

Hussin Abdullah; Abu Bakar, Nor Aznin; Mohd Razani Mohd Jali et al.

## Article

# The current state of Malaysia's journey towards a green economy : the perceptions of the companies on environmental efficiency and sustainability

International Journal of Energy Economics and Policy

## Provided in Cooperation with:

International Journal of Energy Economics and Policy (IJEEP)

*Reference:* Hussin Abdullah/Abu Bakar, Nor Aznin et. al. (2017). The current state of Malaysia's journey towards a green economy : the perceptions of the companies on environmental efficiency and sustainability. In: International Journal of Energy Economics and Policy 7 (1), S. 253 - 258.

This Version is available at:

<http://hdl.handle.net/11159/1159>

## Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics  
Düsternbrooker Weg 120  
24105 Kiel (Germany)  
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)  
<https://www.zbw.eu/>

## Standard-Nutzungsbedingungen:

Dieses Dokument darf zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden. Sie dürfen dieses Dokument nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen. Sofern für das Dokument eine Open-Content-Lizenz verwendet wurde, so gelten abweichend von diesen Nutzungsbedingungen die in der Lizenz gewährten Nutzungsrechte. Alle auf diesem Vorblatt angegebenen Informationen einschließlich der Rechteinformationen (z.B. Nennung einer Creative Commons Lizenz) wurden automatisch generiert und müssen durch Nutzer:innen vor einer Nachnutzung sorgfältig überprüft werden. Die Lizenzangaben stammen aus Publikationsmetadaten und können Fehler oder Ungenauigkeiten enthalten.

<https://savearchive.zbw.eu/termsfuse>

## Terms of use:

*This document may be saved and copied for your personal and scholarly purposes. You are not to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public. If the document is made available under a Creative Commons Licence you may exercise further usage rights as specified in the licence. All information provided on this publication cover sheet, including copyright details (e.g. indication of a Creative Commons license), was automatically generated and must be carefully reviewed by users prior to reuse. The license information is derived from publication metadata and may contain errors or inaccuracies.*



## The Current State of Malaysia's Journey towards a Green Economy: The Perceptions of the Companies on Environmental Efficiency and Sustainability

Hussin Abdullah<sup>1\*</sup>, Nor'Aznin Abu Bakar<sup>2</sup>, Mohd Razani Mohd Jali<sup>3</sup>, Fatimah Wati Ibrahim<sup>4</sup>

<sup>1</sup>School of Economics, Finance and Banking, Universiti Utara Malaysia, Kedah, Malaysia, <sup>2</sup>School of Economics, Finance and Banking, Universiti Utara Malaysia, Kedah, Malaysia, <sup>3</sup>School of Economics, Finance and Banking, Universiti Utara Malaysia, Kedah, Malaysia, <sup>4</sup>School of Economics, Finance and Banking, Universiti Utara Malaysia, Kedah, Malaysia.

\*Email: [hussin2141@uum.edu.my](mailto:hussin2141@uum.edu.my)

### ABSTRACT

Malaysia is committed to fostering the development of a clean and efficient economy; that is, a “green” economy. This means encouraging the development of green businesses and green products, which in turn will create “green jobs.” The current economic and environmental crises have accelerated during the last two decades: Global warming in climate; fuel, food, water and the economy as a whole. At the fundamental level, there exists a misallocation of resources. Relatively little capital was invested in energy efficiency, sustainable agriculture, ecosystem, land and water conservation. This pattern of development and growth has had detrimental impacts on the well-being of current generations and presents risk and challenges for future generations. As Malaysia promotes greater environmental awareness, it is important to establish national benchmarks by which to measure progress toward a greener economy. This study seeks to advance the state of knowledge in Malaysia on the green economy. To achieve this we need to be able to measure resources, economic activity and progress, accurately and appropriately. The result also indicates that an increase in the prioritizing green economy projected by the companies operating in Malaysia will lead to increase in green economic sustainability. This implies that the progress towards the green economy in Malaysia is also influenced by the perception of its importance in the future. The analysis reveals that increase in green economy awareness among the firms will lead to increase in the level of environmental sustainability, thereby improving the current state of green economy in Malaysia. Moreover, an increase in the green economy priority by the companies increases its sustainability in the economy.

