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Sustainable Economic Development and Environmental Performance of Developing and Developed Countries

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Abstract:

At present, many economies are suffering from environmental problems that have significant effects on the climate and life of human beings, thus, the governments and institutions work to reduce the industrial negative effects on the environment. Past studies focus on the nexus of sustainable economic development (SED) and environmental performance (EP) at the company or institution level. This study focused on the country level, and also further examined the outcome in developing and developed countries. This study examines the nexus between sustainable economic development and environmental performance of both developed and developing countries. The data of SED obtained from World Bank and Environmental Performance Index (EPI) for the period 2006-2016. This study also takes into consideration the control variable (CV) of primary school enrolment (SCH) and country population (POP), which may potentially influence the outcome of this study. For the analysis, the study employs panel regression model. The findings revealed that most of the proxies of SED have significant relationship with EPI.

Keywords: sustainable economic development; environmental performance index; developing countries; developed countries.

JEL Classification: L25; Q56.

Introduction

In the modern world, developing and developed countries are increasingly focused on economic achievement, to determine the country's financial strength and economic security. Over the years, most of these countries, both developing and developed countries continue championing for SED through the implementation of impressive economic policies, improvements in economic efficiency, and stimulation of technological investments (Wilhite and McNeill 2015). For example, the development of mega infrastructure projects, massive manufacturing activities, and aggressive promotion of tourism are common activities to promote SED.

SED can be defined as continual economic development through diversification, through various economic segments across different stages of a country's development. Great emphasis is placed on the environmental quality aspects as well. SED also seeks to stimulate the local economies across various industries, *i.e*., agriculture, manufacturing, construction, services and tourism to achieve continuous economic growth (Goulding *et al.* 2014; Henderson 2009).

The SED activities are anticipated to affect EP, as stated by Burton *et al.* (2011). The cost of extensive economic development, with high input and high consumption of economic factors, has resulted in excessive consumption of natural resources, ecological degradation, and environmental pollution.

EP is defined as an explicit and implicit cost of environmental protection activities and is the dissemination of conservation information, which seeks the highest environmental standards, which are meant to be in line with a country's environmental regulations. It is meant to promote and encourage environmental conservation. However, it can be said that countries that comply with environmental regulations may also incur opportunity costs, which may tend to negatively affect profitability, prices, innovation, productivity, and profitability of investment opportunities (Chen *et al.* 2018).

The increasing impact on EP (Ong *et al.* 2019) is not conducive to SED, nor is it harmonious to the development of the local economy, which has aroused widespread concern amongst developing and developed countries. The continual economic development inevitably affects the environmental model and conservation of the environment. Environmental conservation continues to be a global paradox issue across some territories or regions, as some countries which are highly prosperous and have attained much economic wealth, tend to emphasize environmental conservation as a means to prevent global warming, encourage marine protection, and enhance biodiversity and ecosystems. These groups of countries are mostly from the category of developed countries.

Prioritizing economic growth is tricky because it assumes that the power associated with economic development can resolve environmental related issues. SED influences the EP outcome, for example, increased carbon dioxide (CO2) emissions have been a major concern to the environment, due to rapid economic growth (Rahman 2017). There is no evidence to state that the reduction in pollution and the depletion of natural resources is possible through the expansion of the economy (Guillen-Royo *et al.* 2017).

Over the past few decades, the exploitation of Mother Nature and the degradation of our environment has increased at an alarming rate. According to Khokhar and Tabary (2016), between 1990 and 2016, mother earth has lost 1.3 million sq. km of forest, an area larger than South Africa, with 46% of the trees in these forests being felled by man due to increasing economic activities. For example, Dohong *et al.* (2017) cited that in South-east Asia, illegal logging or hunting which is destroying the biodiversity and ecology of Mother Nature tends to impact the indigenous people who find their ancestral land shrinking, and therefore restricting their nomadic life. This is because indigenous people depend on the jungle resources for their livelihood.

Developing and developed countries are facing increasingly different sets of economic and environmental issues. The Worldwide Governance Indicator (WGI), and the Environmental Performance Index (EPI), notes that the bottom scoring nations are mostly from lower-ranked developing countries, *i.e*., in the African continent, and South-West Asian countries. These countries face a long list of country governance issues, with long, troubled legacies, such as poor healthcare systems, ineffective environmental conservation programs, slow GDP rates, and poor Human Development Index (HDI), that go beyond the government's capability to sustain the economic growth, and preserve the EP (Nolan *et al.* 2018; Ali *et al.* 2017).

Conventional agricultural and food processing industries which contribute to the food and nutrition security for the general public, at the same time also contribute to the economic growth, often resulting in excessive consumption of inputs, degradation of natural resources, and higher pollution due to emissions (Foley *et al.* 2011) that contribute to poor environmental performance. The recurrence of issues on land fertility degradation, escalating costs of energy and food, depletion of water resources, indiscriminate use of inorganic chemicals, and the effects of climate change have further toughened the challenge of environmental conservation efforts, as a result of overly focusing on economic development. There is no doubt that financial achievement is important for economies, and that the benefits are tremendous, but governments should not neglect conservation issues, as EP has become ever so important for social and economic sustainability.

