The world environment has been damaged by human activities and natural disasters. This is further exacerbated by climate change. The concept of sustainable banking is one instrument to deal with climate change in the banking sector. Governments and private companies are applying these goals in their policy and business strategies. Because Financial Institutions are critical players to support and provide sufficient funding for the project. The linkage between climate change, the banking system, and central banks has become closer. Central banks are gaining a critical role in driving their sustainability in the financial system. However, the scope of sustainable banking and bank's businesses is enormous. This study focuses on banks' green loan policies.

The study will analyze the factors which affect the green loan policies and enhance the resilience and sustainability of the environment and the banking sector. From the research question "What determines the green loan policy from a bank perspective", increasing business opportunities, better risk management, and enhancing their reputation among stakeholders are 3 factors that will incentivize banks to integrate green loan policy. The data are divided into 4 parts - bank performance analysis, stock price response, consumer survey, and bank employee survey. It looks at the effect of green policy on business opportunities and risk management as well as the effect between financial performance and sustainability performance. The bank's reputation from the investors' point of view is measured through the effect of environmental

events/news and environment disclosure score on the bank's stock price. Customers' attitudes on the reputation of green loan granting banks and linkage between obstacles and effective policy in employees' view are examined. To examine the linkage between green loan and business opportunities, the financial data, sustainability score, environment events/news, and stock prices of 5 significant banks in Thailand from 2015 – 2019 was used. The data is then loaded into the SPSS software for analysis and hypothesis testing.

This study aims to explore how are green loans increase the financial performance of Thai banks, and but does not confirm that green loans lead to better credit risk management. Environmental factors also have an impact on banks' reputations. Environmental disclosure score affects the stock price which represents investors' perception. The customers' attitude influences the reputation of green loan-granting banks. And the right obstacle defining leads the effectiveness of the central bank policy support. The Central bank should launch the policy to enhance interest in green lending. The green loan policies should have an impact on the bank's financial performance, risk management, and/or reputation directly or indirectly to motivate banks to grant green loans. The voluntary policy will be boosted through non-financial incentives and financial incentive policies. However, the central bank should define the root cause of obstacles in designing practical policies. Regulation is not the only key to drive green lending. The banks' reputation from the perspectives of both customers and investors confirms the concept that they are interested in green banking concept. The Central bank's event or reward system on environmental concerns such as green banking reward will put pressure on the sector and increase awareness of green banking. It will also signal that the central bank is focusing on a new target.

As green banking is a new concept in Thailand, the number of studies and data on the green loan is remarkably limited. The conclusion of the impact of the green loan on those motivating factors may early to decide the conclusion. Recommendations for improving the research are provided in the last part of this research.

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Chapter 1: Introduction

The world environment has been damaged by human activities and natural disasters. The exponential growth of the population led human activities to grow at a similar level. It has raised the pressure on stabilizing the earth system. Climate change, higher extinction rate, ozone layer depletion, plastic pollution, drought, and air pollution are some examples of human activities' impact on the earth (Rockström, et al., 2009). Many governments are facing obstacles with regard to environmental degradation. There is a lot of movement from the public and private sectors to solve these problems to reduce Greenhouse Gases (GHGs) Emissions, which is the main cause of global warming.

In 1992, the United Nations (UN) established the United Nations Framework Convention on Climate Change (UNFCCC). It is the first international forum that dealt with climate change especially carbon dioxide emission. (United Nations, 1992) The world adopted the principle from the UNFCCC forum into many international treaties, protocols, acts, and agreements such as the Kyoto Protocol and Paris agreement. In 2000, the Millennium Development Goals (MDGs) included environmental sustainability as one of the UN goals (United Nations). Sustainable Development Goals (SDGs) was established in 2015 which developed from MDGs (United Nation, 2018). This new target consists of 6 environmental issues. Governments and private companies are applying these goals in their policy and business strategies.

Many articles show the effect between climate change and the real sector, such as the change of sea temperature reducing varieties and number of marine animals which will affect the fishery sector, more frequent and stronger storms, the impact of climate change, deteriorating both geography and economy (Rockström, et al., 2009).

Governments are applying SDGs as part of the national agenda. However, the structural transformation is slow. A huge amount of funding is required. Hence, Financial Institutions are considered as critical players in order to support and provide sufficient funding for projects. The financial sector provides adaption to climate change and enhances its financial resilience to climate-related risks (Park &

Kim, 2020). Banks will be able to reduce climate change-related risks and protect, mitigate, and adapt to climate change. The concept of sustainable banking is one instrument to deal with climate change in the banking sector (Park & Kim, 2020).

On the international stage, many central banks have gained the important role of mitigating climate risks by adopting initiatives into their policy. They can intervene in the market by issuing regulations, policies, principles, and/or guidelines. In China, France, and Japan, the green banking policy is mandatory for all financial institutions. While Belgium, Sweden, United Kingdom (U.K.), and Norway apply it voluntarily. These interventions have the purpose of driving banks to enhance sustainable banking (Park & Kim, 2020).

In Thailand, the Bank of Thailand (BOT), the Thai Central bank, acts as the coordinator to support the industry to have a code of conduct. The banking industry already has the responsibility of implementing lending guidelines as one tool to drive the banking sector to sustainable banking (The Thai Bankers' Association, 2019). Currently, BOT has not launched any interventions in the policy to drive sustainable banking by law.

The linkage between climate change, the banking system, and central banks is very close. Central banks are gaining a critical role to drive their sustainability in the financial system over the past decade. The driving of sustainable banking in the international and domestic stages are forcing BOT to plan the roles to develop sustainable banking in Thailand **("The Central Bank roles to drive sustainable banking in Thailand: focus on Green loan policy")**. However, the scope of sustainable banking is enormous. It includes the Environment (Green), Social, Economic, and Governance dimensions. The study focuses on the environment (green) policy, which is concentrated on the bank's policy to mitigate, adapt to climate change and other environmental issues (UNEP, 2016).

Even the scope of green policy on bank's businesses is the major focus of this study, but the concept of universal banking allows banks to provide many financial services. The example of services that

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universal banking provide are loans, asset management, underwriting, bank assurance, and financial advisory (Kagan, 2020). The varieties of a business unit may allow a very massive scope of the study. The research should concentrate on the main business of banks which is loan granting (Bank of Thailand, 2018b).

The purpose of this study is to analyze the factors which affect the development of sustainable banking in Thailand. Hence, it will focus on the Green Loan/Financing Policy. Through this study, the gap that the Bank of Thailand can progress the effectiveness of sustainable growth in the banking industry will be revealed. The Thai banking sector will emphasize environmental concerns in its operation. The study would enhance the resilience and sustainability of the environment and the banking sector. Banking and Finance will be the key sector that motivates the real sector to mitigate and adapt climate change their business horizons. This is a great chance to investigate the motivative factors which lead the sustainable banking that will fit both the Thai banking culture and international standard.

To develop the green loan policy in Thailand, BOT should launch the policy to motivate Thai banks and industries to participate. The initiative policy should reduce the challenges and increase the willingness of banks to cooperate or apply the green strategy in their procedures. The challenges may occur in the form of unclear standards of green loans or the varieties of green principles. The insufficient policies and frameworks would not stimulate banks to take action. These will push the bank to a complicated situation to determine their direction. Before the policy is launched, obstacles and key success factors should be identified.

From the research question **"What determines the green loan policy from a bank perspective"**, there are 3 factors (Numnonda, 2017) that will stimulate banks to integrate the green loan policy into their process implementation which are increasing business opportunities, better risk management (credit risk and legal risk), and enhancing their reputation among stakeholder (investor, customer). This research will use quantitative research methodologies.

To examine the linkage between green loans and business opportunities, the financial data and sustainability score of 5 significant banks in Thailand from 2015 – 2019 is used. The significant banks are the Bank of Ayudhya, Bangkok Bank, Kasikorn Bank, Krungthai Bank, and Siam Commercial Bank (Bank of Thailand, 2017). The financial performance consists of **Total assets (TA), Net Profit (NP), Return on Asset (ROA), Return on Equity (ROE), and Non-performing loan ratio (NPL)** (Waber, 2016) which are shown in the Annual Reports of those banks. The sustainability score is the **ESG Rating** which is measured by Bloomberg or Thaipat (Jamprasert, Kuwalairat, Srivisal, & Sthienchoak, 2020). **The amount of Green Loans** (from the annual sustainability report) is also used to find business opportunities from green financing.

To show that green loans can develop risk management in the organization, the relationship between **the NPL ratio is** compared to **the green loan ratio** from 2015 – 2019.

The reputation on stakeholder perspectives can be measured by **stock prices (2015 – 2019) and sustainability-related news, and ESG rating** for investor's view. For Clients, **the questionnaire is used to find the customer's perspective/satisfaction** on green banking. At least 100 online questionnaires are distributed through social media and the Instant Message application.

In addition, the survey on the bank's employees (compliance or loan analyst) is conducted to find the current barriers, possible policy instruments, and desired activities from the Central bank. The survey is conducted through online channels and distributed through Social media and Instant Message applications to 40 compliances, loan analysts, or loan-related employees of Thai commercial banks.

The paper proceeds as follows. Section 2 is the introduction of green banking and green loan, and relevant literature reviews. Section 3, the roles and challenges of BOT with regard to the green loan policy will be shown. Research methodology and hypothesis development are presented in Section 4. 5th section will contain the information about how the research collected and gathered each data. The result of the research on each data (Secondary and Primary data) will be described in Sections 6 and 7, respectively. The

final section will discuss the recommendations, the current barriers, and gaps of study, the implication for policymakers (BOT) and Thai financial institutions which include 15 Thai commercial banks, and further research suggestions.

Chapter 2: Literature Review

Climate change is becoming a critical concern in many countries. Sustainable banking is the financial sector's tool to deal with environmental problems. Banks play an important role to mitigate and adapt the risk of climate change through granting loans. To drive sustainability there are two paths to develop a framework by regulator-driven and industry-driven (IFC, 2019). This sector will introduce the correlation of the central bank, green banking, and green loan to environmental change.

Central Bank and Environment

Global warming and other environmental issues are becoming critical issues (Ghosh & Ghosh, 2018). To enhance sustainability, authorities should play an important role to support it (Jha & Bhoome, 2013). After the recent financial crisis in 2008, the role of central banks expanded in order to maintain the financial system and became the last resort of banking (Park & Kim, 2020). Based on the above literature, Central banks still have the major responsibility to maintain prices, perform macroeconomic regulations, and other financial responsibilities. The environmental risks became financial risk-related – direct (physical) and indirect (transition) (Prudential Regulation Authority (PRA), 2018). The physical risk is the direct effect of climate change on the financial sector. It affects the physical asset such as flooding which may lead to the financial loss of the bank's collaterals (maintenance cost) (Park & Kim, 2020). Trending to a low-carbon economy will lead to the adjustment of firm values and assets called transition risks (Lewis & Keil, 2019). They said the examples of transition risk change in the business model or consumer behavior will have a positive or negative effect on revaluation.

The risk may affect the monetary, financial, and payment system stability. Since environmental risks will impact the financial sector, the risk from environmental change should be a concerning issue in the regulatory mandate (NGFS, 2018) However, the environment risk-adjusted financial or economic policy may be out of the central banks' mission in some countries. Volz (2017) explained that there is some possible conflict between integrating the green and sustainability issue in the central bank's mandate.

The Action of International Organizations (World Bank, International Finance Corporation, Network for Greening the Financial System (NGFS)) on the environment issue led many central banks to develop the financial sector with environmental considerations. The papers show the scope of the central bank's mission and examples of recommendations and implications to deal with climate change in many countries – both for central banks and the private sector.

NGFS (2019) recommended central banks, policymakers, and supervisors develop sustainability in their operations. The authorities can lead sustainability by managing their investment in the central bank's portfolio. The portfolio can manage following the Sustainable and Responsible Investment (SRI) principles (NGFS, 2019). It will help the central bank to study SRI before calling the financial institutions to take into account the mitigation of Environment, Social, and Governance risks (ESG risk) (NGFS, 2019). The central bank of Bangladesh – "Bangladesh Bank (BB)" – is enhancing sustainable banking by implementing the policy in the BB headquarters and its branches (Ghosh & Ghosh, 2018) This practice of the Central bank is a clear signal to the financial institution under-regulated. Ghosh mentioned that the practice of BB is indicative of effective communication of the Bangladesh financial sector on green banking activities.

For the regulatory-driven approach, many central banks intervene in the market through issuing green banking policies and guidelines. There are many levels of interference in the banking sector. The code of conduct can be divided into 2 groups – voluntary and mandatory, which focus on 4 policy areas (macroprudential, individual safety and soundness, market making and, credit allocation) (Park & Kim, 2020). In China, France Japan, and Bangladesh, the Green banking policy is mandatory for all financial institutions. While Belgium, India, Sweden, United Kingdom (U.K.), and Norway apply it as voluntary (Ghosh & Ghosh, 2018; Park & Kim, 2020).

Sustainable Banking

The increasing environmental, social and governance awareness from both the government and the public pushes banks to be more concerned with sustainability. The private sector is understanding the concept and benefit of sustainability in both the short-run and the long-run. Sustainability will increase the

value of financial and economic in the short-run, and environmental and social value in long run (IFC, 2007). Banks will finance funding for many projects. Most businesses are borrowing funds from the banking sector. Banks can be the motivator for real sectors to mitigate and adapt to climate change in their day-to-day operation (IFC, 2007; Ghosh & Ghosh, 2018; Numnonda, 2017). In the past, banks have a perspective on the environment as an additional management cost for banks (defensive banking). No banks in developed countries stay at this stage (Jeucken, 2001). Nowadays, banks see it as development, as a growth opportunity with all sustainability activities (sustainable banking) (IFC, 2007).

Green banking is one of 4 dimensions of sustainable banking. It will focus on the bank's policy to mitigate, adapt to climate change and other environmental issues (UNEP, 2016). The bank objective will move from profit-oriented to profit-oriented with responsibility (Rajesh & Dileep, 2014). The scope of green banking includes the bank's responsibility on the environment and integration of environmental policy to the business operations (Bai, 2011). Many banks start to transform from defensive banking (1st phase) to sustainable banking (4th phase) by working on internal environmental care (preventive banking – 2nd phase). It is creating environmental awareness within the organization (going paperless, reducing energy consumption, having in-house energy efficiency, and other in-house environment management) (Ghosh & Ghosh, 2018; Jeucken, 2001; Shaumya & Arulrajah, 2017). Jeucken (2001) said offensive banking – 3rd phase, will focus on profitability and on being customer-centric with extra investment/activities on the environment. These extra activities can be sustainable in some projects such as environmental investment funds or financing in sustainable energy. Finally, green banking will enable the formulation of policy & governance to integrate into their day-to-day operations (risk assessment, credit procedure, credit analysis).

The benefits of environment-oriented banks include the reduction of the negative environmental impact, carbon footprint, energy consumption, quality, and conservation of life (Shaumya & Arulrajah, 2017). With the transformation to green banking, financial institutions will expand the range of their benefits by direct profits (opportunity to introduce and innovate the financial instruments), indirect profits (reducing risk, better risk management) and improve their brand value (better reputation for investors,

customers, and stakeholders) (IFC, 2007; Jeucken, 2001; Numnonda, 2017; Park & Kim, 2020; Shaumya & Arulrajah, 2017)

Green Loans

Financial Institutions provide many services for consumers and businesses (Barone, 2020) (IFC, 2007). Many banks use universal banking activities which provide comprehensive financial services including loans, asset management, underwriting, bank assurance, and financial advisory (Kagan, 2020). Barone (2020) and IFC (2007) said the bank is the immediate institution that supports the flow of money from the surplus sector (depositors) to the deficit sector (borrowers). Therefore, lending is the main banking business activity.

The prime responsibilities of a bank on the environment are investments and loans (Thombre, 2011). Financial Institutions are the critical players for funding and supporting activities that will mitigate or adapt to climate change and enhancing its financial resilience to climate-related risks (Park & Kim, 2020). The regulation authority gains more awareness of green finance. In the SBN Progress Report (IFC , Sustainable banking Network (SBN), 2018) it is revealed that only 3 countries have a concrete definition of Green finance products. IFC (2019) showed an increasing number of members (19 out of 22) that defined green finance definition.

A clear definition will have an essential role in guiding decision-making in the related focus. To calculate the benefits from the green loan, a clear definition should be formulated. Green lending is mainly focused on the area of renewable energy, energy efficiency, and clean technology (low-carbon) project (Numnonda, 2017). On the international stage, each region's international organization and central banks define green loans differently. The differences of definition are broadly from the defined specific definition of the green project to widely definition and framework without any detail (EUROPEAN COMMISSION , 2017). To support the strengthening of sustainable finance frameworks in the financial sector, The development of green finance definition is a key priority (IFC, 2019).

In this context, many central banks have to respond to climate change and environmental issues both through in-house activities and other actions (within the financial sector) even there are some challenges on the regulatory and supervisory framework (Volz, 2017). The 3 benefits to shifting to green banking will be the key factors to implement the framework that enhances green loans. The clear definition of a green loan is key to the success of the green loan framework.

Motivational Factors

As the above paragraph mentioned, there are 3 benefits of green banking - expanding business opportunities, improvement of risk management, and enhancement of reputation. Many papers are explaining about the correlation between banks and those benefits.

Business opportunity expansion

The sustainability bank can expand the bank's benefit by direct and indirect profit. They can generate innovative products and financial solutions in a new market, and increase the potential for business development such as new lending areas on a low-carbon project (IFC, 2007).

