Ilomata International Journal of Tax & Accounting
P-ISSN: 2714-9838; E-ISSN: 2714-9846
Volume 4, Issue 3 July 2023
Page No. 470-490

The Effects of Green Innovation, Eco-Efficiency, Business Strategy, Technology Information Investment, and Profitability on Firm Value

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Received : June 6, 2023
Accepted : July 15, 2023
Published : July 31, 2023

Citation: Silaban, D, H., Dewi, R, R. (2023). The Infuluance of Green Innovation, Eco-Efficiency, Strategic Business, Technology Information Investment, and Profitability on Firm Value. Ilomata International Journal of Tax and Accounting, 4(3), 470-490.
https://doi.org/10.52728/ijtc.v4i3.791

ABSTRACT: The current economic growth is in line with the increase in the number of business units and the growth in the number of business units is believed to not only have positive but also the negative effects on the environment and the earth. For this reason, current investment decisions by stakeholders are also seen from the company's effort and contribution to the environmental improvement. This study aims to determine the effects of green innovation, eco-efficiency, business strategy, information technology investment, and profitability on firm value in companies listed on the Indonesia Stock Exchange. In this research, the sources are taken from the annual report, sustainability report and information on the company website. The research sample comprising 125 companies that met the criteria and are listed on the Indonesia Stock Exchange in 2019-2021. The sampling technique used was purposive sampling and the hypothesis testing in this study is multiple linear regression analysis. The results of this study indicate that cost leadership strategy and profitability have a positive effect on firm value. while green innovation, eco-efficiency, differentiation strategy, and information technology investment have no effect on firm value.

Keywords: Green Innovation, Eco-Efficiency, Strategic Business, Information Technology Investment, Profitability, Firm Value

INTRODUCTION

The results review of the Central Bureau of Statistics publication regarding the number of companies by province (unit) for the 2013-2020 period indicates that there has been an increase in the number of company units for the past eight years (www.bps.go.id). The increasing number of company units can have both a positive and a negative impact from the economic perspective. The presence of numerous companies will definitely create new job opportunities so as to minimize the unemployment rate and to reduce economic inequality. On the contrary, the growing number of the enterprises can affect negatively, one of which is a surge in pollution triggered by a significant waste generation as a result of production process. Consequently, water, soil and air

will undergo serious damage, thus, pollution becomes a big problem for the environment around the companies and society.
Environmental issues have been a hot topic of discussion at the global economic level recently, and this is escalating since the world is currently facing crucial matter, an industrial hazardous waste. Through *Greenpeace* organization, Leonard (2022) argued that deforestation caused by the palm oil industry, has converted 17 million hectares of Indonesian forests. As a consequence, the climate crisis is getting worse since the conversion has replaced thousands of existing indigenous habitats. In addition, exploitation is carried out on a large scale against mineral resources on the islands of Kalimantan and Sumatra in which the commodity of coal for export causes ecological crisis in the surrounding areas.

In addition, the issue of global warming is gradually worrying. The increase in global temperature every year is caused by the greenhouse gas effect (Vistinasari et al., 2022). The very massive emission of toxic and dangerous gases originating from various human activities on earth is released into the atmosphere, causing solar energy to be trapped and damage the atmosphere (Anggraeni, 2015; Cossu et al., 2020; Li et al., 2020). Greenhouse gas emissions are seen as a major risk for both nature and human since an increase in emissions affect the ecosystems on earth (Giannarakis et al., 2017; Jo et al., 2020; McKercher et al., 2010). IQAir, stated that in 2021 Indonesia is one of the countries with highly-polluted air, and it ranked 17th out of 117 countries(www.IQAir.com).

The damage itself has reached a critical phase as an accumulation of failures in maintaining sustainable environment and good governance. Moreover, it is in a very weak level of control over the use of resources both by the government as a regulator and by the companies as operators. It can be argued that in carrying out their business operations, the company orientation is solely focused on the fulfillment of the wealth for the shareholders and ignoring the environmental and social aspects. Companies play a big role in creating environmental damage, thus attention and wisdom to care more about the environment should be nurtured. The legitimacy theory approach in this matter can be used to explain how important the role of the company is by considering the impacts of their operations on people's lives. This can be reflected by putting into consideration, that any activities are in line with the concerns for protecting the environment.

As a matter of fact, various findings and data regarding the issues of environmental damage triggered by company operations has become the main concerns of the government as the regulator in taking necessary steps. This is evidenced by the issuance of a new regulation by the Government of the Republic of Indonesia which regulates environmental issues, namely Environmental Law No. 46 of 2017 concerning Environmental Economic Instruments. In addition, the government through its institution namely the Financial Services Authority (OJK) issued OJK regulation NO.51/POJK.03/2017 for the implementation of sustainable finance in various Financial Services Institutions, with the goal to manage a financing system that are in line with the sustainable principles.

