GDP Per Capita, Economic Freedom Index, Political Culture and Freedom of the Press Index as Determinants of Corruption Perception Index: A Global Study

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ABSTRACT

Transparency International publishes annually the Corruption Perception Index (CPI) by ranking countries on their perceived levels of corruption as determined by expert assessments and opinion surveys. Corruption is the misuse of public power for private benefit. The study aimed to find the determinants of CPI. The descriptive inferential design was used involving 146 countries with complete data sets through data mining methodology. The Cluster Analysis, Pearson r, multiple linear regression analysis, stepwise regression model were used. The results showed that Gross Domestic Product per Capita, Economic Freedom Index, Political Culture, and Freedom of the Press Index emerged as the determinants of Corruption Perception Index. The study concludes that the four determinants explain 87 percent of the variation for CPI. Least Developed

Countries and Developing Countries had the greatest vulnerability to corruption. In contrast, Developed Countries had lower corruption.

Keywords - Economics, Corruption Perception Index, GDP Per Capita, descriptive inferential design, Philippines.

INTRODUCTION

The goal of the Corruption Perception Index is to provide data on extensive perceptions of corruption within countries (Lambsdorff 2005). The CPI is a composite index, making use of surveys of business people and assessments by country analysis. These perceptions enhance understanding of real levels of corruption from one country to another. All sources generally apply a definition of corruption such as misuse of public funds for private benefit, for example bribing of public officials, kickbacks in public procurement, or embezzlement of public funds. Overall the CPI is a solid assessment of perceived levels of corruption, helping our understanding of real levels of corruption.

Political corruption poses a serious threat to the stability of developing democracies by eroding the links between citizens and governments (Canache and Allison 2005).Basically, people are aware of corruption. A study shows that Latin Americans are aware of the seriousness of corruption in their countries. Pervasive misconduct of officials may poison public sentiment towards democratic politics. Corruption affects public services in rural areas in different ways than urban areas, and that corruption harms the poor than the wealthy (Azfar and Gurgur 2008).

Transparency International reported that the countries with the highest perceived levels of corruption were: Afghanistan, North Korea, Somalia, Sudan, South Sudan, Libya, Iraq, Turkmenistan, Uzbekistan, Syria, Yemen, Haiti, Chad, Equatorial Guinea, and Guinea Bissau. In 2013, countries with the lowest perceived levels of corruption were Denmark, New Zealand, Finland, Sweden, Norway, Singapore, Switzerland, Netherlands, Australia, Canada, Luxembourg, Germany, Iceland, United Kingdom, Barbados, and Belgium.

Higher Corruption Perception Index is significantly correlated with long-term economic growth, higher rates of foreign investments in countries and an average in GDP growth of 1.70 percent for every increase in a country's CPI score (Shao et al 2007).

There is evidence that real gross domestic product per capita has the strongest correlation with Corruption Perception Index (Wilhelm 2002). Graeff and

Mehlkop (2003) said that there is a strong relation between economic freedom and corruption. Democracy and press freedom have significant impact on corruption (Chowdhury 2004).

Today, it is imperative that we examine the determinants of Corruption Perception Index.

FRAMEWORK

SOCIAL INDICATORS

Education Index

It is derived from adult literacy rate, the percentage of people aged 15 and above who can, with understanding, both read and write a short, simple statement on their everyday life. This includes the gross enrolment ratio for primary, secondary and tertiary education.

Source: United Nations Statistical Data

Freedom of the Press index

Press freedom index is constructed by Freedom House Index. This index is the aggregated value of three categories of indices; Legal Environment (0-30), Political Environment (0-40) and Economic Environment (0-30). The index score range is 0 to 100, the lower the value of index score indicates high degree of freedom (0 for the most freedom) and vice versa.

Source: Freedom House Website

Human Development index (HDI)

The Human Development Index (HDI) is a composite statistic of life expectancy, education, and income indices used to rank countries into four tiers of human development.

Source: UNDP website

ECONOMIC INDICATORS

GDP per capita

This indicator is the Gross Domestic Product (GDP) divided by the total population of a country. GDP is the total output of goods and services for final use produced by an economy by both residents and non-residents, regardless of the allocation to domestic and foreign claims. It does not include deductions for

depreciation of physical capital or depletion and degradation of natural resources**.**
Source: United Nations Statistical Data

Inequality Index

Inequality index is proxied by Gini index derived from the Gini coefficient which is the measure statistical dispersion. In economics, it is usually used to measure inequality of income or wealth of a country. The score varies between 0 to 100; 0 represents perfect economic equality and 100 indicate perfect inequality.
Source: United Nations Statistical Data

