ANALYSIS OF SUCCESS-DEPENDENT FACTORS OF GREEN BONDS FINANCING OF INFRASTRUCTURE PROJECTS IN GHANA

Abstract

Globally, Green Bonds have experienced a fair share of handicaps within the countries of issuance. In lieu of Ghana announcing the possibility of its first green bonds, it is crucial that lessons are taken from past developments to reinforce the prospects of a salutary roll out. This paper explores factors recommended as success-dependent in the Ghanaian markets. A quantitative approach is employed. Twelve factors are extracted from a review of available literature and converted into a questionnaire targeted at professionals in financial institutions. This included, managers, financial analysts, as well as top management personnel. In total 54 questionnaires were distributed. A total of 32 responses are received, proportional to a response rate of 60.37% and was analyzed with relative importance index and one-sample t-test. The results indicate that "Ensuring Good Credit Ratings, Provision of Local Guideline, and Proper Green Qualifications Criteria and Prioritizing Viable Projects" are highest ranked factors. It is important these are incorporated in the framework to be designed for the roll out of green bonds in the Ghana. Considerations should also be made with respect to the culture and state of the financial markets in the country while bringing out the appropriate structure to facilitate the issuances.

Keywords: Green Bonds, Challenges, Success Factors, Infrastructure Projects, Ghana

1. Introduction

The Organization for Economic Co-operation and Development (OECD) (2015) suggests, with regards to financing large-scale infrastructural developments, a history exists on bond usage. Tao (2015) adds, bonds which form part of fixed income instruments are appropriate for the financing of infrastructural projects that are capital intensive in nature. Utility scale renewable energy projects fall into this category. The emergence of green bonds stated in 2007. According to Reboredo (2018) there is an increase in popularity of green bonds internationally, from both issuers and environmentally conscious investors towards the development of climate change mitigation projects like Renewable Energy (RE). Ng and Tao (2016) suggests, with the nascency of green bonds, emphasizing on the label such that it stands out and is easily visible for investors to identify is key. Thus, eliminating the limitations of overlapping. In Draksaite et al. (2018) it is observed currently there are a broader scope of the issuers of bonds since it was first rolled out. The demand surged and the issuers are now not only limited to international institutions and

states, but also private companies have been observed to be participating in the green bond issuances.

The benefits of green bonds are highlighted by numerous studies. In Pham (2016), the volatility of green bond market was analyzed. It highlighted that, the 'labeled' segment of the green bond market experiences large volatility clustering while the pattern of volatility clustering is weaker in the 'unlabeled' segment of the market. Revelli and Paraque (2017), highlight the ability of Green Bonds to constitute an ethical action with a measurable impact, creating ethical and sustainable value beyond economic and financial value. According to Tang and Zhang (2018), stock prices positively respond to green bond issuance. Though a consistently significant premium for green bonds was not observed in the study the overall findings suggest that the firm's issuance of green bonds is beneficial to its existing shareholders. In Zhou and Ciu, (2019) is was observed that, announcements of green bonds issuance have a positive impact not only on companies' stock prices, companies' profitability, and operational performance, but also on innovation capacity, and can improve companies' corporate social responsibility.

Green bonds have had challenges across board with the countries in which they have been employed. Banga (2018) suggested that, in developing countries, the market remains incipient, and its full potential is underappreciated. The lack of appropriate institutional arrangements for green bond management, the issue of minimum size, and high transactions costs associated with green bond issuance, are barriers to the development of green bonds in developing countries. Wang et al. (2019) assessed the factors affecting the risk premiums of green bonds. In the study is was highlighted that, the green attribute factor affecting the risk premium of green bonds is third-party green assessment certification. The bond factors affecting the risk premium of green bond issuance mainly include debt credit rating, issue period, and issue size, all of which affect the risk of green bond issuance. Deschryver and de Mariz, (2020) highlighted; lack of scalability of the green bond market: a deficit of harmonized global standards; risks of greenwashing; the perception of higher costs for issuers; the lack of supply of green bonds for investors; and the overall infancy of the market.

From these challenges, subsequent issuances consider steps to aid in successful enrollment of such bonds with appropriate strategies and procedures. Thus, necessitated countries considering staring up such bonds to seek remedies both standard and local which will see successful issuance of green bonds. Kenya is typical in such a case with the countries steadily laying down the rudiments vital to it first green bond issuance in the coming years (African Local Currency Bond (ALCB), 2018). Ahead of the first issuance, a study conducted by Tu et al., (2020) on the potential of green bond market in Vietnam indicated that, the need for effective legal framework and fiscal policies were highly significant to accelerating the green bind market. Assessing such strategies in Ghana will be pivotal in determining the success of issuance in the country. It is also opined by Draksaite et al. (2018) that, there is a direct impact on the sustainability of the economy with the issuance of green bonds since beneficiaries deploy the bonds in areas of

priorities in the economy. What this means is that, when the green bond markets are well performing, the effects on the economy are enhanced.

2. A Nexus of Green Bond Issues

2.1 Inception of Green Bonds

Green bonds are a class of bonds issued to fund environmentally friendly projects (Ng and Tao, 2016). Green Bonds possess significant potential in mobilizing huge amounts of relatively long-term finance. They remain a niche product, despite their potential however - as the rather small list of World Bank investors illustrates (Griffith-Jones et al., 2012). They are generally appealing to Socially Responsible Investors (SRIs) who prioritize the importance of mitigating climate change (United Nations Environment Programme (UNEP), 2012). Financing environmentally friendly development projects in Africa may be fronted by the issuance of green bonds (Duru and Young, 2016).

