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GREEN BUSINESS MODEL FOR INTERNATIONAL DEVELOPMENT OF INDUSTRIES IN THE ENERGY SECTOR: IN THE CASE OF SOUTH AFRICA

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Abstract. Many countries in the world today are facing challenges of scarce resources, environmental hazard control and how to attain sustainable development within their economies. This has been a centre of debate for many businesses in the world today. By identifying the causes of various environmental challenges as well as creating solutions for the ecological problems makes this research relevant. However, many industries in the energy sector needed to start getting involved in greening their businesses so as to reduce the insufficiency of scarce resources for future generations as well as environmental hazards. Therefore, the aim of this research is to examine the various green business concepts, models and design a new green business model which could be used to predict and target consumers across companies in the energy sector. In addition, before arriving at developing a new green business model it will be very challenging by carrying out series of data analysis from 2010-2014 using a case of South Africa. The method used was the simple linear regression analysis for testing for its validity and reliability of the new green business model whereby, the results obtained could be used for prediction not leaving out some implications, limitations and recommendations.

Keywords: Green business, model, environmental, economy, sustainable development, regression, growth.

Introduction

Environmental hazards and pollution have become one to the highest discussed matters in the world today. Global warming, lack of environmental control, pollution (water and air pollution), lack of proper disposition of waste materials are highly discussed topics in world today caused by various companies. This has led to high debates and discussions concerning sustainability and also various business carrying out research in order to look for solutions to minimize or completely eradicate these environmental hazards. Leading to many businesses and companies turning to greening their businesses so as to minimize the negative environmental effects over the long run. Green business may be the key factor in reducing cost and increasing the efficiency of industries and thus contributing to the scalability of such initiatives. However expensive cost of trading with green technology and its commercialization cannot be ignored. Several large companies or industries initiate the use of green technology including generating renewable energy, wireless information technology, eco-water purification, biofuel etc. In the recent years number of large companies like Vodafone, Unilever and so forth have realized profitable business activities in an economically feasible way (Schuster and Holbrugge 2012) using green business models and technologies.

Hence, when large firms aim to enter low income market through sustainable initiatives, they cannot rely on their existing knowledge (Schuster and Holbrugge 2012) and traditional business models, but must find new and innovative solutions, in that process reinventing their existing business model innovation of sustainability which brings about the implementation of the green business model and technologies. Companies are increasingly focusing on innovation of green technology (Brisgaard, Henriken and Bjerre, 2012) to meet sustainable development goals and reduce environmental risks for future generations. Therefore, the aim of this research is to examine the various green business concepts, models and design a new green business model targeting consumers across companies in the energy sector. However, the analysis of this research will be carried out base on a case of South Africa whereby, a new green business model will be developed by examining two economic quantitative variables (carbon dioxide emission as the dependent

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variable and energy usage as the independent variables) for a period of 2010-2014 using the simple linear regression analysis technique.
This research has three main tasks;

- To design a new green business model.
- To test the new model for validity and reliability.
- To use the new model for prediction.

1. THEORICAL FRAMEWORK

1.1. Sustainable development concept.

The definition of sustainable development can be widely use (Dresner, 2008; Jackson, 2010; Hart and Milsteen, 2003, Sonner, 2012) found in our common future report (WCED, 1987). Dresner (2008) argues that the definition of sustainable development found in our common future is not specific and thus difficult to apply. They various authors break down the concept of sustainable development into three fundamental aspects.

- Environmental aspect: Through gradual change of the ways in which technology is used and developed the common resource base should be conserved and enhanced.
- Social equity aspect: On a national level everybody must be allowed to meet their basic needs in terms of food, sanitation, energy, water and employment. Achieving the needs of sustainable level of population.
- Economic growth aspect: Developing countries should be allowed a growth of equal quality in order to become developed nations. However, economic growth should be revived. (Sustainable environmental org.2014. WCED.2087)

Thus, the critical element of sustainable development includes meeting basic needs of people, intergenerational equity and a recognition of environmental limits (Dresner, 2008). Although efforts have been made to identify environmental limits (Rockstrom et al, 2009) and equity on an emotional basic, Dresner (2008) argues that the concepts are still to fuzzy. The concept of "needs" is used as an example where Dresner (2008) states that it cannot be objectively defined or measured since it is a subjective concept. From an economist perspective there is no difference between needs and wants. Even if the perspective is challenging, there are still difficulties regarding when to separate the two (Dresner, 2008). Several authors (Daly, 2007; Jackson, 2009; Wijkman and Rockstrom, 2012) succeed to develop the concept of sustainable development. However, they did so by arguing that continues economic growth on a planet with limited resources is not possible. Therefore, the economic growth dimension is seen as being in conflict with the environmental dimension of sustainable development if one recognizes a strong sustainable development paradigm and environment boundaries. Notwithstanding, an in-depth overview of sustainable development and issues regarding economic growth as well as environmental limits are however excluded in the scope of this research.

