

Environmental Capabilities Indicators are Prominent for Organizational Competitiveness and Performance. An Empirical Study of Malaysian Manufacturing Industry

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Abstract

It is no doubt, an awareness of environmental responsibility is currently taking place. Locally, Bursa Malaysia has unveiled Environmental, Social and Governance (ESG) Index in 2014 for public listed companies (Berhad) aiming to boost sustainability practices. Internationally, two of the world largest companies; Apple Incorporation – the most valuable companies in the world and Wal-Mart Incorporation – the world largest company in term of revenue are actively engaging with sustainable practices ([Deloitte CFO Insights, 2009](#)). As such, a company's superb performance is no longer constrained on economic expects but has extended to environmental and social matters which named as sustainable performance. Yet, the practice of sustainability in developing nations such as Malaysia is relatively extreme low especially manufacturing companies in Malaysia. Essentially the Excel of Malaysian manufacturing depends on the scrutinization from developed counterparts in term environmental compliance. Aiming to encourage sustainable practices among manufacturing companies, particularly environmental area; the study will develop environmental capabilities indicators aiming to lead higher organization performance with ultimately boost up the sustainability practice. The technique of Amos 18 is applied in this study. Essentially, this study has successfully revealed comprehensive environmental capabilities indicators. In a nutshell, an organization with strong performance definitely possess appropriate indicators of environmental capabilities indicators. As such, regulatory bodies like The Electrical and Electronics Association of Malaysia (TEEAM) and The Federation of Malaysian Manufacturers (FMM), Malaysia Institute of Accountant (MIA), must lead and be proactive in promoting sustainable practices among Malaysian manufacturing companies. They can unlock the study finding in drafting their policies and encourage companies to implement it.

Keywords: Environmental capabilities; Indicators; Prominent; Performance; Manufacturing.



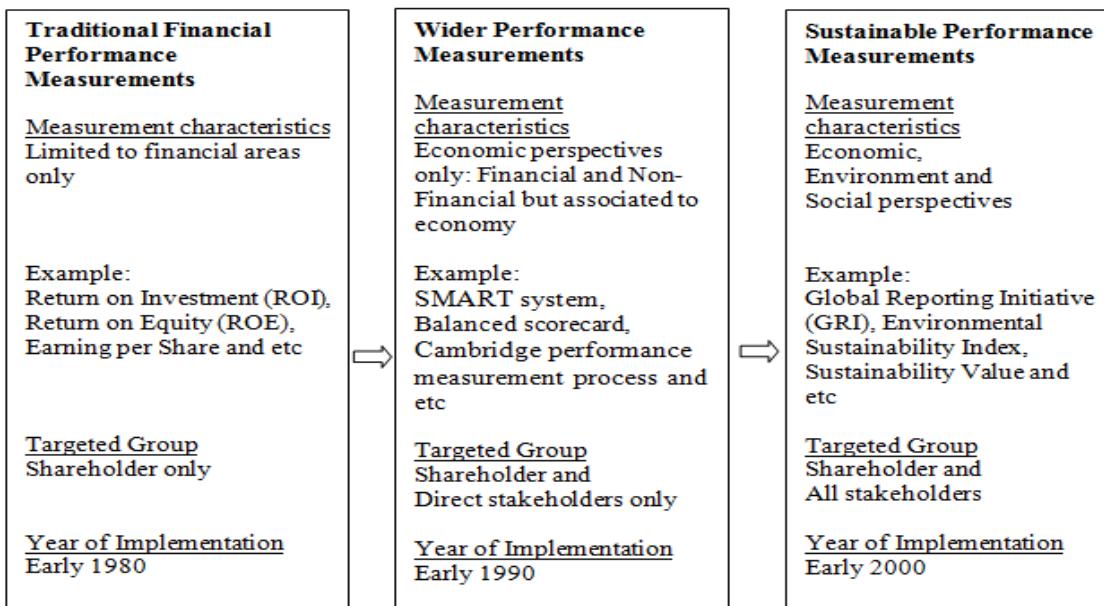
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1. Setting the Agenda

Bursa Malaysia (Malaysian stock market exchange) launched a Corporate Social Responsibilities (CSR) framework as a guide to public listed companies in implementing reporting on sustainability issues in the year 2014. The listing requirements were further altered and tightened to include a “requirement to provide a description of corporate social responsibility activities or practices undertaken by the listed issuer and its subsidiaries”.