The first green bond was issued in 2007 by European Investment Bank (EIB) under the label Climate Awareness Bond (World Bank Group, 2009). Following the EIB's lead, the World Bank began issuing green bonds in 2008 (UNEP, 2012). Kaminker and Stewart (2012) state that, the high ratings of the bonds (highest AAA rating) established early confidence in the markets. The African Development Bank (AfDB) started in 2010, to issue green bonds (Schwerhoff and Sy, 2017). According to AfDB (2015) the overall goal of green bond market mobilizing private sector financing for sound climate and environmentally sustainable investments.

2.2 Global Green Bond Market

In a 2010 estimate, pure green bond issuance was valued at USD 16 billion (OECD, 2011). In comparison to this, UNEP and Bloomberg New Energy Finance (2011) estimated a similar sized market ($13.9bn) using a narrower definition. In 2011, Barclays estimated, between 2011 and 2020, EUR 1.4 trillion of procurement capital could be securitized in "green bonds" across Europe, making this the largest single financing instrument by value for the purchase of low carbon technology (Barclays and Accenture, 2011). By 2014, the new green bond issuances had risen to over $30 billion and steadily on the rise of growing (Schwerhoff and Sy, 2017). Deschryver and de Mariz, (2020) indicate the total value of green bond issuances had risen since its first inception in 2007 and as at 2019 realized a value of US$ 228.2 billion. This represents an exponential increase of over 500% within 2015-2019. The data confirms Kaminker and Stewart (2012) statement on the growing appetite for green bonds globally. However, from the breakdown of issuances, the least portion of issuances came from Africa. The indication is that, the growing appetite for green bonds globally is still not actively present on the continent.

[Insert Figure 1 here]

According to Ng and Tao (2016), as of 2014% the African green bond market accounted for 0.3% of global issuances. By 2019, the Amundi Asset Management and International Finance Corporation (AAM and IFC) (2019) estimated the total global market share of African Green Bonds to be 1%. Although there has been some growth, the magnitude confirms the ALCB (2018) fact stating that Africa's Green Bond market is largely underdeveloped, and accounting for what is available are very few non-sovereign risks and non-supra issuances. In terms of issuances, only six (6) African countries have successfully issued a number of tranches of green bond for the financing primarily energy projects and other green infrastructural developments (ALCB, 2018; Patzdorf, 2019; Ngwenya and Simatele, 2020). Of these, only four African countries rolled out CBI certified green bond packages. These are South Africa (first issuance 2012), Morocco (first roll out in 2016) and Nigeria (first roll out in 2017) and Kenya (first issuance in 2019). Namibia and Seychelles each rolled out green bonds in 2018 though not certified (Patzdorf, 2019).

2.2.1 The Nigerian Green Bond Market

As the first green bond of the country, The Federal Government of Nigeria's sovereign Certified Climate Bond is the first ever Certified sovereign green bond, the first African sovereign green bond. When the first issuances hit the market in December 2017, it met a falling investor appetite however there was a general acceptance by the green bond community. Intended to be used for investment in reforestation, micro-grid projects, electric commuter vehicles and "environmentally friendly" projects in the Niger River delta, the government announced its intention to issue a second tranche with the objective of raising a total of NGN 150 billion (ALCB, 2018).

2.2.2 The South African Green Bond Market

There are three main issuance programme in South Africa - City of Johannesburg Municipal Green Bond, City of Cape Town Green Bond, and Nedbank Green Bond. The City of Johannesburg Green Bond programme was the first of its kind in the emerging market municipal issuance and experienced a 1.5 factor of oversubscription. The proceeds are set to be invested into several RE projects that reduce greenhouse emissions and contribute to a "resilient and sustainable city" (City of Johannesburg) such as the Biogas to Energy Project, and the Solar Geyser Initiative (Goodman, 2017).With an issuance size of 1 billion Rand Green Bond in mid-2017 was the first to be listed on the JSE's new segment. What's more, it is regarded as the nation's first true Green Bond. It was five times oversubscribed and priced tight to the curve. This demonstrated the demand by investors for credible and defensible green issuances in markets with more appealing yields (ALCB, 2018).

2.2.3 The Moroccan Green Bond Market

Issuances in Morocco have been undertaken through two major programme. MASEN Green Bond and BMCE Bank Green Bond (Goodman, 2017). Aimed at financing renewable energy and energy efficiency projects in Morocco over the next 5 years, BMCE issued a USD50.5m

Green Bond in 2016. As part of structured framework to govern the use of bond proceeds, specifications of minimum energy savings and avoided emissions amounts for energy efficiency projects to be eligible have been included. The MASEN (Moroccan Agency for Solar Energy Green Bond will be used to finance three solar energy projects in Morocco) as well as benefit from a sovereign guarantee from the Kingdom of Morocco (Goodman, 2017; ALCB, 2018).

