pISSN: 1906 - 3296 © 2020 AU-GSB e-Journal.
eISSN: 2773 – 868x © 2021 AU-GSB e-Journal.
https://assumptionjournal.au.edu/index.php/AU-GSB

Sustainability practices and enterprise value: evidence of Thai listed oil companies in the Stock Exchange of Thailand

Phutthisith Tungsirihirunkul*, Wibunsak Chaisongkarm, Teetima Piyasirisilp, Wisaroot Pariyaprasert

Received: September 11, 2024. Revised: Frebuary 25, 2025. Accepted: March 18, 2025.

Abstract

This study aims to investigate how sustainability practices affect enterprise value of Thai listed oil firms during 2018 - 2023. With the use of data from 12 Thai listed oil companies. Panel-data regression analysis, an advanced quantitative research method, is adopted to test these relationships with the hypotheses suggesting positive impacts from ESG factors and a negative impact from the pandemic. Key findings are that Systematic SDG's Actions have a significant positive effect on both P/BV ratio and Tobin's Q at a 95% confident level (P-value = 0.039) and at a 99% confident level (P-value = 0.0001) respectively. The research model using Tobin's Q as the dependent variable, however, better fits with empirical data in this study. Crucial recommendations are threefold. Firstly, regulators, oil companies, and investors need comprehensive materiality assessments and actively engage in sustainability activities, emphasizing substantive involvement over mere ESG recognition. Secondly, companies shall integrate UN SDGs into corporate strategies by setting decisive measurable goals, action plans, control processes and, in turn, regularly report performances to relevant stakeholders. Lastly, future empirical studies could examine the relationship between sustainability and enterprise value with different industries and different business environment settings to compare research results and address generalizations.

Keywords: Sustainability, Enterprise Value, Panel-Data Analysis, Oil Company

JEL Classification Code: E44, F31, F37, G15

1. Introduction

Due to various aftermaths of global longstanding economic development such as global climate change, malnutrition, economic inequality, natural resource depletion, loss of biodiversity and the like, sustainability has become a serious strategic issue at the global, country and organization level (IMD, 2024; Muluneh, 2021; Tirado & Meerman, 2012; World Economic Forum, 2024). Empirical studies from several sources (Mahecha et al., 2022; Masterson et al., 2019; Mengist et al., 2020) have pointed out that without sustainability strategic actions from those relevant entities, the world ecosystems will suffer from severe adverse effects and, in the worst scenario, unable to return to a balance state. In this respect, a series of global collective sustainability initiatives (e.g. Kyoto Protocol, Paris Accord, United Nations Sustainable Development Goals) were launched to seek serious co-operations among nation states (Moomaw et al., 1999; UNFCCC, 2024).

According to evidence from IMD (2024), Sachs et al. (2023), and United Nations (2024), both profit and non-profit organizations around the world have dedicated efforts and resources to advance sustainability practices in line with United Nations sustainable development goals (UN SDGs). More critical are overcoming obstacles to transforming the organizations to achieve UN SDGs and the execution of sustainability practices in a systematic fashion (Leleux & van der Kaaij, 2019). Furthermore, to ensure the effective

1*Phutthisith Tungsirihirunkul, Lecturer, Graduate School of Business, Assumption University of Thailand, Thailand. Email: sahanontng@au.edu
2 Wibunsak Chaisongkarm, Lecturer, Faculty of Management Sciences, Kasetsart Universit - Sriracha Campus, Thailand. Email: wibunsak.ch@ku.th
3 Teetima Piyasirisilp, Lecturer, Graduate School of Business, Siam University, Thailand. Email: teetima_p@yahoo.com
4 Wisaroot Pariyaprasert, Lecturer, Graduate School of Business, Assumption University of Thailand, Thailand. Email: witsarootpry@au.edu

execution of sustainability practices, collaborative efforts among different stakeholders of the organization are the key (IMD, 2024). Thus, those organizations which seriously promote, execute, monitor and evaluate sustainability practices based on UN SDGs must establish sustainability strategies to cover three key sustainability pillars including environment, society and governance or the so-called "ESG". In other words, ESG strategic initiatives proposed by the management are key tools, which lead to allocating organizational resources to achieve UN SDGs (Leleux & van der Kaaij, 2019; Sachs et al., 2023).

It has been evident that both listed and private companies in Thailand adopt sustainability strategies with objectives of pursuing their corporate sustainability targets, but also maximizing their enterprise value (Petcharat & Zaman, 2019; Thai Institute of Directors, 2024; UNDP, 2023). Sustainability practices in the ESG domain such as decarbonization, diversity, equity and inclusion (DEI), circular economy, human rights promotion, business code of conduct and the like, have been viewed as key drivers of sustainability performances and eventually foster enterprise value in the medium- and long-term (Cheung et al., 2010; M. Yu & Zhao, 2015). Likewise, previous empirical studies have indicated that companies in different industries are likely to adopt different sustainability practices, partly because their business attributes and value chain activities are totally different from each other (Abdul-Rashid et al., 2017; Chiu et al., 2020; Matakanye et al., 2021; Wellbrock et al., 2020). Nonetheless, sustainability practices have become strategic issues of those companies to meet the expectations of stakeholders. In turn, it is crucial that serious attention is needed to examine relationships between several sustainability practices and enterprise values to broaden our knowledge in sustainability and strategic management (Wuttichindanon, 2017; Yu & Zhao, 2015; Yu & Xiao, 2022).

According to Annual Registration Statements (Form 56-1) of Thai oil listed companies from 2018-2023 (The Securities and Exchange Commission, Thailand, 2024), the oil industry contributes not only to driving Thai economic growth, but also to sustaining energy security of the nation. In fact, Thai oil industry provides input supplies for various sectors ranging from raw materials, intermediate goods to finished goods. Despite adding enormous value to the Thai economy, players in the oil industry face increasing pressure from various stakeholders to reduce environmental impact, especially achieving net zero carbon to curb rising global temperature within 2050. Indeed, they adopt a series of sustainability practices to meet different stakeholders' requirements and, eventually, boost their enterprise value.