1.2. The Green Concept.

As stated in the introduction, major global green transition in businesses in the world today is required to secure the long-term industrial growth of the economy of countries at the same time providing protections for the scare natural resources and their immediate environments. In this light, the green concept has become well known when referring to variety of different industrial elements. The green concept has been understood and examined in so many different ways by various researchers, international organization and also been regarded as a marketing instrument of some of the green components (Ernst & Young, 2008, Henriksen et al, 2012: B).

Another researcher argues that the Green concept are therefore simpler when dealing with environmental goods and services which then turn to form opportunities for green businesses (Ernst & Young, 2008; quoting the CEMEP report; Henriksen et al., 2012: B, FORA, 2009). The idea towards a greener economy is a more acknowledging approach to societal environment which will lead to the emergence of new technologies and innovations thereby leading to non-technological changes in the form of new green business models, green products, green services, new green industries, green market and new green business economies (Chen, 2008; Ernst & Young, 2008). Similarly research also conducted by Wong (2013) suggest that green innovation is being induced by the reduction in the environmental hazards of firms by enabling firms to meet their integrated environmental benefits and eco-targets. Also another researcher describes "Green" as the process intended to increase sustainability environmentally, efficiency in operations so as to revive the economy as well as customers and societal social values. They also explain that many studies have linked "Green" with "Lean" so as to explain how businesses can move forward in profitability and productivity with the use of Green methods (Caldera et al., 2017; Cherrafi et al., 2017; Garza-Reyes, 2015; Sartal et al., 2018)

1.3. The Green Economy concepts.

To begin with the definition of the concept of green economy, it has had various definition over the years. Nevertheless, the most widely recognized one is provided by UNEP, and is quoted in Henriksen et al. (2012: B) "A Green Economy can be defined as an economy that results in improving human well- being and reduced inequalities over the long-term, while not exposing future generations to significant environmental risk and ecological scarcities. In its simplest expression, a green economy can be thought of as one that is low carbon, resource efficient and socially inclusive." (Henriksen et al., 2012: B. pp4). Hence, a green economy looks at a more sustainable future, with particular focus on the environment and people's well-being without such an economic outlook and the establishment of a green business. Green business model innovation and green business models, seems improbable. (OECD, 2011: A, B).

1.4. The Green Growth concepts.

Green Growth is referred to as maximization of economic growth in a sustainable way when taking into consideration natural resources. It can be defined as the achievement of an organization when it uses fewer natural resources to attain growth goals, development and gain a competitive advantage which subsequently lead to a more sustainable result. As Henriksen et al. (2012: B) defines it as, "green growth is about maximizing economic growth and development while avoiding unsustainable pressure on the quality and quantity of scarce natural resources. Green growth is also about harnessing the growth potential that arises from transiting towards a green economy." (pp.5) Green business cannot be develop if there is a lack of green growth. (FORA, 2009, OECD, 2011 A, B; Henriksen et al., 2012: B).

Within the last decade, international organisations have viewed sustainable development as a concept of green growth. Although this approach is based on the international business environment, it also looks at other stakeholders and constellations of actors which may be involved in the initiatives. The position and role of the local authority in such initiatives is adherent upon particular settings and situations (Wittmayer et al., 2016)

However, it is worth noting that other researchers understood that the adoption of the idea about green growth and local policy will vary due to changes in industrial environments and also bad factors including political as well as social capital, networks and governance influence (Gibbs, D. & O'Neill, K. (2017).

1.5. Business Model (BM) concept.

The BM concept, in its essence, explains how business is done by a company. (Henriksen et al, 2012: B). For example, the term is used by many organizations adding the value to BMs to describe sustainability models (Aho 2013). Together with the concept of innovation, it provides the in-depth knowledge as to how businesses are motivated and also how businesses operate, which has been essential in examining the economic behaviour and trading of organizations for centuries (Teece, 2010). However, as an idea, it only became well known due to the rise of the internet in the mid 1990's. Since then it has been gathering significant consistency by trying to form one of the most widely used business terms used by organizational managers, consultants and analyst. (Baden Fuller & Morgan, 2010, Zott et al., 2010).