2.3 Challenges Faced in Adoption and Issuance

2.3.1 The Problem of Qualifying and Standardization

Shishlov et al. (2016) suggests a key problem to be what can be qualified as green. Defining this ultimately depends on the use of the proceeds. Ernest and Young (2016) also alludes to the challenge in defining green and argues that standards may differ according to the needs of every investor. There is no international consensus about how to define "green," though prominent efforts have been made, including the Green Bond Principles and the Climate Bonds Standards, among others (Goodman, 2017). This could eventually harm the market through accusations of green-washing and potentially higher transaction costs as there exists lack of explicit and shared objectives for the green bond market creating misunderstandings (Shishlov et al., 2016). Issuers are faced with the a most daunting challenge of defining products/ processes as green and the regularity of reflection on commitments to invest in projects deemed 'green' (Ernest and Young, 2016).

2.3.2 Additional Cost of Issuance

The additional cost required to issue green bonds are prominent in challenges faced. From the perspective of an Issuer, these costs encountered in interest cost consultancy expenses and expenses relating to the assessment of the financed project, as well as measurement and disclosure of financial and environmental metrics associated with the project collectively may make the green bond costlier (Talal et al., 2016).The additional expenditure for defining the green criteria, monitoring and maintaining the proceeds as green, and transparently communicating performance to investors over the lifetime of the bonds while providing returns similar to a normal bond presents and added economic cost to the issuer (KPMG 2015; Ernest and Young, 2016). In Azhgaliyeva et al. (2019) it is suggested that, costs ranged between USD10 – 100K are incurred typically for a third opinion on green bond issuances. The UNEP (2016) suggests that in ASEAN countries, like Singapore and Malaysia, grants have been made available in covering costs for external reviews. However, in other countries, the cost is still existent. UNEP (2016), raises the issue of disclosure costs being expensive for issuers.

2.3.3 Limited Capacity and Bankable Projects

The Climate Bond Initiative (CBI) and UNEP inquiry (2015) identified the lack of clarity about potential projects scheduled within the investor community as challenge when planning. As there

is limited information of the number and types of projects undertaken, there exists a lack of prioritization of strategic green developments and inhibits the issuances of green bonds (Chugan et al., 2017). Limited investor capabilities also present the problem of readiness to provide capital and results uncertain planning and prioritization of strategic green developments by governments. There also exists a challenge of getting issuers that do have portfolios of suitable green projects to tap the green bond market for project financing in clean projects. This presents the need for improved capacity building for issuers in emerging markets (CBI and UNEP, 2015). Koh (2017) cited in Azhgaliyeva et al. (2019) observes that industry experts estimate that only 45% of the RE projects within the Southeast Asia tend to be bankable without public sector participation.

2.3.4 Limited Credit Absorption Ability

Chang cited in Azhgaliyeva et al. (2019) highlights on the fact that, generally, small and medium sized enterprises are not given access wo the issuance process due to their limited ability to absorb credit. Falsen and Johansson (2015) talks about the difficulties in the development of instruments of aggregation like in the case if asset backed securities and covered bonds. It was observed that, the small size of green projects in comparison to regular infrastructure projects could be linked with this. Azhgaliyeva et al. (2019) further adds that, green bonds in bigger markets, like in China, the prospects of a sustainable green bond market are larger due to the presence of vast number of bigger entities bidding for green finance. However, the situation is smaller markets tend to be the opposite with limited domestic and lack of appropriate projects for green financing.

2.5 The Green Bond Integrity and Guidelines

2.5.1 The Green Bond Principles

The Green Bond Principles launched in 2014 by Citi, JP Morgan, Credit Agricole and Bank of America Merrill Lynch, and are now managed by the International Capital Markets Association (ICMA) (Shishlov et al., 2016). It provides issuers guidance on components involved in launching a credible Green bond package using voluntary process guidelines (Ernest and Young, 2016). The GBP provides a list of eligible project categories, however, allows that regardless of category, the issuer should demonstrate the environmental benefits of all projects benefiting from bond proceeds. The components of this process are; Use of Proceeds, Process for Project Evaluation and Selection, Management of Proceeds and Reporting.

Under ‘Use of Proceeds’, the criteria for a green project is defined. The project should reconcile with categories considered under green by the standards (Goodman, 2017). This takes into consideration, the overall nature of the project to be undertaken and its categorization under environmentally friendly and climate projects. The ‘Process Evaluation and Selection stage defines processes for evaluation and selection of the green project. This comprises factors that are asses within an evaluation and review of the projects to be qualified and selected for green bonds listing (Ernest and Young, 2016).

At the third stage, 'Management of Proceeds' systems to trace the green bond proceeds are put in place. This is one of the most essential stages in the life cycle of a Green bond (Talal et al., 2016). Reporting is the final component of the GPB. An annual report on the use of the proceeds is a recommended requirement (Goodman, 2017). A second-party review and consultation where advice from a consultant that may not be made public is further recommended. Also 'auditing' comprising a verification of the entire process, or a part of it, by third parties. Finally, a 'third-party certification' that involves certification of green bonds by qualified third parties (Ernest and Young, 2016; ICMA 2016).