The business benefit can measure various numerical information. The higher environment effort firms are inclined to have better performance (Seng & Vithessonthi, 2017). The Global Alliance for Banking on Values (GABV) (2017) compared the performance between Valued-Based Banks (VBBs) and Global Systemically Important Banks (GSIBs). By ROA and ROE, the results are indifferent. By the Loan to Total Asset (LTA), VBBs grant loans to the real sector around 2 times of GSIBs. However, the LTA is not appropriate to compare in Thailand. Currently, LTA is high (78%), it does not show the correlation between GABV guidelines and Thai banks (Numnonda, 2017).

In China, green loans drive the banking system greener (Cui, Geobey, Weber, & Lin, 2018). It affects bank performance both in sustainability (sustainability score) and financial indicators (Total Asset, Net Profit, Return on Asset, Return on Equity, and Nonperforming Loan Ratio (Weber, 2016 (b)). This working paper shows that both performances have a strong relationship especially in Total assets and Net

Profit. The green credit policy force Chinese banks to have more consideration for the environment and the social dimension (Waber, 2016).

Improvement of risk management

Risk can impact business success and reputation (IFC, 2007). Banks may face risk directly and indirectly. The physical risk (Prudential Regulation Authority (PRA), 2018) has a direct negative impact on the clients' collateral if it is located in an environmentally damaged area. However, there is some indirect risk related to the financial and operational condition of the bank (IFC, 2007). It is credit risk, market risk, and reputation risk. 68% and 83% of commercial banks faced credit risk and loss of reputation respectively (IFC, 2007). The sustainability risk management systems and practicing risk reduction, increase portfolio quality and gains more creditability for the bank.

To reduce Non-Performing Loans (NPL), appropriate social and environmental risk management is required (Numnonda, 2017). The management should be considered in the credit analyst processes. In 2017, The China Banking and Insurance Regulatory Commission (CBIRC) demonstrated a decrease in the NPL ratio from green loans by around 0.37% (Cui, Geobey, Weber, & Lin, 2018). Cui et al's paper in 2018 uses the NPL ratio as the credit risk indicator to measure the impact of green lending ratio and bank credit risk. NPL ratio is used because it is the widely accepted risk measurement that banks hold (Cui, Geobey, Weber, & Lin, 2018). BOT defines NPL as a loan where the debtor cannot repay the principal or interest over 90 days from the contractual due date (Bank of Thailand, 2018a). There are many empirical uses of the NPL ratio as the credit risk indicator. Cui et al research reveals a higher green loan ratio will result in a lower NPL ratio (2018).

68% and 64% of the respondents from the IFC Sustainability Survey of Financial Institution (2005) mentioned that banks need to consider sustainability issues because it will increase their credibility and reputation, and respond to investor demand (IFC, 2007). IFC report also shows that 16% of respondents identified clients demand banks to consider the issue.

Enhancing reputation

Sustainability engagement and stock returns are correlated (Zhang, Djajadikerta, & Zhang, 2018). The sustainability news affects the volatility of the stock return. The preferred news or events may lead to the growth of the company stock price. The sustainable integration demonstrates the firm has a long-term business strategy that will favor the market (Zhang, Djajadikerta, & Zhang, 2018).

Economists use the event study methodology to answer the effect of events on the value of firms which measure by the financial market data (stock prices over a short period) (MacKinlay, 1997). The steps to measure the effect of an event on stock prices are as follows: 1) Identify the event, 2) Identify estimation and test (event window) period, 3) Estimate expected return (ER) over the estimation period, 4) Calculate abnormal return (AR) over test period and cumulative abnormal return (CAR) (Sitthipongpanich, 2011; Woon). The important parameters to study the event study methodology are model, event, estimation, and test period. The appropriate model to estimate expected return (any securities) and the market return (portfolio) is the market-model-adjusted return ($E(R_{i,t}) = \hat{\alpha}_i + \hat{\beta}_i i R_{m,t}$) (MacKinlay, 1997; Sitthipongpanich, 2011). the result will not be sensitive to an estimation period which exceeds 100 days, and the common length of the test period is 5 days (Eventstudytools, n.d.).
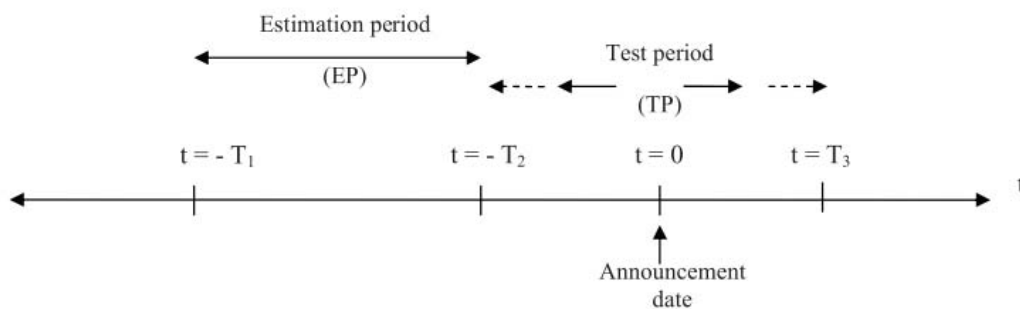
Figure 1: Event study timeline

The market may expect that this flavor strategy will boost the performance outcome. ESG performance has a positive relationship with stock price and it tends to be stronger with higher disclosure

firms (Ng & Zabihollah Rezaee, 2020). ESG performance can be measured by the overall ESG score of the company (Jamprasert, Kuwalairat, Srivisal, & Sthienchoak, 2020). This score is an important non-financial indicator for a sustainability firm. The paper shows that the association between ESG score and credit rating in Japan but in China, the research cannot find the relationship between the two. However, another research shows the impact of rating and the stock market is in the same direction (positive rating event – positive stock market impact, negative rating event – negative stock market impact) (Hubler, Laroche, Louargant, & Ory, 2017).

The bank needs to communicate sustainability performance and increase the engagement of both internal (employees, staff) and external (investors, clients) stakeholders (IFC, 2007). The policy formulation process has 2 approaches – political and policy (Veselý, 2007). The policy stream is efficiently and effectively solving public problems and more practical (Veselý, 2007). The problem analysis step (Problem defining or clarifying the problem or Obstacles) is an important step before formulating the efficiency policy (Hanzl, Meschik, & Sammer, 2003; Nagy, n.d.; Veselý, 2007). To extract problems, data collection is necessary to gather the employees' opinions (Hampton, n.d.; Nagy, n.d.; Problem solving and Problem analysis tools, n.d.). The survey is one of the data gathering tools that are able to study the targeted group's opinion (perspective) behavior and cognition (Tague, 2005). The survey of challenges desired activities (Park & Kim, 2020), and perspective on green loans should be observed for more empirical data. Shaumya & Arulrajah surveyed employees' perspectives on green banking practice and bank's environment performance (2017). In 2005, the IFC Sustainability Survey of Financial Institutions shown obstacles to going sustainability and barriers to investing in this area (IFC, 2005, Cited in IFC, 2007). More than 10 countries have mandatory and/or voluntary policy intervention in green banking policy such as China, France, India, and Japan (Park & Kim, 2020). Those policies can be examples of the desired activities from the central bank. The survey on the current barriers, possible policy instruments, and desired activities from the central bank to encourage banks to grant a green loan is conducted following this principle.

The attitude on a bank's reputation has a positive Pearson correlation coefficient; with decision-making behavior on financial products at 0.132 (Chalermbongkoch & Yothongyod, 2010). Attitude is a notion that affects the favorability for something or some ideas (Jaturongkakul & Jaturongkakul, 2000). There are many theories related to changing attitudes. Affective, Behavioral, and Cognitive are 3 components of Attitudes (Ostrom, 1969). They are known as the "ABC model of attitudes". Affective is an emotional attitude to objects (McLeod, 2018) that can change by 3 different processes namely compliance[1], identification[2], and internationalization[3] (Kelman, 1958). Behavior is the way we act which is influenced by the attitude we have (McLeod, 2018). Fogg's Behavior Model explained the human behavior can be changed gradually by 3 elements – motivators, ability, and prompt (triggers)- and converge at the same moment for occurring of behavior (Fogg, 2009). The last component that affects attitude is cognitive (perception). Cognitive is belief and knowledge on the attitude (McLeod, 2018). The perception processing (information processing) starts from the consumer exposure, attention, transforms the information, and stores it (Hawkins & Molthersbaugh, 2016). The survey on the effect of Green loans on bank reputation from the customer's perspective will be conducted following these theories.

Summary

This chapter provides critical data used to develop the hypothesis. The secondary research show factors that force the bank to apply for the green loan. It also shows the measurement of each factor that can be used to develop the hypothesis to answer the research question "What determines the green loan policy from a bank perspective?"

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[1] occur when person want to achieve acceptance from another person or group (Kelman, 1958)
[2] occur when person want to establish relationship or maintain self-satisfaction between themselves and another person or group (Kelman, 1958)
[3] occur when person accept the idea that in line with his/her values (Kelman, 1958)

Chapter 3 Role and Challenging of BOT on green loan policy

Concerns regarding responsible lending in Thailand have been increasing since the Xepian-Xenamnoy Dam in Lao PDR collapsed on 23 July 2018 (BBC News, 2018). The lending on Xayaburi Dam by 6 Thai banks[4] are mentioned. The questions are "What is the responsibility of bank in lending?" and "Which issue that bank should be aware of in lending?" (Fair Finance Thailand, 2019).

The Thai government is concerned about environmental issues. The National Strategy 2018 – 2037 (Office of the National Economic and Social Development Council, 2018) and 12th National Economic and Social Development Plan (Office of the National Economic and Social Development Council, 2017) mentioned the balance of economic development and environment protection, the sustainable production and consumption, and sustainable waste and resource management stability to reduce the greenhouse gases emission. It is in line with the sustainable development goal of the United Nation.

In terms of Bank of Thailand (BOT), BOT supports sustainable banking in both internal and external organization. BOT reinforces through business operations which affect the environment by increasing the efficiency of banknote production and employee awareness (Bank of Thailand, 2020a). Externally, BOT encourages banks to operate their business with concerns on the environment, society, and governance (Bank of Thailand, 2020a). In addition, the Thai central bank also determines sustainability as a part of BOT strategy 2020-2022 (Bank of Thailand, 2020a). Currently, BOT has launched the first sustainability report in 2019.

BOT supports the financial sector to enhance sustainable banking and drive sustainable finance. They support the integration of ESG into business processes and the financial institution culture (Bank of Thailand, n.d. a) through conferences and workshops (Bank of Thailand, 2020b). The obvious sustainable banking project was shown in Bangkok Sustainable Banking Forum and Sustainable Banking Workshop in 2019 in cooperation with partnerships – The Thai bankers' association, International Finance Corporation,

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[4] Bangkok Bank, Siam Commercial Bank, Krungthai Bank, Kasikorn Bank, Tisco Bank, and Export-Import Bank of Thailand

World Wide Fund for Nature, Fair Finance Thailand, United Nations Environment Program Finance Initiative (UNEP FI) – to gain executive's awareness of the concept of Tone from Top in 2019 and leading the first responsible lending guidelines in the same year (Bank of Thailand, 2020b). By environment dimension, BOT acknowledges banks on environmental and climate change risk by holding the seminar and joining the Network for Greening the Financial System (NGFS) for adopting other countries knowledge in the hope to launch the international standard sustainability financial institution policy.

Figure 2: Thailand Sustainable banking[5]

According to the BOT Act (1942), BOT has the mission to maintain the monetary system, financial institution system, and payment system stability which includes the launching policy, supervision, and examination of financial institutions, and being the last resort of financial institutions. The driving of sustainability is also aligned with BOT's vision "To be an organization of vision and principles that engages with stakeholders in pursuit of Thailand's sustainable economic well-being" (Bank of Thailand, n.d. b). The institutions under the regulation of BOT are banks, exchange agents, credit firms, and payment providers.

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[5] Picture from https://www.bot.or.th/Thai/BOTMagazine/Pages/256204Knowledge02.aspx

Focusing on banks, BOT plays the role of the regulator, supervisor, and developer of banks (Vanikkul, 2014). The BOT regulates and supervises financial institutions to enhance macroprudential, safety and soundness, efficiency, governance, and customer protection (Vanikkul, 2014). Currently, the BOT and banks have developed themselves by applying the environmental dimension in business operations such as energy, water, paper, and waste management (Bank of Thailand, 2020b) (data from sustainability report of 5 significant Thai banks[6]). This development follows the sustainable banking principle. The banking industry already has the responsibility of enforcing lending guidelines as one tool to drive the banking sector to sustainable banking since August 2019 (The Thai Bankers' Association, 2019). The guidelines (2019) mentioned that Financial institutions should consider sustainability, start from top management (Board of Directors), and understand risks that are related to the environment and society (Bank of Thailand, 2020c).

To achieve sustainable banking, internal enforcement from top management (tone from the top) is a critical key factor (Thanrungruang, 2018). It is not only in terms of internal organization development but the external also applies. The BOT will propel the financial institutions to apply sustainable banking guidelines into their operation (Bank of Thailand, 2020b). On other hand, banks are to launch a new financial product which related to environment issue called green loans (data from sustainability report of 5 significant Thai banks[7]) and agreement on responsible lending guidelines among banks. (The Thai

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[6] (Bangkok Bank, 2015; Bangkok Bank, 2016; Bangkok Bank, 2017; Bangkok Bank, 2018; Bangkok Bank, 2019; Bangkok Bank, 2020) (Bank of Ayudhya, 2015; Bank of Ayudhya, 2016; Bank of Ayudhya, 2017; Bank of Ayudhya, 2018; Bank of Ayudhya, 2019; Bank of Ayudhya, 2020) (Kasikorn Bank, 2015; Kasikorn Bank, 2016; Kasikorn Bank, 2017; Kasikorn Bank, 2018; Kasikorn Bank, 2019; Kasikorn Bank, 2020) (Krungthai Bank, 2015; Krungthai Bank, 2016; Krungthai Bank, 2017; Krungthai Bank, 2018; Krungthai Bank, 2019; Krungthai Bank, 2020) (Siam Commercial Bank, 2016; Siam Commercial Bank, 2017; Siam Commercial Bank, 2018; Siam Commercial Bank, 2019; Siam Commercial Bank, 2020)

[7] (Bangkok Bank, 2018; Bangkok Bank, 2019; Bangkok Bank, 2020) (Bank of Ayudhya, 2015; Bank of Ayudhya, 2016; Bank of Ayudhya, 2017; Bank of Ayudhya, 2018; Bank of Ayudhya, 2019; Bank of Ayudhya, 2020) (Kasikorn Bank, 2015; Kasikorn Bank, 2016; Kasikorn Bank, 2017; Kasikorn Bank, 2018; Kasikorn Bank, 2019; Kasikorn Bank, 2020) (Krungthai Bank, 2015; Krungthai Bank, 2016; Krungthai Bank, 2017; Krungthai Bank, 2018; Krungthai Bank, 2019; Krungthai Bank, 2020) (Siam Commercial Bank, 2016; Siam Commercial Bank, 2017; Siam Commercial Bank, 2018; Siam Commercial Bank, 2019; Siam Commercial Bank, 2020)

Bankers' Association, 2019). However, there has not been any policy in place to drive sustainable banking by law.

Chapter 4 Research Methodology

The study develops research hypotheses from what was illustrated in the literature review. The conceptual framework is used to simplify the hypotheses. The framework shows 3 main areas of this study, with the dependent variable(s) and independent variables related to what determines the green loan policy from a bank perspective. It will examine the bank's benefit directly and indirectly from applying the green policy. The study summarizes the benefit of applying to 3 factors – business opportunity, better risk management, and better reputation to investors & customers (IFC, 2007; Jeucken, 2001; Numnonda, 2017; Park & Kim, 2020; Shaumya & Arulrajah, 2017).

As we see in the following figures, many causes affect our 4 sub-areas of study.
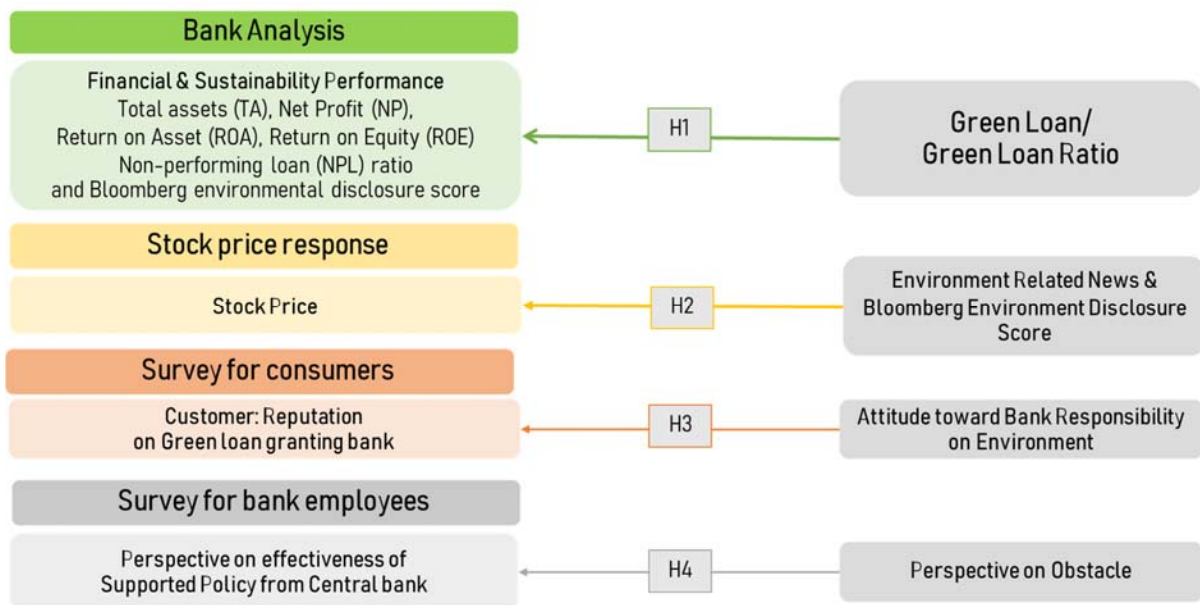
Figure 3: Conceptual Framework 1

Bank Analysis

The effect of green policy on business opportunities and risk management are determined by the effect between financial performance and sustainability performance (Weber, 2016 (b)). The financial performance that Weber (2016 (b)) used was Total assets (TA), Net Profit (NP), Return on Asset (ROA),

Return on Equity (ROE), and Non-performing loan (NPL) ratio. In China, Cui et al's paper in 2018 shows that a higher green loan ratio will result in a lower NPL ratio (2018) which means the higher green loan ratio can lower the credit risk. It will give a positive impact on bank risk management. However, this study is focusing on the effect of green loans on bank business opportunity and risk management. The green loan amount is used to study the impact on financial and sustainability performance (Bloomberg environmental disclosure score). The most important concern setting hypotheses, the reverse causality problem, is in consideration of the paper. Based on this focus, the hypothesis is:

H1 **Green loan amount/ratio has a positive impact on Financial and Sustainability Performance.**

Green loan amount has a positive impact on Total assets (TA).