**Keywords:** Green Economy, Environmental Efficiency, Sustainability, Perceptions of the Companies

**JEL Classifications:** Q56, Q58

### 1. INTRODUCTION

Malaysia is committed to fostering the development of a clean and efficient economy; that is, a “green” economy. This means encouraging the development of green businesses and green products and services, which in turn will create “green jobs.” Malaysia’s vision of a “green economy” would see it moving beyond its status as a manufacturing hub, and establish “low carbon emissions, highly efficient use of resources, and a healthy, well-educated populace.” To achieve this we need to be able to measure resources, economic activity and progress, accurately and appropriately. The current economic and environmental crises have accelerated during the last two decades: Global warming on

climate; fuel, food, water and the economy as a whole. Economic activity has delivered unprecedented environmental damage: An estimated 60% of the world’s ecosystems have been degraded and significant scarcity in key resources. These crises are severely impacting our ability to sustain prosperity and social equity.

At the fundamental level, there exists a misallocation of resources. Relatively little capital was invested in renewable energy, energy efficiency, public transportation, sustainable agriculture, ecosystem, biodiversity protection and land and water conservation. This pattern of development and growth has had detrimental impacts on the well-being of current generations and presents risk and challenges for future generations. Existing

policies and market incentives have contributed to this problem of misallocation of resources because they allow businesses to run up significant social and environmental externalities, largely unaccounted for and unchecked.

Mounting evidence also suggests that transitioning to a green economy has sound economic and social justification. In this regard, the government as well as the private sector has an important role to play in engaging in such an economic transformation. The transformation will have profound impacts on the way we produce, consume and earn a living. There is a need for better public policies, including pricing and regulatory measures, to change the perverse market incentives that drive this misallocation of capital and ignore the social and environmental externality. In the face of this new global economic shift, Malaysia stands a chance to rise to greatness if a serious effort is made in moving towards a green economy.

Indicators are needed to bring attention to these issues, set targets and track progress. From a global point of view, broad indicators could cover the areas of climate change, ecosystem management, resource efficiency, and chemicals and waste management. Within each of these areas, a few leading indicators may be identified.

As Malaysia promotes greater environmental awareness, it is important to establish national benchmarks by which to measure progress toward a greener economy. This study seeks to advance the state of knowledge in Malaysia on the green economy. The economic crisis and global financial crisis of 2008-2009 has also affected the socioeconomic development in Asian countries. In some of them, the gross domestic product growth decreased, and others had been affected by high fuel and food prices. Indeed, these countries influenced by the decline in economic growth and development as well as an increase in unemployment and poverty. However, green economy mostly focuses on efficient use and conservation of natural capital to expand the economy, which provides indemnity against the possible pressures of the world economy.

The main problems that create a hard situation to implement green economy in most of countries are weak management, increasing poverty, many local and border conflicts, high economic dependency on non-renewable and renewable natural resources, and increasing food insecurity (OECD, 2012). In addition, there are other social and environmental challenges that hinder green entrepreneurs and grassroots initiatives to provide innovation solutions for transition to a green economy in some countries. These conditions include the limited access to investment, lack of public support for entrepreneurs, weak environmental legislation, lack of market incentives, poor entrepreneurial culture, low interest from consumers, and governmental bureaucracy (Vaghefi et al., 2015).

The Malaysian government has started some basic and feasible fiscal and financial green technology development incentives. Many Malaysian companies are financing their green technology initiatives. Green technology financing scheme is a government initiative to encourage investments in green technology, which

may also lead to economic growth and achieving a sustainable development. There is a positive relationship between financial sector development and the economic growth. Financial development could have an impact on the degree of inclusiveness of economic development. Therefore, the motivation of this study is to examine the current state of Malaysia's journey towards a green economy. The evaluation of this motivation begins with examining the perceptions of the companies on environmental efficiency (ENE) and sustainability as well other green economy related questions.