With regard to highlighted facts as well as academic and practitioner arguments noted earlier, key objectives of this empirical study are to investigate relationships between sustainability practices and enterprise value of Thai oil companies listed in the Stock Exchange of Thailand (SET). In turn, empirical data were collected from 12 Thai listed companies, which operate in the oil business (see also Table 1) to test hypotheses and provide both academic and practical implications. In this respect, the expected research outcomes are to confirm generic relationships between several variables reflecting sustainability practices and enterprise value in terms of price to book value (P/BV) ratio and Tobin Q ratio of those 12 Thai listed oil companies with a panel data regression model, using data from 2018 – 2023 period.

2. Literature Review

2.1 Sustainability Practices

Sustainability practices have emerged as a critical aspect of corporate strategy, increasingly recognized for their potential to influence financial performance and long-term enterprise value (Ameer & Othman, 2012; Leleux & van der Kaaij, 2019; Milgrom & Roberts, 1992). Within the context of the energy sector, Thai listed oil companies on the Stock Exchange of Thailand (SET) contribute directly or indirectly to economic growth and environmental impact (Statista, 2024; Yuaningsih et al., 2020).

At the same time, the Thai oil industry has implemented sustainability practices encompassing a broad range of environmental, social, and governance (ESG) considerations, including greenhouse gas emission reduction, community engagement, board diversity and the like, as outlined by the Securities and Exchange Commission, Thailand (2024). Globally, oil companies implement various sustainability frameworks, standards, and reporting mechanisms to address environmental and social concerns. The Thai oil industry is no exception. Major Thai oil firms adopt these practices to enhance transparency and accountability, ensuring their operations align with international sustainability norms, namely Global Reporting Initiative (GRI), the Dow Jones Sustainability Index (DJSI), and the United Nations Global Compact (UNGC) (SEC, 2024; Statista, 2024; United Nations, 2024).

Conceptually, sustainability practices in the context of the oil industry refer to the comprehensive strategies and actions undertaken to minimize environmental, social, and economic impacts while ensuring long-term business prosperity (IMD, 2024; Leleux & van der Kaaij, 2019; Nielsen, 2023). Common key practices are frameworks and standards (GRI and DJSI) providing guidance of measurement and reporting sustainability performance (Gbangbola & Lawler, 2020; Jørgensen et al., 2022). The second practice is Corporate Social Responsibility (CSR), comprising initiatives that address social and environmental concerns such as health and safety, fair labor practices and

community engagement (Thai Institute of Directors, 2024; UNDP, 2023). The third practice is sustainability reporting, involving the regular publication of reports that disclose the company's environmental, social, and governance (ESG) performances (Herremans & Nazari, 2016). Finally, other practices are environmental management including waste, water, and pollution management together with innovation and technology to create cleaner, more efficient processes, including renewable energy integration and carbon capture technologies (Laine et al., 2021).

Nonetheless et al. (2019) argued that companies from different industries tend to adopt different sustainability practices due to various constraints such as the industry in the investor's negative list, no proven business case, inadequate committed resources to execute ESG initiatives, unjustified investment return, inability to continue sustainability business ideology and so on.

Effective sustainability practices heavily rely on the results of materiality assessment, which is similar to risk assessment (Jørgensen et al., 2022; Leleux & van der Kaaij, 2019). Materiality assessment enables a company to focus on few high impact sustainability initiatives/action plans, which supposedly nurture business performances and, in turn, foster enterprise value (Nielsen, 2023).

2.2 Enterprise Value

In addition, enterprise value (EV) incorporates a company's total value by considering its market capitalization, debt, minority interest, and preferred shares while deducting total cash and cash equivalents (Damodaran, 2012; Laine et al., 2021). Price-to-book value (P/BV) compares a company's market price per share to its book value per share, reflecting whether a stock is trading at a premium or discount relative to its book value. Tobin's Q assesses the market value of a company's assets against their replacement cost, indicating over-valuation if the ratio is above 1 and under-valuation if it's below 1. These metrics serve as crucial indicators for investors, offering insights into a company's valuation and aiding in making informed investment decisions (Damodaran, 2012). Evidence, however, has shown that listed companies faced negative financial performances from time to time despite serious efforts on sustainability practices, especially in energy sector (The Securities and Exchange Commission, Thailand, 2024). Thus, many research studies were conducted using the above listed methods (i.e., P/BV and Tobin's Q).

2.3 Related Theories

Theories concerning social practices and financial performance often intersect within the realm of corporate social responsibility (CSR) and sustainable business practices (Leleux & van der Kaaij, 2019; Sachs et al., 2023). One prominent theory is stakeholder theory, which emphasizes that organizations should consider the interests of all stakeholders, which include employees, customers, suppliers, governments, communities, and the like, not just shareholders—in their decision-making processes (Freeman et al., 2010; Matakanye et al., 2021). This theory suggests that addressing social and environmental concerns can lead to improved financial performances in the long-run by enhancing reputation, reducing risks, and fostering innovations (Laine et al., 2021; Sachs et al., 2023; Thai Institute of Directors, 2024).

Likewise, institutional theory emphasizes the influence of societal norms, values, and institutional pressures on organizational behaviors (Milgrom & Roberts, 1992; Smith & Hitt, 2005). Companies may adopt socially responsible practices to conform to institutional expectations and gain legitimacy in the eyes of stakeholders, ultimately bolstering financial performance (Leleux & van der Kaaij, 2019). Legitimacy theory, within this context, suggests that organizations strive to maintain alignment with prevailing societal norms and expectations to maintain legitimacy and credibility in the eyes of stakeholders, which can positively influence financial performance (Suchman, 1995).

Finally, the resource-based view suggests that socially responsible practices can serve as valuable intangible assets, such as brand reputation and human capital, which contribute to sustained competitive advantage and financial success (Barney, 2001). Empirical studies strongly support this notion, highlighting the role of CSR in enhancing intangible assets for competitive advantage and financial success (Orlitzky et al., 2003; Peloza, 2006; Surroca et al., 2010). For instance, Orlitzky et al. (2003) found a positive correlation between corporate social performance and financial performance, emphasizing enhanced brand reputation and stakeholder relationships. Similarly, Surroca et al. (2010) demonstrated that CSR activities improve intangible resources, such as innovation, human capital, and reputation, which lead to better financial outcomes. Peloza (2006) argued that CSR acts as an insurance mechanism, protecting firms against negative events and boosting their reputation, thereby positively impacting financial performance. Collectively, these studies underscore that CSR practices enhance intangible assets crucial for long-term financial success.

