ANALYSIS OF ENVIRONMENTAL CONSTRAINTS ON SUCCESSFUL DELIVERY OF INDEPENDENT POWER PROJECTS IN NIGERIA

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A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE (M.Sc.) DEGREE IN PROJECT MANAGEMENT TECHNOLOGY

JULY, 2019.

CERTIFICATION

This is to certify that this work **"Analysis of Environmental Constraints on successful delivery of Independent Power Projects In Nigeria"** was carried out by **Ngerem, Thomas Chinedu** with registration number **20074595068** in partial fulfillment for the award of Master of Science (M.Sc) in Project Management Technology, in the Department of Project Management Technology, Federal University of Technology, Owerri.

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This work is committed to Almighty God for his enabling grace and inspiring wisdom.

ACKNOWLEDGMENTS

To God Almighty I remain forever grateful for his grace, mercy and inspirational knowledge towards me throughout the rigorous task of completing this program. My heartfelt gratitude and appreciation goes to my supervisor Engr. Dr. C.N. Ononuju for his painstaking supervision and constructive criticism which is borne out of his high academic standard and zeal in making sure my thesis was of a standard.

My profound gratitude also goes to my Head of Department Dr. C.I. Anyanwu, Dean of SMAT, Prof. O. T. Ebiringa. I am also indebted to the following lecturers in the Department of Project Management Technology, namely: Prof. G.F. Okorafor, Engr. Prof. F.P.O Ukwuoma, Prof. C.C. Nwachukwu, Surv. Dr. K.A. Okorocha, Engr. Dr. S. O. Okpighe, Dr. U. F. Amaeshi and Dr. B. Amade.

My gratitude also goes to Mr. Anyiam Kizito and Engr. Cosmos Ifeanyi Nwakanma for their assistance in seeing to the success of this research work.

I also appreciate the effort of my brothers, Augustine Ngerem, Simon Ngerem, Mathew Ngerem and my beloved cousin Hon. Innocent Ekenma for their moral and financial support all through my academic work.

Finally, my sincere gratitude goes to my beloved wife Ijeoma Glory Ngerem and my precious daughter Emmamuella Chiazawom Ngerem for their Prayers all through this period.

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ABSTRACT

The research work examined environmental constraints on successful delivery of Independent power projects (IPP) in Nigeria. This study is motivated by the delay in executing IPP over a long time and the poor underperforming nature of projects in the power sector. The purpose of this study is to establish the effect of these constraints on IPP delivery in Nigeria. The study made use of the objective realization questionnaires designed following the likert model and were administered to experts who work as financiers, contractors or consultants in the power sector. One hundred and seventy one (171) questionnaires were distributed from a population size of three hundred (300) with one hundred and twenty five (125) returned. Factor analysis and multiple regression models were used for data analysis. Twenty (20) environmental constraints were identified and selected after a careful review of literature on successful delivery of IPP. The identified constraints were further group to three (3) critical factors using the principal Component Varimax extraction (factor analysis) method which explain 80.03% variance. Three hypotheses were formulated and tested using statistical software package (SPSS) version 21 known as multiple regression analysis which comprises of F-test, ANOVA and t-test. The study revealed that three critical factors namely social, procurement and financial environmental constraints do significantly affects successful delivery of IPP in Nigeria at (P-value) of less than 0.05%. The Earned value analysis (EVA) model results indicate that six of the IPPs under study incurred negative cost overrun except Omoku IPP. Omoku IPP experiences time variation due to the identified constraints. It also infers that only Okpai IPP executed project within time frame, Aba integrated and Azura IPPs were ongoing (not completed) as at the time of visit. These indicate that none of the Plants were 100% optimal in production as a result of consequences of the stated constraints. The study concludes that investors in the power sector need identify and eliminate all constraints mentioned in this work at the planning stage before embarking on IPP delivery. In improving efficiency, the research recommended that stakeholders should take proper understanding of the variables identified in this work for easy management and prevention of cost and time overrun, as well as timely approval of power purchase agreement (PPA), gas purchase agreement, good enabling working environment, granting of long term loan by financial institutions to investors and transmission line capacity improvement.

Keywords: Environmental, Constraints, Independent Power, Project success

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Electricity generation is the method of producing electric power from sources of main energy to the end users through a transmission line known as national grid. Transmission line is that channel in electricity distribution system that carries generated power from the primary source known as turbine to the end users for consumption. It is important to understand that during transmission of electricity to end users, the conduction channel experiences a lot of energy losses along the line, which causes poor electricity distribution at times to end users (Uwaifo, 1994). Nevertheless, electricity being the greatest important invention of the twentieth century was first produced in 1896 in Lagos after 15 years of its introduction in England. The first generating plant was setup in Lagos in 1898 until 1950, which was under the care of the Public Works Department (PWD) in 1946. Its supply has been epileptic due to generation, transmission and other limiting constraints to actualizing effective power supply and projects in Nigeria (Sambo, 2012 & Sada, 2007).

In a bid to effectively develop electricity generation and supply, Government in 1951 established an Electricity Corporation of Nigeria Ordinance as a statutory public Corporation. The company took over power generation projects of Government which were carried out through the PWD by Nigerian Electricity Company (NESC) as a licensed company (Ikeme & Eboho, 2005).

Nigeria dam authority (NDA) was setup to construct, build, run, generate and transmit electricity using dams (water). ECN and the NDA came together to form NEPA which took off from1st of April1972 (Adeoghe, 2009).

There was an urgent need to set up substitute for NEPA and also reform the sector because of many depending conditions under which NEPA was expected to operate in a bid to satisfy national demand. This prompted the transformation and reorganization of NEPA to what is presently called **PHCN**. The unbundling reform policies started in 2005 but gained momentum in 2010 and prompted creation of eighteen successor organizations from NEPA including six Generation Companies, one Transmission Company and 11 Distribution Companies. The segment has likewise been deregulated prompting private companies' investment in production area with introduction of IPPS, whose purpose was to assist in power production and transmission to increase electricity generation to end users (Adeoghe, 2009).

Precisely, Independent power plants (IPPs) are privately owned plants built to generating electricity for commercial sales to power consumers. The plants are realized on the ownership structures for IPP in power industries that include BOO (build, own, operate); BOOT (build, own, operate and transfer); and BLT (build, lease, transfer without the interference of Federal Government. In executing IPPs project procurement, external environment and finance constraints needs to be studied in determining IPPs successful (Eberhard, 2016).

Despite the huge cost of procuring licenses which averages about sixty thousand US dollars and demand for a bankable power agreement by financial institution for IPPs

(NERCNG, 2008) and steady supposed monetary contribution by Federal Government, power interruptions are standard for Nigerian populace and were seen as normal by the citizens. IPP Procurement account for huge proportion of total expenditure and increasingly recognized as essential in influencing electricity project delivery. He further noted that IPPs delay can be traced to inefficient, non-enabling environment, social criteria within procurement process both in public and private organization, which is justifiable by poor service delivery of power production, transmission in Nigeria (Preuss, 2009).

Yet most IPPs have not been functional in delivering electricity to end users or even complete the granted IPP within specified duration due to so many constraints encountered within the working environment (World Bank, 2002).

Gudiené, Banaitis, Banaitiene and Lopes, (2013) observed variables measuring environmental critical factor affecting project execution as political, economic, procurement as well as social environment. Political influences concern political steadiness and government involvement in giving the two motivating forces which are monetary encouragement and enabling atmosphere for potential investors and project advancement (Chen, Effiom, Okon & Oduneka, 2012). Notwithstanding the challenges of not delivering power and IPPs are apparent in these three parts of the nation's power rate chain; generation, transmission, distribution. All these are traced to the numerous problems associated with our environment and the undermining constraints, as generation has dropped from 12,522MW to 3,879MW as at August 2015 according to Mckinsey (2015) report on electricity generation and gap in Nigeria.

Mckinsey (2015) collaborated with Uwaifo (1994) that 85% of mounted capacity in power segment is powered using gas and its availability has been low because of deficient production, financial disincentives, insufficient infrastructure and continuous vandalism. They observed that this actually has affected generation capacity with the ability to distribute 5,300MW transmission mechanism. However, it is interrupted by system breakdown and regular constrained blackouts. At present, transmission capability is high above operational production; however transmission will quickly turn into a limitation because of expanding operational capability. It is evident also that Nigeria’s distribution organizations experience substantial losses, with about 46% of energy shortage because of technical, commercial, inadequate transmission distribution capacity, poor facility maintenance, gas transmission problems and system failure.

1.2 Problem Statement

Nigeria being the largest economy among African nations and having its GDP at USD 569 billion, still generate and perform below required level. The sector continues to require huge investment as power production capacity keeps on missing the mark regarding satisfying domestic needs. These have led to broad power outages, as majority of the masses (55%) are without access to power lines carrying electricity and others that are connected to the power lines continue to experience power outages.

As of now, Nigeria possess power production capacity to supply to nation’s grid of 12,522MW with accessible limit of just around 4,500 MW, to address the issues of Nigeria's populace of about 170 million people and a nation with a GDP development rate of 7% (Mckinsey, 2015).

The historic difference between need for electricity in Nigeria and obtainable power formation's grid has brought about extensive independent power generation in residential, industrial and commercial area (Natasha, 2015). This actually has brought underperforming nature of Nigeria electricity sector and the inability to sufficiently execute, generate and transmit electricity power within time and cost. This has also affected the socio-economic and technical development in the country (Adegbulugbe, 2005). This is apparent from project performance indices such as high maintenance cost in executing IPP, line losses, less efficiency of plants productivity in Megawatt due to certain environmental constraints and the gap in energy availability (Uwaifo, 1994). The need to decide influence of constraints on IPPs delivery in Nigeria necessitated this research, Analysis of environmental constraints on successful delivery of IPP in Nigeria.

1.3 Objectives of Study

This study aims at analyzing the effect external environment constraints has on successful delivery of Independent power projects in Nigeria. The aim above was attained via the stated objectives:

1. To assess the effect of social constraints on successful delivery of IPP.
2. To analyze the effect of procurement constraints on successful delivery of IPP.
3. To evaluate the effects of financial constraints on successful delivery of IPP.
4. To evaluate the effect of identified constraints on cost and time.

1.4 Research Questions

This research intends to answer the following question:

1. What is the effect of social constraint on delivery of IPP in Nigeria?
2. What is the influence of procurement in the delivery of IPP in Nigeria?
3. What is the effect of financial constraint on the delivery of IPP in Nigeria?

1.5 Hypotheses

H_{O1}: Social constraints do not significantly affect successful delivery of IPP in Nigeria.

H_{02}: Procurement factor does not significantly affect successful delivery of IPP in Nigeria.

H_{03}: Financial constraints do not significantly affect successful delivery of IPP in Nigeria.

1.6 Justification of Study

The reason for study is to identify and analyze the factors affecting success of IPP delivery in Nigeria. It is vital to conduct the study, because all IPP in Nigeria under study, experiences one difficulty or the other in trying to function and execute its project in Nigeria. The sector has been supported by Federal Government financially, yet the under seen inherent environmental constraints has undermined IPP success and eventual resulted in several failed projects in Nigeria. It is imperative to know proper planning and forecasting of the sector short coming will help improve and ameliorate inherent environmental constraints affecting IPP delivery in the country.

The factors identified in this work will be helpful to all IPP contractors, companies and stakeholders in the power sector. The aftermath of the study will educate general public on influence of these identified constraints on the delivery of IPP in Nigeria.

The model generated from aftermath of these research, will provide significant and flexible relationship on the dependent and independent variables as well contribute to both academic and empirical literature to future researchers.

1.7 Scope of Study

The study focused mainly on identifying and analyzing environmental constraints on successful delivery of IPP in Nigeria. The study is with particular reference to evaluating the following listed project sites as: AES Barge (Egbin, Lagos State), Okpai (Delta State), Afam VI (Rivers State), Aba integrated (Abia State), Azura (Edo State), Alaoji (Abia State) and Omoku Power Plant (Rivers State). These projects were chosen from the southern part of the country, constructed by contractors in the power industry namely as: Rockson Engineering, Steag engineering and power Electrics. The projects were supervised by National integrated power project (NIPP) commission. It was due to so many limiting constraints affecting IPPs in Nigeria and failure to meet up with project execution time and cost.

This study is limited to the identification of the causes of IPP failures in relation to the cost and duration of the selected IPPs.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

Gnyawali (1994) describes the business setting as happenings, conditions and problems surrounding entrepreneurial activities such as political, economic and socio-cultural influence that impacts individuals' readiness and capability in attempting entrepreneurial activities. These environmental circumstances are mainly because of: Problem in access to credit facility, bureaucratic practices and regulatory policies.

In another contest, Mashhadi and Rehman (2012) sees business environment as crucial component in Project formative and implementation for effective business or project realization. The business environment is limited to physical and social constraints. When the environment constraints are not considered as providing way to ameliorating it, might lead to project failure. They noted this would cause uncertainty in investors' decision making, either to abandon or continue the project. Such uncertainty is thought to comprise three components; insufficient information concerning the environmental situation, inability to accurately assess the probabilities of environmental influences affecting achievement or failure of IPP investors. They equally enumerated these environmental factors that have limited realization of IPP in most developing countries.

i. Lack of Planning.

ii. Poor road and rail transport system.

iii. Political instabilities and crises.

iv. Host community attitude towards the investors.

v. High level of corruption in different sectors.

vi. Continuous vanderlization of oil pipe line and investors equipment by hoodlums.

2.1.1 Project concept and management

Nworuh (2012) defines project as a sequence of organized events and task set out by organizations, having a well-defined goal, date of commencement, time of accomplishment, prerequisites for assets and finance limits. A project is conveyed based on its quality, time and cost stipulations and so as to achieve them, appropriate organization of assets is vital.

It is also described as planning, organizing, guiding, and the running of an organization's assets for a comparatively temporary objective. Project management is said to be acceptable as a way of escaping the troubles inherent in the creation and production segments of an economy and for these reasons many projects are abandoned or are not successful (Nwachukwu & Emoh, 2011).

Harrison (2008) sees the major reason for improvement of project management concept, in the management of project as very dissimilar from usual management of operations which involves specialization, technique, highly sophisticated planning and control for actualizing project objectives.

Hence, organization involvements in project execution of IPP are knowingly or unknowingly involved in a relatively new concept of management known as project management concept (Harrison, 2008). He noted that management concept adopted in realizing any independent power projects, even at high level of various environmental constraints that tends to limit or affects the successful delivery of IPP in Nigeria from start to finish of the project according to project management definition is as follows:

1. Initiation of IPP.
2. Proper Planning of IPP for successful delivery.
3. Project organization.
4. Project directing.
5. Executing IPP within the expected project duration.
6. Project control.
7. Closing of project.

2.1.2 Project Constraints Management

To implement changes, there is always human opposition. So limitations must be thought of in the period of planning before real usage in order to limit the impact of human opposition, With respect to emotional hindrances. There is this propensity for individuals to make guarded move instead of 'toleration' so also their minds inform them otherwise. In this position, individuals are emotionally bothered. In circumstances when limitations have to do with job security, the effect of emotional limitations can be much more noteworthy and can bring about devastative impacts (Chua, shen & Bok, 2003).

Constraints management adds to two main project functions which are planning as well as control (Chua & shen, 2005). Planning functions lay emphasis on increasing optimal schedules by means of simple or complex algorithms with the purpose of actualizing project goals like duration, the cost as well as quality. Control capacities are centered around plan and execution; for example, work task and asset allocation and also managing of supply chain; for instance, material conveyance and stock control. Identifying and eliminating hindrances (Chua et al. 2003) from bottleneck exercises assist to diminish fears in IPP development procedures and increases straightforwardness of the project management.

It is essential to recognize the potential hindrances in the development project (IPPs), which can assist to reduce the needless wastage and also the loss of cash and time on account of insufficient planning. Controlling the limitations is therefore a pre-condition for great performance of undertaken. Limitations must be overseen. Basically, in most cases the constraining effect can be decreased or eradicated (Yates, 2002).

Mcmullen (1995) classified constraints to two sets: those with lesser effect and those with more effect. He recommended that each circumstance contains numerous relative lower influence constraints but just a little higher effect constraint. The higher effect constraints are referred to as main problems or basic causes. He recommended since time is everybody's prime limitation, keeping up with individual and management to maintaining focus on ways to identify and act on the higher effect will assist in utilizing the rare time viably. These constraints may be classified into two:(1) the internal and (2) the external constraints

2.1.3 Definition of Constraints to Project Management

Project constraint can be defined as limiting situation or power which limits the performance of projects within a given setting/atmosphere (Chua & Shen, 2005). It is whatever that hampers advancement toward a goal or an objective. Constraints can result to undesirable outcomes that don't support goals set by an organization. Therefore, the environment together with system limitations leads the way forward to obtaining solutions (Stein, 1997). These hindrances should be minimized or completely removed to limit waste and thereby make project run efficiently. There are limitations in each workplace. There exist circumstances where we are uninformed of presence of constraints, or where we stress on project objectives rather than constraints inherent in our environment where IPP are cited. These constraints can additionally advance into conflicts, disputes with the host communities where the IPP are cited thereby leading to cost implications, directly and indirectly to customers and contractors. These bring problem in working environment, causes complication in project management execution as it affects cost overrun, time and performance (Yates, 2002).

2.1.4 Social Environment Constraints

Social Environmental Constraints comprise the totality of society's act, customs, practices and behaviors that hinders activities and performance of set task. To wide extent, it's an artificial construct that can compare with external environment we dwell. He further identified these environmental elements in his work as Variables as political environment, economic environment, social environment, human and project related factors (Hyvri, 2006).

The social constraints include socio-economic, political, technological and legal. Socio-economic elements deal with tenets, attitudes, cultural aspect, health consideration and general life style of occupants. Moral, legal and political settings identify with need to maintain business laws, as well satisfying the moral or social duty of your clients and communities. In certain industries, technology improvement drives demand for organizations to adjust and always look forward for improvements (Gudiené, Banaitis & Lopeset, 2013).

The Social constraints focuses on the forces within the environmental society, these factors can affect our attitudes, opinions and interests in judgment and perspective, though it is understood that no construction project could proceed in rural location without individuals' contribution. Social factors create restrictions in construction area. It is however not astonished to discover that unwanted effects originate from a trivial number of important people and the hindrances are human constraints. These social limitations can surface as little and irrelevant, but it is always difficult to resolve. Occasionally, it might stir huge issues for project and in the meantime influence the advancement of such project. This limitation will affect acceptance of new technological utilization in carrying out project. It additionally influences the design and awarding of project. We notice often that social limitations always originate from the individuals. Insufficient assumptions or terrible judgment emerging from human limitations can result to disaster, disappointment, absence of inspiration and doubt which can damage confidence and commitments to duty. Constraints involving people, comes in three diverse forms: Human resistance e.g. Attitudes toward investing (Cost), Attitude toward imported materials, Attitudes to service (Corruption and bribery), Attitudes toward work and lifestyles (Politics), Poor educational and capacity training (Newbold, 1998).

2.1.4.1 External Environment Constraints

Gudiené, Banaitis, Banaitiene & Lopes, (2013) defined external environmental factors as those elements influencing achievement of projects that are mostly beyond control of administrative team. He further developed a conceptual critical success factor model for construction (PPP) projects. The recognized factors were grouped into seven primary classes which are external, project and institutional related factors. Others are; factors involving project managers, clients, the contractors, stable macroeconomic condition, accessibility of credit services, reduced interest tariffs and long reimbursement periods. The variables used in estimating external factors are political, economic together with social environments besides others. Political factors centered on polity, government involvement in giving both motivations and providing Conducive atmosphere for potential investors in projects development (Chen, Zhang, Liu & Mo, 2012).

2.1.5 Financial Constraints

Muzenda (2007) defines financial barriers as restricted access to financing and great price inherent in executing the power sector, which include project planning, proposals and importing products like crude oil, minor sovereign credit rankings, restricting access to global credit markets, as well as national capital markets. Potentially, money related instruments are significantly not accessible. Monetary risk consists of inadequate cost retrieval, elastic demand, failure for the payment of services, and foreign trade risk. Possible initiatives in overcoming these challenges involves financing cost-lessening technology; using syndicated loans; increasing pension funds together with project bonds; expanding partial risk assures; utilizing indexing for external cash risk; and putting resources into pre-payment meters.

In many developing countries, governments don't possess monetary ability to sufficiently apply such oversight with control functions, trail and give account of allocation, distribution and utilizing financial assets (Smee, 2002). Political and governmental leakage, extortion, misuse and fraudulent deeds are probably going to happen at each phase of the procedure because of ineffective management of expenditure systems, absence of proper auditing, monitoring, administrative deficiencies and conflicting monetary control over the movement of public assets (Peters, Kandola & Chellaraj, 2000).

2.1.6 Procurement Constraints

Preuss (2009) defines procurement as the acquisition of goods and services by government or the public sector organizations. He noted that efficient and procurement practices contribute to broader organizational goals for sustainable development of the electricity sector; through the inclusion of social and environmental criteria within procurement processes. In conclusion, he confirmed that procurement accounts for huge proportion of total expenditure and increasingly recognized as essential in influencing electricity project service delivery. Still delay in power sector delivery projects can be traced to poor and inefficient procurement practices both in private and public organization.

2.2 Concept of Project Success and Failure

Westerveld (2013) observed that project success is a measure of project within schedule, budget (cost) and specified quality. Ika (2009) opined that projects frequently been finished at time stipulated, within spending plan and to quality precise is a measure success, while some projects that have surpassed their timeframe and budget are measured failure. Thus, the standard for measuring project accomplishment goes past the measure of budget, quality and timeframe; other criteria such as satisfaction of client and end user, and also the impact such a project has on environment to be considered.

However, a project properly managed can add to its achievement, but cannot avert failure. Thus, from these explanations, there is an agreement between researchers that project success includes participants' fulfillment and satisfying goals of project. He further differentiated project success from project management accomplishment. Project success addresses attainment of the total project goals whereas project management accomplishment estimates management of cost, quality and time for the success of a project. A client can view a project as successful whereas the end user may consider it ineffective (Hwang & Lim, 2013).

It's not farfetched that the inability of many projects to generally satisfy the desires and aspirations of end-user is a failure instance. A project, irrespective of completion time or cost fitting is indeed a failed one if it doesn't justify its cost and the value derivable from its use. This refers to circumstance of white elephant project (Nwachukwu & Nzotta, 2010).

Atkinson (1999) grouped achievement criteria into accomplishment at delivery phase and accomplishment at the post-delivery phase. The achievement criterion at stage of delivery includes time, charge and quality. These are known as iron triangle. Project management accomplishment is measured by stated criteria, whereas the project achievement criteria at the phase of post-delivery are grouped into product accomplishment criteria and organizational success criteria. The product accomplishment criteria are end user fulfillment, environmental effect, contractors gain, team member's fulfillment, etc., whereas organizational accomplishment criteria include: organization's benefits such as improved effectiveness, high profit, waste reduction and the elevation of organizational knowledge.

2.3 Theoretical Framework

This study will be guided by transaction cost economic theory and pecking order theory.