Economic Freedom index

Economic freedom Index is used to measure the economic freedom. This Index is constructed by the Heritage Foundation and Wall Street Journal. It is an aggregated index of ten Economic Freedoms like; Business Freedom, Trade Freedom, Monetary Freedom, Freedom from Government, Fiscal Freedom, Property Rights, Investment Freedom, Financial Freedom, Freedom from Corruption and Labor Freedom. Each one has equal weights, i.e. 10. The index score varies between 0 and 100. The higher score of index indicates maximum economic freedom and vice versa.
Source: Heritage.org

Globalization index

The overall index covers the economic, social and political dimensions of globalization. Follow Following Clark (2000), Norris (2000) and Keohane and Nye (2000), it defines globalization to be the process of creating networks of connections among actors at multi-continental distances, mediated through a variety of flows including people, information and ideas, capital and goods. Globalization is conceptualized as a process that erodes national boundaries, integrates national economies, cultures, technologies and governance and produces complex relations of mutual interdependence. In constructing the indices of globalization, each of the variables introduced above is transformed to an index on a scale of 1 to 100, where hundred is the maximum value. Higher values denote greater globalization
Source: KOF Index website

Foreign direct investment (**FDI**)

FDI is a direct investment into production or business in a country by an individual or company of another country, either by buying a company in the target country or by expanding operations of an existing business in that country. Foreign direct investment is in contrast to portfolio investment which is a passive investment in the securities of another country such as stocks and bonds. Its unit of measurement is in dollar.

Source: Wikipedia/ United Nations Statistical Data

Public or Government debt

Public debt is the debt owed by a central government from international or local monetary institutions. By contrast, the annual "government deficit" refers to the difference between government receipts and spending in a single year, that is, the increase of debt over a particular year. It is measured as percentage of GDP (Gross Domestic Product) of a country.

Source: Wikipedia

POLITICAL INDICATORS

Corruption Perception index

Relates to perceptions of the degree of corruption as seen by business people and country analysts and ranges between 10 (highly clean) and 0 (highly corrupt).

Source: Transparency International Webs

Democracy index

The Economist Intelligence Unit's democracy index is based on five categories: electoral process and pluralism; civil liberties; the functioning of government; political participation; and political culture. The five categories are inter-related and form a coherent conceptual whole. The condition of having free and fair competitive elections, and satisfying related aspects of political freedom, is clearly the sine quo none of all definitions. The index score varies between 0 to 10 where 10 indicates full democracy.

Source: Economist Intelligence Unit's Website

Civil and Political liberty

It measures a country's freedom of expression, rights to organize, rule of law, economic rights, and multiparty elections, liberty to have vigorous public debate about values and issues relevant to environmental quality, and legal safeguards

that encourage innovation. It score varies from 1 to 7. It is the mean of two indices, the political liberty and civil liberty. Index Ranging from 1 (High Levels of Liberties) to 7 (Low Level of liberty).

Source: Freedom House Website

Functioning of the government

It measures how the government has acted its role and obligations in fostering democracy. The index score varies from 1 to 10. A 10 index score indicates maximum level of functioning of the government.

Source: Economist Intelligence Unit's Website

Political culture

The concept of political culture refers to how we view the following four aspects of politics, government and society: the relationship between government and the people, rights and responsibility of the people, obligations of government, limits on governmental authority. The index score varies from 1 to 10. A 10 index score indicates best political culture.

Source: Economist Intelligence Unit's Website

ENVIRONMENTAL INDICATORS

Environmental health

Environmental health is an aggregated value from death rate due to intestinal infectious diseases, child death rate due to respiratory diseases, and children under five mortality rate per 1,000 live births. These are indicators of the degree to which the children and adult population is affected by poor sanitation, water and air quality, which are related to environmental conditions.

Air quality

Air quality is an aggregated value from urban population weighted NO_2 concentration, SO_2 concentration, TSP concentration and indoor air pollution from solid fuel use. Poor ambient air quality affects both human and ecosystem health.

Humans exposed to high NO_2 and SO_2 concentrations may suffer respiratory tract problems and permanent damage to lung tissue as a result of long-term exposure. NO_2 and SO_2 are also precursors to the formation of ground level ozone and acid rain and fog which changes the composition of soils, causes acidification of water bodies, and negatively affects animal and plant growth.

Total Suspended Particulates (TSP) gave negative health effects in humans such as increased asthma attacks, chronic bronchitis, decreased lung function and premature death. High exposure indoor pollution, such as the fumes from solid fuel combustion is dangerous to human health.

Source: Organization for Economic Co-operation and Development (OECD), United Nations Human Settlement Programme (UNHABITAT), World Health Organization, European Environmental Agency, and World Resources Institute, plus country data.

Water quality

Water quality is an aggregated value from dissolved oxygen concentration, electrical conductivity, phosphorus concentration and suspended solids. Dissolved oxygen concentration is a measure of eutrophication, which has an important impact on the health of aquatic resources and ecosystems. High levels correspond to low eutrophication. Electrical conductivity is a widely used bulk measure of metals concentration and salinity. High levels of conductivity correspond to high concentrations of metals. Phosphorus concentration is a measure of eutrophication, which affects aquatic resources health. High levels correspond to high levels of eutrophication. Suspended solids is a measure of water quality and turbidity.