1.1. Development of Performance Measurement Models

Generally, the achievement of an organizational objective is dominated by “excellence-performing” companies. For the last two decades, the excellent performance measurement models have evolved from traditional financial performance measurement to a wider performance measurement model and eventually a sustainable performance measurement model as presented in Table 1. The driving force of this remarkable shift is mainly due to the limitations associated with traditional financial performance measurement models and wider performance measurement models.



Source: (Hubbard, 2009); (Stede, 2010);(Onyali et al., 2015); (Tencati, 2016).

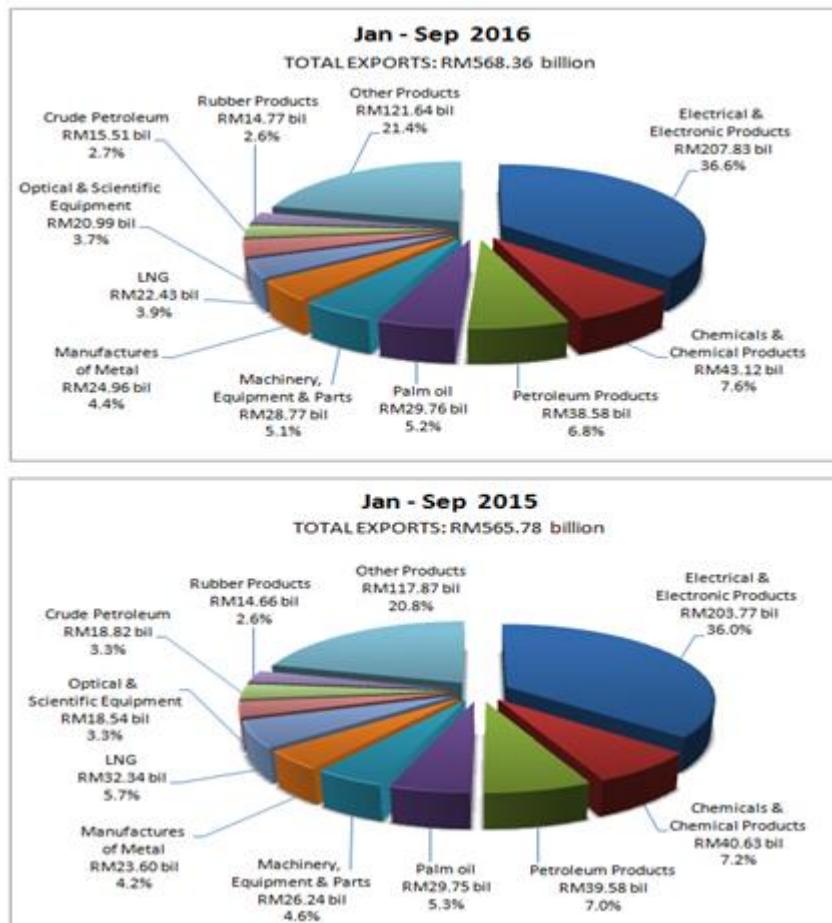
It is undeniable and almost inevitable that expectations and requirements for sustainable reporting which covers economic, environment and social perspectives have increased dramatically. Approximately 95% of the world's 250 largest companies have already issued sustainability reports in 2010, a huge surge when compared to 2005 which was only 50%. However, among all Asian countries, only Japan is listed under the top 10 sustainability reporting by nations

Table-2. Top 10 Sustainability reporting by country in the year 2015

Country	Country makes up of World Total in percentage	Companies' Headquarters make up of Global 500 Largest Companies in percentage and Ranking
United States of America	10%	28% (139)
Spain	9%	2.5% (10)
Brazil	7%	2% (7)
Japan	7%	14% (71)
Sweden	6%	1% (5)
Australia	4%	2% (8)
Netherlands	4%	3% (13)
Canada	4%	2% (11)
Germany	4%	7% (37)
United Kingdom	3%	6% (29)

Source: GRI (2010)

Manufacturing especially electronic and electrical (E & E) industry is characterized as fast-moving in nature, experiencing substantial changes over time, with a high rate of innovation and a high degree of research and development activities (Blonigen and Taylor, 2000; Himmelberg and Petersen, 1994). The industry is largely influenced by the rapid pace of technology change and exposed to international competition. As a result, the performance measurement model used within this industry is expected to change more frequently compared to other industries. E & E products do not only account for the largest export (accounted for more than 36%) by product for two consecutive years from 2015 to 2016, it is also the leading sector, almost four times larger than second largest exported – chemicals & chemical products with slightly above 7% as shown in Figure 1.

