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## Stock Exchanges Sustainability Initiatives and Corporate Environmental Sustainability Commitment

Collins C Ngwakwe<sup>1</sup>

**Abstract:** This paper undertook an analysis to decipher the degree to which stock exchanges' environmental proclivity has influenced companies' environmental commitment. The paper is pertinent, as stock exchanges have often been criticised as instruments of capitalism hegemony, it thus helps to assuage such criticism given the paper's findings about the growing environmental advocacy of stock exchanges to blend with their core economic objective to ensure environmental sustainability. The paper adopted a quantitative approach using the ordinary least square (OLS) technique with time series data from the Carbon Disclosure Project archive showing the number of companies engaging in carbon disclosure over the years. Holding other factors constant, and at an alpha of 0.05 significance level, findings from the analysis show that growth in stock exchanges' environmental initiatives has contributed a positive and significant booster to corporate environmental commitment at *P* level of 0.020 significance, using number of carbon disclosing companies as a proxy for environmental commitment. The paper also found that the launch of the United Nations Sustainable Stock Exchanges in 2009 provided an additional impetus that has accelerated the environmental sustainability momentum of stock exchanges. The paper recommends further research on the extent to which corporate carbon commitments has resonated with pragmatic carbon reduction.

**Keywords:** environmental economics; Stock exchanges; capitalism; corporate environmentalism; sustainable development; Responsible investing; carbon reduction; carbon disclosure;

**JEL Classification:** Q5; Q56; M21; Q01;

### 1. Introduction

Business has been censured for entrenched capitalist economic hegemony that undermines environmental wellbeing (Kolk & Levy, 2001; Shankleman, 2015). Hence, business has received extensive criticism for contributing to environmental degradation and concomitant climate change that threatens human and environmental sustainability. Since the origin of capitalism, survival of the fittest has reigned supreme (Freeman, Martin & Parmar, 2007), but the socialists and the environmentalists have often been derided by capitalists for sustainability activism. Advocates of environmental sustainability whose vocal standing made news in the early days of environmentalism include John Meum who led environmental advocacy to save the Hetch Hetchy Valley in the United States (Sierra Club, 2008). Similarly, in the recent past, there have been outcries in academic publications that corporate empires wield influences meant to obstruct climate change and environmental policies. Such negative influence includes amongst others, political lobbying and climate change denial, which are tactical moves to perpetuate business as usual if left unchallenged (Stoll-Kleemann, O'Riordan & Jaeger, 2001; Shankleman, 2015; Björnberg, Karlsson, Gilek & Hansson, 2017).

However, recent evolution in consumer movements for environmentally sustainable business operations, products and services is adding momentum to corporate sustainability rethink and initiatives (Cherian & Jacob, 2012). In addition, natural proofs of sustainability exigence are adding impetus; there has been increasing physical changes in weather patterns with concomitant negative impacts on humans such as droughts, erratic rainfalls, and rising level of tropical diseases (Kreyling et al., 2017). In response, government environmental policies are shifting towards a positive stance on environment and sustainable development. Thus, many countries in developed, emerging and

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developing nations are taking up environmental and climate change policies and regulations (Hughes et al., 2018).

Consequently, there are evolving environmental orientation in global stock exchanges, World Federation of Exchanges (WFE) (2014), with support from the United Nations Sustainable Stock Exchanges (UNSSE), that suggest emerging functional transformation toward sustainable stock exchanges and these sustainability transformations seem to be driving some impetus on corporate environmental proclivity (Wallace & Harvey, 2015; UNSSE, 2017). Therefore, the objective that motivates this paper is to analyse the influence of stock exchange environmental initiatives on corporate environmental initiatives.

The rest of the paper is organised as follows: the next section attempts a brief connection between the stock exchange and sustainable development; the next section presents emerging sustainable development stance in stock exchanges; and the paper ends with conclusion.

## **2. Environmental Economics Theory – A Brief**

In recent years, an unprecedented global environmental awareness ensued from the late 1970s and has engulfed the health and safety thinking of the society including the corporate, governments and institutions. Such environmental safety consciousness has had a somewhat neutralisation effect on the previously pure economic thought that constituted the fulcrum of the capitalist economic system. The economics and capitalist institutions are thus realising that “health is wealth” and that the environment is the crux of society’s health and as such, if an unbridled plundering of the environment continues unchecked, the economic system might lose its value given the negative health consequences implicit or explicit.