Green loan amount has a positive impact on Net Profit (NP).

Green loan ratio has a positive impact on Return on Asset (ROA).

Green loan ratio has a positive impact on Return on Equity (ROE).

Green loan ratio has a negative impact on Non-performing loan (NPL) ratio.

Green loan amount/ratio has a positive impact on Bloomberg's environmental disclosure score.

Stock price response

The measurement of investor price is the stock price. When investors have a positive view of any stock, it leads the stock prices to go up. The said news may lead to the growth of company stock price (Zhang, Djajadikerta, & Zhang, 2018). On the other hand, the credit rating also affects the stock price (Hubler, Laroche, Louargant, & Ory, 2017) but this study will just focus on the environmental factor. Thus, the Environmental Performance (Bloomberg environmental disclosure score) is used to describe the effect on the stock price. The hypotheses on green loan to reputation from investors' perspective are as follows. Hence, the hypothesis is:

	The bank's environmental news/event and the Bloomberg
H2	**environmental disclosure score have a positive impact on stock**
	price

Environment-related news/events have a positive impact on stock

price.

Bloomberg's environmental disclosure score has a positive impact on

stock price.

The study methodology will be applied to 100 days of estimation period and 5 days of the test period. The expected return will be calculated by market-model-adjusted return. The comparison of abnormal returns between two groups of banks is classified as more events (BAY, KBank, SCB) and less events (BBL, KK, KTB, and TMB) and groups which have the ticker at 14 events over 5 years (average events of banks).

Consumer Survey

Attitude is a notion that affects the favorability for something or some ideas (Jaturongkakul & Jaturongkakul, 2000) Affective, Behavioral, and Cognitive are 3 components of Attitudes (Ostrom, 1969). They are known as the "ABC model of attitudes". So, the paper studies the effect of attitude toward bank reputation and what is the strongest relationship factor of the ABC model of attitudes that affect bank reputation. The hypothesis is:

H3   Attitude has a positive impact on the reputation of Green loan

granting banks.

Survey of bank employees

The policy formulating procedure requires problem defining, business needs, or obstacle identifying to formulate the efficiency policy (Hanzl, Meschik, & Sammer, 2003; Nagy, n.d.; Veselý, 2007). An effective and cheap method of gathering data is utilizing a survey. A survey is used to understand the

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opinion, behavior, or cognition of the sample on the defined objective (Hanzl, Meschik, & Sammer, 2003; Tague, 2005). To examine the relationship between perspective on the obstacles and the support policy, the survey gathered bank employees' opinion on the current barrier, possible policy instruments, and desired activities from the central bank. The survey of IFC Sustainability Survey in 2015, Park & Kim in 2020, and Shaumya & Arulrajah in 2017 guided the idea for the employee perspective survey. This study examines the correlation between employee perspective on obstacle factors of granting green loan and perspective on the effectiveness of support policies for granting green loan from the central bank. On the other hand, It means that the strong consensus on obstacle factors leads to a high degree of effectiveness of support policies. The hypothesis is:

> **H4   Employee perspective on obstacle factors has a positive impact on perspective on effectiveness of support policies from central bank.**

Summary

This chapter explains the cause and effect of each factor in this research. The conceptual framework and hypotheses are applied to simplify the idea which was developed from the literature review chapter. These 7 hypotheses will be used to design the data collection method and results. The list of hypotheses is shown in appendix 1.

Chapter 5 Data Collection

From the literature review, we found 3 factors - increasing business opportunities, better risk management (credit risk and legal risk), and enhancing their reputation among stakeholders (investor, customer) – will determine the green loan policy from a bank perspective (Numnonda, 2017). This study gathering the data of 5 significant Thai banks from 2015 which is the year that the United Nations announced the Sustainable Development Goals: SDGs) to 2019. The significant Thai banks or Domestic systemically important banks (D-SIBs) are identified by 4 indicators (Size, Interconnectedness, Substitutability, and Financial institution infrastructure, and Complexity) (Bank of Thailand, 2017). The significant banks are Bank of Ayudhya (BAY), Bangkok Bank (BBL), Kasikorn Bank (Kbank), Krungthai Bank (KTB), and Siam Commercial Bank (SCB) (Bank of Thailand, 2017). This study uses various data to examine the hypothesis.

Summary statistics of banks in the data set

The 5 Banks that the study used are Domestic Systemically Important Banks (D-SIBs) in Thailand. The asset size of these 5 banks is 13,942,946 million baht which count as 76.74% of total asset of Thai commercial banks (included retail bank). The deposit amount and Loan amount of these 5 banks are 10,255,433 and 9,144,511 million baht which equal to 78.26% of the total deposit amount and 76.80% of the total loan amount of Thai commercial banks (included retail bank) respectively. The details of assets, deposits, and loan size of each bank are shown in the below table.

Table 1 : Market Share[8]

	Asset Size	Market share by asset size	Deposit Size	Market share by deposit size	Loan Size	Market share by loan size
BBL	**3,123,361**	**17.19%**	**2,316,035**	**17.67%**	**1,832,828**	**15.39%**
SCB	**2,952,447**	**16.25%**	**2,156,489**	**16.46%**	**1,995,248**	**16.76%**
KTB	**2,908,358**	**16.01%**	**2,158,460**	**16.47%**	**1,879,541**	**15.78%**
Kbank	**2,724,055**	**14.99%**	**2,065,669**	**15.76%**	**1,826,520**	**15.34%**
BAY	**2,234,725**	**12.30%**	**1,558,780**	**11.90%**	**1,610,374**	**13.52%**
TMB	1,045,343	5.75%	663,559	5.06%	646,194	5.43%
Tbank	999,575	5.50%	734,561	5.61%	693,929	5.83%
UOB	566,212	3.12%	456,411	3.48%	404,342	3.40%
CIMBT	385,109	2.12%	199,132	1.52%	222,002	1.86%
KK	299,216	1.65%	172,661	1.32%	230,062	1.93%
Tisco	285,305	1.57%	218,433	1.67%	228,608	1.92%
LH	230,548	1.27%	165,018	1.26%	151,569	1.27%
ICBCT	215,797	1.19%	129,823	0.99%	110,246	0.93%
SCBT	142,378	0.78%	61,908	0.47%	27,659	0.23%
TCR	56,635	0.31%	47,325	0.36%	48,204	0.40%
Total	**18,169,064**	**100%**	**13,104,264**	**100%**	**11,907,326**	**100.00%**

Source: Kbank Annual registration statement (Form 56-1) (Kasikorn Bank, 2019a)

Summary of data

The data to examine increasing business opportunities consists of financial data, sustainability score, and amount of Green Loan (from annual sustainability report). The bank's financial performance data are Total assets (TA), Net Profit (NP), Return on Asset (ROA), Return on Equity (ROE), and Non-performing loan ratio (NPL). The NPL ratio will use the NPL ratio from the infrastructure and construction sector (Bank of Thailand, 2020d) because most green loans are classified in these 2 sectors. The financial performance data and loan amount by industry were collected from the Bank of Thailand database (Bank

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[8] Bangkok Bank public company ltd. (BBL), Siam Commercial Bank public company ltd. (SCB),Krung Thai Bank public company ltd. (KTB), Kasikornbank public company limited (Kbank), Bank Of Ayudhya public company ltd. (BAY), TMB bank public company limited (TMB), Thanachart bank public company ltd. (Tbank), United Overseas Bank (Thai) public company limited (UOB), CIMB Thai Bank public company limited (CIMBT), Kiatnakin Phatra bank public company limited (KK), TISCO bank public company limited (Tisco), Land and Houses Bank public company limited (LH), Industrial And Commercial Bank Of China (Thai) public company limited (ICBCT), Standard Chartered Bank (Thai) public company limited (SCBT), The Thai Credit Retail Bank public company limited (TCR)

of Thailand, 2020e). The sustainability score is Environment, Social, and Governance (ESG) Rating (Jamprasert, Kuwalairat, Srivisal, & Sthienchoak, 2020). However, The ESG rating is a combination of Environmental, Social, and Governance scores. This research uses the **environmental disclosure score of Bloomberg** to measure the effect of the environmental score.

The green loan amount is the loan granting the amount related to environmental concerns. The amount is provided in the Sustainability Report[9]. On the other hand, the green loan amount in the sustainability report is unclear. For example, some banks did not provide the green loan amount data in some years or provide different data in each year (credit outstanding, and credit limit). Therefore, the data had adjusted by discounting the green loan amount and loan growth rate and adding some credit outstanding that was shown in the sustainability report. Some of them were provided in form of loan group structure and other green loans. We then calculated in weighted terms the loan sector with the green loan structure of that bank and summed it with the credit outstanding that shown in the sustainability report (not in the same sector). The industry that we had estimated loan data in this research is the infrastructure sector.

For the development of credit risk management, the growth of NPL is calculated Year on Year from NPL ratio data from the Bank of Thailand database (Bank of Thailand, 2020e) and used the green

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[9] The Sustainability Report from 5 significant Thai bank (Bangkok Bank, 2015; Bangkok Bank, 2016; Bangkok Bank, 2017; Bangkok Bank, 2018; Bangkok Bank, 2019; Bangkok Bank, 2020) (Bank of Ayudhya, 2015; Bank of Ayudhya, 2016; Bank of Ayudhya, 2017; Bank of Ayudhya, 2018; Bank of Ayudhya, 2019; Bank of Ayudhya, 2020) (Kasikorn Bank, 2015; Kasikorn Bank, 2016; Kasikorn Bank, 2017; Kasikorn Bank, 2018; Kasikorn Bank, 2019; Kasikorn Bank, 2020) (Krungthai Bank, 2015; Krungthai Bank, 2016; Krungthai Bank, 2017; Krungthai Bank, 2018; Krungthai Bank, 2019; Krungthai Bank, 2020) (Siam Commercial Bank, 2016; Siam Commercial Bank, 2017; Siam Commercial Bank, 2018; Siam Commercial Bank, 2019; Siam Commercial Bank, 2020)
[9] (Bangkok Bank, 2015; Bangkok Bank, 2016; Bangkok Bank, 2017; Bangkok Bank, 2018; Bangkok Bank, 2019; Bangkok Bank, 2020) (Bank of Ayudhya, 2015; Bank of Ayudhya, 2016; Bank of Ayudhya, 2017; Bank of Ayudhya, 2018; Bank of Ayudhya, 2019; Bank of Ayudhya, 2020) (Kasikorn Bank, 2015; Kasikorn Bank, 2016; Kasikorn Bank, 2017; Kasikorn Bank, 2018; Kasikorn Bank, 2019; Kasikorn Bank, 2020) (Krungthai Bank, 2015; Krungthai Bank, 2016; Krungthai Bank, 2017; Krungthai Bank, 2018; Krungthai Bank, 2019; Krungthai Bank, 2020) (Siam Commercial Bank, 2016; Siam Commercial Bank, 2017; Siam Commercial Bank, 2018; Siam Commercial Bank, 2019; Siam Commercial Bank, 2020)

loan ratio which is calculated from the green loan amount from the same source with data for examining increasing business opportunities divided by total loan amount.

The measurement of reputation from an investor perspective used stock price, ESG rating (environmental disclosure score of Bloomberg), and sustainability-related news. The stock price historical data of those 5 banks are collected daily from www.investing.com (Fusion Media Limited, 2020) for hypothesis 2 because environmental-related news also on daily basis. For hypothesis 2, The historical data is on an annual basis corresponding to the ESG rating. The ESG rating also collected environmental disclosure score from Bloomberg as the same dataset with examine of increasing business opportunities which is environmental disclosure score of Bloomberg. Environmental-related news of each bank was collected in September 2020 from www.ryt9.com (RYT9) - the online world, economy, finance, and investment news agency which reports real-time news. (InfoQuest Limited, 2015-2020). The data from RYT9 are screened by the tag of each bank[10]. The Environmental-related news of each bank was chosen. There is 104 news related to the environment from 7 banks over 5 years (Table 1).

	2015	2016	2017	2018	2019	Total
BAY	4	4	3	3	2	**16**
BBL	2	1	5	1	0	**9**
Kbank	7	3	6	6	5	**27**
KTB	3	1	1	2	1	**8**
SCB	7	12	10	4	6	**39**
TMB	2	0	1	0	1	**4**
KK	0	0	0	1	0	**1**
Total	**23**	**21**	**25**	**16**	**14**	**104**

Table 2: Environmental News of 5 Banks (Unit: News)

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[10] "ธนาคารกรุงเทพ" for Bangkok bank, "ธนาคารกรุงศรีอยุธยา" for Bank of Ayudhya, "ธนาคารกสิกรไทย" for Kasikorn bank, "ธนาคารกรุงไทย" for Krungthai Bank, "ธนาคารเกียรตินาคิน" for Kiatnakin Bank, "ธนาคารทหารไทย" for TMB bank, and "ธนาคารไทยพาณิชย์" for Siam Commercial Bank

Bank	2015	2016	2017	2018	2019	Total
BAY	4	4	2	3	2	15
BBL	2	1	5	1	0	9
Kbank	6	3	6	6	5	26
KTB	3	1	1	2	1	8
SCB	5	10	9	4	6	34
TMB	2	0	1	0	1	4
KK	0	0	0	1	0	1

Table 3: Environmental News of 5 Banks (Unit: Days)

This paper used 100 days estimation period before the event date and 5 days test period before and after the event date for the event study. The event date is the date that the environmental-related news occurred which was collected from RYT9. The stock price and market price are the same datasets with the hypothesis 2 dataset.

This research develops the question from the ABC model of attitudes to study the customers' perspective on green banking and the determinant factors. The effect of a Green loan on bank reputation in the customer's perspective was tested by the survey. The survey started from September 26, 2020, to October 9, 2020, with 164 respondents. The questionnaires were distributed through online channels such as Line application (instant message), Facebook, Instagram, and Twitter randomly. The questionnaires were created in a google form[11]. The sample target is Thai banks' customers. The question in this survey is shown in Appendix 2.

This study used the 5-point Likert scale to measure all variables both the dependent variable and independent variables from a customer perspective survey. The Likert scale asked to know the respondent agree on the variable(s) which 1 strongly disagrees and 5 strongly agreeing. The dependent variable is bank reputation from the customer perspective. The attitude toward bank responsibility on the environment, customer behavior, attitude, and perception are independent variables. The group of questions on each variable is shown in Appendix 3.

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[11] Link to access questionnaire for banks' customers: https://forms.gle/Xtyacjcnru5CEwW28

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The current barrier, possible policy instruments, and desired activities from the central bank to encourage bank grant green loan were observed from banks' employees who related to compliance and loan process. The survey expected 40 respondents between September 26, 2020, to October 9, 2020. The questionnaires were distributed through online channels randomly. The Google form is also used to generate questionnaires[12]. After the survey period, there are 58 responses from the bank's employees. Appendix 3 is a list of questions on this survey.

This data has an important value to reveal; "What determines the green loan policy from a bank perspective?" Data are gathered from many source sites both the public sector, private sector (data agencies), and individual (questionnaires). To achieve the objective of the study, the data arrangement is required to boost the effectiveness of computing for data interpretation. The data will be the critical key to answering the hypothesizes designed for the research question. The data will then be loaded on the SPSS software for analysis and hypothesis testing.

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[12] Link to access questionnaire for banks' employee: https://forms.gle/Sddh7jhYjurqnTgd7

Chapter 6 Research Result from Quantitative data

Data from Chapter 4 (data collection) was analyzed in this chapter. These secondary data were collected from Banks' report, Bank of Thailand, and Bloomberg which are the financial data. For example, Total asset, Total Loan, Return on Assets, Return on Equity, NPL Ratio, Green Loan, and Environmental disclosure score. Data were analyzed to test the hypotheses in chapter 3 by SPSS software.

In this chapter, Hypothesis 1 – 2 will be examined. To study the relationship between Green Loan and Business opportunity and risk management. H2 will be used stock price response to study the relationship between event or environment score and bank reputation from an investor perspective (stock price).

H1 **Green loan amount/ratio has a positive impact on Financial and Sustainability Performance.**

Green loan amount has a positive impact on Total assets (TA).