Figure-1. Exports by Major Sector for 2015 and 2016 (RM billion)

Source: Department of Statistics, 2016

According to [Blonigen and Taylor \(2000\)](#), company survival in this industry mainly depends on the ability of companies to innovate or quickly imitate new products particularly product embedded with sustainable criteria ([Saxena and Khandelwal, 2010](#)). Nevertheless, as the largest export by product in Malaysia, the E & E industry is always subject to global presence and being closely scrutinised by a wide range of stakeholder particularly international community ([Epstein, 2008; Hart, 1995](#)) from Western Nations who require high sustainable achievement. In addition, according to [Stede \(2010\)](#), this industry is recognized as one of the largest contributors to environmental and social externality and problems, particularly E & E components related to computer equipment. This casts the interest to conduct a performance measurement study on this area.

2. Research Objective

Although sustainable reporting is significantly prominent especially in a developed nation such as Europe, the present number of sustainable reporting in Asia, such as in Malaysia, is relatively low. The majority of sustainable reporting in Malaysia is still based on a voluntary basis without any assurance statement or substance measurement due to the low level of awareness and the absence of legislative pressure to commission the practice ([Sawani et al., 2010](#)). However, how long can this low rate of sustainable reporting remain? It is questionable and requires attention since more and more nations are ahead in adopting sustainable reporting, including nations like Brazil (Table 1), a developing nation which ranked 3rd in world sustainable reports. No doubt, under the era of globalisation, domestic regulations related to sustainability will be mature and also in line with international standards very soon. Furthermore, companies are subject to increasing expectations from a wide range of stakeholders, particularly the international community.

In short, the continuity of Malaysian manufacturing especially E&E's excellence relies heavily on their level of sustainable performance. Hence, this study is, in time and it is significant to explore the environmental capabilities indicators exclusively for Malaysian manufacturing especially E&E companies, aiming to generate the sustainable performance and competitiveness among companies.

2.1. Past Study

The Brundtland Report ([World Commission on Environment and Development, 1987](#)) states that “sustainability is about how to fulfil the needs of the present generation without compromising the ability to meet the future generations’ needs”. [Szekely and Knirsch \(2005\)](#) states that business sustainability is a model employing “*sustaining and expanding economic growth, customer relationships, shareholder value, corporate reputation, and the quality of products and services*” by implementing ethical business practices and eventually adding value for the entire company’s stakeholders. In this context, a company must consider engaging with shareholders, employees, clients, suppliers, public authorities, local community, civil society and etc. As a result, sustainability involves building a strategy so that companies only use the resources that can be replenished or replaced. Company sustainability can be deemed as “*a wide approach that includes various characters, in particular relating to the contextual combination of economic, environmental, and social areas*” ([Schaltegger and Burritt, 2005](#)).

Currently, sustainability reports, either integrated or separate from the company’s annual report is the most common form of reporting on sustainability performance ([Jones et al., 2005](#)). [Robins \(2005\)](#) states that there are over sixty different codes of sustainable practices globally that companies attempt to abide by. Table 2.2 summarizes six commonly used sustainable performance measurement models ([ACCA, 2010](#)); ([Graham, 2006](#)). Below is the list of sustainability frameworks suggested in the previous literature.

- (1) Environmental Footprint by International Federation of Accountant ([IFAC, 2005](#))
- (2) Full Cost Accounting ([2001](#)).
- (3) Performance criteria designed in recent academic research by [Figge and Schaltegger \(2000\)](#)
- (4) Environment Sustainability Index constructed by the ([World Economic Forum, 2005](#))
- (5) Global Reporting Initiative (GRI) formulated by a United Nations affiliate company and Coalition for Environmentally Responsible Economics ([GRI, 2006](#))
- (6) Sustainability framework developed by [Deloitte \(2009\)](#)

2.2. Challenges of Sustainable Performance Reporting

It must be emphasized that while sustainable reporting has increased globally, there are also significant differences across companies, industries and countries in the adoption of sustainable performance measurement model ([Dragomir, 2010; Jones et al., 2005; Kolk, 2004](#)). There is still plenty of ambiguity concerning the components of sustainable performance measurements ([ACCA, 2010; Dragomir, 2010; Ehrenfeld, 2005; H. and M., 2009; Jones et al., 2005; Marshall and D., 2003; Newson, 2002; O’Dwyer and Owen, 2005; Sharma and Ruud, 2003](#)).