Accordingly, environmental economics theory, whilst so diverse in theory and application, can be couched within the Pareto (80/20) principle (Kane, 2014; Li, Hung Chiang, Zhou & Choi, 2014; Gudarzi & Rahimi, 2015). In this instance of environmental economics in a capitalist society, it can be said that up to eighty percent of environmental problems emanate from unsustainable use of natural resources, which are owned by twenty percentage of the opportune population (Nick, 2008; Kiremire, 2011). This continuum of reasoning prods environmental economics, which is a tentacle of economics that deals with the economic dimensions of environmental problems and solutions (Starvins, 2007). Therefore, the crux of environmental economics theory is that all forms of environmental pollution constitute externalities to the polluter – mostly the corporate, which are not reported back to the costs and prices of corporate operations.

Hence, it has been suggested that the key to halting externalities should be through an imposition of emission tax that is equitable to the damage caused by private interests to the society (Starvins, 2007). Therefore, compensation, which relies on costs and prices have dominated the theoretical solutions of environmental economics. Compensation has been seen to reside on the side of command and control actions by authorities; in the same vein, internalisation of externalities seem to be vested on the side of market-based instruments for motivating environmental responsibility. Whilst some of the instruments are mandatory, majority appear voluntary such as the listing of companies in the sustainability indices of stock exchanges. With a wide array of literature on stock exchanges’ sustainability index, there seem to be a growing incentive by companies to get indexed in environmental sustainability indexes, which has thus provided a soft measure to encourage environmental compliance. Stock exchanges’ sustainability indexes could thus be said to fall within the market-based instruments; hence, this paper sought to evaluate the impact of environmental sustainability initiatives of stock exchanges on corporate environmental sustainability initiatives.

### 3. Literature Review

This literature section explores the literature on how stock exchanges are gradually integrating environmentalism into stock markets core economics pursuit thereby encouraging corporate environmental sustainability operations through voluntarism and/or minor coercion arising from certain stock exchanges' listing requirements (Eccles, Serafeim & Armbrester, 2012). The following review is not sacrosanct, but presents a brief summary of selected closely related literature to this paper's focus.

#### 3.1. Stock Exchanges and Corporate Environmental Initiatives

In their concern over the tension between investment pursuit and environmentally sustainability development, Richardson and Cragg (2010) opine that financial markets:

*“Should not allow the pursuit of maximising investment returns to prevail over an ethical agenda of promoting social and economic justice and environmental protection”* (Richardson & Cragg, 2010, p. 21).

They maintain that stock exchanges and/or financial markets should serve as the pressure pump to drive corporate environmental sustainability momentum.

In this regard, many countries are using the stock exchanges as avenues to encourage environmental and/or sustainability compliance by making sustainability compliance as one of the stock exchange listing requirements; example includes inter alia, the Johannesburg Stock Exchange, the Shanghai Stock Exchange and the Malaysian Stock Exchange (Eccles, Serafeim & Armbrester, 2012; Ioannou & Serafeim, 2017). In the recent past, sustainability indices have emerged in many countries' stock exchanges to survey the sustainable operations of organizations listed in stock markets (Orsato et al, 2015). Researchers and professionals anticipate that sustainable organizations will profit by being listed in such stock exchanges, yet proof of implicit significant corporate financial value from such is still rare.

Accordingly, using the institutional theory, (Orsato et al., 2015) researched the motives that spur corporations to be listed in the sustainability index. The outcomes of the research bolster the principle suggestions of the institutional hypothesis, and additionally the “green benefit” literature that the impalpable corporate benefits derived from voluntary ecological activities, for example, access to information, new abilities and reputational increase, better clarify the endeavours organizations make to be listed in sustainability indexes (Orsato et al., 2015). However, critiques of stock exchange sustainability indexes have argued and questioned the democratic stance of stock exchanges in offering a veritable green economy index with trusted veracity to incentivise the corporate to be green in their operations (Perez, 2016). Such critics wonder whether indeed the centre of capitalism, which is the stock exchange, could pivot pragmatic corporate green operations given the primary goal of stock exchange in raising share values (see e.g. Perez, 2016). On the contrary, there is the belief by other researchers that the corporate in emerging economies listed in stock exchanges' sustainability indexes experience improved sustainability initiatives thereby attracting green conscious investors into their companies (Hsu & Chang, 2017). Similarly, current research conducted in Korea find that shareholders react with shock when they perceive the release of carbon disclosure from firms where investors have a stake. These shocks arise because, on seeing the carbon emissions of firms, investors realise the impending cost implication of carbon and attendant global warming on their investments; the researchers also find that such shock could be moderated by continuous release of carbon disclosure to the market even before the official release of the carbon disclose project (Lee, Park & Klassen, 2015).