Green loan amount has a positive impact on Net Profit (NP).

Green loan ratio has a positive impact on Return on Asset (ROA).

Green loan ratio has a positive impact on Return on Equity (ROE).

Green loan ratio has a positive impact on Non-performing loan (NPL) ratio.

Green loan amount / ratio has a positive impact on Bloomberg environmental disclosure score.

H2 **Bank's Environmental news/event and Bloomberg environmental disclosure score has a positive impact on Stock Price**

Environment Related News has a positive impact on Stock Price.

Bloomberg environmental disclosure score has a positive impact on Stock Price.

The result of hypotheses 1 and 2 are summarized in the table below. The resulting detail is shown in appendix 5.

| Dependent Variable | Independent Variable | R Square | Adjusted R Square | ANOVA P-value | Unstandardized Coefficients | | Standardized Coefficients | |
					B (Constant)	B Independent Variable	Beta	P-value
Total assets (TA) (million baht)	Green loan (million baht)	.328	.299	.003	2,329,809.985	7.460	.573	.003
Net Profit (NP) (million baht)	Green loan (million baht)	.557	.537	.000	20,272.525	.316	.746	.000
Return on Asset (ROA)	Green loan ratio	.403	.377	.001	.009	.204	.635	.001
Return on Equity (ROE)	Green loan ratio	.221	.187	.018	.088	1.152	.470	.018
Non-performing loan (NPL) ratio	Green loan ratio	.164	.128	.045	.090	2.708	.405	.045
Bloomberg environmental disclosure score	Green loan (million baht)	.108	.068	.116	22.033	.000	.329	.116
Bloomberg environmental disclosure score	Green loan ratio	.104	.063	.125	21.698	280.916	.322	.125
Green loan (million baht)	Total assets (TA) (million baht)	.328	.299	.003	-80,359.048	.044	.573	.003
Green loan (million baht)	Net Profit (NP) (million baht)	.557	.537	.000	-21,050.513	1.762	.746	.000
Green loan ratio	Return on Asset (ROA)	.403	.377	.001	-.009	1.972	.635	.001
Green loan ratio	Return on Equity (ROE)	.221	.187	.018	-.005	.192	.470	.018
Green loan ratio	Non-performing loan (NPL) ratio	.164	.128	.045	.007	.061	.405	.045

Dependent Variable	Independent Variable	R Square	Adjusted R Square	ANOVA P-value	Unstandardized Coefficients		Standardized Coefficients	P-value
					B (Constant)	B Independent Variable	Beta	
Green loan (million baht)	Environmental disclosure score	.108	.068	.116	10,074.152	917.343	.329	.116
Green loan ratio	Environmental disclosure score	.104	.063	.125	.006	.000	.322	.125
Stock price	Environment Related News	.001	.000	.079	114.536	13.656	.022	.079
Stock Price	Environmental disclosure score	.204	.168	.027	25.671	3.121	.451	.027
Environmental disclosure score	Stock Price	.204	.168	.027	19.058	.065	.451	.027

Table 4: SPSS Result for Hypothesis 1-2

H1 **Green loan amount/ratio has a positive impact on Financial and Sustainability Performance.**

Green loan amount has a positive impact on Total assets (TA).

From Table 4, this regression model, R square = .328, indicating that 32.8% of variation in Total asset (y) is explained by the independent Amount of Green loan (x_1). And the Adjusted R square = .229. The ANOVA table shows the regression model is good fit as p-value (0.003) less than the level of significance α = 1% (0.01).

$y = a + b_1 x_1 = 2,329,809.985 + 7.460 x_1$ (This function is used to predict y for any given x_1)

$y = \beta_1 x_1 = .573 x_1$ (x_1 affects y with strength of .573)

As P-Value (0.003) is less than the significance level of α = 1% (0.01), This hypothesis is accepted. So, Green loan amount has a positive impact on Total assets.

Green loan amount has a positive impact on Net Profit (NP).

From Table 4, this regression model, R square = .557, indicating that 55.7% of variation in Net Profit (y) is explained by the independent Amount of Green loan (x_1). And the Adjusted R square = .537. The ANOVA table shows the regression model is good fit as p-value (0.000) less than the level of significance α = 1% (0.01).

$y = a + b_1 x_1 = 20,272.525 + .316 x_1$ (This function is used to predict y for any given x_1)

$y = \beta_1 x_1 = .746 x1$ (x_1 affects y with strength of .746)

As P-Value (0.000) is less than the significance level of α = 1% (0.01), This hypothesis is accepted. So, Green loan amount has a positive impact on Net Profit.

Green loan ratio has a positive impact on Return on Asset (ROA).

From Table 4, this regression model, R square = .403, indicating that 40.3% of variation in Return on Asset (y) is explained by the independent Green loan Ratio (x_1). And the Adjusted R square = .377. The ANOVA table shows the regression model is good fit as p-value (0.001) less than the level of significance $\alpha = 1\%$ (0.01).

$y = a + b_1 x_1 = .009 + .204 x_1$ (This function is used to predict y for any given x_1)

$y = \beta_1 x_1 = .635 x_1$ (x_1 affects y with strength of .635)

As P-Value (0.001) is less than the significance level of $\alpha = 1\%$ (0.01), This hypothesis is accepted. So, Green loan Ratio has a positive impact on Return on Asset.

Green loan ratio has a positive impact on Return on Equity (ROE).

From Table 4, this regression model, R square = .221, indicating that 22.1% of variation in Return on Equity (y) is explained by the independent Green loan Ratio (x_1). And the Adjusted R square = .187. The ANOVA table shows the regression model is good fit as p-value (0.018) less than the level of significance $\alpha = 5\%$ (0.05).

$y = a + b_1 x_1 = .088 + 1.152 x_1$ (This function is used to predict y for any given x_1)

$y = \beta_1 x_1 = .470 x_1$ (x_1 affects y with strength of .470)

As P-Value (0.018) is less than the significance level of $\alpha = 5\%$ (0.05), This hypothesis is accepted. So, Green loan Ratio has a positive impact on Return on Equity.

Green loan ratio has a negative impact on Non-performing loan (NPL) ratio.

From Table 4, this regression model, R square = .164, indicating that 16.4% of variation in Non-performing loan (NPL) ratio (y) is explained by the independent Green loan Ratio (x_1). And the Adjusted R square = .128. The ANOVA table shows the regression model is good fit as p-value (0.045) less than the level of significance α = 5% (0.05).

y = a + b_1 x_1 = .090 + 2.708 x_1 (This function is used to predict y for any given x_1)

y = $\beta_1 x_1$ = .405 x_1 (x_1 affects y with strength of .405)

As P-Value (0.045) is less than the significance level of α = 5% (0.05), This hypothesis is accepted. Green loan Ratio has an impact on Non-performing loan (NPL) ratio with a different effect from hypothesis.

Green loan amount/ratio has a positive impact on Bloomberg's environmental disclosure score.

Green Loan Amount

From Table 4, this regression model, R square = .108, indicating that 10.8% of variation in sustainability performance (Bloomberg environmental disclosure score) (y) is explained by the independent Amount of Green loan (x_1). And the Adjusted R square = .068. The ANOVA table shows the regression model is not good fit as p-value (0.116) more than the level of significance α = 10% (0.10). This hypothesis is rejected. So, Green loan amount does not have a positive impact on Environmental disclosure score.

Green Loan Ratio

From Table 4, this regression model, R square = .104, indicating that 10.4% of variation in Bloomberg environmental disclosure score (y) is explained by the independent Green loan Ratio (x_1). And the Adjusted R square = .063. The ANOVA table shows the regression model is good fit as p-value (0.125) less than the level of significance α = 10% (0.10). This hypothesis is rejected. So, Green loan ratio does not have a positive impact on Environmental disclosure score.

Reverse Causality

The reverse causality also shows in Table 4 result. The result was accepted in TA, NP, ROA, ROE, and NPL ratio variables in hypothesis 1 with lower unstandardized coefficients than the hypotheses except for NP and ROA.

H2   The bank's environmental news/event and the Bloomberg environmental disclosure score have a positive impact on stock price.

Environment-related news/events have a positive impact on stock price.

From Table 4, this regression model, R square = .001, indicating that 0.1% of variation in Stock Price (y) is explained by the independent environment-related news (x_1). And the Adjusted R square = .000. The ANOVA table shows the regression model is good fit as p-value (0.079) less than the level of significance α = 10% (0.10).

$y = a + b_1 x_1 = 114.536 + 13.656 x_1$ (This function is used to predict y for any given x_1)

$y = \beta_1 x_1 = .022 x_1$ (x_1 affects y with strength of .022)

As P-Value (0.079) is less than the significance level of α = 10% (0.10), This hypothesis is accepted. So, environmental-related news has a positive impact on stock price.

The event study methodology also shows the average of the abnormal return from 97 events of Thai banks. It is classified into 2 categories – More events and Less events bank with the trigger at 14 events over 5 years. The following figure plot the cumulative abnormal return from market-model-adjusted return. The result shows the abnormal return at event day for "more event" banks by using the market model is -0.218% the standard error is 0.195% and the p-value is -1.56. The "less events" group also has the same. On the event day, the abnormal return is 0.17%, the Standard deviation is 0.223%, and the p-value is -0.41. At the 10% significant level, the null hypothesis is accepted. It means environmental-related news has no impact on the stock price.

However, The CAR plot shows that the average CAR drives up since day -1 to 1 in both groups. CAR in day 0 (event date) of "More news/event" is stable. On the other hand, the "Less news/event" has more variation. The day 1 after the event date the CAR of "More news/event" tends to increase more than the "Less news/event" CAR tends to increase until day 4 after the event date. It is clear that the "Less news/event" stock price is more varied than the "More news/event", both before and after the event date. But it may be too early to tell that the environmental-related event has or does not have an effect on price.
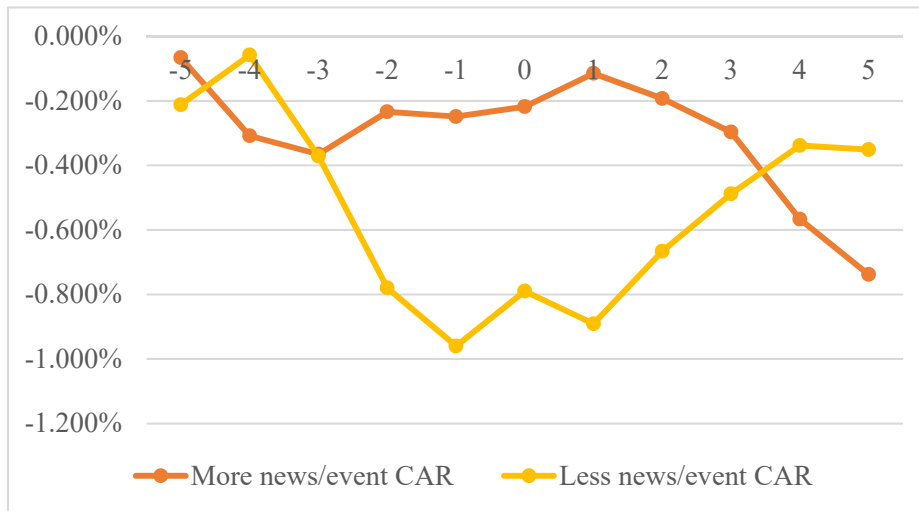
Figure 4: CAR Plot (event study)

Event Date	More news/event		Less news/event	
	AR	CAR	AR	CAR
-5	-0.066%	-0.066%	-0.212%	-0.212%
-4	-0.242%	-0.308%	0.154%	-0.058%
-3	-0.057%	-0.365%	-0.314%	-0.371%
-2	0.131%	-0.234%	-0.408%	-0.780%
-1	-0.015%	-0.249%	-0.180%	-0.960%
0	0.031%	-0.218%	0.170%	-0.790%
1	0.103%	-0.115%	-0.101%	-0.891%
2	-0.078%	-0.193%	0.225%	-0.666%
3	-0.104%	-0.297%	0.178%	-0.488%
4	-0.270%	-0.567%	0.150%	-0.338%
5	-0.171%	-0.738%	-0.013%	-0.351%

Table 5: Abnormal Return and Cumulative Abnormal Return for event study

Bloomberg's environmental disclosure score has a positive impact on stock price.

From Table 4, this regression model, R square = .204, indicating that 20.4% of variation in Stock Price (y) is explained by the independent Environmental disclosure score (x_1). And the Adjusted R square = .168. The ANOVA table shows the regression model is good fit as p-value (0.027) less than the level of significance α = 5% (0.05).

$y = a + b_1 x_1 = 25.671 + 3.121 x_1$ (This function is used to predict y for any given x_1)

$y = \beta_1 x_1 = .451 x_1$ (x_1 affects y with strength of .451)

As P-Value (0.027) is less than the significance level of α = 5% (0.05), This hypothesis is accepted. So, Environmental disclosure score has a positive impact on Stock Price.

The summary of hypothesis testing is shown in the table below. Almost All hypotheses are accepted at a different significant level of α.

	Hypothesis	Result
H1	Green loan amount has a positive impact on TA	Accept at significant level of α = 1%
H1	Green loan amount has a positive impact on NP.	Accept at significant level of α = 1%
H1	Green loan ratio has a positive impact on ROA.	Accept at significant level of α = 1%
H1	Green loan ratio has a positive impact on ROE.	Accept at significant level of α = 5%
H1	Green loan ratio has a negative impact on NPL ratio.	Accept at significant level of α = 5% with positive impact
H1	Green loan amount/ratio has a positive impact on Bloomberg's environmental disclosure score.	Rejected
H2	Environmental-Related News has a positive impact on Stock Price.	Accept at significant level of α = 10%

	Hypothesis	Result
H2	Bloomberg environmental disclosure score has a positive impact on Stock Price.	Accept at significant level of $\alpha = 5\%$

Table 6: Hypothesis 1-2 testing

Summary

This chapter examined the impact of the green loan on each variable which data is the secondary data. The data are gathered from reliable sources (Bank of Thailand, Bloomberg, and Banks' report). Hypothesis 1 and 2 are tested by regression analysis by SPSS software. Most of them are accepted in different significant levels (P-value). However, the impact of green loan ratio and NPL ratio is different, and the impact between green loan and Bloomberg environmental disclosure score in hypothesis 1 is not accepted. Hypothesis 2 also confirms that environmental-related news and Bloomberg environmental disclosure score have a positive impact on stock price from the regression analysis. All hypotheses have reverse causality but the effects (independent variables) of reverse causality are lower than the main hypotheses, except the reverse causality for net profit and return on asset. The other hypothesis testing and data analysis which was gathered using primary data (Questionnaire and Survey) will be reported in the next chapter.

Chapter 7 Research Result from Questionnaire

This chapter presents data collected from 164 respondents from the survey on the effect of Green loan on bank reputation/image in the customer's perspective and 51 respondents from the survey on the current barrier, possible policy instruments, and desired activities from the central bank to encourage banks to grant green loans. The surveys are distributed by online channels such as Line application (instant message), Facebook, Instagram, and Twitter randomly. The surveys are inquired about the participants' perspective as the bank's customers and employees on bank reputation and green loan, and barriers, public action, and green loan granting, respectively.

Customer Questionnaire

Of 164 respondents, 64.02 % of respondents were female and 35.98 % were male. The respondents were distributed into age groups. The highest age group response was **25-29 years old – 40.24% (66 respondents)**, follow by 30 -34 years old -14.63% (24 respondents) and 35-39 years old – 10.98% (18 respondents). Most of them that had the highest education level is 1.22% from Secondary level and below (2 respondents), 1.83% from Vocational education (3 respondents), 42.68% from Bachelor's degree or equivalent (70 respondents), **51.83% from Master's degree (85 respondents)**, and 2.44% from Ph.D.'s degree (4 respondents)
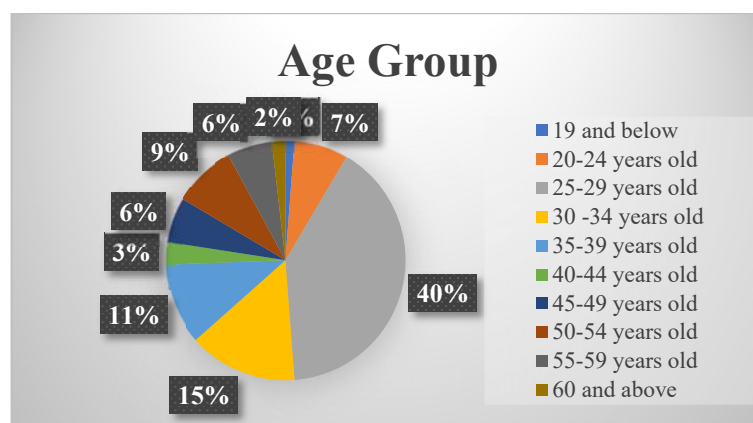
Figure 5: Age Group of banks' customers' questionnaire

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Their occupations are diverse. **45 of them are office workers (27.44%)**, followed by 36 Government Officers (21.95%), 31 Bank officers (18.90%), 15 Business Owners (9.15%), 12 specialized financial institutions (SFI) officers (7.32%), 11 students (6.71%), 2 Doctors/Nurse (1.22%), 1 Lecturer (0.61%) and Engineer (0.61%), and others occupation are counted as 10 respondents (6.10%) which consist of freelance, creative, retirement, etc. Their monthly income is shown in the following table.