Gangi and Abdulrazak (2012) stated that EP is a non-financial achievement that contributes towards SED. At least, most of the developing countries, particularly Malaysia, Thailand, and India, have revised their economic policies and focused on non-financial achievements to improve their investment climate, and promote environmental sustainability. Matzdorf and Meyerl (2014) cited that developed countries emphasize EP (Kasbun *et al.* 2016) and ecosystem services as an agenda that prioritizes it above economic development.

Martinez-Alier *et al.* (2010) and Wilkinson and Pickett (2010) further stated that prioritizing SED over environmental issues have proven to be of little, or no success in preventing the destruction of ecosystems, biodiversity loss, and global warming, but increased the social-economic inequalities within, and across these countries. This study intends to provide empirical evidence for SED in developing and developed countries, which would then have an impact upon EP.

From the perspective of the developed countries, the emphasis is toward fostering economic growth and development, while ensuring natural resources continue to provide the necessary raw materials on which human beings rely (Organisation for Economic Co-operation and Development, 2019). However, developing countries are much more interested in economic achievement, and less priority is put forth for environmental conservation, as economic activities generate the necessities for the population. Hence, developing countries generally score lower rankings for EP.

The objective of this study is to examine the relationship between SED on EPI in developing and developed countries, where the perception is that when economic activities are vibrant, the environment is subject to devastation. Traditionally, SED is measured through financial data achievement, *i.e*., Gross Domestic Product (GDP), Gross National Income (GNI), and the Consumer Price Index (CPI).

Poorly regulated economic policies have raised numerous impactful issues regarding EP, such as pollution, logging, deforestation, climate change, and loss of biodiversity. Hence, it is time for the government and institutions to refocus on SED which will affect the EP achievement. The approach starts from an initial set of numerous indicators of economic data, such as EPI, and WGI. Each indicator is identified to monitor and assess the progress towards the achievement of the goal that has been set concerning a particular environmental aspect (Diakaki, Grigoroudis, and Stabouli 2006). Therefore, governing institutions have become ever so important to moderate the conflict between SED and EP.

Weak economic development and EP can be upgraded by reforming the bureaucracy associated with government systems, *i.e*., increasing the capacity, improving the benefits, adopting performance indicators, streamlining public service processes, enhancing accountability and transparency, as well as enforcing ethics, laws, and regulations for all civil servants.

1. Literature Review

1.1 Theoretical Review

Mukherjee and Chakraborty (2010) studied the relationship between economic development, the environment, and governance development. Based on the regression results, the findings stated that there is a significant nonlinear relationship between EP and the level of income in the countries that were listed in the Environmental Performance Indicators (EPI) report. According to this relationship, EP increases with income in the initial stage, but it comes to a fall, due to the higher levels of income. In short, there is a reversed U-shaped relationship between the country's income level and EP.

Xie *et al.* (2019) scrutinized the relationship between the EP index and SED across the Environmental Performance Indicator (EPI) reported between 2006 to 2008. The findings specified a positive and significant relationship between these two factors in developing and developed countries. Additionally, the countries were categorized into three classes based on the level of revenue and found a stronger relationship across those with a higher level of income. Jafari and Ahmadpour (2011) used the panel data method to investigate the link between the environment's consistency index and the economic development across developing countries from 2001- 2005, and the results confirmed the reverse Environmental Kuznets Curve (EKC) effect. This indicated an inverse U-shaped link between economic growth and pollution indices. According to EKC, when economic development is initiated, income inequality rises with the increase in per capita numbers. However, after increasing to a certain level of a turning point, income inequality starts to gradually fall.

Environmental degradation increases with economic development, but in the mid to longer terms, environmental quality begins to improve as economic development increases. In other words, there might be a turning point at which, the correlation between SED and EP changes direction. This theory is widely known as the Environmental Kuznets Curve (EKC) hypothesis (Ahmeda and Long 2012; Li *et al.* 2014).

To explore the relationship between SED and EP, it is understood that a trade-off between economic development and environmental damages or degradation will take place. Therefore, Environmental Kuznets Curve (EKC) is one of the most popular and important theories surrounding this relationship. The EKC hypothesis also suggests that the relationship between SED and EP is not linear. Instead, it may be represented by an

inverted U-shaped curve, U-shape curve, inverted N-shape curve, or N-shaped curve, depending on the data input (Mukherjee and Chakraborty 2013; Zhao *et al.* 2013).

The argument is that SED causes negative ecological damages that initially tend to increase as the economy progresses and develops until the progress reaches a turning point, where the environmental impact stabilizes and begins to fall, but the economy continues to grow. This theory is based on the original principle that was developed by Simon Kuznets in 1955, which studies the relationship between economic growth and income inequality. When the economy grows, the market forces first will increase the income inequality, which would eventually, minimize due to market saturation. However, since 1991, this theory has adapted to environmental policies, of which the EKC hypothesis was developed from there onwards, mainly for the field of environmental sciences and its associated impact.

According to Almeida *et al.* (2016), some authors use composite indicators to measure the EP, so that they can address broader features of the ecosystems using a single environmental variable. However, none of these proposed indexes cover a wide range of ecosystem dimensions. For example, none of these composite indexes considered the consequences on human health due to environmental damages. Furthermore, the amount of research that has used an environmental composite index is still far too small to provide consistent conclusions on the actual relationship between economic growth, and ecological damage.