2.3.1 Transaction Cost Economic Theory:

Transaction Cost Economic theory (TCE) is adopted because of its financial and economic benefits as regard bringing all the various cost in purchasing goods and services. These costs are important during contractual agreement, as they are built into the budget by investors. In explanation, transaction cost theory accounts for the actual cost of purchasing products or services through the market rather than having it delivered from within the firm. At its foundation, TCE is a theory of organizational efficiency, which ascertains how a complex transaction can be structured and governed so as to minimize waste. The objective is to identify the comparatively better organizational arrangement that best matches the key features of the transaction, because it offers the investors reasonable least-cost result to govern a given transaction. Understanding this fact is also the main purpose of prescription derived from TCE (Melese & Franck, 2005). TCE is very important as it address the following:

(i) TCE has a wider applicability to the examination of complex trades and agreements.

(ii) TCE is constructive stakeholder theory where the primary objective is to guarantee resourceful dealings and prevention of waste. TCE shares many attribute with existing stakeholder management principles.

(iii) TCE offers a useful distinction and counterpoint to other organization theories, such as competence- and power-based theories of the firm.

It is important that when buying goods or foreign exchange, there will be some transaction costs incurred in addition to the price of the goods. These are expenditures earned when purchasing or selling a goods or service in a monetary sense, which include transaction costs, information cost of finding the price, or the effort to convey a goods or services to the market, contracting costs, coordination costs, and search costs. The inclusions of all costs are considered when making a decision and not just the market prices. In considering transaction theory, investors look into certain condition in contract agreement to ascertain the products that are to be manufactured in-house, co-produced or outsource in the cause of executing projects. These are decisions that must be ascertained in order to have the right balance between debt and equity financing, which is regularly adopted in constructing Independent Power Project (IPP) by investors. The theory in balancing equity and debt transaction through a complex contractual relationship is to avoid waste in procurement of goods and services as well create transaction value. In purchasing products, this assertion helps to limit the overall cost of purchasing goods and services while executing projects (Hughes, Hillebrandt, greenwood & Kwawu, 2006).

2.3.2 Pecking Order Theory:

The pecking order theory (POT) of the capital structure is a theory in corporate finance, which tries to elucidate why investors prefer to use one type of financing over another. The main motive is that the cost of financing tends to increase when the degree of asymmetric information increases. The POT states that investors are given a preference to fund asset prospects using three bases: first through the company's reserved incomes (internal funds), followed by debt, and only when varieties are not feasible due to firm growth, financing through equity becomes the last alternative. Accordingly, the form of debt a firm takes can act as an indicator for requesting external finance. Using external or equity funding leads to a fall in the prices of shares of the firm, as it affect the circulation of dividends in order to increase cash flow which is as a result of equity funding. Notwithstanding, profitable firms enjoy more internal funds available and vice-versa. In POT, Asymmetric information drives the issue of debt over equity due to irregular or change in contract terms by the principal due to unforeseen circumstances. Debt issuance signals the confidence of the board that an investment is profitable and good to embark on such contract. Equity issuance signals a lack of confidence in the board that may feel the share price is overvalued. In balancing debt and equity finance resulting from the POT a Trade-Off theory can be adopted with a lot of cost benefits (Berger & Udeli, 1998).

2.4 Empirical Review

In addition, there are relatively scarce empirical research dedicated to constraints in delivery IPP, though Giwa (2010) obtained success in ascertaining the inimical factors affecting IPP in the country as project development difficulties, Government inability to provide enabling environment, high cost of building IPP, poor project definition, fault in operation as well as in maintenance agreement, insufficient cost tariff, absence of a renowned counter-party for signing the Power purchase agreement for the government, IPP failure to safeguard Power Purchase Contract and most significantly absence of payment provision guarantee within the power purchase contract, the shortage of energy (refined natural gas and bulky fuel oil) used in generating, in sufficient safety of fuel provision infrastructure mainly in Niger-Delta region, the difficulty encountered in site acquisition process and scarce infrastructure, while adopting judgmental method of comparative analysis without using know significant analytical tools.

A fresh report by World Bank in the year 2002 states thus, there is increase transport costs in the country which implies a direct expression of the bad rail and road condition. The report made reference to a case of the expense of transporting truck trailer away from Maiduguri which is located at northern part of the nation to Lagos that lies at the coast. This costs up to N320 000 (roughly 1500 Euros), the report confirmed that the sum is greater than the comparable sea freight for a similar truck trailer taking off from Europe to Nigeria. The World Bank in their view outlined that the principal problem in realizing IPP in Africa is due to inability in securing a Bankable agreement with financial institution (World Bank, 2002).

In Nigeria, having access to credit services from banks is rather rigid and also the interest amounts are greatly unstable (World Bank, 2002).World Bank information additionally alludes to a study carried out in the year 2002, where fewer than 16 percent of respondents revealed that they possess loan having longer terms above one year. Thus, it is informative to take note that current credit facilities frequently don't encourage long period of financing demand of capital or project infrastructure as in the power sector. In summary, financial marketplace in the country is known by volatile profit rates and brief term funds. The report from World Bank (2002) likewise cited its 2001 survey, which discovered that the yearly average consumptions of agent business endeavors in the nation add up to N50, 703 for power. 31% of the sum is channeled to public sector payment. Additionally, a prior investigation on 179 firms by World Bank revealed that 92 percent of the organizations improvise power through generators because of the power infrastructure shortfall in the nation. They equally explain that plan for the trade of electricity by producer as well as the buyer usually, is for a longer period of term. The record which the two parties consent to as an agreement to guide such contract is known as Power Purchase Agreement (PPA) and the purchaser of the power generated by IPP is known as Power off-takers. The PPA content is mainly made up of capacity, energy, penalties on power availability and bonus.

Eberhard (2017)cited in his study that private segment investment is crucial to attaining more power in the Sub-Saharan Africa. Alongside, the project funded by the Chinese through IPP which characterize the fastest developing sources of energy investment in the Sub-Saharan Africa. IPP investment chart show less concern for energy market structures, yet are bound to incline toward nations with solid planning, procurement as well as contracting limit, with great regulatory quality. Facts from the region, centered primarily on unique, detailed case studies conducted in five different countries which are Nigeria, Kenya, South Africa, Uganda and Tanzania. The five countries were chosen because they have the highest and the vast experience with the IPP for a long period of time, giving account for about 80 percent of the IPP investment for Sub-Saharan African. Each of these nations has created at least four IPP, a reality that encourages an evaluation of enabling guidelines and regulatory structures, planning and acquiring practices and every nation additionally has a blend of direct negotiation and project bidding, which can possibly reveal insight into which acquisition techniques, are increasingly effective. The five selected nations have hosted IPP using various technology bases that permit a relatively thorough evaluation of reliability and cost. It also demonstrates range of possession as well as financing plan for IPP. However, development financing organizations have important influence in mitigating danger and acquiring private financiers. We likewise observe renewable power source getting through the continent in cost and scale. This breakthrough is partly facilitated by procurement that delivers cheaper prices and greater transparency when likened to renewable energy. The methodology adopted is the in depth earned-value cost evaluation and data comparison of generated powers in megawatts from different plants across the countries. These highlighted the necessity for policy implementations, dynamic applications of effective project policies, effective capacity regulations, lowest-cost planning, and connected to timely commencement of procurement of recent generation capacity as well as proper risk mitigation techniques. Such efforts have the capacity to support sustainable economic as well as social development all around the continent for the delivery of successful IPP.

Sule (2010) in his study factors affecting electricity generation projects failure as non-diversification of energy sources, poor maintenance culture, kidnapping, insecurity, overloading of distribution and transmission lines. It was also observed that nonexistence of research and development, vanderlization of power lines, mismanagement of public funds, and low level of annual rainfall are factors affecting power project generation, transmission and distribution of electricity in Nigeria. The listed factors are seriously affecting the performance indices of electricity utilities in the country, which are efficiency, number of consumers connected to the line powers, high maintenance cost, and transmission losses. The researcher adopted the content analysis in arriving at its finding.

Sambo (2012) cited that national growth requires ample electricity supply of which all activities as generation, transmission and distribution, primary to it are capital-intensive in terms of funds, natural and human resources. The diminishing power sector government funding, tied with low private sector participation and fragile political will, require creative and innovative answers in addressing the power supply problem in Nigeria. Hence, the study examined power sector privatization as viable selection.

Emovonet (2010) focused on the problems and solution Power Generation face in Nigeria. The study employed content analysis technique using questionnaire. The outcome showed that from the overall grid capacity of 8.876 MW, the amount accessible as at December 2009 was 3.653 MW. Thus available power is less than 41% of the total installed capacity due to constraints that hinders IPP. The result further shows that maintenance, planning, management, inadequate funding, poor electricity pricing, monopoly, poor energy mixing, inadequate gas supply, vanderlization, poor spare parts inventory were ranked as the most established factors influencing effectiveness of IPP generation system without the use of any statistical tool.

Iwayemi (2008) carried out a study on electricity issues and alternatives to Investment in energy production and transmission in the country utilizing the method of content analysis. The result show that poor electricity service is the outcome of ageing and improperly maintained generating, transmission and distribution infrastructure facilities failures, weak financial and economic health of the state-owned company NEPA/PHCN were responsible for IPP problem in Nigeria.

Eberhard (2016) adopted a simple data percentage methodology by using the input declared and output delivered power generated capacity. This is examined by using the comparative data of the declared and delivered data for analyzing different Independent power projects in Nigeria. These helped to evaluate accomplishment or failure of entire understudy IPP in Nigeria. The result highlighted these as the success determinant of IPP; favorable equity partner, favorable debt arrangements, credit worthy off-taker, power sector reform, enabling environment, policy regulation, transparent competitive bidding practices, good planning, optimistic technical performance, strategic management and relationship building, credit enhancement and other risk management and mitigation procedures.

Ijewere (2010),carried out a study on a survey where the researcher had no control on independent variables influencing power supply in the country because they already have occurred and the researcher could not control them. Research data were obtained using a sample size of one hundred and twenty (120) respondents after proper interview by the researcher. The three hypotheses were tested using chi-square, percentages and theoretical analysis. The data collected is presented using tables, pie, histogram and bar charts. It was revealed that poor financing, poor maintenance culture, utilization of outdated tools, inadequate spare parts jointly with lack of skilled manpower are the challenges faced by private sectors in power industries and adequate plans are yet to be in place for these problems to be addressed. Sequel to the above, it was suggested that the PHCN's equipment needs to be upgraded, the government needs to finance the organization adequately and management need to develop proper maintenance culture as well as engaging services of skilled staff.

Adegbulugbe and Momodu (2007) cited in their study balancing the Acts in the Power sector "The Unfolding Story of Nigeria Independent Power Project in Nigeria. They actually examine the analysis of determining factors that influence outcomes of power projects and electricity delivery as Contributing Elements to Success (CES). The CES are list of factors connecting independent variables which inclusion/exclusion improves the probability of accomplishment of IPP. A percentage comparative analysis was adopted as methodology which is primarily for analysis of power project performance in developing countries using declared and delivered capacity generated in megawatts. These uncovered that investors are favored at the expense of the host country once there is adequate planning, proper investment climate, and competitive bidding practices as contributing element to success in delivering IPP in Nigeria. These have made the most considerable contribution to outcomes of IPP success delivery in Nigeria. However, with some delays noted in delivery IPP as: Labour issues, sales of power plants, vandalism of gas pipelines, inadequate gas infrastructure, maintenance and funding, tariff regimes and profits compilation. The entire power sector, privatization has not proven to be solution to solving electricity sector issues without properly providing ideal environment and policies implementations. In spite of this, at the project level, there is need for improved PPA that will take into consideration the yearning and ambitions of all the stakeholders involved in the sector. This finally balances investor and development outcomes for private sector participation in the power sector especially the generation sub-sector.

Oricha and Olarinoye, (2012) in their research, detailed that for steady and improve effectiveness in energy supply, the interconnected factors affecting efficiency and steadiness of the power supply must be well studied. There was no major methodology adopted in this study. The outcomes of analysis identified the following issues which affect the value and steadiness of energy supply in any emerging country/region as follows: government policy; economy factor; natural and societal factor; effective power management; experienced personnel; effective technology together with security factor. These factors stated above possess indirect or direct effect on the efficiency and stability of energy supply. Numerous numbers of confounding factors which are capable of preventing restructuring of the power sector to develop electricity market which can improve the efficiency of energy supply in the country. Ideas of actions that ought to be considered before proffering solutions to most of the energy sector problems are made available during the paper presentation.

Eberhard (2008) noted in his study analyses and the results of African IPPs that nearly 40 IPPs are well developed to date, of which this study is focused largely in 8 nations namely (Egypt, Tunisia, Morocco, Ghana, Côte d'Ivoire, Tanzania, Kenya and Nigeria) which possess many notable widespread experience with the IPP to supply empirical data needed for this study, using a comparative research method. At its center is a debate of how adjusting of development as well as investment results really improves sustainability of plans for open and private partners alike. Contributing essentials to achievement are likewise identified as the foundation for a more viable investment. More balanced results are observed in the North Africa as obtained in sub-Saharan Africa, due to reasons related to more compelling investment environments, strong policy frameworks, less planning mishaps, copious low-cost fuel as well as secure fuel agreements and credit enhancements like sovereign guarantees. With little exceptions, these elements were absent in SSA, where the function of development funding institutions and the strategic management of projects seem more important.

Ubi et al. (2012) focused on problem and factors affecting electricity generation, factors to power project failure and determinants of electricity supply in Nigeria respectively. His findings were based on content analysis, hence, did not employ any methodological tool to institute relationship that exist among the identified variables.

2.5 Environmental Constraints in delivery IPP in Nigeria

Environmental constraints affecting successful delivery of IPP in Nigeria were selected after review of different literatures, related articles, journals and textbooks as outlined below:

1. **Cost and fund mismanagement by public office holders (CoFPoh)**

Stakeholders in IPP also perceived that bribery, corruption and illegal activities results in mismanagement of government resources, thereby contributing to untimely delivery of IPP in Nigeria through cost overrun (Eberhard, 2008).

2. **Insecurity associated with our environment (InsAwOE)**

Political unrest in most developing countries like Nigeria has been a major problem to IPP investors. This is because no investors want to spend money in an unstable political environment, as this might lead to total cash bankruptcy. Investors are afraid of losing their capital due to continuous change of government (Inugonum, 2005).

3. **Unskilled Labour and poor capacity training (UnskiledL)**

Sambo (2010) identified lack of capacity development training, poor research and development program while Eberhard (2016) collaborated that Poor capacity development has virtually affected IPP performance as well contribute positively to its failure in the country.

4. **Poor Maintenance Culture (PoorMC)**

IPPs failure has always been identified with poor maintenance culture, which has totally affected power sectors development in Nigeria. In addition, Proper maintenance culture contributes directly to positive power utilities whereby power is made accessible to consumers every time. Maintenance of this sector would be difficult if they possess less funds to acquire the desired spare parts together with paying for the running cost. Proper maintenance culture is an essential requirement in maintaining any physical structures, like power generation, distribution and transmission networks for operational readiness. In Nigeria electricity power sector maintenance is normally carried out after systems failure without any forethought control until system breakdown (jewere, 2010).

5. Vandalization of Equipment (Vandalization)

The Nigeria electricity division experiences high sabotage in the area of vandalism of gas pipeline, cables and IPP equipment. In addition, the transmission and distribution lines are equally destroyed by winds, construction work and soil erosion leading to failure in executing IPP (Uwaifo, 1994).

6. Poor Road Network (**PoorRN)**

Power project materials are very heavy and costly to transport within locations in Nigeria due to terrible bridges and poor road condition of most locations in the southern region of the country. However, this delay timely delivery of equipment to site, thereby affecting project execution within specified budget and time (Giwa, 2010).

7. Delay In Acquiring Power Purchase Agreement (DelayPPA)

Delay in granting power purchase agreement and other government policies do significantly affect IPP investors. (Ise-olorunkanmi, 2014).

8. Delay In Acquiring Gas Purchase Agreement (DelayGPA)

Inadequate gas supply and delay in granting gas purchase agreement were ranked high among factors influencing delivery of IPP in the country (Eberhard, 2016).

9. Delay in Procuring and Clearing IPP Equipment (DelayCIPPsE)

In Nigeria investors pay a lot of demurrage in clearing IPP materials and equipment. This is largely due to so many government policies as well as illegal deal in the port. Hence, delaying power projects execution in Nigeria.

10.Unfavorable Regulatory Policies (UnfavorableRPolices)

Ise-olorunkanmi (2014) observed that government in-effective policies on permit and license delays IPP actualization in Nigeria.

11.Delta and southern Region (CPPTMNDR)

Poor geographical sate of most location in the southern part of Nigeria, especially in the Niger Delta region has been a major factor in contract agreement with contactors assigned project in the region. This has a lot of effect on cost and time of executing IPP in the area (Sule, 2010).

12. Land Acquisition Problem (LandAcQ)

Land acquisition in Nigeria has been limited due to the land tenure (System) act. It is due to poor compensation by the authorities and other associated crises that has always limited land acquisition by investors in the sectors. When not properly resolved always lead to restiveness by the youth, thereby disrupting project execution in such community (Giwa, 2010).

13. Effect of Community Norms On IPPS Delivery (EFComNorm)

Community norm as relates to culture and additional activities has been cited as key constraints IPP in Nigeria. This social factor need be resolved, mostly among community and investors. The communities always claim damages to plants, destruction of native shrines and other social amenities (Ijewer, 2010).

14. Problem Associated with Funding (**ProblemAFound)**

Investor's inability to access bankable credit and long term loan is problem to the subdivision. Institutions demand for short term loan for fear of losing their investment, most especially when project fails. They are scared of risk monetary involvement with the investors thereby requesting for short term loans while the investors are scared due to unforeseen circumstances that may limit their project obligation in future (Ijewere, 2010).

15. Demand for short term loans by financial institutions (DemandSTLFI).

To a certain extent, a number of investors in the power sector demands long-term loan from Private Investors for executing IPP in Nigeria. When perfected, will aids project delivery, but financial institutions are not always ready to render such loan because it does not pay them. They prefer a short term loan to investors and this never worked out for investors for the fear of not recouping their investment. They recognized long term investment will guarantee good investment return (Chikuni, 2007 & Eberhard, 2008).

16. Community Restiveness (Community R).

Community restiveness often leads to vanderlization of IPP facilities such as gas pipeline and other related equipment, thereby affecting gas transportation to site via pipeline as well limiting IPP execution in the country (Giwa, 2010).

17. **Delay In Granting Permit And License (DelayGPAL**).

Delay in granting permit and licenses have actually affected project time and cost in delivery successful IPP in Nigeria (Eberhard, 2016).

18. Dependent on foreign and IPP material (DependentFEIUPPsM)

According to (Eberhard, 2008), IPP equipment and other relevant materials are fully on importation from the Western World. Nevertheless, continuous dependent on imported materials by investor has limited project execution in the sector according.

19. High Vat rate due to our environment (HighVATR)

High VAT associated with import duties due to high demurrage assigned to goods as a result of delay in the port (Giwa, 2010).

20. Dependent on foreign expert rate for installation (DependentFIn)

Due to dependent on foreign expert rate for IPP installations, these actually result in delay in IPP completion (Giwa, 2010).

2.6.1 Identified environmental constraints with respective notation

Table 2.1: Social Environment constraints and their Corresponding Notations

S/N	SOCIAL CONSTRAINTS	NOTATIONS
1	Insecurity associated with our environment	InsAwoE
2	Unskilled labour and poor training	UnskilledL
3	Poor maintenance culture	PoorMC
4	Vandalism of IPPs Equipment	Vanderlization
5	Poor road Network	PoorRN
6	Community Restiveness	CommunityR
7	Effect of community norms on IPPs delivery	EFComNorm

Source: Field data 2017.

Table 2.2: Procurement Constraints and their Corresponding Notations

	PROCUREMENT CONSTRAINTS	NOTATIONS
1	Delay in acquiring Power purchase Agreement	DelayPPA
2	Delay in acquiring granting Purchase Agreement	DelayGPA
3	Land Acquisition Problem	LandAcQ
4	Delay in granting Permit and License	DelayGPL
5	Delay in procuring and clearing IPPs Equipment	DelayCIPPsE
6	Dependent on foreign Equipment and IPPs Materials	DependentFE-IPPM
7	Dependent on foreign Expatriate for major Installation	DependentF-MI

Source: Field data 2017.

Table 2.3: Financial Constraints and their Corresponding Notations

	FINANCIAL CONSTRAINTS	NOTATIONS
1	Cost and fund mismanagement by public office holders	CoFMPOh
2	Unfavorable economic regulatory polices	UnfavorablePolices
3	Cost associated with poor geographical area in most Niger Delta Region (southern Nigeria).	CPPTMNDR
4	Problem associated with funding	ProblemAFound
5	Demand for short term loan by investors	DemandSTLFI
6	High VAT Rate	HighVATR

Source: Field data 2017

2.6 Nigeria Power Sector Reform and its Importance

The purpose of the power sector restructuring in developing nations is mainly to advance utility performance in both commercial, technical and in that process invite greater investment to deliver sustainable, adequate, affordable and dependable services for everyone and boost the economy (Eberhard & Gratwick, 2008).The reform is motivated by severe underperformance; reform has been in the works since 1998, which represented the (legal) end of the State's monopoly over the electric supply industry. In spite of the 1998 decree and the continued poor performance across production, transmission and supply, limited change occurred. In 2005, reform efforts accelerated via the Electric Power Sector Reform Act (EPSRA), which indicated how the NEPA would be divided into successor companies, an independent regulator would be established, and service would be extended and improved (Mohiuddin, 2011). The proper model of energy sector restructuring is mainly to unbundle, make private, create regulatory bodies, and build markets(Victor& Heller, 2007). Unbundling of production from Distribution and Transmission was initially understood as key reform element, and one that arguably should even precede introduction of IPPs to ensure fairness in the contracting and dispatching of IPPs (Kapika & Eberhard, 2013).

Kuale (2006) collaborated with Adoghe (2009) in his findings; they made some exceptions to the generality of the rules set earlier. They discovered that many public utilities actually performed so well but because of growing awareness that monopolies of state hinder competition and eventually turn out into low service standard, poor investment outcomes and planning etc. This power sector restructuring act is what highlights policy framework in Nigeria for IPPs. Not with standing, Inugonum (2005) also noted that in an attempt to realizing constant and steady electricity supply in Nigeria, the government has venture into so many strategic planning and reform policies. On 11th March 2005, the government signed into law the electricity power sector reform (ESPR) Acts and the unbundling of public electricity provider into several entities. This was main reason for the decentralization of the segment and granting of licenses to different independent power producers (IPP) because the sector relies on the federal government for capital funding.

Ikeme and Ebohon (2005) cited that the sector restructuring in Nigeria led to corporatization of nations' owned asset, now known as the Power Holding Company of Nigeria (PHCN).The unbundling prompted the foundation of eighteen successor organizations from NEPA consisting six Generation Companies, eleven distribution companies and a transmission Company**.** The sector has also been deregulated leading to private sector participation in the generation sector and a number of IPP are in operation within the nation today. These 18 companies have their own management, which is self-accounting but not reliant on government financing.

i. Ensure systematic development of a viable power market.

ii. Guarantee efficient, safe and adequate production of electricity.

iii. Promote viable including the private sector involvement.

iv. Protect consumers including the public interest.

v. Develop standard which measure in line with international top practice.

vi. Evolve stable and justifiable rates thereby guaranteeing realistic profit.

vii. License and control persons involved in Electricity business.

viii. Settle differences among industry members. (Adeoghe, 2009)

Ikeonu (2006), collaborated with Haggard and Webb (Ikeme, 2005), as he cited that Electric Power Segment Reform Bill of 2005 was endorsed to break the control which has been maintained by NEPA over these years. The specific objective of this move was to fulfill the following:

1. To ensure a safe, resourceful, affordable and cost effective system of generating, transmitting and the distribution of electricity across the grid.
2. To place power supply to effectively support socio-economic growth of the nation.
3. To reorganize the energy segment for privatization.
4. To develop the environmental effect of the power generation.
5. To frame a master strategy for energy pool within West Africa.

