Globalization, institution and environmental quality: A case of selected sub-Shahara Africa countries

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Abstract
The world today is been faced with numerous challenges and one of those challenges is global warming which was as a result of climate change caused by basically economic activities. The aim of this study is to investigate on the effect of globalization and institutions and how they both affect environmental quality with reference to selected Sub-Sahara Africa Countries. A trend analysis was also carried out to study the movement of these variables used to proxy globalization, institution and environmental quality. The study also used the pooled OLS coupled with both the random effect, fixed effect and the Hausman test for the appropriateness of the model. The result of the study shows a positive relationship between globalization and environmental quality and a negative relation relationship between institution and environmental quality. Based on the result, the study recommends the effectiveness of government policies on quest for eco-friendly environmental and to reduce pollutions of all sort.

Keywords: Globalization, Institution, environmental quality, sub-Sahara Africa

Introduction
According to Scholte (2005) [27] cited in Peterson Institute for International Economics, globalization is defined as the word used to describe the increasing interdependence of the economies of the worlds, including various cultures and population through cross-border trade in both goods and services, investment flow, technology, information and people. Several countries have over time-built partnership for economic gains to encourage this so-called globalization movement across different countries in the world (Scholte, 2005) [27]. The term globalization was known when it gains popularity after the Cold War in the early 1990s as it deemed to structure modern lifestyle.

Scholte (2005) [27], also revealed that globalization has been known to have been widely varied in its effect and though complex and politically oriented, with main development in technology, it has benefited the whole society making the certain group be worse off. With more understanding of trade-off or cost-benefit ratio, could pave way for increasing problems while maintaining the huge payoffs.

According to Shahbaz, *et al*. (2017), globalization is a global trend which has affected both the social, political and economic features of human existence. He further noted that the term globalization is linked with economies of the world with the use of innovative opportunities, trade, ties among cultures and flow of capital. Globalization also pioneers trade openness and financial liberalization which thus affect economic growth and development positively, which on the other hand impact positively on the environment. Deviating from the positive implication of globalization is the adverse effect of globalization which the world is currently suffering till date. Environment quality has over the last few decades been seen as a major demerit of globalization with several institutions or stakeholders increasing the degradation of the environment. Pollutant emission has also contributed to the increase adverse effect for climate change in the globe and imbalance or distorted ecosystem. However, pollutant emissions from industrial exploration and commercial activities have resulted in reducing economic growth and development sustainability (Shahbaz, *et al*. 2015).

Globalization has a series of dimensions which include; social, political and economic dimension, where each of them contributes significantly to reducing or increasing the emissions of carbon. Though the relationship between globalization and economies is explained with trade, financial activities and investment, global economies expansion and progressive global financials which has led to increasing in energy consumption and thus carbon emission (Shawkat, 2019) [30]. In social globalization, people are connected to form a network and information flow is enhance with proximity to culture. An example is it enables people to access information especially for business best practices, the knowledge gotten and implementation of this best practice will help to reduce the consumption of energy in the processes of production and turn to improve the quality of the environment.

Research Problems
In the last few decades, we have witnessed a progressive trend and discussion in climate change and global warming both locally and international especially by NGOs and other different governments of the world which has led to environmental spoilage like high rising sea level, biodiversity loss, deforestation, an unusual increase in winds, drought and rainfall and huge failures in agricultural production which on the other hand has claims so many life especially in the Sub-Sahara African countries (Hawken *et al*. 2008) [19]. In line with the Paris Climate Change Conference in 2015, to reduce global warming, globalization can be regarded as a policy instrument for enhancing environment quality (Rhodes, 2016) [25]. Several works of literature have posited the use of openness to trade for globalization and focusing less on the socio-economic and political dimension of globalization.

A study carried out by Schwela *et al.*, (2006) revealed that in the Sub Saharan African countries, there has been an identified increase in growth of population, migration, motorization, urbanization and the strive for economic growth. These driving forces according to Schwela *et al.* (2006) has contributed to pressures like increase in vehicle fleets, which major consumers of energy and also a major source of air pollution from the emission of Carbon Monoxide in the urban settlement. Another is the increase in two-wheelers with also a daily emission of carbon monoxide, hydrocarbons and nitrogen oxides from the transportation sector. The poor state of infrastructure has contributed to the issue of re-suspended emission of dust. The product sold in certain petroleum market is adulterated and of low quality.