For the EKC, the most commonly used variables to measure economic growth are the country's income levels and the GDP rates (Fiorino 2011), as both variable information is easily available, and the criteria to measure the income level and GDP are rather standardized, worldwide. For the variables used to measure EP, the diversity and differences are huge, and predominantly one variable is used, although, some approaches make use of indexes or composite indicators, *i.e*., Environmental Performance Indices (EPI), Environmental Degradation Index (EDI), and Environmental Sustainability Indexes, that cover a wide range of environmental aspects.

The use of Environmental Performance Indexes (EPI) to test the EKC hypothesis allows for the consideration of larger amounts of information and a much broader evaluation of perspectives. Therefore, ECI covers a much bigger and wider spectrum of ecosystem features (Mukherjee and Chakraborty 2013). This can certainly provide additional insights and information and will bring new perspectives. It will also improve the research associated with the relationship between SED and EP. Thus, the objective is to generate conditions for better decisions and policymaking.

In summary, the vast amounts of literature still present an unclear or inconsistent result, and no consensus regarding the level of global environmental impact, which is caused by excessive economic developments, is readily available (Liu *et al.* 2020). Hove and Tursoy (2019) argued that the reliability of the EKC hypothesis has not been completely resolved.

Ansari *et al.* (2020) stated that the Ecological Modernisation Theory (EMT) implies a conservation failure. Therefore, EP typically needs political strength to support it because environmental degradation is fast becoming a global issue and has gone beyond the government's capability to resolve it. Indeed, the global industrial growth creates a demand for environmental innovations as a result of scarce natural resources, but at the same time causes environmental degradation if done without proper control and measurements. Hence, both EKC and EMT theories apply to SED's impact on EP.

1.2 Literature Review

Developing and developed countries are increasingly facing numerous challenges in pursuit of SED, through appropriate policies and regulations for economic growth. The challenges include the threats of political instability, economic and social inequalities, territorial disputes and conflicts, environmental pollution and degradation, and incidences of communicable and non-communicable diseases.

The key challenge facing this is a lack of effective SED, that adopts appropriate economic policies to preserve the environmental issues that eventually devastate the EP. Wu *et al.* (2020) mentioned that, over the last two decades, many developing countries have been grappling with the issue of low-economic growth by changing their overall economic policy agendas, particularly focusing on environmental improvement agendas that are supported by international and regional organizations. For example, the World Bank, the International Monetary Fund (IMF), the Asian Development Bank (ADB), or The World Health Organisation (WHO), and the World Trade Organisation (WTO). The intention is to achieve an equilibrium concerning the performance between SED and EP. Hence, it is time for developing countries to move away from the inward-looking manner of SED policies, towards an outward-looking strategy for balancing the performance of economic growth, and environmental conservation.

For developed countries, in general, priorities are always focused on the EP, rather than any economic activities. Economic development that causes devastating effects to EP is very unlikely to be approved by the governments in the developed countries. The operation of heavy industries or extraction of natural resources is undertaken under stringent guidelines and regulations to prevent the degradation of EP.

The link between natural resources for an EP issue, such as corruption is a result of continued economic growth, which is derived from the substantial income of natural resources. This is built on corruption and mismanagement of natural resources. A study by Erum and Hussain (2019) found that countries that have an abundance of natural resources tend to perform poorly because of corruption. This is due to unlimited natural resources, which bring easy revenue, and therefore chances of wastages or corruption are high, particularly in developing countries like Nigeria, Yemen, Seri Leon, Syria, and Sudan. Several anecdotal pieces of evidence have also shown that high levels of corruption exist in such countries (Dong *et al.* 2019). From an environmental perspective, socially optimal rates of resource usage, for example, how many fish are being caught, or how much forest is being harvested, is crucial to the ecosystem. The causes of resource mismanagement arise when economic policies are not well defined. The laws, customs, and regulations play an important role in governing access to natural resources and preventing the misuse, wastage of resources, or environmental pollution. Thus, environmental performance is not simply a technological matter, but sustainable economic development.

Further to that, Truong and Clayton (2020) cited that economic challenges include the development of appropriate investment policies to reduce malfunction or mismanagement, in the environmental conservation effort. For instance, fisheries, forestry, and mining sectors attract a lot of rent-seeking behavior, and often politicians are involved in this for their gain. Fang *et al.* (2017) also cited rapid economic development caused by urban agglomerations which is a key embodiment of the economic development level and sustainability of a country. This also comes into a negative effect that excessively affects the economic development, and faces severe problems environmentally, which significantly restrict the environmental performance of the countries.

Therefore, many countries around the world have started focusing on getting quality healthcare services, due to the ever-increasing environmental pollution, as a result of rapid economic activities (Hensher 2020). Tian *et al.* (2019) also cited that rapid economic development in developed countries, such as New York, Paris, Tokyo, and Seoul, have experienced the relocation of small-medium industries (SMI) and corporations to less developed areas, to minimize the environmental impact and enhance EP, besides meeting the profitability objectives. Developing countries like India, Russia, and Brazil have also formed many urban agglomerations that are continuously optimized within the industrial structure, with conservation elements to enhance the economic vitality and promote EP.