Though the focus of BM concept is thought to be of high importance when referring to this article and it also offers an opportunity to understand the metabolism that are at the centre of how businesses operate which brings about the concept of Green business model innovation (GBMI) (Henriksen et al., 2012: B, pp.111). It remains a rather broad term, as it is usually studied without being properly carrying out specific analysis for their various uses. Also another researcher used the term BM innovation to study community of solar energy (Funkhouser et al. 2015).

The emergence of the term business model analysis has allowed for the comparisons and unpacking of existing and new approaches by businesses to value creation, capture and delivery by many researchers in the field of energy (Hall and Roelich, 2016; Hannon et al., 2013; Richter, 2013)

In addition, another researcher also concluded that many business models in the agricultural sector have as their primarily focused; that is, they focus on profit when there is an increasingly competitive environment and focus on business models sustainability if needed. (Barth et al. 2017)

Table 1. Definition of Business Model.*(created by authors)*

Author(s), year	Business Model (BM) definitions
(Baden-Fuller & Morgan; 2010).	"It is the role of business models to analyse a set of specific level of description of how a firm distribute value in a profitable manner and organizes itself."
(Teece; 2010).	"A model that predicts data and other evidence that accepts a value proposition for customer and a reliable structure of cost and revenues for the organization delivering that value."

(Massa and Tucci, 2013).	"Business model innovation refers to the activity of designing, validating creating, and implementing a new business model."
(Ostenwalder et al; 2015)	"A conceptual framework that contains a set of elements and which examines relationships between variables while expressing the logic of business of a specific organisation. It also explains the value of an organization offer compared to several segments of the firm structure, customers and its network of partners for marketing, creating and delivering this capital value relationship to create profitable and sustainable revenue stream."
(Murray and Scuotto, 2016)	"Business model is a model that allows organizational managers to connect, implement innovative goods and services to important sectors."

1.6. Green business model (GBM) concept.

GBM concept is a highly talked about concept in today's world by referring to the various difficulties involved in reducing scarce resources inefficiencies using reliable green innovation approaches. As an approach in its easiest form, it also seeks to successfully assist firms and organizations towards their development goals, opportunities and the emerging components of green business challenges. In order to achieve this, a process of change is needed as well as transformation of various existing research from different business sectors of organization to develop a new economical viable BM which is eco-focused. The developing concept of GBM however, faces major challenges which changes the way the business is carried out. Development of GBMs still remains unsettled due to these challenges. The first challenge of the development of GBMs is that; it is not yet widely distributed within organizations and also not used extensively. Secondly, many costumers, financial institutions, suppliers and government entities lack the adequate knowledge regarding the actual cost and the actual benefit of the GBMs. Thirdly, there is lack of knowledge by various organizations regarding the origins of GBMs (the understanding of evolution GBMs from the transformation of traditional BM). And lastly, there is still lack of control of the policies related to GBMs that is, local authorities, municipalities, and the government do not provide adequate promotion to boost up GBMs development of organizations in order for them to become inspired developing new solutions and partners amongst themselves so as to attain sustainable development. (Fora, 2009)

In addition, GBMs has been seen by many researchers as a new way of doing business in a sustainable manner. It is also seen by these researchers as a framework that organizations use to carry out their existing BM innovations and thus looking at the products and services total life cycle cost so that they can become more efficient, that is lowering their consumption of energy levels, reducing waste and optimizing resources usage. Also, it is seen by some researchers as the movement that is required by companies to generate new organization models, different marketing methods etc. (FORA, 2009), 2011; Henriksen et al, 2012: A, B; Bagaard et al, 2012)

Few studies do exist that focuses and deals with GBMs barriers and have also focus on a specific GBM. For example, some researchers investigated a GBM customer-sited solar photovoltaics (PV) barriers, by carrying out a comparative analysis study in Germany, Japan and the United States. The main barriers investigated included long payback periods, customer concerns about PV reliability, deployment of the PV on site and capital costs. (Strupeit and Palm 2015). In addition, another researcher focused on market barriers to energy efficiency, as a GBM, such as regulatory and economic policies, imperfect competition, and misplaced incentives. (Al-Saleh and Mahroum. 2014)
Notwithstanding, another researcher proposed a data envelopment analysis (DEA) model novel network to evaluate GSC management in the presence of fuzzy data and undesirable outputs. The results they got emphasise that environmental performance and economic are inextricably linked in a supply chain. (Mirhedayatian et al. 2014). However, another researcher identified 47 barriers under 5 main domains. Their research was ranked the 26th to essential barriers by applying AHP approach. (Govindan et al. 2014)