Nowadays, most sustainable reports tend to focus on descriptive performance, with little benchmarking on clear sustainable performance measurements. [Marshall and D. \(2003\)](#) revealed that 82% of the 79 surveyed corporations in the USA produced sustainability measures which were descriptive in nature, with only 13% and 5% on target and efficiency respectively. More importantly, the study also indicated that only 50% of the companies sampled had a sustainability report. It is anticipated that sustainable reports would be much lower in emerging markets like Malaysia.

Sustainable reporting sees a significant departure from the traditional financial performance report and wider performance report. Under sustainable reporting, it is hardly appropriate for a retailer to try to measure its toxic chemical emissions or for an oil producer to simply report on its paper recycling program. In fact, empirical research has consistently found that industries and companies focus on different measures because their context and issues are different [Jones et al. \(2005\)](#). Economist Intelligence Unit (2011) shows that 75% of large international companies in developed nations were under pressure to produce non-financial measures of performance.

Based on the challenges above, how many companies have changed their performance measurement practices currently? How many companies do measure and evaluate their own performance, for example, on human, social and natural capitals? Even if considering only the listed and multinational companies worldwide, how many of these companies do dilute the shareholder approach to deploy a more comprehensive stakeholder one? And if the largest companies are not so engaged, what about the small and medium-sized enterprises (SMEs), which are the majority of companies in the economic systems of every nation ([Perrini and Tencati, 2006](#)).

Measuring organizational performance in the future will be far more complicated with a major shift from the traditional financial performance measurement model to a sustainable performance measurement model. The contingency theory also highlights that no universal performance measurement can be applied equally to all companies in all circumstances, it depends on organizational contextual factors. As a result, this study aims to explore the indicators of environmental capabilities in promoting sustainable practices, particularly on Malaysian E & E companies. More importantly, this study will enhance the reliability of the indicators of environmental capabilities by having the performance measures of the indicators. From the aspect of sustainability, it is believed that if an indicator is perceived to be important in a company, it should be able to provide the performance measure.

2.3. Theoretical Background

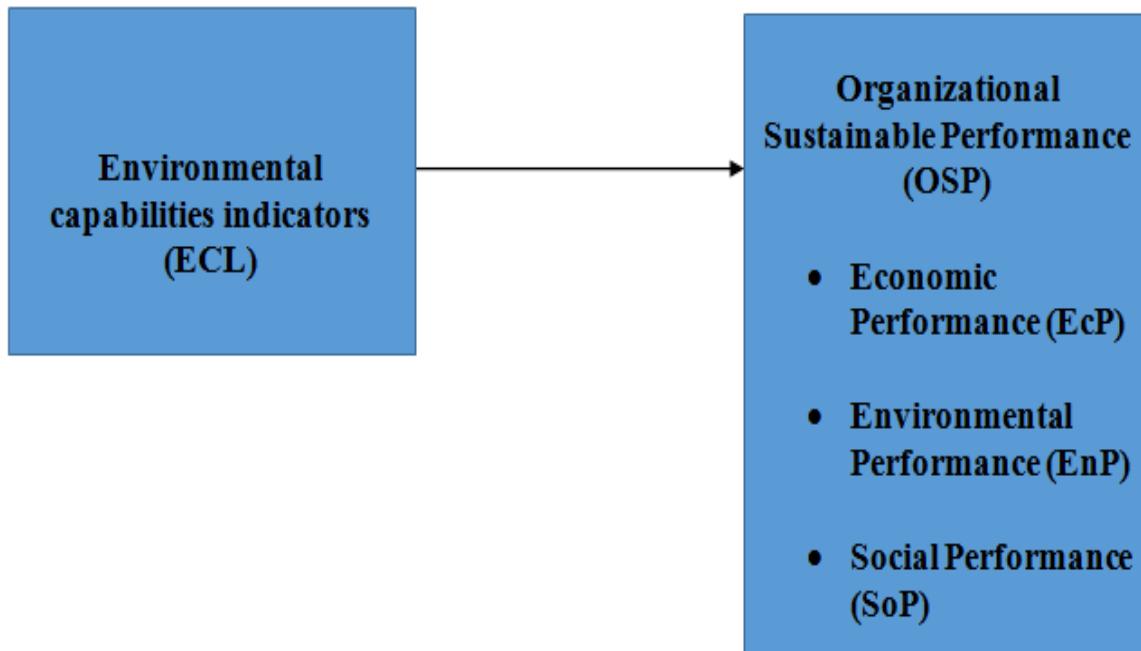
Contingency theory is the main theory underline this study. Contingency theory means that one thing depends on other things, and there must be a “goodness of fit” between organizational structure and their internal and external environment for companies to be effective. This suggested that particular features of an appropriate performance measurements performance will depend on the specific circumstances or contingency variables (performance measurements indicators) in which a company operates ([Otley, 1980](#)).