Features of the SED across developing and developed countries lead to significantly different outcomes in EP that must be considered when making strategic governance or commercial decisions (Filimonova et al., 2020). Effective economic policies ensuring SED and EP achieve the required equilibrium, and resolving issues between economic activities that may have a devastating impact on the natural environment is crucial. Therefore, the problems of developing solutions for assessing the impact of the SED on EP in countries with different levels of development have become increasingly important and relevant (Eder *et al.* 2017).

2. Methodology

Traditionally, it is believed and understood, that attain SED does not come without sacrifices, particularly for the EP. As Chen *et al.* (2018) mentioned, the world is undergoing an industrialization era. Hence, global warming and EP has become much more severe than before, due to excessive economic development.

Independent Variable (IV): Sustainable Economic Development (SED)

The IV of this study is set as SED. SED is the variable that influences the outcome of all the subsequent variables. By definition, SED refers to any form of economic growth that does not bring a negative impact to the environment, while continuing economic development (Grimsley 2016; Nino 2016). With this concept in mind, institutions and government agencies have sought to understand the role of innovation in minimizing environmental degradation that eventually contributes to remarkable results for EP. The IVs of this study are Gross Domestic Product (GDP), Net Capital Account (NCA), Foreign Direct Investment (FDI), and General Government Gross Debt (DEBT).

Dependent Variable (DV): Environmental Performance (EP)

Yasir *et al*. (2020) cited EP as being tested and measured systematically, while the principle of EP was to hypothesize that continual and excessive economic development will cause degradation or devastating effects to EP. For this study, EP was measured using the Environmental Performance Index (EPI).

EPI data is divided into two categories, *i.e*., Environmental Health and Ecosystem Vitality. Both are the main objectives in the EPI report. Environmental Health measures human health as a result of environmental degradation, while Ecosystem Vitality measures environmental protection and natural resources management. Environmental Health and Ecosystem Vitality are proactive environmental management approaches towards sustainable environmental development, which aims to improve environmental sustainability without compromising the quality, performance, functionality, aesthetics, and cost (Johansson 2002; Nielsen and Wenzel 2002).

Control Variables (CV)

Primary School Enrolment (SCH)

SCH is referring to the opportunity to acquire knowledge and high literacy rates which produce more knowledgeable and rational thinking citizens. Knowledgeable and rational thinking citizens can generate knowledge-based economic ideas and are friendlier to conservation efforts (Le 2008).

Country Population (POP)

For the size of POP, the general assumption is that the bigger the country's population, the more challenging it is to fulfill SED and EP. As the economy, healthcare, and technology progress, so will the continual growth of the world's population.

Hypothesis Development

Caravaggio (2020) mentioned that the Environmental Kuznets Curve theory (EKC) implies that as countries undergo SED, the focus on the country's economy will progress from developing to a developed status, due to a rapid economic development, and this may potentially devastate the EP. Inequality is then expected to decrease when country attains a developed country status, while enjoying rapid growth, thereby increase the per-capita income and emphasising EP. Therefore, Kuznets Curve suggested that inequality should be that of an inverted "U" shape, and EP will improve as the economy progresses, and eventually an emphasis will be placed on the achievement of EP.

The Ecological Modernization theory (EMT) relates to SED and EP. Therefore, from the basis of a country's enlightened self-interest, economy growth and ecology can be favourably combined between SED and EP, *i.e*., productive use of natural resources and environmental resources such as air, water, soil, ecosystems will be considered to complement SED. Therefore, the more the economy progresses, the better the conservation of EP. The more the economy progresses, the better the conservation of EP. This is to ensure the continual availability of natural resources and environmental media (Bergendahl *et al.* 2018). The following was developed:

H1: There is a significant relationship between Sustainable Economic Development (SED) on Environmental Performance (EP).

Data Collection

The developing and developed countries data employed in this study was obtained from the World Bank database (https://data.worldbank.org/) which is freely accessible by the general public. This World Bank time series data is a sequence of numbers collected at regular intervals over some time, from consistent and reliable sources, of which the public can have access to free of charge and. publishes a set of SED data, including the Gross Domestic Product (GDP), Foreign Direct Investment (FDI), Net Capital Account (NCA), and General Government Gross Debt (DEBT), which are widely used to measure a country's economic growth and achievement.

For EP data, the studies adopted the Environmental Performance Index (EPI) to evaluate the country's achievement on environmental issues. EPI also provided the ranking and statistical analysis for member countries, about the performance and reaction on high impact environmental issues. The EPI's environmental impact issues were divided into two segments, of which, the first segment was on the preservation of environmental issues, and prioritization of human well-being. The second segment was on the protection of the ecosystem's vitality, and promotion of sustainable natural resources management.

The control variables: Primary School Enrolment rate (SCH) was obtained from the World Bank's published data, and the Population of the country's size (POP), was also obtained from the database of the World Bank's demographers.

Model Designing

The models below were developed to investigate the impacts of the SED on the Environmental Performance Index (EPI). The same model is tested on three levels, which are pooled sample, developing and developed countries.