Source: United Nations Environment Programme (UNEP), Organization for Economic Co-operation and Development (OECD), European Environment Agency (EEA), plus country data.

OBJECTIVES OF THE STUDY

This study is a descriptive analytical research with the following specific objectives:

1. To determine the clusters of countries across selected social, economic, political and environmental indicator.
2. To determine the determinants of Corruption Perception Index.

METHODOLOGY

The study is a descriptive analytical research considering social, economic, political and environmental indicators identified through data mining and used as a basis for cluster analysis. Stepwise regression analysis was used to determine the significant predictors of Corruption Perception index. The data mining process followed the procedure used by Padua (2007).

The researchers first identified selected social, economic, political and environmental indicators and their corresponding sub-indicators were identified. The choice of variables was developed from an analysis of the literature on corruption perception index and from the researcher's personal knowledge and inputs from preliminary interviews with other experts obtained through Delphi technique Stuter (2009) second, from a preliminary list of variables, data of the 176 countries were consolidated. Data obtained from websites were confirmed through email by the Ministries of Environment, Economic Development, and Education of different countries. Some countries had missing data, thus further information was sought. However, some countries failed to provide the needed information. The researchers decided to include countries with complete sets of data. Hence, out of 176 countries, only 146 were included. Third; cluster analysis was performed for the indicators to determine the characteristics of each cluster. Fourth; theories were formulated. The new theories were validated through multiple regression analysis and stepwise regression analysis.

Cluster Analysis. The term *cluster analysis* cited by Blashfield (2009) encompasses a number of different algorithms and methods for grouping objects of similar kind into respective categories. A general question facing researchers in many areas of inquiry is how to *organize* observed data into meaningful structures, that is, to develop taxonomies. In other words, cluster analysis is an exploratory data analysis tool used to sort different objects into groups in a way that the degree of association between two objects is maximal if they belong to the same group and minimal otherwise (www.neurobot. bio.auth.gr/auchieues/ tutorials). Cluster analysis can be used to discover structures in data without providing an explanation/interpretation.

Table 1. Measurement of Variables

Indicators	Sub-indicators	Sources	Level of measurements
Social indicators	Literacy Index	http://hdr.undp.org/en/statistics/data/.	interval
	Freedom of the Press Index	http://www.freedomhouse.org/	interval
	Human Development Index	http://hdr.undp.org/en/statistics/data/.	interval
Economic indicators	GDP per capita *(z-score)**	http://hdr.undp.org/en/statistics/data/.	interval
	GINI Index	http://hdr.undp.org/en/statistics/data/.	interval
	Economic Freedom Index	www.heritage.org/index/	interval
	Globalization Index	http://globalization.kof.ethz.ch/	interval
	FDI Inflow in Million *(z-score)**	http://hdr.undp.org/en/statistics/data/.	interval
	Public Debt (% of GDP)	http://hdr.undp.org/en/statistics/data/.	interval
Political indicators	Corruption Perception Index *(0-10 scale)*	www.transparency.org/	interval
	Democracy Index *(0-10 scale)*	https://www.eiu.com/	interval
	Civil and Political Liberty *(1-7 scale)*	https://www.eiu.com/	interval
	Functioning of the Government *(0-10 scale)*	https://www.eiu.com/	interval
	Political Culture *(0-10 scale)*	https://www.eiu.com/	interval
Environmental indicators	Environmental Health Index	http://sedac.ciesin. columbia.edu/es/esi/	interval
	Air Pollution (Effect to Humans)	http://sedac.ciesin. columbia.edu/es/esi/	interval
	Water Pollution (Effect to Humans)	http://sedac.ciesin. columbia.edu/es/esi/	interval

Multiple Regression Analysis. To develop a model that would show the best and robust predictor to be included in the regression equation, the Stepwise Regression Analysis using SPSS (at α = 0.05 significance level of entering and α = 0.10 significance level of staying) was used. The variable or variables that will enter in the model contribute most to the reduction of the variability of the dependent variables. The estimated full model regression equation takes the form:

$$Y_i = \beta o + \beta 1\, X_i 1 + \beta 2\, X_i 2 + \beta 3\, X_i 3 + \beta 7\, X_i 7$$

where Ŷ is the predicted value of the dependent variable and X_i's are independent variables. The β_O is a constant representing the y-intercept and the rest of β's are the estimate regression coefficients. Multiple regressions were used to estimate the parameters that would generate the model.

In the study, the indicators that were not measured in index form were transformed to z-score to overcome linearity, normality, and variance heterogeneity problems (McDonald, 2009).

Data Transformation. Some of the indicators were standardized in the form of z-scores. All indicators preserved the relative distances between countries' values by converting all variables to z-scores, which were obtained by subtracting the mean from the observation and dividing the result by the standard deviation of the variable. For aggregated indicators, variable components were transformed into the same unit through z-score before computing the one representing composite value.

