

A Survey of Private Sector Energy Infrastructure Financing in Developing Countries and Project Finance (Nigeria Power Sector) Using Ordered Logit Model (OLM)

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Nasir Kolade
School of Business & Enterprise
University of the West of Scotland

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Introduction/Background Information

- Energy infrastructure- a driver of sustainable growth and development;
- Developing countries and achieving United Nations Sustainable Development Goals (SDGs);
- Current sources of funding - government and corporate loans (finance gap), and;
- Lack of depth and expertise needed to close this gap.

- ❑ Energy needed to attract FDI/FPIs into local economy;
- ❑ Synergy btw sovereign Govt., DFIs and investors;
- ❑ 60% of the pop. lack access to clean energy. Nigeria population is over 180 million;
- ❑ HDI 0.527 IN 2015, ranked 152 out of 188 countries (UNDP, 2016);
- ❑ Over 68 million pop. lives on less than \$1.25/day (UNDP, 2017) and;
- ❑ Aligning with United Nations SDGs no 7.
- ❑ This research is proposing PF to bridge the financing gap;

Systematic Literature Review

- **Dailami & Leipziger (1998) project finance source of private infrastructure investment in a developing country, attracting foreign direct investment and mitigate inherent country risk in the major financial transactions.**
- **Both, the Central Bank of Nigeria (CBN 2013, p.209) and the African Development Bank (AfDB 2014, p.14) needs a yearly investment of \$5 billion, Nigeria's energy sector only received \$5.3bn as the amount appropriated in the last 16 years, while the corporate loans it had access to over the period were \$15.3billion (these were granted to both oil/gas and power generation firms).**
- **The amount invested (project finance) between 2000 and 2012 was more than \$375 billion, (Ahmed, 1999; Esty, 1999; Estache, 2004 and Yescombe, 2014).**

Research Gaps

- Most studies have focused on power consumption, impact of electricity on economic growth, power sector reforms etc., while little attention have been paid to effective use of project finance in developing countries in general and Nigeria in particular;
- Few researchers have actually studied specific developing countries, such as Venezuela, the Philippines, India, Chile, and Peru (see Bonetti, Caselli & Gatti, 2010; Bond and Carter, 1995; Esty; 1999 and Gupta and Sravat, 1998). There some supporting evidence to establish the positive impact of project finance on a country's economy (see Gupta and Sravat, 1998; Esty, 2002 & 2004; Gatti, 2005; Kleimeier & Versteeg 2010 and Regan, 2014);
- There is little research work that examines project finance as an alternative or as part of the financing mix used in financing energy infrastructure deficits in Nigeria (Narrative & systematic literature search).

Research Aim, Question and Objective

➤ Critically examine the use of project finance as an alternative source of financing energy projects in Nigeria, in order to contribute solutions to the challenges of deficits in the energy infrastructure that have an effect on economic growth and development in Nigeria.

□ Research Question

• To what extent does the active participation of investors correspond to higher levels of project finance investment in energy infrastructures?

❖ Research Objective

• To examine how investors (financial institutions, foreign direct investment and private investors) can participate actively in energy asset infrastructure development using project finance to strengthen capital formation roles in Nigeria.

Research Methods- Data Collection, Analysis and Interpretation

- **Purpose and quota sampling (Saunders et al., 2012).**
- **Heathcote, et al., 2014, p. 1&10: WEF-stakeholders are pension funds, insurance companies, sovereign wealth funds, endowments etc.**
- **The themes of the survey, comprising 60 questions which were organised in six sections: business environments (8 questions), government and regulations (9 questions), finance and investments (19 questions), risk (8 questions), project finance (15 questions) and finally collateral security (6 questions).**
- **Similar approach to Demirag et al. (2011) and Howcroft and Fadhley (2006).**

Data Description

- The themes of the survey, comprising 60 questions which were organised in six sections: business environments (8 questions), government and regulations (9 questions), finance and investments (19 questions), risk (8 questions), project finance (15 questions) and finally collateral security (6 questions).
- 110 respondents out of 138 (79.7%),
- A five-point Likert scale survey, (Vaske, et al., 2017).
- Respondents had the choice of selecting one of these opinions: 1 (strongly agree), 2 (disagree), 3 (neutral), 4 (agree) and 5 (strongly agree).
- Reliability tests were also conducted, through the use of the Alpha-Cronbach test -internal consistency, (α) of 0.89, which is higher than 0.70 (Hochman & Timilsina, 2017; Diedenhofen & Musch, 2016).

Hypotheses

- **Business environment**
- **Hypothesis 1**
- **Ho: Business environment is not statistically significant in influencing the decision-making process for an investor investing in Nigeria.**
- **Government regulations**
- **Hypothesis 2**
- **Ho: Government regulations are not statistically significant to promote investment in Nigeria,**
- **Finance and Investment**
- **Hypothesis 3**
- **Ho: Energy projects financed using project finance are not associated with shallow financial markets and not statistically significant.**
- **Risk**
- **Hypothesis 4**
- **Ho-Financing energy project using project finance is not associated with greater country risk when investing in Nigeria's energy sector.**
- **Project Finance**
- **Hypothesis 5**
- **Ho: Project finance has no effect statistically on financing large energy projects.**
- **collateral assets.**
- **Hypothesis 6**
- **Ho: Project finance is not statistically significant without recourse to project sponsor collateral assets.**

Ordered Logit Model (OLM)

- This research uses a deductive approach, whereby existing theory (agency cost/theory) was used to developed hypothesis and tested using primary (via questionnaires) data and ordered logit.
- The empirical model specifications development follows those of Hosmer and Lemeshow (2000) and Trochim (2006).

Primary Data Analysis/Interpretations

- **Validity & reliability tests (Pilot and Alpha Cronbach)**
- **Descriptive statistics**
- **Dependent Variable Frequency table**
- **Correlation Matrix**
- **Ordered Logit Models;**
 - **Coefficient**
 - **Odds Ratio**
 - **Marginal Effects**

Research Key Findings/Contributions

- Hypothesis- 1-6 (Likelihood ratio):
- H_a -The six themes were all statistically significant in funding an energy project in Nigeria.
- Respondent's responses (primary data) demonstrated evidence that is consistent with the view that project finance has a superior ability to provide/ increase funds available to finance energy projects;
- Contributes to the body of knowledge; extends the boundary by specifically conducting research on one country, with the capacity to replicate the same study in another country (especially developing countries).