Several limitations, nevertheless, have been observed. For instance, Leleux and van der Kaaij (2019) argued that practicality of sustainability depends largely on both execution speed and corporate direction, which the resource-based view may not be applied since some firms are lack of intangible assets, but striving to pursue sustainability practices. Moreover, firms tend to execute sustainability initiatives, which satisfy some, not all, stakeholders, which contribute largely to their business performances and enterprise value.

2.4 Previous Empirical Studies

A number of previous empirical studies have generally confirmed that sustainability practices can affect company performances. For instance, Magara et al. (2015) found that environmental accounting significantly impacts the profit margin, return on equity, and Tobin's Q ratios of oil and mining companies listed in the Philippines.

Suttipun (2015) and Wuttichindanon (2017) confirmed the association of ownership status, company size, and industry type with CSR activities and sustainability reporting practices. Large companies, state enterprises, and certain industries were found to be more concerned with sustainable practices, reflecting the influence of stakeholders. In contrast found that the ASEAN Corporate Governance Scorecard negatively impacts firm value and that sustainability reporting does not affect firm value.

Lakkanawanit et al. (2022) conducted a broader study with a larger sample size, including 552 companies listed on the Stock Exchange of Thailand (SET) and 169 companies on the Market for Alternative Investment (MAI). They categorized the companies into two groups – energy-intensive and energy-conservation industries – and confirmed that energy conservation has a positive effect on firm performance. These results, in turn, are consistent with both stakeholder and legitimacy theory.

In recent years, numerous studies have used accounting disclosure documents and financial statements as proxies for independent and dependent variables in the study of firm values (Atz et al., 2022; Chen & Xie, 2022; Chen et al., 2023; Coelho et al., 2023; Rojo-Suarez et al., 2024; Yu and Xiao, 2022; Zhou et al., 2022).

Atz et al. (2022) performing a meta-analysis with the use of peer-review empirical studies concluded that financial performance of ESG investing firms has on average been indistinguishable from those conventional investing ones. However, one-third of these empirical studies confirmed that ESG investing firms gain superior performance.

Chen and Xie (2022) studied a relationship between ESG disclosure and financial performance using of ESG investors as the mediating variable. The key result was that ESG disclosure has a significant effect on corporate financial performance. In addition, they reached two striking conclusions in the extended analysis; first, ESG disclosure persuades ESG investors and, second, ESG investors play a moderating role in the connection between ESG ratings and financial performance.

Chen et al. (2023) conducted an empirical study using a panel data multiple regression analysis and a sample of organizations worldwide. In turn, they found that ESG performance is positively interrelated with corporate performance. More specifically, the influence of ESG rating on corporate performance is significant for large-scale companies and insignificant for small-scale companies.

Rojo-Suarez et al. (2024) investigated a relationship between sustainability practices and financial performance based on Latin America oil and gas firms. They discovered that ESG policies are associated with lower medium-term discount rates, but also, ESG practices positively link with lower future dividend growth.

Zhou et al. (2022) examined a relationship between ESG performance and company market value mediating by financial performance. Better ESG performance is likely to enhance the company's market value and, in turn, financial performance indicates a significant mediating impact. Moreover, operational capacity is a vital mediating factor for ESG performance to drive the company's market value.

According to empirical studies mentioned earlier, quantitative data were expressed through firm age, firm size, board size, and firm value, while ROA, ROE, and P/BV ratio, Tobin's Q were commonly used as dependent variables to capture enterprise value or firm performance. Several studies (Atz et al., 2022; Chen & Xie, 2022; Zhou et al., 2022) utilized, however, dummy variables as the proxy of qualitative data in the research model. In so doing, ones confirmed the impact of sustainability practices (e.g. ESG disclosure, diversity) on organizational performance.

3. Research Methods and Materials

3.1 Research Framework

Based on theoretical and empirical evidence mentioned earlier, the researchers hypothesize that there exist relationships between sustainable practices and enterprise value among oil companies listed in the Stock Exchange of Thailand (SET). A comprehensive review of sustainability literature and Annual Registration Statements (Form 56-1) of Thai oil listed companies from 2018-2023 suggests several sustainable variables, including ESG recognition, ESG court-cases, and SDG actions, while enterprise value is gauged through Price-to-book (P/BV) and Tobin's Q ratio. In addition, taking the recent pandemic's impact into account, the COVID-19 variable, which significantly disturb

economic activities across the world, is incorporated into the conceptual models in Figures 1 and 2 to capture the mediating effect of this unique event. Both conceptual models aim to provide insights into the dynamic interplay between sustainability practices and enterprise value within the context of the SET-listed oil companies.

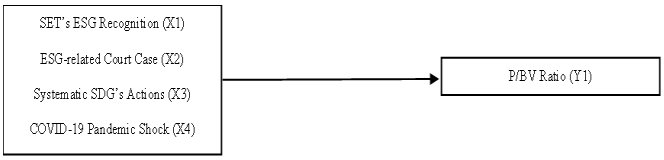

Figure 1: Conceptual Model 1: P/BV Ratio

Figure 2: Conceptual Model 2: Tobin's Q

3.2 Methodology

As this study aims to examine relationships between sustainability practices and enterprise value, researchers collected data from 12 Thai listed oil companies in the Stock Exchange of Thailand. Three key criteria of company selection are: (1) revenue size is greater than one billion Thai Baht, (2) oil is the main source of the company revenue, and (3) there is no interruption in the company's business during 2018 – 2023 (i.e. research period). Also, an external shock, namely, COVID-19 Pandemic was considered as a mediator between sustainability practices and enterprise value. These secondary data were adopted to undertake panel data regression analysis with 4 independent variables – i.e., SET's ESG Recognition (X1), ESG-related Court Case (X2), Systematic SDG's Actions (X3), COVID-19 Pandemic Shock (X4) - and 2 dependent variables – i.e., P/BV Ratio (Y1) and Tobin Q (Y2).