2.4. Relationship Between Environmental Capabilities Indicators and Organizational Sustainable Performance and Competitiveness

According to [Stede \(2010\)](#) and [Schaltegger and Burritt \(2005\)](#), the design of the environmental capabilities indicators underlines the success of sustainable practices. Essentially, bringing in the concept of sustainability into organizational philosophy has implications for business strategy, which, in turn, affects how companies measure their performance ([Graham, 2006](#)). For instance, there are considerable differences existing across companies, industries and countries in adopting of the environmental capabilities indicators and their sustainable performance ([Dragomir, 2010; Kolk, 2004](#)). Additionally, empirical researchers have consistently found that industries and organizations focus on different indicators of different performance because of their context and issues ([Erol et al., 2011; Jones et al., 2005](#)).

In a nutshell, the success of sustainable practices depends on how the environmental capabilities indicators is designed ([Perrini and Tencati, 2006; Schaltegger and Burritt, 2005; Stede, 2010; Székely and Knirsch, 2005; Teh et al., 2012](#)). It is noted that companies which value environmental capabilities indicators are expected to translate the indicators into performance which can be measured and quantified. The strong relationship between environmental capabilities indicators and performance will provide a clear direction and achieve better improvement to the company in the future. Based on the discussions above, the detailed research model and operationalization for the research variables are shown as figure 2.

Figure-2.The Detailed Research Mode



3. Methodology

The questionnaires were designed based on the questionnaire guideline literature by [Easterby-Smith et al. \(2002\)](#). The targeted respondents are the chief executive officers (CEOs), chief financial officers (CFOs), financial controllers, accountants, managers such as general managers, human resource managers or finance managers. Most of the questions in the survey are on a 5-point Likert scale in which respondents are required to indicate the extent to which he or she agrees or disagrees with a particular statement.

To enhance the accuracy of data collection, a list of companies in E&E companies provided by several government agencies such as FMM and TEEM are considered. The Electrical and Electronics Association of Malaysia (TEEAM) is a representative company of the electronics and electrical industries in Malaysia that was established in 1952. Meanwhile

The Federation of Malaysian Manufacturers (FMM) is Malaysia's premier economic company. Since its establishment on July 2, 1968. List of E & E companies are well represented by both organization. After the cross-checking on both databases and eliminating duplicates, a single database consisting of 2212 companies was created containing the whole population of electronics and electrical companies registered either with TEEM or FMM in Malaysia.

Structural Equation Model Program Software - Statistical Package for Social Sciences (SPSS), Amos 18 is used in this study. Prior to the test, several multivariate analysis assumptions must be considered. Firstly, missing data which will mislead the statistical results is examined via dichotomous grouping variable ([Hair et al., 2006; Kline, 2005](#)). Secondly, in terms of the sample size, a total of 217 samples are used in this study as SEM techniques via AMOS requires at least 200 observations. Thirdly, multivariate normality necessitates normal distribution for both individuals and combinations. Basically, there are two major techniques - Confirmatory Factor Analysis (CFA) and Path Analysis, which are used in this study.

4. Data Analysis

Under Amos, Figure 3 shows the initial measurement model for the model framework which consists of two components; indicators and performance, the environmental capabilities indicators (ECI) and organizational sustainable performance (OSP) which is divided into three sub-constructs; economic performance (EcP), environment performance (EnP) and social performance (ScP).

All the constructs in the model are allowed to correlate with because there are no persuasive reasons that constructs should not have co-relationships with each other. The initial measurement model is a generic measurement model and all the measures in the proposed model are insightful. As illustrated in Figure 1.0, the initial measurement model resulted in the following fit model: Chi-square (χ^2) = 1721.533, Degree of Freedom (df) = 714, P-Value = 0.000, RMSEA = 0.081, CFI = 0.878, TLI = 0.867, χ^2/df = 2.411. As expected, this initial measurement model is not fit and resulted in the modification of the measurement model.