EPIit = α0 + β1 $GDPit$ + β2 $FDIit$ + β3 $NCAit$ + β4 Debtit + β5 $SCHit$ + β6 $POPit$ + εit

where,

Environmental Performance Index (EPI)

HI = Health Impact

WR = Water Resources

BH = Biodiversity & Habitat

PNR = Productive Natural Resources

CE = Climate & Energy

Sustainable Economic Development (SED)

NCA = Net Capital Account

GDP = Gross Domestic Product

Debt = General Government Gross Debt (% to GDP)

FDI = Foreign Direct Investment

Control Variables (CV)

SCH = Primary School Enrolment

POP = Population of the Country

The data was tested by using panel regression and conducted using STATA. The LM and Hausman tests have been conducted to identify the most appropriate estimation to apply. To ensure the reliability of the result, several robustness tests have been carried out, such as autocorrelation, heterscedescity, and collinearity. XTGLS and XTSSC codes have been applied to those data that content of any diagnostic error.

Description and justification of the research methods used. Normally, the methods will be selected from known and proven examples. In special cases the development of a method may be a key part of the research, but then this will have been described in Introduction section and reviewed in first one.

3. Findings and Discussion

3.1 Descriptive Statistics

Based on Table 1, the developing country's mean for Health Impact (HI), Water Resources (WR), and Biodiversity and Habitat (BH) was lower than that of the developing countries, except for the Product Natural Resources (PNR) and the Climate and Energy (CE). Overall, developing countries show a much lower mean value as compared to developed countries, except for PNR. This was due to developed countries placing EP above all other economic activities and prioritizing environmental conservation. In contrast, developing countries place less priority on EPI, but pay attention to economic sustainability, and fulfils the needs of the general public for food, healthcare, education, and employment opportunities.

The mean value for NCA was USD0.300 billion; GDP was USD364.112 billion, DEBT was USD48.060 billion and FDI was USD11.431 billion. The first proxy used in this study to represent SED was the Net Capital Account (NCA). NCA represents the balance sheet of the country and keeps track of the country's income, assets, and liability for the reporting year. The mean value of NCA for developed countries was almost double compared to developing countries, which could be due to better management of the country's financial accounts.

The SED proxy is the Gross Domestic Products (GDP). Table 1 indicates the mean value of the GDP for developing countries was USD 166 billion, and for developed countries, this was USD819 billion. The mean of the General Government Gross Debt, the percentage to GDP (DEBT) for developing countries was USD45 billion, whereas the mean values for developed countries were UD55 billion. The last proxy of SED is the Foreign Direct Investment (FDI), which is the mean value for developing countries at USD4.7 billion, whereas the mean value for developed countries was USD27.4 billion. This indicates that the mean value of developing countries was almost 6-fold lesser, as compared to that of the developed countries. This is best described by the developed country's

FDI which is much more economically sustainable compared to developing countries, as governments of developed countries were perceived to be much more efficient and politically stable.

Table 1. Descriptive statistics for SED, EPI, and CV

		Pooled		Developing Countries		Developed Countries	
Grouping	Variables	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
	NCA (USD Billion)	0.30	2.22	0.25	2.07	0.41	2.52
	GDP (USD Billion)	364.12	1431.94	166.21	750.81	819.45	2276.92
	DEBT (Not sure)	48.06	35.88	45.02	31.79	55.05	43.09
SED	FDI (USD Billion)	11.41	38.38	4.70	20.39	27.43	60.32
	HI (%)	54.49	34.37	46.39	30.16	73.15	36.20
	WR (%)	44.71	35.60	40.81	33.98	53.70	37.62
	BH (%)	48.97	32.58	47.96	31.67	51.30	34.51
	PNR (%)	51.00	28.94	51.87	28.42	48.97	30.05
EPI	CE (%)	42.87	32.79	42.72	33.69	43.22	30.67
	School enrollment (%)	73.24	22.94	62.49	23.31	89.85	6.79
CV	Population (million)	37.13	138.65	44.49	162.71	20.16	46.23
	Observation	1110 (100%)		774 (69.73%)		336 (30.27%)	

Notes:
SED: Sustainable Economic Development
NCA: Net Capital Account
GDP: Gross Domestic Products
DEBT: General Government Gross Debt (% to GDP)
FDI: Foreign Direct Investment
EPI: Environmental Performance Index
HI: Health Impact
WR: Water Resources
BH: Biodiversity and Habitat
PNR: Product Natural Resources
CE: Climate and Energy
SCH: School Enrolment
POP: Population

Table 2 reports the findings for the pooled sample results, which combines the impact of the SED n the EPI for developing and developed countries.

The GDP is positively and significantly related to WR, BH, and CE in the pooled sample findings. Many studies have been conducted on delivering a much greener GDP worldwide, for both developing and developed countries, as a proven greener GDP enhances environmental conservation. For example, Yang and Poon (2009) mentioned that China implemented a greener GDP and was able to deduct the costs of adverse environmental externalities. This indicated that there was a positive impact between the GDP, and the environmental performance, as well as natural resources. Likewise, Malaysia's greener GDP which is adjusted to the natural resources has caused environmental damage, which is also causing the GDP performance to deteriorate (Vaghefi *et al.* 2015).

In table 2, the DEBT is positive and significantly related to all the measurement variables which serve as a proxy for the EPIs (HI, WR, BH, PNR, and CE). Goss and Roberts (2011) stated that the impact of debt is economically important in developing and developed countries. For example, the United States regards debt as a significant value-enhancing tool, or risk-reducing means for natural resources when considering environmental performance. In addition to that, Hoepner *et al.* (2016) also showed that greater disclosures of environmental sustainability reduce the debt for both developing and developed countries when environmental conservations are taken into consideration.

