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DETERMINING THE FINANCIAL PERFORMANCE OF MALAYSIAN GREEN TECHNOLOGY COMPANIES USING TOBIN'S Q

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ABSTRACT

Massive technology, business pressure and the growth of global market penetration have led to most businesses becoming more environmentally friendly. The issue of climate change, waste management, air pollution and water pollution have all challenged the practice of business ethics, notwithstanding the ever-present pressure for companies to be more competitive in the marketplace. To be more

financially sustainable, most of the businesses are forced to keep the balance between resources available and future sustainability in the long-term period. To ensure the success of sustainability, green technology is one of the most important initiatives to motivate companies to become more financially sustainable in the future. Thus, the purpose of this study is to examine the factors that have influenced the financial performance of Malaysian green technology companies using Tobin's Q. The dependent variable is Tobin's Q which represents the firm's market value, while independent variables are measured by carbon productivity, waste productivity, energy productivity, growth and firm size. The data for the study came from 10 selected green technology companies listed in the Bursa Malaysia and were the top-ranked eco-friendly companies in Malaysia. The findings indicate that all independent variables (growth, carbon productivity, waste productivity and energy productivity) were significant, but firm size was not significant. The findings imply that by adapting to the use of green technology, companies benefited a lot in terms of minimizing cost, sustaining a healthy environment, as well as helping companies to become sustainable in the long term.

Keywords: Tobin's Q, green technology companies. financial performance, sustainability.

INTRODUCTION

In the past few decades, Malaysia has experienced strong economic growth and this growth was attributed in no small part to the improved performance of firms, especially in the financial performance of these business organizations. However, due to the massive improvement in technology, rapid international market penetration, and greater globalization of businesses, firms in Malaysia have also been forced to become more environmentally concerned. The issue of climate change, waste management, air pollution and water pollution in business operations has led to critical issues and challenges on sustainability, as well as financial performance. In this regard, most businesses were forced to spend high costs for operations, and it has become detrimental to many of the organizations in their quest to remain sustainable in the future. Sourcing, manufacturing and logistics

were seen as the main contributory factors to problems in business operations (Beamon, 1999). As a result, business operations were being pressured by various stakeholders from within and without, such as government agencies, workers, environmental activists, and non-profit groups (Zhu & Sarkis, 2006). In addition to this, the pressure to play a more responsible role and uphold business ethics in order to safeguard the environment has also become a more crucial issue in recent years (Zhang, 2014).

The most important aspect of the growing concern for the environment was in looking after the interest and welfare of society (Martinez-Ferrero & Frias-Aceituno, 2015; Shao et al., 2014). In many respects, society has started to pay more attention to the environmental and social issues, and the frequency of information disclosure about these two aspects of societal concern has increased substantially since the late 1970s (Patten, 2002). Along with environmental issues, more precisely the issue of climate change, organizations have started to focus on the consumption and use of water, energy, biodiversity and so on (Pulver, 2007; Stubbs & Cocklin, 2008; Boiral & Paillé, 2012). This focus has helped companies to keep a balanced view on the availability of resources and sustainability for the future.

In line with the initiatives to be more environmentally friendly, most of the companies in Malaysia have shown compliance as there was a concerted effort to join the campaign to promote green awareness among their customers by producing green products and applying green technology in their business operations. These companies have come to be known as green companies as they have put into practice their concern for the environment and have been consistent in adopting green technology in their organizations. A company was considered Green as the company had carried out its business by meeting the requirements of a balanced commitment to profitability, sustainability and humanity (Makower & Pike, 2008). To help companies to become more competitive and financially sustainable in the long term, the Bursa Malaysia had in 2006, mandated that all public listed companies (PLCs) had to prepare a corporate social responsibility (CSR) report which would showcase their sustainability practices. This requirement was to underscore the new focus and priority on the social aspects, that is, people in the community, as well as to address