For this reason, innovation is needed to provide a solution to the environmental problems from the company, yet maintaining a healthier business orientation. The innovations needed are the

ones that can provide solutions to environmental problems currently occurring deteriorating. An environmentally friendly approach to all business operations can be illustrated through green innovation. (AlNuaimi et al., 2020; Benoit & Patsias, 2017; Ma et al., 2017) stated that *green innovation* is new or improved procedures, methods, systems and products made to avoid or minimize the impact of environmental damage. According to (Lin et al., 2013; Lu et al., 2022; Moshood et al., 2022; Sun et al., 2023) the concept of green innovation encourages companies to manage production waste and convert it into products that have added value and become an additional income for the company. In driving for the success of the green innovation concept which takes a relatively long time, a concept or strategy is also needed so as to make efficiency in terms of costs. (Dewi & Rahmianingsih, 2020) argued that environmental innovation has a positive effect on company value. On the other hand, different results are obtained form the research results by (Yao et al., 2019) emphasizing that environmental innovation has a negative effect on the company value.

However, with the innovation or concept of *Eco-efficiency (*stands for "*ecological economic efficiency")* an increased productivity but a reduced cost of production can help improve the environment quality through the company work processes. Besides, *Eco-efficiency* is a combination of environmental and economic pillars, intended to support economic activities and to function as a supervisor in reducing environmental impacts by introducing a more rational use of resources. A former research regarding *eco-efficiency* conducted by (Osazuwa & Che-Ahmad, 2016) stated that *eco-efficiency* positively affect the firm value. Nevertheless different results were obtained by (Damas et al., 2021; Yamasaki et al., 2021; Zha et al., 2020) who argued that *eco-efficiency* negatively influence the firm value.

The next indicator contributing to sustainable development is the information technology investment. Advances in information technology that are so dynamic have a tremendous impact on the industry. The industrial era of 4.0 is a design for automation and digitization of work processes where the implementation is carried out one hundred percent by machines and does not involve human performance in its actualization. In addition, there are five types of technologies that support the progress of industry 4.0: Internet of Things (IoT), Artificial Intelligence (AI), Human Machine Interface, robot technology, and 3D printing technology. A good investment in information technology will result in an increase of production and financial performance. Information technology not only serves as a medium for supporting work but also increases the value of a company's competitive advantage if it is optimized. Referring to the previous research on information technology investment that has been carried out by (Cheng et al., 2021; Kohli et al., 2012; Wang et al., 2021) it was found that the results of information technology investment has a positive effect on firm value.

Business strategy is the key to success in a business and in its actualization. Without the synergy of the two, a business fails to run optimally. (Porter, 1985) divides business strategy into two parts: *cost leadership strategy* and *differentiation strategy*. Cost leadership strategy is defined as the process of creating goods at a lower cost than competitors but maintaining almost the same quality as competitors. Whereas *differentiation strategy* is the process of introducing new products, improving them or continuing a product innovation. A business strategy approach that fits the company goals

results in good financial performance and is able to signal what attracts the attention of investors, thereby increasing the value of the company. A study on business strategies implemented by Technology & Mukulu, 2015 revealed that *cost leadership strategy* positively affect the firm value. In addition, another research on *differentiation strategy* has been carried out by (Chang et al., 2015) who revealed that there is a positive influence between the two differentiated strategies on the firm value.

An indicator that can affect the value of the company is profitability. Profitability is a ratio used to assess the level of efficiency in the utilization of company assets or in another sense, a method used to see the ability of a company in generating profits for a certain period from a number of assets owned by the company.

In fact, issues regarding the environment need to be studied and observed further since the effects of damage to the environment in Indonesia are mostly dominated by company activities where concerns to the environment are low and innovation is in dire need. This research is a combination of research by (Dewi & Rahmianingsih, 2020; Osazuwa & Che-Ahmad, 2016) regarding *green innovation* and *eco-efficiency* on firm value. The difference between these two studies is that researchers add three independent variables, namely information technology investment variables, business strategy, and profitability. In addition, the samples and periods studied in this research serve as a differentiator. This study examines the samples of the Energy and Industrial sectors for the 2019-2021 period. It aims to see the effects of *Green Innovation, Eco-Efficiency,* Business Strategy, Information Technology Investment, and Profitability on Company Value. This research contributes not only to the improvement of theories related to environmental accounting, but also to companies in managing and carrying out their operations, since they play a crucial role in preventing environmental damage from recurring. In other words, companies are considered capable in minimizing the negative effects of their operations on the environment and in maximizing its potential for improving the value of the company.