Income Level (baht/month)	Respondents	(%)
20,000 and below	**20**	12.20%
20,001-40,000	**39**	23.78%
40,001-60,000	**35**	21.34%
60,001-80,000	**24**	14.63%
80,001-100,000	**23**	14.02%
100,001 and above	**23**	14.02%

Table 7: Income Level of banks' customers (respondents)

Respondents use a variety of banking products and channels. All of them have a deposit account (100%) and most of them have a credit card (83.54%) and a mutual fund portfolio (43.90%). The figure shows that all respondent is familiar with the bank. They use at least one product/service from the bank. Banks provide their service through a diversified channel – the most popular channel is the digital channel (65.24% - 107 Respondents), mobile banking and internet banking, and automatic teller machine (atm) / automatic cash deposit machine (13.41% - 22 Respondents).
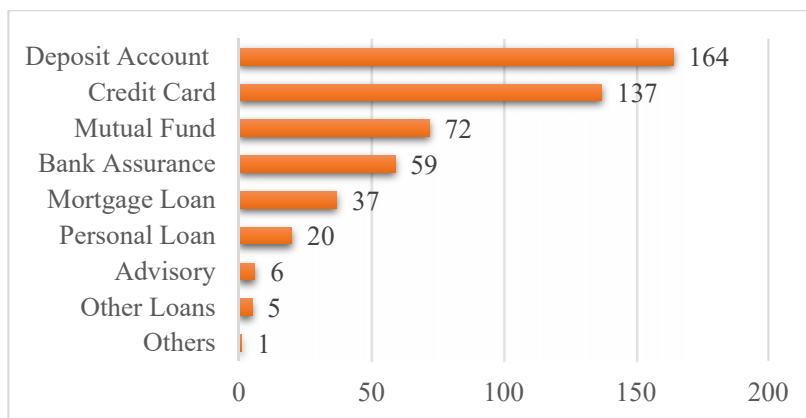
Figure 6: Products/ Services used by banks' customers (respondents)
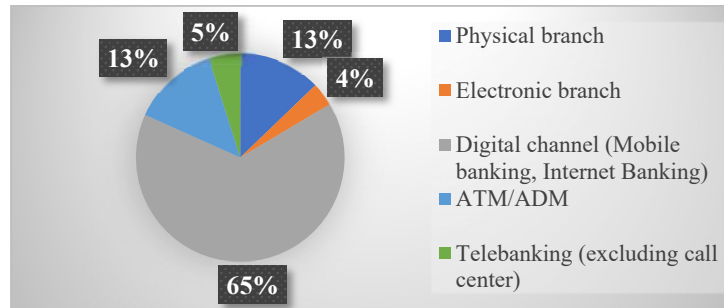
Figure 7: Banking Channel

The hypothesis testing in this chapter will examine Hypothesis 3 to study the relationship between Green loans and banks' reputation from the customer perspective. Table 6 shows the summary of testing. However, The resulting detail is shown in appendix 5.

> H3   Attitude has a positive impact on the reputation of Green loan granting
>
>   banks.

H3   Attitude has a positive impact on the reputation of Green loan granting banks.

From Table 8, this regression model, R square = .342, indicating that 34.2% of the variation in Reputation effect (CRE) is explained by the independent Attitude (CA). And the Adjusted R square = .338. The ANOVA table shows the regression model is a good fit as the p-value (0.000) is less than the level of significance $\alpha = 1\%$ (0.01).

CRE = $a + b_1 x_1$ = .948 + .685 CA (This function is used to predict CRE for any given CA)

CRE = $\beta_1 x_1$ = .585 CA (CA affects CRE with strength of .585)

As P-Value (0.000) is less than the significance level of $\alpha = 1\%$ (0.01), This hypothesis is accepted. Therefore, Attitude has a positive impact on the reputation of Green loan granting banks.

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Dependent Variable	Independent Variable	R Square	Adjusted R Square	ANOVA P-value	Unstandardized Coefficients		Standardized Coefficients	P-value
					B (Constant)	B Independent Variable	Beta	
Reputation effect (CRE)	Attitude (CA)	.342	.338	.000	.948	.685	.585	.000
Attitude (CA)	Reputation effect (CRE)	.342	.338	.000	2.297	.499	.585	.000
Obstacle Factors (EOb)	Supported Policy from central bank (ECBS)	.113	.095	0.016	2.332	.431	.336	.016
Supported Policy from central bank (ECBS)	Obstacle Factors (EOb)	.113	.095	0.016	2.721	.262	.336	.016

Table 8: SPSS Result for Hypothesis 3-4

Bank Employee Questionnaire

From 51 respondents, Male are 39.22% (20 responses) and Female are 60.78% (31 responses). Most employees are 25-29 years old (27.45% or 14 respondents), followed by 35-39 years old (23.35% or 12 respondents), 30 -34 years old (15.69% or 8 respondents), 40-44 years old (9.80% or 5 respondents) and other 23.53% or 12 respondents are in the age above 45 years old.
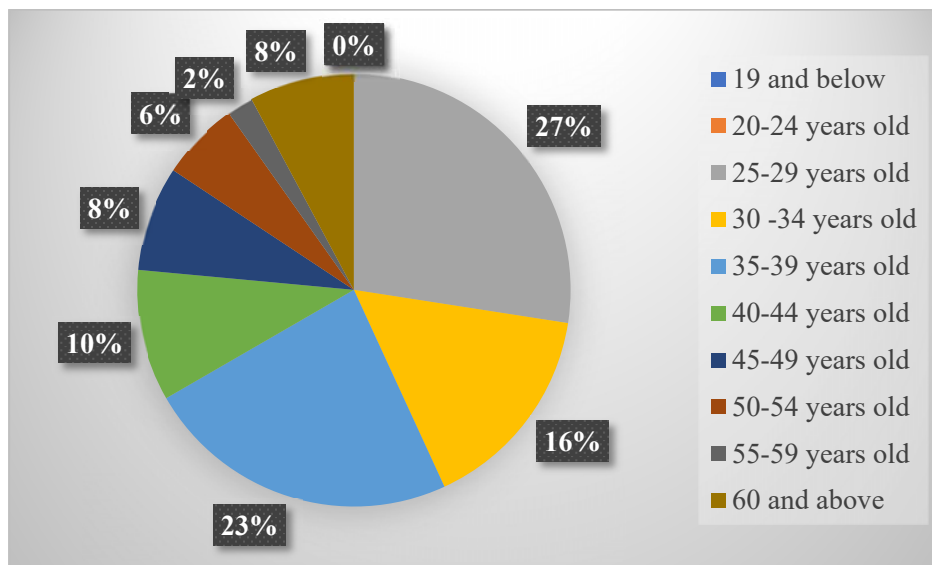
Figure 8: Age Group of banks' employees' questionnaire

The respondents' highest education level in Master's degree is 38 people (74.51%) and Bachelor's degree is 13 people (25.49%). Employees from Credit and Credit analyst function are the biggest group that responded to this survey (22 Respondents or 43.13%), 6 (11.76%) from Risk Management, 8 (15.69%) from Compliance, 8 (15.69%) from Branch Banking, 2 (3.92%) from Treasury, 1 (1.96%) from Law, and Other functions are 4 respondents (7.84%).

In this survey, 2 Top Management (3.92%), 6 Senior Directors, Directors or equivalent (11.76%), 17 Managers or Assistant Managers (33.33%) 25 Officers (49.02%) joined. Most of them have work experience in the finance and banking industry for more than 10 years (23 respondents or 45.10%), followed by 6-7 years' experience (9 respondents or 17.65%).

Working experience in the finance and banking industry	Respondents	(%)
3 years and below	**8**	15.69%
4-5 years	**3**	5.88%
6-7 years	**9**	17.65%
8-9 years	**8**	15.69%
10 years and above	**23**	45.10%

Table 9 : Working experience in the finance and banking industry

The respondents have experienced banks' environment protection through their employer's (bank) projects. They experience the following initiatives: reduction of the use of plastic items, water-saving, energy-saving, waste segregation, going paperless, 3Rs: Reduce Reuse Recycle, and the use of energy-efficient equipment.
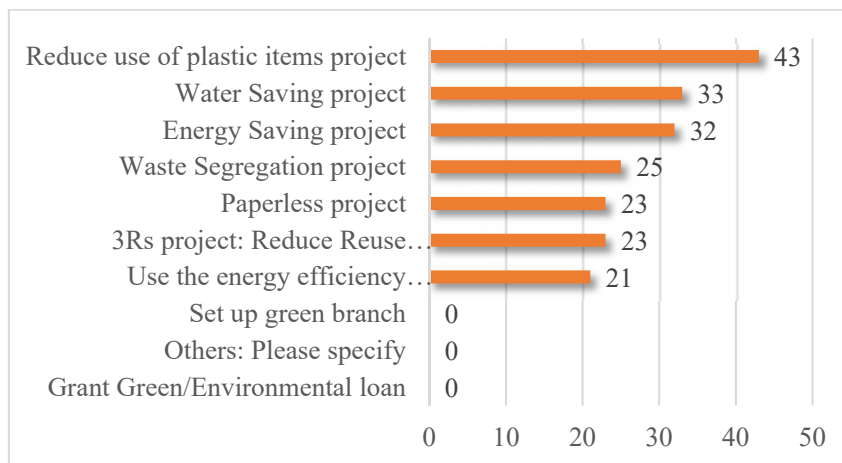
Figure 9: Experienced in banks' environment protection

The hypothesis testing in this chapter will examine Hypothesis 4 to study the relationship between employee perspective on obstacle factors has a positive impact on perspective on effectiveness of support policies from central bank Green loan. Table 6 shows the summary of testing. However, the results are detailed in appendix 5.

H4   Employee perspective on obstacle factors has a positive impact on

perspective on the effectiveness of support policies from the central

bank.

H4   Employee perspective on obstacle factors has a positive impact on perspective on effectiveness of support policies from central bank.

From Table 8, this regression model, R square = .113, indicating that 11.3% of the variation in perspective on the effectiveness of supported policies from the central bank (ECBS) is explained by the independent perspective on obstacle factors (EOb). And the Adjusted R square = .095. The ANOVA table shows the regression model is good fit as p-value (0.016) less than the level of significance α = 5% (0.05).

ECBS = a + b_1 x_1 = 2.332 + .431 EOb (This function is used to predict ECBS for any given EOb)

ECBS = $\beta_1 x_1$ = .336 EOb (EOb affects ECBS with strength of .336)

As P-Value (0.016) is less than the significance level of α = 5% (0.05), This hypothesis is accepted. Hence, the perspective on obstacle factors has a positive impact on the perspective on the effectiveness of supported policies from the central bank. This means defining the true obstacle lead strongly agree on the support from the central bank will be effective.

The score of bank practice is measured by 5 Likert-scale where 1, being strongly disagree, and 5, being strongly agree. The average score on the bank practice question is above 3.5 which means employees agree that their banks have an environmental policy. However, the employees are uncertain about the green loan granting and credit analyst process of their banks.

Statement	Average Score
My bank educates and trains the employees on environment protection (energy saving, energy efficiency, resource management)	3.63
My bank has environmental concern practices.	3.75
My bank supports activities for save the environment.	3.84
My bank has concrete environmental policy.	3.69
My bank implements its environmental policy in its actual practice.	3.65
Our top management plays a critical role to enforce the environmental policy	3.51
My bank contributes to awareness on environmental conservation.	3.65
My bank grants loans to support the business sector on environmental concern project (Green Loans)	3.39
My bank analyzes the environmental risks before granting loan.	3.22

Table 10: Average score of bank practice

Based on the employee perspective, green lending does not provide any obvious relationship with the overall bank's business opportunity and risk management. Nonetheless, it will improve ESG rating, legal risk, and the reputation of bank.

Statement	Average Score
Bank's Business opportunity	
Return on Equity (ROE) will increase.	3.35
Return on Asset (ROA) will increase.	3.35
Total Asset (TA) will increase.	3.33
Net Profit (NP) will increase.	3.43
Non-performing Loan Ratio (NPL Ratio) will decrease.	3.06
Environment, Social, and Governance (ESG) Rating will increase.	4.06
Risk Management	
Credit risk (NPL growth) will decrease.	2.98
Legal risk (responsibility to the client's project) will decrease.	3.69
Market Risk (stability of collateral value) will decrease.	3.12
Operational Risk (business continuity) will decrease.	3.31
Stock price will increase.	3.24
Reputation	
International level reputation will be better.	4.12
Reputation on Shareholder(s) (Investor(s)) perspective will be better.	3.88
Reputation on Customer(s) perspective will be better.	4.00

Table 11: An employee perspective

There are many obstacles to green lending. Most of the statements got the average score of more than 3.5 which can indicate that employees believe that green loan is deterred by many obstacles. These include the long payback period, lack of incentive, lack of institutional capacity, insufficient knowledge, credit analysts' lack of experience to analyze environmental risks, difficulty of environmental impact assessment, unclear environmental (green) loan definition, lack of guidelines, principles, or rules on green loan practices from the public sector, and lack of environmental awareness in the business sector. The additional obstacles are also given. Some employees believe that the ecosystem and business strategy do not accommodate. They also think that collateral is a public infrastructure that is difficult for the bank to seize and sell, and the concept of sustainable banking on responsible or green lending are not showing concrete benefit.

Statement	Average Score
Low Return Rate	3.45
Long Payback Period	3.63
Lack of incentive (Tax, Capital adequacy ratio)	3.88
Lack of institution capacity (Lack of data or information)	3.75
Insufficient knowledge (Lack of knowledge on environmental risks)	3.86
Credit analysts lack experience to analyze environmental risks	3.84
Difficulty of environmental impact assessment	3.92
Unclear Environmental (Green) Loan definition	3.76
Lack of guidelines, principles, or rules on green loan practices from the public sector	3.88
Lack of internal environmental loan policy/guideline/practice	3.61
Lack of environmental awareness in the business sector	3.73

Table 12: Obstacles for green lending

Moreover, the supporting factors and the desired actions from central banks on green lending are studied. The average score for each supporting factor statement is above 4 except for the "Non-financial benefits" factor in which the score is nearly 4. It can be indicative that employees thought the following statement is the supporting factor for the bank to grant a Green loan. Additionally, some respondents said the global trend is one of the most important supporting factors for a green loan and suggested that the factors should not focus on financial benefit only.

Statement	Average Score
Financial incentive (Tax, Capital adequacy ratio)	4.14
Non-financial benefits (Reward system)	3.78
Sufficient knowledge to assess environmental risks	4.14
Credit analysts' training on environmental risk	4.12
Environmental risk data provided to generate risk models	4.12
Clear definition of green loans	4.18
Concrete guidelines, principles, or rules on green loan practices from the public sector	4.20
Clear internal environmental loan policy/guideline/practice	4.12
Top management involvement	4.20
Increase of environmental awareness in the business sector	4.31

Table 13: Green lending Supporting factors

The desired actions from central banks are the most important topic in this questionnaire. The result shows that employees agree if the central bank launches the following policies to support the Green loan granting. The scores (average scores) are close to 4 which means 'agree' on the Likert 5 scale point. The 5 highest average scores (Table 14) are on green credit guidelines (4.14), environmental risk management guidelines (4.14), incentive on the limit of investment ratio on the environmental sector (4.06), green banking regulations/principles (4.04), and incentive on the limit of credit exposure for environmental loans (4.04). This result is aligned with the ranking of the 5 most important central bank policies which will support the bank to grant green loans. The result from ranking (Table 15) shows that Green banking regulations/principles, green credit guidelines, environmental risk management guidelines, incentive on the capital adequacy ratio, and expansion of the role or proportion of board of directors on the environment are the 5 most important policies which will support green loans granting an employee view. Moreover, training employees should also be a policy that is worth mentioning.

Statement	Average Score
Green banking regulations/principles	4.04
Green credit guidelines	4.14
Environmental risk management guidelines	4.14
Expand the role or proportion of board of directors on the environment	3.86
Incentive on the Capital Adequacy Ratio	4.00

Statement	Average Score
Exempt some part of required reserve for environmental loans	3.98
Incentive on limit of investment ratio on environmental sector	4.06
Incentive on limit of credit exposure for environmental loans	4.04
Incentive for Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) for environmental loans	3.92
Incentive on Loan-to-Value caps for environmental loans	3.96
Integrate environmental risks in stress testing	3.84
Require banks to assess their own environmental risk	3.90
Require banks to report the environment related lending data	3.90
Provide an environmental risk model	3.90
Disclosure of environmental risks	3.80
Disclosure of environment-related lending data	3.76
Non-financial benefits (Reward system)	3.94

Table 14: Central Bank supports on Green lending

Statement	Respondents	(%)
Green banking regulations/principles	43	20.19%
Green Credit Guidelines	29	13.62%
Environmental risk management guidelines	25	11.74%
Incentive on the Capital Adequacy Ratio	18	8.45%
Expand the role or proportion of board of directors on the environment	16	7.51%
Incentive on limit of credit exposure for environmental loans	11	5.16%
Exempt some part of required reserve for environmental loans	10	4.69%
Incentive on limit of investment ratio on environmental sector	9	4.23%
Non-financial benefits (Reward system)	9	4.23%
Provide an environmental risk model	9	4.23%
Disclosure of environment-related lending data	8	3.76%
Incentive on Loan-to-Value caps for environmental loans	5	2.35%
Require banks to assess their own environmental risk	5	2.35%
Require banks to report the environment related lending data	5	2.35%
Disclosure of environmental risks	4	1.88%
Incentive for Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) for environmental loans	4	1.88%
Integrate environmental risks in stress testing	3	1.41%

Table 15: 5 most important central bank policies which will support bank to grant green loans

	Hypothesis	Result
H3	Attitude has a positive impact on reputation of Green loan granting bank	Accept at significant level of $\alpha = 1\%$
H4	Employee perspective on obstacle factors has a positive impact on perspective on effective of supported policies from central bank.	Accept at significant level of $\alpha = 5\%$

Table 16: Hypothesis 3-4 testing

Reverse Causality

The reverse causality is also shown in table 8. The result was accepted in reverse of hypotheses 3 and 4 with lower unstandardized coefficients than the main hypotheses. It means the hypotheses have reverse causality, which has a lower effect than the main hypothesis.