sustainability-related issues of business operations. Therefore, the term ESG (Environmental, Social and Governance) has since been used extensively by the investment community to reflect its stand that the environment, society and governance mattered. Sustainability was also viewed in the context of EES (Economic, Environmental and Social), without the governance element. From the perspective of an environmentally friendly organization, it will have impact on both living and non-living natural systems including land, water, air and the ecosystem. This motivates the organization to efficiently manage the usage of energy and water, its discharge of emissions and the potential loss of biodiversity. It implies that sustainability-related issues can significantly affect an organization's risk profile, potential liabilities and its value. This is consistent with the stand of Bakar et al (2019) who stated that based on the Sustainable Reporting Guide (SRG), companies should disclose information on not only the economic dimension, but also information regarding how their business operations might influence and/or contribute to the well-being of other organizations. Therefore, the present study was aimed at examining firm performance not only the factors which might contribute to a firm's performance in terms of financial sustainability, but also equally important how it has taken into consideration environmental concerns in the business operations of the organization.

Using Tobin's Q Theory to Measure Financial Performance

Financial performance can be defined as an organization performing its financial activities. Performance results have traditionally been measured in monetary terms and can be considered as an indicator of the level of financial health of a firm over a period of time. Therefore, financial performance is a very crucial matter to examine when assessing the overall position of an organization in the marketplace.

Tobin's Q theory is one of the important concepts in business law and policy used to examine regulatory and corporate governance impact on firm value and economic welfare. More than three hundred law review articles, including those widely cited in corporate and securities law used Tobin's Q as a proxy to measure a firm's value. Nicholas Kaldor first developed the Q theory in 1996 and after a decade it was popularized by James Tobin. The purpose of the theory

has been to explain the combined market value of every company in a stock market, and this value should be equal to its replacement cost.

Therefore, this study was designed within the framework of Tobin's Q theory, to study the factors that could influence the financial performance of selected green technology companies in Malaysia. There is an urgent need to examine empirically this issue in the context of sustainability, so as to determine whether the trending green practice can improve organizational financial performance. This study would be able to contribute significantly to the literature on finance and green practices since the criteria to gauge a firm's green performance, such as waste productivity, energy productivity, and carbon productivity had become closely linked to the financial performance of Green technology companies. Besides, this study has also emphasized the use of Tobin's Q ratio as a tool to identify the factors that influenced financial performance.

LITERATURE REVIEW

The empirical literature related to financial performance using Tobin's Q is growing rapidly. There are several factors that can impact the performance of Malaysian green technology companies, and these as mentioned earlier included a firm's size, growth and green performance (carbon productivity, waste productivity and energy productivity), as well as Tobin's Q which is seen as representing the firm's market value.

Tobin's Q

Tobin's Q can be defined as the market value of equity, plus the book value of total liabilities, and divided by the book value of total assets. It indicates if the ratio of a firm's market value is less than one, which indicates that it is undervalued. On the other hand, when it is more than one and the market value is higher than the total asset value, it is an indication that the company may be overvalued. Horvathova (2010) documented that Tobin's Q has been used to measure corporate financial performance based on market value. Tobin's Q could also be regarded as a proxy for operating performance, but most researchers

have reported that it was rather ambiguous when used to evaluate corporate governance.

Nishitani and Kokubu (2011) which focused on a firm's value as measured by Tobin's Q, had described the present value of a firm's expected future net cash flow as one of the major economic performance indicators. Moreover, in line with the trend in earlier studies, Konar and Cohen (2001) and Iwata and Okada (2011) have also mainly used Tobin's Q as a financial performance indicator. It is worth noting that studies focusing on Tobin's Q were not only subjected to problems of a business model and accounting policy choices, but it could also suffer from an omitted variables bias (Gregory & Whittaker, 2013; Hibiki & Managi, 2010). Abdi et al. (2020) also employed Tobin's Q as a proxy and representation of a firm's financial performance when evaluating the environmental, social and governance (ESG) impact. and thus, indirectly assessing the firm's sustainability performance. Using a similar method, Rodríguez-Fernández et al. (2019) employed Tobin's Q, instead of return on assets (ROA) and return on equity (ROE) as an indicator for a firm's market value, to determine the impact of environmental, social, governance and controversies (ESGC) on the financial performance of firms. The literature reviewed has clearly shown that previous studies have consistently used Tobin's Q as a relevant measurement tool of a firm's market value and financial performance, while taking into consideration environmental concerns, as well as the sustainability of the company.