2.7 Overview of Selected IPP under Study in Nigeria

2.7.1 The Okpai Power Plant Project.

Table 2.4: Overview of Okpai Independent Power project, Nigeria

Plant	Okpai IPP	Contract Details	20-years PPA (build-own-operate) U.S.dollar denominated Capacity charge: US$13.00/KW/month (2006) Energy charge: 2.2c/KWh (2006)
Location	Okpai Delta State		
Capacity	450 MW		
Ownership	60% NNPC, 20% Agip oil company (Italy). 20% Philips oil Company (U.S)	Financing	100% equity financed 60% NNPC 20% Agip 20% Philips
Technology	Combine-cycle gas turbines	Security	PPA backed by oil revenue of NNPC.
Value	US$462 Million (including gas infrastructure)	Fuel Contact	Agip to provide fuel
COD	2005	EPC	Alstom
Contract Change	Ongoing discussions connected to investment charges which increased from 150 million US dollar through462 million US dollar; because of disagreement, complete payment not being effected by utility.		

Sources: Adegbulugbe(2007); Eberhard and Gratwick(2012).

The Okpai Power Plant Facility is situated in Delta State and was to be in two phase 480 MW gas plant (300 MW OCGT with conversion to 480 MW CCGT). It was granted license by the Nigeria Electricity Commission (NERC) in 1999 to the Nigeria Agip oil company (NAOC) and Philip oil Company, as a combined venture investment. The target was to help in the elimination of atmospheric emission by 2008.

The power facility project commenced in July 2001 and construction, started in 2003 by a consortium headed by (NAOC) as the contractor to the project after duly awarded the contract, which was constructed in line with a power purchase agreement (PPA) signed on July 4, 2001 at the cost of US$300 million with the then National Electric Power Authority prior to the approval of Electric Energy Sector Reform Act 2005, which created NERC. The plant was on a build –own-operate (BOO) basis with the intention of utilizing the flared gas wasting in the oil and gas sector. The gas infrastructure deal was included in the contract in other to help attract positive incentives to investors in the power generation sectors as agreed in the contract documents. The successful oil company would be allowed to offset costs under joint venture oil and the gas activities and rapidly depreciate their assets

The project experienced a cost overrun from the initial US$300 to US$462 million, which is an additional US$150 to the original cost. This was due to an underestimation of the needed gas infrastructure and contract act of vandalism by the host communities. Payments were not made to the IPP investors as the parties were able to settle their differences in court. On successful completion of facility on 1st April, 2005 and upon delivering the 480mwatts to the national grid, investors were rewarded with an additional cost of USD$132 million for compensation due to vandalism, delay in materials importation and insufficient needed gas infrastructure as plant was on build-own-operate basis (Eberhard & Gratwick, 2012).

2.7.2 AES Barge Power Project Plant

AES Barge venture was the pioneer IPP contract in Nigeria, back then in 1999. In the center of power crisis circumstance, coupled with the outcome of 1998 passage into law, permitting private segment investment, negotiations for the two-section project started. The plans were for a 90 MW diesel barge-mounted plant and a 560 MW permanent gas-fired plant with a common PPA. The deal was directly negotiated within few months amid the U.S. based Enron, the Lagos state government, the NEPA, and Ministry of Steel and Power (Eberhard & Gratwick, 2012).

Table 2.5 Overview of AES Barge Independent Power Project, Nigeria

Plant	AES Barge	Contract Details	13-25 years PPA (Build-own-operate) U.S. dollar denominated. Flat capacity charge (OECD CPI indexed).US$19.35/KW/month (November 2006) No energy charge
Location	Egbin, Lagos State		
Capacity	270 MW		
Ownership	95% AES Limited (U.S), 5% YinkaFolawaiyo Power Limited (Nigeria)	Financing	One hundred and twenty million US dollar loan Foreign and local debt (Rand Merchant Bank, Diamond Bank Nigeria, Fortis Bank, KfW, United Bank for Africa, Africa Merchant Bank)
Technology	Open-cycle gas turbines (9x30MW)	Security	Sovereign guarantee-60 million US dollar Credit letter (Finance Ministry) OPIC Political risk insurance.
Value	US$240 Million (US$888/KW)	Fuel Contact	No separate supply of fuel contract. NEPA presently called PHCN) gives fuel procured exactly from Nigeria Gas Company.
COD	June 2001. Early plant size rose from 90MW through 270MW		

Sources: Adegbulugbe (2007), Eberhard and Gratwick(2012)

Strong oppositions were soon raised about the absence of a clear and competitive process, the excessive contract-termination charges, and lack of penalties for performance below standard and high capacity charges. Mounting public pressure resulted to the deal being modified: the barge-mounted plant was increased to two hundred and seventy (270) MW and modification in fuel from diesel into becoming natural gas. Construction of plant was complete (before filing for bankruptcy) while the permanent plant abandoned as deal was concluded in 2000. AES and Yinka Folawiyo power limited bought 95 percent and 5 percent stake of the plant from Envon as the EPC contract went to AES. The plant started operation in 2001 and because there was no reform policy and law, while initial risk allocation was skewed in favor of the individual developer. Certain contract terms, like the availability insufficiency payment terms and certificate of tax certificate, have a long time been renegotiated. Furthermore, there existed fuel supply restrictions on plant's operations relating to unrest in the Niger Delta region. Supply constraints and uncompetitive operating costs meant that plant has always been essentially mothballed for some years (Eberhard & Gratwick, 2012). In constructing AES Barge plant, the original plant size was increased to two hundred and seventy MW from ninety MW which comprise nine units of thirty MW each) and adjustment in fuel into natural gas emanating from liquid fuel, both had the influence of decreasing capacity charge; current arbitration (lasting five years) finished, involving availability insufficiency payment, meanwhile the certificate of tax exemption is kept pending for the period the project will have to last by government and these actually affected Plant execution (Eberhard, 2012).

2.7.3 Afam vi Power Plant

As with Okpai, the NEPA invited a number of IOCs to tender for the two-part Afam project. The Project incorporated the refurbishment of Afam V and the procurement of the new Afam VI plant. A group headed by Shell secured the 2001 bid; operations commenced in2008. Arrangements were likened to that of Okpai, and involved a U.S.-dollar-denominated PPA and full equity financing.

Table 2.6: Overview of Afam VI, Independent Power Project, Nigeria

Plant	Afam Phase VI IPP	Contract Details	20-years PPA (build-own-operate) U.S.dollar denominated Capacity charge: US$13.00/KW/month (2006) Energy charge: 2.2c/KWh (2006)
Location	Afam Rivers State		
Capacity	630 MW		
Ownership	55% NNPC, 30% Shell (UK/Netherlands) 10% Elf Total (France), 5% Agip oil company (Italy).	Financing	100% equity financed 55% NNPC 30% Shell 10% Elf 5% Agip
Technology	Combine-cycle gas turbines (3x148MW gas turbine) (1x230MW steam turbine)	Security	Credit Letter (Ministry of finance)
Value	US$462 Million (including gas infrastructure)	Fuel Contact	Shell to provide gas supply
COD	2008	EPC	Daewoo E and C

Sources: Eberhard and Gratwick(2012)

The main difference was that PPA in Afam VI deal was anchored by a letter of credit (LC) from the finance Ministry and not anchored by oil revenues of the NNPC. Afam VI and Okpai were both completely equity funded, with NNPC taking a majority share and the oil companies taking the balance. Open-minded decrease allowances made the projects eye-catching for investors. Thus, these were not classic IPPs relying on nonrecourse project finance. Other foreign oil companies operational in Nigeria like Exxon, Total and Chevron never participated in the IPP openings, though Chevron now looks at a new IPP development to monetize domestic gas as (LNG) prices fall, (Eberhard, 2012).

In January 2006, Nigeria obtained BB-credit rating, meaning that it does not need to promise its crude or stream of income as safety against the default of PHCN's. A Credit Letter gotten from the Finance Ministry was considered adequate security. The contract terms stipulated pay with least obtainable volume of 80 percent. The concluding investment rate was put at 540 million US dollar for running the project. Not one of the aforesaid projects were actualized, in the recognized time span, neither the extra huge-scale IPP, nor state-claimed plants which were to accomplish an objective of twenty-one thousand MW by 2010.

2.7.4 Aba Integrated Power Project

Geometric Power Limited (GP) is a forerunner developer of power project in Nigeria. It has set up power generation tool in Aba of Nigeria, anticipating to give great electric support service to great number of industrial and profit making clients. Initially, the project consisted of the connection of one hundred and forty-one MW gas-fired electric plant in first phase, over 110km of 33 kV and 11kV sub-transmission lines, four recent mini-stations and banks for dispersal of electric to the enormous industrialized and commercial users' that get power from PHCN. Aba power together with Geometric Power obtained twenty-years concession from Nigeria Federal Government to provide electricity solely to Aba industrial metropolis and its neighboring town and has built Aba

IPP. The IPP in Aba is the earliest self-governing and combined power utility existent in Nigeria, which involves a one hundred and forty-one MW gas powered plant, a twenty-seven KM pipeline gas, and a dissemination utility, inside a ring-fenced dispersal network. It's an implanted power facility intended to create and disperse its very own power. This Project currently is possessed by Project Developer, Aba Power and Geometric Power Limited including other investors. Throughout the deliberation time between Nigeria Federal Government and PHCN so as to avoid "cherry picking" of good clients, a resolution was reached for expanding this project to incorporate all power buyers on the conveyance system of PHCN Aba Commercial Unit which secured Aba city, with rural regions. With the understanding of this, GP built up independent corporate unit – Geometric Power Aba Limited to possess and control the recent power production station; and Aba Power Limited to deal with electric power dispersion system. Subsequently, NERC served a power production certificate to GPAL, together with electric distribution certificate to APLE.

The advancement of the IPP in Aba is founded on a technical review and business education of Aba Island led by the Geometric Power through a joint effort with Government possessed utility, PHCN in 2006 that secured data on every day highest load for Aba Island, repressed interest, rundown of closed of industries and predicting power utilization prerequisites of the different clients' classifications in Aba**.** Over time, the service of PHCN turned out to be progressively problematic, with regular power reduction and poor quality of power. Practically all industrialized and commercial business have been compelled to depend on different types of self-generation and alternative power source, while probably the biggest industries have chosen to set up lasting power stations so as to fulfill all power demand. The report recognized an extensive and expanding gap between the power need and supply in Aba.

Table 2.7: Overview of Aba integrated Independent Power Project, Nigeria

Plant	Aba Integrated Power Project	Contract Details	PPAs with Aba distribution company (same parent company) and directly with Aba Industrial customers
Location	Aba Abia State		
Capacity	141 MW		
Ownership	Geometric Power Limited, (Nigeria)	Financing	Debt-equity mix Senior debt: Diamond bank (Nigeria) and Stanbic IBTC (Nigeria) Minor Debt: IFC, EIB and Developing Africa Structure Fund
Technology	Open-cycle gas turbine.	Security	N.A
Value	US$460 Million (including gas and T and D infrastructure)	Fuel Contact	Shell to provide gas supply
COD	Currently being refinanced EPC		Geometric Electric

Sources: Greene and Macrae (2006)

The result was additionally validated in Aba by a complete census of various users and a survey of existing delivery network in Aba conducted by NRECA, the Dispersal Management Contractor in 2008 for IPP in Aba. Similar study carried out in 2009 in Aba disclosed that occupants and profit making entities are ready to pay reflective charge for power instead of continuing to acquire enormous high charge of running alternative generators for business purpose. The study went ahead to disclose that about two-third of occupants in Aba produce nearly 170MVA (nearly 136MW) of power via generators whereas approximately 115MVA (about 92MW) is produced by industrial and commercial users. These figures validate the unfulfilled need for electricity in Aba. The project being ring-fenced, do not feed from national grid run by TCN. Development started in 2008. The project was expected to be commissioned in October 2013, but the plant is not yet operational because of issues with the gas pipeline and disputes regarding the licensed area. Stretching 27 kilometers (km) from the plant to Shell's Imo River facility, the gas pipeline was completed in September 2013. Nevertheless, inconsistencies in design between Geometric Power and Shell triggered a setback (Africa Oil & Gas Report, 2014). An even more serious issue is a dispute with the local distribution company regarding the licensed area. The Plant is delayed from being powered since completion. The project is intended to serve primarily industrial clients, which is a demand cluster that no distributor is willing to give up; hence, tensions over the service area are ongoing (LeBoeuf, Lamb, Greene & Macrae, 2006).

2.7.5 Azura-Edo IPPs project

Azura Plant is the first financed power generation and path-breaking IPP development in Nigeria from the time when reforms began. Investment costs of the plant were valued at US$895 million for a 450 MW OCGT which reflect a high risk perception by investors.

The PPA is the newly created NBET which has scarce liquidity and is dependent on revenue flows from newly privatized distribution companies that are experiencing high losses and unsatisfactory collections. Development cost is great and project sponsor is fairly minor with poor cash flow.

Table 2.8: Overview of Azura-Edo Independent Power Project, Nigeria.

Plant	Azura-Edo IPP	Contract Details	20 years PPA with NBET
Location	Benin City, Edo State		
Capacity	459 MW		
Ownership	Azura Edo Limited (Mauritius) 97.5% and Edo State Government 2.5%	Financing	US$180 million equity (20%) US$715 million debt 15 debt providers including DFIs, for example, IFC, FMO and commercial banks Main equity sponsors: Azura-Edo Ltd 97.5% Commissioning APHL 50% (Amaya capital 80%, American Capacity 20%); AIM 30%; ARM 6%: Aldwych 14% and Edo State 2.5%)
Value	US$895 Million	Fuel Contact	15 years fuel supply agreement with Seplat gas supply
Financial Close	2015	EPC	Siemens and Julius Berger Nigeria

Sources: Eberhard and Gratwick (2012)

Nevertheless, first-generation developer leveraged on equity partners with a great amount of debt suppliers, each desired to restrict its exposure. Every deal has had to be negotiated from scratch. With Azura being the first IPP in several years, there was no readymade template to follow, and capacity had to be built among the various stakeholders. The International Finance Corporation (IFC) was a co-lead arranger of the development finance institution (DFI) component of the debt, and the World Bank employed its full range of risk mitigation instruments to make the project bankable.

The Multilateral Investment Guarantee Agency (MIGA) provided a full equity guarantee as well as a partial risk debt guarantee. The International Bank for Reconstruction and Development (IBRD) provided a credit enhancement guarantee to the NBET and commercial debt mobilization guarantees. The IBRD guarantee backstops payment obligations by the NBET, which provides security under the PPA in manner of an LC delivered by commercial bank for the IPP. The LC can be drawn in the event the NBET or the Nigerian government fails to make timely payments to the IPP. Following the drawing up of the LC, the NBET would be obliged to make repayment to the LC bank (under the Reimbursement and Credit Agreement), failing which the LC bank should recourse to IBRD PRG below Guarantee Agreement. This as well would prompt the duty of Nigeria Federal Government under the protection agreement. The commercial debt PRG provides direct support to commercial lenders in an incident of debt payment default caused by the NBET failure to create undisputed expenses under the PPA, or government's expenses under a conclusion of PPA. A credit letter has been issued for gas supply.

The Azura-Edo IPP deal reached a significant milestone in 2014 coupled with the signing of key project documents and the finalization of debt arrangements; however, financial close was delayed until 2015 by the government's reluctance to provide appropriate security. Given the complexity and price of Azura deal; questions have been raised as to whether project-financed IPPs are worthwhile in risky environments. The counterargument is in a sense that, Azura's development and risk-mitigation costs could be seen as being spread across the large pool of new IPP presently in the pipeline. As contracts are successfully concluded, subsequent investments should become less complex and less costly to negotiate. Expectantly, they will also involve fewer risk mitigation measures.

2.8 Research Gap

Quite a lot of work has been done in electricity distribution, generation and transmission with respect to identifying various challenges affecting IPP success in Nigeria. Researchers like Sule (2010), Emovon (2010) and Ubi (2012) emphasizes on factors affecting electricity generation and supply in Nigeria. Their findings were based on content analysis in establishing relationship that exists among identified variables. Adekeye (2008) research on "Electricity generation capacity and power sector delivery in Nigeria" while Eberhard (2016) looked into analysis on IPP in Nigerian and understanding development outcome in Africa, also adopted percentage method of data analysis and percentage comparative study of the power project sector in Nigeria. The analysis was used in checking performance of IPP in Nigeria using the declared input against delivered output of power generated by selected plants in Megawatts. They inferred that different factors listed in their work were success to IPP delivery in Nigeria. In conclusion, they suggested measures in limiting the identified constraints that results to IPP failures. This work adopted different methodology like; the earned value analysis in checking the effect of cost and time on project performance, factor reduction method in reducing the various constraints to few considerable critical factors and finally multiple analyses in testing hypotheses. These contributed immensely to bridging the gap in various findings and cited literatures in this work as none adopted any of the methodology used in this research. In addition, this work is unique as it looked into environmental constraints affecting IPP successful delivery in Nigeria. Findings from this study would proffer solutions working against IPP delivery with respect to managing cost, time and project performance in Nigeria.

CHAPTER THREE

METHODOLOGY

3.1 Research Design

According to Nworuh (2012), the research design deals with an overall plan outline to build an interconnection between the conceptual research problem and the empirical research. Though, it involves series of events or detailed procedures and approaches to follow to acquire valid responses to questions. The researcher adopted a Judgmental survey method because the audience for data collection was professional in the sectors. The Data collection method will be centered on questionnaires distributions, which are main source of gathering data as well the secondary data of selected IPP in Nigeria.

3.2 Population of the Study

Table 3.1 Population Size

S/N	PLANTS	POPULATION SIZE	DISTRIBUTED	RETURNED	VALID	INVALID	NOT RETURNED
1	AES BARGE IPP	44	24	20	18	2	4
2	OKPAI IPP	42	25	22	18	4	3
3	AFAM VI IPP	46	24	21	18	3	3
4	ABA IPP	42	24	22	20	2	2
5	AZURA PLANT	42	24	19	18	1	5
6	ALAOJI IPP	42	25	21	18	3	4
7	OMOKU IPP	44	25	20	15	5	5
	TOTAL	**300**	**171**	**145**	**125**	**20**	**26**

Source: Field data Analysis, 2017

Table 3.1 shows the target sample utilized in the study. It comprises of three hundred (300) numbers of staff working with the seven selected IPP sites. Respondents include contractors, professionals and shareholders in power industry.

3.3 Research Instruments

Data sources are considered very essential since it decides accuracy and objectivity of survey. However, procedure of data gathering depends on several factors, which include nature, problem scope and accuracy extent required. In undertaking this work, two basic data (instrument) sources used are secondary and primary data.

3.3.1 Primary Data

Primary data are original data gathered exactly for research work. The main basis of primary data was obtained through the questionnaire, which was given to experts and contractors in energy sector.

3.3.1.2 Administration of Questionnaire

Nworuh (2012) observed that a questionnaire is an instrument for finding data beyond the easy physical reach of the researcher.

To get a sample which actually is the true depiction of population, 171 prepared questionnaires were distributed among the experts, professionals and contractors in energy sectors for data collection and 125 were returned for analysis. Twenty (20) respondent data were used differently for testing reliability and data acceptance using same questionnaire. The selected IPP under study are: Okpai IPP, AES Barge Power Project, Afam VI power, Aba Integrated Power, Azura-Edo IPP, Omoku Power Project, Alaoji Power Project build and constructed by Rockson engineering, Steag engineering and Geometric power project Company as service provider in energy sectors etc.

The formulated questionnaires were done in simple manner for clarity sake using the likert model, through a judgmental survey technique which is based on identifying the effect of environmental constraints on successful delivery of Independent Power Project in Nigeria. It was prepared in multiple choice forms for providing alternative sets of answers that will best represent the actual perception and situation on ground.

These substitute set of answers, were outlined in five grade points (1-5) known as Likert scale (Likert, 1974) as shown below:

Table 3.3: Likert Five Grade Scales

Views	**Grade points**
Strongly disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly agree	5

However, the questionnaire was personally delivered by hand to various selected respondents. Most were completed and returned immediately on submission to respondent, while others that couldn't complete the response at time of submission were later sent at their convenience for collection.

3.3.2 Secondary Data

As observed by Nworuh (2012) auxiliary data are gathered for purpose other than investigation at hand. Therefore, secondary data sources used include already published data in journals, internet, research work, newspaper, textbooks and annual company reports.

3.4 Data Collection Procedures

The researcher adopted the Judgmental sampling survey method, which is non-probability sampling technique method where the researcher selects units to be sampled based on their knowledge and professional judgment. The purpose of selecting the above methods is because members are not assigned randomly. Judgmental sampling usually is adopted when restricted individuals own the characteristic of interest. It is a feasible sampling method in finding information from specific set of persons based on judgment.

It is appropriate for sourcing and analysis of data, which involved the use of structured questionnaires, and was personally delivered to the (contractors and consultants) respondent in the energy sectors in Nigeria. The surveys serve as guide to decisions on a research and it is advantageous for providing original and reliable information.

3.4.1 Sample Size Determination

To determine the sample size, the researcher adopted the formula presented below as given by Yamani:

$$n = \frac{N}{1 + N\left(e^2\right)} \qquad (3.1)$$

Where Total population size (N) = 300, n= Sample size, e = Error limit of significance maximum acceptance (5% = 0.05).

$$n = \frac{300}{1+300(0.05^2)}$$

$$n = 171$$

Sample size (n=171) shows the copies of the questionnaire distributed, number returned after distribution=145, number valid =125 and number invalid= 20.

% Response = Number Valid

Total Sample size

% Response = 125

171

% Response =0. 73X100

% Response = 73%

This implies that the researcher is able to cover 73% of the total sample size of 171 respondents.

3.4.2 PILOT STUDY TEST

The Pilot (testing) study for this research are in two stages, which involves distributing the questionnaires using judgmental survey approach by targeting professionals (consultants) and contractors in the energy sector, totaling twenty (20) in number due to their experience and involvement in executing IPP.

These will provide the researcher with vital information related to IPP construction, execution and possible challenges both in design and layout. Second phase involved giving the questionnaires to researchers, supervisors to provide researchers with useful comments related to data quality and accuracy.

Use of questionnaires raises two data quality issues namely, data reliability and validity. To meet the requirements of validity, the following procedures were undertaken, as suggested by Malhora and Birks (2003). An extensive literature was under taken in analyzing effect of environmental constraints on IPP delivery. This research adopted self-administered questionnaires which was filled by the respondents mostly consultant and contractors in the energy sectors. This procedure was taken to meet requirements of reliability. The research instruments from designated respondent were tested for reliability and validity.