2.5.2 Climate Bond Standards

Facilitated through taxonomy to encourage common definitions globally within green bond markets (CBI and UNEP, 2015). Standardization is done in accordance to a set of guidelines which for certain types of green projects, includes technological specifications (Talal et al., 2016). It follows that third parties verify compliance with Climate Bond Standards is existent in green bonds so as to facilitate certification by the CBI. A typical example is that of the MASEN Green Bond which received a certification under CBS2 following verification by Vigeo Eiris. This ensures the credibility of the issued bond among investors. The standards by the CBS are sector specific and easily adopted by issuers (Ernest and Young, 2016). The certification procedure is outlined in Figure 2.

[Insert Figure 2 here]

3. Methodology

The quantitative strategy was adopted as it allows for greater amount of data collection within a limited time frame (Dawson, 2019). Mainly within this, a behavioral analysis is possible using numerical data (Creswell, 1994). A deductive approach is assumed following the nature of the study in testing validity of factors from previous studies. A survey type design is also employed to illicit data from respondents sampled from the population (Owens, 2002).

3.1 Sampling

Convenience and purposive sampling technique were employed such that the best suited personnel are targeted to provide adequate data for the study (Kumar, 2011). The unit of analysis considered were institutional investors in banks, insurance, investments and other financial service providers.

The population considered in this study were, pension funds, insurance and banking firms within the financial industry of Ghana. A population of 110 was identified (NPRA, 2017; NIC 2018; BoG, 2019) and sampled to a size of 54 using the Kish. From this sample size, the respondents were geographically selected form the Greater Accra and Kumasi Regions of Ghana. This was justified by data from Ghana Statistical Service indicating that There are about 70.8% economically active population Accra and about 71.4% economically active population can be found in Kumasi. With this being the case, most of organizations tend to headquartered within

these two regions. Data from literature review was modelled into questionnaires and distributed to respondents. On a Likert scale of priority between 1 – 5 'where 1= Not a Priority 2= Low Priority, 3= Medium Priority, 4= High Priority, 5= Very High Priority' respondents were required to rank the factors they considered topmost priority for deployment of green bonds in Ghana. In total 54 questionnaires were distributed.

3.2 Data Collection

To reach out to respondents, participatory mails were sent to the customer service departments of the organizations. The requests were then referred to appropriate department for review. At this point resource personnel were selected to participate in the study by the said department. In the case of hand delivered requests, a similar process was followed to reach respondents. Since the study was widely explorative; it accommodated the opinions of both personnel in top and lower management of the organizations thus, no specific exclusion criteria were set. However, the personnel who took part had to be recommended by the institution as capable of providing relevant contribution to the study. This included, CEOs, directors, managers, and financial analysts. In ensuring that no ethical considerations were breached, the respondents received a briefing on the study and solicited their consent before participating in the study. Privacy and confidentiality were also assured thus allowing respondents to freely provide as much information as possible. A total of 32 responses are received, proportional to a response rate of 60.37%. Baruch and Holton (2008), estimate a response rate of 35.7% to 52.7% for organizational studies. Ease of online delivery and responses could factor into the high rate of response. Thus, making it suitable for the study.

3.3 Data Analysis

The Statistical Package for Social Sciences statistics software was utilized in the analysis of data retrieved. The analysis included the descriptive statistics of the responses which highlighted the means and standard deviations. The mean scores represent the average of the responses, while the standard deviations also demonstrate how dispersed the individual scores are around the mean. The relative importance indexes of the were determined using the formula;

$$\text{Relative Importance Index (R.I.I.)} = \sum \frac{W}{A*N}$$

Where, W is the weighting given to each factor by the respondents (ranging from 1 to 5), A is the highest weight (5 in this case), and N is the total number of respondents. Higher the value of RII, more important was the cause of delays. The RII is a widely used ranking technique for Likert type data from which the researcher presumes an equal interval between scales The RII values range from 0 - 1. Thus, the case of higher value represents a higher impact or significance of the variable (Holt, 2014; Gündüz et al. 2013). In addition to this, a one sample t test was performed. This was to test the significance of the individual variables against the overall mean of the measure. The one sample determines the difference from a sample mean to a hypothesized mean

on a single group (Moore et al., 2015). For this study the confidence level was set at 95 thus significance was established at $p < 0.05$.

4. Results

4.1 Demographic Data

The demographics of respondents was requested for to ensure the target group were being considered. Information on the place of work, capacity of work, and period were solicited. This was to highlight the representation of the background strata of the responses received. The place of work confirmed that responses were duly received from the expected sample of the study (Owusu-Manu et al., 2019). This formed part of the assessment of reliability and reinforced confidence in the results obtained from the analysis.

The highest response was received from 13 Insurance Company affiliations, representing 41% following steadily are that of Banks with 11 responses as 34%. Pension Funds and Brokerage affiliations followed with 6 and 2 responses representing 19% and 6% respectively. The statistic representation highlights the most respondents being financial analysts with a 53% from 17 responses. Managers follow with 11 responses as 34%. Executive directors represent 6% (2) of responses and Chief Executive Officer and Associates represent 3% (1) each. With respect to the periods of work with the institutions of affiliation, most recorded was *less than 5 years* with 43.8 % coming from 14 respondents. Period of *6 – 10 years* followed with 34.4% from 11 responses, *11 – 15 years* proportioned in 15.6% from 5 respondents and *16 – 20 years* at 6.2% from 2 respondents. This data shows an appropriate distribution of finance professionals targeted in terms of management and staff practitioners.