SET's ESG Recognition (X1) refers to the recognition by the Stock Exchange of Thailand for a company's adherence to environmental, social, and governance standards, reflecting the company's commitment to sustainable practices.

ESG-related Court-Case (X2) measures the number of years since the initiation of legal cases against the company, providing insight into the impact of legal issues. For instance, if a legal case was initiated in 2020, it would be counted as one year in 2021.

Systematic SDGs Actions (X3) evaluate the company's alignment with the United Nations Sustainable Development Goals, requiring a materiality assessment and engagement in ESG activities in at least two out of three areas: environmental, social, and governance.

COVID-19 Pandemic Shock (X4) considers the impact of the COVID-19 pandemic on the company's operations and financial performance, particularly during the years 2020 and 2021. These variables collectively provide a comprehensive framework to assess and compare the financial and sustainability performance of companies, ensuring a thorough and structured evaluation.

This study examines various financial and sustainability metrics to evaluate the performance and sustainability practices of publicly listed companies.

P/BV Ratio (Y1) or Price-to-Book Value Ratio is used to measure how much investors are willing to pay per Thai Baht of the company's book value per share. It is calculated by dividing the market price at the end of the period by the book value per share.

Tobin's Q (Y2) is another key metric that compares the market value of a company to the replacement cost of its assets, calculated as the sum of market value of equity and total liabilities divided by total assets. These numbers are provided by DataStream.

With regard to econometric analysis approach (Greene, 2018; Wooldridge, 2010), this study adopted a panel-data multiple regression analysis to test relationships between sustainability practices and enterprise value with data gathered from 12 Thai listed oil companies. Compared to other quantitative research methods, the panel data multiple regression analysis is suitable for this research for two reasons. First, this method is the hybrid between time series and cross-sectional data analysis, which enables hypothesis testing with the use of 12 companies' data over a range 6 years period. Second, hypothesis testing results do not violate assumptions of best linear unbiased estimator and, in turn, the researchers could make reliable discussions, implications (Greene, 2018; Wooldridge, 2010).

Although the majority of the oil companies included in the sample are predominantly state-owned, under the recent regulations of the Stock Exchange of Thailand (SET) all listed companies are mandated to annually disclose their sustainable practices through the 56-1 form and a One report (SEC News, 2021).

Since PTT Oil and Retail Business Public Company Limited (OR) was listed in SET during 2021, the researchers obtain OR data from 2021 – 2023 (3 periods). Thus, this study consists of 69 data points. After thoroughly review all data points, the researchers conclude that there is no need for data cleansing and missing data remedy as unusual data patterns do not exist.

Table 1: Summary of secondary data in this research

	Variable	Total data unit[1]	Data sources[2]
1	SET's ESG Recognition (X_1)	69	SET ESG Ratings in www.setsustainability.com
2	ESG-related Court Case (X_2)	69	56-1 One Report of Thai 12 listed oil companies in www.sec.or.th
3	Systematic SDG's Actions (X_3)	69	56-1 One Report of Thai 12 listed oil companies in www.sec.or.th
4	COVID-19 Pandemic Shock (X_4)	69	DataStream by Thomson Reuters
5	P/BV Ratio (Y_1)	69	DataStream by Thomson Reuters
6	Tobin's Q (Y_2)	69	DataStream by Thomson Reuters

Note:

1.Data were collected from the SEC, SET, and DataStream databases for 12 Thai listed oil companies from 2018 to 2023, with each variable comprising 69 data points across companies and years.

2.Thai 12 listed oil companies include:

[1]. Bangkok Aviation Fuel Services Public Company Limited (BAFS)
[2]. Bangchak Corporation Public Company Limited (BCP)
[3]. IRPC Public Company Limited (IRPC)
[4]. PTT Oil and Retail Business Public Company Limited (OR)
[5]. PTG Energy Public Company Limited (PTG)
[6]. PTT Public Company Limited (PTT)
[7]. PTT Exploration and Production Public Company Limited (PTTEP)
[8]. RPCG Public Company Limited (RPC)
[9]. Sea Oil Public Company Limited (SEAOIL)
[10]. Star Petroleum Refining Public Company Limited (SPRC)
[11]. SUSCO Public Company Limited (SUSCO)
[12]. Thai Oil Public Company Limited (TOP)

Two regression models were proposed, and hypotheses were examined for all 4 independent variables and 2 dependent variables as exhibited follows:

$$Y_{1ij} = \beta_0 + \beta_1 X_{1ij} + \beta_2 X_{2ij} + \beta_3 X_{3ij} + \beta_4 X_{4ij} + \varepsilon_{1ij} \quad (1)$$

$$Y_{2ij} = \beta_0 + \beta_1 X_{1ij} + \beta_2 X_{2ij} + \beta_3 X_{3ij} + \beta_4 X_{4ij} + \varepsilon_{2ij} \quad (2)$$

Where:

Y_{1ij} = P/BV Ratio
Y_{2ij} = Tobin Q
X_1 = SET's ESG Recognition (a dummy variable, where 1 = there is SET's ESG recognition and 0 = no SET's ESG recognition)
X_2 = ESG-related Court Case (a dummy variable, where 1 = there is ESG-related court case and 0 = no ESG-related court case)
X_3 = Systematic SDG's Actions (a dummy variable, where 1 = there is systematic SDG's actions and 0 = no systematic SDG's actions)
X_4 = COVID-19 Pandemic Shock (a dummy variable, where 1 = existence of external adverse event and 0 = no adverse event)
β_0 = Intercept
β_1, β_2, β_3, and β_4 = Independent Coefficients
ε_{1ij} and ε_{2ij} = Error Term in Equation 1 and 2 respectively
i = Thai 12 listed oil companies during year 2018 – 2023

While Equation 1 displays relationships between 4 independent variables (X_1, X_2, X_3 and X_4) and P/BV Raio (Y_1), Equation 2 represents relationships between 4 independent variables (X_1, X_2, X_3 and X_4) and Tobin's Q (Y_2). With reference to Wooldridge (2010) and Greene (2018), this research study was based on panel data multiple regression analysis. To confirm relationships between independent and dependent variables noted in equations 1 and 2, t-Statistic was adopted as the key indicator to accept or reject Null Hypothesis with the 95% significance level. Furthermore, the researchers illustrated the goodness of fit by R-Square and F-Statistic based on one-way ANOVA to ensure the reliability of study results.