Firm Size

Firm size is also another important variable that affects the market value of companies. This factor has caught the attention of researchers working in other areas of research too. Valuing small firms has proven to be a very difficult task. Firm size plays a role in other areas too. Moeller et al. (2005) have demonstrated that acquisitions by small firms have been profitable for their shareholders, but the pattern was the reverse for large firms. Previous research has suggested that it was important to control risk (Hilman & Keim, 2001; Frank & Goyal, 2003; Jermias, 2008). These studies have suggested that firm size might influence its performance; larger firms might have more capacity and capabilities. Therefore, this study has provided controls

over the differences in a firm's operating environments but included the size variable in the model. According to Gallego-Álvarez et al. (2015), firm size controlled on the positive effect of environmental performance on economic performance and it could be confirmed by using the log of total assets of the firm. Dowell et al. (2000) found that large companies that adopted strict green initiatives generated a higher stock market performance. This shows that the size of a company is very crucial to determine the capacity for green initiatives in the organization, and at the same time sustaining the ability to boost the financial performance of the company. Therefore, the present study has the following hypothesis (H_1):

H_1: There is a significant relationship between firm size and a firm's financial performance

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Growth

The growth of a firm also affects the firm's financial performance, as well as the sustainability of the company. Ab Razak et al. (2008) examined the impact of an alternative ownership control structure and corporate governance on firm performance among government-linked companies (GLCs) and non GLCs in Malaysia. The said study was based on a sample of 210 firms from 1995 to 2005. The findings showed that there was a significant impact of government ownership on company performance, after controlling for company-specific characteristics such as company size, non-duality, leverage and growth. According to Delmar et al. (2010), sales growth was strongly and positively related to corporate financial performance. This observation was also supported by Delmar et al. (2013) who found that sales growth had a positive influence on firms' profitability when they used log-difference of net sales as a proxy of the sales growth. Gallego-Álvarez et al. (2015) also corroborated the finding that growth positively affected a firm's financial performance. It can, therefore, be concluded that growth is one of the important factors to investigate as it has been found to be able to help increase the firm performance, especially in corporate governance and sustain the profitability of the company. Thus, the present study has proposed the following second hypothesis (H_2):

H_2: There is a significant relationship between growth and financial performance

Green performance

Green performance is a commitment of organizations to preserve and protect the natural environment with its multi-dimensional characteristics, such as maintaining the quality of water, air, soil, etc. Another definition states that environmental performance refers to the effects of business activities and products on the natural environment, such as resource consumption, waste generation and emissions. In earlier studies by Konar and Cohen (2001), Iwata and Okada (2011), and Hibiki and Managi (2010), green performance has been measured using CO_2 productivity and ignoring substitutability and complementarity between different pollutants or environmental management practice. In terms of waste management, Bartolacci et al. (2018) has found that separate waste collection might positively influence a company's financial performance. Another study by Fang Chen (2018) also found that green performance had a positive impact on financial performance, especially for those performance initiatives aiming to improve environmental protection, such as waste reduction. In summary, the findings have clearly shown support for firms' decisions regarding environmental and financial issues which were considered crucial for their long-term sustainability.

Besides, energy productivity is also one of the critical factors that can influence financial performance. According to Fan et al. (2017), energy-intensive firms have always faced the pressure to improve energy efficiency and reduce energy consumption. The study by Fan et al. (2017) has found, using Tobin's Q, that energy efficiency was positively related to return on asset, and return on equity.