[Insert Table 1 here]

The reliability standard of 0.700 is exceeded as shown in Table 2. This generally translates to a reliable scale with appropriate levels of internal consistency.

[Insert Table 2 here]

Table 3 and Table 4 illustrates the analysis in detail. Form the one sample t test, it is highlighted that, a number of variables test significant at a confidence level of 95%. Twelve (12) variables were keyed in for this procedure and of it Good credits ratings toped the ranking with a RII score of 0.956. its standard deviation and collective mean score were 0.491 and 4.78 respectively. The t – test also showed the variable to be significant (t= 10.329, sig = 0.00). In 2nd place is Provision of Local Guidelines for Green Scope which was also statistically significant (t= 4.314, sig = 0.00) with a RII of 0.869, standard deviation of 0.602 and a mean score of 4.34. Significant in 3RD place was Proper Qualifications Criteria for Green (t=4.289, sig = 0.00) having an RII of 0.856 and its respective standard deviation and mean score at 0.523 and 4.28. Prioritizing

Financially Viable RE Projects, was significant in 4th place (t= 2.347, sig = 0.026), with RII of 0.85, means and standard deviation of 4.25 and 0.156 respectively.

Among subsequently ranked factors from 5th – 10th are, Protection Against Currency Risks (not significant at t = 0.640, sig = 0.527), Promoting Investor Interest in Climate Financing (not significant at t = -0.254, sig = 0.801), Enhancing Capacity of Institutional Investors (not significant at t = -0.500, sig = 0.621), Provision of Tangible Added Benefits (not significant at t = -1.063, sig = 0.296), Supporting Government Policies Like Tax Relief and Subsidies (significant at t = -2.771, sig = 0.009) and Sensitizing the Need for Environmentally Friendly Investments (significant at t = -3.334, sig = 0.002). Their RII scored at 0.794, 0.769, 0.763, 0.75, 0.688 and 0.688. The 9TH and 10TH ranked variable, though with the same RII score had to be ranked with respect to their standard deviations. Mean scores recorded for these intermediate variables ranked between 3.97 – 3.31. The last two variables in are Encouraging public level participation in 11th place and significant at 5% (t = -3.582, sig = 0.001), and Creating / stabilizing efficient bond market in 12th place also significant (t = -4.389, sig = 0.00). The RII scores of both stand at 0.681 and 0.663. their associated respective means and standard deviations are also 3.41-0.756 and 3.31-0.738.

[insert Table 3 here]

[Insert Table 4 here]

5. Discussion

5.1 Good credit ratings

Good credit ratings scored remarkably high with a RII of 0.956. This shows how much of a priority investor see this factor to be. As a determinant of green bond success, it is requisite that the issuer has good credit ratings which in themselves will make investors feel secured in committing funds. Arca (2013) opines that bonds that generally have a rating below A tend to be unattractive for investors. More so with respect to bonds denominated in foreign currency which are linked to payment sources in a particular country ceiling are usually provided such that its performance influences investor activity on such bonds (Brieceno-Garmendia et al., 2008). Bassanini et al. (2011) alludes to this with the suggestion that investors have their preferences on bonds with AA rating as such bonds potentially have a better security. Schroeter (2013) expresses that the creditworthiness of the borrower is assessed based on the credit ratings with regards to their accountability for debt and financial instruments. Developing economies are faced with higher risks regarding the political climate, currency and credit risks for foreign investors thus making it more difficult to obtain good credit ratings for potential issuers of green bonds (CIB, 2015). In such economies where cost of capital has a very high share in overall project cost although credit enhancement might increase some cost to public sector, it can be a better cost-effective option than direct subsidies

5.2 Provision of local guidelines

Guidelines for green bonds have been very critical in its success. Ranking 2nd with a RII of 0.869 the, the provision local guideline for green scope is one of the priorities considered by industry professionals. It must be noted that though standard green bond guidelines exist such as the green bond principles its impendent that country specific guidelines are also developed in tandem to give a true representation of local conditions and peculiarities which can be associated with the bonds EY (2016). Guidelines traditionally control the entire issuance procedure and as a requisite of the strategies for success ought to design to make the best scenarios governing a specific country. This is ultimately because, conditions are not the same in any two places hence the need for relatable procedures of action are key to ensure the success of issuance (Talal et al., 2016). Accordingly, in World Bank report on creating green bond markets a recommendation presented is that, a requirement of "clear country-level guidance" is key for its creation (Network, 2018). Adding to this, lack of such frameworks and guidance is mostly the issue with other similar countries yet to issue green bonds.

5.3 Proper 'green' qualifications criteria

Ranked 3rd with a RII score of 0.856. The qualification of projects as green ought to be properly defined to eliminate ambiguity and misinterpretation. This variable has long been a challenge facing green bond with a large number of investors, issuers and project developers not on the same page in defining green (ALCB, 2018). A typical example is some argument challenging the 'greenness' of hydroelectricity as large areas of land need to inundated for the creation of dams and the effect it has on communities in the long run (Shishlov et al. 2016). As such in every issuing transaction it should be made clear and succinct what should qualify as green and what isn't. A common challenge prevailing in the green bond market is the issue of greenwashing. This is the situation where projects which are not actually environmentally are packaged and made to look as such. Flammer (2018) suggests that the case of limited public governance of corporate green bonds is a cause. Companies utilize techniques of selective disclosure, bogus eco-labels and skewed narratives to attract investment into their packages. Trompeter (2017) cites the case 'clean coal projects' being marketed as a 70% cleaner compared to traditional though however scientific research has debunked the claims of this. Wang (2018) comments on the lack of local green bond regulations within the United States and how the universal exiting regulations are adhered to voluntarily. It is important that considerations are also given to special industrial requirements as the concept of green may be unique in these cases. If anything can be made from these past studies, it is the particular attention which must be paid to definitions of the green criteria of prospective projects.