4. Results and Discussion

As shown in Table 2, the P/BV ratio of the samples ranged between 0.33 times to 4.44 times, with an average of 1.43 times. Tobin's Q ratio is shown with a minimum of 0.15 and maximum of 1.78. In terms of standard deviation, the P/BV is more sensitive than Tobin's Q with the value of 0.95 and 0.33 respectively. However, the standard deviation of Tobin's Q from this research is less fluctuated compared to 10.05 for the sample of mining and oil companies in the Philippines (Magara et al., 2015). Other variables in this study are dummy ones and, in turn, there is no result of the descriptive statistics. It is important to note that this study assumed that COVID-19 pandemic affects all 12 companies during 2020 – 2021 period.

Table 2: Descriptive Statistics

Descriptive Statistics	P/BV	Tobin Q
Standard Deviation	0.95	0.33
Mean	1.43	0.88
Minimum	0.33	0.15
Maximum	4.44	1.78

Source: statistical analysis result by the researchers

Table 3 exhibits the regression results of Equation 1, using the P/BV ratio as the dependent variable. Equation 1 overall shows moderate relationships between independent variables and P/BV ratio with relatively low the R-square (R^2) value of 12.23% and F-statistic value of 2.2299 at the 10%

significant level (Greene, 2018).

Hypothesis testing results indicate that only Systematic SDG's Actions (X_3) has a positive effect on P/BV ratio (Y_1) at the 5% significance level. In turn, the remaining 3 independent factors, namely, SET's ESG Recognition (X_1), ESG-related Court Case (X_2) and COVID-19 Pandemic Shock (X_4) do not show any significant relationship with P/BV ratio (Y_1). In other words, the impact of these three independent variables (X_1, X_2, and X_4) on P/BV ratio (Y_1) is minimal for all 12 Thai listed oil companies. In line with sustainability literature and recent empirical studies (Atz et al., 2022; Chen & Xie, 2022; Leleux & van der Kaaij, 2019; Sachs et al., 2023; Zhou et al., 2022), one can claim that companies with systematic SDG's actions tend to seriously take sustainability issues into account and continuously create sustainability awareness across the management and all employees.

Table 3: Regression table for Equation 1 (P/BV)

Variable	Coefficients	t-Statistic	P-value
Constant	0.6023	1.8978	0.0622
X_1	0.2152	0.8223	0.4139
X_2	-0.0146	-0.0465	0.9631
X_3	0.7967	2.1080	0.0390**
X_4	0.0330	0.1388	0.8900
---------- Observations	69		
F-statistic	2.2299*		
R Square	0.1223		
Adjusted R2	0.0675		
Standard Error	0.9218		

Source: statistical analysis result by the researchers
Note: *, **, and *** denote statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

Table 4 presents hypothesis testing results of Equation 2, employing Tobin's Q as the dependent variable. Compared to R^2 value and F-statistic value of Equation 1, this equation overall displays a better explanation of the relationship between independent variables and Tobin's Q with the R^2 value of 26.65% and F-statistic value of 5.8132 at the 1% significant level (Greene, 2018).

Hypothesis testing results in Table 4 spell out that Systematic SDG's Actions (X_3) significantly affects Tobin's Q (Y_2) at a 5% significant level. This finding evidence supports the conclusion of previous studies (Atz et al., 2022; Chen & Xie, 2022; Chen et al., 2023; Lakkanawanit et al., 2022; Magara et al., 2015). On this basis, systematic SDG's actions (e.g., waste water management, renewable energy investment, human rights, proper risk management) drive enterprise value (Tobin's Q). Nonetheless, other independent factors (i.e., SET's ESG Recognition (X_1), ESG-related Court Case (X_2) and COVID-19 Pandemic Shock (X_4)) do not show any relationship with Tobin's Q ratio (Y_2) similar to results of Equation 1.

Table 4: Regression table for Equation 2 (Tobin's Q)

Variable	Coefficients	t-Statistic	P-value
Constant	0.4305	4.2607	0.0001
X_1	-0.0321	-0.3850	0.7015
X_2	0.0350	0.3509	0.7268
X_3	0.5183	4.3073	0.0001***
X_4	0.0267	0.3522	0.7259
---------- Observations	69		
F-statistic	5.8132***		
R Square	0.2665		
Adjusted R2	0.2207		
Standard Error	0.2935		

Source: statistical analysis result by the researchers
Note: *, **, and *** denote statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

The key finding of this study, in fact, is in parallel with Yu and Xiao (2022)'s study about *"Does ESG Performance Affect Firm Value? Evidence from a New ESG-Scoring Approach for Chinese Enterprises"*. There exists a significantly positive relationship between ESG performance and firm value, using Tobin's Q and the Market-to-Book ratio as proxies. In this respect, a series of SDG actions can enhance corporate value through better stakeholder engagement and sustainability practices (Leleux & van der Kaaij, 2019; Sachs et al., 2023; Yu & Xiao, 2022).

In the similar vein, this research confirms the finding of study about *"ESG Performance and Corporate Value: Analysis from the Stakeholders' Perspective"*. ESG performance improves corporate value observed in both P/BV and Tobin's Q ratio. Nevertheless found a more nuanced relationship in that the impact of ESG performance on financial metrics can significantly vary across different business contexts and ESG dimensions. This means that not every ESG factor uniformly affects enterprise value. Similarly, Yu & Xiao (2022) confirmed that ESG performance does not consistently enhance stock returns or P/BV ratio, suggesting that the significance of ESG factors relies on market and temporal business contexts.