LITERATURE REVIEWS

Legitimacy Theory and Signal Theory

Anjani & Astika (2018) stated that legitimacy is a way to regulate the activities of a company centering on its alignment with the community, government, community groups or individuals in certain places. Legitimacy has an impact on the company's operational activities, thus, it needs to be in line with the goals of the community to creates a process or method, with community as its priority. Furthermore, (Suchman, 1995) added that legitimacy is linked to the activities of a company that are expected to be in line with the order of norms, beliefs, and values of the society. The idea of being ready to voluntarily report and present information on environmental and social issues becomes the basis ,why the legitimacy theory exists (Anggraeni, 2015).

In 1973 the emerging signal theory developed by Jensen Spence described that there were certain exclusive groups in a company who have more information about the company and provide

positive sentiment when information distribution occurs. Signal theory is a concept that reveals the important relationship between the delivery of company information and the investment decisions made by potential investors. (Suganda, 2018) stated that signal theory is used as a way of interpreting an action originating from company management to disclose information aimed at investors so as to be able to convert investors' decisions in view of the company's condition. Signal theory is a way companies can minimize the impact of information asymmetrically by voluntarily providing good or bad information. Information technology investment can be used by companies as a signal because with the hope that the company work processes will increase and encourage information disclosure.

Hypothesis Formulation

The Effect of Green Innovation on Corporate Values

Referring to (Agustia et al., 2019), the presence of a company is not only aimed at seeking profit or fulfilling value for shareholders, but the operation of a company is expected to be able to generate value for all *stakeholders*. To implement this, a leader who can boost the proportion of environmental performance, social performance, and environmental performance beneficial for the company's future sustainability is required. In O'Donovan's research (2002) the relationship between legitimacy theory becomes the concerns when the company is able to survive (*sustainable)* as long as it aligns its business operations with the norms adopted in society. Innovation is a business strategy to enhance investors' perceptions of companies and to encourage businesses to have a competitive advantage if conducted in a sustainable manner.

One of the innovations companies can carry out is green innovation. *Green innovation* is perceived to be able to provide added value through the improvement of company performance in creating proper processes and efficient use of resources. The application of green innovation requires companies to be able to reduce adverse environmental effects that arise and convert production waste into products that have added value. Green innovation is an added value for the company because it is considered a way out of environmental issues. This is in line with the results of (Dewi & Rahmianingsih, 2020) which emphasized that *green innovation* have positive effect on the firm value. Therefore, by looking at the analysis, a hypothesis is made as follows:
H_1: Green Innovation positively affects the firm value.

The Effects of Eco-Efficiency on Firm Value

The idea formulation of *Eco-Efficiency* is intended to monitor business entities in carrying out its production and in controlling the environment. It encourages an increase in company work patterns to get better and the value of company stock prices to get higher (Hansen & M, 2007). According to Aulia & Hadinata (2019) legitimacy theory is an effort to encourage companies to carry out business operations aligned with the rules or norms adopted in society as the implementation of *eco-efficiency* is a real form of environmental management system. Based on a research conducted by (Osazuwa & Che-Ahmad, 2016) *eco-efficiency* is a form of business strategy that drives the value of the company to a better direction. Eco-efficiency focuses on the company's ability to innovate products and services without causing environmental damage.

The implementation *eco-efficiency* concept serves as a competitive advantage for a company. This is considered a positive assessment for the company *stakeholders* as it is considered to have contributed to the efforts in preserving the environment. Based on the results of previous research (Osazuwa & Che-Ahmad, 2016) it can be concluded that *eco-efficiency* gives positive effects on the firm value.
H_2: Eco-Efficiency positively affects the firm value

The Effects of Cost Leadership Strategy on Company Value
According to (Porter, 1985), companies adopting *cost leadership strategy* are considered to have a stronger character in a business competition as the advantages in terms of spending lower costs than competitors can be highlighted. Consequently, a bigger profit in business can be generated. The business entity applying the pattern of *cost leadership strategy* will put such an effort to be an operating company with the lowest cost, compared to its competitors in the market. This is done to attract attention of the existing customers.

Applying *cost leadership strategy* for the sake of loyal customers by setting lower price to the products sold is another advantage for the company. Customer loyalty triggers the company's financial performance to be better because it can help generate higher and more sustainable income from sales. Additionally, the financial performance is followed by a positive sign on the stock market where investors will be more interested and tend to invest their capital in companies with good sales performance, thus, increasing the value of the company. Moreover, a similar research result by (Technology & Mukulu, 2015) revealed that *cost leadership strategy* has a positive effect on the firm value. The next hypothesis is formulated as follows:

H_3: Cost Leadership Strategy positively affects the firm value.