The organization of the paper is structured as follows. Section 2 is the literature review, and Section 3 is the literature review. Section 4 discusses the results and findings while Section 5 concludes the paper.

## 2. LITERATURE REVIEW

In a green economy, there is emphasis on the pursuit of opportunities to invest in sectors that rely upon and use natural resources and ecosystem services. Investing in green sectors, including the water sector, can create more jobs and greater prosperity. However, these opportunities are strongest in areas where people still do not have access to clean water and adequate sanitation services. Early investment in the provision of these services appears to be a precondition for progress. Once made, the rate of progress will be faster and more sustainable, thus making the transition to a green economy possible. Water in the green economy focuses on the socioeconomic opportunities that proper water management provides for social and economic development, and at the same time safeguarding freshwater ecosystems. In green economies, the role of water in both maintaining biodiversity and ecosystem services and in providing water is recognized, valued and paid for.

The Organization for Economic Co-operation and Development (OECD) promotes green growth, acknowledging that "green and growth can go hand in hand" by promoting economic growth and development, and at the same time ensuring that natural assets continue to provide the resources and environmental services on which human well-being relies (OECD 2011). The OECD green growth strategy provides an actionable framework to foster the necessary conditions for innovation, investment and competition that can give rise to new sources of economic growth. In a series of policy documents, the OECD outlined a central role market instruments should play in ensuring the diffusion of clean technologies and other environmental goods and services internationally (OECD, 2010; 2011). This involves getting the price right, encouraging investments in green technologies, eliminating fossil fuel subsidies and introducing corrective taxation. The OECD approach to green growth has a social dimension to it. A greener growth is expected to address the social issue of high unemployment in OECD countries as a result of the 2008-2009 economic recessions.

Another important green economy formulation is spearheaded by the United Nations Environment Programme (UNEP). The green economy initiative which was launched in October 2008, not only aimed at seizing the economic opportunities that this

contemporary concept of green economy has to offer, but also broadened the framing of the green problem to encompass social issues. The UNEP report towards a green economy (UNEP, 2011) defines the green economy "as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities". For UNEP, a green economy is "one which is low carbon, resource efficient and socially inclusive." The report puts forth a macroeconomic case-output and job-for investing in sectors that produce environmentally enhancing products and services, while also guiding ways to boost pro-poor investments. UNEP also puts a strong emphasis on getting the market and prices right in creating the enabling conditions for a green economy (Bina and La Camera, 2011).

Meanwhile, Fulai (2010) argues that green growth does not refer to the standard definition of output growth. Rather, it embraces the broader notion of economic progress by emphasizing qualitative growth. The work of UNESCAP on green growth is the closest to the spirit of qualitative growth. UNESCAP and a number of its member states have organized soul-searching dialogues to explore what constitutes the quality of economic growth. Besides emphasizing development that enhances the quality of life and human well-being, UNESCAP also advocates countries to move beyond the sustainable development rhetoric and pursue a path of green growth. The basic principles for greening growth in UNESCAP countries are quality and eco-efficiency of economic growth, and environmental sustainability (ENS) vis-à-vis environmental performance. For this UNESCAP has identified four pillars for the transition to greener growth: Eco-tax reform; sustainable infrastructure; the greening of business; and sustainable consumption (UNESCAP, 2008).

Chen (2001) uses a quality based model for analyzing the strategic and policy issues concerning green product development. On the demand side, he analyzed preferences of ordinary green customers. On the supply side, he analyzed the producers' strategic decisions regarding quantities, prices and qualities of the product, whilst on the policy side, he evaluated the effects of environmental standards on economic and environmental consequences of green product development.

The World Bank has also been concerned with the green environment. The World Bank would first examine the environmental effects of the projects, before considering for project financing. Projects which are being proposed for bank financing are reviewed at the earliest stage possible to identify those that could cause significant environmental effects (Goodland, 1990). This is to ensure any possible environmental consequences are dealt with at the early stage or reject the projects that do not meet the requirements. Big is not always good. Mega projects can bring environmental destruction and undesirable consequences. The government or the project manager has to calculate project gains and costs, where ecological and geological functions are given due weight and community well-being are placed into accounts (O'riordan, 1990).