RESULTS AND DISCUSSION

Cluster Analysis of Countries

For purposes of comparative policy analysis, the study was conducted to identify appropriate peer countries against whom one can benchmark in terms of environmental, social, economic and political policies for improved performance. Those at the leading edge of the peer group may also be looked into for best practices in policy or technology system. One way to establish peer groupings of the countries based on environmental, social, economic and political indicators is through statistical means which is the cluster analysis. Cluster analysis is used to separate a large group of objects into subgroups with similar characteristics. It is

used to identify statistically related groups of countries based on the similarity of indicator scores for environment, social, economic and politics. Within each peer group, countries have a better basis for benchmarking their economic, social, political and environmental performance because the group members are the most homogeneous with respect to the included variables and the differences across the groups are maximized. While we can force the statistical tools to generate any number of clusters, researchers found that the four groupings identified in the Dendrogram (Figure 1) and Table 1 represents a particularly interesting set of peer groups. Noticeably, these clusters are having observable similarities in the four types of indicators. The data of the variables included in the analysis all cover the year 2012.
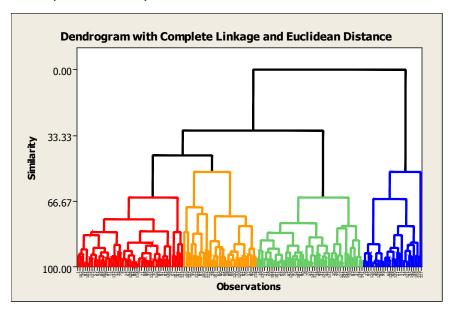

Figure 1: Dendrogram of 146 countries

The number of clusters was identified based on the similarity levels and distances between the joined clusters. The amalgamation step after the cluster of 4, the values on the similarity level and distance changed abruptly and this determined the number of clusters for the final partition. This means that using four (4) clusters, the similarity level within each cluster is reasonably large and distances between the joined clusters is reasonably small. These facts could indicate that 4 clusters are reasonably sufficient for the final partition. The clusters are identified based on

the four different colors in the dendrogram (Figure 1). Countries that are found in Cluster 1 are in red color, countries in Cluster 2 are shaded with orange, those in Cluster 3 are in green and countries that made up Cluster 4 are colored blue. The countries that composed each of the four clusters are presented in Table 2.

Table 2: Clustering of countries based on the cluster algorithm

CLUSTER 1 (45 countries) Red	CLUSTER 2 (31 countries) Orange	CLUSTER 3 (45 countries) Green	CLUSTER 4 (25 countries) Blue
Albania	Bhutan	Algeria	Australia
Argentina	Botswana	Angola	Austria
Bangladesh	Bulgaria	Armenia	Belgium
Benin	Cape Verde	Azerbaijan	Canada
Bolivia	Costa Rica	Belarus	Chile
Bosnia and Herzegovina	Croatia	Burundi	Cyprus
Brazil	Czech Republic	Cambodia	Denmark
Burkina Faso	Georgia	Cameroon	Estonia
Colombia	Ghana	Central African Republic	Finland
Comoros	Hungary	Chad	France
Congo Republic	Israel	China	Germany
Dominican Republic	Italy	Djibouti	Ireland
El Salvador	Jordan	Ecuador	Japan
Greece	South Korea	Egypt	Netherlands
Guyana	Kuwait	Equatorial Guinea	New Zealand
Haiti	Latvia	Eritrea	Norway
Honduras	Lithuania	Ethiopia	Portugal
India	Malaysia	Gabon	Singapore
Indonesia	Mauritius	Gambia	Slovenia
Iran	Montenegro	Guatemala	Spain
Jamaica	Namibia	Guinea	Sweden
Kazakhstan	Oman	Guinea-Bissau	Switzerland
Kenya	Poland	Lesotho	United Kingdom
Kyrgyzstan	Qatar	Liberia	United States

Lebanon	Romania	Laos	Uruguay
Mexico	Rwanda	Madagascar	
Moldova	Saudi Arabia	Malawi	
Morocco	Slovakia	Mali	
Nepal	South Africa	Mauritania	
Nicaragua	Turkey	Mozambique	
Niger	United Arab Emirates	Pakistan	
Nigeria		Paraguay	
Panama		Russia	
Papua New Guinea		Senegal	
Peru		Sierra Leone	
Philippines		Sri Lanka	
Serbia		Swaziland	
Suriname		Tanzania	
Tajikistan		Thailand	
Trinidad and Tobago		Togo	
Tunisia		Venezuela	
Turkmenistan		Vietnam	
Uganda		Yemen	
Ukraine		Zambia	
Uzbekistan		Zimbabwe	

Four (4) clusters are identified with 45 countries under Cluster 1, 31 countries make-up the Cluster 2, 45 countries in Cluster 3 and 25 countries composed the Cluster 4. Countries belonging to the same cluster are more homogenous in terms of the indicators considered than are countries belonging to other clusters. The countries that formed each cluster are shown in Table 2. It may be noted that Cluster 1 contains some least developed countries in Africa namely Benin, Burkina Faso, Comoros, Niger and Uganda. It also includes least developed countries in Asia such as Bangladesh and Nepal and one least developed country in the Caribbean region which is Haiti.