3.4.3 Test of Validity and Reliability of study Instrument

Reliability is raised as a quality data issue with regards to utilization of questionnaire (Sekaran, 2003). The adopted statistics for determining data internal consistency, reliability of set of scale items is Cronbach's Alpha. As such, reliability of an instrument connotes degree of consistency an idea is measured**.** One means of determining the consistency strength is by utilizing the Cronbach's alpha statistic. It is calculated by comparing score acquired for each item together with whole score for individual observation (usually for each respondent) and then correlating that to variance of every specific item scores:

Cronbach Alpha Formular:

α= (k/(k–1))(1– ∑ki=1σ2yi/σ2x)Where: K is refered to as figure of items scaled,

σ2yi represents the variance related to item I.

σ2x refers to variance relatedto the detected total scores.

Differently, Cronbach's alpha is described as

$$\alpha = \frac{k \times \bar{c}}{\bar{v} + (k-1)\bar{c}}$$

Where: K refers to number of items scaled,$\bar{c}$ denotes average of the covariance between the items, $\bar{v}$ denotes average variance for each item.

Therefore, Cronbach alpha means the function of amount of items a test is comprised of, the average covariance among sets of items, and variance of total scores (Cronbach, 1951).

Table 3.4: Result of Cronbach's Alpha test using SPSS software, version 21

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.797	.805	3

Sources: Field Data Analysis, 2017

Table 3.3 shows the reliability test result using the Cronbach's Alpha method. An items scale is said to be reliable only when it has reliability scale values of 0.70 or greater (O'Leary-Kelly & Vokurka, 1998). The result of the Cronbach's alpha from the twenty respondent samples data, used in this research agrees to the condition for acceptability with Cronbach's Alpha value of 0.797 which is greater than 0.70 (O'Leary-Kelly & Vokurka, 1998).

3.5 Method of Analysis of Data

Nworuh (2012) defined data analysis as those techniques with which the agent removes from the information, data that was not obviously there previously and would empower an outline portrayal of subject studied to be affected. The data for this study is generated from primary source using the questionnaire approach, while the secondary data were gotten from related journals.

The instrument of data analysis used includes:

I. Earned value analysis.

II. Factor analysis.

III. Multiple regression analysis.

3.5.1 Earned Value Analysis

Earned Value is advancement over traditional accounting progress measures. Traditional methods emphasized on planned expenses and actual costs. Earned Value allows the calculation of cost variance analysis in the budget, performance indices, completion date and final cost as well forecast the trend of project performance by comparing planned value to actual results. This gives managers greater insight into potential risk areas. Managers can generate risk mitigation plans based on actual cost, schedule and technical progress of the work. It is tool used by project manager to earlier identify and control problems before they become challenging. It permits projects to be achieved better on time and on budget (Sunil, Pankaj & Bhangale, 2013). Shatanand, Akshay and Chavan (2012), in collaboration with Sunil et al (2013) noted that EVA allows project manager to minimize project risk to the barest minimum level and permit organizational growth. It is imperative to let the project manager know about the impact of the Earned Value Analysis toward the cost performance of the project so that can rise the usability of the Earned Value, as it remains a useful method for guiding the project manager in decision making (Shantanand, 2012).There are basically three terms which decides Earned Value Method:

1. Budgeted Cost of Work Scheduled (BCWS) or Planned Value (PV) The planned value is that part of the approved total cost estimate which is scheduled to be spent on an activity during a given period.

   PV = Physical Work + Approved Budget.

2. Actual Cost of Work Performed (ACWP) or Actual Cost (AC) Actual cost (AC), also called actual cost of work performed (ACWP), is the total of direct and indirect costs incurred in achieving work on an activity throughout a given period. It is the total cost upon accomplishment of the activity.

3. Budgeted Cost of Work Performed (BCWP) or Earned Value (EV) The earned value (EV), also known as the budgeted cost of work performed (BCWP), is an approximation of the value of the physical work actually accomplished. It relates the unique planned costs for the project or activity and the rate at which the team is completing work on the project or activity to date. Earned Value (EV) = total project budget multiplied by the % of project completion.

The following parameters is defined from the above

i. Cost Performance Index

Cost Performance Index (CPI) can be used to estimate the projected cost to complete the project based on performance to date. It is given by:

CPI = EV / AC

CPI = 1 means that the planned and actual costs are same.

CPI < 1 means that project is under budget.

CPI > 1 means that project is over budget.

ii. Cost Variance

Cost Variance (CV) is the comparison of the budgeted cost of work performed with the actual cost. It is calculated as follows

CV = EV –AC

A negative cost variance means the project is over budget that is performing the work cost more than planned. When this happens, the project managers will be able to know that cost is going beyond the budget.

3.5.2 Factor Analysis

In consideration of the number of constraints (variables) listed in this study. It is important to look into reducing the set of exogenous variables to a considerable number for data analysis. There are two different available data reduction methods: principal component and factor analysis method. Although principal component analysis is endorsed for dependent variables, exploratory factor analysis is a more appropriate data reduction technique for exogenous (independent) variables. Whereas main component investigation boosts information variation clarified by a blend of straight vectors, factor examination recognizes a fundamental structure of latent factors. Specifically, factor analysis identifies interrelationships among the variables in an effort to find a new set of variables, fewer in number than the original set, which express that common among the original variables. The main benefit of engaging factor analysis stems from the growth of a dormant variable structure. Factor analysis provides a means for describing underlying strategies; principal component analysis offers no such potential relationship (Costello & Osborne, 2005).

The common factor-analytic model is usually expressed as

$$X_{nx1} = \lambda_{(nxm)} F_{(mx1)} + \varepsilon_{(nx1)} \quad (1)$$

$$\begin{bmatrix} X_1 \\ \vdots \\ \vdots \\ X_n \end{bmatrix}_{nx1} = \begin{bmatrix} \lambda_{11} & \cdots & \cdots & \lambda_{1m} \\ \vdots & \ddots & & \vdots \\ \vdots & & \ddots & \vdots \\ \lambda_{n1} & \cdots & \cdots & \lambda_{mn} \end{bmatrix}_{nm} \begin{bmatrix} F_1 \\ \vdots \\ \vdots \\ F_m \end{bmatrix}_{mx1} + \begin{bmatrix} \varepsilon_1 \\ \vdots \\ \vdots \\ \varepsilon_n \end{bmatrix}_{nx1}$$

where **X** is a *p*-dimensional vector of observable attributes or responses, **F** is a *q*-dimensional vector of unobservable variables called common factors, λ is a *p x q* matrix of unknown constants called *factor loadings*, and **ε** is a *p*-dimensional vector of unobservable error terms. The model assumes fault terms are independent and identically distributed and are with the common factors. The model generally assumes that common factors have unit variances and that the factors themselves are uncorrelated. Since the method adopted here is exploratory in nature, a solution, should it exist, is not unique. Any orthogonal rotation of the common factors in the relevant *q*-space results in a solution that satisfies Eq. (1). To select one solution, we embrace an orthogonal Varimax rotation which tries to alternate the common variables so that a discrepancy of the squared factor loadings for a factor is made great. Factor analysis generates vectors of factor loadings, one vector for each factor, and generates a number that typically is lower than the original amount of variables. From the loadings we can construct a ranking in continuous latent space for each factor. Common factors are interpreted by calculating the size of their loadings which give the ordinary correlation between an observable attribute and a factor. We follow the process recommended by Comrey and Shen (1992) for allocating importance to common variables. Exploratory factor analysis suffers from several disadvantages. First, unlike principal component analysis, exploratory factor analysis offers no unique solution and hence does not generate set of factors that is unique or orthogonal. The lack of a unique solution limits the procedure's generalizability to all situations. Second, any latent structure identified by the procedure may possibly not be readily interpretable. Factor loadings may display magnitudes and signs that do not make sense to informed observers and thus, might not easily be interpretable in every circumstance (Conway & Huffcutt, 1992).

3.5.3 Multiple Regression Analysis

The multiple regression measures the relationship existing between three or more variables. It also helps to scrutinize the type of connection between a given dependent variable with two or more independent variables in a regression function.

Nevertheless, the result attained from the questionnaire data sample was analysed using the factor analysis. Score values of selected factors from the factor analysis results were considered as independent variables (environmental constraints) for predicting successful delivery of IPP in Nigeria.

The regression equation is presented as;

$SDIPP = a + b_1X_1 + b_2X_2 + b_3X_3 + e$

Where 'a' is regression constant, 'b_1', 'b_2' and 'b_3' are regression coefficients of factor Scores (S), e is the error term of the regression model, while SDIPP = Y (Successful delivery of independent power project) dependent variable and the independent variables are: X_1 = Social constraints, X_2 =Procurement constraints, X_3= Financial constraints. Regression coefficients were tested by using t test. Determination coefficients (R^2) were used as predictive success criteria for regression model (Nworuh, 2012). The Analysis of variance (ANOVA) is a technique of partitioning the total variation of our data into useful components, which provide means of measuring different source of variation. However, the processes for testing the parity of three or more means were done via SPSS (Version 21) statistical tool to ascertain the individual and combine effect of the identified constraints on successful delivery of IPP in Nigeria. They also help to ascertain tenability of null hypothesis formulated for study at 0.05 level of probability (Nworuh, 2012).

CHAPTER FOUR

RESULTS AND DISCUSSION

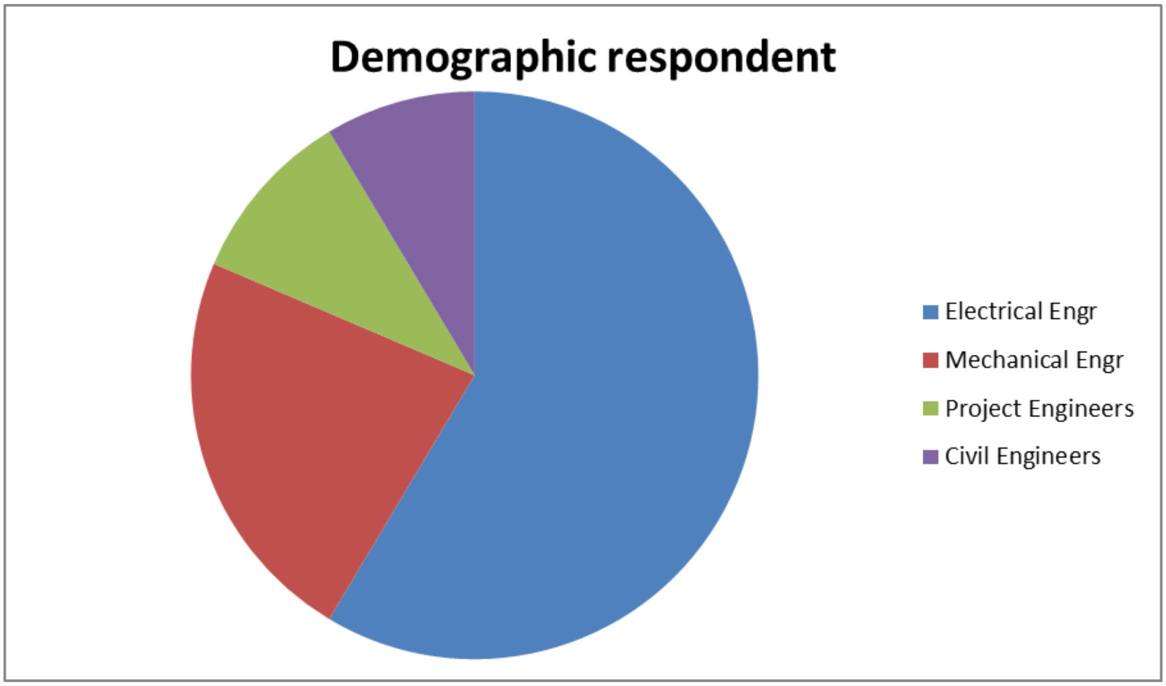
4.1 Background and Characteristics of Respondents

The demographic variables in this section as shown in table 4.1 below are gender, age and professionalism. A total of one twenty-five (125) copies of the questionnaires were filled and returned to the researcher. From the analysis of one twenty five questionnaires returned, the following are the results of the various characteristics classifications.

Table: 4.1 Respondent demographic classifications:

S/N		**GENDER**			**PROFESSIONALISM**		
		Age (yrs)	**No**	**%**	**Department**	**No**	**%**
1	Male	40-60	85	68	Electrical Engineers	55	44
					Mechanical Engineers	30	24
2	Female	35-55	40	32	Project Engineers	25	20
					Civil Engineers	15	12
	TOTAL	**125**		**100**		**125**	**100**

Sources: Field Data Analysis, 2017



The survey response in table 4.1 above shows that forty-four (44) percent of respondents are Electrical Engineers, twenty-four (24) percent Mechanical, twenty (20) and twelve percent were project and civil Engineers respectively. All respondents are within the age bracket of 35 and 60 years of age while sixty-eight (68) percent represent male and thirty-two (32) percent female. This implies that all the respondent samples are experts' in separate disciplines and consulting (contracting) firms as relate IPPs in Nigeria.

4.2 Data Presentation and Analysis of IPP Performance

Table 4.2 below evaluates some selected Independent power project in Nigeria. These projects where embarked upon by contractors in the energy sectors, whose capacity is to build operate and transfer of projects as stipulated in the contract act. The contractors have failed to meet up contractual obligation of executing IPP within time, cost and end users satisfaction. It is on this note that the researcher adopted the Earned value analysis in checking project cost and time variation of the selected IPP from the secondary data information provided below:

Table 4.2 Project cost and time evaluation of Selected IPP

S/N	Project Title	Estimated Project Cost (PV) Million($)	Actual Project Cost (AC) Million($)	Project Cost Variation (CV) Million($)	% Project Cost variation (%CV)	Estimate Project Completion Period (Year)	Actual Project Completion Period (Year)	Time variation (TV) Year	% Time Variation	Status of Projects
1	**AES Barge IPPs**	200,000,000	240,000,000	40,000,000	20	3	6	3	100	Completed
2	**Okpai IPPs Delta State**	402,000,000	462,000,000	60,000,000	15	3	3	0	0	Completed
3	**Afam VI IPPs Rivers State**	402,000,000	462,000,000	72,000,000	19	6	8	2	33.3	Completed
4	**Aba Power Plant**	340,000,000	460,000,000	120,000,000	35	4	9	5	125	Ongoing
5	**Azura IPPs**	702,000,00	895,000,000	193,000,000	24	5	11	6	120	Ongoing
6	**Alaoji IPPs**	890,000,000	902,000,000	12,000,000	1.3	3	6	3	100	Completed
7	**Omoku IPPs**	132,000,000	132,000,000	0	0	4	7	3	75	Completed
Remarks			See Appendix V (A)							

Source: Field Data Analysis, 2017

In explaining this, the Earned value analysis (EVA) model was adopted to decide, the height of variations that occurred due to constraints effect on Independent power project (plants) constructed and commissioned in Nigeria.

Table 4.2 above, revealed that virtually all the IPP selected in this study incurred high level of cost overrun and time variation. Only Omoku IPPs did not experienced cost overrun from the seven selected IPP under study. The result also shows that Okpai IPP in Delta State was executed at Zero (0%) time variation with 15% cost variation while Alaoji IPP with 100%-time variation and 1.3% cost variation correspondingly. It also indicates that both projects were completed within time irrespective of cost overrun. Aba and Azura IPP failed with a higher cost overrun of 54% and 68% respectively with over 100%-time variation due to contractual dispute between the government and contractors.

However, detailed observation through literature and performance reliability revealed that cost overrun and time variation experienced are due to constraints, such as high cost of PPAs, GPA, compensation on youth community restiveness, land settlement crises, unfavorable Government policies, installation and clearing cost and high VAT Rate.

4.3 Overall Cost and Time Variation Ranking Comparison

Table 4.3 below shows overall ranking of all the IPP using both time variation and cost overrun. It implies that Aba integrated >Azura IPP >Afam>Alaoji IPP > AES Barge IPP>Okpai>Omoku IPP. This indicate that Omoku IPP is the best executed project within time and less cost variation than Alaoji<Okpai<Afam IPPs<AES Barge IPPs<Azura IPP< Aba IPP in this order. It also implies that the worst project is Aba Integrated IPPs followed Azura IPPs, due to high cost overrun and delay in executing IPP within time, resulting from the consequence of environmental constraints as identified.

Table 4.3 Overall Cost And Time Variation Ranking Comparison

S/N	Project Title	Estimated Project Cost (PV) Million($)	Actual Project Cost (AC) Million($)	Project Cost Variation (CV) Million ($)	% Project Cost variation (%CV)	% Cost Variation Ranking	% Time Variation	% Time Variation Ranking	Cost and time Ranking Overall Rating
1	AES Barge IPPs	200,000,000	240,000,000	40,000,000	20	5th	100	4th	5th
2	Okpai IPPs Delta State	402,000,000	462,000,000	60,000,000	15	3rd	0	1st	2nd
3	Afam VI IPPs Rivers State	390,000,000	462,000,000	72,000,000	19	4th	33.3	3rd	4th
4	Aba Power Plant	340,000,000	460,000,000	120,000,000	35	7th	125	5th	7th
5	Azura IPPs	702,000,00	895,000,000	193,000,000	24	6th	120	6th	6th
6	Alaoji IPPs	890,000,000	902,000,000	12,000,000	1.3	2nd	100	4th	3rd
7	Omoku IPPs	132,000,000	132,000,000	0	0	1st	75	2nd	1st

Source: Field data Analysis, 2017

4.4 Descriptive Statistics for the Independent Variables

Table 4.4 below shows the descriptive statistics of the independent variables (environmental constraints) under investigation. The table shows the mean, standard deviation and record of respondents who participated in the survey.

Table 4.4: Descriptive Statistics of all the independent variables

Factors	Mean	Std. Err.	[95% Conf.	Interval]
CoFMPoh	14.264	0.471394	13.73098	14.79702
InsAwoE	14.184	0.438529	13.31603	15.05197
UnskilledL	13.216	0.430241	14.36443	16.06757
PoorMC	14.552	0.448432	13.66443	15.43957
Vandalization	15.664	0.427739	12.81739	14.51061
PoorRN	15.280	0.316554	10.65345	11.90655
DelayPPA	13.984	0.448508	13.09628	14.87172
DelayGPA	14.632	0.431432	13.77807	15.48593
DelayCIPPsE	14.432	0.454275	13.53286	15.33114
UnfavorableRPolices	11.352	0.32632	10.70612	11.99788
CPPTMNDR	11.224	0.308558	10.61328	11.83472
LandAcQ	13.992	0.422511	13.15573	14.82827
EFComNorm	14.000	0.427295	13.15426	14.84574
ProblemAFound	13.944	0.410555	13.1314	14.7566
DemandSTLFI	11.168	0.398827	10.37861	11.95739
CommunityR	15.076	0.438629	13.30783	15.04417
DelayInGPL	11.268	0.401888	10.37255	11.96345
DependentFEIPPsM	15.864	0.374742	13.12228	14.60572
HighVRate	11.568	0.361598	10.8523	12.2837
DependentFERMI	15.096	0.398614	13.30703	14.88497

Source: Field-data, 2015

A look at the means indicates that dependent on foreign equipment and IPP materials (DependentFEIPPsM), Vandalism of IPP Equipment (Vandalization), community restiveness (CommunityR), Dependent on foreign Expatriate for major Installation (DependentFERFMIn), Poor infrastructure road Network (PoorRN) are the most important environmental constraints influencing the successful delivery of IPP in Nigeria. There variables have the highest mean values of 15.864, 15.664, 15.280, 15.096 and 15.076 respectively and it shows from the result that the respondents rated the variables between strongly agreed and agreed.

The least rating of the variables on the 5-point scale by the respondents goes to demand for short term loan by investors (DemandSTLFI), delay in granting permit and licensees (DelayGPL), high VAT rate associated with our environment (HighVATR), land acquisition problem (LandAcQ) and Unskilled labour (UnskilledL) ranged between disagree and neutral with a mean value of 11.168, 11.268, 11.5864, 11.224 and 11.352 respectively, etc.

4.5 Establishing the Link between the Independent Variable

Table 4.6 below shows the relationship degree of relationship existing between the dependent variable, the independent variables and also the degree of relationship among the independent variables. Correlation matrix is a four-sided cluster of numbers that gives coefficients among individual variable and others examined. Correlation coefficient among a variable with itself is one, thus the main diagonal elements of correlation matrix comprises 1s. From table 4.6, it is observed that dependent variable successful delivery of independent power projects in Nigeria is strongly and positively related to independent variables with poor road network having the strongest positive correlation of 0.9803. It is worthy of note that the correlation coefficient among variables are significant ($P \leq 0.01$ or $P \leq 0.05$). A critical look at degree of relationship among the independent variables shows that there are substantial numbers of large correlations indicating that factor analysis is an appropriate statistical methodology to be adopted in the analysis.

Table 4.6 Correlation Coefficient of the Dependent and Independent Variables

```
. correlate ESDIPPs Corruption Politic UnskilledL PoorM Vandaliztion PoorRN DelayPPA DelayGPA DelayCIPPsE HighRAE PPTMNDR LandAcQ UnfavourableRP P
> roblemAF DemandSTLFI CommunityR DelayGPL DependentFEIPPsM HighVATR DependentFERMI
(obs=125)
```

	ESDIPPs	Corrup~n	Politic	Unskil~L	PoorM	Vandal~n	PoorRN	DelayPPA	DelayGPA	DelayC~E	HighRAE	PPTMNDR	LandAcQ	Unfavo~P
ESDIPPs	1.0000													
Corruption	0.2601	1.0000												
Politic	0.4332	0.3483	1.0000											
UnskilledL	0.3902	0.2595	0.3368	1.0000										
PoorM	0.5719	0.3180	0.2183	0.1880	1.0000									
Vandaliztion	0.7729	0.1434	0.4013	0.4673	0.4097	1.0000								
PoorRN	0.9607	0.2649	0.4153	0.4024	0.5334	0.8223	1.0000							
DelayPPA	0.8079	0.2211	0.4160	0.3017	0.3792	0.6589	0.8150	1.0000						
DelayGPA	0.7341	0.1098	0.4247	0.4383	0.4266	0.6784	0.7411	0.6036	1.0000					
DelayCIPPsE	0.8949	0.2726	0.3100	0.2797	0.6617	0.6259	0.8205	0.6532	0.5724	1.0000				
HighRAE	0.9320	0.2690	0.4508	0.4529	0.4857	0.7653	0.9004	0.7982	0.7516	0.7621	1.0000			
PPTMNDR	0.9223	0.2414	0.4061	0.4600	0.3911	0.7310	0.9055	0.8069	0.7222	0.7490	0.8850	1.0000		
LandAcQ	0.9803	0.2385	0.4667	0.4495	0.5225	0.8263	0.9724	0.8216	0.7940	0.8229	0.9484	0.9438	1.0000	
Unfavourab~P	0.9021	0.2252	0.4324	0.4292	0.4273	0.7310	0.9167	0.7581	0.7682	0.7226	0.8787	0.8977	0.9283	1.0000
ProblemAF	0.9602	0.2040	0.4728	0.4199	0.4121	0.7750	0.9377	0.8447	0.7556	0.7673	0.9494	0.9458	0.9771	0.9179
DemandSTLFI	0.6842	0.0513	0.3483	0.2370	0.0488	0.5004	0.6572	0.6594	0.4810	0.4775	0.6730	0.7428	0.6932	0.7363
CommunityR	0.8469	0.1508	0.4179	0.4035	0.3276	0.6586	0.8163	0.7928	0.7293	0.6646	0.8435	0.8488	0.8686	0.8551
DelayGPL	0.7188	0.1190	0.3522	0.2733	0.0585	0.5326	0.6918	0.7006	0.5123	0.5131	0.7013	0.7740	0.7275	0.7243
DependentF~M	0.7733	0.1875	0.2866	0.3368	0.4716	0.6196	0.7781	0.6256	0.6104	0.6910	0.7333	0.7631	0.7844	0.7510
HighVATR	0.8749	0.2033	0.3670	0.3470	0.4607	0.7253	0.8421	0.7324	0.6911	0.7224	0.8322	0.8351	0.8819	0.8109
DependentF~I	0.7196	0.1853	0.3151	0.3319	0.3741	0.5729	0.7223	0.6771	0.5786	0.5646	0.6447	0.6892	0.7287	0.6822

	Proble~F	Demand~I	Commun~R	DelayGPL	Depend~M	HighVATR	Depend~I
ProblemAF	1.0000						
DemandSTLFI	0.7857	1.0000					
CommunityR	0.9036	0.7067	1.0000				
DelayGPL	0.8142	0.9127	0.7412	1.0000			
DependentF~M	0.7414	0.5253	0.6566	0.5534	1.0000		
HighVATR	0.8587	0.6116	0.7454	0.6411	0.6964	1.0000	
DependentF~I	0.7193	0.5426	0.6752	0.5928	0.5807	0.6782	1.0000

4.6 Factor Analysis Result

4.6.1 Kaiser-Meyer-Olkin Degree of Sampling Suitability And Bartlett's Test of Sphericity.

Before the removal of factors, numerous tests have to be utilized to evaluate appropriateness of respondent data aimed at factor analysis. These tests comprise Kaiser-Meyer-Olkin together with Bartlett'sSphericityTest.20. KMO index, particularly, is suggested once cases towards variable ratio remain less than 1:5. KMO index roams from zero through one, with 0.50 thought out as appropriate for analysis (Hair &

Anderson, Tatham & Black, 1995). The Bartlett's Sphericity Test remains significant at ($p < 0.05$) for suitable factor analysis.