Mabogunje (1995) [20] argued that though efforts have been made to solve environmental problems as stated by Schwela *et al.* (2006), none of these efforts has been successful as a result of not understanding the nature and solutions to the problem due to weak government institutions. Based on conventional knowledge, residents in Sub-Sahara are seen as highly irresponsible on issues about the environment and seek international assistance from environmental disaster. Consequently, protecting the environment of Sub-Sahara Africa is a problem that requires to be dealt with and integrate an effective management technique for the eco-friendly environment.

Another major problem with the issue of environmental quality in Sub-Sahara Africa is that the role of governance and institutions have been of low priority (van Vuuren *et al.* 2012) [31]. The weak institutions in Africa as a whole has resulted in poor policy implementation on the thrive for environmental quality. A study conducted by Ibrahim and Law (2015) posited that a political instrument for feasible development is used to balance the idea of economic development, social fairness and environmental degradation. He also noted that a sound and quality environmental policies and management control in an economy could be the major explanatory factors for enhancing the quality of the environment.

Based on the statement, the current study was aimed at investigating the globalization, institutions and environmental quality. In other words, the study will examine empirically, the effect of globalization and institutions on environmental quality. The study will be guided with the following objectives.

Objectives of the Study
The Objectives of the study is to
- Explain with trend analysis the movement of globalization, institutions and environmental quality in selected Sub-Sahara African Countries
- Empirically examine the relationship between globalization and institutions on the environmental quality in selected Sub-Sahara Africa.

The study was limited to examining globalization, institutions and its impacts on environmental quality regarding selected Sub-Sahara African Countries. Selected Sub-Sahara African countries used in the study were; Sudan in Northeast Africa, South Africa in Southern Africa, Kenya is Eastern Africa, Nigeria in Western Africa; Cameroon in Central Africa and Ghana in Western Africa. There was no special reason responsible for the selection of these Sub-Sahara Africa countries, as they were selected on a random basis.

2. Literature Review
Concept of Globalization
Globalization is a notion with a believable amount of uncertainty. The uncertainty is regarded as the different view and dimensions from which the concept of globalization is seen. Based on this note, the term globalization is regarded by many as financial globalization, economic globalization, political globalization, mature capitalism, neo-imperialism, neo-colonialism (Majekodunmi and Adejuwon, 2012) [21].

Globalization has been seen as a freedom. This implies the procedure of eliminating restrictions that have been imposed on migration from one country to another with the aim of an open world economy (Scholte, 2005) [27]. This concept posited a widespread fall or perhaps complete removal of trade barriers, capital influx and restrictions to foreign exchange (Scholte, 2005) [27].

Globalization is somewhat referring to as internationalization. This concept explains the hug and progressive trade flows and investment in the capital within nations of the world. This view explains the exhibition of globalization in increasing level of migration, diseases and information across the borders of different countries in the world (Scholte, 2005) [27]. It further explains that globalization can be referred to as universalization which implies human race integration to one body. This notion implies the spread of western culture (Westernization).

On the economic perspective, globalization is said to have created certain global agencies like the World Bank, World Trade Organization and International Monetary Fund (IMF). These foreign bodies take power from nations of the world to make policies that are of benefit to both developing and developed countries. The extent of globalization differs between countries and also between sectors and parastatals of the world. There exists this view that regards globalization as another form of development of capitalist. The proponent of this notion maintains that capitalism has reduced and that nations of the world haveve advanced already above capitalism to a post-capitalist society. Most see it as a form of restructuring the capitalist mode of production. The bone of contention is that capitalist remains a fundamental mode of production wile multinational firms concentrate production in their hands with more possession with finance capital and consumerism.

Concept of Institutions
The notion "institution" is a widely known topic in several disciplines. Broadly speaking, institutions refer to artificial made rules and regulation that is used to guide human behaviour. The high number of economists posited that "institution matter" is needed when explaining economic growth and development. In sociology, the concept of 'institution' has been in the middle of the analysis (Keizer, 2008), in relatively has a different meaning with how it is being conceptualized by another discipline.

A study conducted by Acemoglu and Robinson (2008) argued that the main factors affecting the difference in prosperity across countries are differences in economic institutions. He noted that solving the issue of development entails reforming institutions. They further opine that development could be very difficult to achieve because

these economic institutions are influenced by the political process. According to them, economic institutions of society rely on the political institution nature and the dissemination of societal political power.