Aside from Least Developed Countries (LDC's), Cluster 1 also comprises developing countries in Europe (Albania, Bosnia and Herzegovina, Greece, Moldova, Serbia and Ukraine), Africa (Congo Republic, Kenya, Morocco, Nigeria, and Tunisia), Asia (India, Indonesia, Iran, Kazakhstan, Kyrgyzstan,

Lebanon, Philippines, Papua new Guinea, Tajikistan, Turkmenistan and Uzbekistan), and South and Central America (Argentina, Bolivia, Brazil, Colombia, Dominican Republic, El Salvador, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru, Suriname and Trinidad and Tobago). Cluster analysis proves homogeneity of characteristics among least developed countries and developing across continents in terms of the considered economic, social, political and environmental indicators.

If Cluster 1 is concentrated of countries with less economic development, Cluster 2 is condensed of countries in Europe with advance economies such as Czech Republic, Hungary, Italy, Poland, Slovakia, in Asia like Israel and South Korea and in Africa like South Africa. Cluster 2 also includes developing countries in Africa - Botswana, Cape Verde, Ghana, Mauritius and Namibia, in Asia – Jordan, Kuwait, Malaysia, Oman, Qatar, Saudi Arabia, Turkey and United Arab Emirates and in Europe – Bulgaria, Croatia, Georgia, Latvia, Lithuania, Montenegro and Romania. Cluster 2 also includes two least developed countries in Africa – Bhutan and Rwanda and one developing country in South America – Costa Rica. Though composition of Cluster 2 is varied in terms of economy but cluster analysis proved homogeneity in terms of the indicators identified in the study.

Similar with Cluster 1, Cluster 3 is composed mostly by African least developed countries such as Angola, Burundi, Central African Republic, Chad, Djibouti, Equatorial Guinea Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Laos, Madagascar, Malawi, Mali, Mauritania, Mozambique, Senegal, Sierra Leone, Tanzania and Zambia together also with the least developed country in Asia which are Cambodia, Laos and Yemen. Cluster 2 also includes developing countries in Africa (Algeria, Cameroon, Gabon, Swaziland and Zimbabwe), Asia (Armenia, Azerbaijan, China, Egypt, Pakistan, Sri Lanka, Thailand and Vietnam), Europe (Belarus and Russia), and in South and Central America (Ecuador, Paraguay, Venezuela and Guatemala). It is noted that Cluster 3 is composed by a large ratio of countries with least developed economy.

Distinct from the previous clusters, Cluster 4 mainly encompasses known countries with highly developed economy and advanced technological infrastructure relative to other less industrialized nations. First on the list are countries in Europe such as Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Ireland, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland and United Kingdom. Other non-European developed countries are also included in Cluster 4 particularly Australia, Canada, Cyprus, Japan, New Zealand, Singapore, and United States of America. Uruguay, a

developing country in South America completed the list of countries under Cluster 4. Noticeably, Cluster 4 is condensed of countries with high economic and human development.

Every cluster includes many geographically connected and economically consistent countries, suggesting that they have similar underlying environmental, economic, social and political characteristics.

Table 3: Characterization of clusters

Variables	CLUSTER 1 (45 countries)	CLUSTER 2 (31 countries)	CLUSTER 3 (45 countries)	CLUSTER 4 (25 countries)	International mean
Education index	0.55	0.72	0.55	0.89	0.64
Freedom of the Press Index	45.98	43.23	73.62	20.24	49.51
HDI	0.58	0.75	0.58	0.89	0.67
GDP per capita (z-score)*	-0.52	0.38	-0.52	1.45	0.01
Inequality index	42.91	40.32	42.14	33.16	40.24
Economic Freedom Index	55.84	66.12	52.83	73.65	60.14
Globalization Index	52.16	66.81	48.55	82.75	59.40
FDI Inflow in Millions (z-score)*	-0.16	-0.18	-0.11	0.72	0.00
Public Debt (% of GDP)	46.95	45.46	37.42	75.00	48.50
CPI	33.60	51.55	28.22	76.64	43.12
Democracy Index	5.70	6.12	3.70	8.40	5.63
Civil and Political Liberty	3.21	2.81	5.30	1.34	3.45
Functioning of Government	4.78	5.91	3.12	8.29	5.11
Political Culture	4.93	5.65	4.77	8.03	5.56