The model needs to be re-specified as the initial measurement model is unable to adequately fit the data. Theoretical guidelines and experimental reflections are applied to direct model re-specification. At first, factor loadings were examined. [FIELD \(2005\)](#) recommended that the factor loadings should be at least 0.5. The comparison between a number of items for pre- and post- modification of the model is shown in Table 3.

Table-3. Comparison of Items Pre- and Post- Modification

Construct	Ref	No. of Items Pre-Modification	No. of Items Post-Modifications	No. of Items Deleted
Construct: Environmental capabilities Indicators	ECI	5	5	0
Construct : Organizational Sustainable Performance	OSP			
Sub con. 1: Economics Performance	EcP	13	9	4
Sub con. 2: Environmental Performance	EnP	14	14	0
Sub con. 3: Social Performance	SoP	8	8	0

Next, the values of Modification Indices (MI) were tested to see whether supplementary areas could further enhance the model fit. The performance show all items' Modification Indices (MI) are less than 15, thus there are no significant covariances between the error terms among the same construct and no further modification is needed.

Table 4 presents the comparison of fit statistics between the initial and modified measurement model. Based on the modified measurement model in Figure 4.4, it yields the following fit model: Chi-square (χ^2) of 1094.886, RMSEA of 0.069, CFI of 0.925, TLI of 0.917, and the χ^2/df ratio of 2.016. All the criteria were met. The modification process significantly improved the overall model fit and the model fit is acceptable.

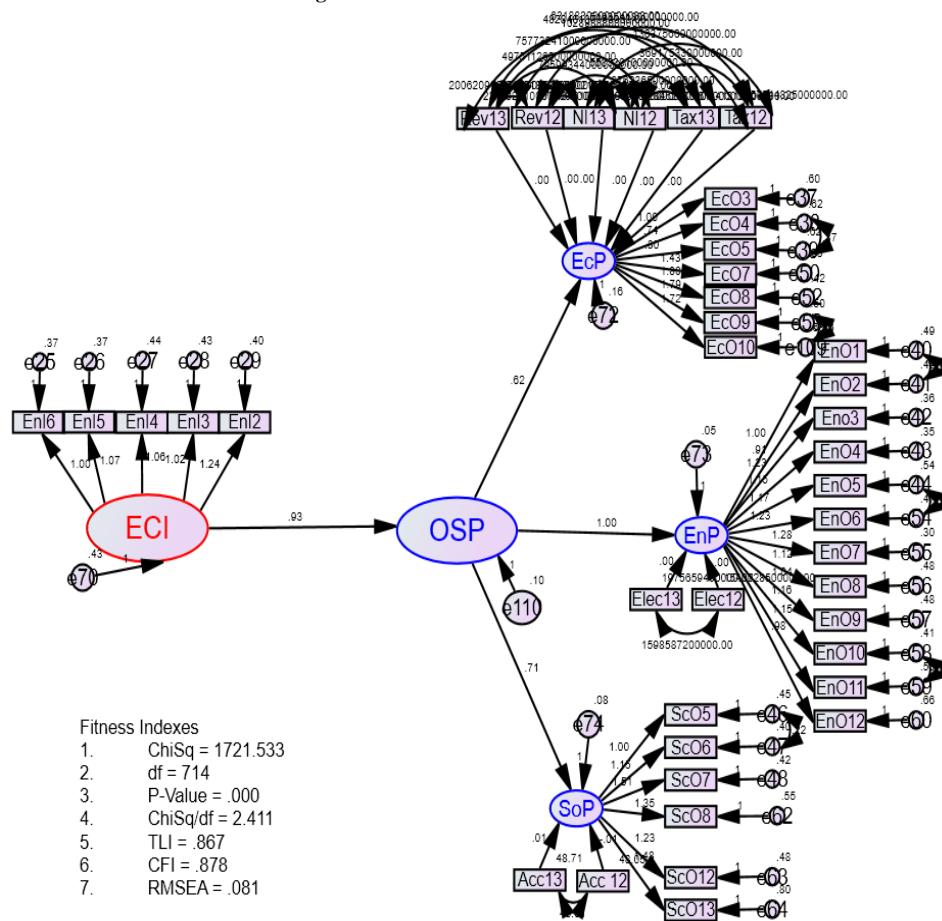
Table-4. Comparison of the Fit Statistics between Initial and Modified Measurement Model

Fit Statistics	Initial Measurement Model	Modified Measurement Model
Chi-square (x2)	1721.533	1094.886
Degree of Freedom (df)	714	543
P-Value	0.000	0.000
RMSEA	0.081	0.069
CFI	0.878	0.925
TLI	0.867	0.917
x2/df	2.411	2.016

Note: P-value =0.000, RMSEA = below 0.08, CFI, TLI =either one above 0.9
 χ^2/df = below 5

Once the fit of the measurement model is acceptable, the second step is to test the structural model via path analysis. SEM is broadly used to analyse the inter-relationships or multi-regression of all the variables in a measurement model ([Awang, 2012](#)).