Table 4.7 KMO and Bartlett's Test

Kaiser-Mayer-Oklin Measure of sampling Adequacy	.925
Bartlett's Approx. Chi-Square of Sphericity	3486.320
Df	190
Sig.	0.00

Table 4.7 above shows that KMO index is suitable for analysis as value of acceptance is high and within acceptable range of 0.925.

Table 4.8: Communalities

Environmental Constraints	Early	Extraction
CoFMPoh	1.000	.971
InsAwoE	1.000	.622
UnskilledL	1.000	.625
PoorMC	1.000	.502
Vandaliation	1.000	.843
PoorRN	1.000	.665
CommunityR	1.000	.939
DelayGPA	1.000	.732
DelayCIPPsE	1.000	.632
UnfavorableRPolices	1.000	.812
CPPTMNDR	1.000	.901
LandAcQ	1.000	.910
EFComNorms	1.000	.985
ProblemAFound	1.000	.886
DemandSTLFI	1.000	.978
DelayPPA	1.000	.850
DelayGPL	1.000	.823
DependentFEIPPsM	1.000	.861
HighVATR	1.000	766
DependentFERFMIn	1.000	.792

Extraction Method: Main Component Analysis**.**

This was utilized to remove communalities shown above. Communality for one variable is variance given account for by removed factors. The greater the communality, the more reliable it remains an indicator. It is desirable for the average level of communality to be minimum seventy also for communalities to not vary over an extensive range (MacCallum, 1999). The average communality for 20 variables in the study is 0.8003. The table reveals that over 97 percent of variance in bribery and Poor attitude to service accounted for, 62.2 percent of variance in unstable political environment accounted for 62.5 percent of variance in unskilled and capacity training accounted for 98.5 percent of variance in demand for short term loan by financial institutions is accounted for and so on.

Table 4.9: Aggregate Variance Explained

Module	Initial Eigen Values			Extraction Sum of Squared loadings			Rotation Sum of the Squared Loadings		
	TheTotal	% variance	% cumulative	Total	% Variance	% cumulative	Total	% variance	% cumulative
1	13.325	66.624	66.624	13.325	66.624	66.624	6.823	34.115	34.115
2	1.542	7.710	74.334	1.542	7.710	74.334	6.230	31.152	65.266
3	1.138	5.691	80.025	1.138	5.691	80.025	2.952	14.759	80.025
4	.868	4.342	84.367						
5	.636	3.181	87.548						
6	.381	1.903	89.451						
7	.368	1.841	91.292						
8	.354	1.771	93.063						
9	.289	1.447	94.510						
10	.236	1.181	95.691						
11	.218	1.089	96.780						
12	.164	.819	97.599						
13	.134	.670	98.269						
14	.119	.594	98.862						
15	.091	.454	99.317						
16	.071	.356	99.673						
17	.043	.215	99.888						
18	.013	.063	99.951						
19	.006	.029	99.980						
20	.004	.020	100.000						

Method of Extraction: Principal Component Analysis.

Table 4.9 above shows total variance expounded, the table displays factors extracted after the analysis with their Eigen values, variance percentage attributed to individual factor, and the cumulative variance for the factor. Component is depicted by every variation within the variables. Individual variable is therefore standardized with peak variance of each as 1.0. An Eigen value reveals the quantity of variance described by component. Kaiser's in his Criterion, 1958) states that components having Eigen value of 1.0 or higher should be reserved for analysis. Kaiser's Criterion remains the default retaining technique in SPSS. Conway together with Conway and Huffcut in 2003 established that amid organizational examiners, Kaiser's Criterion is the mostly utilized technique of detecting quantity of components to be utilized in guiding factor analysis. It is observed that initial factor accounted for 66.624% of variance, whereas the 2nd 7.710% of variance and third accounts for 5.691% of variance. All the other factors are insignificant. Therefore, three Components with Eigen value of one or greater explain almost 80.03% total variance. Higher percentage of entire variance described is a sign that strong relationships exist amid group of variables. After rotation, result showed improvement in the quantity of variance described for each three constraints,(Social constraints_1) accounted for 34.115% of entire variance described, (procurement constraints_2) 31.152% of entire variance and (Financialconstraints_3) accounted for 14.759% of total variation with accumulative sum of squares load of 80.03%.

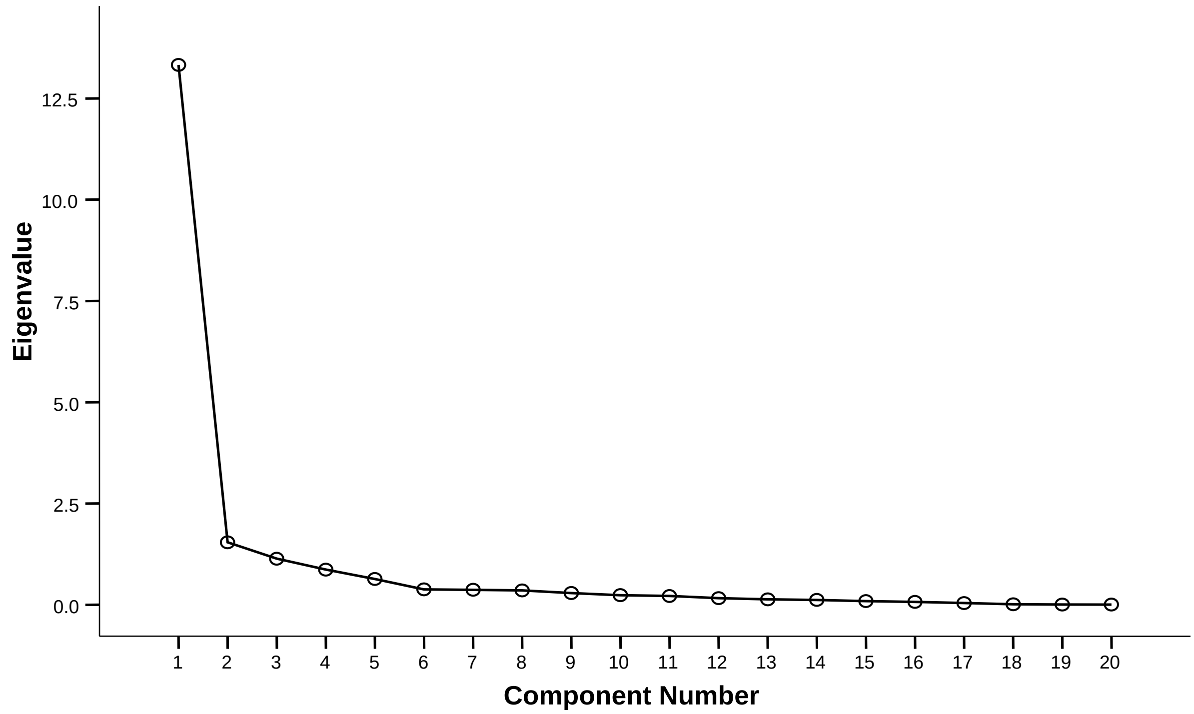


Figure 2: Scree Plot of Component Extraction

4.7. Scree Plot Result Interpretation

The point where the departure occurs from the smaller Eigen value to break or debris point, indicate the quantity of factors to retain, which in this situation is three factors. The factors retained are those with Eigen values larger than or same as one. The values are 13.32, 1.542 and 1.138 with percentage (%) cumulative variance of 80.03% (table 4.9) it indicates that the three factors cumulatively can guarantee 80.03% cumulative variance without the influence of remaining seventeen (17) constraints with Eigen values of less than one are discarded. After rotation, result showed improvement in the quantity of variance described for each of three components. Component_1 accounted (Social constraints) for 34.115% of entire variance, component_2 (Procurement constraints) accounted for 14.759% and component_3 (Financial constraints) accounted for 14.759% of total variation with a cumulative sum of square loading of 80.03%

Table 4.10: Component Matrix (i)

Environmental Constraints	Components		
	A	B	C
CoFMPoh	.976		
InsAwoE			.508
UnskilledL			.603
PoorMC	.667		
Vandalization	.701		
PoorRN	.812		
CommunityR	.962		
DelayGPA	.850		
DelayCIPPsE	.792		
UnfavorableREPolices	.818		
CPPTMNDR	.949		
LandAcQ	.950		
EFComNorm	.991		
ProblemAFound	.939		
DemandSTLFI	.982		
DelayPPA	.742	-.537	
DelayGPL	.891		
DependentFEIUPPsM	.773		
HighVATR	.797		
DependentFERFMIn	.882		

Extraction Method: Main Component Analysis.

a. 3 Component extracted.

Table 4.11 Rotated Component Matrix (i)

Environmental Constraints	Components		
	1	2	3
CoFMPoh			.726
InsAwoE	.746		
UnskilledL	.743		
PoorMC	.667		
Vandalization	.868		
PoorRN	.612		
CommunityR	.702		
DelayGPA		.641	
DelayCIPPsE		.538	
UnfavorableERPolices			.813
CPPTMNDR	.621		
LandAcQ		.703	
EFComNorm	.679		
ProblemAFound			.673
DemandSTLFI			.745
DelayPPA		.901	
DelayGPL		.724	
DependentFEIUPPsM		.893	
HighVATR			.660
DependentFERFMIn		.639	

Extraction Method: Main Component Analysis, Rotation Method: Varimax together with the Kaiser Normalization.

a. Rotation gathered in eight iterations.

The three components with Eigen values higher than 1.0 were rotated using Varimax rotation method and Kaiser Normalization to generate an orthogonal solution revealed in Table 4.11 Varimax rotation method is the most utilized method to produce an orthogonally rotated matrix (Comrey, 1992). It is generally accepted that loadings ought to be 30 or higher to provide any interpretive value (Comrey, 1992). A loading is simply the Pearson correlation among the variable and the extracted component (Stevens, 2009). The greater the loading, the more the variable is a pure measure of the component (Comrey, 1992). Although no conclusive standards exist, the higher the loading, the greater confidence the researcher can have that a strong relationship exists. Comrey and Lee's (1992) often cited guideline for interpreting loadings includes: 0.71=excellent, 0.63=very good, 0.55=good, 0.45=fair and 0.32=poor. Several variables with loadings from good through excellent provide a foundation for researcher to make more definitive conclusions about the component adopted. All loadings lower than 0.5 where eliminated from the rotated component matrix in Table 4.11 The three component rotated matrix shown above reveals an interpretable, simple solution. Each component has an amount of variables with high loadings. There are minor significant overlapping variables. Termed cross loading by Costello and Osborne (2005), variables that load at .32 or greater on two or additional components warrant additional questioning by the researcher in connection to suitability of variable in contributing to meaningful factorial solution. Using the rotated factor loadings in above table, it is observed that many of components loaded strongly on component _1 is renowned as 'Social constraints' with nine study variables on row representing 45% of total variables. Less amount of variables (7 study variables) representing 35% of total variables comprised in study loaded strongly on component _2 which we shall call 'procurement constraints' and five variables or 20% of total variables involved in study loaded strongly on component_ 3 which we shall call 'Financial constraints'.

4.8 Multiple Regression Analysis of the Extracted Factors

Table 4.12: Model Summary Estimation of Relationship Model and Interpretation

Model	R	R Square	Adjusted R square	Std. Error of Estimate
1.	.986(a)	.971	.970	3.01986

a. Predictors: (Constant), REGR factor value three for analysis one, REGR factor value two for analysis one, REGR factor value one for analysis.

In Table 4.12, the study found that independent variables joined, were in connection with dependent variable having 0.986that is, a positive connection, together with the involvement of independent variables to dependent variable having R-square of value 0.971. This shows that independent factors (constraints) joined to clarify the rate 97.1 percentage of the modification in the conduct of dependent variable that considered a great percentage, whereas statistical independent concepts added up to the influence of the variables joined on dependent variable via the modified R-square 0.97. The result above indicates that successful delivery of independent power projects in Nigeria is strongly related to environmental constraints. This helps to validate the correlation result of table 4.12 which shows a positive correlation between the variables under consideration.

Table 4.13: Multiple Regression Analysis of all Predictors on successful IPP delivery in Nigeria

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	87228.099	3	12409.366	1360.739	.000[a]
Residual	1103.469	121	9.120		
Total	88331.568	124			

a. Predictor: (Constant), REGR Factor score three for analysis one, REGR factor value for analysis one, REGR factor value one for analysis one

b. Dependent Variable: SDIPP

Table 4.13 gives the report of ANOVA on the overall model. The table displays a collective effect of social constraints, procurement and finance constraints on successful delivery of IPP in Nigeria. As Probability figure (P) is lower than 0.05, it signifies a significant model. Therefore, the variables combination significantly foresees dependent variable that is (F=1360.739; P=0.000<0.05). It reveals that the stated data and model are suitable in describing the collective effect of environmental constraints on successful delivery of IPP in Nigeria. Judging from the result of the analysis of variance, null hypothesis that states no significant effect of the collective environmental constraints on successful delivery of IPP is rejected in favor of the alternative. This therefore implies that the specified environmental constraints collectively affect the successful delivery of independent power projects in Nigeria.

4.9 Test of Relative Contribution of Independent Variables

Table 4.14.: Relative contribution of the individual IPPs predictors

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	56.384	.270		208.749	.000
REGR factor score 1 for analysis 1	13.828	.271.	.786	50.990	.000
REGR factor score 2 for analysis 1	9.758	.271	.555	35.984	.000
REGR factor score 3 for analysis 1	3.713	.271	.211	13.690	.000

a. Dependent variable: SDIPPs

The predictability or suitability of proposed linear multiple regression model as specified in the methodology was established from the analysis of variance revealed in Table 4.14 above and since the independent (predictors) variables can successfully and adequately predict the effect of environmental constraints on successful delivery of IPP in Nigeria it is therefore necessary to examine how each constraint contributed in predicting the successful delivery of independent power projects (dependent variable) using the two sample student's t-test at significance level of 0.05.

Table 4.14 above shows the un-standardized and standardized coefficients, standard errors, two sample t-value calculated and the probability figure of each constraint considered in our study. Since the values used in the regression analysis is standardized through factor analysis, the standardized coefficients will be reported in this work. The t- values is gotten by dividing the values of un-standardized coefficients of the constraints by their corresponding standard error. The standardized Beta Coefficients represent the contributions of each constraint to the model. The t-values and p-values showed the impact of the independent constraints on the dependent variable. From Table 4.16, it was clear that the social constraints have the greatest impact on successful delivery of IPP achieving a ß level of 13.828 (the large t-value of 50.990 and corresponding low p-value of 0.000 buttressed the result for Constraints_1 (Social constraint), followed by Component_2 (Procurement constraint) with (ß = 9.758) and factor_3 (Financial factor) with standardized beta coefficient of 3.713. The result also shows the corresponding t-values of (Procurement constraint = 35.798 with a p-value = 0.000, Financial constraint = 13.169 with a p-value = 0.000. The result can therefore be represented in the multiple regression models below:

SDIPP = 280.743 + 13.828X_1 + 9.758X_2 + 3.713X_3.

SDIPP = Y (successful delivery of independent power projects) dependent variable, while the independent variables are: X_1= Component_1 (Social constraints), X_2 = component_2 (Procurement constraints) and X_3= Component_3 (Financial constraints) are statistically significant and also included in the model.

The un-standardized beta coefficients in Table 4.16 can be interpreted that the independent random constraints have strong impact on successful delivery of independent power projects in Nigeria. Here, 100% change in component_1 (Social constraint) will lead to 1382.8% change in the delivery of IPP in Nigeria, 100% change in component_2 (Procurement constraints) will lead to 975.8% change in level of delivery of IPP in Nigeria, For component_3, 100% change in Financial constraint (component_3) will contribute 371.3% change in successful delivery of IPP in Nigeria.

4.10 Test of Hypotheses

4.10.1 Test of Hypothesis H_{01}:

There are three hypotheses to be tested, and using the appropriate statistical methodologies specified in this work, the decision rules are hereby made Using Table 4.14.

H_{01}: Social constraint does not significantly influence the successful delivery of IPPs in Nigeria.

To test hypothesis, two sample t-test statistics was employed from Table 4.14 above. It implies that the constraints are significant at student's t-values of 50.990 and P-Value of 0.000 which is less than our reference probability level of 0.05.

Decision Rule:

The null hypothesis (H_{01}) is rejected.

The other hypothesis represented as (H_{A1}) is accepted.

4.10.2 Test of Hypothesis H_{02}:

H_{02}: Procurement influences do not significantly affect the successful delivery of IPPs in Nigeria.

From the sample t-test in table 4.14, at student's t-value of 35.984 with probability value of 0.000 which is less than our significant value reference point of 0.05.

Decision Rule:

The null hypothesis (H_{02}) is rejected.

The other hypothesis represented as (H_{A2}) is accepted.

4.10.3 Hypothesis Test $H_{03:}$

$H_{03:}$ Financial constraints do not affect the successful delivery of IPPs in Nigeria.

Table 4.14 shows that at student's t-value of 13.690 and P-value of 0.000 less than 0.05 significance value.

Decision Rule:

The null hypothesis (H_{03}) is rejected.

The other hypothesis represented as (H_{A3}) is accepted.

4.11 Ranking of Factors to IPPs Successful Delivery

Table 4.15 Ranking of Factors

S/N	Constraints (Constraints)	Ranking (t-Value)	% contribution to Model	Ranking Position
1	Social Constraints	50.990	1382.8	1st
2	Procurement Constraints	35.984	9.758	2nd
3	Financial Constraints	13.690	3.713	3rd

Using (table 4.14) the t-test values, it implies that 100% change in each constraints at their respective t-value will lead to corresponding change in IPPs delivery at 1382.8 factor_1, 9.758 factor_2 and then 3.713 for factor_3.

4.12 Discussion of Results

The following observations were made after a thorough analysis on the study:

1. Using the factor reduction analysis, the researcher concludes (Table 4.11) that nine (9) study variables loaded strongly on component _1 representing 45% of total variables included in the study which the researcher renamed as 'Social environment constraints'. Less number of variables (7 study variables) representing 35% of the total variables included in the study loaded strongly on component _2 which we shall call 'procurement environment constraints' and five variables representing 20% of total variables included in the study loaded strongly on component_ 3 which we referred as 'Financial constraints' were the critical environmental constraints on successful delivery of IPP in Nigeria. They collectively contributed 80.03% cumulative variance of the entire study variables (Table 4.9)
2. The research agrees that the three hypotheses formulated are significantly constraining IPP delivery using regression analyses. The researcher identified the environmental constraints affecting IPP successful delivery as social, procurement and financial factors (See Table 4.14), for example Ubi, Effiom, Okon & Oduneka (2012), Eberhard (2016) revealed in their study that constraints that are socially inclined, financial challenges and procurements issues are the main constraining factors of IPP projects in Nigeria.
3. The identified (independent variables) constraints namely social, procurement and financial constraints are all correlated to the dependent variables (Y)

indicated as SDIPP. It implies that a change in any of the independent variable automatically affects the dependent variable, which is significant in our study as it explain the research questions (Table 4.14). This depicts that there is a strong relationship between the major constraints (social, procurement and financial environment) and successful delivery of IPP. Eberhard (2017) in their study noted that social, procurement and financial constraints are part of the critical success factor determinant to successful IPP in Nigeria. Giwa (2010) in his research collaborated with Eberhard (2017), Ubi (2012) and Emovonet (2010) where he highlighted the inimical challenges to IPP failure as observed in this research work.

4. The results of the Earned value analysis also agree that IPP delays are caused by time and cost overrun. However, most IPP are not usually delivered at the expected time and within the required estimated cost. The result further shows that six (6) out of the seven studied IPP incurred cost overrun except Omoku IPP, which experiences time overrun (delay). However, only Okpai IPP executed project within time frame, While Aba integrated and Azura IPP were ongoing (not completed) as at the time of visit (Table 4.2).

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The results of the twenty identified environment constraints were re-grouped into three Principal components using the factor reduction (extraction) method. The re-grouped principal component constraints of interest are social constraints, procurement constraints and financial constraints with their corresponding constraints as:

S/N	**SOCIAL ENVIRONMENT CONSTRAINTS**	**NOTATIONS**
1	Insecurity associated with our environment	InsAwoE
2	Unskilled labour and poor capacity training	UnskilledL
3	Poor maintenance culture	PoorMC
4	Vandalism of IPP Equipment	Vandalization
5	Poor road Network	PoorRN
6	Community Restiveness	CommunityR
7	Effect of community norms on IPPs delivery	EFComNorm

	PROCUREMENT CONSTRAINTS	**NOTATIONS**
1	Delay in acquiring Gas Purchase Agreement	DelayGPA
2	Delay in procuring and clearing IPP Equipment	DelayCIPPsE
3	Land Acquisition	LandAcQ
4	Delay in acquiring Power purchase Agreement	DelayPPA
5	Delay in granting permit and license	DelayGPL
6	Dependent on foreign Equipment and IPP Materials	DependentFEIUPPsM
7	Dependent on foreign Expert rate for major Installation	DependentFERFMIn

	FINANCIAL CONSTRAINTS	NOTATIONS
1	Cost mismanagement by public office holder	CoFMPoh
2	Unfavorable economic regulatory polices	UnfavorableRPolices
3	Cost associated with poor geographical area in most Niger Delta/southern Region.	CPPTMNDR
4	Problem associated with funding	ProblemAFound
5	Demand for short term loan by investors	DemandSTLFI
6	High VAT Rate	HighVATR

The analysis shows that the three (3) principal components extracted 80.03% cumulative variance. This indicates three identified factors understudy are significant as it shows strong relationships among group of variance explained for three factors.