Stock exchanges are recognised for their outstanding contribution to corporate environmental initiatives (UNSSSE, 2015). Through their major role as a market capital generating hub, stock exchanges serve as conduits through which corporate environmental activities and impacts could be

evaluated both by climate and environmental rating agencies, climate change advocates and researchers. For instance, the carbon disclosure advocacy by the Carbon Disclosure Project (2017), is made possible through listed companies in stock exchanges. Accordingly, the stock exchange plays an important role of gathering global corporate into a pool of exchange markets from where both economic and environmental proclivities of the corporate could be measured. From the stock exchange listing of companies, researchers are able to analyse economic related performance against climate performance (Beatty & Shimshack, 2010; Lee, Park & Klassen, 2015). Hence, many stock exchange in the world have introduced environmental sustainability disclosure policies, standards and guidance for their listed companies to follow in reporting environmental issues (Khalamayzer, 2016). The global stock exchanges have begun environmental innovation and initiatives by supporting the climate change campaign through committing to a call by the United Nations Environmental Programme (UNEP), in which majority of the global stock exchanges have joined the Sustainable Stock Exchange (SSE) initiative. According to the editor of GreenBiz:

*“These exchanges have pledged to list their guidance on the Sustainability Stock Exchanges (SSE) initiative. It’s a peer-to-peer platform that invites global exchanges to promote ESG disclosure among listed companies and among each other. SSE includes over 60 exchanges — representing more than 70 percent of listed equity markets — and more than 30,000 companies with a market capitalization over \$55 trillion”* (Khalamayzer, 2016, p. 1)

In support of Khalamayzer (2016) assertion above, industry directors have avowed that stock exchanges are on the leading part to corporate environmental sustainability as they express their sentiments as follows: *“If you want a powerful tool for predicting where the sustainability field is heading, just look at what’s going on with stock exchanges”* (Wallace & Harvey, 2015, p. 1). The stock exchanges’ continuous initiatives to environmental sustainability advocacy can be seen from a sudden metamorphosed stance of World Federation of Exchanges (WFE). From its previous benevolent mother organisation, the WFE has joined other global organisations as a strong supporter and guardian toward stock exchanges transition from a capitalist hub to a blend of environmentally caring economic capital center, wherein stock exchanges receive guidance from their umbrella organisation – the WFE, on environmental sustainability operations. In 2014, the WFE made an official launch of its sustainability advocacy through its sustainability Working Group, WFE (2014), which is a step further to the United Nations Sustainable Stock Exchange (UNSSE) initiative, which was launched in 2009. According to Wallace and Harvey (2015), the sustainability guidance of WFE seems even stronger than the sustainability guidance of the United Nations Sustainable Stock Exchanges (UNSSE), a proof that stock exchanges are becoming pivotal to corporate environmental responsibility initiatives.

The influence of stock exchanges on corporate environmental sustainability is argued to be couched in the stock exchanges innovation of the concept of responsible investment, which is enshrined in the phenomenon of ESG (environmental, social and governance) practices of companies (Myklebust, 2013). Being the arbiter of business capital exchange, where all business-enabling financial instrument are facilitated (Myklebust, 2013; Lane & Myant, 2016), companies are docile to the nudges in respect of stock exchanges sustainability innovations in order to retain corporate legitimacy within the stock exchange and in the eyes of investors. However, some researchers have argued that the current burgeoning of auxiliary stock exchanges, popularly referred to as alternative stock exchanges might somewhat neutralise the overarching role of stock exchanges in championing corporate governance and environmental issues (Koldertsova & Christianson, 2008). Despite these arguments though, there are ubiquitous research and evidence that point to and which elucidates diverse stock exchanges innovations, initiatives and healthy activities that advocate corporate environmental sustainability (Wallace & Harvey, 2015; UNSSE, 2015). These environmental penchants of the stock exchanges serve as clues and plausible arguments against old-age beliefs that the stock exchanges are only machines and/or centres of capitalism (Lane & Myant, 2016).

Rather than being seen as mere centre of capitalism, the current years of sustainable innovations of stock exchanges have witnessed commitments by the stock exchanges, which aligns with the call by

the World Commission on Environment and Development (WCED) (1987). In the goal eight (8) of the WCED report, which is popularly referred to as the Brundtland Report, the commission called for a sustainable and responsible industries that would strive for sustainable industrial development, which would produce more whilst using less of the natural resources and hence ensuring environmental economic development. The World Federation of Stock Exchanges (WFE) has responded to the right direction by joining hands with the United Nations Sustainable Stock Exchanges initiation and currently the stock exchanges can be seen to be hosting and championing environmental sustainability indices – from the Americas to Europe and from Asia to Africa (UNSSE, 2015). The stock exchanges sustainability reforms are in consonance with Quigstad (2011) assertion that although the stock exchanges main duty is to provide a financial conduit for businesses, but that they also have a role in enhancing general welfare of the society. One of which is ensuring sustainable economic development through their role as resource allocators and exertion of control over the business empires (Myklebust, 2013). Therefore, the environmental sustainability initiatives of the stock exchanges in the current years have been focussed on spurring corporate environmental sustainability behaviour.