The Table5 represent the regression estimates that were generated from the modified measurement model in AMOS software. Regression analysis is a measure of beta estimate in its actual unit while standardized regression analysis is a measure of beta estimate in standard deviation ([Awang, 2012](#)). Additionally, Figure 5 also reveals the P value and R²derived from the modified measurement model.

Figure-3.Initial Measurement Model**Figure-4.** Modified Measurement Model

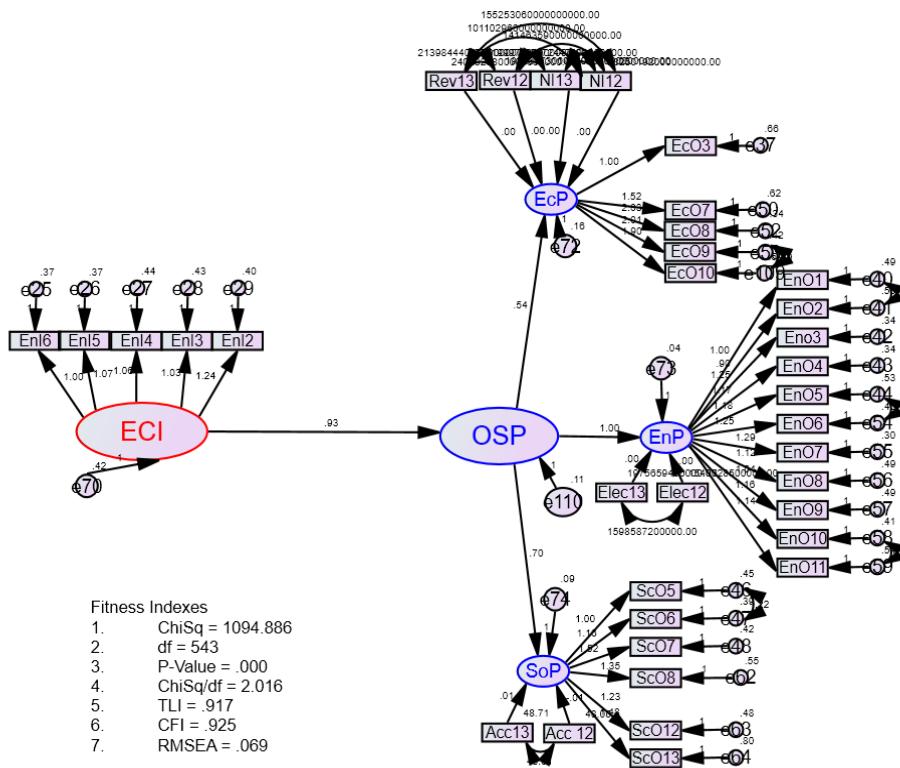
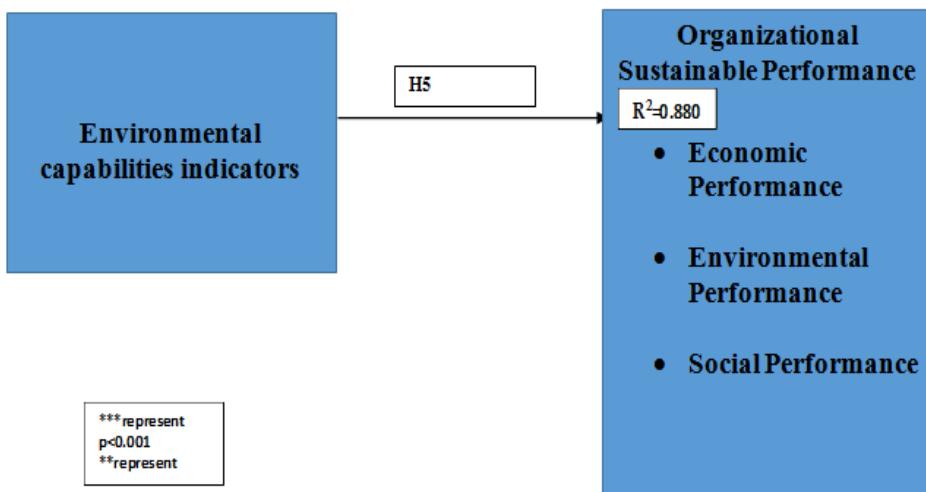