Environmental Health	44.84	73.66	43.97	95.28	59.33
Air Quality	55.45	76.83	55.18	96.14	66.88
Water Quality	32.77	66.32	33.16	96.04	50.85

* **Note:** Negative z-score means that indicator level is below the average level across countries and positive z- score above means that indicator level is above average

Table 3 shows mean ratings of the four clusters in terms of the identified Social, Economic, Political and Environmental indicators. As indicated in Table 3 both Cluster 1 and Cluster 3 consistently ranked last in terms of Social indicators. Both Cluster 1 and Cluster 2 got the lowest mean level of Education index, Freedom of Press index and Human Development index. Higher values in Freedom of Press index indicate lesser degree of freedom and vice versa. On the other hand, Cluster 4 has obtained the highest level of the three mentioned social indicators. The reason behind these results can be supported by the previous findings that Both Cluster 1 and Cluster 3 comprise mostly the least developed and developing countries while Cluster 4 is composed of purely highly developed countries. This is expected that countries with advanced economies are capable enough to sustain relatively higher degree of human development, literacy rate and press freedom.

In term of economic indicators, Cluster 1 and Cluster 3 are still in competition for the last rank position in terms of GDP per capita, Inequality index, Economic freedom index, Globalization index, and FDI inflow while Cluster 4 is consistently leading in the mentioned economic indicators. Countries in Cluster 1 and Cluster 3 have so much to learn from countries in cluster 4 in terms of best practices on economic policies. In terms of Public debt, developed countries in Cluster 4 had the highest mean percentage of public debt relative to GDP while countries in Cluster 3 had the lowest. This indicates that most of the countries with advanced economies likely are those countries also which had the largest government debt relative to its GDP, while less developed nations tend to have minimal public debt. It makes sense, because only those highly industrialized countries have huge spending pattern and qualified to borrow huge amount.

In terms of political indicators same scenario can be observed, Cluster 1 and Cluster 3 are consistently in the lowest ebb while rich nations in Cluster

4 are consistently in the forefront specifically in upholding the highest degree of democracy, lowest degree of corruption (higher value means less corrupt), highest level of civil and political rights (lower value means higher liberty) and best government functioning and political culture. This indicates that political freedom coupled with high degree of democracy promotes economic development. Authoritarianism and corruption kill development.

In terms of environmental indicator, rich countries in Cluster 4 obtained the highest level of environmental health, air quality and water quality while countries in Cluster 1 and Cluster 3 both occupied by less developed countries obtained the lowest level of the enumerated environmental indicators. The economic theory as emphasized in "Environmental Kuznets Curve" that after the peak of industrialization, highly developed countries will start protecting their depleted environment and will put a large portion of budget on it. Thus, they tend to have good environmental performance index score. On the other hand, less developed and developing nations likely are usually trapped on the stage of maximizing the use of its environmental resources for promoting economic development hence they had less concern about the environment on their current state.

STEPWISE REGRESSION ANALYSIS

The World Bank (2005) once said that "corruption is the single greatest obstacle to economic and social development. It undermines development by distorting the rule of law and weakening the institutional foundation on which economic growth depends". The Transparency International takes it as, "… one of the greatest challenges of the contemporary world. It undermines good government, fundamentally distorts public policy, leads to the misallocation of resources, harms the private sector and private sector development and particularly hurts the poor".

Table 4: Explanatory variables with statistically significant correlations
to corruption perception index

Explanatory Variables	Corruption Perception Index		
	Pearson r	t	p-value
Education index	0.61	9.88	<0.01**
Freedom of the Press Index	-0.69	-9.37	<0.01**
HDI	0.69	11.2	<0.01**
GDP per capita (z-score)	0.76	12.31	<0.01**
Inequality index	-0.32	-10.23	<0.01**
Economic Freedom Index	0.82	8.78	<0.01**
Globalization Index	0.75	9.78	<0.01**
FDI Inflow in Millions (z-score)	0.29	8.45	<0.01**
Public Debt (% of GDP)	0.32	14.56	<0.01**
Democracy Index	0.72	11.4	<0.01**
Civil and Political Liberty	-0.62	-13.45	<0.01**
Functioning of Government	0.75	10.34	<0.01**
Political Culture	0.74	10.6	<0.01**
Environmental Health	0.72	9.78	<0.01**
Air Quality	0.57	7.87	<0.01**
Water Quality	0.74	12.56	<0.01**

** Statistically significant at 0.01 level

Hence this study was conducted to determine the most influential and powerful indicators that affect Political Corruption. Corruption in this study is proxied by Corruption Perception Index as measurement.