The movement towards a low-carbon and sustainable economy will demand an important transition of economic, energy, and social systems. Proposing economic objectives and policies and environmental policies plays an important role in pioneering and promote the shift but as Dasgupta, De Cian and Verdolini (2016) [11] noted that Institutional development is needed for proper policies implementation and effective monitoring.

Globalization, institutions and environmental quality
Globalization and Environmental Quality

In a study conducted by Copeland and Taylor (2004) [10], trade openness can affect environmental quality both positive and negative. Similarly, Grossman and Krueger (1991) [15] argued that the effect of international trade on the environment relies deeply on policies execution in local economies, despite the size and levels. of development. Authors of free trade opined that the concept is an outcome of efficiency in the production of the countries participating in trade by resource allocation. Heckscher (1919) [16] and Ohlin (1979) [22] posited that "*trade is the main engine that provides an innovative opportunity to enhance the process of production as well as productivity of abundant natural resources*".

Runge (1994) [26] and Helpman (1998) suggested that openness to trade reduces emissions of CO_2 through the use of standard and cleaner technologies in consumption and production activities. Similarly, researchers have noted that trade openness does not only affects the economy of developed countries but also brings changes that are detrimental to the quality of their environment. For example, is the relocation of heavy industries from developed countries with stiffs' environmental policies to countries with slack environmental policies. The various study has been able to contemplate on globalization role on environmental indicators for just a country or a panel framework. The most empirical review has been placed on knowing the effect of conventional and modern globalization indicators on the quality of the environment (Machado, 2000).

In the same vein, Antweiler *et al*. (2001) [3] investigated the impact of trade on the quality of the environment with an introductory composition, technological and scale impact. A study by Managi *et al*. (2008) discovered that the improvement on the quality of the environment is as a result of regulations in the environment is way stronger than the effect of capital-labour intensively.

Consequently, Baek *et al*. (2009) [5] posited in a study that environmental effects of trade liberalization on environmental quality for 50 developed and developing countries over the data period of 1960-2000. Inspite authenticating the environmental Kuznet curve hypothesis and the pollution haven hypothesis for both developed and developing economies.

Institutions and Environmental Quality

Dasgupta and De Cian (2016) [11] carried out a study on the influence of institutions and governance on environmental policy, environmental outcomes and investments. In their study, using an econometrics analysis to examine the relationship between the dependent and independent variables. A description was made on the linkage between institutions and several variables that are responsive to the performance of the environment and policies guiding environmental discrimination has been in operation.

The public goods nature of environmental protection has been the theoretical argument for government activity in the environmental context. Private institutions have refused to take into cognizance the cost of underpinning pollution as a result of externalities, making a pace for government intervention (Bimonte, 2014) [6]. Important questions have been asked on the extent of government intervention and how several varieties of government and arrangement of electoral processes affect environmental regulations and quality of the environment.

According to a study conducted by Castiglione *et al*. (2013) [7] posited that a solid and more adhere rule of law leads to reduction in environmental contamination, while in Castiglione *et al*. (2012) found that there exists a negative relationship between pollution and the rule of law, he further that when the rule of law is strongly adhered to, the Environmental Kuznets Curve (EKC) turning point will happen at a lower level of income per capita, which will decrease emissions.

Still, on institutional quality and its influence on environmental quality, Welsch (2004) [32] conducted a study on the impact of corruption on pollution and discovered that corruption has both direct and indirect effect on environmental pollution. Similarly, Cole (2007) [9] also discovered that per capita emissions is increased as a result of corruption which is direct while the indirect impact is seen in higher income countries.

Theoretical Framework
The Environmental Kuznets Model

According to Grossman & Krueger's (1991) [15], the environmental Kuznets model. This explains the hypothesized or empirical relationship between the different indicators of environmental degradation and per capita income. The model posited that in the first stage of economic growth and development, environmental degradation and pollution increases, but when it exceeds some given level of per capita income, which differs according to the indicators, will reverse it trend and when income is high, it leads to high environmental quality.