The measurement of green performance via carbon emission, energy and water consumption has resulted in conflicting views on the relationship between these criteria. Some researchers have argued that a reduction in pollution would result in an incremental cost for a firm, without any financial benefits (Cordeiro & Sarkis, 1997; Stanwick & Stanwick, 1998) or there was no relationship observed (Rassier

& Earnhart, 2010). Iwata and Okada (2011) examined Japanese manufacturing companies by collecting data from 2004 to 2008, when the greenhouse emissions of these companies were measured. The researchers reported a significant negative relationship between the generation of carbon emission and Tobin's Q, and intangible valuation measured using Tobin's Q. This finding was also supported by Walley and Whitehead (1994) and Telle (2006), studies which both argued that firms trying to improve the green performance and conserve resources used in the core areas of business has resulted in lower profits. According to Rassier and Earnhart (2010), who used a panel data of chemical manufacturing industries, the findings showed a negative impact on Tobin's Q. The research was based on a study of the Clean Water Act on financial performance. These studies have been useful to the current study as they have shown different results and held different perspectives on green performance, showing how these differences could have influenced a company's financial performance and market value. Therefore, the present study has proposed the following hypotheses:

H_3: There is a significant relationship between carbon productivity and financial performance.

H_4: There is a significant relationship between waste productivity and financial performance.

H_5: There is a significant relationship between energy productivity and financial performance.

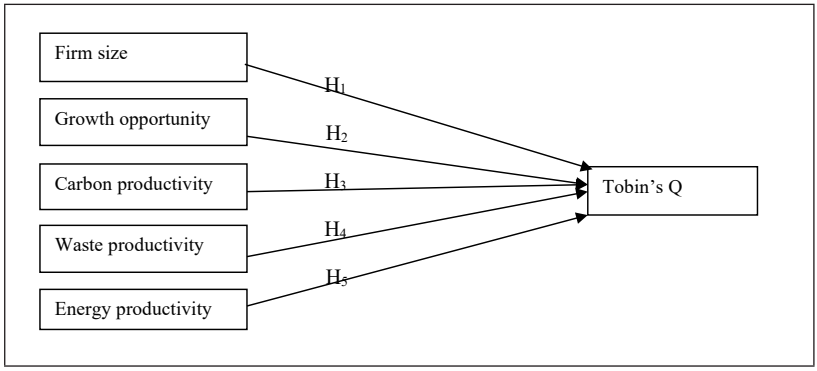
METHODOLOGY

Research Framework

Figure 1 shows the research framework used to examine the relationships between financial performance (firm size and growth) and green performance factors (carbon productivity, waste productivity and energy productivity) and Tobin's Q. Based on the framework, five hypotheses have been proposed and would be examined in the study.

Figure 1

Framework Showing the Relationship between Tobins Q, Financial and Green Performance



Regression Model

To confirm the hypotheses of the study, the empirical analysis carried out was based on the regression model as is shown in Equation (1).

$$Q_{it} = \beta_0 + \beta_1 FS_{it} + \beta_2 G_{it} + \beta_3 CO_{2it} + \beta_4 W_{it} + \beta_5 E_{it} + \varepsilon_{it} \quad (1)$$

where,

Q_{it} = Tobin's Q
FS_{it} = Firm Size
Git = Growth
CO_{2i} = Carbon Productivity
W_{it} = Waste productivity
E_{it} = Energy productivity
β_i = Coefficients (i = 1,2,3, …,5)
ε = Error Term

Measurement of Variables

As for the measurement of variables, the study employed Tobin's Q as a proxy of the firm's market value, which was the dependent variable. The five independent variables were firm size, growth opportunities,

carbon productivity, energy productivity and waste productivity. Table 1 displays the measurement and variables for the study.

Table 1

Variables and their Measurement

Variables	Measurement
Dependent variable: Firm's market value	Tobin's Q = market capitalization + total debt/total asset
Independent variables:	
Firm size	Natural log of total asset
Growth opportunities	Sales (p_1)-sales (p_0)/sales p_0
Carbon productivity	Sales/total CO_2 (tones)
Energy productivity	Sales/energy consumption (gigajoules)
Waste productivity	Sales/waste produce(tons)

Data and Sampling Method

This study collected data on financial performance and green performance from DataStream, the World Bank and Malaysian Statistics websites. Furthermore, to test the financial performance of Tobin's Q in Malaysian Green Technology Companies within a ten- year period and to confirm the presence of factors influencing financial performance, this study has employed STATA 14 Software. The study has also conducted a panel data analysis, which included the following: descriptive statistics, panel specification test (*F*-Test, BP-LM Test, Hausman Test), diagnostic test (multicollinearity, serial correlation, heteroskedasticity), correlation test, and panel regression.