The Effect of Differentiation Strategy on Firm Value

According to (Porter, 1985), the application of *differentiation strategy* in companies refers to creating different products from its competitors by improving the product itself and by providing a better service. Differentiation strategy focuses on the process of selling new products and services, creating innovation, building brand image, and substantial funding on R&D. This strategy allocates a generous amount of funds for the products and services, in order to obtain a significant income. With bigger profits published in the financial statements, it becomes a signal for investors because the company can prove that the results of its performance through the its profits generation affects the value of the company. Similarly, the results of research by (Chang et al., 2015) stated that there was a positive effect between *differentiation strategy* to company value. In regards to the above analysis, the formulation of the hypothesis is:

H_4: *Differentiation Strategy* positively affects the firm value.

The Effect of Information Technology Investment on Firm Value
(Andriani, 2019) explains that the use of information technology is an advantage and a desired behavior by the users that implement this system. The emergence of the industrial 4.0 revolution

in 2018 has proven to change the industrial work patterns which previously focused on the use of conventional power, to a work pattern that maximizes performance on the use of technology. Information technology encompasses *digitalization*, *artificial intelligent* (AI), *big* data, and *robotics employment*.

Referring to Andriani's research (2017), it is emphasized that a good investment in information technology must take into account its benefits for improving financial performance and organizational strategy. Kohli et al., (2012) views that the aspects of information technology contributes to the company's future performance in terms of an enhanced capability, flexibility, and company growth. Proper investment in information technology encourages companies to have a competitive advantage that fosters better competitiveness than competitors.
Below is the proposed hypothesis:

H_5: Information Technology Investment has a positive effect on firm value.

The effects of Profitability on Firm Value

One of the financial performance indicators in determining whether or not the goals of the company have been achieved is impacted from the level of company profitability. According to (Mardiyati et al., 2015) profitability is the net result for various provisions that have been used by the company. In addition, profitability is useful to measure the company's ability in utilizing its assets to generate profits. A high profitability value indicates that the company is more efficient in utilizing company assets or in another sense by having the same amount of assets to create higher profits.

Increased profitability is a sign that the company has worked effectively and has performed well. Potential investors are attracted to companies that are performing well and are able to generate an increased level of profitability, as the goal of investing is to gain a considerable amount of *return* on the invested capital. Therefore, a good reaction from investors is knowing that the company receives positive response in the market response and that the company value is higher. Referring to a study by Nyoman et al., (2017) , it is stated that there is a positive influence concerning the profitability on the firm value. Thus, the hypothesis is:

H_6: Profitability has a positive effect on the firm value.

METHOD

Research Design

The population in this study are companies listed on the Indonesia Stock Exchange within the 2019-2021 period. The sampling technique is purposive sampling, where the sample used meets the required criteria. The research sample covers 125 companies with a total sample of 375 observations. The secondary data sources, both the annual and the sustainability reports are quoted from the company websites _www.idx.co.id. The hypothesis testing is used as the basis for

evaluation in this research. The research hypothesis is refers to a form of temporary answer to each assumption. The aims is to test the hypothesis on the influences of *green innovation, eco-efficiency*, business strategy, investment in information technology, and profitability on firm value. The quantitative method is the selected method to test the hypothesis along with multiple regression tests using the EViews 9 test tool.

Variables and Measurements

The variables in this study include the independent variables, the dependent variable, the controlling variable. Below is the explanation:

Independent Variables

Green Innovation

Environmental innovation (green innovation) is an innovation in which there are new ways, practices, methods and production mechanisms or transformations that are useful in suppressing the effects of environmental damage. Green Innovation is an idea that aims to provide a sustainable solution for an effective production process by making efficient use of raw materials and energy so as to reduce the amount of production costs incurred. Referring to the research of Febiola & Khusnah (2022) green innovation ideas encourage companies to be able to process waste to be converted into feasible products of value so that they can serve as additional income for the company.

The concept of green innovation in this study is assessed through four parameters, and is based on the research by (Agustia et al., 2019). The parameters are:

1. The production process uses new technologies to reduce energy, water and waste generated.
2. Products that are created using environmentally friendly materials or materials that have the least impact or potential hazard on the environment.
3. The composition of the materials used in the production process can be recycled.
4. Packaging products used are environmentally friendly.

Each item stated in the company's annual report will be given a value of 1 and for items that are not informed is given a value of 0. Furthermore, the overall value of the variables that can be informed is divided by the total of all disclosure items

$$Green\ Innovation = \frac{n}{k}$$

n : The number of items disclosed by the company
k : The number of disclosure items in *Green Product Innovation*

Eco-Efficiency

This strategy comes as a concept map to reduce the use of water, energy, and raw materials for producing goods at all stages. The measurement for eco-efficiency is done by looking at the level of company achievements in fulfilling the eight existing indicators, whether or not the company

has implemented the system of *eco-efficiency* , the measurement refers to study by (Bandyopadhyay, 2015; Moraes et al., 2019; Subires et al., 2019; Yuliansyah et al., 2021):