According to Cole (2003); de Bruyn (2000) [12] and Friedl and Getzner (2003) [14], the Environmental Kuznets Curve is an important concept, but in most literature, it is econometrically weak. However, little or no attention has been paid to the statistical properties of the data used, such as the serial dependence or stochastic trends in time series. In line with Perman & Stern (2003) [23] review, by the time a diagnostic and specification test is been conducted on the data, we will find out that the Environmental Kuznets Model does not exist. Similarly, Shawkat (2019) [30] made use of the environmental Kuznet curve which he divide into technique, scale and effect of it composition and then

integrating the energy roles of consumption of energy, foreign direct and trade openness as it affects carbon emission in the United State.

The neoclassical theory

During the end of the 19th century in Victorian England, were the Neoclassical school of economic thought begins, with the unofficial leader from the Cambridge economist Alfred Marshall. Where the classicists had beckon upon the natural law philosophy to get their own theories. The neoclassicists used the engineer's tools of analytical geometry and differential calculus to create abstract models of market economies (Christiano, 2014) [8].

The neoclassicist theory emphasized the so-called "efficient" market as the means of optimizing satisfaction among consumers and producers. As these two different groups met in the market place, voluntary exchange prices would be established to set consumption and production at an optimal equilibrium level. He also noted that increase in price could instigate the invention of new technologies and raw materials, and they would encourage efficiency and substitution both in consumption and production.

Producer's and consumer's surplus provided a means for neoclassical economists to begin valuing societal welfare, but the conceptual framework was incomplete. It still lacked some means of accounting for pollution and the like which, although they occur external to the market transaction, nevertheless still affect human welfare. The missing piece was supplied by A.C Pigou, a former student of Marshall, in his 1920 book titled, "The Economics of Welfare". Pigou also realized that these market-external changes in human welfare could cut both ways yielding beneficial and detrimental effects. These effects he called "uncompensated services and disservices" (Pigou, 2017) [24].

Pigou (2017) [24] provided an example of an uncompensated service;

"*It is true in like manner of land devoted to afforestation, since the beneficial effect on climate extends beyond the borders of the estates owned by the persons responsible for the forest*"

And of an uncompensated disservice

"…smoke from factory chimneys… in large towns inflicts a heavy uncharged loss on the community, in injury to buildings and vegetables, expenses for washing clothes and cleaning rooms, expenses for the provision of extra artificial light and in many other ways.

Pigou also noted that the modern notion of economic externalities, changes in welfare due to unintended side effects often of an environmental nature- that are not directly captured in the market transaction itself. Externalities provided a powerful way of incorporating environmental damage into economic assessment.

3. Methodology

The relationship between globalization, institution and environmental quality has long been a topic of interest in both economic, social and political literature. Globalization and institutions according to literature have been said to have both negative and positive impact on the environment (Dasgupta and De Cian, 2016; Antweiler *et al*., 2001; Baek *et al*. 2009) [11, 3, 5].

Thus, this study, following the work of Shahbaz *et al*. (2018) [29]; Esty & Ivanova, (2004) [13]; Dasgupta & Cian,

(2016) [11]; Ali *et al*., (2019) [2], suggest that globalization which is proxy with Foreign Direct Investment, Gross Fixed Capital Formation. institution proxy by regulatory quality and control of corruption, environmental quality by Cardon dioxide emissions while GDP was used as the control Variable, which varies across the six (6) selected Sub-Sahara Africa Countries. This present study is based on annual time series data gotten from the World Bank Development Indicator, Transparency International and Governance Indicators database. The data that was collected; Carbon dioxide emission as the dependent variable and Foreign Direct Investment, Regulatory quality, Gross Fixed Capital Formation, Control of Corruption and GDP as the independent variable. The study is cross-sectional research will investigate the relationship between environmental quality as the dependent variable and terms of trade as a proxy for globalization and Regulatory quality as a proxy for institutions.

Three types of panel data analysis were applied for the study, namely; the Pooled OLS model, the random effect model and the fixed effect model were used to analyze the study. The study assumptions were that the coefficient and intercept are fixed in the coefficient of the constant, thus, the variant of time and space are not put into cognizance.