Chen (2001) further examines the green product development and mentions that green product development is receiving significant attention from different market participants, including customers,

industries, and governments around the world. Chen develops a quality-based model for analyzing the strategic and policy issues required concerning the development of products with conflicting traditional and environmental attributes. The government can play a considerable role in the green economy initiatives. There are a number of opportunities that provide a barrier or future development of the environmental industry sector. Some of these are avoided, reusing and recycling wastes. The new drivers of change are legislative and regulatory pressures, introduce technologies to minimize wastes, to process waste and to support green business initiatives (Roberts, 2004).

Collin et al. (2005) examine technology adoption trends and discuss how technical change continues to play an important role in sustaining productivity growth. The adoption trends have been impacted by several factors such as increased investment in education, development infrastructures, public and private investment, and improved technological capability. The focus is mainly on the irrigated cereals-based systems of Asia, where the green revolution has been more progressive. The authors suggest that major changes with significant impact on technology adoption and productivity growth have occurred.

Green economy or ENS is not as costly as some have thought. Cogburn (2004) argues that green procurement in the US can achieve managerial values in environmental policy. Public policy must be effective, efficient and economical. Green product is not as expensive as it is usually thought, but can be less expensive if analyzed in economic term. Consumers' willingness to pay for green initiatives in addition to green foods includes other areas such as: Green markets, private provision of public goods and the hotel industry.

### 3. METHODOLOGY

This study focuses on green economy in Malaysia. The study consists of field-based survey of high technology based firms at Kulim Hi-Tech Park, Kedah, Malaysia through the structured questionnaire technique, Kedah, Malaysia. A total of 46 companies was selected from a wide range of industries such as manufacturing, services, and primary production. A convenient sample consists of subjects included in the study because they happen to be in the right place at the right time (Polit and Hungler, 1993).

The structured questionnaire covered the following issues: Company information, the nature of the business and the owner-managers aspirations for the green economy; the environmental practices pursued by the business plus the drivers for their engagement; their perceived environmental impact; how the owner-managers understand ENS, and method and implementation.

### 4. FINDINGS AND DISCUSSION

The basic descriptive statistics of the major variables employed in the study are presented in Table 1. The mean represents the average value of each variable in relation to its total observations. The standard deviation shows the degree of dispersion between

**Table 1: Descriptive statistics**

| Variable | Mean±Standard deviation | Skewness | Kurtosis |
|----------|-------------------------|----------|----------|
| GES      | 2.703±0.446             | -2.378   | 8.991    |
| ENE      | 1.196±0.435             | 2.384    | 8.347    |
| GEA      | 0.978±0.147             | -3.559   | 14.022   |
| GEP      | 4.848±0.363             | -0.309   | 2.580    |
| ENS      | 1.065±0.219             | -1.937   | 4.751    |
| SDA      | 1.152±0.382             | 3.179    | 13.877   |
| PIE      | 3.739±0.612             | -2.739   | 10.943   |
| TRO      | 3.652±0.566             | -1.361   | 3.873    |
| GEO      | 2.891±1.636             | 0.207    | 1.363    |
| GOE      | 1.082±0.190             | 3.043    | 13.479   |
| PTN      | 1.109±0.315             | 2.514    | 7.322    |
| CRT      | 1.261±0.575             | 2.785    | 12.305   |
| ISD      | 2.500±1.049             | -0.058   | 1.837    |
| GEK      | 1.870±0.806             | 0.238    | 1.611    |

GES: Green economy sustainability, ENE: Environmental efficiency, GEA: Green economy awareness, GEP: Green economy priority, ENS: Environmental sustainability, SDA: Sustainable developmental actions, PIE: Potential impact on environment, TRO: Turnover, GEO: Green economy obstacles, GOE: Green economy operational efficiency, PTN: Partnership, CRT: Certification, ISD: Investment in sustainable development, GEK: Green economy knowledge

observations. This helps in detecting the existence of outlier in the data generation process and points to the possibility of having heteroscedasticity in the regression analysis. From the results in Table 1, it is observed that the standard deviation is characterized by low dispersion, which signifies the absence of outliers and less likelihood of encountering the problem of heteroscedasticity in the data.