Table-5. Regression Result

		Estimate	S.E.	C.R.	P	Label
OSP	<--- ECI	.926	.101	9.142	***	par_47
SoP	<--- OSP	.705	.089	7.943	***	par_23
EcP	<--- OSP	.542	.083	6.530	***	par_24
Pollutions	<--- ECI	1.069	.100	10.652	***	par_1
WasteMgt	<--- ECI	1.065	.104	10.209	***	par_2
ReuseRecycle	<--- ECI	1.029	.102	10.085	***	par_3
Renewable	<--- ECI	1.240	.111	11.120	***	par_4
RenewableEnergy	<--- EnP	1.251	.103	12.090	***	par_5
RenewableMaterial	<--- EnP	1.167	.099	11.850	***	par_6
ReuseComponent	<--- EnP	1.184	.108	10.925	***	par_7
OperatingProfit	<--- SoP	1.156	.090	12.844	***	par_8
WomenMgt	<--- SoP	1.520	.159	9.577	***	par_9
Relief	<--- EcP	1.523	.190	8.038	***	par_10
Subsidies	<--- EcP	2.027	.228	8.886	***	par_11
EnviroIncentives	<--- EcP	2.008	.229	8.779	***	par_12
RecycleMaterial	<--- EnP	1.248	.109	11.486	***	par_13
EnergyReuse	<--- EnP	1.287	.104	12.407	***	par_14
WasteKg	<--- EnP	1.121	.103	10.893	***	par_15
Scrap	<--- EnP	1.043	.099	10.511	***	par_16
SaleCO2	<--- EnP	1.162	.102	11.428	***	par_17
EqualStaff	<--- SoP	1.349	.153	8.817	***	par_18
CommunitySkill	<--- SoP	1.227	.141	8.720	***	par_19
CommunityProgram	<--- SoP	1.478	.174	8.492	***	par_20
SocialIncentives	<--- EcP	1.903	.225	8.459	***	par_30
PrimaryMaterial	<--- EnP	.905	.065	14.013	***	par_45
ElectricityCO2	<--- EnP	1.144	.107	10.718	***	par_46

Figure-5. Results



5. Final Discussion

In this study, environmental capabilities indicators are strongly influencing the organizational sustainable performance and competitiveness. Both of them have the strong positive relationship. It reveals that indicators of environmental capabilities underlie the success of organizational performances. In short, companies with environmental capabilities indicators are likely to create performances to measure their sustainable practices. According to [Stede \(2010\)](#) and [Schaltegger and Burritt \(2005\)](#) the design of environmental capabilities measurements underlie the success of sustainable practices or performances. Essentially, bringing in the concept of sustainability into organizational philosophy has implications for business strategies, which, in turn, affects how companies measure their performance and eventually the performance ([Graham, 2006](#)). This result, which shows that indicators of environmental capabilities are associated with the performances of organization, is consistent with [Erol et al. \(2011\)](#); [Stede \(2010\)](#); [Graham \(2006\)](#); [Perrini and Tencati \(2006\)](#); [Schaltegger and Burritt \(2005\)](#); [Jones et al. \(2005\)](#); [Székely and Knirsch \(2005\)](#); [Kolk \(2004\)](#).

6. Conclusion

Essentially, successful sustainable performances require a comprehensive environmental capabilities indicators. Hence, stakeholders, particularly regulators, ranging from lawmakers like the government, securities commission and Bursa Malaysia, or non-government regulators can play a crucial role in this context. They must lead and be proactive in promoting sustainable practices among Malaysian electronics and electrical companies. They can unlock the indicators and performances of environmental capabilities constructed in this study in drafting their policies. Additionally, they can also contribute or formulate a sustainable index used in the industry especially Malaysian manufacturing companies especially E&E sector.

7. Limitation

Since this study focuses on only Malaysian manufacturing companies, future research can be done involving different countries, different types of organizations and different industries, which may lead to different conclusions from the current study.

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