The sample of the study comprised 10 public listed companies from different industries and which practiced green initiatives. The selected industries were those from oil and gas, manufacturing, electronics, plantation and pharmaceutical. As the time span of the study covered a period of 10 years, data of the selected companies drawn from the Bursa Malaysia were gathered from 2005 to 2014. The selected companies and industries have been chosen as the sample for this study because they showed good potential in the practice of green technology and were newly listed as the top ranked eco-friendly

companies in Malaysia. The present study focused on the specific period starting from 2005 to 2014, because most of the selected companies had only recently begun to adopt green technology in their business operations, that is, since the year 2005. Thus, the context of the present study was the 10-year performance of the companies since they first started to adopt green technology. More specifically, the study was concerned with whether since the adoption of green initiatives in their organizations, there were certain factors had helped the firms to perform well.

Method of Analysis

First, to prove the hypotheses, namely H_1, H_2, H_3, H_4 and H_5, this study has conducted several panel specifications tests to confirm the presence of factors that had influenced financial performance. Then, in the next step, the static panel approach was tested to choose the appropriate method for estimation. There were three available alternatives involved, and they were pooled ordinary least squares (POLS), fixed effects model (FEM), and random effects model (REM). In this study, the choice of an appropriate model from among POLS or FEM or REM depended upon three types of tests as was suggested and outlined by Park (2011). The tests were the *F*-test, Breusch-Pagan Lagrangian Multiplier (BP-LM) test, and Hausman test.

RESULTS AND DISCUSSIONS

The results of this study were obtained from the different modes of analyses carried out, namely the descriptive analysis to determine minimum, maximum, mean and standard deviation, the diagnostic test, the panel specification test to decide the final model, and the panel regression analysis.

Descriptive Analysis

Table 2 reports the descriptive statistics for Tobin's Q and financial performance. It shows that there were 100 observations made. Firm size had the highest mean value which was 13.823, and this was followed by the variable 'waste' which had a mean value of 7.436.

For the standard deviation, 'waste' showed the highest value which was 20.990. This result implied that 'waste' had a greater spread of data from the mean. Besides, 'waste' also had the highest maximum value, while carbon indicated the highest minimum value. The lowest mean value was registered by the variable 'growth' which indicated 0.076, while the lowest value for standard deviation was registered by the variable 'energy'. Besides, 'growth' had both the lowest minimum and maximum value.

Table 2

Descriptive Statistics

Variables	Obs	Mean	Std Dev.	Minimum	Maximum
Q	100	0.841	0.495	0.150	2.320
Firm Size	100	13.823	2.881	6.503	17.746
Growth	100	0.076	0.198	-1	0.650
Waste	100	7.436	20.990	0.010	94.870
Energy	100	0.131	0.375	0.000214	1.632
Carbon	100	1.280	4.640	136009.300	3.650

Panel Specification Test

Table 3 discusses the panel specification test; *F*-test, BP-LM test and Hausman test. The *F*-test was conducted to decide the most appropriate model for the study, the choice between the POLS model or FEM. From Table 3, it can be seen that the *p*-value of the *F*-test was 0.0001, which was less than 0.05. Therefore, the hypothesis Ho that each firm has a different intercept was rejected. Hence, the FEM was found to be the more appropriate model for the study than the POLS. Next, the BP-LM test was used to decide between the POLS or the REM. The result showed that the *p*-value was 0.000 which was less than 0.05. Therefore, Ho was rejected. This showed that the REM was more appropriate than the POLS. In other words, there were firm-specific effects in the data. Besides, Table 3 also helped to explain the Hausman test, which was important to decide between the FEM or the REM. Based on the results, the *p*-value was 0.0026 which was less than 0.05. Therefore, Ho was rejected, and the most appropriate model

was the FEM. Based on the overall test, the results have suggested that the FEM was the most appropriate model estimator.