Table 2. Definition of Green Business Model *(created by authors)*

Author(s), year	Green Business Model (GBM) definitions
(FORA, 2010).	"A BM which influences the reduction of waste disposals and supports the creation of goods and services which have environmental benefits and viable economically."
(Henriksen et.al. 2012, Lindgren and Taran, 2010; FORA, 2009).	''Emerging business models which is able to create new business model innovations possibilities for the development of green based technology while avoiding environmental risks and resources scarcities to future generations."
(Nordic Reports, 2012).	''The integration of green in form of products or services or processes. Also, there is very limited research evidence on concept of green business model innovation."
(UNESCAP,2012).	''It is BM that uses more than one individual technologies; the term examines goods, services and procedures that are used in consumption process as well as green production."
(Zhang, 2012).	''A low carbon economy with the aim to reduce the level of oil and coal consumption at the

	same time achieving social/economic development, environmental/ecological protection as well as reducing greenhouse gases."
(SAIIA, 2013).	''A BM whose economic activities system is in relation to the production, consumption and distribution of products and services while not exposing the future generation to significant ecological scarcities/environmental risk so as to improve the well-being of humans in the long-run."
(Tell et al., 2016)	"GBM can also be considered as a framework to be used in the case of uncertainty in order to compete and reshape the whole business offering of various organizations"

2. RESEARCH METHODOLOGY.

This research follows an inductive approach and uses the quantitative method of time series data analysis of a case of South Africa in order to examine and carryout the various tasks of the research. A new green business model will be developed which could be used for forecasting and also tested for its validity and reliability. An in-depth knowledge of the type of quantitative method used in this research was the Simple Linear Regression Analysis. Whereby, a new green business model will be derived and built from the simple linear regression model or equation.

2.1. The simple linear regression Analysis.

Simple linear regression is a statistical method that allows us to summarize and study relationships between two quantitative variables that is, the dependent and the independent variables.
For example, if some variable of interest (y), is driven another variable x. We can then name y the dependent variable and x the independent variable. Also, if the relationship between y and x is basically linear but has a random component ε, which is call the error term.

Let us assume i index be equals to the observations on x, y data pairs.

The Simple Linear Regression Equation: $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$ (1)

Y_i = Outcome of Dependent Variable (response) for i^{th}

X_i = Level of the Independent (predictor) variable for i^{th}

$\beta_0 + \beta_1 X_i$ = Linear (systematic) relation between Y_i and X_i

β_0 = Mean of Y when X=0

β_1 = Change in mean of Y when X increases by 1

ε_i = Random error term

The parameters β0 represents the y-intercept and β1 shows the slope of the relationship.
In order to properly examine this model, we have to make some few assumptions regarding the error term;

1. E(ui) =0 u has a mean of 0 for all i
2. E(u2 i) = σ2Ŷŷ u it has the same variance for all i
3. E(uiuj) =0,i 6≠ j no correlation across observations

The higher the regression coefficient, the more influence the independent variable has on the dependent variable.

2.2. Data selection and variables description.

In developing the new green business model, we had to adopt in our model two green indicators to present a representative index of green business productivity; CO2 emissions and energy consumption. Taking CO2 emissions as our dependent variable and energy consumption as our independent variable output.

1. CO2 emission: The level of CO2 emission is closely related to green business economic activities which is being directly affected by the energy consumptions of industries in South Africa.

2. Energy consumption: Energy consumption in South Africa economy is closely related to economic activities which directly determines Carbon emissions level in to the atmosphere through the high combustion of coal which is South Africa main source energy.

Looking at these two green business indicators we had to develop a new green business model base on these two indicators.

2.3. New model building.

For us to design a new green business model from the simple linear regression equation we had to analyse and study the relationship between two quantitative variables (dependent and independent variables) which are related to green business. In this regard, choosing the carbon dioxide emission (metric tons per capital) as the dependent variable and energy use (kg of oil equivalent per capital) as the independent variable within the time period of 2010-2015 in the case of South Africa.