### **3.2. A Brief on Environmental Initiatives of Exchanges that Spur Corporate Environmental Compliance**

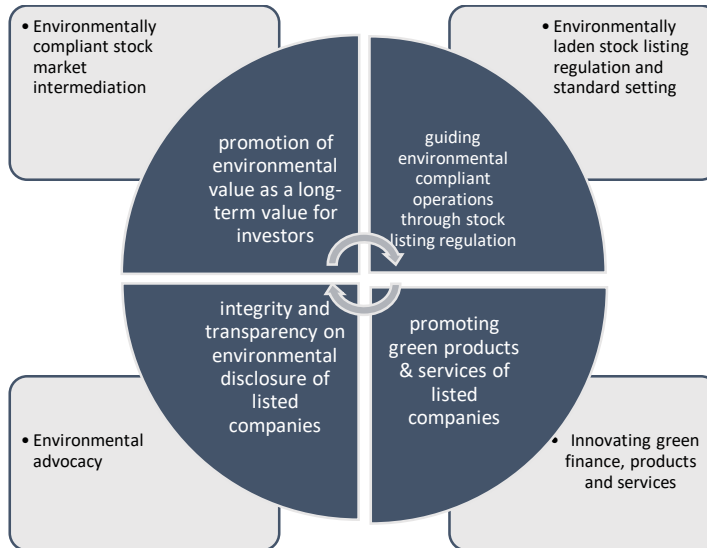
There are many global exchanges that have exhibited pragmatic commitment with environmental sustainability initiatives with the firm believe that sustainability operations are pivotal to corporate resilience amidst changing climate and its negative impacts on corporate investment and financial health (UNSSE, 2017). Stock exchanges' growing environmental sustainability initiatives has also been boosted by the unprecedented consumer and investors' awareness of and interest in environmental sustainability as they become more convinced that the safety of their investment might depend on long-term corporate environmental sustainability standing. Thus an avid investor would not want the had-earned capital to be flushed away by a corporate insensitivity to the environment, hence investors are now adding their voice to encourage corporate management to incorporate the environment in corporate tactical and strategic operations. Thus, the stock exchanges recognise investors' concern for the environment and are therefore innovating toward environmental and sustainable stock exchanges. Another booster to stock exchanges' environmental sustainability devotion as an added strategy to the core stock exchanges investment business is the environmental and sustainability advocacy being played jointly by the United Nations Global Compact (UNGC). the United Nations Conference on Trade and Development (UNCTAD); the United Nations Environmental Programme Financial Initiative (UNEP FI) and the Principles for Responsible Investment (PRI) (UNSSE, 2015).

A brief of pragmatic initiatives of the global exchanges toward environmental sustainability can be noted with few examples from some global exchanges amongst others.

The New York Stock Exchange (NYSE) provides environmental indexes for listed companies such as the “*NYSE Arca Environmental Services Index (AXENV)*; *the NYSE Arca WilderHill Clean Energy Index (ECO)* and *the NYSE Arca WilderHill Progressive Energy Index (WHPRO)*” (UNSSE, 2017, p. 1). The listed companies in the NYSE constitute a significant part of the Carbon Disclosure Project's Standard and Poor (S&P, 500) Disclosure Leadership Index and the Dow Jones Sustainability Index (UNSSE, 2017). The London Stock Exchange (LSE) has environmentally related sustainability indices such as the FTSE Green Revenues Index Series, the FTSE4Good Index Series, FTSE Environmental Market Index Series and the FTSE All-World Ex-Fossil Fuel Index Series. The LSE also has green bonds listed in its stock exchange (UNSSE, 2017). The Shanghai Stock Exchange has many environmental related indices in its stock exchange, which includes inter alia, the SSE 180 Carbon Efficient Index, the SSE Green Corporate Bond Index and SSE Green Bond Index. The Shanghai Stock Exchange also has green bonds listed in the stock exchange (UNSSE, 2017). The South African Johannesburg Stock Exchange (JSE) requires listed companies to apply or explain how they have complied with the South African King codes of corporate governance, which includes sustainability reporting. The JSE has a renowned responsible investing index (FTSE/JSE Responsible

Investing Index Series) which is an adoption of the Financial Times and London Stock Exchange (FTSE) Environmental, Social and Governance rating index. In addition, the JSE has green bonds listed in its stock exchange (UNSSE, 2017).