1. Concerns for the environment have resulted in a significant reduction in company waste
2. Concerns for the environment have resulted in an increased service quality
3. Concerns for the environment have resulted in the changes of the work environment
4. The benefits of the environment-oriented business are the reduced costs of processes, products and services
5. Concerns for the Environments have contributed to the adoption of alternative technologies and processes
6. Concerns for the environment have helped companies in developing products, services and processes
7. Concerns for the environment have helped reduce carbon emission
8. Concerns for the environment have helped reduce energy consumption

Each item described in the company's annual report will be given a value of 1 and for items that are not described is given a value of 0. Furthermore, the overall value of the variables that can be informed is divided by the total of all disclosure items.

$$\text{ECO - EFFICIENCY} = \frac{\sum Xj}{N}$$

$\sum Xj$ = Number of items disclosed by the company
N = Number of disclosure items

Business Strategy

According to (Wu et al., 2015), business strategy refers to *cost leadership strategy* and *differentiation strategy*. Businesses that are run with a competitive strategy through a lower cost approach as a wider market absorption objective and are required to reduce prices, regulate fees and costs, reduce R&D costs, do not focus on customer marginal utility, high asset turnover, and maximize resources power to get the highest level of productivity is a hallmark of *cost leadership strategy*. Whereas a business run with a focus on creating product innovation, maintaining customer loyalty to a brand, and producing good quality products, requires more funding for R&D to make a differentiated innovation. In addition, maximizing profits compared to the average competitor is another feature of *differentiation strategy*. Both formulas are measured by:

Cost leadership strategy

$$\textbf{ATO} = \frac{\text{OPERATING SALES}}{\text{OPERATING ASSETS}}$$

ATO = Asset Turnover
Operating Sales = (Total Sales) – (Cash) – (Short-term Investment)
Operating Assets = (Total Asset) – (Cash) – (Short-term Investment)

Differentiation Strategy

$$\textbf{PM} = \frac{\text{OPERATING INCOME+R\&D EXPENDITURE}}{\text{SALES}}$$

PM = Profit Margin
Operating Income = Profit obtained after deducting direct and indirect operational costs
R&D Expenditure = R&D Activities
Sales = Total sales

Information Technology Investment

Based on a study conducted by (Andriani, 2019), Information Technology (IT) investment is defined as an investment decision to allocate all types of resources (hardware, software, and human resources) to manage information systems. The method used to measure information technology investment in a company is by looking at how much the company allocates to support investment activities related to information technology, both software and hardware. The measurement of technology investment value in this study is formulated as follows:

$$\textbf{TI} = \frac{\textbf{Total Investasi TI}}{\textbf{Total Asset}}$$

Profitability

Profitability is one of the media that is useful to describe the company's financial condition to investors within a certain period of time . The company's financial performance serves as a means for the company to boost its image, to share the value, and to set the future plans. In this study, the measurement of the profitability variable is measured through the ratio of profitability with proxies on *Return on Assets* (ROA), where ROA is able to measure a company's ability to generate profit from the assets used. This proxy is based on a research by (Mahrani & Soewarno, 2018) and described as follows:

$$\textbf{Return On Assets (ROA)} = \frac{Net\ Income}{Total\ Asset}\ x\ 100\%$$

Bound Variable (Company Value)

Firm value is the value embedded in the company and this can be used as a benchmark in assessing the level of company quality as well as the level of welfare of shareholders (Sabrin, 2016). The measurement for firm value in this study uses the Tobin's Q ratio, as (Damas et al., 2021) has formulated. The measurement is described below:

$$\textbf{Tobin's Q} = \frac{\text{MVE+Debt}}{\text{TA}}$$

Tobin's Q = Firm Value
MVE = Number of shares outstanding x share price
Debt = Book value of total liabilities (Short term liabilities + Long-term obligation)
Total Assets = Book value of total assets

Control Variable (Company Size)

The categorization of a small or large company can be analyzed through the level of ownership of a company's assets. Companies with large scale tend to attract more investors' attention because they have better conditions in terms of stability. Asset measurement can be carried out using the natural log of total assets because the total assets are considered more s\table and better in describing the company size. This proxy refers to a study by (Suryana & Rahayu, 2018) is :
L (n) Total Assets