5.4 Prioritizing financially viable green projects

According to the CBI (2015), it of significant need that projects are viable economically as they serve as an attractive benefit to investors. This comes with no surprises as a variable ranked among top factors with a RII of 0.850. Viability of green projects have been observed to be high with low capital cost; a benefit already offered with green bonds (CBI and ISS, 2016). However,

governments may also consider alternative channels of helping increase the viability of green projects (CBI, 2015). Chugan et al. (2017) highlights the success of this approach has seen a rising interests in emerging economies and typically in Africa, Kenya is undertaking this process of 'strategic priority projects. A list of key strategic projects that the government may prioritize over a timeframe maybe contemplated with the goals expressed in these strategies/ INDCs. The CBI (2015) comments that, this policy actions for one are not specific to bond markets per say, however when put in place they facilitate effective financing of projects through bonds. La Rocca and Baietti (2012) adds that, with the inherent characteristics of eco-friendly projects making them less economically attractive to conventional projects, it is important governments provide support in ensuring their viability.

6. Outcomes and Implications

6.1 Theoretical and Practical Implications

As supported from review of past literature, key factors highlighted for green bond success include; Good Credit Ratings, Provision of Local Guidelines, Proper Qualifications Criteria, and Prioritizing Financially Viable Green Projects. Theoretically this confirms the findings of previous studies and establishes the importance of the factors to success of roll out of green bonds. Practically, the implications drawn from the findings suggests a critical incorporation of these factors within the frameworks of future green bonds. Credit ratings have shown to be a key indicator for investors and as such the right implements ought to be made available to ensure the green bonds in Ghana are highly rated. The provision of local guidelines specifically tailored accordance with the financial climate of the country is important. The regulator, most likely the Bank of Ghana should carefully assess the current effective and non-effective practices within the financial landscape in order to come out with the best fit guidelines for a successful green bond issuance in the country.

6.2 Managerial/Policy Implications

Qualifications of green projects is also a key factor which will need critical consideration as part of the frameworks. Specific institutions can be setup to carefully define the parameters and scope within which a project can be considered to be green within the context of Ghana. This will may be more effective by collaborating with the Environmental Protection Agency (EPA) to bring out a criterion for the assessment of the greenness of a project. In addition, priority to viable projects will see to it that, bond issuances produce desired results both for investors and developers. This can be facilitated through rigorous investment appraisals and analysis with consideration to current economic conditions and forecasted future performance.

6.3 Contributions to Knowledge

This study has outlined the factors which are critical to the success of green bond roll out in Ghana. This was explored form the point of players in the financial sector in Ghana. Through this, key considerations which ought to be taken into account for the future issuances are

highlighted. The findings from the case of Ghana thus adds up to the existing body of knowledge on Green Bond financing. The gap presented by the lack of exclusive and specific literature in relation to Ghana is also been filled by the study. The insights are valuable to further development of advanced literature on green bonds within the country and across the globe.

7. Conclusion

In this study, the benefits of green bonds, challenges in issuances and success factors for Ghana are looked into. With the case of good credit ratings is highlighted as the most significant factor, it is incumbent for regulator to implement market control mechanisms which ensure efficient role out of green bonds. Particularly in the time of rapid clean up within Ghana's financial sector, there exists the potential for incorporating early seeds of green bond principles and guidelines as part of strategic plans for the future.

Renewable energy project developments also need to be extensively explored and appraised. The investor need for viable green projects remains significant for green bind successes even after first issuances. Taking into account the peculiar characteristics - in terms of risks and returns - of green infrastructure developments, much efforts need to be put in place towards promoting projects with the most benefit-cost ratio. To safeguard the green bond integrity however and prevent 'greenwashing' clear and unambiguous guidelines need to developed and consented to by all stakeholders.

A case to be made from the perspective of lowly ranked and insignificant factors recorded in this study is one that, investors priorities establishing the early frameworks of green bonds. This can be justified with fact that, factors of investor interest, tangible benefits and institutional capacity may not be of relevance at the onset especially if pioneered by the state. Successful pilots will automatically induce these in later issuances. In the case of currency risks, the backing of the state in national issuances inadvertently provides a buffer. All in all, the market remains focused on foundational success at the inception, after which the low ranked factors could be put into considered.

With respect to limitations of the study, the focus on the Ghanaian context may make it constrained exiguous for generalizations. In addition, this study also considers a perspective only from the investor side. Inclusion of the regulators and developers of projects could further add bring to light more inherent data structures. The study, however presents a foundation for future studies on this scope nonetheless. Future researchers should consider looking into the development of implementation frameworks for project specific issuances.