Accordingly, the stock market role in corporate environmental compliance can be summarised in the following chart in Figure 1.



**Figure 1. Stock Market Role in Corporate Environmental Compliance**

*Source: Author's chart with information from the UNSSE (2015, p. 1)*

Given the stock exchanges environmental innovation, in the following method and analysis section, the paper explores the extent to which years of stock exchanges environmental innovation and/or advocacy is related to listed companies' environmental commitment using carbon disclosure and compliance commitment as an example of environmental commitment.

**4. Method and Results**

This paper used the positivist paradigm (Robson & McCartan, 2016) wherein the ontology and epistemology is realism and objectivism respectively (Aliyu, Bello, Kasim & Martin, 2014). Therefore, given the positivism slant, the paper applied a quantitative analysis approach since positivist paradigm accesses the relationship between variables being examined using a statistical approach (Antwi & Hamza, 2015). The dependent variable data was from Carbon Disclosure Project (CDP) (2017) on the growth of companies engaging on carbon disclosure and commitment from the year 2003 to 2016. In addition, the independent variable data was retrieved through a content analysis of annual sustainability engagements of five major global stock exchanges. The content of stock exchanges' environmental sustainability initiatives was examined starting from 2003. The decision to use the years 2003 to 2016 is based on data availability from the Carbon Disclosure Project (2017). Content analysis is a popular approach in sustainability research, which has also been used in other environmental management related research such as in corporate environmental supply chain (Brandenburg, Govindan, Sarkis & Seuring, 2014; Fahimnia, Sarkis & Davarzani, 2015). The content being examined is usually converted to numbers (Auer-Srnka & Koeszegi, 2007), thus in this case, whilst the base year of stock exchanges' environmental sustainability initiatives was assigned 1, subsequent years with an additional improvement on existing sustainability initiatives was assigned 2 to show improvements in sustainability initiatives. Since the paradigm is positivist and quantitative, the regression statistical approach to measure the relationship between stock exchanges' sustainability initiatives and companies' environmental commitment was used.

Therefore, the OLS regression model is represented by:

$$Y = \beta_0 + \beta_1\chi_1 + \varepsilon$$

Where: Y = growth in number of companies engaging in carbon disclosure (CDComps);  $\beta_0$  = Y intercept (constant);  $\beta_1$  = the regression coefficient;  $\chi_1$  = independent variable (stock exchanges' sustainability initiatives [SEXSusInit]);  $\varepsilon$  = the error term controlling for unaccounted independent variables. The regression result is presented in Table 1.

**Table 1. Regression Results**

Model 1: OLS, using observations 2003-2017 (T = 15)				
Dependent variable: CDComps				
	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>
const	-520.25	854.557	-0.6088	0.55315
SEXSusInit	1219.92	463.449	2.6323	0.02070 **
Mean dependent var	1675.600		S.D. dependent var	856.6111
Sum squared resid	6701284		S.E. of regression	717.9717
R-squared	0.347677		Adjusted R-squared	0.297498
F(1, 13)	6.928782		P-value(F)	0.020698
Log-likelihood	-118.8573		Akaike criterion	241.7145
Schwarz criterion	243.1306		Hannan-Quinn	241.6995
rho	0.482801		Durbin-Watson	0.998609