Regression Models

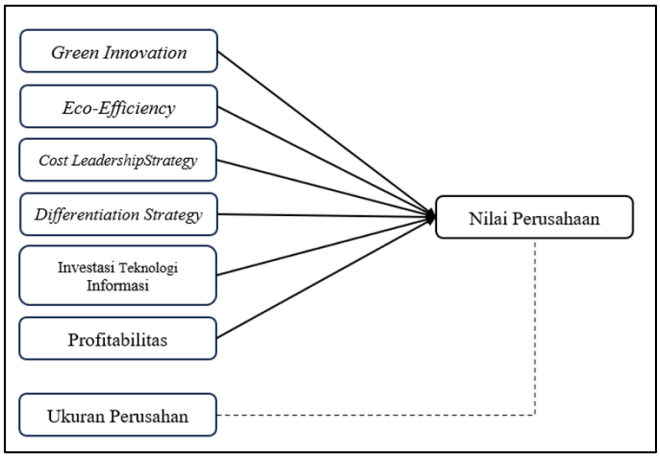
The regression model used in this study is multiple linear analysis with one dependent variable, five independent variables, and one controlling variable.
The following are the regression models used in this study:

$$\mathbf{Q = a + b_1\ GI + \beta_2\ ECO + \beta_3\ CLS + b_4\ DFS + b_5\ ITI + \beta_6\ LENGTH + SIZE} + e$$

Q = Firm Value
A = Constant
b_{1-6} = Regression Coefficient
GI = *Green Innovation*
ECO = *Eco-Efficiency*
IN = Information Technology Investment
CLS = *Cost Leadership Strategy*
DFS = *Differentiation Strategy*
LONG = Profitability
Size = Firm Size
It is = *Error*

Thinking Framework

The following below is the framework implemented in this study:



RESULTS AND DISCUSSIONS

Description of the Research Object

This is a study conducted by using a number of hypotheses and aims to analyze the framework developed to obtain empirical evidences on the influences of *Green Innovation, Eco-Efficiency,* Business Strategy, Information Technology Investment, and Profitability on Company Value. The database used in this study is secondary data obtained from the companies' annual reports listed on the Indonesia Stock Exchange, among others are the Energy, Industrial, Tobacco sub-sector, and Non-Durable Household Products sub-sectors within the periods of 2019-2021. The sampling technique used is purposive *sampling*. The following are the criteria of purposive *sampling* in sample selection.

Information	Amount
Energy sector companies for the 2019-2021 period listed on the IDX.	71
Industrial sector companies for the 2019-2021 period listed on the IDX.	54
Tobacco and Non durable Household Products sub-sector companies listed on the IDX for the 2019-2021 period.	14
Companies in the Energy, Industry, Tobacco sub-sector and Non Durable Household Products which did not publish complete financial reports for the 2019-2021 period.	(14)
Total research sample	125
Total final research sample used (3 years x 125)	375

Data Analysis

Table 1
Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
NP	375	0.28670	16.7527	1.723436	2.060444
GI	375	0.00000	1.00000	0.580000	0.329985
Eco-F	375	0.00000	1.00000	0.638000	0.292719
CLS	375	-1.77600	6.72440	0.803024	0.938208
DFS	375	-0.97430	0.93411	0.065530	0.234296
ITI	375	0.00000	0.11640	0.002103	0.009556
PRFT	375	-1.53830	0.52020	0.037199	0.143502
SIZE	375	22.44200	33.5372	28.67296	1.875088

Source: Secondary data processed, 2023

Referring to the descriptive test results form the table, it indicates that *n* is the amount of data for each variable with the total of 375 data originating from Energy, Industrial, Tobacco sub-sector, and Nondurable Household Products sectors listed on the Stock Exchange Indonesia for the 2019-2021 period. Green innovation has an average value for the distribution of company values at 1.723436. A considerable Tobin's Q value is 1.0, which is interpreted as a successful market valuation of the company (asset market value = book value of assets). Mark Tobin's Q < 1, means the company is relatively cheap*(undervalued)* as book value is higher than market value. This can attract interested parties to buy the company. Tobin's Q value > 1, the company is classified as expensive*(overvalued)*. With an average company value of 1.723436, it indicates that the qualification of company value is categorized as a company with market value > book value of assets (*overvalued).* The green innovation variable has an average value (mean) in the GI variable of 0.580000 with a total of 375 data indicating that most of the research samples have four aspects of environmental innovation that are considered good, and the average value that has been obtained also reflects the sample data examined in the application of green innovation is proven to be better at implementing the production process of innovative items that relate to environmental protection. The cost leadership strategy variable has an average value. The average value (mean) for the variable *cost leadership strategy* is a value of 0.803024 which means that the company's ability to generate sales based on total assets owned is 80%. The average value obtained is considered to have a good category since the value is close to 1.00 or 100%. The higher the ATO value, the more capable the company is to earn revenue through efficient business operations and effective use of resources.

The differentiation strategy variable has an average (mean) value for measuring the variable *differentiation strategy,* and it gains a value of 0.065530 which means that the overall ability of the 375 samples is that there is an average company able to implement this to only 6% percent. The ideal average value of this DFS proxy is 1, so looking at the results of the descriptive table, companies that apply or focus on this differentiation strategy are few. The information technology investment variable has an average value of 0.002103, which means that based on the average obtained, it indicates that many companies haven't implemented and or invested in information

technology. The profitability variable has an average value of 0.037199 with a total of 375 data, this value means that the average ability of company assets to generate profits is low. The company size variable in this study acts as a controlling variable and is proxied by the natural log of assets to show the company size. The average value of profitability is greater than the standard deviation value of 28.67296 > 1.875088 which indicates that the distribution of this variable value is considered good.