The new green business model equation $CO2 = \beta_0 + \beta_1 \text{Energy use} + \varepsilon_i$ (2)

Table 3. Time series data of CO2 emission and Energy usage (2010-2014) of South Africa

	Response	Explanatory
	Y variable	X variable
Year	CO2 Emissions (metric tons per capital)	Energy use (kg of oil equivalent per capital)
2010	9,191	2748,4
2011	9,004	2703,2
2012	8,845	2628,4
2013	8,674	2599
2014	8,98	2695,7

Source: world bank data base (created by authors).

From the new green business model equation (2) above, running the regression analysis of the time series data on table 3 above in Microsoft excel gives the following data analysis below.

Table 4. Results of summary outputs

Regression Statistics	
Multiple R	0,982927
R Square	0,966146
Adjusted R Square	0,954861
Standard Error	0,040932
Observations	5

Table 5. Results of Anova

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0,143444	0,143444	85,61587	0,002671
Residual	3	0,005026	0,001675		
Total	4	0,148471			

Table 6. Results of Coefficients.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0,542408	0,90762	0,597616	0,592199	-2,34604	3,430859	-2,34604	3,430859
X Variable 1	0,003139	0,000339	9,252885	0,002671	0,002059	0,004219	0,002059	0,004219

The results obtained Green Business Model CO2 = 0.5424 + 0.0031Energy use (3)

Table 7. Results of Residual outputs.

Observation	*Predicted Y*	*Residuals*	*Standard Residuals*
1	9,169384	0,021616	0,609784
2	9,027506	-0,02351	-0,66309
3	8,792715	0,052285	1,474959
4	8,700431	-0,02643	-0,74563
5	9,003964	-0,02396	-0,67602

Figure 1. Results for Energy usage residual plot.

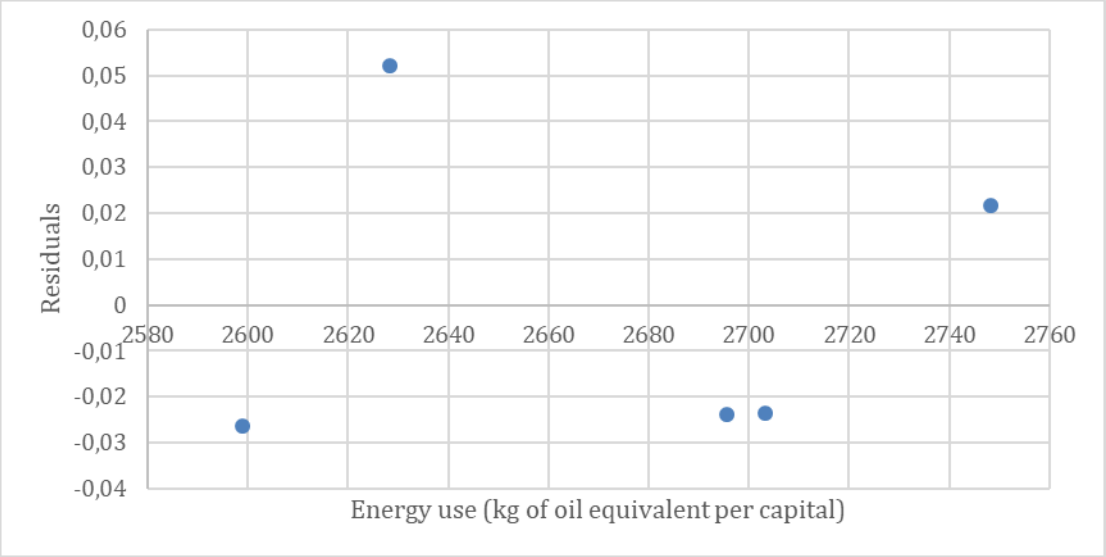


Figure 2. Results for the Goodness of fit plot.