Result of regression analysis infers that the three critical constraints namely social, procurement and financial constraints do significantly affect successful delivery of IPP in Nigeria. It is plain with their respective significant probability (P-value) of lower than 0.05%. Hence, the entire three hypotheses (H_0) were rejected while accepting their corresponding alternative hypothesis (H_A).

Regression model equation

$$\mathbf{Y = 280.743 + 13.828 X_1 + 9.758 X_2 + 3.713 X_3}$$

Where X_1, X_2 and X_3 are the determined constraints

X_1 = Social Constraints, X_2= Procurement and X_3= Financial constraints known as independent variables.

Y = SDIPP (Success factor determinant of IPP in Nigeria).

However, Social constraints contributed the highest influence on dependent variable with t-value of 50.990 as 100% change in this factor will lead to **1382.8%** change in the delivery of IPP in Nigeria, while procurement factor is the second highest factor with t-value of 35.984 as 100% change in the factor contributed 9.758% change in the delivery of IPP while the least factor finance with t-value of 13.690 will contribute 3.713 change in distribution of IPP In Nigeria. The regression model above showed there exist a significant effect of the three (3) component factors after analysis on the distribution of IPP in Nigeria.

In conclusion, Azura Power plant were unsuccessful in its execution stage due to dispute in signing project documents, cost finalization as project finally reached a landmark in 2014 as well attained financial closure in 2015. The Azura Power Plant was designed to be opened in 2015 but owing to the identified problem has been planned to be concluded in 2018. Most especially, government has failed to provide an enabling environment for IPP delivery in Nigeria. Aba Integrated Power Project couldn't meet end user's satisfaction as the project also was not completed during construction stage. It started construction in 2008 with an expected commissioned date in 2013, though the plant later failed due to gas pipeline line issues and disagreement concerning the licensed data. The project execution date was initially designed to be opened in 2013, but at this material time, the gas pipeline was still at its completion stage. The plant also hit its milestone, when shell Nigeria Limited and Geometric Power (GP) had dispute as regard inconsistency design specification and set back with the licensed distributing company. However, it was refinanced and the current execution date was fixed till 2019.

The Earned value analysis (EVA) results indicate that six of the IPP under study incurred cost overrun except Omoku IPP. Omoku IPP experiences time variation because of identified constraints in this study. Omoku IPP did not experience cost overrun while the remaining (4) IPPs did incur high cost overrun. Aba integrated and Azura IPP were ongoing (not completed) as at time of visit. Okpai IPP had zero (0) percent time variation, which indicate that project was completed within time while four (4) IPPs were not completed within time due to the identified constraints affecting its delivering going by the result of the earned value analysis discussed in table 4.2. It is of significance to understand that all the plants did not produce at optimal 100% capacity efficiency, because of the inherent environmental constraints identified in the study as: social, procurement and financial constraints. These constraints also have important influence on indices of determining project performance, which are cost, time and quality. The result also proves that IPP were completed under a high cost and time overrun. It indicates that power producers have to contend with constraints such as social, procurement and financial constraints for successful delivery of IPP in Nigeria.

The study concludes that since electricity is the bedrock of socio-economic growth of nation, priority must be shifted to timely delivery of IPP for rapid economic development.

5.2 Recommendations

The following recommendation will improve efficiency, performance and eliminate project cost and time overrun when applied.

i. Government should increase the capacity of transmission line at the grid to enable sustainability of the generated power to end users.

ii. They should timely grant PPA, GPA, license and permit to investors in the power sector industry for quick delivery of projects.

iii. They should adopt a credit enhanced scheme for investors and financial institution should also assist them with long term loans.

iv. Government should encourage transparency in contract awarding especially during contract tendering and bidding.

v. Government should introduce Tax wavers to investors in IPP as this will eliminate delay in clearing imported materials in the country.

vi. Once the identified environmental constraints are properly eliminated, IPP delivery will be successful in Nigeria.

vii. The researcher developed a valid and unique hypothesis. These variables are all significant at probability values ($P \leq 0.05$), which implies that identified variables are all constraints to realizing IPPs in Nigeria. Indicating that all null hypotheses (H_o) were rejected while accepting all alternative hypotheses (H_A).

viii. The development of a unique Model for the research.

Regression Model Equation

$Y = 280.743 + 13.828 X_1 + 9.758 X_2 + 3.713X_3$ where X_1, X_2 and X_3 are all constraints variables. This implies that any change in constraints affects Y.

i. This work will serve as part of future educational references to factors affecting IPP realization in Nigeria.

ii. The result of analysis has shown that delay in delivery IPP lead to time and cost overrun as well affecting end users satisfaction.

iii. The analysis of emergency and sustainability of IPP for economic advancement of technological sector in Nigeria.

iv. Analysis of factors affecting IPP sector in a deregulated economy, using Nigeria as a case study.

v. The impact of IPP delivery project on technological development including sustainability of petty scale business in Nigeria.

REFERENCES

Adegbulugbe, A., Momodu, A.S.,Adenikinju. A.,Akinbami., J & Onuvae., P.(2007). Balancing the acts in the power sector: The unfolding story of Nigeria Independent power projects, 27th USAEE/IAEE Conference, 16–19 September, 2007, North American. www.usae.org/usage2007/submisions/onlineproceeding.

Adoghe, A.U.,Odigwe, I.A, & Igbinovia, S.O. (2009). Power sector reforms-effects on Electric power supply reliability and stability in Nigeria. *International Journal of Electrical and Power Engineering*, 3 (1), 36-42. http://www.weathat.com/power-sector-reforms-in-a2219.

Africa Oil and Gas Report (2014). *Commissioning-hitches delay gas Supply to Geometric power plant. Retrieved from http://africaoilgasreport.com/2014/05/gas-Monetization/commissioning-hitches-delay-gassupply-to-geometric-power-plant/.*

Anyanwu, (2008). *Research methodology in Business and Social sciences*. Owerri, Imo State: Canum Publisher Nig. Ltd.

Artz., (1999). Buyer supplier performance: The Role of Assets specificity, Reciprocal Investments and Relational exchanges. *British Journal of management,* 10(2), 113-26.

Atkinson, R. (1999). Project management: cost, time and quality, two best guesses and A phenomenon, it is time to accept other success criteria. *International Journal of Project Management,* 17(6), 337-42.

Berger, A. N., & Udell., G. F. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking and Finance*, 22, 613–673.10.1016/S0378-4266 (98) 00038-7

Castellano, A., Kendall, A., Nikomarov, M., & Swemmer, T. (2015). Brighter Africa, McKinsey & Company Monthly Journal. Retrieved from https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/powering-africa.

Chen, Y.Q., Zhang, Y.B., Liu, J.Y. & Mo, P. (2012). Interrelationships among critical Success factors of construction Projects based on the structural equation model. *Journal of Management in Engineering,* 28(3), 51-243.

Chikuni, E. & Okoro, O. L. (2007). Power Sector Reforms in Nigeria: Opportunities and Challenges. *Journal of Energy of South Africa* 18 (3): 52–57.

Chua, D.K.H., Kog, Y.C., & Loh, P.K. (1999). Critical success factors for different Project objective.*Journal of Construction Engineering and Management,* 125(3), 50-142.

Chua, D., Shen, L. & Bok., S. (2003). Constraint-based planning with Integrated Production schedule over internet. *Journal of Construction Engineering and Management*, 129(3), 293-301.

Chua, D. K. H, & Shen L. J. (2005). Key constraints analysis with integrated production Scheduler. *Journal of Construction Engineering and Management*, 131(7), 753-764.

Comrey., A. L. & Lee, H. B, (1992). *A first course in factor analysis.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Conway, J.M, & Huffcutt, A.I. (2003). A review and evaluation of exploratory factor analysis practice in organizational research. *Journal of Organizational Research Methods,6* (2), 147-168.

Costello, A.B. & Osborne, J.W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Journal of Practical Assessment Research & Evaluation, 10* (7), 1-9.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Journals of Psychometrika study*, 16(3), 297–334. doi:10.1007/bf02310555.

Eberhard, A., Gratwick. K., Morellac, E. & Antmann, P. (2017). Independent power Projects in Sub-saharan Africa: Investment trends and policy lessons*. Journal of Energy Policy*, 108 (2017), 390–424.

Eberhard, A., & Gratwick, K. (2008). Analysis of Independent Power Projects in Africa: Understanding development and Investment outcomes; development Policy Review. *Journal of International Energy Agency Outlook,* 26(30), 309-380.

Eberhard, A., & Gratwick, K. (2011). IPPs in Sub-Saharan Africa: Determinants of Successes. *Journal of Energy Policy,*39 (9), 5541–5549. http://dx.doi.org/10.1016/j.enpol.2011.05.004.

Eberhard, A., & Gratwick, K. (2012). Light Inside: *The Experience of Independent Power Projects in Nigeria*. A working paper presented at the Infrastructure Consortium for Africa development Bank, Tunisia.

Eberhard, A., Gratwick, K., Morella, E.,& Antmann, P. (2016). Independent Power

Projects in Sub-Saharan Africa: Lessons from five key countries. The World Bank, Washington, D.C. http://dx.doi.org/10.1596/978-1-4648-0800-5.

Emovonet., (2010). Issues with Electricity generation in Nigeria. *International Energy Journal*. (12) 35

Giwa, F.A. (2010). Failures of Independent Power Producers in Nigeria: The Inimical Challenges (Master's thesis). Retrieved from http://www. *academica.edu*

Gnyawali, D. R., & Fogel, D. S. (1994). Environments for entrepreneurship Development: Key Dimensions and Research Implications. Journal of Entrepreneurship Theory and Practice, 18 (4), 43-62.

Guanrong Chen and Trung Tat Pham (2006), "Introduction to Fuzzy Systems", Chapman & Hall/CRC Publications.

Gudiené, N., Banaitis, A., Banaitiené, N., & Lopes, J. (2013). Development of a Conceptual Critical Success Factors Model for Construction Projects: a Case of Lithuania. *11th International Conference on Modern Building Materials, Structures And Techniques,* MBMST 2013 Lithuania (57, pp.392-97): Procedural Engineering.

Hair, J., Anderson, R.E., Tatham R.L, & Black W. C. (1995). *Multivariate data analysis,* 4th edition, New Jersey: Prentice-Hall Inc.

Harrison, F.L (1992). *Advanced Project Management*: A Structured Approach, Gower: Adershot.

Hughes, W.P, Hillbrandt, P, Greenwood, D.G, & Kwawu, W.E.K (2006*). Procurement in the Construction Industry.* The Impact of alternative market and supply processes, Taylor and Francis, London.

Hwang, B.G., & Lim, E.J. (2013). Critical success factors for Key project players and Objectives: Case Study of Singapore. *Journal of Construction Engineering and Management,* 139(2), 204-15.

Hyvari, I. (2006). Success of projects in different organizational conditions. *Journal of Project Management,* 37(4), 31-41.

Ijewere, A .A. (2010). *The Management of Electricity Power supply in Nigeria problems and prospects*. Department of business Administration University of Benin, Benin City.

Ika, L.A. (2009). Project Success as a topic in project management. *Journals of Project Management,* 40(4), 6-19

Ikeme, J., & Ebohon, O.J. (2005). Nigeria's electric power sector reform: What should Form the objectives. *Energy Policy Journal, (*33), 1213 – 1221.

Ikeonu, I. (2006). The Nigerian Electric Power Sector Reform: Establishing an effective Licensing Framework as a tool for attracting Investment. *Journal institute for Public –Private Paertnerships,39-49.* Retrieved from http://www.ip3.org/ip3_site/the- Nigerian electric-power-sector-reform-

Inugonum, T.(2005). Challenges facing the development of independent power producers in a deregulated power sector in Nigeria, (NEPA as a case sturdy); the International conference on power system operation and planning (ICPSOP), 22-26 May, 2005 (pp. 33-37) cape Verde.

Ise-olorunkanmi, O. J. (2014). Issues and challenges in the privatized power sector in Nigeria. *Journal of Sustainable Development Studies*, 6(1) 2201-4268, 161-174.

Iwayemi. A.,(2008). Investment in Electricity Generation and Transmission in Nigeria. *Journal of International association of Energy Economics Forum*, (37), 37.

Joseph, I.O. (2014). Issues and challenges in the privatized power sector in Nigeria. *Journal of Sustainable Development Studies, 6*(1), 161 – 174.

Kaiser, H.F. (1958). The Varimax criterion for analytic rotation in factor analysis*. Journal of Psychometrika,* 3(2) 187-200.

Kapika, J.,& Eberhard, A.A., (2013). Power-Sector Reform and Regulation in Africa: Lessons from Kenya, Tanzania, Uganda, Zambia, Namibia and Ghana. Human Science Research Council, Cape Town

Kuale, P.A., & Tsado, J. (2006). Optimization approach to independent power production. *IEEE journal,* U.S.A, 10(1), 1-1.

Labo, H.S (2010). Current Status and Future of the Transmission Network" Investors' forum presentation for the Privatization of PHCN successor companies. Retrieved from www.ijettjournal.org

LeBoeuf, Lamb, Greene & Macrae 2006. 'First IPP in Nigeria'. Retrieved from http://www.icafrica.org/fileadmin/documents/First_IPP_in_Nigeria_v1.PPT Accessed February 4, 2015.

Li, B., Akintoye, A., Edwards, P. J., & Hardcastle, C. (2005). Critical Success Factors For PPP/PFI Projects in the UK Construction Industry. *Journal of Construction Management and Economics,* 23(5), 459-71.

Likert, R. (1974). *The method of constructing an attitude scale, in Maranell, G.M. (Ed.), Scaling: A Sourcebook for Behavioral Scientists.* (pp. 21-43) Chicago: Aldine Publishing Company.

Lim, C.S. & Mohamed, M.Z. (1999). Criteria of project success: an exploratory re-Examination. *International Journal of Project Management,* 17(4), 243-8.

MacCallum, R. C., Widaman, K. F., Zhang, Z. & Hong, S. (1999). Sample size in factor analysis. *Journal of Psychological Methods,* (4), 84-99.

Malhotra, N., & D. Birks. (2003). Marketing Research: An Applied Approach. London: Prentice Hall.

Mashhadi, A. H., & Rehman, Q. I. (2012). Effect of external environment on the performance of the fast food industry. *International journal of management, economics and social sciences,* (1), 1-7

Mayer, S.C. & Majluf, N. (1984). Corporate Financing and Investment decisions when firms have information's that investors do not have. *Journal of financial economics,* 13, 187-221

McKinsey, (2015). Electric Power & Natural Gas Report. Brighter Africa: "The growth Potential of the Sub-Saharan electricity sector*. Journal of the infrastructure consortium of Africa.* Retrieved from: https://www.icafrica.org/en/knowledge-hub/article/brighter-africa-the-growth-potential-of-the-sub-saharan-electricity-sector-276/.

Mcmullen, T. B. (1995). *Introduction to the theory of constraints (TOC) management System*. St. Lucie Press/ APICS Series.

Melese, F., & Frank, R., (2005). A Transaction cost economics view of DOD outsourcing: Presented at the 2nd annual Acquisition Research symposium of the Naval Postgraduate School, California.

Mohiuddin, A. (2011). The Privatization Transaction Process and the Opportunities for Investments in the Nigerian Power Sector." Electric Power Sector Reform Workshop, Abuja, May 25.

Natasha, M. (2015). *African Law and Business – Article titled: "A scramble for power the Nigerian energy crisis"*.

NERCNG (2008) "The Nigerian Electricity Commission Guide to the Development of Independent Power project in Nigeria".

Newbold, R. C. (1998). *Project management in the fast lane:* Applying the theory of Constraints, St. Lucie Press.

Nwachukwu, C. C., & Emoh, F. I. (2011). Building construction project management Success as a critical issue in real estate development and investment. *American J Social and Management Sciences*, 2(1), 56-75.

Nwachukwu, C. C.,& Nzotta, S. M. (2010). Quality factors indexes: a measure of Project Success constraints in a developing economy*. Interdisciplinary Journal of Contemporary Research in Business*, 2(2), 505

Nworuh, G. E. (2012). *Fundamentals of applied Quantitative Techniques for Management Decision*. Federal University of Technology Owerri, Imo State Nigeria.

Ochugudu, A.I., & Onodugo, V.A. (2013). Power Sector Reform Deliverables, how well and good to customers. *International Journal of Management Technology,* 1(1),*1- 14,* Published by European Centre for Research Training and Development UK (www.ea-journals.org).

Okoro, O. L., & Chikuni, E. (2007). Power Sector Reforms in Nigeria: Opportunities and Challenges. *Journal of Energy in South Africa,*18 (3), 52–57.

O'Leary-Kelly, S.W., & Vokurka, R.J. (1998). The empirical assessment of construct Validity. *Journal of Oper. Manage,* 16(4), 387-405.

Onochie, U.P., Egware, H.O., & Eyakwanor, T.O. (2015).The Nigeria Electric Power Sector(Opportunities and Challenges). *Journal of Multidisciplinary Engineering Science and Technology,* 2(4), 494 – 502.

Oricha, J.Y., & Olarinoye, G. A. (2012). Analysis of Interrelated factors affecting Efficiency and stability of Power supply in Nigeria. *International Journal of Energy Engineering,*2 (1), 1-8.doi: 10.5923/j.ijee.20120201.01.

PHCN, (2009). *Nigeria power requirements. PHCN of Nigeria Daily Reports, Sunday 07/06/09 National Control Centre Oshogbo Nigeria*.

PHCN, (2005). *Generation and Transmission Grid Operation: 2005 Annual technical Report from PHCN Control Centre,* (pp9-23) Oshogbo, Nigeria.

Preuss, L. (2009). Addressing sustainable development through public procurement:

The case of local government. *Journal of supply chain management,* 14 (3), 213-223.

Sada, I. (2007). Analysis on Generation Transmission and Distribution of Nigeria Power for National Development: A paper presented at 2nd National Conference of Colleges of Agriculture, Environmental, Engineering and Science and Technology, Hassan Usman Katsina Polytechnic, p 2.

Sambo, A. S., Garba, B., Zarma, I.H.,& Gaji, M.M. (2012). Electricity generation and the Present Challenges in the Nigerian power sector. *Journal of Energy and Power Engineering,*6(7), 1050 – 1059.

Sekaran, U. (2003). *Research method for business: A skill-building Approach* (5th ed.). London: Willey.

Shatanand Patil, Akshay Patil and Prof. Pramila Chavan. "Earned Value Management For Tracking Project Progress", *International Journal of Engineering Research and Applications,* (2012)1026 –1029.

Smee, C. (2002). Performance Measurement and Improvement in a Centralized System. *Journal of Improving Health Systems Performance in OECD Countries,* 23, 34-45.

Stein, R. E. (1997). *The theory of constraints: Applications in quality and Manufacturing* (2nd ed.). New York: Rochester.

Stevens, J.P. (2009). *Applied multivariate statistics for the social sciences*. New York, NY: Routledge.

Steven, K., & Ranja, T. (1997). *Renewable Energy Technologies in Africa*. London: Zed Books Ltd.

Sule, A. H. (2010). Major factors affecting Electricity Generation, Transmission and Distribution in Nigeria. *International journal of engineering and mathematical intelligence,* 1 (1), 3.

Sunil Ganpat Mahadik, Pankaj P. Bhangale. "Study & Analysis of Construction Project Management with Earned value Management System", *International Journal of Innovative Technology and Exploring Engineering,* (2013) Vol 3.

Toor, S.R., & Ogunlana, S.O. (2009). Construction professionals' perception of critical success factors for large-scale construction projects. *Journal of Construction Innovation,* 9(2),149-67.

Ubi, P.S., Effiom, L., Okon, E.O., & Oduneka, A.E. (2012), The determinants of Electricity supply in Nigeria*. International Journal of Business Administration*, 3(4), 72-82.

Uwaifo, S. O. (1994). *Electric Power distribution Planning and development*. (1st ed.). Marina Lagos, Nigeria: Malt-House Press Ltd.

Varley, C., & Lammers, G. (1999). *Electricity Market Reform:* An International Energy Agency Handbook*; OECD:Paris*. Retrieved from http://scholar.google.com/scholar_lookup?

Victor, D., & Heller, T.C, eds (2007).*The Political Economy of Power Sector Reform: The Experiences of Five Major Developing Countries*, Cambridge: Cambridge University Press.

Wang, S. Q., &Tiong, L. K. (2000). Case study of Government initiatives For PRC's BOT Power plant project. *International Journal of Project Management*, 18, 69–78 and *the Electricity Journal*. Vol. 14 (4), 19-24.

Westerveld, E., (2003).The project excellence model: linking success criteria and critical Success factors. *International Journal of Project Management,* 21, 411-18.

Whelton, M., Penneanen, A., & Ballard, G. (2004). *Knowledge Emergence andAdaptive Management*: An Exploration on the Co-Production of Project Needs and Requirements by Client-Specialist Groups 2004, USA: Idea Group Publishing 2004 (Pp.251-275).

World Bank (1993). "The World Bank's Role in the Electric Power Sector: Policies for Effective Institutional, Regulatory, and Financial Reform" Washington DC

World Bank (2002). "Public and Private Electricity provision as a barrier to Manufacturing competitiveness" World Bank Report No. 36483-NG, Nigeria, Competitiveness and Growth from http://www.worldbank.org/afr/ findings

Yates, D.J., & Hardcastle, C. (2002). The Causes of Conflict and Disputes in Construction; A Transaction Cost Economics Perspectives*. Journal of Financial Management of Property and Construction,* 7 (2), 115-126.

Yusuf J,Boyi J., &Muazu M. B. (2007). Regional Grid System Design Results for the Nigerian Electric Power System with the Aid of Neplan*. Nigeria Society of Engineers Technical Transactions Journal*, 42 (1), 18- 27.

APPENDICES

School of Postgraduate Studies,
Federal University of Technology
Owerri, Imo State.
25th February, 2012.

Dear Sir/Madam,

REQUEST FOR RESPONSE TO RESEARCH QUESTIONNAIRE

I am a master's degree student of the Federal University of Technology Owerri, Imo State.

I am through with my course work, but presently carrying out a research on Analysis of Environmental Constraints on Successful Delivery of Independent Power Projects in Nigeria.

I hereby solicit your objective answers to the questionnaire, in order to collect empirical data for this research, as your responds will guide me in the success of this academic work.

However, I would like to assure you that all information supplied would be used strictly for academic purpose.

Thanks for your co-operation.

Yours faithfully,

Ngerem Thomas Chinedu

QUESTIONNAIRE

Analysis of environmental constraints on Successful delivery of independent power projects in Nigeria.