Table 3

Panel Specification Result

	F-test	BP-LM test	Hausman test	Technique
p-value	0.0001	0.0000	0.0026	Fixed Effect model (FE)

As shown in Table 4, the calculated values of Variance Inflation Factors (VIF) was 17.23 which was more than 10. This result showed that multicollinearity did appear to be a severe problem in this study. In addition, Table 4 also reports the serial correlation test (autocorrelation) using the Wooldridge test. The result shows that the *p*-value was 0.000 which was less than 0.05. It means that there was a serial correlation problem in this study. Besides, the study looked at heteroskedasticity using the Modified Wald Test. The results show that the *p*-value was less than 0.05. Therefore, H_o was rejected. This means that the variances were not constant or there was a heteroskedasticity problem. Based on the diagnostic tests, the study was found to have suffered from heteroskedasticity, multicollinearity and serial correlation problems. As for the solution, a fixed effect with a cluster option was the best strategy to rectify the problems.

Table 4

Diagnostic Result

VIF	Serial Correlation	Heteroscedasticity	Strategy to rectify
17.23	0.0194	0.0000	Fixed effect (cluster)

Considering the various diagnostic tests that have been conducted and the remedial procedures undertaken, it can be concluded that the examined statistical test has satisfied the key assumptions of linear regression. In other words, there is enough evidence in this study

to conclude that the examined statistical test has satisfied the key assumptions of linear regression. The total number of observations was 100.

Estimation Results

As shown in Table 5, the regression result suggests that the model fitted the data well at the one percent level. The adjusted R^2 is 79.63 percent. It means that the 79.63 percent variation in the firm market value or Tobin's Q, can be explained by all the independent variables in the model. However, another 20.37 percent can be explained by other variables which were not included in the study. The results of the regression also suggested that firm size, waste productivity, energy productivity, and CO_2 productivity had a statistically significant relationship with Tobin's Q.

Table 5

Regression Analysis

	FE Model
Firm size	-0.16**
	(-1.58)
Growth Opportunity	0.13
	(0.90)
Waste productivity	0.006***
	(0.68)
Energy productivity	-0.08**
	(-0.91)
CO_2 productivity	-0.00***
	(-7.48)
Constant	3.04**
	(2.06)
N	100.00
R^2_	0.8251
Adjusted R^2_	0.7963

Note: (1) *t*-statistics in parentheses (2) *, ** and *** denote statistically significant at 10%, 5% and 1% level of significance (3) Q = ROE, Firm size, growth= growth, waste= waste productivity, energy=energy productivity, CO_2=carbon productivity.

The negative coefficient of firm size has implied that firm size has a significant negative relationship with Tobin's Q. It means that for every one-unit increase of firm size, Tobin's Q will decrease by 0.16 unit, that is when other variables are held constant. This result is supported by Becker et al. (2010) who found that firm size had a negative relationship with Tobin's Q and influenced the financial performance. This has the implication that the smaller the firm size is, the more profitable it is. As compared to bigger firms, the smaller firms were usually concentrated in niche markets. Therefore, in such niche markets, there will be less competition and the company will generate more profit. This is also consistent with the finding in the study by Gallego-Alvarez et al. (2015) which showed that there was a negative relationship between firm size and the operational performance of the company. Thus, hypothesis 1 (H_1) can be accepted.

As for the issue of CO_2 productivity, which refers to the release of carbon dioxide into the atmosphere indirectly as carbon emission, the concern has been about how many tonnes of greenhouse gas (GHG) was produced by an organization. The sign of coefficient indicated that there was a significant negative relationship between CO_2 productivity and Tobin's Q. Thus, hypothesis 3 (H_3) was accepted. Therefore, if other independent variables remained constant, for every one-unit decrease in CO_2 productivity, the value of Tobin's Q will increase by 0.000 unit. This is because the company has prioritized the use of renewable sources such as natural gas and oil biodegradable products that will produce less carbon and encourage cost saving in its business operations. Therefore, this result is consistent with that in Iwata and Okada (2011), which found that GHG emission had a significant and negative effect on financial performance. This finding was also supported by Busch and Hoffman (2011), which by using Tobin's Q found a negative impact of carbon productivity on corporate performance.