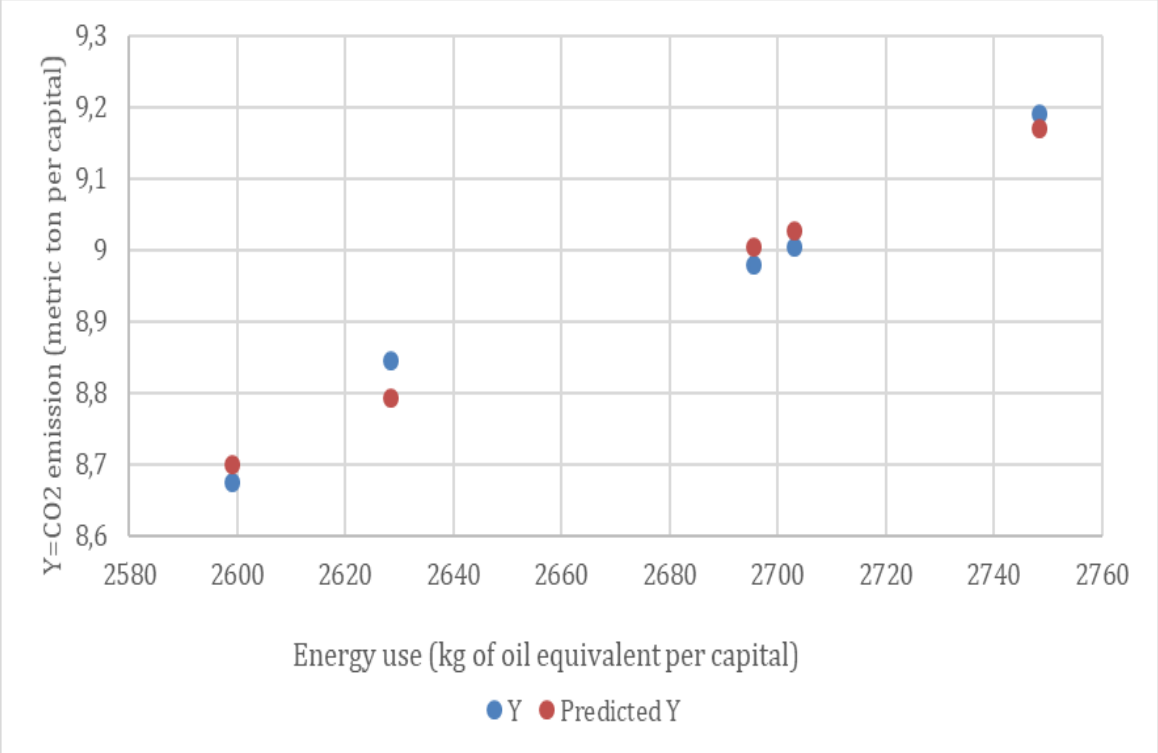
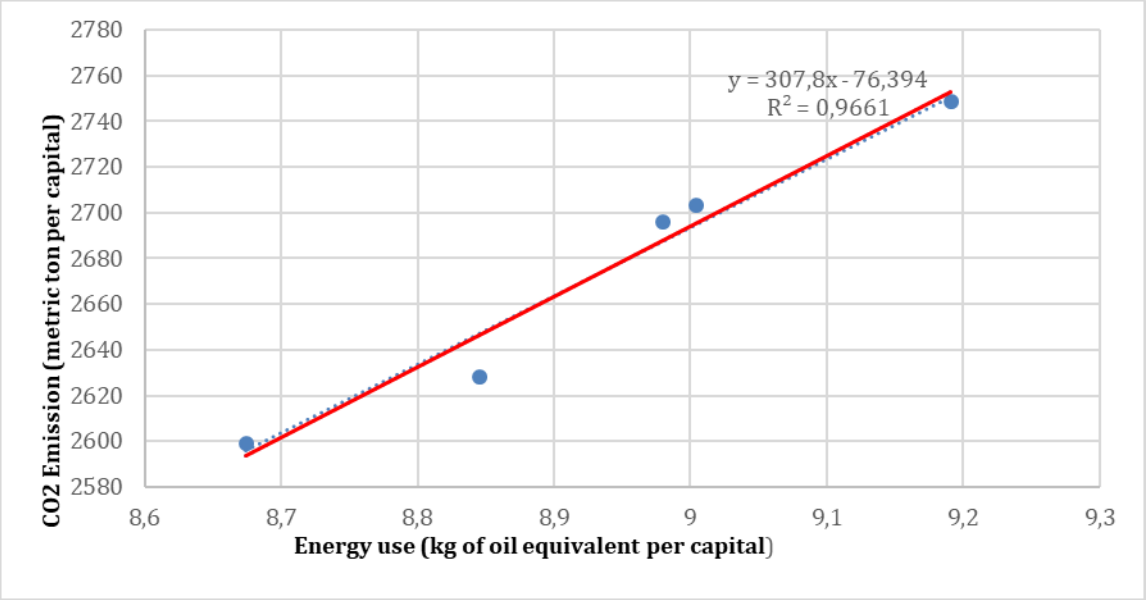


Figure 3. The results indicating the new green business regression model plots



3. Interpretation of results.

On table 4 above which indicates the summary outputs gotten after running the regression analysis. Looking at the *multiple R Square* which stipulates the actual correlation between the independent and dependent variables the. The *R Square* explains the percentage of variation of the dependent variable which is being influenced by the independent variable. As it is seen on table 4 above 96% of variation in CO2 emission is being correctly explained by the independent variable of Energy use. So therefore, in this research when dealing with simple linear regression analysis we are more concerned with the *R Square* which should always lie between 0 and 1. The *R Square* further explains that the closer it is to 1 it means the model is efficient and valid. As it is seen on table 4 above *R Square* is 0.966 which is really high and closer to one. Look at the *Adjusted R Square* it is the more accurate *R Square* which penalizes the use of a greater number of independent variables.