Summary

The demographic data of bank customers and employees are provided to analyze the diversification of primary sources in terms of gender, age, income level, occupation, job position, and highest education level. Hypothesis 3 is tested and accepted at a 1% significant level. The data analysis from the employee survey shows that most of them are agree that the mentioned statements are obstacles, supporting factors, and desired actions from central banks on green lending in their perspective. Hypothesis 4 is accepted at a 5% significant level.

Chapter 8 Discussion and Policy Recommendation

Discussion

The study's purpose is to identify the Central Bank's roles to drive sustainable banking in Thailand: with a focus on green loan policy by analyzing the factors which affect the development of sustainable banking in Thailand which is centered on Green Loan/Financing Policy. The research models developed from the research question "What determines the green loan policy from a bank perspective?" Through this study, the relationship between green loans and motivating factors (business opportunity, risk management, and reputation) will be identified in 4 areas of study. The model is measured by conducting a regression analysis from 5 years of historical data and questionnaires.

Following the empirical analysis results, all hypotheses proved that green loan has an impact on those response variables. It was statistically proven that green loan influences the financial performance (Total Asset, Net Profit, Return on Asset, Return on Equity, and Non-Performing Loan (NPL) ratio) with different significant levels. The bank's environmental-related news/event and the Bloomberg environmental disclosure score has a positive impact on stock price from the regression analysis. The more environmental-related news/event (included green lending news) or better environment score will lead to a higher stock price. However, the results from the event study contrast with the regression analysis, as they do not confirm the impact between the bank's environmental-related news/event and stock price. Customers' attitude has a positive impact on the reputation of the Green loan granting bank. Customers have a better attitude to the green lending bank. Employees agree on obstacle factors for granting the loan will lead to the effectiveness of central bank policy support of granting the loan. On the other hand, we can conclude that employees think the obstacle to granting green loans can be solved by the supporting policy from the central bank. The reverse causation also proves that the indicators have a bi-directional effect, but the hypotheses have a higher impact than the reverse causality testing, except for net profit and return on asset.

From the bank employee questionnaire, the policies in sector 6 are using in many countries (China, Bangladesh, India, Indonesia, etc.). The study suggests that the central bank should consider the 5 most important policies - Green banking regulations/principles, Green Credit Guidelines, Environmental risk management guidelines, Incentive on the Capital Adequacy Ratio, and Expanding the role or proportion of board of directors on the environment to support the bank to grant green loans. Other financial incentives may be used to support the growth of green lending. For example, providing incentive on the Capital Adequacy Ratio, requiring a reserve for environmental loans, limiting of investment ratio, limiting of credit exposure, Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), Loan-to-Value caps, etc.

In conclusion, the statistically significant testing result of this study is that green loans increase the financial performance of Thai banks and but do not confirm that green loans lead to better credit risk management. In terms of reputation, environmental-related factors have an impact on banks' reputations. Environmental disclosure score affects the stock price which represents investors' perception. The customer attitude influences the reputation of the green loan granting bank. And the right obstacle defining leads the effectiveness of the central bank policy support.

Policy Implication

This research shows that the business opportunity, risk management, and reputation determine the green loan policy from a bank perspective. The increase of green loans leads to increasing business opportunities (financial performance) and enhancing their reputation among stakeholders (investor, customer) which in line with the empirical studies. Central banks should support the green lending initiatives in every country because they are key to change and influence the sector even it does not ensure that green loans lead to better risk management (credit risk).

These results support that the central bank should launch a policy to widen the interest in green lending. Regulation is one of the most important parts to drive the growth of green loans. To influence green lending, the green loan policy should have an impact on bank financial performance, risk management,

and/or reputation directly or indirectly to motivate banks granting the green loan. The regulation can be mandatory or voluntary, but the voluntary policy is preferable for long-term sustainable development. The voluntary policy will boost non-financial incentives and financial incentive policies. However, the central bank should define the root causes and obstacles for designing practical policies.

The regulation is not the only key to drive green lending. The reputation perception from customers and investors confirms that they are interested in the green banking concept. The public has heightened environmental awareness. The event or rewards on the environment concern policy are one of the keys to pressure banks regarding the green banking reputation. As the central bank, Bank of Thailand's event or reward system on environmental concerns will pressure the sector, and increase awareness on green banking. It will signify the new mandate which the central bank is focusing on.

Recommendation

The Central Bank's role is not focused only on legislation, but it also covers acknowledgment, monitoring and evaluating banks, and building environmental awareness in the private sector (person and corporation) for market forces to drive sustainable banking in Thailand.

First, the central bank should develop an agenda on green banking to shift the mindset of organizations, stakeholders (especially the banking sector), and society and be concerned about climate change. They should allocate a portfolio in green financial instruments and employ environmental practices in the organization to communicate to the public.

The second step is to acknowledge the sector by collecting knowledge from a joint network around the world. The knowledge will bring forth practical advice and contribute to the mindset of risks related to climate, and why it dangerous to the sector, how to measure, and what should bank manage the climate risk.

Peer pressure by market disclosure, published reports, and interactions with society will force banks to implement green lending. Report or disclosure of environment-related lending data is an important policy

that the central bank also should consider. These policies may increase the competitiveness in environmental concerns in the banking industry, create some peer pressure on other banks that are late to start on this issue. The perceived benefit will be the monitoring, evaluation, and further study of a green banking sector.

The data is an important tool to monitor and evaluate banks. The central bank should set up a database for effective monitoring, evaluating, building environmental awareness, and further study of the policy. The database will not just be a tool to generate awareness, but it will also support other factors to stimulate green banking.

Nowadays, the Bank of Thailand (BOT) tries to enforce the sustainable concept from banks to the public. They consider that awareness building from the organization has more sustainability than central bank enforcement. BOT acts as a supporter of the banking industry for sustainable banking. The voluntary action will lead to a more sustainable implementation, better reputation, and put pressure on sustainable banking. They should establish a database, collect knowledge, and practice market discipline in the sector to acknowledge, monitoring, and evaluating banks, and building environmental awareness which is another method to drive sustainable banking in Thailand.

Limitation and Future research

As sustainable banking is a new concept in Thai commercial banking, data on green lending in Thailand is limited. There is no specific standardized green loan report, and not all banks are provided the sustainability report. The green loan is defined by each bank's policy, which may lead to having different classifications. The main focus studied on each subsector faces difficulty. The historical data is limited because the sustainability report of the Securities and Exchange Commission is only within the last 5 years.

News data are collected manually and there is less information on environmental news. For the event study, the effect of other events (nonenvironmental-related) is not carved out. The environment and other events for each bank stock may occur within the same day. The sentiment of other news was not

assessed. The abnormal return is not the whole effect of the event. Estimation and testing periods are difficult to determine for there is always a tradeoff between accuracy and parameter shifts (Sitthipongpanich, 2011).

The Bloomberg environment disclosure score was used instead of Thaipat's ESG rating which provided the only list of ESG index. The green lending in customer and employee perspectives is rarely studied. The survey may be intensively done by particular groups of respondents. The 2020 data were not included in this research due to the uncertain period of the COVID-19 pandemic.

To reiterate, green banking is a new concept in Thailand, the number of studies and data on green loans is limited. Hence, its impact may take several years to demonstrate. The conclusion on the impact of the green loan on those motivating factors may be too early to be decided in the conclusion. It would require more rigorous research and data. The required data should be statistically, theoretically, and empirically conducted. It is recommended that further research should be conducted to study the sentiment of environmental-related and other news on stock pricing, the NPL ratio, and other risks. It is imperative to conduct green loan research, and in-depth analysis on employee perspective on the central bank's green policies. Other future research such as empirical or comparative studies on green credit policy or definition should be conducted to explore the appropriate policy that will fit Thailand's financial system and culture, and be consistent with international standards.

Appendices

Appendix 1: List of Hypothesis

H1   Green loan amount/ratio has a positive impact on Financial and Sustainability Performance.

Green loan amount has a positive impact on Total assets (TA).

Green loan amount has a positive impact on Net Profit (NP).

Green loan ratio has a positive impact on Return on Asset (ROA).

Green loan ratio has a positive impact on Return on Equity (ROE).

Green loan ratio has a negative impact on Non-performing loan (NPL) ratio.

Green loan amount / ratio has a positive impact on Bloomberg environmental disclosure score.

H2   The bank's environmental news/event and the Bloomberg environmental disclosure score has a positive impact on stock price

Environment-related news/events have a positive impact on stock price

Bloomberg's environmental disclosure score has a positive impact on stock price

H3   Attitude has a positive impact on the reputation of Green loan granting banks.

H4   Employee perspective on obstacle factors has a positive impact on perspective on effectiveness of supported policies from central bank.

Appendix 2: Survey on the effect of Green loan on bank reputation/image in the customer's perspective

<ins>Questionnaire for customers</ins>

Survey on the effect of Green loan on bank reputation/image in the customer's perspective

As I am a student in Master's Degree of Development Policy at the KDI school of Public Policy and Management. This survey is conducted to assist my Thesis. Your response will be kept confidential.

Thank you for your participation,

Mr. Prukprakarn, Tanaracht

<ins>Section 1: Personal Information</ins>

    1. Gender

☐ Male   ☐ Female

    2. Age

☐ 19 and below   ☐ 40-44 years old

☐ 20-24 years old   ☐ 45-49 years old

☐ 25-29 years old   ☐ 50-54 years old

☐ 30 -34 years old   ☐ 55-59 years old

☐ 35-39 years old   ☐ 60 and above

    3. Income Level (baht/month)

☐ 20,000 and below

☐ 20,001-40,000

☐ 40,001-60,000

☐ 60,001-80,000

☐ 80,001-100,000

☐ 100,001 and above

    4. Occupation

☐ Student   ☐ Doctor

☐ Bank officer   ☐ Engineer

☐ Government Officer   ☐ Company Officer

☐ Business Owner   ☐ Others: Please specify

5. Highest Education Level

☐ Secondary level and below

☐ Vocational education

☐ Bachelor's degree or equivalent

☐ Master's degree

☐ Ph.D's degree

Section 2: Customer Behavior (current)

1. Kind of bank's product(s)/service(s) that you use (select at least one that you use)

☐ Deposit Account   ☐ Mortgage Loan

☐ Credit Card   ☐ Personal Loan

☐ Bank Assurance   ☐ Other Loans

☐ Mutual Fund   ☐ Advisory

☐ Others: Please specify

2. Which banking channel(s) you have been using? (select one that you frequently use)

☐ Physical branch   ☐ Electronic branch

☐ Digital channel (Mobile banking, Internet Banking)   ☐ Banking Agent (banking service at 7-11, post office)

☐ ATM/ADM   ☐ Others: Please specify

☐ Telebanking (excluding call center)

3. Reason(s) to choose banking service (select at least one)

☐ Bank's Policy on Environment, Social, and Governance   ☐ Product's response to customer need

☐ Bank's Prudential (Capital Adequacy ratio, Performance)   ☐ Speed

☐ Bank's Reputation   ☐ Technology

☐ Service Quality   ☐ Security

☐ Accessibility   ☐ Interest Rate

☐ Others: Please specify

4. **Please rank the important of each factor that will increase your demand to apply for a bank service (1-5 with 1 being the most important and 5 being least important)**

	Bank's Policy on Environment, Social, and Governance		Product response to customer need
	Bank's Prudential (Capital ratio, Performance)		Speed
	Bank's Reputation		Technology
	Service Quality		Security
	Accessibility		Interest Rate

5. **How do you participate in protecting the environment? (select the one that applies the most)**

☐ Energy Saving ☐ 3Rs: Reduce Reuse Recycle

☐ Water Saving ☐ Waste Segregation

☐ Paperless ☐ Use energy-efficient equipments/appliances

☐ Reduce plastic use ☐ Others: Please specify

Section 3: Environment Policy Perception (current)

1. **Do you know what is green loan?**

☐ Yes ☐ No

2. **In your perception, which Thai commercial bank has an environmental policy strategy. (select at least one)**

☐ Kbank ☐ CIMBT

☐ SCB ☐ SCBT

☐ KTB ☐ KK

☐ BBL ☐ UOB

☐ BAY (Krungsri) ☐ LH bank

☐ TMB ☐ ICBC

☐ Thanachart bank ☐ TISCO bank

☐ None of all

3. **In your perception, which Thai commercial bank grants green loan. (select at least one)**

☐ Kbank ☐ CIMBT

☐ SCB ☐ SCBT

☐ KTB ☐ KK

☐ BBL   ☐ UOB

☐ BAY (Krungsri)   ☐ LH bank

☐ TMB   ☐ ICBC

☐ Thanachart bank   ☐ TISCO bank

☐ None of all

4. **In your perception, which Thai commercial bank has the best environmental policy strategy**. **(select the one that you think the best)**

☐ Kbank   ☐ CIMBT

☐ SCB   ☐ SCBT

☐ KTB   ☐ KK

☐ BBL   ☐ UOB

☐ BAY (Krungsri)   ☐ LH bank

☐ TMB   ☐ ICBC

☐ Thanachart bank   ☐ TISCO bank

☐ No difference

5. **In your perception, which Thai commercial bank grants the biggest amount of green loan**. **(select the one that you think the best)**

☐ Kbank   ☐ CIMBT

☐ SCB   ☐ SCBT

☐ KTB   ☐ KK

☐ BBL   ☐ UOB

☐ BAY (Krungsri)   ☐ LH bank

☐ TMB   ☐ ICBC

☐ Thanachart bank   ☐ TISCO bank

☐ No difference

6. **In your perception, what kind of loan(s) should be defined as Green loan. (select the one that you think the most important)**

☐ Loan for renewable energy (wind power, hydropower, biogas)

☐ Loan for green building construction/ energy saving renovation

☐ Loan for electric public transportation

☐ Loan for Machine replacement

☐ Loan for waste management

☐ Loan for Wastewater treatment system

☐ Loan for biochemical

☐ Loan for energy efficiency equipment

☐ Loan for solar panels   ☐ Loan for low carbon infrastructure

☐ Energy saving mortgage loan   ☐ Loan for electric or hybrid car

☐ Loan for reduction carbon emission project   ☐ Others: Please specify

Section 4: Attitude toward bank responsibility on environment

1. **In your opinion, do you agree with the following statements?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	The earth has many environmental issues.					
2	Environmental problems are a major problem that should be resolved.					
3	Business sector should pay attention to solving environmental problems.					
4	Banking sector should be a critical player to solving environmental problems.					
5	Banks gets direct effect from environmental problems.					
6	Banks gets indirect effect from environmental problems.					
7	Banks should have the environmental policy to operate their businesses.					
8	Shareholder or investor have the critical roles in driving the environmental policy in banks.					
9	Top management have a critical role to drive the environmental policy in bank.					
10	Banks should have a department with direct responsibility on the environment.					
11	Banks should have internal environmental policy to reduce carbon emission. (energy, water, paper, and waste management)					
12	Banks should grant loans to support the business sector on environmental concern projects. (Green Loans)					
13	Banks should seriously promote and support green lending.					
14	Green loan is an environmentally friendly financial instrument.					
15	Green loan will be the instrument that solves the environmental problem.					
16	Green loan will increase awareness in the real sector to implement on environmental solution.					

Section 5: Customer Perspective

1. **In your opinion, do you agree that the environmental or green lending policy will improve the following factors of bank?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
	Bank's Business opportunity					
1	Improve the variety of banking products					
2	Generate innovative financial products/services					
3	Ensure the banking products will consider the environment					
4	Improve the bank's financial performance (Return, Profit, Asset, NPL Ratio)					
5	Improve the bank's sustainability performance (Environment, Social, and Governance Rating)					
	Risk Management					
6	Credit risk (NPL growth) will decrease.					
7	Legal risk (responsibility to the client's project that has environmental conflict) will decrease.					
8	Market Risk (stability of collateral value) will decrease.					
9	Operational Risk (business continuity) will decrease.					

2. **In your opinion, do you agree with the following statements?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
	Reputation					
	Customer behavior (Motivate: pleasure, hope, and social acceptance – Trigger: Spark, facilitator, and Signal)					
1	Before I decide financial services from a bank, I also consider the bank's environmental/ green lending policy.					
2	Before I decide to apply the loan from a bank, I also consider the bank's environmental/ green lending policy.					
3	Before I decide to deposit my money in bank, I also consider the bank's environmental/ green lending policy.					

	Statement	1	2	3	4	5
4	Before I decide to invest in stock of bank, I am also considering on bank's environmental/ green lending policy.					
5	Green loans will improve the environmental quality.					
6	Green loans will improve the public's acceptance of banks' role in promoting sustainable development.					
7	Green loans will lead to sustainable banking.					
8	Green loans will facilitate bank to be sustainable banking.					
9	Green loans will signal banks to drive themselves as sustainable banking.					
	Attitude (Compliance, Identification, and Internationalization)					
10	I am proud to be a customer of a bank that provides green lending.					
11	I think I can contribute to the environment when being a customer of a bank that provides green lending.					
12	I prefer service(s) from a bank that provides green lending.					
13	I am satisfied to use financial service from a bank that provides green lending/ has environmental policy rather than bank that does not provide.					
14	I am satisfied to apply the loan from a bank that provides green lending/ has environmental policy rather than bank that does not provide.					
15	I am satisfied to deposit my money in a bank that provides green lending/ has environmental policy rather than bank that does not provide.					
16	I am satisfied to invest stock of a bank that provides green lending/ has environmental policy rather than bank that does not provide.					
17	I am satisfied to use other financial services from a bank that provides green lending/ has environmental policy rather than bank that does not provide.					
18	My close friends have influenced my banking preference.					
19	If my friends use services from a bank that provides green lending, I tend to follow them.					
20	Current environmental values lead me to use the services from a bank that provides green lending.					
	Perception (Exposure, Attention, Interpretation, and Memory)					
21	Green loan is a kind of advertisement for bank's environmental concern.					