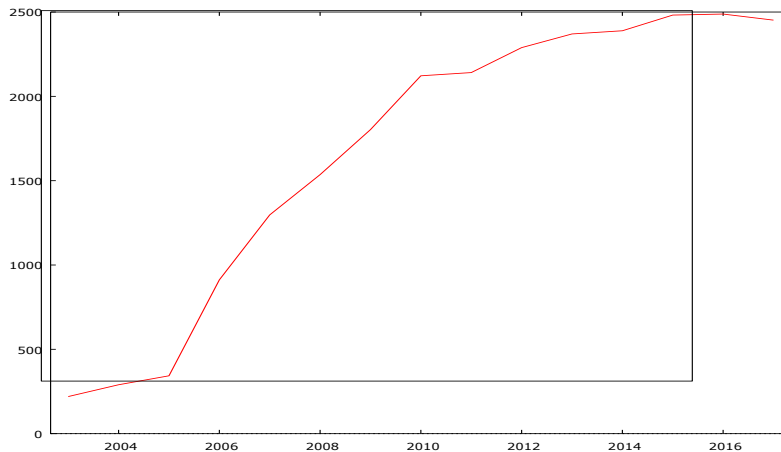
**Table 2. Normality of Residual**

<i>Test for normality of residual</i>				
Test for normality of residual -				
Null hypothesis: error is normally distributed				
Test statistic: Chi-square(2) = 4.19079				
with p-value = 0.123022				
Frequency distribution for uhat1, obs 1-15				
number of bins = 5, mean = -3.86535e-013, sd = 717.972				
interval	midpt	frequency	rel. cum.	
< -1321.3	-1629.6	1	6.67%	6.67% **
-1321.3 -	-704.86	-1013.1	1	6.67% 13.33% **
-704.86 -	-88.385	-396.63	4	26.67% 40.00% *****
-88.385 -	528.09	219.85	5	33.33% 73.33% *****
>= 528.09	836.33	4	26.67%	100.00% *****
Test for null hypothesis of normal distribution:				
Chi-square(2) = 4.191 with p-value 0.12302				

**Table 3. Heteroskedasticity Tests**

<i>White's test for heteroskedasticity</i>				
White's test for heteroskedasticity -				
Null hypothesis: heteroskedasticity not present				
Test statistic: LM = 0.0810957				
with p-value = P(Chi-square(1) > 0.0810957) = 0.775818				
White's test for heteroskedasticity				
OLS, using observations 2003-2017 (T = 15)				
Dependent variable: uhat^2				
Omitted due to exact collinearity: sq_SEXSusInit				
	coefficient	std. error	t-ratio	p-value
-----				
const	234118	819403	0.2857	0.7796
SEXSusInit	118130	444384	0.2658	0.7945
Unadjusted R-squared = 0.005406				
Test statistic: TR^2 = 0.081096,				
with p-value = P(Chi-square(1) > 0.081096) = 0.775818				





**Figure 1. Growth in carbon disclosing Compliance companies since 2003**

Table 1 to Table 3 present the regression results of the relationship between stock exchanges sustainability initiatives and corporate environmental initiatives (represented in this test by carbon disclosure engagement and compliance) as the dependent variable (Y) using data from the carbon disclosure project. The analysis was meant to check if stock exchanges environmental sustainability initiatives have had any significant influence on corporate environmental agenda. Thus using the OLS regression statistics, at an alpha ( $\alpha$ ) of 0.05, the error term ( $\epsilon$ ) controlled for all uncounted independent variables. The regression result show that within the sample of five stock exchanges over 2003-2017, fifteen (15) years, there is a significant and positive relationship between the burgeoning stock exchanges environmental sustainability initiatives and corporate carbon disclosure compliance and commitment as indexed in the Carbon Disclosure Project (CDP). The analysis also tests for normality and homogeneity of variables, Table 2 and Table 3 indicates that that errors are normally distributed and are homoscedastic. This result is useful for policy makers and institutional advocates for sustainable development. It indicates that improved nudging of stock exchanges environmental sustainability such as being done by the United Nations Sustainable Stock Exchanges (UNSSE) would facilitate improved corporate environmental sustainability compliance. Figure 1 shows how the corporate have progressed over the years regarding carbon disclosure and commitments – with a rising positive trend. These findings are in alignment with Richardson and Cragg (2010) assertion that stock exchanges and financial markets should be the conduits that support corporate environmental sustainability initiatives. These findings also provide a moderation to popularly held belief about stock exchanges capitalist preoccupation (Lane and Myant, 2016). Stock exchanges are innovating in view of the fact that the financial role of the exchange could succeed if growing societal, consumer and investor environmental awareness is incorporated in stock exchanges operations.

## 5. Conclusion

The aim of this paper was to analyse how stock exchanges’ environmental initiatives have influenced companies’ environmental activities. A review of the literature indicates varied research that recognise progressions with corporate and stock exchange sustainability issues, but this paper advances the literature by empirically testing the influence of stock exchanges’ sustainability advocacy on the growth of corporate environmental sustainability commitments using the number of companies engaging in carbon disclosure project from 2003 to 2016. With the application of ordinary least square (OLS) technique, results from the analysis show that growth in stock exchanges’ environmental initiatives has contributed a positive and significant booster to corporate environmental commitment at *P* level of 0.020 significance, using number of carbon disclosing companies as a proxy for environmental commitment. The paper also found than the launch of the United Nations Sustainable Stock Exchanges in 2009 provided an additional impetus that has accelerated the environmental sustainability momentum of stock exchanges. There is however scanty information in

the literature regarding how carbon commitments of companies have resonated in actual carbon reduction. It is therefore recommended that further research should evaluate the extent to which corporate carbon commitments has contributed to pragmatic carbon reduction. The paper is relevant, as stock exchanges have often been criticised as instruments of capitalism hegemony, it thus helps to assuage such criticism given the paper's findings about the growing environmental advocacy of stock exchanges to blend with their core economic objective to ensure environmental sustainability