The normality of the data is investigated using skewness and kurtosis. The following variables; green economy sustainability (GES), green economy awareness (GEA), green economy priority (GEP), ENS, potential impact on environment (PIE), turnover (TRO) and investment in sustainable development (ISD) are negatively skewed. The most negatively high skewed variable is GEA followed by PIE and the least negatively skewed variable is an ISD followed by GEP. However, ENE, sustainable development actions (SDA) green economy obstacles (GEO), green economy operational efficiency (GOE), partnership, certification (CRT) and green economy knowledge (GEK) are positively skewed. The most positively high skewed variable is GOE and the least is found to be GEO. Some of the statistics such as GEA and GOE are respectively negatively and positively respectively far from the threshold standard of zero and the absolute value of 1.96 bound suggested in Haniffa and Hudaib (2006) and the absolute value of less than two as in Curran et al. (1996). However, the values are found not beyond the value of three proposed by Kline (2011) which is argued to cause a problem of non-normal distribution. Therefore, it is clear that there is no sufficient evidence to conclude that the data are not normally distributed.

Moreover, the normality of the data is also tested using the kurtosis statistics. The data show the existence of leptokurtic, mesokurtic and platykurtic distribution. The example of the leptokurtic distributed variable is GEA which shows a value of 14.022 and GEK with a value of 1.611 which represents a platykurtic distribution. Despite the fact that 14.022 is far above the benchmark value of three as emphasized in Bai and Ng (2005)

and seven as in Curran et al. (1996), notwithstanding Kline (2011) argues that kurtosis statistic show a severe non-normal distribution when its value exceeds 20. This further validates the normal distribution of the data as revealed by the skewness statistics.

The descriptive analysis indicates that, currently, the companies perceived that the benefit of green economy can be truly attainable through the various benefits of ENS practice. This includes, through advertising for the business or what is called higher reputation, customer retention, penetrating new market, cost containment and improving relations with distributors. These are shown by 44 respondents representing 96%, 44 respondents representing 96%, 43 respondents representing 93%, 42 respondents representing 91% and 42 respondents representing 91% out of 46 respondents in each case respectively. It, therefore, shows that the at the current state the benefit of green economy can be truly attainable through advertising for the business or what is known as higher reputation, customer retention, penetrating new market, cost containment and improving relations with distributors.

Furthermore, all the sampled companies expect that their firm green economy practice will increase during the next 12 months. In addition, about 85% of the companies rated green economy as the most important programme for the future of their companies. The green economy practice is also perceived to highly increase the level TRO in the next 3 years. This is perceived by about 70% of the respondents. While 26% of them believe that there will be a stable rate of TRO despite practicing green economy by the companies. This is a strong pointer towards a high level of acceptability of the green economy practice by the sampled companies. The level of acceptability is also seen by the guess of the companies to be officially certified to prove their commitment towards implementing ENS practice.

The current state of the Malaysia's journey towards green economy is further shown by the level of awareness of the programme among the companies operating in Malaysia. About 98% of the respondents are fully aware about GES practice. Furthermore, the majority of the respondents defines the term green economy as energy conservation/renewable sources of energy, while 35% of them responded that the green economy is about the economy that reduces its environmental impacts and 26% of the companies define it as an economy based on sustainable activities.

Nonetheless, the study also presents the empirical analysis on the current state of green economy in Malaysia by regressing ENS on the highlighted indicators. The result is presented in Table 2. The F-statistic indicates that the joint significance of the variables in the model is statistically significant at the 1% level of significance. This is shown in the lower part of the table to be 23.6 with a probability value ( $P = 0.000$ ). This indicates the overall adequacy of the model. Furthermore, the various indicators used in the regression explain about 78% of the variation in the ENS in measuring the current state of the Malaysia's journey towards green economy practice.