3.1 Pooled Ordinary Least Square

For our samples to be reliable, firstly we estimated the equations as follows;

$CE = \beta 0 + \beta_1 FDI + \beta_2 RQ + \beta_3 GFCF + COC\beta_4 + \beta_5 GDP + \mu t$

Where;

CE= Carbon dioxide Emission
FDI= Foreign Direct Investment
RQ= Regulatory quality
GFCF=Gross Fixed Capital Formation
COC=Control of Corruption
GDP=Gross Domestic Product
μt = Error Terms

As Aparaschivei (2012) [4] noted, the pooled Ordinary Least Square model estimates the model leaving behind the structure of the pane data. The pooled Ordinary Least Square is used to estimate pooled ordinary least square could be utilized for estimating the set of data

$$Y = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \varepsilon_{it}$$

Where:

$$\varepsilon_{it} = \lambda_i + u_{it}$$
$$u_{it} \sim N(0, \sigma_u^2)$$

In the model as stated above, u_{it} meaning error of time varying, which described time variation among data of the same components and then, λ_i is seen as unexplained heterogeneity.

3.2 Model of fixed effects

This can also be called the unobserved effect. When analyzing the fixed effect, assumptions are made on all studies to have the same side effect. Our common effect size will be based on an estimate of the summary effect. The variation here explains the within individuals rather than between individuals which are referred to as "within" estimator. The following are the assumptions of the fixed effect model which are termed constant.

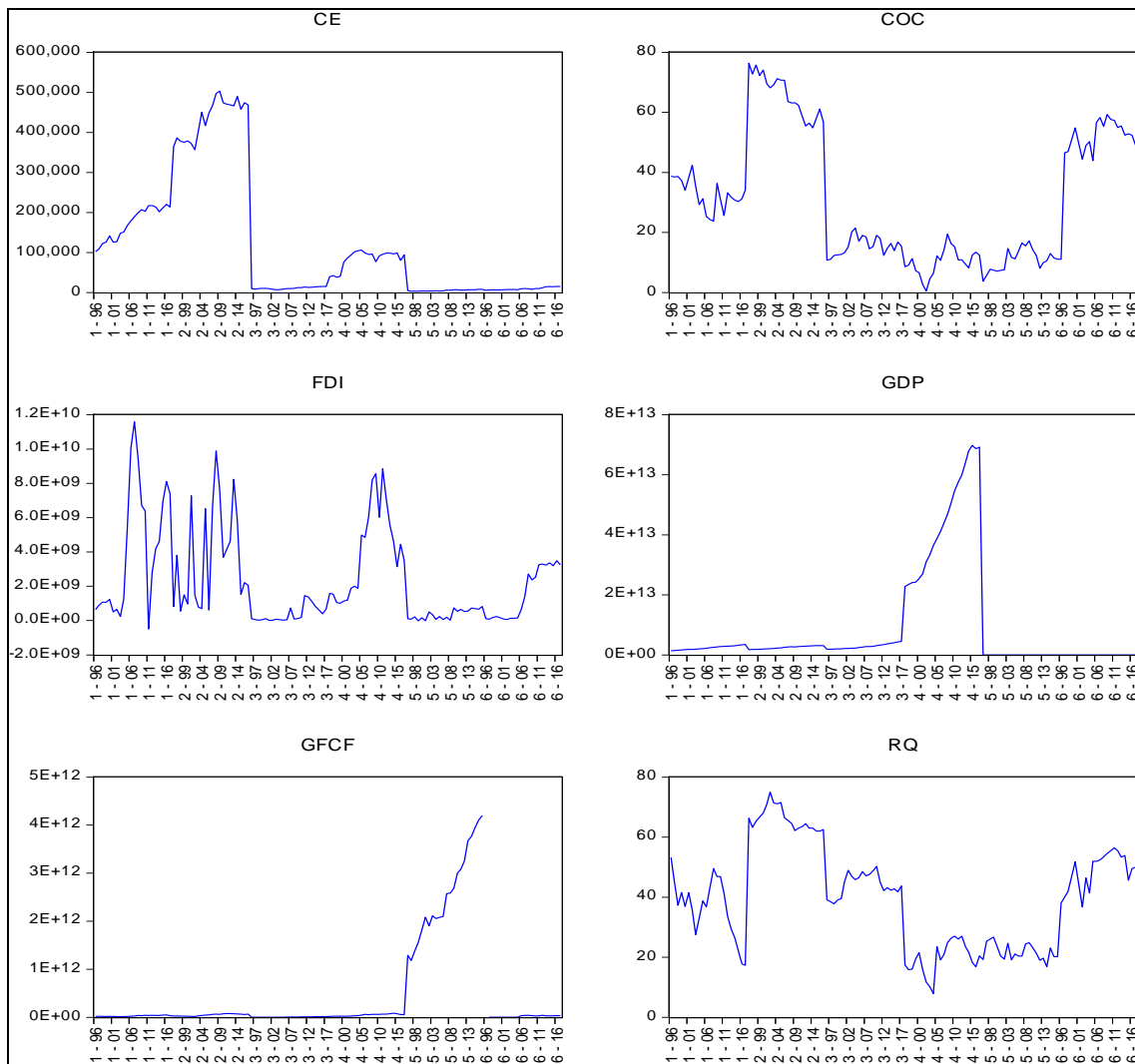$$Y = (\beta_0 + \lambda_i) + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + u_{it}$$