The FDI is negatively significantly related with all the EP indicators, which includes HI, WR, BH, PNR, and CE, in the pooled sample's findings. FDIs are sensitive to institutional quality, which not only impacts the market competitiveness but also affects the population's safety and health (Santangelo and Andersson 2013). For example, an FDI that generates industrial waste and CO2, if without proper governance, will impact public health, by destroying the environment performance. In addition to that, health is a facet of human development, of which, from the perspective of the resource-based elements, is an important aspect in determining the FDI (Globerman and Shapiro 2002).

Table 2. The Pooled Results for the Relationship of SED and EPI

Variable	HI	WR	BH	PNR	CE
Constant	4.930	5.262	1.822	-4.414	2.915
	(0.811)	(0.859)	(0.940)	(0.808)	(0.927)
NCA	-0.025	0.095	0.292	0.481	0.300
	(0.975)	(0.935)	(0.750)	(0.512)	(0.808)
GDP	0.076	**0.278****	**0.147****	0.005	**0.286*****
	(0.305)	(0.001)	(0.040)	(0.931)	(0.000)
DEBT	**0.439****	**0.432*****	**0.359****	**0.403*****	**0.367****
	(0.001)	(0.000)	(0.000)	(0.000)	(0.002)
FDI	**-0.396****	**-0.503****	**-0.428****	**-0.335****	**-0.679****
	(0.047)	(0.007)	(0.030)	(0.042)	(0.001)
SCH	**0.852*****	-0.002	-0.260	0.069	0.135
	(0.000)	(0.991)	(0.221)	(0.675)	(0.557)
POP	**0.141****	-0.016	0.078	**0.172****	0.053
	(0.011)	(0.809)	(0.150)	(0.001)	(0.406)
R-Square	0.406	0.266	0.232	0.288	0.325
F- Test	**29.290*****	**16.990*****	**5.800*****	**8.220*****	**11.940*****
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Significant at 0.1(*), 0.05 (**), 0.01(***) level or significant at 10%, 5% and 1%.
P-value is in parentheses

One of the control variables in this model, the school enrolments is positively significant to the HI at a 99% confidence level. The school enrolments enhance the knowledge and awareness that promotes sustainable environmental development that has been identified as the preservation drive for natural resources (Rauch 2002; Giddings *et al.* 2002). However, it is still somewhat challenging to find the best way of educating the public, especially in developing countries, as education sometimes is not a priority agenda for some governments (Cicmil *et al.* 2017).

The population of the country, which serves as another control variable in this model, has found evidence of the positive relationships related to HI and PNR. The R-square for the pooled sample model is within 23.2% to 40.6%. All the F-tests are significant.

Regarding the GDP in table 3, only the GDP of the developing countries was positively significant to HI, WR, BH, PNR, and CE, and none of the developed countries is significantly related to the EPI. This reflected an improvement toward the GDP to enable developing and developed countries to enhance their healthcare services. As the economy becomes more prosperous, this allows more budget for social security, tranquillity, safety, and the well-being of the public, which eventually minimizes the health impact.

One of the ways to measure BH is from the CO2 emissions that are derived from fossil fuel consumption, which is linked directly to the GDP, where a higher GDP achievement is always associated with developing countries but is also extended across developed countries (Denham *et al.* 2016; Cortes-Borda *et al.* 2015). For example, the cement industries in developing countries like Thailand, have been trying to minimize emissions and reduce fossil fuel consumption through the use of solid biomass and waste heat recovery in the manufacturing processes.

Most of the developing and developed countries were positively significantly related to EPI and the coefficient of developing countries was lower than the developed countries. DEBT brings an economic impact to developing and developed countries, as debt is considered a key component of the socioeconomic position, and an important socioeconomic determinant of the health of the public (Drentea and Reynolds 2012; Sweet *et al.* 2013). Noticeable increasing debt levels amongst the developing and developed countries around the world will cause debt stress and impact health, which has become increasingly relevant for environmental performance achievement (International Monetary Fund 2016). Individuals in developing and developed countries frequently incur debt for reasons that range from medical expenses, providing the necessities of life, to achieving higher social status, or simply consuming supplementary items to stay healthy (Chawla and Uppal 2012; Dwyer *et al*. 2011).

The findings for the relationships between FDI and EPIs are similar to the relationships between GDP and EPIs, in which only the FDI for developing countries is significantly related to all EP indicators. None of the developed countries has found evidence of the relationship between FDI and EP.

Table 3. The Results for the Relationship of SED and EPI categorized in Developing and Developed Countries.