According to systematic SDG actions mentioned in the previous sections, there are a number of strategic actions impacting enterprise value. Materiality assessment among them plays a very crucial role in identifying strategic priorities in pursuit of the company's corporate sustainability goals (Leleux & van der Kaaij, 2019; SEC News, 2021; The Securities and Exchange Commission, Thailand, 2024). Materiality assessment significantly enhances company performance and enterprise value through several key mechanisms (IMD, 2024). In turn, strategic alignment can

exist partly because the process of materiality assessment enables companies to identify, prioritize and execute sustainability practices, which are the most important to their stakeholders and their business (Leleux & van der Kaaij, 2019). This alignment ensures that the company's sustainability efforts are strategically integrated into its core business operations, leading to more efficient resource allocation and improved long-term performance. By understanding which ESG issues are most material, companies can focus their strategies in business areas that offer the great effects and competitive advantages (Nielsen, 2023).

Likewise, risk management is a crucial aspect where the materiality assessments play a vital role (Leleux & van der Kaaij, 2019; The Securities and Exchange Commission, Thailand, 2024). By identifying materiality issues, companies can proactively manage risks associated with these factors. This approach helps mitigate potential negative impacts on the company's financial performance and reputation; thereby, enhancing overall resilience (Jørgensen et al., 2022). Effective risk management through materiality assessments allows companies to anticipate and address potential ESG-related challenges before they escalate, ensuring more stable and predictable operations (Leleux & van der Kaaij, 2019).

In a similar vein, value creation is significantly enhanced by focusing on the most materiality issues (Leleux & van der Kaaij, 2019; The Securities and Exchange Commission, Thailand, 2024). Research has shown that sustainability reporting, driven by materiality assessments, can lead to an increase in market value. This shows the economic benefits of integrating ESG considerations into strategies, as companies that effectively manage ESG impacts are often in a better position to capitalize on new opportunities, improve their competitive positioning, and attract investment (Nielsen, 2023).

5. Conclusions

5.1 Conclusion

As addressed earlier, this study aims to examine whether sustainability practices (SET's ESG Recognition, ESG-related Court Case, and Systematic SDG's Actions), moderated by the COVID-19 Pandemic Shock, significantly affect enterprise value (P/BV and Tobin's Q ratio) of 12 oil companies listed in the Stock Exchange of Thailand. Utilizing a panel-data regression analysis method with empirical data from 2018 - 2023, research findings indicate that: first, Equation 2, which Tobin's Q is the dependent variable, is more statistically significant than Equation 1, which employs P/BV ratio as the dependent variable. Notably, this study confirms that Systematic SDG Actions (X_3) is the only significant independent variable in both Equations 1 and 2. Other three independent variables (i.e., SET's ESG Recognition (X_1), ESG-related Court Case (X_2) and COVID-19 Pandemic Shock (X_4)) has no significant effect on P/BV and Tobin's Q ratio.

On this basis, the overall conclusion of this empirical study is that *systematic SDG's actions significantly contribute to fostering enterprise value of Thai listed oil companies during 2018 – 2023.* Those oil companies with a series of ESG/SDG's actions such as regular materiality assessment, continuous risk management, ESG-oriented project investment and the like are likely to advance their performances and achieve satisfactory enterprise value (Leleux & van der Kaaij, 2019; SEC News, 2021; The Securities and Exchange Commission, Thailand, 2024).

5.2 Recommendation

With regard to results of this study, the researchers give recommendations for both practitioners as follows. Firstly, regulators, oil companies, and investors should prioritize the process of materiality assessment and actively engage in sustainability (ESG) activities over merely seeking for ESG recognition. This approach ensures that sustainability efforts are aligned with the organization's strategies and address the most significant ESG issues impacting enterprise value. Strengthening systematic SDG actions is crucial, as these have shown a significant positive impact on enterprise value. Secondly, companies should integrate the United Nations Sustainable Development Goals (UN SDGs) into their corporate strategies by setting clear measurable goals, regularly monitoring ESG-related project progress, and continuously reporting outcomes to stakeholders. Thirdly, developing comprehensive ESG policies that go beyond regulatory compliances by seriously focusing on long-term sustainability goals, risk management, and value creation will ensure that ESG considerations are embedded in all aspects of business operations and decision-making processes. Fourthly, investors and regulators should promote education and awareness about the importance of ESG factors in investment decisions through workshops, seminars, and collaboration with academic institutions. Fifthly, incentivizing ESG performances through tax benefits, subsidies, or recognition programs can encourage companies to adopt sustainability practices. Sixthly, to improve the reliability and comparability of ESG data, standardizing ESG reporting requirements with clear metrics and guidelines is essential. Finally, oil companies should leverage technological innovations to enhance their ESG performances by adopting cleaner technologies, improving energy efficiency, and utilizing data analytics to track and optimize sustainability initiatives. By focusing on recommendations mentioned above, stakeholders can foster

a more sustainable and resilient oil business that enhances enterprise value and contributes to broader societal and environmental goals.

For academics and future research study, one could examine the relationship between sustainability practices and enterprise value with different industries and different business environment settings to compare research results and address generalizations. Moreover, investigating a relationship between sustainability practices and enterprise value shall not limit to listed companies, but could extend research studies towards private companies and small and medium enterprises (SMEs). In this regard, one can compare their striking sustainability practices with previous findings. However, the quality of data from private companies and SMEs may be questionable and, in turn, affect the reliability of research findings (Damodaran, 2012). Last but not least, future empirical research shall take both internal and external mediating factors into account since these mediators (e.g., leadership, corporate shared value, operational efficiency, geo-political tensions, epidemic, Carbon Border Adjustment Mechanism (CBAM)) could reinforce or weaken the effect of sustainability practices on enterprise value (Greene, 2018; Wooldridge, 2010).

5.3 Limitation and Further Research

This study is subject to several limitations that should be acknowledged. Firstly, the research focuses exclusively on publicly listed oil companies in Thailand, with data collected over the period from 2018 to 2023. Consequently, research findings may not be generalizable to oil companies in other countries, where regulatory environments, market conditions, and socio-economic factors are significantly different. It has been evident that unique characteristics of the Thai market, including the dominance of state-owned enterprises and specific regulatory requirements, may influence the outcomes observed in this study (SEC, 2024). These factors could lead to different sustainability practices, financial performance metrics, and responses to ESG issues compared to those oil companies operating in different international contexts.