The results in the table reveal that increase in the level of GEA will lead to increase in the level of ENS, thereby improving the

current state of green economy in Malaysia. The coefficient is statistically significant at the 99% level of confidence. Moreover, the table also indicates that an increase in the level of GEP of the operating companies will also lead improvement in the level of ENS. It is shown that an increase in the GEP by the companies increases its sustainability in the economy. The coefficient is statistically significant at the 1% level of significance. Therefore, the more important the companies perceived green economy practice the higher will be its level of improvement in Malaysia.

The results in Table 2 further reveal that the importance of certification proving increase in the level of commitment towards implementing environmental sustainable practice leads to improvement in the level of ENS practice in Malaysia. The coefficient is found statistically significant at the 1% level of significance. Similarly, a short run increase in the TRO expectations of the green economy oriented business in the sample leads to greater improvement in the state of Malaysia's green economy practice. The statistics show that the coefficient is statistically significant at the 5% level of significance.

The variable that measures the ENE, which comprises of energy usage, recycling and re-use of its materials, environmentally friendly technologies, selective waste, internal training on ENE and purchase and use of materials with less effect is also positively related to ENS practice. However, the coefficient is not statistically significant at any conventional levels of significance. This might be caused by the developing country's excessive energy usage, least recycling of materials and use of material with high environmental effect, especially at the time of the study when the practice of green economy is still not fully embraced by the companies due to their ancient operation process.

However, SDAs such as easy access to bank loans, incentives, less bureaucracy and market regulations and control is found negatively related to the current state of Malaysia's journey towards a green economy. This might be so in developing and emerging economies where bank loans are not readily available, high level of bureaucracy and inadequate market regulation and control to effectively promote indigenous firms, especially the small and medium scale businesses which are confronted with inadequate capital and weak competitive

ability. This is similarly argued in Brau and Woller (2004), Gregori et al. (2014), among others. Wilson et al. (2011) and Fairman and Yapp (2005) for bureaucratic bottleneck.

The consistency of the results is examined based on the diagnostic checks reported in the lower part of Table 2. These include test for multicollinearity, heteroscedasticity, variable omission, model specification and normality of residuals. The study checks for the possibility of multicollinearity among the independent variables using correlation coefficients. Furthermore, in Table 2 additional test based on variance inflation factor (VIF) is also reported in Table 3. In line with the correlation threshold, the VIF also indicates absence of severe multicollinearity among the independent variables.

The assumption of homoscedasticity is examined based on Breusch and Pagan (1979) and Cameron and Trivedi (2005) decomposition of the information matrix test. Both of the results reveal that the residuals are homoscedastic at least at the 10% level of significance in the case of Breusch-Pagan, Cook-Weisberg test. Thus, there exists no problem of heteroscedasticity in the model. Moreover, the normality of residuals is also examined using three different alternatives, skewness, kurtosis and interquartile range, which assumed asymmetry of the distribution of residuals. The tests fail to reject the null hypotheses of normal distribution of the residuals and the interquartile ranges for test of normality. All the test statistics show that the residuals are approximately normally distributed, except for the skewness which reject the null hypothesis of normally distributed residuals. Nevertheless, the two other tests of the normality of the data distribution are sufficient evidence that the residuals are normally distributed.

The test for model specification fail to reject the null hypothesis that the model is correctly specified. This is revealed by the non-significance of the  $\hat{\rho}$  square statistic. This indicates that the model is correctly specified. Moreover, the study conducts omitted variable bias test. The result indicates that there exists no omitted variable bias. Thus, it can be confidently concluded that the results presented in Table 2 are unbiased, efficient and consistent in explaining the variations in ENE practice which is aimed at measuring the current state of the Malaysia's journey towards a green economy.