Model Suitability Test

Chow Test

It is concluded that if Ho is rejected, the model used is fixed *effect*. When the selected model is a the model of fixed *effect*, what must be done further is a testing with the Hausman test method, in which the purpose of this test is to measure whether or not the *fixed effect* or *random effect* models will be used.

Table 2-Uji Chow

Effect Test	Prob
Cross-section Chi-square	0.0000

Source: Data processed by Eviews 9

The results of the chow test in table 2 demonstrates that the cross section probability value is 0.000 or <0.05, then Ho is rejected. Therefore, the selected model is *fixed effect model.*

Hausman test

If Ho is rejected, the model used is *fixed effect*. This test was carried out with the aim of being able to determine which model in the regression data panel is the more suitable to use, *random effect model* or *fixed effect model.*

Table 3-Uji Hausman

Test Summary	Prob
Cross-section Random	0.0188

Source: Data processed by Eview 9

The results obtained from the Hausman test shows that the probability value of *cross-section random* is 0.0188 <0.05, this means that Ho is rejected and Ha is accepted. Thus, the appropriate model to be applied is *fixed effect model.* With final results stating that the model used is *fixed effect model,* classic assumption tests such as tests for normality, multicollinearity, heteroscedasticity, and autocorrelation are unnecessary, considering that the model results obtained are *fixed effect model* not *common effect model.*

Hypothesis Testing

The hypothesis testing consists of exposing the interpretation of the regression model and testing the regression coefficients. The purpose of this test is to see how influential the independent variable is on the dependent variable. Below is a two-tailed test (significance value (sig) is divided by 2).

Table 4 Hypothesis Testing

Variabel	Prediksi Arah	Koefisien	Prob. (2-tailed)	Prob (1-tailed)	Keputusan
C	+	21.32928	0.0000	0.0000	
GI	+	-0.0213251	0.6443	0.3222	H1 ditolak
ECO	+	0.119299	0.8340	0.4170	H2 ditolak
CLS	+	0.409706	0.0093	0.0047	H3 diterima
DFS	+	-0.500826	0.1723	0.0862	H4 ditolak
ITI	+	-0.14233	0.9921	0.4961	H5 ditolak
PRFT	+	2.53383	0.0000	0.0000	H6 diterima
SIZE	+	-0.695424	0.0000	0.0000	
Goodness of Fit Test					
Adj R2	0.804685				
Prob Fstat	0.0000				

Based on table 4 above, the regression model obtained is:

$$YNP = \alpha - 0.0213251\beta_1 GI + 0.119299\beta_2 ECO + 0.409706\beta_3 CLS - 0.500826\beta_4 DFS - 0.14233\beta_5 ITI + 2.53383\beta_6 PRFT - 0.695424 C1SIZEit + e$$

F-Test

After the F-test that has been carried out, it is found that the probability value of *F-Statistic* is a value of 0.0000 <0.05. Therefore, along with the independent variables namely *Green Innovation*, *Eco-Efficiency*, Business Strategy, Investment Information technology, it has an influence on the value of the Company. For this reason, the regression model used is feasible model.

R^2-Test

From the results of the fit-test that has been carried out, a value of *Adjusted R-Square* (**R^2*)** is obtained, it is equal to 0.804685. This indicates that the ability of the independent variable to explain the behavior of the dependent variable is 80%. Simultaneously, it can also be interpreted that there are other independent variables such as green *innovation*, *eco-efficiency*, business strategy, and investment in information technology that can explain something that affects the value of the company by 20%.

T-Test

The following is a table of T test results which can be partially reflected in table 4. The effect of each independent variable on the dependent variable are as follows: The test results for probability

variable of green innovation value is 0.6443/2, that 0.3222 > 0.05 (Ha rejected). This means that green innovation has no effect on firm value at the 95% confidence level. Probability variable on the test result of eco-efficiency value is 0.8340/2, that means 0.4170 > 0.05 (Ha rejected), or in other words, eco-efficiency has no effect on the firm value at the 95% confidence level. The probability variable value concerning the test results of cost leadership strategy is 0.0093/2, meaning that 0.0047 <0.05 (Ha accepted), thus the cost leadership strategy has a positive and significant influence on firm value at the 95% confidence level. The probability variable on the test results regarding the differentiation strategy is 0.1723/2, the 0.0862 <0.05 (Ha rejected) means that differentiation strategy has no effect on firm value at the 95% confidence level. Moreover, the test results for the probability value of the information technology investment variable are 0.9921/2, where 0.4961 > 0.05 (Ha is rejected) meaning that technology investment has no effect on firm value at the 95% confidence level. Finally, The test results for the probability value of the profitability variable are 0.0000/2, where 0.0000 <0.05 (Ha is accepted) so it is concluded that profitability has a positive and significant influence on firm value at the 95% confidence level.