- This method is adopted when analyzing the impact of variables over time.
- It identifies and explores the predictor and the outcome within an entity

3.3 Model of random effect
A substitute to the model of fixed effect is the model of random effects which most times is referred to as an error component model. The random effect assumes that λ_i is gotten from a different probability distribution. The random effect contains the following;

$$Y = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \lambda_i + u_{it}$$

The different intercept was proposed by the model of random effect for each of the entity and the intercepts are constant over time possessing the relationships between the explanatory and observed variables to the same both cross-sectionally and temporally.

3.4 Hausman Test
To decide within the fixed or random effect, the Hausman Test was run. It helps to determine an estimator uniformity when a comparative study is conducted with an alternative.

$$H = (\hat{\beta}_{re} - \hat{\beta}_{fe})'(Var(\hat{\beta}_{fe}) - Var(\hat{\beta}_{re}))^{-1}(\hat{\beta}_{re} - \hat{\beta}_{fe})$$

4.0 Data Analysis
Trend Analysis

This section will explain an over of the trend in each of the variables for the six (6) Sub-Sahara Africa countries as used for the study.

Carbon Emission; The trend for carbon emission shows an increasing trend for Sudan and South Africa. The rate of carbon dioxide emission fell drastically in Kenya as compare to the last value for South Africa. It therefore experiences as slight increase for Nigeria which was sustained over the time frame but fell in 2010 for Nigeria and it experience a turn down for Cameroon and was at a low level through out the time span for Cameroon and Ghana.

In conclusion, countries that are more industrialized especially South Africa had a high level of carbon emission while less industrialize countries like Kenya, Cameroon and Ghana have a low level of carbon dioxide emission.

Control of Corruption: The control of corruption was incredibly high in countries like Sudan, South and Ghana. This also connote a low level of corruption in the country. Nigeria and Kenya have the lowest level of corruption

control.

In conclusive, this posit the weakness of the Environmental Kuznet curve as opined by Cole (2003); de Bruyn (2000) [12] and Friedl and Getzner (2003) [14] that the Environmental Kuznets Curve is an important concept, but in most literature, it is was termed econometrically weak.

Foreign Direct Investment: According to the graph above, the trend for FDI was averagely in a zig zag movement across the 6 countries but was incredible low in Kenya and Cameroon but high in Sudan though low at first, high and low in South Africa, high in Nigeria with a fall in most period and little bit higher in Ghana. Based on theory, countries involve more in international trade are said to have high Foreign Direct Investment.

This invariably explains that countries with high carbon emission trend have a high Foreign Direct Investment.

Gross Domestic Product: The result shows an incredible low level of GDP in Sudan, South Africa, Kenya, Cameroon and Ghana as compare to that of Nigeria. This support to the statistics from Forbes (2019) that Nigeria is Sub-Sahara Africa's largest economy and it depends majorly on oil as its main source of foreign exchange earnings and revenues.

Gross Fixed Capital Formation: As shown in the graph above, the level of Gross Fixed Capital Formation was low across Sudan, South Africa, Kenya and Nigeria but tends to be high for both Ghana and Cameroon.

Regulatory Quality: South Africa have the highest regulatory quality which is followed by Ghana, Kenya and Sudan with Nigeria been the lowest of them all.

4.2 Pooled OLS, fixed effect and random effect

From the table above, the OLS results show that the coefficient for TOT is 4.1394 with a positive and significant relationship with Carbon dioxide emission (CE). This shows that an increase in the terms of trade of about 1% will lead to an increase in Carbon dioxide emission by 4.13%. The Hausman fixed-effect model test was seen as the most reliable model for the study. The result of the fixed effect R^2 was within 0.0741. This explains a 7.41% of changes in Carbon dioxide emission. Which explains that the model is statistically positively significant at 1% level.