## 6. References

- Aliyu, A.A.; Bello, M.U.; Kasim, R. & Martin, D. (2014). Positivist and Non-Positivist Paradigm in Social Science Research: Conflicting Paradigms or Perfect Partners? *Journal of Management and Sustainability*, 4(3), pp. 79 – 95. Retrieved from <http://www.ccsenet.org/journal/index.php/jms/article/viewFile/39893/22135>.
- Antwi, S.K. & Hamza, K. (2015). Qualitative and quantitative research paradigms in business research: A philosophical reflection. *European Journal of Business and Management*, 7(3), pp. 217-225.
- Auer-Srnka, K.J. & Koeszegi, S. (2007). *From words to numbers: how to transform qualitative data into meaningful quantitative results*. Retrieved from [http://www.dphu.org/uploads/attachements/books/books\\_3754\\_0.pdf](http://www.dphu.org/uploads/attachements/books/books_3754_0.pdf).
- Brandenburg, M.; Govindan, K.; Sarkis, J. & Seuring, S. (2014). Quantitative models for sustainable supply chain management: Developments and directions. *European Journal of Operational Research*, 233(2), pp. 299-312.
- Beatty, T. & Shimshack, J.P. (2010). The impact of climate change information: New evidence from the stock market. *The BE Journal of Economic Analysis & Policy*, Retrieved from [http://econ.tulane.edu/shimshack/post\\_climate\\_scores.pdf](http://econ.tulane.edu/shimshack/post_climate_scores.pdf).
- Bunkley, Nick (2008). *Joseph Juran, 103, Pioneer in Quality Control, Dies*. New York Times. Retrieved from <http://www.nytimes.com/2008/03/03/business/03juran.html>.
- Björnberg, K.E.; Karlsson, M.; Gilek, M. & Hansson, S.O. (2017). Climate and environmental science denial: A review of the scientific literature published in 1990–2015. *Journal of Cleaner Production*, 167, pp. 229-241.
- Cherian, J. & Jacob, J. (2012). Green marketing: A study of consumers' attitude towards environment friendly products. *Asian social science*, 8(12), p. 117.
- Carbon Disclosure Project (CDP) (2017). The growth of action. Retrieved from <https://www.cdp.net/en/scores-2017>.
- Eccles, R.; Serafeim, G. & Armbruster, P. (2012). Integrated Reporting in South Africa. Harvard Business School Case 413-038. <https://www.hbs.edu/faculty/Pages/item.aspx?num=43155>.
- Fahimnia, B.; Sarkis, J. & Davarzani, H. (2015). Green supply chain management: A review and bibliometric analysis. *International Journal of Production Economics*, 162, pp. 101-114.
- Freeman, R.E.; Martin, K. & Parmar, B. (2007). Stakeholder capitalism. *Journal of Business Ethics*, 74(4), pp. 303-314.
- Gudarzi, M.N. & Rahimi, G. (2015). Application of pareto axiom in decrement of air pollution of large cities of Iran. *Jurnal UMP Social Sciences and Technology Management*, 3(1), pp.73 -77. Retrieved from <http://jsstm-ump.org/2015%20Volume%203,%20Issue%201/73-77.pdf>.
- Hsu, C.W. & Chang, D.S. (2017). Investigating critical organizational factors toward sustainability index: Insights from the Taiwanese electronics industry. *Business Ethics: A European Review*. <http://onlinelibrary.wiley.com/doi/10.1111/beer.12154/full>.
- Hughes, S.; Chu, E.K. & Mason, S.G. (2018). Introduction. In *Climate Change in Cities*. Springer, Cham, pp. 1-15.
- Ioannou, I. & Serafeim, G. (2017). *The consequences of mandatory corporate sustainability reporting*. Retrieved from [http://www.hbs.edu/faculty/Publication%20Files/11-100\\_ed78b358-dddd-41f0-9a05-5c1b430b15f9.pdf](http://www.hbs.edu/faculty/Publication%20Files/11-100_ed78b358-dddd-41f0-9a05-5c1b430b15f9.pdf).
- Khalamayzer, A. (2016). *Sustainability reporting in stock exchanges comes of age*. Retrieved from <https://www.greenbiz.com/article/sustainability-reporting-stock-exchanges-comes-age>.
- Kiremire, A.R. (2011). Application of Pareto Principle in software engineering. Retrieved from [http://www2.latech.edu/~box/ase/papers2011/Ankunda\\_termpaper.PDF](http://www2.latech.edu/~box/ase/papers2011/Ankunda_termpaper.PDF).
- Kane, G., 2014. *Accelerating Sustainability Using the 80/20 Rule*. Do Sustainability: Oxford.
- Koldertsova, A. & Christianson, H. (2008). *The role of stock exchanges in corporate governance*. Retrieved from <http://www.oecd.org/finance/financial-markets/43169104.pdf>.
- Kolk, A. & Levy, D. (2001). Winds of Change: Corporate Strategy, Climate change and Oil Multinationals. *European Management Journal*, 19(5), pp. 501-509.