Moreover, the chosen timeframe during 2018 – 2023 may also affect research findings, as it includes the significant global economic shock caused by the COVID-19 pandemic. This event presumably had a profound impact on the oil industry worldwide, and the specific effects on Thai oil companies during this period may not reflect typical market conditions (World Economic Forum, 2024).

Future research should consider a broader geographic scope and a longer time horizon to enhance the generalizability of research findings. Comparative studies involving oil companies from diverse regions and varying regulatory environments would provide a more comprehensive understanding of how ESG factors influence enterprise value across the global oil industry. Additionally, incorporating data from periods outside the pandemic could offer insight into more stable market conditions.

Lastly, while this study provides valuable insights into the relationship between sustainability (ESG) practices and enterprise value for Thai listed oil companies, caution should be noted when extrapolating these results to other contexts. Further research is needed to validate these findings across different countries and time periods (Greene, 2018; Wooldridge, 2010)

References

Abdul-Rashid, S. H., Sakundarini, N., Raja Ghazilla, R. A., & Thurasamy, R. (2017). The impact of sustainable manufacturing practices on sustainability performance. *International Journal of Operations & Production Management, 37*(2), 182-204. https://doi.org/10.1108/IJOPM-04-2015-0223

Ameer, R., & Othman, R. (2012). Sustainability practices and corporate financial performance: A study based on the top global corporations. *Journal of Business Ethics*, *108*(1), 61-79. https://doi.org/10.1007/s10551-011-1063-y

Atz, U., Van Holt, T., Liu, Z. Z., & Bruno, C. C. (2022). Does Sustainability Generate Better Financial Performance? Review, Meta-analysis, and Propositions. *Journal of Sustainable Finance and Investment, 3708495.* https://dx.doi.org/10.2139/ssrn.3708495

Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of Management, 27*(6), 643-650. https://doi.org/10.1177/014920630102700602

Chen, S., Song, Y., & Gao, P. (2023). Environmental, social, and governance (ESG) performance and financial outcomes: Analyzing the impact of ESG on financial performance. *Journal of Environmental Management*, *345, 118829.* https://doi.org/10.1016/j.jenvman.2023.118829

Chen, Z., & Xie, G. (2022). ESG disclosure and financial performance: Moderating role of ESG investors. *International Review of Financial Analysis, 83,* 102291. https://doi.org/10.1016/j.irfa.2022.102291

Cheung, Y. L., Tan, W., Ahn, H.-J., & Zhang, Z. (2010). Does corporate social responsibility matter in Asian emerging markets? *Journal of Business Ethics, 92*(3), 401-413. https://doi.org/10.1007/s10551-009-0164-3

Chiu, C. L., Zhang, J., Li, M., Wei, S., Xu, S., & Chai, X. (2020). A study of environmental disclosures practices in Chinese energy industry. *Asian Journal of Sustainability and Social Responsibility, 5*(1), 9. https://doi.org/10.1186/s41180-020-00036-1

Coelho, R., Jayantilal, S., & Ferreira, J. J. (2023). The impact of social responsibility on corporate financial performance: A systematic literature review. *Corporate Social Responsibility and Environmental Management, 30*(4), 1535-1560 https://doi.org/10.1002/csr.2446

Damodaran, A. (2012). *Investment valuation: Tools and techniques for determining the value of any asset*. Wiley.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & de Colle, S. (2010). *Stakeholder theory: The state of the art*. Cambridge University Press.

Gbangbola, K., & Lawler, N. (2020). *Gold standard sustainability reporting: A step-by-step guide to producing sustainability reports*. Taylor & Francis.

Greene, W. H. (2018). *Econometric analysis*. Pearson.

Herremans, I. M., & Nazari, J. A. (2016). Sustainability reporting driving forces and management control systems. *Journal of Management Accounting Research, 28*(2), 103-124. https://doi.org/10.2308/jmar-51470

IMD. (2024, April 30). *International institute for management development*. IMD. https://www.imd.org/ibyimd/tag/climate-change/

Jørgensen, S., Mjøs, A., & Pedersen, L. J. T. (2022). Sustainability reporting and approaches to materiality: Tensions and potential resolutions. *Sustainability Accounting, Management and Policy Journal, 13*(2), 341-361. https://doi.org/10.1108/SAMPJ-01-2021-0009

Laine, M., Tregidga, H., & Unerman, J. (2021). *Sustainability accounting and accountability*. Routledge. https://doi.org/10.4324/9781003185611

Lakkanawanit, P., Dungtripop, W., Suttipun, M., & Madi, H. (2022). Energy conservation and firm performance in Thailand: Comparison between energy-intensive and non-energy-intensive industries. *Energies, 15*(20), 7532. https://doi.org/10.3390/en15207532

Leleux, B., & van der Kaaij, J. (2019). *Winning sustainability strategies*. Springer International Publishing. https://doi.org/10.1007/978-3-319-97445-3

Magara, R., Aming'a, N., & Momanyi, E. (2015). Effect of environmental accounting on company financial performance in the Philippines. *British Journal of Economics, Management & Trade, 10*(1), 1-11. https://doi.org/10.9734/BJEMT/2015/19909

Mahecha, M. D., Bastos, A., Bohn, F. J., Eisenhauer, N., Feilhauer, H., Hartmann, H., Hickler, T., Kalesse-Los, H., Migliavacca, M., Otto, F. E. L., Peng, J., Quaas, J., Tegen, I., Weigelt, A., Wendisch, M., & Wirth, C. (2022). Biodiversity loss and climate extremes - study the feedbacks. *Nature, 612*(7938), 30-32. https://doi.org/10.1038/d41586-022-04152-y

Masterson, V. A., Vetter, S., Chaigneau, T., Daw, T. M., Selomane, O., Hamann, M., Wong, G. Y., Mellegård, V., Cocks, M., & Tengö, M. (2019). Revisiting the relationships between human well-being and ecosystems in dynamic social-ecological systems: Implications for stewardship and development. *Global Sustainability, 2*, 8. https://doi.org/10.1017/sus.2019.5

Matakanye, R. M., van der Poll, H. M., & Muchara, B. (2021). Do companies in different industries respond differently to stakeholders' pressures when prioritizing environmental, social and governance sustainability performance?. *Sustainability, 13*(21), 12022. https://doi.org/10.3390/su132112022

Mengist, W., Soromessa, T., & Feyisa, G. L. (2020). A global view of regulatory ecosystem services: Existed knowledge, trends, and research gaps. *Ecological Processes, 9*(1), 40. https://doi.org/10.1186/s13717-020-00241-w

Milgrom, P. R., & Roberts, J. (1992). *Economics, organization, and management*. Prentice Hall.