From the table above, the OLS results shows that the coefficient of the intercept is -1534 which shows that the expected value on your dependent variable will be less than 0 when all independent/predictor variables are set to 0. The coefficient of COC is 3095.8 which is positive and significance and it shows that a unit increase in COC rank will lead to a 3095 unit increase in Carbon Emission. FDI shows a positive and significant relationship with CE with coefficient and Probability of 1.83 and 0.0000; GDP has a positive and insignificant relationship with CE with 1.42 and 0.0512 as its coefficient and Probability. GFCF have a positive and insignificant relationship with CE with both coefficient and probability of 1.94 and 0.0936 while the RQ have a positive and significant relationship with CE with coefficient and probability of 2869 and 0.0128**.**

Fixed effect model

The major Problem with the Pooled OLS is that it does not distinguish between the various countries that we have. In other worlds, by combining six Sub-Sahara by pooling we deny the heterogeneity or individuality that may exist among six countries.

The term effect fixed effect is due to the fact that although the intercept may differ across computer companies, but intercept does not vary over time, that is it time invariant

Random effect model

The six countries have a common mean value for the intercept as opposed by the fixed effect model

Hausman Test

The results from the above table show that the three models (OLS, FE, RE) to analyze carbon dioxide emission in 6 Sub-Sahara African countries. The resulted from the Hausman test supports the fixed effect which is against the pooled OLS and the RE.

The reason for supporting the Hausman test is based on the fact that the Probability of the test is less than 0.05 which explains that the Null hypothesis is rejected and the alternative is accept showing that Fixed Effect is Appropriate.

The result of the findings is similar to that of Castiglione *et al*. (2013) [7]; Dasgupta & De Cian (2018); Baek *et al*. (2009) [5]; Antweiler *et al*. (2001) [3]; Copeland & Taylor (2004) [10]. This conforms to the Apriori expectation as earlier illustrated in several empirical works of literature reviewed in the study. The result from the analysis shows that foreign Direct Investment which proxy globalization as earlier reviewed by Runge (1994) [26] and Hepman (1998); Antweiler *et al*. (2001) [3]. This applies to the six Sub-Sahara Africa countries used for the study. The study results also explained that the regulatory quality of these six Sub-Sahara African countries which proxy institutions is negatively related to environmental quality, in other words, an increase or improvement in institutions participation through making concrete policy on environment protection will enhance the quality of the environment which is similar to the findings of Castiglione *et al*. (2013) [7]. The above findings illustrate that there exists a relationship of the six Sub-Sahara African countries between dependent variable; Carbon dioxide emission (CE) which is a proxy of environmental quality and the independent variable; Foreign Direct Investment (FDI), Gross Fixed Capital Formation (GFCF) which measures globalization and regulatory quality (RQ) which measure institutions and GDP as the control variable.

5. Conclusion

The present study aims at examining globalization, institutions and environmental quality with an empirical analysis of selected Sub-Sahara African countries. From the study, the results show that there is a significant and positive relationship between environmental quality as the dependent variable and institutions and there is a significant and negative relationship between environmental quality and Carbon emission.

To our knowledge, no published research in the field of environmental modelling and assessment has studied the role of globalization in the dynamic evolution of CO2 emissions focusing on the case of developed countries, using fairly modern techniques. This study empirically addressed this research gap by examining the relationship

between globalization and CO2 emissions across 25 developed countries within country-specific time series and panel frameworks covering the data period of 1996-2017.

Based on past literature review, no published article or journal in the field of economics or environmental management has been able to capture both globalization and institutions as a key determinant factor to environmental quality using the case of Sub-Sahara countries. Empirically, the study addressed the gap in research of integrating both globalization and institutions, though previous work uses Carbon dioxide emission, which was also used in this study, the study used regulatory quality which captures all forms of institutional policy and regulations covering the period 1996-2017.

Based on empirical findings, we conclude that globalization and institutional quality in selected Sub-Sahara Africa Countries increase carbon dioxide emission. The study also concludes that in the long term, globalization does not benefit the health of the environment of the four sub-Sahara African countries.

Policy Implications
Governments of these economies may use proper and effective policy coordination to minimize the environmental cost caused by globalization.

Policymakers should use globalization as an instrument in making a framework for environmental policy to improve environmental quality in the long-run.

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