Waste productivity has been defined as the unwanted or unusable material produced as a result of the production process. In the present study the positive value of waste productivity coefficient showed a positive relationship, and similarly with Tobin's Q. It means that if other independent variables remained constant, the value of Tobin's Q will increase by 0.006 if waste productivity increases by one-unit.

This implies that with the practice of good waste management, when the recycling or reusing of resources becomes more effective and efficient, there will be better financial performance as costs will be reduced. This is finding is consistent with that in Fang Chen (2018) and Bartolacci et al. (2018), studies which found that waste productivity was positive and statistically significant with financial performance. Thus, hypothesis 4 (H_4) can be accepted.

Furthermore, in the context of energy productivity, the result showed a negative relationship and was statistically significant with Tobin's Q. If other independent variables were held constant, for every one-unit of energy productivity decrease, Tobin's Q will increase by 0.08 unit. The result is thus consistent with the study by Fan et al. (2017) which showed that there was a negative relationship and was statistically significant between energy intensity and firm performance (Tobin's Q). This result has implied that the lower the energy productivity, the higher the level of ROE (Tobin's Q). In particular, what this means is that when a company manages to achieve the same economic output with less energy, it will lead to greater financial performance. Besides, it also shows the ability of the company to work efficiently by reducing the usage of energy without reducing the production level. Therefore, hypothesis 5 (H_5) can be accepted.

The coefficient of Growth Opportunity was statically insignificant at five percent level of significance. Thus, in the present study, Growth Opportunity had an insignificant impact on Tobin's Q. Apparently, growth opportunity had the least influence on the financial performance of Malaysian Green Technology companies. Hypothesis 2 (H_2) was therefore, not accepted. This result was however, in contrast to the findings of Chinaemerem and Anthony (2012).

CONCLUSION

The findings of this study on the selected variables used to measure the financial performance of Malaysian Green Technology companies, have shown that carbon productivity and energy productivity were the most significant variables that could cause a huge impact on the firm's market value (Tobin's Q). Carbon productivity showed a negative

relationship and was statistically significant with market value. It proved that the lower the production of carbon dioxide emissions by the green technology companies, the higher the market value (Tobin's Q). This was because carbon dioxide would contribute to environmental problems such as greenhouse effects. Carbon dioxide gas was not only produced by vehicles and air conditioners, it has also been coming from the business industry such as manufacturing, oil and gas and others.

The results of this research have also been consistent with the findings in Iwata and Okada (2011) which showed that greenhouse gas emissions have had a significant and negative effect on financial performance. Besides, energy productivity also showed a negative relationship and was statistically significant with Tobin's Q. It seemed to suggest that the lower the usage of energy in the firms, the higher the market value (firm performance). This result has implied that when a company has the ability to achieve the same productivity with less energy used, it leads to greater financial performance. In fact, this is also due to less energy usage (the company used less fossil) although most of the industry still used the energy resources from oil and coal. Fossil fuels are neither renewable sources or clean. Hence, it cannot help to lessen pollution and reduce greenhouse gas emissions. This is supported in a study by Fan et al. (2017), which found that energy intensity had a significant and negative relationship with firm performance. In a nutshell, companies by adopting green technology in their operations can assist a lot in sustaining a healthy environment, as well as minimizing cost which in turn will help companies to become sustainable in the long term. The firm's market value will also increase by boosting the profitability of the company. As for the limitations present in this study, it is worth noting that it only covered a ten-year period of financial performance among Malaysian Green Technology companies, and there was also a lack of availability of green performance data.

For future research, the researchers have recommended that the scope of the study be extended to include more green management factors and to lengthen the period of study to see the impact of green performance in a longitudinal study. The study also should also focus more on the

sustainability of Green Technology companies in a specific sector, for example in the healthcare sector, energy sector and technology sector.

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