**Table 2: OLS regression result with ENS as dependent variable**

| Variables                              | Coefficients | Standardized coefficients | Standard errors | t-values                     | P values      |
|----------------------------------------|--------------|---------------------------|-----------------|------------------------------|---------------|
| CONS                                   | 1.074        | -                         | 0.332           | 3.24                         | 0.001         |
| GEA                                    | 0.848        | 0.570                     | 0.149           | 5.69                         | 0.000         |
| GEP                                    | 0.190        | 0.314                     | 0.056           | 3.39                         | 0.001         |
| CRT                                    | 0.191        | 0.499                     | 0.034           | 5.57                         | 0.000         |
| ENE                                    | 0.034        | 0.059                     | 0.049           | 0.69                         | 0.247         |
| SDA                                    | -0.032       | -0.063                    | 0.052           | -0.62                        | 0.271         |
| TRO                                    | 0.093        | 0.241                     | 0.040           | 2.33                         | 0.013         |
| Diagnostics                            |              |                           |                 |                              |               |
| R <sup>2</sup>                         |              | 78%                       |                 | Skewness                     | 13.61 (0.018) |
| F-statistics                           |              | 23.61 (0.000)             |                 | Kurtosis                     | 2.60 (0.107)  |
| VIF                                    |              | 1.66                      |                 | Interquartile range          | 1.36          |
| B-P Cook-Weisberg (heteroscedasticity) |              | 2.99 (0.084)              |                 | Model Specification          | -0.30 (0.765) |
| Cameron and Trivedi IM-test            |              | 25.53 (0.102)             |                 | RAMSEY Omitted Variable Test | 0.22 (0.802)  |

The values in parenthesis under the diagnostics tests represent the probability values that corresponds to their respective statistics. CONS: Constant, GEA: Green economy awareness, GEP: Green economy priority, CRT: Green economy certification, TRO: Turnover, SDA: Sustainable development actions, B-P: Breusch-Pagan test for heteroscedasticity, VIF: Variance inflation factor, OLS: Ordinary least squares

**Table 3: Multicollinearity analysis**

| Variables | VIF  | 1/VIF |
|-----------|------|-------|
| GEA       | 1.81 | 0.552 |
| GEP       | 1.55 | 0.643 |
| CRT       | 1.45 | 0.688 |
| SDA       | 1.32 | 0.759 |
| ENE       | 1.89 | 0.528 |
| TRO       | 1.93 | 0.519 |

Mansfield and Helms (1982), the mean for the VIF is 1.66. VIF: Variance inflation factor, GEA: Green economy awareness, GEP: Green economy priority, CRT: Green economy certification, SDA: Sustainable development actions, ENE: Environmental efficiency, TRO: Turnover

## 5. CONCLUSION

The study reviews the level of ENE. The finding shows that a greater proportion of the sampled companies invest to improve energy use because they believe in it while other companies only invest to improve energy usage because they are required to do it by the law. Additionally, the majority of the firms invest in recycling and re-use of its materials, environmentally friendly technologies, internal training on green economy, selective waste and purchase and use of materials with less effect simply because they believe in such investment to ensure ENE. The companies are very much concerned about the PIE when they realize new products and services. This is also a pointer to the successful ENE in Malaysia based on the analyzed responses of the various high technology based firms operating in Kedah Darul Aman.

Furthermore, GEA and knowledge lead to improvement in ENE. This finding is not surprising given the responses of the high technology oriented firm about their knowledge on the conceptualization of ENE. Therefore, the perception of the firms about green economy can therefore lead to improvement in the ENE. More so, invest in sustainable development through increase moral commitment towards sustainable development, investment to improve the companies' image and to meet the needs of the customers, investment in innovation and cost containment as well as in market opportunities increase the level of ENE. Similarly, an increase in the green economy operation efficiency, which entails general consulting services to the customers, maintenance services, training and customer awareness and network with other green oriented firms also leads to improvement in the level of ENE. However, the study found that insufficiency of control to effectively promote indigenous firms, especially the small and medium scale industry's retard ENE in Malaysia. This is normally the case in most developing and emerging economies.

## 6. ACKNOWLEDGMENT

The author(s) gratefully acknowledges receipt of research grant from the Fundamental Research Grant Scheme, Ministry of Higher Education (S/O No. 12915).