Section A

Each of the following statements, indicate the extent to which you agree or disagree before and after the advent of information technology as it relates to your organization. In the 5-points scale provided, mark a cross (X) at the point that represents your feeling.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SD	D	N	A	SA

	ENVIRONMENTAL CONSTRAINTS	**SA**	**A**	**N**	**D**	**SD**
A	**COST AND FUND MISMANAGEMENT BY PUBLIC OFFICE HOLDERS**	**(COFMPOh)**				
1	There is mismanagement and cost padding during IPP contract bidding process by stakeholders and staff in the energy sector					
2	Fictitious loading IPP of production cost					
3	IPP operations and maintenance cost are exaggerated					
4	IPP materials and goods procured are over invoiced					
5	IPP subcontract various operations at inflated costs					
B	**INSECURITY ASSOCIATED WITH OUR ENVIRONMENT**	**(InsAwoE)**				
1	Insecurity associated with our business environment affects IPP delivery					
2	Insecurity affects commitment of resources, including funds					
3	Insecurity leads to Political instability which affect project team and IPP delivery					
4	Constant Political struggle and kidnapping resulting from insecurity affect contractors, host communities and state governments staff from executing IPP					
5	Political instability has no influence on IPPs life cycle					
C	**UNSKILLED LABOURAND POOR CAPACITY TRAINING**	**(UnskilledL)**				
1	There is no human capacity constraint in IPPs					

2	Available labour lack technical capability for successful project delivery					
3	Availability of skilled manpower is a challenge to IPPs					
4	Shortage of skilled labour slows down successful IPPs delivery					
5	Community attitude on the provision of unskilled labour limits successful delivery of IPPs in Nigeria					
D	**POOR MAINTENANCE CULTURE**	**(PoorMC)**				
1	Poor planned maintenance culture helps IPPs successful delivery					
2	Not having enough funds for maintenance spare parts and running cost hinders IPPs successful delivery					
3	Poor unplanned maintenance culture hinders IPPs successful delivery					
4	Careless monitoring of breakdown of IPPs equipment limits successful delivery of IPPs in Nigeria					
5	Non replacement of obsolete pieces equipment is a problem to successful delivery of IPPs					
E	**VANDALIZATION OF EQUIPMENT**	**(Vandalization)**				
1	Construction disputes leads to vandalization of IPPs equipment					
2	Communal crisis leads to vandalization of IPPs facilities					
3	Construction works vandalization of IPPs equipments delay successful delivery of IPPs					
4	IPPs equipment vandalization by thieves hinders successful delivery of IPPs					
5	Vandalization of equipment is a major problem in successful IPPs delivery					
F	**POOR ROAD NETWORK**	**(PoorRN)**				
1	Poor road network hampers successful delivery of IPPs in Nigeria					
2	Poor state of roads is a problem to successful delivery of IPPs in Nigeria					
3	Problem of transportation of equipment to IPPs site is a limitation to IPPs successful delivery					
4	Poor maintenance of road network constraints successful delivery of IPPs					
G	**DELAY IN ACQUIRING POWER PURCHASE AGREEMENT**	**(DelayPPA)**				
1	Delays in acquiring power purchase agreement (PPA) constraints successful delivery of IPPs					
2	Poor government procurement policy constraints IPPs successful project delivery					
3	Unrealistic power purchase agreement limits IPPs successful project delivery					
4	Improper/Low tariff and PPA is a problem to successful delivery of IPPs in Nigeria					
5	Perennially inadequate gas supply resulting from delay in PPA limits successful delivery of IPPs					
H	**DELAY IN ACQUIRING GAS PURCHASE AGREEMENT)**	**(DelayGPA**				
1	Delay in gas supply agreement hinders successful delivery of IPPs					
2	Inability of government to collaborate with oil multinationals on gas					

	supply agreement to IPPs impedes successful delivery of projects					
3	Procurement process resulting from gas purchase agreement retards IPPs successful project delivery					
4	Unfavourable gas pricing and purchase rules hinders successful delivery of IPPs					
5	Weak gas procurement agreement does not limit successful IPPs delivery					
I	**DELAY IN PROCURING AND CLEARING IPPS EQUIPMENT**	**(DelayCIPPsE)**				
1	Delay in clearing of imported IPPs equipment does not limit successful delivery of IPPs in Nigeria					
2	High transaction cost of clearing IPPs equipments hinders successful delivery of projects					
3	Bureaucratic bottlenecks at the ports delay the clearing of imported IPPs equipment					
4	Demurrage associated with delay in clearing imported equipment limits successful delivery of IPPs in Nigeria					
J	**UNFAVOURABLE REGULATORY POLICIES**	**(UnfavorableRPolices)**				
1	Government regulatory policies are favourablefor IPPs investors					
2	There is adequate protection and obligation for all parties involved in IPPs arrangements.					
3	The regulatory policies are not transparent and predictable					
4	Unfavourable regulatory policies have severe impact on successful IPPs delivery.					
K	**COST EFFECT OF POOR PHYSICAL TERRIAN IN MOST NIGER DELTA REGION**	**(CPPTMNDR)**				
1	Poor physical terrain limits successful IPPs delivery					
2	Erosion in Niger delta region affects successful delivery of IPPs					
3	Accelerates IPPs successful delivery					
4	Distorts speedy delivery of IPPs successful delivery					
5	Ecological problems in Niger Delta increases the speed of Successful IPPs delivery					
L	**LAND ACQUISITION PROBLEM**	**(LandAcQ)**				
1	Land acquisition problems has minor effect of successful IPPs delivery					
2	Land acquisition process hinders IPPs successful delivery					
3	Host community restiveness impedes speedy acquisition of land by IPPs					
4	Wrong sitting of IPPs resulting from land acquisition problem affects successful delivery IPPs in Nigeria					
M	**EFFECT OF COMMUNITY NORMS ON IPPs DELIVERY**	**(EFComNorm)**				
1	Claims for destroying social amenities have hindered IPPs delivery.					
2	Continuous fight with region due to native shrine destruction has affected citing IPPs.					
3	Non compensation for relocation of deity as customs has been a problem of delivering IPPs.					

4	They communalities believe that IPPs will affect their shrines position in certain areas.					
5	They communities negotiated heavily for shine shrine and deity relocation in the affected area, causing project delay of IPPs					
N	**PROBLEM ASSOCIATED WITH FUNDING**	**(ProblemAFound)**				
1	Traditional of source of IPPs finance has been constrained since financial crisis					
2	Unhealthy investment climate hinders investors from making large capital funding of IPPs					
3	Lack of strong and clear incentives, coupled with high regulatory uncertainty, result in under-funding of IPPs.					
4	There is a stable and competitive investment framework that sufficiently rewards adequate funding of IPPs in a timely manner.					
5	Low level of private funding of IPPs delays project delivery					
O	**DEMAND FOR SHORT TERM LOANS BY FINANCIAL INSTITUTIONS**	**(DemandSTLFI)**				
1	Restrictions on long term loans by financial institutions hinders successful IPPs delivery					
2	Fear of mismanagement of funds make financial institutions give only short term loans to IPPs					
3	Long gestation period associated with power generation limits successful delivery of IPPs in Nigeria					
4	Short term loans at high interest rate demanded from investors constraints successful delivery of IPPs in Nigeria					
P	**COMMUNITY RESTIVENESS**	**(CommunityR)**				
1	No effort to mitigate the adverse impact of IPPs projects on the communities					
2	IPPs are not attuned to the cultural, organizational and social environment of the host communities					
3	IPPs communities resistance to change limits IPPs successful delivery					
4	Constant Political struggle and instability among host communities affects IPPs					
5	Kidnapping and indigenous professionals in IPPs communities limits successful delivery of IPPs projects					
Q	**DELAY IN GRANTING PERMIT AND LICENCE**	**(DelayGPL)**				
1	There is no delays in licensing and approval for IPPs					
2	IPPs regulators pose a serious barrier					
3	Regulatory uncertainty granting permit affects, delays and deters investment decisions					
4	Weak institutional framework on granting permit and license limits successful delivery of IPPs					
R	**DEPENDENT ON FOREIGN EQUIPMENT AND IPPS MATERIALS**	**(DependentFEIPPM)**				
1	Dependence on foreign equipment and IPPs materials limits					

	successful project delivery					
2	IPP payment in local currency but equipment materials are in foreign currency hinders successful project delivery					
3	Inadequate local equipment and IPPs material limits successful delivery of IPPs					
4	Delay in the supply of foreign equipment and materials is a problem to successful delivery of IPPs in Nigeria					
S	**HIGH VAT RATE DUE TO OUR ENVIRONMENT**	**(HighVATR)**				
1	High VAT rate associated with our environment hinders successful delivery of IPPs in Nigeria					
2	High cost component associated with high VAT rate limits successful delivery of IPPs in Nigeria					
3	VAT relief policies do not constraint successful IPPs delivery					
4	High VAT rate scares investors and limits successful delivery of IPPs					
5	Most purchased equipment are secure on high VAT without incentive					
T	**DEPENDENT ON FOREIGN EXPERTRIATE FOR MAJOR INSTALLATION**	(**DependentF-MI)**				
1	Dependence on foreign expatriate for installation limits successful delivery of IPPs					
2	Lack of local experts for major installation does not impede successful IPPs successful delivery					
3	High cost of foreign expatriate for major installation is a problem to successful delivery of IPPs					
4	IPPs relies on expatriates talents because of poor training of local engineers, hence increases perceived uncertainties and block decision for successful IPPs delivery.					

S/N	**EFFECTS ON SUCCESSFUL DELIVERY OF INDEPENDENT POWER PROJECTS IN NIGERIA**	**VHE**	**HE**	**N**	**LE**	**VLE**
	SOCIAL CONSTRAINTS					
1	How do you rate the effect of instability on IPP delivery					
2	How do you rate the effect of poor training and unskilled labour on IPP Successful delivery					
3	How do you rate the effect of Poor maintenance culture on successful delivery of IPP					
4	How do you rate the effect of vandalism on IPP delivery					
5	How do you rate the effect of poor road network on successful delivery of IPP					
6	How do you rate the effect of community restiveness on successful delivery of IPP					
7	How do you rate the effect of community norm on IPP delivery					
	PROCUREMENT CONSTRAINTS					
8	How do you rate the effect of delay in acquiring GPA on delivery of IPP					
9	How do you rate the effect of delay in procuring and clearing imported IPP equipment on delivery of IPP					
10	How do you rate the effect of land acquisition problem on successful delivery of IPP					
11	How do you rate the effect of delays in acquiring PPA on successful delivery of IPP					
12	How do you rate the effect of delay in procuring permit and license on successful delivery of IPP					
13	How do you rate the effect of dependent on foreign equipment procurement on successful delivery of IPP					
14	How do you rate effect of dependent on foreign experts rate for major installation on successful delivery of IPP					
	FINANCIAL CONSTRAINTS					
15	How do you rate the effect of mismanagement of public fund by office holders					
16	How do you rate the effect of Unfavourable regulatory policies on successful delivery of IPP					
17	How do you rate the cost effect of poor physical terrain in most Niger delta/ southern region on IPP delivery					
18	How do you rate the effect of problem associated with funding on successful delivery of IPP					
19	How do you rate the effect of demand for short term loans by financial institution on IPP delivery					
20	How do rate the effect of high VAT rate associated with our environment on successful delivery of IPP					

Performance and Project cost of selected IPPs in Nigeria.

Project Name	**AES Power Plant**	**Okpai Power Plant**	**Afam VI Power Plant**	**Aba Power Plant**	**Azura Power Plant**	**Alaoji Power Plant**	**Omoku Power Plant**
Project Location	Lagos State	Delta State	Rivers state	Abia State	Edo State	Abia State	Rivers State
Initial project Sum (Million $)	200	312	390	406	895	902	132
Final Project Sum (Million $)	240	462	540	Over	Over	Over 1500	132
Project Awarded Time (Start)	1998	2003	2001	2008	2009	2010	1999
Initial Project Completion Date (Year)	2001	2003	2006	2013	2015	2012 Lag due to upgrade	2002
Actual Project Completion (Year)	2006	2005	2008	2019 Expected	2018 Expected	2015 Phase 5 and 6 Upgrade	2005
Initial Project date of Completion (lag Time) Year	3	0	4	7	6	2	3
Final Project (Lag Time) Year	5	2	2	6	3	3	3
Total Actual Project (Lag Time) Date of completion(Year)	8	2	6	13	9	5	6
Time Variation (Year)	5	2	2	6	3	3	3
Status of IPPs Project	Functional Project	Success/ Functional	Functional Project	Project Failed	Project Failed	Functional	Success/ Project
Project Sum Variation (Million $)	40	150	150	Over Cost	Over cost	Over Cost	0
% of Project Cost Variation	20%	48%	39%	Over	Over	Over	0%
% time Variation	166%	0%	50%	86%	50%	150%	0%
Level of Project Completion (%)	70%	100%	95%	24%	50%	100%	100%
Remarks (Constraints)	See Appendix V (A)						

Source: Field Data, 2017

Performance and Project cost of selected IPPs in Nigeria

S/N	**Project Title**	**Project Location**	**Final Contact Sum ($)**	**% of Plant performance**	**Constraints to Successful Delivery of IPPs (Remark)**
1	AES Power Plant	Lagos State	240	64%	Political and technical issues, non-transparent bidding (Corruption) and due to plant upgrade from 90MW to 560MW
2	Okpai Power Plant	Delta State	462	79%	Vandalism of IPPs gas line and equipment, Litigation due to failure in project execution, additional cost of $132 million due to upgrading of plant to 450MW, from 300MW, which is additional of 150MW
3	Afam VI Plant	Rivers State	540	81%	Vandalism, additional cost of IPPs plant from 270MW to Afam VI 630MW, Delayed PPA and GPA.
4	Aba Integrat e plant	Abia State	460	Not completed	Gas pipeline Vandals and dispute regarding Licensed area. Problem with transmission line distribution grid and design inconsistency
5	Azura Power Plant	Edo State	895	Not Completed	Insecurity, problem in signing PPA, high risk associated with environment and project financial closure due to high cost.
6	Alaoji Power Plant	Abia State	902	79%	Problem of PPA, GPA, Vandalism of plants, insecurity in the region, high cost associated with the environment and materials.
7	Omoku Plant	Rivers State	132	65%	Vandalism of gas pipeline, Insurgency and insecurity in the region, high cost of Plant and other associated materials and labours.

Source: Field data, 2017

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  /SCALE('ALL VARIABLES') ALL
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  /STATISTICS=ANOVA
  /SUMMARY=MEANS VARIANCE CORR.
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Reliability

Notes

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	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
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	Elapsed Time	00:00:00.00

[DataSet1]

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	20	100.0
	Excluded[a]	0	.0
	Total	20	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.797	.805	3

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance
Item Means	91.333	90.000	92.750	2.750	1.031	1.896
Item Variances	54.132	30.197	70.618	40.421	2.339	450.063
Inter-Item Correlations	.579	.438	.670	.231	1.528	.012

Summary Item Statistics

	N of Items
Item Means	3
Item Variances	3
Inter-Item Correlations	3

ANOVA

		Sum of Squares	df	Mean Square	F	Sig
Between People		2196.000	19	115.579		
Within People	Between Items	75.833	2	37.917	1.620	.211
	Residual	889.500	38	23.408		
	Total	965.333	40	24.133		
Total		3161.333	59	53.582		

Grand Mean = 91.333

SPSS for Windows

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GET
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/VARIABLES Corruption Politic UnskilledLPoorMVandaliztionPoorRN
CommunityRDelayGPADelayCIPPsEHighRAEPPTMNDRLandAcQUnfavourableRP
ProblemAFDemandSTLFIDelayPPADelayGPLDependentFEIPPsMHighVATR
DependentFERMI/MISSING LISTWISE /ANALYSIS Corruption Politic UnskilledL
PoorMVandaliztionPoorRNCommunityRDelayGPADelayCIPPsEHighRAE PPTMNDR
LandAcQUnfavourableRPProblemAFDemandSTLFIDelayPPADelayGPL
DependentFEIPPsMHighVATRDependentFERMI
/PRINT INITIAL CORRELATION SIG DET KMO EXTRACTION ROTATION FSCORE
/PLOT EIGEN ROTATION
/CRITERIA MINEIGEN (1) ITERATE (25)
/EXTRACTION PC
/CRITERIA ITERATE (25)
/ROTATION VARIMAX /SAVE REG (ALL) /METHOD=CORRELATION
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Factor Analysis

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KMO and Bartlett's Test

Kaiser-Mayer-Oklin Measure of sampling Adequacy	.925
Bartlett's Approx. Chi-Square of Sphericity	3486.320
Df	190
Sig.	0.00

Table 4.4 : Communalities

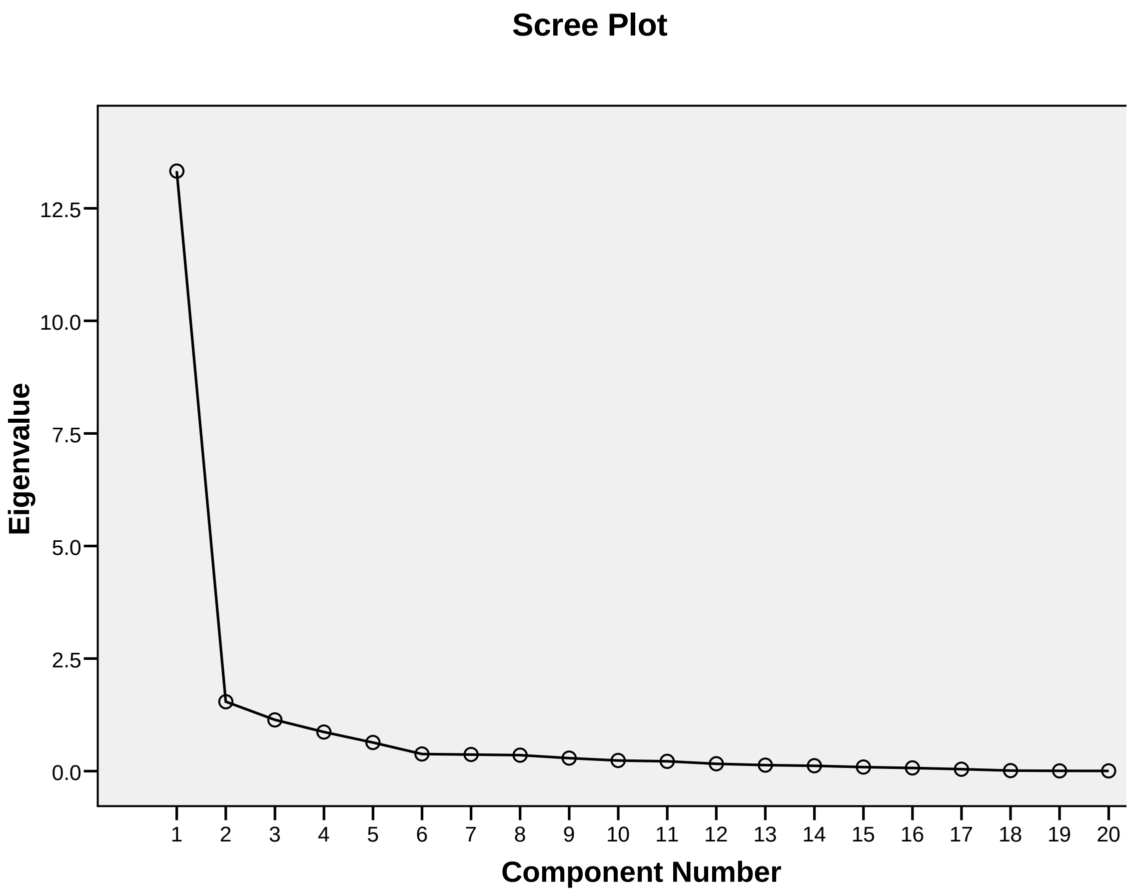
Environmental Constraints	Initial	Extraction
CoFMPoh	1.000	.971
InsAwoE	1.000	.622
UnSkilledL	1.000	.625
PoorMC	1.000	.502
Vandalization	1.000	.843
PoorRN	1.000	.665
DelayPPA	1.000	.939
DelayGPA	1.000	.732
DelayCIPPsE	1.000	.632
UnfavorableRpolices	1.000	.812
CPPTMNDR	1.000	.901
LandAcQ	1.000	.910
EFComNorms	1.000	.985
ProblemAFound	1.000	.886
DemandSTLFI	1.000	.978
CommunityR	1.000	.850
DelayInGPL	1.000	.823
DependentFEIPPsM	1.000	.861
HighVATR	1.000	766
DependentFERFMIn	1.000	.792

Extraction Method: Principal Component Analysis

Total Variance Explained

Component	Initial Eigen Values			Extraction Sums of Squared loadings			Rotation Sums of Squared Loadings		
	Total	% variance	% cumulative	Total	% Variance	% cumulative	Total	% variance	% cumulative
1	13.325	66.624	66.624	13.325	66.624	66.624	6.823	34.115	34.115
2	1.542	7.710	74.334	1.542	7.710	74.334	6.230	31.152	65.266
3	1.138	5.691	80.025	1.138	5.691	80.025	2.952	14.759	80.025
4	.868	4.342	84.367						
5	.636	3.181	87.548						
6	.381	1.903	89.451						
7	.368	1.841	91.292						
8	.354	1.771	93.063						
9	.289	1.447	94.510						
10	.236	1.181	95.691						
11	.218	1.089	96.780						
12	.164	.819	97.599						
13	.134	.670	98.269						
14	.119	.594	98.862						
15	.091	.454	99.317						
16	.071	.356	99.673						
17	.043	.215	99.888						
18	.013	.063	99.951						
19	.006	.029	99.980						
20	.004	.020	100.000						

Extraction Method: Principal Component Analysis.



Scree Plot
Eigenvalue
12.5
10.0
7.5
5.0
2.5
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Component Number

Component Matrix (a)

Environmental Constraints	Component		
	1	2	3
CoFMPoh	.976	.072	-.114
InsAwoE	.268	.540	.508
UnskilledL	.491	.140	.603
PoorMC	.467	.188	.499
VandIization	.503	.701	-.315
PoorRN	.812	.078	-0.08
DelayPPA	.962	.068	-.092
DelayGPA	.850	-.097	-.001
DelayCIPPsE	.792	.062	.001
UnfavorableRpolices	.818	.273	-.261
CPPTMNDR	.949	.028	.001
LandAcQ	.950	-.089	.009
EFComNorm	.991	.033	-.050
ProblemAFound	.939	-.060	-.003
DemandSTLFI	.982	-.119	.002
CommunityR	.742	-.537	.104
DelayGPL	.891	-.170	.027
DependentFEIPPsM	.773	-496	.129
HighVATR	.797	.090	-.184
DependentFERFMIn	.882	.021	-.116

Extraction Method: Principal Component Analysis.

b. 3 Component extracted.

Rotated Component Matrix (a)

Environmental Constraints	Component		
	1	2	3
CoFMPoh	.786	.555	.211
InsAwoE	-.071	.254	.744
UnskilledL	.331	.015	.718
PoorMC	.287	.093	.641
Vandalization	.053	.900	.172
PoorRN	.643	.430	.258
DelayPPA	.777	.534	.225
DelayGPA	.770	.316	.200
DelayCIPPsE	.636	.404	.254
UnfavorableRpolices	.547	.705	.126
CPPTMNDR	.785	.451	.284
LandAcQ	.849	.362	.241
EFComNorm	.819	.500	.254
ProblemAFound	.825	.385	.240
DemandSTLFI	.892	.358	.231
CommuntyR	.913	-.107	.071
DelayGPL	.842	.267	.205
DependentFEIPPsM	.917	-.076	.119
HighVATR	.627	.522	.108
DependentFERFMIn	.735	.475	.161

Extraction Method: Principal Component Analysis.
Rotation Method: varimax with Kasier Normalization.

a. Rotation Converged in 6 iterations

Component Transformation Matrix

Component	1	2	3
1	.844	.455	.285
2	-.536	.728	.427
3	-.014	-.513	.858

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with kasier Normalization.