	HI		WR		BH		PNR		CE	
Variable	Developing	Developed	Developing	Developed	Developing	Developed	Developing	Developed	Developing	Developed
Constant	-44.761 (0.502)	-9.410 (0.773)	-146.579 (0.176)	7.815 (0.810)	-5.188 (0.950)	-15.340 (0.595)	-54.490 (0.460)	-14.418 (0.588)	-117.703 (0.368)	-6.248 (0.839)
NCA	2.810 (0.279)	0.127 (0.920)	7.080 (0.101)	-0.779 (0.520)	1.418 (0.650)	0.262 (0.818)	3.662 (0.183)	0.459 (0.666)	6.571 (0.202)	-0.008 (0.994)
GDP	**0.241** (0.031)	0.146 (0.302)	**0.407** (0.001)	0.182 (0.240)	**0.280** (0.036)	0.082 (0.588)	**0.166** (0.035)	-0.009 (0.941)	**0.634** (0.000)	0.139 (0.252)
DEBT	**0.168** (0.008)	**0.547** (0.000)	**0.164** (0.042)	**0.498** (0.001)	0.118 (0.340)	**0.446** (0.002)	**0.179** (0.088)	**0.528** (0.000)	0.182 (0.107)	**0.485** (0.000)
FDI	**-1.219** (0.002)	-0.235 (0.176)	**-1.297** (0.005)	-0.223 (0.302)	**-1.296** (0.049)	-0.150 (0.431)	**-1.532** (0.003)	-0.113 (0.375)	**-2.169** (0.007)	-0.236 (0.154)
SCH	**0.749** (0.003)	**2.384** (0.051)	-0.036 (0.863)	**3.211** (0.008)	-0.379 (0.116)	**2.934** (0.038)	-0.029 (0.858)	**1.663** (0.058)	-0.048 (0.853)	**2.473** (0.005)
POP	0.010 (0.908)	-0.021 (0.902)	-0.128 (0.242)	-0.033 (0.850)	0.013 (0.911)	-0.044 (0.794)	0.101 (0.126)	0.032 (0.834)	-0.155 (0.149)	-0.036 (0.792)
R-square	0.355	0.496	0.188	0.458	0.181	0.413	0.199	0.510	0.350	0.495
F- Test	**27.560** (0.000)	**8.990** (0.000)	**18.480** (0.000)	**18.490** (0.000)	**3.930** (0.001)	**8.070** (0.000)	**9.350** (0.000)	**9.370** (0.000)	**21.100** (0.000)	**9.690** (0.000)

Significant at 0.1(*), 0.05 (**), 0.01(***) level or significant at 10%, 5% and 1%.
P-value is in parentheses

However, different from GDP, the EP indicators are negatively impacted by the FDI. There are two main hypotheses regarding the influence of FDI inflow on environmental conservation, according to the Pollution Haven Hypothesis (PHH) and Pollution Halo Hypothesis. The Pollution Halo Hypothesis mentions that FDI can enhance the environmental quality by transferring green technology to developing countries to minimize the pollution index (Birdsall and Wheeler1993).

According to the Pollution Haven Hypothesis theory that was conceptualized by Copeland and Taylor (2004), the FDI from developed countries to developing countries happen because the costs are cheaper, for both labor and resources. Developing countries generally having weak environmental regulations, which is another factor for lowering the establishment costs, but enhancing comparative advantage, especially for pollution-intensive investments (Jensen 1996). FDI indeed helps to raise the growth of the host countries but also causes the host country to face environmental degradation. This is an inevitably negative effect on environmental pollution which includes water resources.

According to Benassy-Quere *et al.* (2007), their findings stated that quality and attractive promotions of FDI will significantly increase the FDI flows between the two countries. For example, China as a model of a developing country used the actual FDI flow data to consider the interaction between resources and regulations. They found that Chinese investors preferred to venture into countries with abundant natural resources, and poor political or regulation situations. Therefore, this type of FDI tends to devastate the host country's products and natural resources.

For the CV, school enrollments are positively significantly regressed to HI, WR, BH, PNR, and CE for developed countries. All the developing countries have found no evidence on the explanation of school enrollments on EP, except in the model that regresses with HI. School enrolment is important to promote high-quality education, which is the effect to build a balanced social, sustainable economy, and environmentally friendly vision, as a result of greater public awareness of conservation (United Nation, 2015).

The United Nations Decade of Education for Sustainable Development (2005- 2014) (Mula and Tilbury 2009) suggested that environmentally sustainable development related topics need to be incorporated into education in a holistic and trans-disciplinary manner. This involves the embedding of environmental conservation competencies into the existing educational syllabus and placing knowledgeable young people at the centre of the environmental conservation development (Wals 2013). The literacy rate and educational system maturity might be one of the ways in explains the varied findings in developing and developed countries while related to school enrolment.

In table 3, none of the model findings show evidence of the relationship between population and EP indicators. The R-square for all the models is within 18.1% to 51%. All the F-test results show significance.

Conclusion

Developing and developed countries typically overly emphasize economic achievements to attaining sustainable economic development (SED), while sacrificing environmental performance (EP), which results in environmental degradation.

For the hypothesis in this study, the relationship between SED on the Environmental Performance Index (EPI), it was noted that developing countries tend to sacrifice the environmental conservation aspect, and emphasize economic development. It is a completely different scenario for developed countries, where the priority always emphasizes environmental conservation, regardless of the economic conditions. When taking the control variables of school enrolment (SCH), and population (POP) into consideration, the results of these developing and developed countries performed differently, especially for SCH, as it was noted that conservation awareness was related to the education level.

Overall, the results are significantly favorable to SED for EPI- HI, WR, BH, PNR, and CE, which is in line with the hypothesis. Hence, this result can conclude that overall, SED does impact EPI across all the variables, except NCA and POP.