Discussion of Research Results

Green Innovation has no effect on Firm Value

This is evidenced by the probability value *green innovation* ie 0.3222 > 0.05. Regression coefficient values on green *innovation is* -0.0213251, so with reference to the significance value and the regression coefficient value, it can be concluded that green *innovation* has no effect on firm value. The results of this study are in line with the research by Yao et al., (2019) which revealed that environmental innovation statistically has no effect to company value. Hence, it is concluded that if *green innovation* of the company increases, there will be a decrease in the value of the company and vice versa.

Eco-Efficiency has no effect on Firm Value

This is evidenced by the probability value eco-efficiency ie 0.4170 > 0.05. Regression coefficient value of eco-efficiency is 0.119299. Referring to the significance value and the regression coefficient value, it can be stated that eco-efficiency has no influence on firm value. The results of this study are in line with a study by Hazudin et al., (2015) who found that eco-efficiency does not affect the value of the company. The underlying reason is that when running the process of eco-efficiency, the company will be faced with an arising negative effect due to the incurring costs for the environment. As a consequence, the level of profitability and return for investors is reduced.

Cost Leadership Strategy positively affects firm value

From the probability value of cost leadership strategy where 0.0047 < 0.05, and with regression coefficient value concerning the cost leadership strategy, the result of 0.409706 refers to the significance value and the regression coefficient value. Thus, it is concluded that cost leadership strategy has a positive influence on firm value. The results of this study are in line with a research

conducted by Atikiya (2018) which emphasized that cost leadership strategy positively affects firm value. It was found that the impact of cost leadership strategy is shown when a company is able to achieve its uniqueness by lowering costs and by being operationally superior through efficient operating actions, one of which is creating a streamlined cost structure.

Differentiation Strategy has no effect on Firm Value

From the probability value of differentiation strategy where 0.0862 > 0.05, and the regression coefficient value on differentiation strategy is -0.500826, it is concluded that differentiation strategy does not affect the value of the company. The results of this study are in line with a research by Surono et al., (2019) which revealed that differentiation strategy in creating unique, new, and different in nature products will take quite a long time and the risk of selling failure is big. The price offered is relatively higher and only certain groups and product market segments who are interested in purchasing the items.

Information Technology Investment has no effect on Firm Value

This is evidenced by the value of the probability of investment in information technology i.e. 0.4961 > 0.05. Information technology investment coefficient regression value is -0.14233. The results obtained is similar to a study conducted by (Ludipa et al., 2018) in which technology investment had no effect on firm value. Nevertheless, this strategy can be implemented although the company is still making some reviews. In fact, the implementation of using information technology can not guarantee a 100% efficient, thus a delayed investment benefits might occur. Once a new IT investment is made, it takes 3 to 4 years or even longer for the company to generate a considerable profit.

Profitability influences firm value

This is evidenced by the value of the profitability where 0.0000 < 0.05. and the regression coefficient is 2.53383. With reference to the significance value and the regression coefficient value, it can be concluded that profitability has a positive influence on firm value. The results of this study are in line with a research conducted by Nyoman et al., (2017) which revealed a high profitability value, indicating that the company's ability to earn profits also increases, thus, the ability to distribute dividends to shareholders will also increase.

CONCLUSIONS

This research was conducted to see whether or not there is an influence on Green Innnovation, Eco-Efficiency, Business Strategy, Information Technology Investment, and profitability on company value. The samples used in this study are companies engaged in the Energy, Industrial, Tobacco sub-sector, and the Nondurable Household Products sub-sectors listed on the Indonesia Stock Exchange in the 2019-2021 period. After going through the details of the total inspection process, the final samples used in this study is 375 sample data. This study implements a statistical analysis tool in the form of multiple regression analysis. Based on the results of the research

described earlier, it can be concluded that the cost of leadership strategy and profitability have a positive effect on firm value, whereas the variables of green innovation, eco-efficiency, differentiation strategy, and information technology investment have no effect on firm value.

In regards to the legitimacy theory, it was found that the results of the research do not support the legitimacy theory in which stakeholders' expectations for companies to provide satisfaction not only in terms of financial performance but also in other concerns for social and environment is unfulfilled. Furthermore, this study failed to prove that matters related to the environment were required by stakeholders. Legitimacy theory is not helpful in supporting firm value outcomes. This occurs because the awareness of both the company and the community hasn't yet been shown. However, the signal theory in this research is proven to support the research results. Lastly, it can be concluded that in fact, any related information will be beneficial for the company so that they can keep abreast with the latest issues.

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