The study was done through the use of Stepwise Regression Analysis which is an iterative regression method that determines the most influential variables among a set of variables. Prior to stepwise regression analysis, correlation test between Corruption Perception Index and the explanatory variables included in the study was performed as shown in Table 4. As computed and presented in the table, Education index, HDI, GDP per capita, Inequality index, Economic

Freedom index, Globalization index, FDI Inflow, Public Debt, Democracy index, Civil and Political liberty, Functioning of Government, Political Culture, Environmental Health, Air Quality and Water Quality showed significant positive relationship to Corruption Perception Index at 99% confidence level. Conversely, Freedom of the Press Index, Inequality index and Civil and Political Liberty proved significant negative relationship to Corruption Perception Index at the same confidence level. The statistical significance of the relationship is confirmed by the computed p-values shown Table 4. Every p-value is lesser than the 0.01 alpha level.

The result indicates that countries with high social indicators, that is, higher level of Education index and Human development index are less perceived to be corrupt (higher value of CPI means lesser corruption index). Educated people with good health and income are less likely to do corrupt activities because they can have what they want and what they need. Nothing drives them to do it and there are many things which impede them to do it like reputation risk.

Likewise, negative relationship between Freedom of Press Index and CPI suggest that Corruption is less perceived in countries with high degree of Press freedom. The freedom of speech and press in democratic societies enable the public to access information and broadcast their discoveries. This will lead to reduction in the level of corruption.

Result also revealed that the levels of development as proxied by GDP per capita are inversely related to the level of corruption. The nations at low economic growth take little or even no sympathy for the vast majority of poor citizens. This will aggravate self-interest among people which further leads them to corruption. Income inequality can also influence the level of corruption. There is a higher income inequality when most of the income is owned by the few. This will bring the rest to poverty and drives them toward corruption.

Economic freedom index and globalization index are also inversely related to level of corruption. The higher level of personal economic freedom (less political control over nations' economic resources and opportunities) will reduce the involvement of public offices/officials with the masses. This limited connection minimizes the chances of indulging into corruption. Similarly, higher level of globalization leads higher level of trade-openness in the market. A good trade-openness would remove the control of government officials over administrative commodities like permits. Thus, globalization will lessen the chances of exchanges of these products for private benefits.

Foreign Direct Investment is negatively related to CPI. That is, because, higher level of corruption discourages investor to invest their money. Investors

are afraid in pouring money to a high risk projects surrounded by corrupt people. Public debt is also negatively related to CPI. It suggests that countries with huge government debt tend to be perceived as less corrupt. The strength of democracy, civil and political liberty is negatively correlated to the corrupt behavior. In democratic communities, the public officials obtain their power from the people and they must use it for the interest of the people. A low level of corruption is the product of good functioning of government and political culture. Countries perceived with less corruption index are usually developed countries with higher income economies. These countries are known to have good Environmental Performance index (EPI). Hence, Environmental health, air quality, and water quality are inversely related to level of perceived corruption.

Table 6: Summary of stepwise regression variable selection

Explanatory Variables	Corruption Perception Index			
	beta	Std. error	t	p-value
Constant	0.28	7.55	0.04	0.00*
GDP per Capita	8.44	1.14	7.42	0.00*
Economic Freedom Index	0.64	0.09	6.68	0.00*
Political Culture	2.07	0.59	3.49	0.00*
Freedom of the Press Index	-0.14	0.04	-3.44	0.00*

* Statistically significant at 0.05 level

Summary on Stepwise Regression Analysis results were depicted in Table 6 and Table 7. The result revealed that the GDP per capita, Economic Freedom Index, Political culture and Freedom of the Press Index give significant contribution to Corruption Perception Index, thus they entered in the model. This means that among the 16 explanatory variables, only the four mentioned variables are the most influential predictor and contribute most in the reduction of the variability in CPI across one hundred forty-six countries.

The combination of these indicators formed the best four-variable model which registered a higher coefficient of determination $r^2 = 0.87$. This implies that 87% of the variance in Life CPI is due to the four variables. Significant

t-statistics across the four significant predictors (p-value < 0.05) further affirmed the foregoing findings; thus the model that would generate CPI is given below,

CPI = 0.28 + 8.4 GDP per Capita + 0.64 Economic Freedom Index + 2.07 Political culture – 0.14 Freedom of the Press Index

The coefficient of 8.4 on the GDP per capita suggests that for every one level increase in the z-score of GDP per capita, there will be an 8.4 level increase in the CPI score holding other indicators as constants. This model also shows that for every one level increase in Economic Freedom index causes the CPI to increase by 0.07 points, provided that other indicators are kept constant. Other coefficients can be interpreted also the same way above.

Table 7: Stepwise regression model summaries for 1 to 4 variables

Model	R^2	Adjusted R^2	Standard error of estimates	Corruption Perception Index				
				R^2 Change	F Change	df1	df2	Sig. F Change
1	0.74	0.73	9.99	0.74	341.21	1.00	123.00	0.00
2	0.84	0.83	7.86	0.10	76.48	1.00	122.00	0.00
3	0.86	0.86	7.32	0.02	19.54	1.00	121.00	0.00
4	0.87	0.87	7.02	0.01	11.84	1.00	120.00	0.00

Table 7 illustrates iterative steps of regression method to determine the most influential predictors using stepwise linear regression. No other variables entered after the step 4 (model 4) and this concluded the four variables (GDP per capita, Economic Freedom Index, Political culture and Freedom of the Press Index) as most powerful and robust predictors of CPI. At step four (4), coefficient of determination change (R^2 change) was maximized while standard error was minimized.