The governments or investors are more focused on economic achievements and profitability, rather than on aspects of environmental conservation. These finding highlights and emphasizes the importance and advantages of enabling co-existence of both SED and EP, as both SED and EP are interdependent across several industries, for example, tourism, ecological conservation, biodiversity, agriculture, aquaculture, and many more.

From the study findings, developing countries displayed a poor performance across almost all aspects of the EP. This was because developing countries tended to overly emphasize economic achievement, and compromise conservation efforts to attain financial sustainability for their citizens. As a result, there is a need for

developing countries to invest in comprehensive healthcare systems, gazette forests, or marine parks, which can act as permanent reserved and restricted areas, which would then help limit the excessive exploration of natural resources. This would then be managed according to demand and supply principles, which would follow the international standards for waste and toxic pollutants management guidelines. Hopefully, improvements can be achieved soon.

Surprisingly, developed countries also performed only marginal better in terms of HI and PNR, as developed countries were slightly more sensitive across industries that caused health problems, such as chemical industries, nuclear process related industries, and heavy manufacturing. Pertaining to the PNR score for crude oil and mining, developed countries try to stay competitive and relevant on the economics of scale, and have therefore continued exploration activities, even though commodity prices were lower.

Governments or institutions from developing and developed countries perceive environmental conservation differently. In conclusion, developing countries tend to prioritize SED, instead of EP, due to poor economic achievements, and need to provide economic opportunities for a much larger population, increasingly corrupted institutions, prioritization of a self-sustaining economy, reduction in poverty, and avoiding hunger or malnutrition, which are amongst the reasons to focus on SED, rather than conservation.

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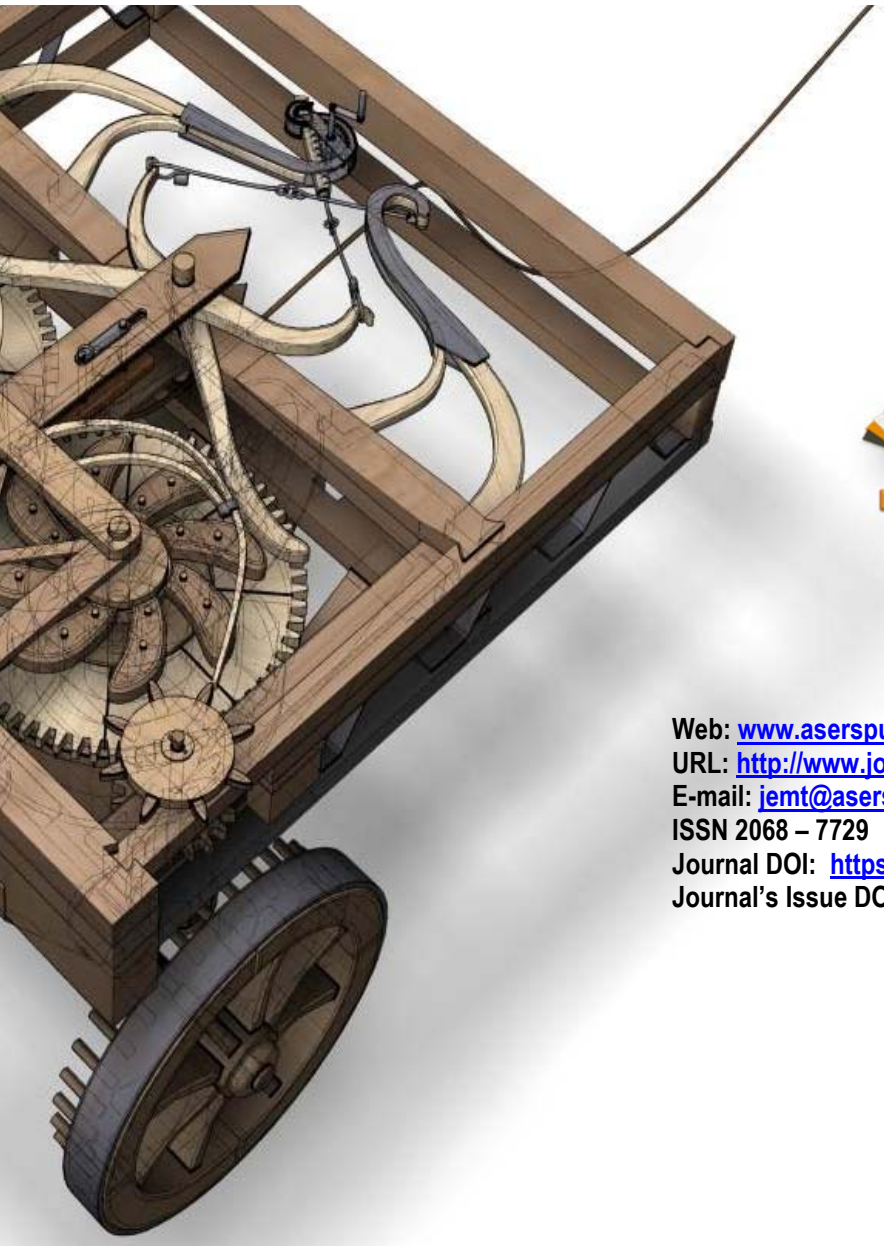

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