## REFERENCES

Bai, J., Ng, S. (2005), Tests for skewness, kurtosis, and normality for time series data. *Journal of Business and Economic Statistics*, 23(1), 49-60.

Bina, O., La Camera, F. (2011), Promise and shortcomings of a green turn in recent policy responses to the "double crisis". *Ecological*

*Economics*, 70(12), 2308-2316.

Brau, J.C., Woller, G.M. (2004), Microfinance: A comprehensive review of the existing literature. *The Journal of Entrepreneurial Finance*, 9(1), 1-27.

Breusch, T.S., Pagan, A.R. (1979), A simple test for heteroscedasticity and random coefficient variation. *Econometrica*, 47(5), 1287-1294.

Cameron, A.C., Trivedi, P.K. (2005), *Micro Econometrics: Methods and Applications*. United Kingdom: Cambridge University Press.

Chen, C. (2001), Design for the environment: A quality-based model for green product development. *Management Science*, 47(2), 250-263.

Cogburn, J.D. (2004), Achieving managerial values through green procurement? *Public Performance and Management Review*, 28(2), 236-258.

Curran, P.J., West, S.G., Finch, J.F. (1996), The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods*, 1(1), 16-29.

Fairman, R., Yapp, C. (2005), Enforced self-regulation, prescription, and conceptions of compliance within small businesses: The impact of enforcement. *Law and Policy*, 27(4), 491-519.

Fulai, S. (2010), A green economy: Conceptual issues. Background Paper for the UNEP Major Groups and Stakeholders Consultation on Green Economy. Geneva. p26.

Goodland, R.J. (1990), World bank's environmental assessment policy. *Hastings International and Comparative Law Review*, 14, 811.

Gollin, D.D., Morris, M., Byerlee, D. (2005), Technology adoption in intensive post-green revolution systems. *American Journal of Agricultural Economics*, 87(5), 1310-1316.

Gregori, G.L., Cardinali, S., Palanga, P. (2014), How to create value for micro-businesses approaching the green economy. *Greener Journal of Business and Management Studies*, 4(1), 19-30.

Haniffa, R., Hudaib, M. (2006), Corporate governance structure and performance of Malaysian listed companies. *Journal of Business Finance and Accounting*, 33(7-8), 1034-1062.

Kline, R.B. (2011), *Principles and Practice of Structural Equation Modelling*. 5<sup>th</sup> ed. New York: The Guilford Press.

Mansfield, E.R., Helms, B.P. (1982), Detecting multicollinearity. *American Statisticians*, 36(3), 158-160.

O'Riordan, T. (1990), On the 'greening' of major project. *The Geographical Journal*, 156(2), 141-148.

OECD. (2010), *Development Co-operation Report 2010*, OECD. DOI: 10.1787/dcr-2010-en.

OECD. (2011), *Development Co-operation Report 2011*, OECD. DOI: 10.1787/dcr-2010-en.

OECD. (2012), *Green Growth and Developing Countries: A Summary for Policy Makers*. Organisation for Economic Co-operation and Development, Paris Publishing.

Polit, F.D., Hungler, P.B. (1993), *Essentials of Nursing Research: Methods, Appraisal, and Utilisation*. 3<sup>rd</sup> ed. Philadelphia, PA: Lippincott.

UNEP. (2011), *Towards a green economy: Pathways to sustainable development and poverty reduction - A synthesis for policy makers*. Available from: <http://www.unep.org/greeneconomy>.

UNESCAP. (2008), *Greening Growth in Asia and the Pacific Follow-up to the World Summit on Sustainable Development: Taking action on the Regional Implementation Plan for Sustainable Development in Asia and the Pacific, 2006-2010*. Bangkok: United Nations ESCAP.

Vaghefi, N., Siwar, C., Aziz, S. (2015), Green economy: Issues, approach and challenges in Muslim countries. *Theoretical Economics Letters*, 5, 28-35.

Wilson, C., Williams, I.D., Kemp, S. (2011), Compliance with producer responsibility legislation: Experiences from UK small and medium-sized enterprises. *Business Strategy and the Environment*, 20(5), 310-330.