- Kreyling, J.; Khan, M.A.A.; Sultana, F.; Babel, W.; Beierkuhnlein, C.; Foken, T. & Jentsch, A. (2017). Drought effects in climate change manipulation experiments: quantifying the influence of ambient weather conditions and rain-out shelter artifacts. *Ecosystems*, 20(2), pp. 301-315.
- Lane, D. & Myant, M. eds. (2016). *Varieties of capitalism in post-communist countries*. Hampshire: Springer.
- Li, J.; Hung Chiang, Y.; Zhou, L. & Choi, NY T. (2014). Measuring carbon emission from energy consumption in a Hong Kong family. *Facilities*, 32(7/8), pp. 324-341, <https://doi.org/10.1108/F-12-2011-0099>.
- Lee, S.Y.; Park, Y.S. & Klassen, R.D. (2015). Market responses to firms' voluntary climate change information disclosure and carbon communication. *Corporate Social Responsibility and Environmental Management*, 22(1), pp. 1-12, <http://dx.doi.org/10.1002/csr.1321>.
- Myklebust, T. (2013). *The Role of Stock Exchanges in Shaping More Sustainable Company and Market Practices*. Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2324743](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2324743).
- Orsato, R.J.; Garcia, A.; Mendes-Da-Silva, W.; Simonetti, R. & Monzoni, M. (2015). Sustainability indexes: why join in? A study of the Corporate Sustainability Index (ISE) in Brazil. *Journal of Cleaner Production*, 96, pp. 161-170, <https://doi.org/10.1016/j.jclepro.2014.10.071>.
- Perez, O. (2016). The Green Economy Paradox: A Critical Inquiry into Sustainability Indexes. *Minnesota Journal of Law, Science & Technology*. <http://dx.doi.org/10.2139/ssrn.2653687>. Quigstad, Jan, *Contribution at the conference on Welfare effects of financial innovation*. (2011). <http://www.norges-bank.no/no/om/publisert/foredrag-ogtaler/2011/contribution-conference-welfare-effects/>.
- Richardson, B.J. & Cragg, W. (2010). Being virtuous and prosperous: SRI's conflicting goals. *Journal of business ethics*, 92, pp. 21-39.
- Robson, C. & McCartan, K. (2016). *Real world research*. London: John Wiley & Sons.
- Starvins, R.L (2007). Environmental economics, retrieved from <http://www.nber.org/papers/w13574.pdf>.
- Stoll-Kleemann, S.; O'Riordan, T. & Jaeger, C.C. (2001). The psychology of denial concerning climate mitigation measures: evidence from Swiss focus groups. *Global environmental change*, 11(2), pp. 107-117.
- Shankleman, J. (2015). How industry lobbyists undermine sustainable development. Retrieved from <https://www.greenbiz.com/article/are-industry-lobby-groups-undermining-green-business>.
- Sierra Club (2008). *Hetch Hetchy history*. Retrieved from <https://vault.sierraclub.org/ca/hetchhetchy/history.asp>.
- UNSSSE (2017) sustainable stock exchanges initiative – Stock Exchanges Fact Sheets. Retrieved from <http://www.sseinitiative.org/data/fact-sheets-3/>.
- UNSSSE (United Nations Sustainable Stock Exchange) (2015) role of stock exchanges in promoting corporate sustainability. Retrieved from <http://www.sseinitiative.org/wp-content/uploads/2015/08/Brief-2-Role-of-Stock-Exchanges-in-Promoting-Corporate-Sustainability.pdf>.
- Wallace, M. & Harvey, E. (2015). Take a clue from stock exchanges to gauge sustainability's future. Retrieved from <https://www.greenbiz.com/article/take-clue-stock-exchanges-gauge-sustainabilitys-future>
- WFE (World Federation of Exchanges) (2014). World Federation of Exchanges Sustainability Working Group, retrieved from [https://www.intercontinentalexchange.com/publicdocs/WFE\\_ESG\\_Recommendation\\_Guidance\\_and\\_Metrics.pdf](https://www.intercontinentalexchange.com/publicdocs/WFE_ESG_Recommendation_Guidance_and_Metrics.pdf).