Component Score Coefficient Matrix

Environmental Constraints	Component		
	1	2	3
CoFMPoh	.038	.119	-.045
InsAwoE	-.177	.035	.539
UnskilledL	-.025	-.189	.504
PoorMC	-.042	-.120	.438
Vandalization	-.208	.490	-.033
PoorRN	.024	.068	0.33
DelayPPA	.038	.106	-.030
DelayGPA	.088	-.0.17	-.009
DelayCIPPsE	.029	.056	.035
UnfavourableRpolices	-.040	.275	-.104
CPPTMNDR	.050	.045	.029
LandAcQ	.091	-.014	.002
EFComNorm	.052	.072	-.007
ProblemAFound	.080	0.05	.002
DemandSTLFI	.104	-.024	-.010
CommunityR	.233	-.275	-.055
DelayGPL	.115	-.062	-.008
DependentFEIPPsM	.220	-.266	-.024
HighVRate	.021	.153	-.097
DependentFERMT	.050	.092	-.062

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with kasier Normalization. Component scores

Component Score Covariance Matrix

Component	1	2	3
1	1.000	.000	.000
2	.000	1.000	.000
3	.000	.000	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with kasier Normalization. Component scores

REGRESSION

```
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT SDIPPs
/METHOD=ENTER FAC1_1 FAC2_1 FAC3_1 .
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Regression

[DataSet1] C:\Users\Mr Kizito\Desktop\factor for Thomas\tom ton.sav

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: SDIPPs

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986[a]	.971	.970	3.01986

a. Predictors: (Constant), REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37228.099	3	12409.366	1360.739	.000[a]
	Residual	1103.469	121	9.120		
	Total	38331.568	124			

a. Predictors: (Constant), REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

b. Dependent Variable: SDIPPs

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	56.384	.270		208.749	.000
	REGR factor score 1 for analysis 1	13.828	.271	.786	50.990	.000
	REGR factor score 2 for analysis 1	9.758	.271	.555	35.984	.000
	REGR factor score 3 for analysis 1	3.713	.271	.211	13.690	.000

a. Dependent Variable: SDIPPs

Data for Reliability Testing

s/n	1st Administration	2nd Administration	3r Administration
1	95	99	95
2	94	95	94
3	100	90	99
4	96	96	96
5	87	90	90
6	66	74	95
7	88	88	88
8	95	99	95
9	94	95	94
10	100	90	99
11	96	96	96
12	90	90	90
13	74	74	75
14	88	88	88
15	90	90	90
16	95	74	95
17	88	88	88
18	95	99	95
19	94	95	94
20	100	90	99

Primary Data for analysis

tngerem IPPs Data

S/N	SDIPPs	Politic	Unskild	PoorM	Vandli	PoorRN	Commu	DelayG	Delay	HighRAE	PPTMN	LandAc	Unfavour	Problem	Demand	DelaP	DelayG	Depend	HighVAT	DependF	Corrupti	FAC1_1	FAC2_1	FAC3_1
1	62	23	6	7	21	17	20	17	7	18	9	10	11	17	12	8	8	8	16	8	16	-0.95109	2.10138	-0.88109
2	62	16	20	16	17	11	10	12	15	10	20	11	12	15	20	15	19	14	11	11	11	0.44782	-0.74171	0.96417
3	29	11	12	14	8	5	7	8	11	5	7	8	7	8	8	4	8	4	12	7	12	-1.20865	-0.8428	-0.17087
4	69	5	20	20	10	19	15	20	24	13	15	20	15	20	20	18	20	18	18	15	18	2.04864	-1.1571	-0.08951
5	63	19	7	8	17	17	13	24	17	15	13	16	13	16	16	12	16	12	15	13	15	0.39142	0.89037	-1.00796
6	53	14	14	16	15	8	11	13	15	13	11	13	11	13	13	8	13	8	15	11	15	-0.47345	0.27202	0.06719
7	66	7	18	7	15	18	14	18	12	14	14	18	14	18	18	14	18	14	18	14	18	1.14973	0.07227	-1.31563
8	66	22	21	21	15	18	14	18	18	14	14	18	14	18	18	17	18	17	19	14	19	0.8534	-0.55148	1.76832
9	97	8	9	22	9	23	19	9	23	25	19	24	19	24	24	20	24	20	24	19	24	2.58474	0.3026	-1.25929
10	97	23	24	14	24	23	19	24	23	25	19	24	19	24	24	18	24	18	20	19	20	1.49136	1.53423	1.09044
11	43	19	17	16	18	9	9	10	13	11	9	10	9	10	10	7	10	7	10	9	10	-1.3234	0.13365	1.10953
12	44	15	10	12	19	10	8	9	10	14	8	9	8	9	9	7	9	7	10	8	10	-1.34648	0.66106	-0.44564
13	54	16	10	13	19	12	10	12	12	16	10	12	10	12	12	8	12	8	12	10	12	-0.84647	0.92474	-0.40468
14	40	12	13	11	11	10	8	10	24	10	8	10	8	10	10	9	10	9	13	8	13	-0.4964	-0.46921	-0.39847
15	77	17	20	8	15	7	15	20	17	19	15	20	15	20	20	19	20	19	18	15	18	1.50999	-0.2824	-0.28233
16	64	10	15	13	18	14	12	15	14	18	12	15	12	15	15	10	15	10	13	12	13	0.00987	0.71871	-0.64415
17	23	13	9	11	9	7	5	6	7	5	5	6	5	6	6	8	6	8	7	5	7	-1.22691	-1.39091	-0.46364
18	61	20	22	12	21	13	11	13	13	19	11	13	11	13	13	9	13	9	15	11	15	-0.8451	0.99467	0.95921
19	67	16	18	9	15	15	13	17	15	17	13	17	13	17	17	16	17	16	15	13	15	0.84635	-0.17134	-0.21947
20	54	14	12	12	18	12	10	12	12	16	10	12	10	12	12	8	12	8	11	10	11	-0.74422	0.72501	-0.4649
21	30	17	13	10	9	8	6	5	8	8	6	7	6	7	7	5	7	5	7	6	7	-1.55713	-0.82635	0.23406
22	30	9	6	10	10	8	6	7	12	8	6	7	6	7	7	7	7	7	11	6	11	-1.0131	-0.5677	-1.41212
S/N	SDIPPs	Politic	Unskild	PoorM	Vandli	PoorRN	Commu	DelayG	Delay	HighRAE	PPTMN	LandAc	Unfavour	Problem	Demand	DelaP	DelayG	Depend	HighVAT	DependF	Corrupti	FAC1_1	FAC2_1	FAC3_1
23	87	16	20	17	17	20	17	22	20	22	17	22	17	22	22	16	22	16	20	17	20	1.47465	0.69207	0.40749
24	49	15	15	15	9	15	11	14	15	9	11	14	11	14	14	13	14	13	13	11	13	0.39973	-1.16579	0.31401
25	54	21	17	13	16	12	10	12	12	16	10	12	10	12	12	7	12	7	11	10	11	-1.03144	0.47857	0.88635
26	32	7	20	16	12	13	8	9	24	5	8	9	8	9	9	7	9	7	12	8	12	-0.7181	-0.8535	0.46529
27	71	14	7	22	17	14	13	17	14	20	13	17	13	17	17	17	17	17	16	13	16	0.85333	0.18997	-0.51078
28	71	25	21	14	21	5	13	16	15	21	13	16	13	16	16	12	16	12	16	13	16	-0.33698	0.87813	1.31609
29	60	17	16	17	16	15	12	15	25	15	12	15	12	15	15	10	15	10	14	12	14	-0.09138	0.41912	0.68656
30	39	8	14	16	8	13	9	11	13	7	9	11	9	11	11	7	11	7	10	9	10	-0.38034	-1.01028	-0.14341
31	32	17	10	25	11	13	8	9	13	5	8	9	8	9	9	4	9	4	12	8	12	-1.4093	-0.48761	1.25803
32	50	19	16	10	7	11	10	14	11	11	10	14	10	14	14	15	14	15	13	10	13	0.4792	-1.5643	0.26626
33	54	9	13	8	12	6	10	13	21	15	10	13	10	13	13	12	13	12	11	10	11	0.23776	-0.37553	-1.2291
34	34	24	19	12	7	7	6	7	7	11	6	7	6	7	7	7	7	7	8	6	8	-1.54055	-1.30587	1.61393
35	60	12	15	12	17	16	12	14	16	16	12	14	12	14	14	8	14	8	13	12	13	-0.2799	0.84043	-0.40487
36	27	23	21	20	12	6	5	6	6	8	5	6	5	6	6	4	6	4	10	5	10	-2.24152	-0.96377	2.50756
37	69	19	12	21	10	19	15	20	19	13	15	20	15	20	20	19	20	19	19	15	19	1.68627	-0.92222	0.53299
38	83	18	20	17	19	22	17	21	22	20	17	21	17	21	21	13	21	13	19	17	19	0.94537	1.16645	0.759
39	30	12	9	13	8	7	6	8	7	7	6	8	6	8	8	9	8	9	8	6	8	-0.81218	-1.43441	-0.50431
40	56	8	15	18	18	17	12	14	17	13	12	14	12	14	14	7	14	7	14	12	14	-0.30903	0.75547	-0.19381
41	33	16	12	20	10	9	7	9	9	7	7	9	7	9	9	10	9	10	8	7	8	-0.82405	-1.48959	0.81754
42	47	17	11	15	20	12	9	10	12	14	9	10	9	10	10	5	10	5	12	9	12	-1.49817	1.10782	0.11506
43	53	11	17	12	10	14	11	14	14	12	11	14	11	14	14	12	14	12	12	11	12	0.37624	-0.84887	-0.21384
44	37	7	6	8	12	9	7	8	9	11	7	8	7	8	8	4	8	4	10	7	10	-1.18979	0.24295	-1.85264
45	43	11	12	11	7	11	9	12	11	9	9	12	9	12	12	10	12	10	10	9	10	-0.01227	-1.18792	-0.62808
S/N	SDIPPs	Politic	Unskild	PoorM	Vandli	PoorRN	Commu	DelayG	Delay	HighRAE	PPTMN	LandAc	Unfavour	Problem	Demand	DelaP	DelayG	Depend	HighVAT	DependF	Corrupti	FAC1_1	FAC2_1	FAC3_1
46	23	9	7	9	7	7	5	6	7	5	5	6	5	6	6	6	6	6	9	5	9	-1.17417	-1.17088	-1.25823
47	67	18	8	15	16	15	13	7	15	17	13	17	13	17	17	16	17	16	21	13	15	0.5915	0.42827	-0.62379
48	54	12	13	21	8	12	10	12	12	16	10	12	10	12	12	9	21	9	14	10	14	-0.0168	-0.6553	0.21713
49	67	24	17	14	12	15	13	17	15	17	13	17	13	17	17	13	17	23	18	13	24	0.86539	-0.6179	0.90042
50	72	9	21	21	10	21	16	21	21	13	16	21	16	21	21	19	21	19	19	16	19	2.15727	-1.20158	0.43406
51	70	19	15	17	20	18	14	8	18	18	14	17	14	17	17	10	17	10	17	14	5	-0.18693	1.31919	0.54672
52	43	25	7	23	7	11	9	12	11	9	9	22	9	12	12	12	12	12	10	9	10	-0.16646	-1.47298	1.35119
53	46	13	10	16	15	8	10	11	25	11	10	11	10	24	11	4	21	4	14	10	14	-0.5668	0.67335	-0.20506

54	59	14	17	16	8	17	13	17	17	11	13	17	13	17	17	15	17	15	15	13	24	1.09957	-1.2113	0.34509
55	50	12	20	14	17	13	10	9	13	13	10	12	10	22	12	21	12	10	14	10	14	0.24029	-0.69945	0.19574
56	71	12	5	23	16	14	13	17	14	20	13	17	13	17	17	14	17	14	15	13	15	0.65488	0.45751	-0.74742
57	40	10	11	18	10	10	8	10	10	10	8	10	8	10	10	10	10	8	11	8	11	-0.52857	-0.91468	-0.22716
58	67	21	14	24	16	16	13	23	16	18	13	16	13	16	16	13	16	13	15	13	24	0.24931	0.1812	1.2779
59	60	18	9	19	20	7	12	14	12	16	12	24	12	17	14	8	14	8	24	12	15	-0.40705	1.43116	-0.13007
60	59	19	18	21	5	18	13	16	18	12	13	16	13	16	16	13	16	13	17	13	17	0.71905	-1.21744	1.4212
61	83	8	8	22	20	22	17	21	22	20	17	21	17	21	21	17	21	17	18	17	18	1.65656	1.0166	-1.09556
62	60	15	11	15	22	17	12	13	17	17	12	13	12	13	13	6	13	6	15	12	24	-0.8829	1.8462	-0.28142
63	57	25	10	19	12	13	11	21	13	15	21	14	11	14	14	11	14	11	15	11	8	-0.05479	0.02896	1.05174
64	57	14	14	24	11	12	11	15	12	14	11	15	11	15	15	15	15	15	8	11	15	0.4985	-1.36331	0.82576
65	76	20	21	21	24	21	16	20	21	17	16	20	16	20	20	16	20	16	18	16	18	0.77505	0.83234	1.45604
66	60	12	13	14	17	16	12	14	16	16	12	14	12	14	14	8	14	8	14	12	8	-0.28209	0.90417	-0.45153
67	43	5	20	21	11	12	9	11	12	10	9	11	9	11	11	7	11	7	11	9	11	-0.49867	-0.8939	0.49374
68	30	6	9	7	5	7	6	8	7	7	6	8	6	8	8	10	8	10	9	6	10	-0.32767	-1.7018	-1.68503
69	74	18	15	17	19	16	14	18	16	20	14	18	14	18	18	17	18	17	18	14	18	0.82937	0.43545	0.20407

S/N	SDIPPs	Politic	Unskild	PoorM	Vandli	PoorRN	Commu	DelayG	Delay	HighRAE	PPTMN	LandAc	Unfavour	Problem	Demand	DelaP	DelayG	Depend	HighVAT	DependF	Corrupti	FAC1_1	FAC2_1	FAC3_1
70	87	20	21	19	23	21	17	21	21	23	17	21	17	21	21	17	21	17	22	17	22	1.08353	1.27127	0.99692
71	94	15	12	18	20	9	18	23	20	25	18	23	18	23	23	18	23	18	21	18	21	1.70967	1.17367	-0.68206
72	60	8	14	14	14	15	12	15	15	15	12	15	12	15	15	11	15	11	14	12	9	0.3719	0.08018	-0.78934
73	43	22	20	23	11	12	9	11	12	10	9	11	9	11	11	7	11	7	12	9	12	-1.08224	-0.7948	2.39039
74	40	7	12	8	5	9	8	25	9	9	8	11	8	7	14	12	24	12	7	8	20	0.78908	-2.05251	-1.31433
75	47	21	25	24	14	11	9	11	11	13	9	11	9	11	11	8	11	10	11	9	11	-1.03909	-0.8387	2.78296
76	63	14	14	17	18	18	13	15	18	16	13	15	13	15	15	11	15	21	16	13	16	0.56193	0.1544	-0.03201
77	77	24	22	19	22	19	15	18	19	21	15	18	15	18	18	13	18	13	17	15	17	0.12453	1.13268	1.78949
78	54	8	11	8	15	12	10	12	12	16	10	12	10	7	12	8	5	8	13	10	13	-0.61683	0.68741	-1.5627
79	47	13	11	10	12	10	9	12	10	12	9	12	9	12	12	10	12	10	10	9	10	-0.29949	-0.4588	-0.73573
80	20	7	8	8	6	5	4	5	5	5	4	5	4	5	5	8	5	8	5	4	5	-1.06007	-1.81785	-1.38501

81	54	25	21	17	22	13	10	11	13	17	10	11	10	11	11	6	11	6	13	10	13	-1.65735	1.13362	2.0015
82	63	8	17	21	18	17	13	16	17	15	13	16	13	16	16	13	16	13	14	13	14	0.51257	0.07308	0.09305
83	53	17	13	16	20	16	11	12	16	14	11	12	11	12	12	5	12	5	15	11	15	-1.14114	1.38434	0.33814
84	60	10	17	24	11	21	12	16	14	14	12	16	12	16	16	16	16	16	17	12	17	0.98079	-1.06437	0.54605
85	93	17	23	18	18	24	19	24	24	22	19	24	19	24	24	17	24	17	20	19	20	1.83742	0.80404	0.88082
86	30	6	6	14	12	8	6	7	8	8	6	7	6	7	7	7	7	7	10	6	10	-1.05888	-0.57466	-1.37356
87	83	18	21	17	19	22	17	21	22	20	17	21	17	21	21	14	21	14	18	17	18	1.03641	0.97045	0.86733
88	27	11	11	9	11	6	5	6	6	8	5	6	5	6	6	7	6	7	9	5	9	-1.35255	-0.87864	-0.77183
89	74	12	18	15	17	16	14	24	16	20	14	18	14	18	18	17	18	17	16	14	16	1.2111	0.0413	-0.23463
90	70	18	13	19	23	19	14	16	19	19	14	16	14	16	16	8	16	8	18	14	18	-0.42147	1.98411	0.39554
91	66	8	19	21	12	18	14	18	18	14	14	18	14	18	18	13	18	13	15	14	15	1.03351	-0.52239	0.31396
92	23	11	7	9	8	7	5	6	7	5	5	6	5	6	6	8	6	8	9	5	9	-1.08057	-1.30169	-1.09549
93	78	14	16	12	20	15	14	18	15	23	14	18	14	11	18	14	18	14	16	14	16	0.50307	1.03916	-0.55266

S/N	SDIPPs	Politic	Unskild	PoorM	Vandli	PoorRN	Commu	DelayG	Delay	HighRAE	PPTMN	LandAc	Unfavour	Problem	Demand	DelaP	DelayG	Depend	HighVAT	DependF	Corrupti	FAC1_1	FAC2_1	FAC3_1
94	40	8	12	8	9	10	8	10	10	10	8	10	8	10	10	20	8	10	12	8	12	0.2397	-1.48777	-1.38606
95	71	12	20	12	16	14	13	17	14	20	13	17	13	17	17	14	17	14	18	13	21	0.69001	0.26225	-0.27589
96	73	19	21	20	13	18	15	20	18	16	15	20	15	20	20	19	20	19	8	15	18	1.44298	-1.1893	1.51624
97	73	10	18	21	21	20	15	18	20	18	15	18	15	18	18	12	18	12	17	15	17	0.56427	1.00413	0.23908
98	53	7	14	13	15	15	11	13	15	13	11	13	11	13	13	11	13	11	12	11	12	0.11179	-0.07193	-0.85655
99	48	7	6	7	18	9	8	9	9	17	8	9	8	9	9	5	9	5	11	8	11	-1.1959	1.23169	-2.19695
100	50	11	13	10	21	12	10	21	12	12	10	13	10	13	13	13	13	13	22	10	12	0.06873	0.513	-1.1399
101	51	12	9	9	17	10	9	11	10	8	9	11	9	11	11	8	11	8	12	20	21	-0.57024	0.52456	-1.27216
102	47	13	14	11	18	8	9	12	17	12	9	12	9	12	12	12	21	12	9	9	12	-0.13209	-0.35371	-0.36421
103	57	8	15	17	16	13	11	14	13	15	11	14	11	14	14	14	14	14	13	11	17	0.37595	-0.37189	-0.45395
104	70	18	16	20	23	19	14	16	19	19	14	16	14	16	16	8	11	8	8	24	18	-0.48998	1.76971	0.87921
105	69	18	20	19	13	20	15	19	20	24	15	19	15	19	19	16	19	16	16	15	16	1.07813	0.00201	0.96829
106	47	13	8	12	18	12	9	10	12	14	9	10	9	10	10	5	10	5	7	9	21	-1.26502	0.89453	-0.74685
107	30	9	8	8	10	8	6	7	8	8	6	7	6	7	7	5	7	5	10	6	10	-1.23702	-0.43571	-1.35932
108	57	10	15	12	9	12	11	15	12	14	11	15	11	15	15	16	15	16	12	11	12	0.93654	-1.29895	-0.66977

109	50	5	9	16	19	14	10	11	14	21	10	11	10	11	11	6	11	6	21	10	5	-0.78001	1.70314	-1.59011
110	43	13	10	16	15	13	9	10	13	11	9	10	9	10	10	8	20	8	12	9	12	-0.59499	-0.04704	-0.25555
111	80	19	16	17	23	21	16	19	21	21	16	19	16	19	19	12	19	12	20	16	20	0.39295	1.84417	0.41906
112	64	8	6	10	11	13	12	16	13	17	12	16	12	16	16	17	16	17	17	22	17	1.3879	-0.13174	-2.37017
113	94	13	19	25	19	21	18	23	21	25	18	23	18	23	23	17	23	17	22	18	22	1.69359	0.95651	0.5617
114	57	12	9	11	10	12	11	12	21	14	11	15	11	15	15	16	15	16	8	11	14	0.84738	-0.96314	-1.01653
115	64	9	14	12	8	24	12	15	14	18	12	15	12	15	15	11	15	11	13	12	8	0.62468	-0.18045	-0.82367
116	36	17	8	14	14	12	8	9	12	8	8	9	8	9	9	7	9	7	12	8	12	-1.15099	-0.04122	-0.10705
S/N	SDIPPs	Politic	Unskild	PoorM	Vandli	PoorRN	Commu	DelayG	Delay	HighRAE	PPTMN	LandAc	Unfavour	Problem	Demand	DelaP	DelayG	Depend	HighVAT	DependF	Corrupti	FAC1_1	FAC2_1	FAC3_1
117	71	16	17	21	18	14	13	17	21	20	13	17	13	17	17	17	17	17	17	13	17	0.74964	0.05662	0.65202
118	90	16	17	19	21	23	18	22	23	23	18	22	18	22	22	16	22	16	20	24	20	1.4643	1.52312	0.15872
119	60	18	11	17	20	16	12	14	16	16	12	14	12	14	14	8	14	8	13	12	13	-0.62934	1.20297	0.23284
120	33	9	10	13	10	10	7	8	10	8	7	8	7	8	8	7	8	7	8	7	8	-0.91804	-0.81802	-0.6896
121	53	19	20	17	21	16	11	12	16	14	11	12	11	12	12	6	12	6	14	11	14	-1.19772	1.04244	1.35235
122	57	21	15	9	9	13	11	17	13	15	11	14	11	14	14	13	14	13	21	21	9	0.41491	-0.13983	-0.13522
123	47	15	8	14	19	12	9	10	12	21	9	10	9	10	10	5	10	5	12	9	12	-1.42092	1.51616	-0.62518
124	53	21	16	12	10	14	11	14	9	12	11	14	11	14	14	13	14	13	8	11	12	0.09628	-1.0683	0.744
125	44	13	20	15	7	9	8	9	10	14	8	9	8	9	9	6	9	8	10	8	10	-0.8657	-0.9983	0.72934