GDP per capita shows significant effect to CPI which insinuates that richer countries are less likely to do corruption because they could afford what they need and what they want hence they have no reasons to do it. Economic Freedom Index is also a significant predictor to CPI. A person with high degree of economic freedom has higher degree of political freedom and hence higher degree of freedom from corruption. Political culture proved to be a significant

determinant of corruption. Freedom of Press is a significant predictor of CPI which suggests that press freedom could be used to reduce corruption. That is, because Press freedom could expose the anomalous/corrupt activities and also could make these socially condemnable. Thus, increase in press freedom will reduce the level of corruption.

CONCLUSION AND IMPLICATIONS

From the findings, the following conclusions and implications are:

The cluster analysis reflects a clustering of the countries with similarities in economic, social, political and environmental characteristics.

Identified social, economic, political and environmental characteristics have been consistently low in the clusters of developing and least developed countries, signifying that the nation's level of development determines the quality of life of the citizens.

The cluster analysis reveals that least developed and developing countries had greatest vulnerability in corruption. In contrast, developed countries had greatest immunity in corruption.

Corruption Perception index is largely a function of economic, social and political characteristics. Level of perceived corruption of highly developed countries across continents is primarily a function of high GDP per capita, high degree of economic freedom, good political culture and high degree of press freedom.

LITERATURE CITED

Azfar, Omar and Tugrul Gurgur
2008   Does Corruption affect health outcomes in the Philippines? Economics of Governance Vol. 9, Issue 3, Pages 197-244.

Blashfield, R.K.
2009   The growth of cluster analysis: Tryon, Ward and Johnson. Retrieved on January 16, 2009 from www.eric.ed.gov/ERICWebPortal/recordDetails?accno=EJ239639

Canache, Damarys and Michael E. Allison
2005   Perceptions of Political Corruption in Latin American Democrats. Latin

American Politics and Society vol. 47, Issue 3, pages 91-111. Retrieved on January 20,2014 from *www.onlinelibrary.wiley.com*

Chowdhury, Shyamal K.
2004   The effect of democracy and press freedon on corruption: an empirical test. Economics Letters Vol. 85, Issue 1 October 2004, pages 93-101, Retrieved on January 20, 2014 from *www.sciencedirect.com*

Clark, William C.
2000   Environmental Globalization, in: Joseph S. Nye and John D. Donahue (eds.), Governance in a Globalizing World, Brookings Institution Press, Washington, D.C.: 86-108.

Graeff, P. and G. Mehlkop
2003   The Impact of Economic freedom on Corruption: Different patterns for rich and poor countries. European Journal of Political Economy Vol. 19 Issue 3, pages 605-620. Retrieved on January 20, 2014 from *www.sciendirect.com*

Keohane, Robert O. and Joseph S. Nye,
2000   Introduction, in: Joseph S. Nye and John D. Donahue (eds.), Governance in a Globalizing World, Brookings Institution Press, Washington, D.C.: 1-44.

Lambsdorff, Johann Graf
2005   The Methodology of the 2005 Corruption Perception Index. Transparency International (TI) and University of Passau. Retrieved on January 20,2014 from *http://www.ccpar.sysu.edu.com*

Mcdonald, J.H.
2009   Handbook of biological statistics (2nd ed). USA: Sparky House Publishing.

Norris, Pippa,
2000   Global Governance and Cosmopolitan Citizens, in: Joseph S. Nye and John D. Donahue (eds.), Governance in a Globalizing World, Brookings Institution Press, Washington, D.C.: 155-177.

Padua, R.N.

2007   Graduate education policy framework for developing countries: survey and cluster analysis of worldwide patterns in advanced education. Proceedings of the International Research Conference in Higher Education. Commission on Higher Education. Quezon City.

Stuter, L. The Delphi Technique. www.seanet.com/~barkeonwds/school/DELPHI.htm. Retrieved February 2, 2009.

Shao, J.,Ivanov, P.C., Podobniv, B, Stanley, H.E.

2007   Quantitative relations between corruption and economic factors. The European Physical Journal B 56 (2): 157. ArXiv: 0705.0161. Bib code: 2007EPJB...56...1575. doi: 10.1180/ epjb/e2007-00098-2.

Wilhelm, Paul G.

2002   International Validation of the Corruption Perception Index: Implications for Business Ethics (Springer Netherlands) 35(3):177-89. doi: 10.1023/A: 1013882225402.Retriewed January 20,2014.

Corruption Perception Index 2013. Full table and rankings. Transparency International. Retrieved January 20, 2014.