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References

African Local Currency Bond (ALCB), (2018), 'Understanding The African Green Bond Market'- http://www.alcbfund.com/wp-content/uploads/2018/03/2018-03-05-African-Green-Bond-Market_Final.pdf (Accessed 27th January, 2019)

Amundi Asset Management and International Finance Corporation (AAM and IFC) (2019). Emerging Market Green Bonds Report 2018: A consolidation year paving the way for growth. Offi cial report

Azhgaliyeva, D., Kapoor, A. and Liu, Y., (2020). Green bonds for financing renewable energy and energy efficiency in South-East Asia: a review of policies. *Journal of Sustainable Finance & Investment*, *10*(2), pp.113-140.

Banga, J., (2019). The green bond market: a potential source of climate finance for developing countries. *Journal of Sustainable Finance & Investment*, *9*(1), pp.17-32.

Bank of Ghana (2019). Licensed Banks, Representative Offices & Their Registered Offices In Ghana – Available via; https://www.bog.gov.gh/supervision-a-regulation/register-of-licensed-institutions/banks

Barclays and Accenture (2011), Carbon Capital: Financing the Low Carbon Economy, *Barclays PLC*, London. Available via: http://nstore.accenture.com/Geneva/Studie_FINAL.pdf

Baruch, Y., and Holtom, B. C. (2008). Survey response rate levels and trends in organizational research. *Human relations*, *61*(8), 1139-1160.

Bassanini, F., Del Bufalo, G. and Reviglio, E., (2011). Financing Infrastructure in Europe–Project Bonds. *Solvency II and the "Connecting Europe" Facility,* Paper prepared in occasion of the "Eurofi Financial Forum

Chugan, P.K., Mungra, Y. and Mehta, K., (2017). Challenges and policy implications for marketing green bonds. *Book titled" Consumer Behaviour & Contemporary Marketing Strategy", (Eds.), Tripurasundari Joshi, Jayesh P. Aagja and Sapna Parashar, Excel India Publishers, New Delhi for IMNU*, pp.371-384.

Climate Bonds Initiative, & International Institute for Sustainable Development. (2016). *Roadmap for China: Green Bond Guidelines for the next Stage of Market Growth*

Climate Bonds Initiative, (2015). Scaling up Green Bond Markets for Sustainable Development: A strategic guide for the public sector to stimulate private sector market development for green bonds. *consultation paper*.

Climatewise, (2011), 'Creating Long Term Value Insurers Ask for Action So They Can Invest' – Cambridge Institute of Sustainable Leadership. http://www.climatewise.org.uk/news/2011/12/5/creating-long-term-value-insurers-ask-for-action-so-they-can.html (Accessed 27th January, 2019)

Dawson, C., (2019). *Introduction to Research Methods 5th Edition: A Practical Guide for Anyone Undertaking a Research Project*. Robinson.

Deschryver, P., & de Mariz, F. (2020). What Future for the Green Bond Market? How Can Policymakers, Companies, and Investors Unlock the Potential of the Green Bond Market? *Journal of Risk and Financial Management*, *13*(3), 61.

Draksaite, A., Kazlauskiene, V. and Melnyk, L., (2018). The Perspective of the Green Bonds as Novel Debt Instruments in Sustainable Economy. In *Consumer Behavior, Organizational Strategy and Financial Economics* pp. 221-230. Springer, Cham.

DuPont, C., Levitt, J. and Bilmes, L., (2015). Green bonds and land conservation: The evolution of a new financing tool.

Duru, U. and Nyong, A., (2016). Why Africa needs green bonds. *Africa Economic Brief, 7*(2), p.8.

Elliott, T. and Zhuang, M., (2014). The greening of the corporate bond market. *S&P Research, (44)*, pp.1-11.

Ernest and Young (EY), (2016), 'Green Bonds a Fresh Look at Financing Green Projects'

Falsen, C. and Johansson, P., (2015). *Mobilizing the debt market for climate change mitigation. Experiences from the early Green Bonds market* (Master's thesis).

Flammer, C., (2018). Corporate green bonds. Available via: https://dx.doi.org/10.2139/ssrn.3125518

Goodman, D., (2017), The Climate Finance Readiness Programme; A Climate Finance Instrument for the Implementation of Nationally Determined Contributions? *The Potential of Green Bonds / Discussion Paper. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Bonn and Eschborn, Germany.*

Griffith-Jones, S., Ocampo, J.A. and Spratt, S., (2012). Financing renewable energy in developing countries: mechanisms and responsibilities. The European Report on Development.

Gündüz, M., Nielsen, Y., & Özdemir, M. (2013). Quantification of delay factors using the relative importance index method for construction projects in Turkey. *Journal of management in engineering*, *29*(2), 133-139.

Hebb, T. (2012). The next generation netwoof responsible investing. Ottawa: Springer science + Business media B.V (1).

Holt, G. D. (2014). Asking questions, analysing answers: relative importance revisited. *Construction Innovation*.

Kaminker, Ch. and Stewart, F. (2012), "The Role of Institutional Investors in Financing Clean Energy", *OECD Working Papers on Finance, Insurance and Private Pensions*, No.23, OECD Publishing.

Koh, H., (2017). Half of Southeast Asia's Renewable Energy Projects are Unbankable'.

KPMG (2015). KPMG's Global Center of Excellence for Climate Change & Sustainability. Sustainable Insight. Gearing up for green bonds. Key considerations for bond issuers.