	Statement	1	2	3	4	5
22	Banks will be the outstanding bank if they provide green loan.					
23	Banks that provide green loans will have better reputation in the environmental dimension.					
24	Banks that provide green loans will have better reputation in overall dimension.					
25	Banks that providing green loans will be recognized as environmental (green) banks.					
26	Green loans will ensure that bank will operate their business in consideration of the environment.					

Appendix 3: Survey on current barrier, possible policy instruments and desired activities from the central bank to encourage bank grant green loan.

<u>**Questionnaire for Bank's employees**</u>

Survey on current barrier, possible policy instruments and desired activities from the central bank to encourage bank grant green loan.

As I am a student in Master's Degree of Development Policy at the KDI school of Public Policy and Management. This survey is conducted to assist my thesis. This study is an individual study not related to Bank of Thailand's operation. Your response will be kept confidential.

Thank you for your participation,

Mr. Prukprakarn, Tanaracht

<u>**Section 1: Personal Information**</u>

   1. Gender

☐ Male   ☐ Female

   2. Age

☐ 19 and below   ☐ 40-44 years old

☐ 20-24 years old   ☐ 45-49 years old

☐ 25-29 years old   ☐ 50-54 years old

☐ 30 -34 years old   ☐ 55-59 years old

☐ 35-39 years old   ☐ 60 and above

   3. Income Level (baht/month)

☐ 20,000 and below

☐ 20,001-40,000

☐ 40,001-60,000

☐ 60,001-80,000

☐ 80,001-100,000

☐ 100,001 and above

   4. Job Position

☐ Top Management   ☐ Senior Director, Director or equivalent

☐ Manager, Assistant Manager   ☐ Officer

☐ Other: Please specify

   5. Department

<u>Please specify</u>

6. Highest Education Level

☐ Secondary level and below

☐ Vocational education

☐ Bachelor's degree

☐ Master's degree

☐ Ph.D's degree

7. Working experience in finance and banking industry

☐ 3 years and below

☐ 4-5 years

☐ 6-7 years

☐ 8-9 years

☐ 10 years and above

Section 2: Bank Practice

1. My bank protects the environment by

☐ Energy Saving project   ☐ 3Rs project: Reduce Reuse Recycle

☐ Water Saving project   ☐ Waste Segregation project

☐ Paperless project   ☐ Use the energy efficiency equipment

☐ Reduce use of plastic items project   ☐ Set up green branch

☐ Grant Green/Environmental loan   ☐ Others: Please specify

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	My bank educates and trains the employees on environment protection (energy saving, energy efficiency, resource management)					
2	My bank has environmental concern practices.					
3	My bank supports activities for save the environment.					
4	My bank has concrete environmental policy.					
5	My bank implements its environmental policy in its actual practice.					
6	Our top management plays a critical role to enforce the environmental policy					

7	My bank contributes to awareness on environmental conservation.					
8	My bank grants loans to support the business sector on environmental concern project (Green Loans)					
9	My bank analyzes the environmental risks before granting loan.					

Section 3: Employee perspective

1. **In your opinion, do you agree that Green lending will improve the following factors of the bank?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
Bank's Business opportunity						
1	**Bank Performance** Return on Equity (ROE) will increase.					
2	Return on Asset (ROA) will increase.					
3	Total Asset (TA) will increase.					
4	Net Profit (NP) will increase.					
5	Non-performing Loan Ratio (NPL Ratio) will decrease.					
6	**Sustainability Performance** Environment, Social, and Governance (ESG) Rating will increase.					
Risk Management						
7	Credit risk (NPL growth) will decrease.					
8	Legal risk (responsibility to the client's project) will decrease.					
9	Market Risk (stability of collateral value) will decrease.					
10	Operational Risk (business continuity) will decrease.					
Reputation						
11	Stock price will increase.					
12	International level reputation will be better.					
13	Reputation on Shareholder(s) (Investor(s)) perspective will be better.					
14	Reputation on Customer(s) perspective will be better.					

Section 4: Obstacle for green lending

1. **In your opinion, do you agree that the following factors are the obstacles to banks in granting green loans?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	Low Return Rate					
2	Long Payback Period					
3	Lack of incentive (Tax, Capital adequacy ratio)					
4	Lack of institution capacity (Lack of data or information)					
5	Insufficient knowledge (Lack of knowledge on environmental risks)					
6	Credit analysts lack experience to analyze environmental risks					
7	Difficulty of environmental impact assessment					
8	Unclear Environmental (Green) Loan definition					
9	Lack of guidelines, principles, or rules on green loan practices from the public sector					
10	Lack of internal environmental loan policy/guideline/practice					
11	Lack of environmental awareness in the business sector					

2. **In your opinion, what is/are the other obstacle(s) for bank to grant green loans?**

Please specify

Section 5: Green lending Supporting factors

1. **In your opinion, do you agree that the following factors will support banks in granting green loans?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	Financial incentive (Tax, Capital adequacy ratio)					
2	Non-financial benefits (Reward system)					
3	Sufficient knowledge to assess environmental risks					
4	Credit analysts' training on environmental risk					
5	Environmental risk data provided to generate risk models					
6	Clear definition of green loans					
7	Concrete guidelines, principles, or rules on green loan practices from the public sector					
8	Clear internal environmental loan policy/guideline/practice					
9	Top management involvement					
10	Increase of environmental awareness in the business sector					

2. **In your opinion, what is/are the other supporting(s) for bank to grant green loan?**
   Please specify

Section 6: Central Bank supports on Green lending

1. **In your opinion, do you agree that if the central bank provides the following policies, it will support banks in granting green loans (solve the obstacles for green lending)?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	Green banking regulations/principles					
2	Green credit guidelines					
3	Environmental risk management guidelines					
4	Expand the role or proportion of board of directors on the environment					
5	Incentive on the Capital Adequacy Ratio					
6	Exempt some part of required reserve for environmental loans					
7	Incentive on limit of investment ratio on environmental sector					

	Statement	1	2	3	4	5
8	Incentive on limit of credit exposure for environmental loans					
9	Incentive for Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) for environmental loans					
10	Incentive on Loan-to-Value caps for environmental loans					
11	Integrate environmental risks in stress testing					
12	Require banks to assess their own environmental risk					
13	Require banks to report the environment related lending data					
14	Provide an environmental risk model					
15	Disclosure of environmental risks					
16	Disclosure of environment-related lending data					
17	Non-financial benefits (Reward system)					

2. **In your opinion, what is the 5 most important central bank policies which will support bank to grant green loans?** (Please rank 1-5 with 1 being the most important and 5 being least important)

	Green banking regulations/principles
	Green Credit Guidelines
	Environmental risk management guidelines
	Expand the role or proportion of board of directors on the environment
	Incentive on the Capital Adequacy Ratio
	Exempt some part of required reserve for environmental loans
	Incentive on limit of investment ratio on environmental sector
	Incentive on limit of credit exposure for environmental loans
	Incentive for Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) for environmental loans
	Incentive on Loan-to-Value caps for environmental loans
	Integrate environmental risks in stress testing
	Require banks to assess their own environmental risk
	Require banks to report the environment related lending data
	Provide an environmental risk model
	Disclosure of environmental risks
	Disclosure of environment-related lending data

	Non-financial benefits (Reward system)

3. In your opinion, what is/are the other central bank policies which will support bank to grant green loans?

<u>Please specify</u>

Appendix 4: Measurement Constructure

Factor	Types of questions and scale	Measurement
Customers Perspective		
Attitude (CA)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	• The earth has many environmental issues. • Environmental problems are a major problem that should be resolved. • Business sector should pay attention to solving environmental problems. • Banking sector should be a critical player to solving environmental problems. • Banks gets direct effect from environmental problems. • Banks gets indirect effect from environmental problems. • Banks should have the environmental policy to operate their businesses. • Shareholder or investor have the critical roles in driving the environmental policy in banks. • Top management have a critical role to drive the environmental policy in bank. • Banks should have a department with direct responsibility on the environment. • Banks should have internal environmental policy to reduce carbon emission. (energy, water, paper, and waste management) • Banks should grant loans to support the business sector on environmental concern projects. (Green Loans) • Banks should seriously promote and support green lending. • Green loan is an environmentally friendly financial instrument. • Green loan will be the instrument that solves the environmental problem.

Factor	Types of questions and scale	Measurement
		• Green loan will increase awareness in the real sector to implement on environmental solution.
Business Opportunity (CBO)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	• Improve the variety of banking products • Generate innovative financial products/services • Ensure the banking products will consider the environment • Improve the bank's financial performance (Return, Profit, Asset, NPL Ratio) • Improve the bank's sustainability performance (Environment, Social, and Governance Rating)
Risk Management (CRM)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	• Credit risk (NPL growth) will decrease. • Legal risk (responsibility to the client's project that has environmental conflict) will decrease. • Market Risk (stability of collateral value) will decrease. • Operational Risk (business continuity) will decrease.
Reputation effect (CRE)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	• CRCB measurement • CRA measurement • CRP measurement
Reputation: customer behavior (CRCB)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	• Before I decide financial services from a bank, I also consider the bank's environmental/ green lending policy. • Before I decide to apply the loan from a bank, I also consider the bank's environmental/ green lending policy. • Before I decide to deposit my money in bank, I also consider the bank's environmental/ green lending policy. • Before I decide to invest in stock of bank, I am also considering on bank's environmental/ green lending policy. • Green loans will improve the environmental quality.

Factor	Types of questions and scale	Measurement
		• Green loans will improve the public's acceptance of banks' role in promoting sustainable development. • Green loans will lead to sustainable banking. • Green loans will facilitate bank to be sustainable banking. • Green loans will signal banks to drive themselves as sustainable banking.
Reputation: Attitude (CRA)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	• I am proud to be a customer of a bank that provides green lending. • I think I can contribute to the environment when being a customer of a bank that provides green lending. • I prefer service(s) from a bank that provides green lending. • I am satisfied to use financial service from a bank that provides green lending/ has environmental policy rather than bank that does not provide. • I am satisfied to apply the loan from a bank that provides green lending/ has environmental policy rather than bank that does not provide. • I am satisfied to deposit my money in a bank that provides green lending/ has environmental policy rather than bank that does not provide. • I am satisfied to invest stock of a bank that provides green lending/ has environmental policy rather than bank that does not provide. • I am satisfied to use other financial services from a bank that provides green lending/ has environmental policy rather than bank that does not provide. • My close friends have influenced my banking preference. • If my friends use services from a bank that provides green lending, I tend to follow them.

Factor	Types of questions and scale	Measurement
		• Current environmental values lead me to use the services from a bank that provides green lending.
Reputation: Perception (CRP)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	• Green loan is a kind of advertisement for bank's environmental concern. • Banks will be the outstanding bank if they provide green loan. • Banks that provide green loans will have better reputation in the environmental dimension. • Banks that provide green loans will have better reputation in the overall dimensions. • Banks that providing green loans will be recognized as environmental (green) banks. • Green loans will ensure that bank will operate their business in consideration of the environment.
Employees Perspective		
Bank Practice (EBP)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	• My bank educates and trains the employees on environment protection (energy saving, energy efficiency, resource management) • My bank has environmental concern practices. • My bank supports activities for save the environment. • My bank has concrete environmental policy. • My bank implements its environmental policy in its actual practice. • Our top management plays a critical role to enforce the environmental policy • My bank contributes to awareness on environmental conservation. • My bank grants loans to support the business sector on environmental concern project (Green Loans) • My bank analyzes the environmental risks before granting loan.

Factor	Types of questions and scale	Measurement
Employee perspective (EP)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	In your opinion, do you agree that Green lending will improve the following factors of the bank? • EBO measurement • ERM measurement • ERep measurement
Business Opportunity (EBO)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	In your opinion, do you agree that Green lending will improve the following factors of the bank? • Return on Equity (ROE) will increase. • Return on Asset (ROA) will increase. • Total Asset (TA) will increase. • Net Profit (NP) will increase. • Non-performing Loan Ratio (NPL Ratio) will decrease. • Environment, Social, and Governance (ESG) Rating will increase.
Risk Management (ERM)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	In your opinion, do you agree that Green lending will improve the following factors of the bank? • Credit risk (NPL growth) will decrease. • Legal risk (responsibility to the client's project) will decrease. • Market Risk (stability of collateral value) will decrease. • Operational Risk (business continuity) will decrease.
Reputation (ERep)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	In your opinion, do you agree that Green lending will improve the following factors of the bank? • Stock price will increase. • International level reputation will be better. • Reputation on Shareholder(s) (Investor(s)) perspective will be better. • Reputation on Customer(s) perspective will be better.

Factor	Types of questions and scale	Measurement
Obstacle (EOb)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	In your opinion, do you agree that the following factors are the obstacles to banks in granting green loans? • Low Return Rate • Long Payback Period • Lack of incentive (Tax, Capital adequacy ratio) • Lack of institution capacity (Lack of data or information) • Insufficient knowledge (Lack of knowledge on environmental risks) • Credit analysts lack experience to analyze environmental risks • Difficulty of environmental impact assessment • Unclear Environmental (Green) Loan definition • Lack of guidelines, principles, or rules on green loan practices from the public sector • Lack of internal environmental loan policy/guideline/practice • Lack of environmental awareness in the business sector
Supporting Factor (ESF)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	In your opinion, do you agree that the following factors will support banks in granting green loans? • Financial incentive (Tax, Capital adequacy ratio) • Non-financial benefits (Reward system) • Sufficient knowledge to assess environmental risks • Credit analysts' training on environmental risk • Environmental risk data provided to generate risk models • Clear definition of green loans • Concrete guidelines, principles, or rules on green loan practices from the public sector • Clear internal environmental loan policy/guideline/practice • Top management involvement • Increase of environmental awareness in the business sector

Factor	Types of questions and scale	Measurement
Central Bank Support (ECBS)	5 points Likert scale with 1 being strongly disagree and 5 being strongly agree	In your opinion, do you agree that if the central bank provides the following policies, it will support banks in granting green loans? • Green banking regulations/principles • Green credit guidelines • Environmental risk management guidelines • Expand the role or proportion of board of directors on the environment • Incentive on the Capital Adequacy Ratio • Exempt some part of required reserve for environmental loans • Incentive on limit of investment ratio on environmental sector • Incentive on limit of credit exposure for environmental loans • Incentive for Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) for environmental loans • Incentive on Loan-to-Value caps for environmental loans • Integrate environmental risks in stress testing • Require banks to assess their own environmental risk • Require banks to report the environment related lending data • Provide an environmental risk model • Disclosure of environmental risks • Disclosure of environment-related lending data • Non-financial benefits (Reward system)

Appendix 5: Result from SPSS

Appendix- Output
from Spss.docx

Appendix 6: Questionnaire Result

Questionnaire for customers

Survey on the effect of Green loan on bank reputation/image in the customer's perspective

As I am a student in Master's Degree of Development Policy at the KDI school of Public Policy and Management. This survey is conducted to assist my Thesis. Your response will be kept confidential.