Moomaw, W., Ramakrishna, K., Gallagher, K., & Freid, T. (1999). The Kyoto Protocol: A blueprint for sustainable development. *The Journal of Environment & Development, 8*(1), 82-90. http://www.jstor.org/stable/44319354

Muluneh, M. G. (2021). Impact of climate change on biodiversity and food security: A global perspective—a review article. *Agriculture & Food Security, 10*(1), 36. https://doi.org/10.1186/s40066-021-00318-5

Nielsen, C. (2023). ESG reporting and metrics: From double materiality to key performance indicators. *Sustainability, 15*(24), 16844. https://doi.org/10.3390/su152416844

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. *Organization Studies, 24*(3), 403-441.

Peloza, J. (2006). Using corporate social responsibility as insurance for financial performance. *California Management Review, 48*(2), 52-72.

Petcharat, N., & Zaman, M. (2019). Sustainability reporting and integrated reporting perspectives of Thai-listed companies. *Journal of Financial Reporting and Accounting*, *17*(4), 671-694. https://doi.org/10.1108/JFRA-09-2018-0073

Rojo-Suarez, J., Alonso-Conde, A. B., & Gonzales-Ruiz, J. D. (2024). Does sustainability improve financial performance? An analysis of Latin American oil and gas firms. *Resources Policy, 88,* 104484. https://doi.org/10.1016/j.resourpol.2023.104484

Sachs, J. D., Lafortune, G., Fuller, G., & Drumm, E. (2023). *Implementing the SDG stimulus. Sustainable Development Report 2023.* Dublin University Press. https://doi.org/10.25546/102924

SEC News. (2021). *SEC prepares listed companies for disclosure of annual registration statement via Form 56-1 One Report.* Securities and Exchange Commission. https://www.sec.or.th/EN/

Smith, K. G., & Hitt, M. A. (2005). *Great minds in management: The process of theory development.* Oxford University Press.

Statista. (2024). *Leading listed companies in Thailand.* https://www.statista.com/statistics/1426927/thailand-leading-publicly-traded-companies-by-revenue/

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *The Academy of Management Review, 20*(3), 571. https://doi.org/10.2307/258788

Surroca, J., Tribó, J. A., & Waddock, S. (2010). Corporate responsibility and financial performance: The role of intangible resources. *Strategic Management Journal, 31*(5), 463-490.

Suttipun, M. (2015). Sustainable development reporting: Evidence from Thailand. *Asian Social Science, 11*(13), 316-324. https://doi.org/10.5539/ass.v11n13p316

The Securities and Exchange Commission, Thailand. (2024). *Annual registration statement (Form 56-1) of Thai oil listed companies from 2018–2023.* The Securities and Exchange Commission, Thailand. https://market.sec.or.th/public/idisc/en/FinancialReport/ALL

Thai Institute of Directors. (2024, April 30). *Corporate governance report of Thai listed companies 2018-2023.* https://thai-iod.com/th/publications.asp?type=4

Tirado, M. C., & Meerman, J. (2012). *Climate change and food and nutrition security*. Springer Netherlands. https://doi.org/10.1007/978-94-007-0110-6_4

UNDP. (2023). *SDG guidebook for Thai listed companies.* UNDP.

UNFCCC. (2024). *The Paris Agreement.* https://unfccc.int/process-and-meetings/the-paris-agreement

United Nations. (2024). *Sustainable Development Goals (SDGs).* https://sdgs.un.org/goals

Wellbrock, W., Ludin, D., Röhrle, L., & Gerstlberger, W. (2020). Sustainability in the automotive industry, importance of and impact on automobile interior – insights from an empirical survey. *International Journal of Corporate Social Responsibility, 5*(1), 10. https://doi.org/10.1186/s40991-020-00057-z

Wooldridge, J. M. (2010). *Econometric analysis of cross-section and panel data.* MIT Press.

World Economic Forum. (2024). *Sustainability at the Forum.* https://www.weforum.org/sustainability-world-economic-forum

Wuttichindanon, S. (2017). Corporate social responsibility disclosure—choices of report and its determinants: Empirical evidence from firms listed on the Stock Exchange of Thailand. *Kasetsart Journal of Social Sciences, 38*(2), 156-162. https://doi.org/10.1016/j.kjss.2016.07.002

Yu, M., & Zhao, R. (2015). Sustainability and firm valuation: An international investigation. *International Journal of Accounting and Information Management, 23*(3), 289-307. https://doi.org/10.1108/IJAIM-07-2014-0050

Yu, X., & Xiao, K. (2022). Does ESG performance affect firm value? Evidence from a new ESG-scoring approach for Chinese enterprises. *Sustainability, 14*(24), 16940. https://doi.org/10.3390/su142416940

Yuaningsih, L., Febrianti, R. A. M., & Kamran, H. W. (2020). Climate change and energy consumption patterns in Thailand: Time trends during 1988–2013. *International Journal of Energy Economics and Policy, 11*(1), 571-576. https://doi.org/10.32479/ijeep.10695

Zhou, G., Liu, L., & Luo, S. (2022). Sustainable development, ESG performance and company market value: Mediating effect of financial performance. *Business Strategy and the Environment, 31*(7), 3371-3387 https://doi.org/10.1002/bse.3089