Kumar, A. (2011). *Research and Writing Skills*. New York, NY: Lulu Press. (978-1-4466-0560-8)

La Rocca, R. and Baietti, A., (2012). *Green Infrastructure Finance: Framework Report*. World Bank Publications.

Moore, D. S., Notz, W. I., & Fligner, M. A. (2015). *The basic practice of statistics*. Macmillan Higher Education.

National Insurance Commission, (2018). 2017 Annual Report and Financial Statements. Available via; http://nicgh.org/procurement-notices/annual-report/

Network, S.B., (2018). Creating Green Bond Markets.

Ng, T.H. and Tao, J.Y., (2016). Bond financing for renewable energy in Asia. *Energy Policy*, *95*, pp.509-517.

Ngwenya, N. and Simatele, M.D., (2020). Unbundling of the green bond market in the economic hubs of Africa: Case study of Kenya, Nigeria and South Africa. *Development Southern Africa*, pp.1-16.

OECD (2011), The Role of Pension Funds in Financing Green Growth Initiatives. Available via: http://www.oecd-ilibrary.org/finance-and-investment/the-role-of-pension-funds-in-financing-greengrowth-initiatives_5kg58j1lwdjd-en (Accessed 27th January, 2019).

OECD, B.P., (2015). Green bonds–Mobilising the debt capital markets for a low carbon transition. *Policy perspective*.

Owens, L. (2002). *Introduction to Survey Research Design.* Published on Research Gate, New York

Owusu-Manu, D. G., Debrah, C., Antwi-Afari, P., & Edwards, D. J. (2019). Barriers of Project Bond Initiatives in Infrastructure Financing in Ghana. In *Construction Industry Development Board Postgraduate Research Conference* (pp. 12-21). Springer, Cham.

Patzdorf, L. (2019). First Green Bond from Kenya: Acorn USD40m - Climate Bonds Certified, financing green buildings., Available via; https://www.climatebonds.net/2019/10/first-green-bond-kenya-acorn-usd40m-climate-bonds-certified-financing-green-buildings

Pham, L., (2016). Is it risky to go green? A volatility analysis of the green bond market. *Journal of Sustainable Finance & Investment*, *6*(4), pp.263-291.

Reboredo, J.C., (2018). Green bond and financial markets: Co-movement, diversification and price spillover effects. *Energy Economics*, *74*, pp.38-50.

Revelli, C. and Paranque, B., (2017). Ethico-Economic Analysis of Impact Finance: The Case of Green Bonds. *Available at SSRN 2983178*.

Schneider, t. E. (2011). Is Environmental Performance a Determinant of Bond Pricing? Contemporary accounting research, 1537-1562

Schroeter, U.G. (2013). Credit Ratings and Credit Rating Agencies. Handbook of Key Global Financial Markets, Institutions, and Infrastructure. p.379–390.

Schwerhoff, G. and Sy, M., (2017). Financing renewable energy in Africa–Key challenge of the sustainable development goals. *Renewable and Sustainable Energy Reviews*, *75*, pp.393-401.

Shishlov I., Morel R., Cochran I. (2016), 'Beyond Transparency: Unlocking the Full Potential of Green Bonds' – Institute for Climate Economics.

Talal F. S., Walid S. and Abdelrahim A. (2016), 'Green Bonds' CEDRO – *'Empowering Lebanon with Renewable Energy.*

Tang, D.Y. and Zhang, Y., (2018). Do shareholders benefit from green bonds? *Journal of Corporate Finance*.

Tao, J.Y., (2015). Utilizing Green Bonds for Financing Renewable Energy Projects in Developing Asian Countries. *Financing Renewable Energy Development in East Asia Summit Countries*, p.343.

Trompeter, L., (2017). Green is Good: How Green Bonds Cultivated into Wall Street's Environmental Paradox. *Sustainable Development Law and Policy Brief*, *17*(2).

Tu, C.A., Rasoulinezhad, E. and Sarker, T., 2020. Investigating solutions for the development of a green bond market: Evidence from analytic hierarchy process. *Finance Research Letters*, p.101457.

UNEP (2012), Financing renewable energy in developing countries - United Nations Environment Programme Finance Initiative.

UNEP (2015), Developing Effective Off-Grid Lighting Policy – Guidance note for governments in Africa, Nairobi: United Nations Environment Programme.

UNEP and Bloomberg New Energy Finance (2011), Global Trends in Renewable Energy Investment 2011. *Analysis of Trends and Issues in the Financing of Renewable Energy*. New York: UNEP and Bloomberg.

Vetrano, R., (2018). The emergence of green bonds: how sustainable finance is being approached worldwide.

Wang, E.K., (2018). Financing green: Reforming green bond regulation in the United States. *Brooklyn Journal of Corporate, Financial & Commercial Law*, *12*(2), p.9.

Wang, Q., Zhou, Y., Luo, L., & Ji, J. (2019). Research on the Factors Affecting the Risk Premium of China's Green Bond Issuance. *Sustainability*, *11*(22), 6394.

Zhang, H., (2020). Regulating green bond in China: definition divergence and implications for policy making. *Journal of Sustainable Finance & Investment*, pp.1-16.

Zhou, X. and Cui, Y., (2019). Green Bonds, Corporate Performance, and Corporate Social Responsibility. *Sustainability*, *11*(23), p.6881.