On table 5 above, looking at it explains the degree of freedom, the sum of squares and the overall significance level. So, in this case my main focus is the overall significance level which should be less than 0.05 for the model to be a good model and also reliable. So as indicated on table 5 above the overall significance level F is 0.0026 which is really less than 0.05 which indicates the model is a linear model and it is a straight line fit.

Table 5 above shows the coefficients of Regression which we can see the intercept which is the where the regression line intercept on the Y-axis as 0.542 and the coefficient of the x variable (energy use) as 0.0031. Looking at the standard error which is the standard deviation of the coefficients and it should be low for the model to be good model which is low. Also, looking at the t-statistics which explains the significance level of the estimates of the model which are the coefficients which should be less than 0. The P-test is also a significance test which seen by looking at the P-value of the coefficients which is 0.0026 which is less than 0.05 for the 95% confidence level that the coefficients are significant which indicates the model is a good model. Then we have the lower and upper confidence level which is not important for now in this research.

Table 6 above indicates the residuals and their values which I got 5 observations from 2010-2014 and also indicates the predicted values of Y (CO2 emission). So, by using the new regression equation (3) above to be able to get the predicted values of Y (CO2 emission). For example, if we look at actual value of the CO2 emission in observation 1 in 2010 is 9.191 while the predicted value of Y (CO2 emission) is 9.169. So, the error is 0.0216 which indicates it is a good prediction model. That is Predicted value of Y which is Residual Error = Actual – predicted. So therefore, a good model shouldn't give high residual values. So therefore, we could use the new green model equation (3) above to predict future changes in the dependent variable y (CO2 emission).

Figure 1 above shows the residual plots in the regression analysis. The residuals are non-correlated and are lying close to 0 along the x-axis and have no pattern which indicates the model is a good model.

Figure 2 which indicates the regression plot seen by their actual and predicted values of Y (CO2 emission). So, we could notice that the predicted and the actual values of Y (CO2 emission) are so close together which indicates a good and efficient model by producing a straight linear regression line as it can be seen on Figure 3 above.

Conclusions

Many industries in the case of South Africa operating in the energy sector are trying to use green business model in order to attain international development by trying to reduce the amount of Carbon dioxide emission into atmosphere through *'greening'* their businesses so as to achieve sustainable development. This research was out to examine other green business concepts and had the aim of developing a new green business model which could use by industries in the energy sector to predict the amount of Carbon dioxide emission in the atmosphere so as to attain sustainable development as well as economic growth.

The results of this research were achieved by analysing other Green Business Concepts and deriving a new Green Business Model from the simple linear regression equation (1) which led to the creation of a new green business model as it can be seen in equation (2) above. Statistics for this research was collected from the world bank data base of the economy situation of South Africa. South Africa was used as case study in order to carry out analysis of the data collected for 2010-2014 of Carbon dioxide emission and energy usage within the set period of time.

From the result obtained running the simple linear regression analysis on excel, using the new green business model developed in equation (2) above, we could conclude that this new green business model in equation (2) above is valid and reliable and can be used for predicting as well as forecasting by some firms in the energy sector in South Africa which has been proven by the newly obtained green business model seen in equation (3) above. However, this newly obtained green business model equation (3) above was further tested for it predicting ability by looking at the residual outputs obtained in table 7 above.

This research was limited to a number of factors which can be seen below as follows;

- In this research not all the concepts of green business models were examining. Only a few selected concepts were examining in order to carry out this research.
- Only quantitative analysis was used in other to carry out this research.
- This statistic of this research was limited to one Case Study of South Africa and also limited to the time period of 2010-2014.
- In this research only one method was used which was the simple linear regression to derive a new model of green business.