Thank you for your participation,

Mr. Prukprakarn, Tanaracht

Section 1: Personal Information

    1. **Gender**

59	Male	**105**	Female

    2. **Age**

2	19 and below	**5**	40-44 years old
12	20-24 years old	**10**	45-49 years old
66	25-29 years old	**14**	50-54 years old
24	30 -34 years old	**10**	55-59 years old
18	35-39 years old	**3**	60 and above

    3. **Income Level (baht/month)**

20	20,000 and below
39	20,001-40,000
35	40,001-60,000
24	60,001-80,000
23	80,001-100,000
23	100,001 and above

    4. **Occupation**

11	Student	**45**	Company Officer
31	Bank officer	**2**	Doctor
12	SFI Bank officer	**1**	Teacher
36	Government Officer	**1**	Engineer
15	Business Owner	**10**	Others: Please specify

5. Highest Education Level

2   Secondary level and below

3   Vocational education

70   Bachelor's degree or equivalent

85   Master's degree

4   Ph.D's degree

Section 2: Customer Behavior (current)

1. Kind of bank's product(s)/service(s) that you use (select at least one that you use)

164	Deposit Account	**37**	Mortgage Loan
137	Credit Card	**20**	Personal Loan
59	Bank Assurance	**5**	Other Loans
72	Mutual Fund	**1**	Advisory
1	Others: Please specify		

2. Which banking channel(s) you have been using? (select one that you frequently use)

21	Physical branch	**6**	Electronic branch
107	Digital channel (Mobile banking, Internet Banking)	**0**	Banking Agent (banking service at 7-11, post office)
22	ATM/ADM	**0**	Others: Please specify
8	Telebanking (excluding call center)		

3. Reason(s) to choose banking service (select at least one)

18	Bank's Policy on Environment, Social, and Governance	**76**	Product's response to customer need
69	Bank's Prudential (Capital Adequacy ratio, Performance)	**81**	Speed
55	Bank's Reputation	**66**	Technology
71	Service Quality	**86**	Security
107	Accessibility	**75**	Interest Rate
2	Others: Please specify		

4. **Please rank the important of each factor that will increase your demand to apply for a bank service (1-5 with 1 being the most important and 5 being least important)**

	Factor	1st	2nd	3rd	4th	5th
1	Bank's Policy on Environment, Social, and Governance	3	5	1	3	11
2	Bank's Prudential (Capital ratio, Performance)	24	16	18	17	9
3	Bank's Reputation	6	9	9	9	6
4	Service Quality	5	14	12	26	18
5	Accessibility	15	19	31	26	16
6	Product response to customer need	24	12	25	5	18
7	Speed	12	15	12	21	12
8	Technology	5	9	13	17	16
9	Security	42	28	12	14	16
10	Interest Rate	15	21	16	10	17

5. **How do you participate in protecting the environment? (select the one that applies the most)**

102	Energy Saving	65	3Rs: Reduce Reuse Recycle
89	Water Saving	61	Waste Segregation
96	Paperless	72	Use energy-efficient equipments/appliances
116	Reduce plastic use	0	Others: Please specify

Section 3: Environment Policy Perception (current)

7. **Do you know what is green loan?**

103	Yes	61	No

8. **In your perception, which Thai commercial bank has an environmental policy strategy. (select at least one)**

73	Kbank	3	CIMBT
52	SCB	6	SCBT
28	KTB	3	KK
31	BBL	4	UOB
23	BAY (Krungsri)	3	LH bank
12	TMB	4	ICBC
3	Thanachart bank	14	TISCO bank
43	None of all	28	I do not know

9. **In your perception, which Thai commercial bank grants green loan**. (select at least one)

61	Kbank	**0**	CIMBT
37	SCB	**3**	SCBT
23	KTB	**1**	KK
21	BBL	**1**	UOB
14	BAY (Krungsri)	**1**	LH bank
5	TMB	**0**	ICBC
0	Thanachart bank	**5**	TISCO bank
57	None of all	**33**	I do not know

10. **In your perception, which Thai commercial bank has the best environmental policy strategy**. (select the one that you think the best)

55	Kbank	**0**	CIMBT
9	SCB	**2**	SCBT
6	KTB	**0**	KK
4	BBL	**1**	UOB
4	BAY (Krungsri)	**0**	LH bank
2	TMB	**0**	ICBC
0	Thanachart bank	**7**	TISCO bank
74	No difference		

11. **In your perception, which Thai commercial bank grants the biggest amount of green loan**. (select the one that you think the best)

53	Kbank	**0**	CIMBT
8	SCB	**1**	SCBT
7	KTB	**0**	KK
8	BBL	**1**	UOB
0	BAY (Krungsri)	**0**	LH bank
2	TMB	**0**	ICBC
1	Thanachart bank	**6**	TISCO bank
77	No difference		

12. In your perception, what kind of loan(s) should be defined as Green loan. (select the one that you think the most important)

55	Loan for renewable energy (wind power, hydropower, biogas)	2	Loan for green building construction/ energy saving renovation
11	Loan for electric public transportation	1	Loan for Machine replacement
21	Loan for waste management	6	Loan for Wastewater treatment system
0	Loan for biochemical	6	Loan for energy efficiency equipment
7	Loan for solar panels	36	Loan for low carbon infrastructure
11	Energy saving mortgage loan	8	Loan for electric or hybrid car
0	Loan for reduction carbon emission project	0	Others: Please specify

Section 4: Attitude toward bank responsibility on environment

2. In your opinion, do you agree with the following statements?

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	The earth has many environmental issues.	0	0	4	53	107
2	Environmental problems are a major problem that should be resolved.	0	1	4	50	109
3	Business sector should pay attention to solving environmental problems.	1	2	5	54	102
4	Banking sector should be a critical player to solving environmental problems.	1	4	23	67	69
5	Banks gets direct effect from environmental problems.	4	24	57	53	26
6	Banks gets indirect effect from environmental problems.	4	10	45	74	31
7	Banks should have the environmental policy to operate their businesses.	1	2	22	77	62
8	Shareholder or investor have the critical roles in driving the environmental policy in banks.	0	4	30	64	66
9	Top management have a critical role to drive the environmental policy in bank.	0	0	19	58	87
10	Banks should have a department with direct responsibility on the environment.	2	3	27	82	50
11	Banks should have internal environmental policy to reduce carbon emission. (energy, water, paper, and waste management)	1	1	29	71	62
12	Banks should grant loans to support the business sector on environmental concern projects. (Green Loans)	0	2	13	75	74

	Statement	1	2	3	4	5
13	Banks should seriously promote and support green lending.	0	2	16	72	74
14	Green loan is an environmentally friendly financial instrument.	0	3	17	82	62
15	Green loan will be the instrument that solves the environmental problem.	0	12	21	74	57
16	Green loan will increase awareness in the real sector to implement on environmental solution.	3	7	10	86	58

Section 5: Customer Perspective

3. **In your opinion, do you agree that the environmental or green lending policy will improve the following factors of bank?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
Bank's Business opportunity						
1	Improve the variety of banking products	0	4	25	98	37
2	Generate innovative financial products/services	1	3	26	93	41
3	Ensure the banking products will consider the environment	0	4	27	88	45
4	Improve the bank's financial performance (Return, Profit, Asset, NPL Ratio)	7	9	70	62	16
5	Improve the bank's sustainability performance (Environment, Social, and Governance Rating)	1	3	28	95	37
Risk Management						
6	Credit risk (NPL growth) will decrease.	11	18	72	47	16
7	Legal risk (responsibility to the client's project that has environmental conflict) will decrease.	5	13	47	71	28
8	Market Risk (stability of collateral value) will decrease.	8	21	67	52	16
9	Operational Risk (business continuity) will decrease.	7	18	58	64	17

4. In your opinion, do you agree with the following statements?

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
Reputation						
	Customer behavior (Motivate: pleasure, hope, and social acceptance – Trigger: Spark, facilitator, and Signal)					
1	Before I decide financial services from a bank, I also consider the bank's environmental/ green lending policy.	2	15	48	79	20
2	Before I decide to apply the loan from a bank, I also consider the bank's environmental/ green lending policy.	4	18	45	73	24
3	Before I decide to deposit my money in bank, I also consider the bank's environmental/ green lending policy.	4	15	48	75	22
4	Before I decide to invest in stock of bank, I am also considering on bank's environmental/ green lending policy.	4	14	46	75	25
5	Green loans will improve the environmental quality.	0	7	26	85	46
6	Green loans will improve the public's acceptance of banks' role in promoting sustainable development.	1	7	30	86	40
7	Green loans will lead to sustainable banking.	1	7	39	77	40
8	Green loans will facilitate bank to be sustainable banking.	2	10	44	74	34
9	Green loans will signal banks to drive themselves as sustainable banking.	1	6	41	81	35
	Attitude (Compliance, Identification, and Internationalization)					
10	I am proud to be a customer of a bank that provides green lending.	1	6	43	85	29
11	I think I can contribute to the environment when being a customer of a bank that provides green lending.	1	6	28	97	32
12	I prefer service(s) from a bank that provides green lending.	2	12	39	86	25
13	I am satisfied to use financial service from a bank that provides green lending/ has environmental policy rather than bank that does not provide.	3	12	34	87	28
14	I am satisfied to apply the loan from a bank that provides green lending/ has environmental policy rather than bank that does not provide.	2	11	34	81	28

	Statement	1	2	3	4	5
15	I am satisfied to deposit my money in a bank that provides green lending/ has environmental policy rather than bank that does not provide.	2	9	42	84	27
16	I am satisfied to invest stock of a bank that provides green lending/ has environmental policy rather than bank that does not provide.	1	9	41	84	29
17	I am satisfied to use other financial services from a bank that provides green lending/ has environmental policy rather than bank that does not provide.	1	9	46	873	35
18	My close friends have influenced my banking preference.	5	14	51	61	33
19	If my friends use services from a bank that provides green lending, I tend to follow them.	1	14	54	66	29
20	Current environmental values lead me to use the services from a bank that provides green lending.	1	10	46	74	33
	Perception (Exposure, Attention, Interpretation, and Memory)					
21	Green loan is a kind of advertisement for bank's environmental concern.	0	2	30	90	42
22	Banks will be the outstanding bank if they provide green loan.	1	6	42	82	33
23	Banks that provide green loans will have better reputation in the environmental dimension.	0	3	30	84	47
24	Banks that provide green loans will have better reputation in the overall dimensions.	0	4	29	88	43
25	Banks that providing green loans will be recognized as environmental (green) banks.	3	8	38	75	40
26	Green loans will ensure that bank will operate their business in consideration of the environment.	1	6	35	91	31

Questionnaire for Bank's employees

Survey on current barrier, possible policy instruments and desired activities from the central bank to encourage bank grant green loan.

As I am a student in Master's Degree of Development Policy at the KDI school of Public Policy and Management. This survey is conducted to assist my thesis. This study is an individual study not related to Bank of Thailand's operation. Your response will be kept confidential.

Thank you for your participation,
Mr. Prukprakarn, Tanaracht

Section 1: Personal Information

1. Gender

20	Male	**31**	Female

2. Age

0	19 and below	**5**	40-44 years old
0	20-24 years old	**4**	45-49 years old
14	25-29 years old	**3**	50-54 years old
8	30 -34 years old	**1**	55-59 years old
12	35-39 years old	**4**	60 and above

3. Income Level (baht/month)

3	20,000 and below
8	20,001-40,000
12	40,001-60,000
10	60,001-80,000
4	80,001-100,000
14	100,001 and above

4. Job Position

2	Top Management	**6**	Senior Director, Director or equivalent
17	Manager, Assistant Manager	**25**	Officer
1	Other: Please specify		

5. Department

22	Credit / Credit Analyst	2	Treasury
6	Risk Management	1	Law
8	Compliance	4	Others
8	Branch Banking		

6. Highest Education Level

0	Secondary level and below
0	Vocational education
13	Bachelor's degree
38	Master's degree
0	Ph.D's degree

7. Working experience in finance and banking industry

8	3 years and below
3	4-5 years
9	6-7 years
8	8-9 years
23	10 years and above

Section 2: Bank Practice

3. My bank protects the environment by

32	Energy Saving project	23	3Rs project: Reduce Reuse Recycle
33	Water Saving project	25	Waste Segregation project
23	Paperless project	21	Use the energy efficiency equipment
43	Reduce use of plastic items project	0	Set up green branch
0	Grant Green/Environmental loan	0	Others: Please specify

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	My bank educates and trains the employees on environment protection (energy saving, energy efficiency, resource management)	1	7	11	23	9
2	My bank has environmental concern practices.	1	6	9	24	11
3	My bank supports activities for save the environment.	0	5	11	22	13
4	My bank has concrete environmental policy.	0	8	9	25	9

	Statement	1	2	3	4	5
5	My bank implements its environmental policy in its actual practice.	1	6	12	23	9
6	Our top management plays a critical role to enforce the environmental policy	1	8	14	20	8
7	My bank contributes to awareness on environmental conservation.	1	7	11	22	10
8	My bank grants loans to support the business sector on environmental concern project (Green Loans)	2	7	16	21	5
9	My bank analyzes the environmental risks before granting loan.	5	5	19	18	4

Section 3: Employee perspective

2. **In your opinion, do you agree that Green lending will improve the following factors of the bank?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
Bank's Business opportunity						
1	**Bank Performance** Return on Equity (ROE) will increase.	1	5	22	21	2
2	Return on Asset (ROA) will increase.	1	5	22	21	2
3	Total Asset (TA) will increase.	2	4	22	21	2
4	Net Profit (NP) will increase.	1	5	20	21	4
5	Non-performing Loan Ratio (NPL Ratio) will decrease.	3	9	25	10	4
6	**Sustainability Performance** Environment, Social, and Governance (ESG) Rating will increase.	0	1	8	29	13
Risk Management						
7	Credit risk (NPL growth) will decrease.	2	9	30	8	2
8	Legal risk (responsibility to the client's project) will decrease.	3	1	12	28	7
9	Market Risk (stability of collateral value) will decrease.	1	11	23	13	3
10	Operational Risk (business continuity) will decrease.	1	7	22	17	4
Reputation						
11	Stock price will increase.	1	8	21	20	1
12	International level reputation will be better.	0	0	7	31	13

	Statement	1	2	3	4	5
13	Reputation on Shareholder(s) (Investor(s)) perspective will be better.	0	1	16	22	12
14	Reputation on Customer(s) perspective will be better.	1	0	11	25	14

Section 4: Obstacle for green lending

2. **In your opinion, do you agree that the following factors are the obstacles to banks in granting green loans?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	Low Return Rate	0	7	16	26	2
2	Long Payback Period	0	5	16	23	7
3	Lack of incentive (Tax, Capital adequacy ratio)	0	2	10	31	8
4	Lack of institution capacity (Lack of data or information)	0	3	12	31	5
5	Insufficient knowledge (Lack of knowledge on environmental risks)	0	3	10	29	9
6	Credit analysts lack experience to analyze environmental risks	0	4	9	29	9
7	Difficulty of environmental impact assessment	0	3	11	24	13
8	Unclear Environmental (Green) Loan definition	0	4	13	25	9
9	Lack of guidelines, principles, or rules on green loan practices from the public sector	0	3	9	30	9
10	Lack of internal environmental loan policy/guideline/practice	0	8	9	29	5
11	Lack of environmental awareness in the business sector	1	2	13	29	6

4. **In your opinion, what is/are the other obstacle(s) for bank to grant green loans?**

- Ecosystem and business strategy do not accommodate.
- Collateral is the public infrastructure which hard for bank to take.
- The concept of sustainable banking on responsible or green lending are not showing concrete benefit.
- Lack of Government support in form of tax shield or low interest.

Section 5: Green lending Supporting factors

3. **In your opinion, do you agree that the following factors will support banks in granting green loans?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	Financial incentive (Tax, Capital adequacy ratio)	0	0	7	30	14
2	Non-financial benefits (Reward system)	0	2	13	30	6
3	Sufficient knowledge to assess environmental risks	0	1	4	33	13
4	Credit analysts' training on environmental risk	0	1	4	34	12
5	Environmental risk data provided to generate risk models	0	1	6	30	14
6	Clear definition of green loans	0	0	6	30	15
7	Concrete guidelines, principles, or rules on green loan practices from the public sector	0	1	4	30	16
8	Clear internal environmental loan policy/guideline/practice	0	0	6	33	12
9	Top management involvement	0	0	6	29	16
10	Increase of environmental awareness in the business sector	0	0	2	31	18

4. **In your opinion, what is/are the other supporting(s) for bank to grant green loan?**
   - Global trend which impact to business strategy.
   - Supporting factor should focus on the importance more than financial benefit from green loan granting .

Section 6: Central Bank supports on Green lending

4. **In your opinion, do you agree that if the central bank provides the following policies, it will support banks in granting green loans (solve the obstacles for green lending)?**

1 – Strongly Disagree 2- Disagree 3-Uncertain 4- Agree 5- Strongly Agree

	Statement	1	2	3	4	5
1	Green banking regulations/principles	0	3	8	24	16
2	Green credit guidelines	0	2	4	30	15
3	Environmental risk management guidelines	0	1	6	29	15
4	Expand the role or proportion of board of directors on the environment	0	5	11	21	14
5	Incentive on the Capital Adequacy Ratio	0	3	9	24	15

	Statement	1	2	3	4	5
6	Exempt some part of required reserve for environmental loans	0	5	6	25	15
7	Incentive on limit of investment ratio on environmental sector	0	3	6	27	15
8	Incentive on limit of credit exposure for environmental loans	0	3	8	24	16
9	Incentive for Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) for environmental loans	0	4	10	23	14
10	Incentive on Loan-to-Value caps for environmental loans	0	3	12	20	16
11	Integrate environmental risks in stress testing	1	4	10	23	13
12	Require banks to assess their own environmental risk	0	7	6	23	15
13	Require banks to report the environment related lending data	1	5	8	21	16
14	Provide an environmental risk model	0	4	9	26	12
15	Disclosure of environmental risks	0	6	10	23	12
16	Disclosure of environment-related lending data	0	6	10	25	10
17	Non-financial benefits (Reward system)	0	2	11	26	12

5. **In your opinion, what is the 5 most important central bank policies which will support bank to grant green loans?** (Please rank 1-5 with 1 being the most important and 5 being least important)

	Statement	1st	2nd	3rd	4th	5th
1	Green banking regulations/principles	29	6	2	2	4
2	Green credit guidelines	5	13	7	4	0
3	Environmental risk management guidelines	1	9	13	2	0
4	Expand the role or proportion of board of directors on the environment	1	4	0	9	2
5	Incentive on the Capital Adequacy Ratio	5	0	2	5	6
6	Exempt some part of required reserve for environmental loans	0	4	2	2	2
7	Incentive on limit of investment ratio on environmental sector	0	1	4	3	1
8	Incentive on limit of credit exposure for environmental loans	0	0	6	3	2
9	Incentive for Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) for environmental loans	0	0	0	3	1
10	Incentive on Loan-to-Value caps for environmental loans	0	1	1	0	3
11	Integrate environmental risks in stress testing	0	0	0	1	2
12	Require banks to assess their own environmental risk	1	0	0	1	3

13	Require banks to report the environment related lending data	0	0	1	1	3
14	Provide an environmental risk model	1	1	1	2	4
15	Disclosure of environmental risks	0	1	1	1	1
16	Disclosure of environment-related lending data	1	1	3	1	2
17	Non-financial benefits (Reward system)	1	2	0	1	5

6. **In your opinion, what is/are the other central bank policies which will support bank to grant green loans?**

- Training

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