As a result, for the aforementioned limitation of this research I will like to recommend;

- Further analysis of other concepts related to green business model to be examined before engaging in research related to this field of study.
- Increase in the scope of the research by using both quantitative and qualitative analysis method to carry out this type of research and also used other method other methods in order to efficiently carry out this type of research.
- And finally, I will highly recommend companies in the energy sector to try to be engage in low carbon emission schemes by '*greening*' their business so as to achieve sustainable development within their economies.

References.

Alamsyah, D. P. (2016). pentingnya external factors untuk keunggulan bersaing industri energi baru terbarukan. . Jurnal Ecodemica: Jurnal Ekonomi, Manajemen, dan Bisnis,, 4(1), 1-14.

Alfredsson, E. &. (2014). The Inclusive Green Economy. Shaping society to serve sustainability—minor adjustments or a paradigm shift.

Al-Saleh, Y., & Mahroum, S. (2015).). A critical review of the interplay between policy instruments and business models: greening the built environment a case in point. Journal of cleaner production., 109, 260-270.

Baldwin, j. (2016). Baldwin, J. (2016). Go Tell it on the Mountain (Vol. 371). Everyman's Library. Everyman.

Banwart, S., Black, H., Cai, Z., Gicheru., P., Joosten, H., Victoria, R.,....& Vargas, R. (2014). Benefits of soil carbon: report on the outcomes of an international scientific committee on problems of the environment rapid assessment workshop. Carbon Management,. 5(2), 185-192.

Barth, H., & Melin, M. (2018). A Green Lean approach to global competition and climate change in the agricultural sector–A Swedish case study. Journal of Cleaner Production, 204, 183-192.

Bisgaard, T., Henriken, k., & Bjerre, M. (12, 2012). Green Business Model Innovation-conceptualisation, Next Practice and Policy. Nordic Innovation Report.

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), 299-312.

Cohen, M. A., & Vandenbergh, M. P. (2012). The potential role of carbon labeling in a green economy. . Energy, 34, S53-S63.

Dresner, k., & Stone, P. (2008). A multiagent approach to autonomous intersection management. Journal of artificial intelligence research,. 31, 591-656.

Dresner, S. (2012). The principles of sustainability. Routledge.

FORA. (2010). Green Business Models in the Nordic Region - A key to promote sustainable growth. Paper commissioned by the Nordic Council of Ministers.

Funkhouser, E., Blackburn, G., Magee, C., & Rai, V. (2015). Business model innovation for deploying distributing generating: The emerging landscape of comunity solar in the U.S Energy Research & Social Science,. 10, 90-101.

Go, A. S., Mozaffarian, D., Roger, V. L., Benjamin, E. J., Berry, J. D., Borden, W. B., ... & Franco, S. (2013). Forecasting the future of cardiovascular disease in the United States: a policy statement from the American Heart Association. Circulation, 127(1), e6-e245.

Hall, S., & Roelich, K. (2016). Business model innovation in electricity supply markets: The role of complex value in the United Kingdom. Energy Policy, 92, 286-298.

Yang, W., & Zhang, Y. (2012). Research on factors of green purchasing practices of Chinese. Journal of business management and economics, 3(5), 222-231.

Kaggwa, M., Mutanga, S. S., & Nhamo, G. (2013). South Africa's Green Economy Transition: Implications for Reorienting the Economy Towards a low Carbon Growth Trajectory.

Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. . Research policy, 41(6), 955-967.

Mohanty, M. (2012). New renewable energy sources, green energy development and climate change: Implication to Pacific Island countries. Management of Enviromental Quality: An International Journal., 23(3), 264-274.

Nair, S., & Paulose, H. (2014). Emergence of green business models: The case of algae biofuel of aviation. 65, 175-184: Energy Policy.

Porter, M., & Van der Linde, C. (n.d.). Green and competitive: ending the stalemate. The Dyanamics of the eco-efficient economy: environmental regulation and competitive advantage., 33.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin III, F. S., Lambin, E. F., ... & Nykvist, B. (2009). A safe operating space for humanity. nature. 461(7263), 472.

Strupeit, L., & Palm, A. (2016). Strupeit, L., & Palm, A. (2016). Overcoming barriers to renewable energy diffusion: business models for customer-sited solar photovoltaics in Japan, Germany and the United States. Journal of Cleaner Production, 123, 124-136. journal of cleaner production, 123, 124-136.

Tawakkoli, S. S. (2015). Business Model Innovation in the Context of Sustainable Development-A case study of how a business model is modified when a corporation commits to bringing a sustainability innovation to market.

WCED, S. W. (1987). World Commission on Environment and Development. Our common future.