

Project Portfolio Management Practices in Nigeria's Construction Industry

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Abstract

Project Portfolio Management (PPM) is a combination of projects or a set of business practices that integrates projects under the sponsorship organizations. These require different approaches, strategies, models, and practices when managing projects and programs within the portfolio. In Nigeria, many organizations have projects, subsidiaries, and branches in many cities across the country. However, they fold, abandoned, temporarily suspended or close within a decade or two, which is worrisome. These are linked to their PPM practices. As such, the aim of this paper is to identify, assess and discuss the PPM practices in Nigeria's construction organizations with a view to examining the effects of such practices on the project portfolios. The research reviewed data from journals, conference/seminar/workshop papers, the internet etc. on the Project Portfolio Management (PPM) related fields and areas that help to identify, and narrow fourteen-PPM practices within the Nigerian and Global Context. These identified practices form the backbone of the research questionnaire, randomly administered to various professionals in Nigeria's construction industry. In the overall analyses, these fourteen-PPM practices are significantly effective in terms of good performances in PPM organizations in Nigeria's construction industry. These practices provide positive results on the overall PPM performances in achieving the organizational objectives in the portfolios.

Keywords: Construction industry; Organizations; Factors; Portfolio; Projects; Practices; Nigeria.



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1. Introduction

1.1. Background to the Study

Construction projects are the engine and catalyst for physical developments while adequate financing and funding are simply the fuel that drives and lubricates the engine (projects) into working effectively (Sadiq *et al.*, 2017). Nigeria as the most populous country in Africa harbors a long-term aspiration of being among the world's top 20 economies (African Development Bank Group, 2013). As a developing country, it needs to embark on various construction projects such as Residential, Office, Commercial and other buildings; Roads, bridges, Rail networks, Power generation projects etc., to makes its built environment viable for investments and business operations. The Public organizations (Government), the Private Organizations (Investors) or a partnership of both known generally as the clients normally initiate such projects. In some cases, many projects will be ongoing simultaneously and each has its own budget and duration while some may be similar while others are entirely different; all were to serve a business and or some specific organization's objectives. A collection of projects is a "Program" and largely a "portfolio" (Sadiq *et al.*, 2017).

Project Portfolio Management (PPM) can be referred to as: Combination of projects under the sponsorship of a particular organization sharing scarce resources (Archer and Ghasemzadeh, 1999a; Jonas *et al.*, 2012); a set of business practices that integrates projects with other business operations (Archer and Ghasemzadeh, 2004; Dammer and Gemünden, 2006; Levine, 2005); a dynamic decision making process whereby new projects are evaluated, selected, and prioritized; existing projects are accelerated, terminated, or de-prioritized; and resources are allocated and re-allocated to the active projects (Cooper *et al.*, 2000); Involves projects that are selected and managed in line with strategy and that resources are allocated to projects with the optimization of the entire portfolio in mind (Archer and Ghasemzadeh, 1999a;1999b; Artto and Dietrich, 2004; Artto *et al.*, 2004) A collection of projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives (Project Management Institute – PMI, 2017). Some organizations may employ the use of a project portfolio to effectively manage multiple

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programs and projects that are underway at any given time (Ibid). As such, various organizations adopt different approaches, strategies, models, and practices when managing projects and programs within a portfolio. These PPM practices will require a lot of finesse and expertise in handling challenges that different projects within a portfolio may pose.

1.2. The Research Problem

Despite the variety of instructions on how projects should be selected to the portfolio, how resources should be allocated to projects, how to align the entire portfolio with strategy, and how to assess the success of the portfolio, companies still struggle with the resource sharing problem across projects as well as constant changes in their portfolios (Elonen, 2003; Englund and Graham, 1999). It appears that the attention project portfolio managers give to portfolio activities is inadequate and working with multiple projects overloads the employees (Elonen, 2003; Zika-Viktorsson *et al.*, 2006). The alignment between project portfolios and customer relationship portfolios is a missing link which is implicitly reflected in the objectives of single projects because their results should satisfy a certain hierarchy of their needs and satisfaction (Martin, 2012). PPM can be understood as the hub of an intra-company system that connects projects and operations (Florice and Ibanescu, 2008). These require different decision situations and different decision-making approaches, which some authors asserted that combining decision-making approaches that were based on different logics might be difficult (Florice and Ibanescu, 2008) and it might lead to conflicts within the organization (Bessant *et al.*, 2011). In addition, the dilemma in resource sharing is poorly understood and hardly solved in project portfolios and is just one among others. Many other deviations from the companies' PPM frameworks appear in the day-to-day practice (Stilling and Eskerod, 2008).

In Nigeria, some organizations like the transportation companies, oil and Gas companies, Retail and Shopping Malls, Manufacturing companies, banking sector, insurance companies, bottling companies, project consultancy firms, bagging companies etc., do have subsidiaries and branches in many cities across the country, however they fold, get abandoned, temporary suspend or close within a decade or two which is worrisome (Sadiq *et al.*, 2017) These may be traced to PPM practices within such organizations.

Coupled with this are the defects within the Nigeria financial environment. Major identified problems include man-power problems, defective regulatory framework, capitalization problems, poor investment climate, and lack of professionalism (Nzotta, 2005). Evidence on the factors explaining project portfolio management performance is still limited and more research is needed to test all aspects of the frameworks. With the call for more evidence, recent research is also beginning to question some of the underlying assumptions, particularly associated with viewing project portfolio management as a rational decision process (Stilling and Eskerod, 2008).

1.3. Research Aim and Scope

The aim of this research paper is to identify, assess and discuss the PPM practices in Nigeria's construction organizations with a view to examining the effects of such practices on the project portfolios. The study only focuses on the construction projects within the Portfolios of various organizations, companies, firms, and enterprises in Nigeria. It does not include stocks portfolios in the aforementioned organizations, companies, firms, and enterprises.

1.4. Research Hypothesis

To address the research problem and fully achieve the research aim, the following Hypotheses were formulated and tested using the appropriate statistical tool:

Null Hypothesis - H_0 : Project Portfolio Management *Practices* used by PPM organizations in Nigeria's construction industry *are not* significantly effective.

Alternative Hypothesis - H_A : Project Portfolio Management *Practices* used by PPM organizations in Nigeria's construction industry *are* significantly effective.

2. Literature Review

2.1. Project Portfolio Management (PPM) and the Executing Organizations in Nigeria's Construction Industry

Nigeria is a West African country often referred to as the "Giant of Africa", owing to its large population of 184 million inhabitants which is the largest in Africa and 7th in the world; Size with a total area of 923,768 sq. km; and Economy with a gross domestic product (GDP) of \$377.6 billion and per capita GDP of \$2,400 (Library of Congress Federal Research Division, 2008; Peter, 1987; The CIA World Fact Book, 2014). Nigeria has abundant natural resources and ought to be one of the world leading economies but, unfortunately, Nigeria is still entrapped in a web of problems which hinders her growth (African Development Bank Group, 2013; Library of Congress Federal Research Division, 2008; Nigeria Becomes Africa's Largest Economy, 2014). The ADB report of 2013 also states that the Country harbors a long-term aspiration is to be among the top 20 economies in the global world by the year 2020 (Vision 20:2020). The primary objectives are to:

- i. Create an enabling environment for green and inclusive economic growth;
- ii. Diversify the Nigerian economy;
- iii. Create employment opportunities; and
- iv. Reduce poverty.

These lofty objectives can only be achieved and or realized through the requisite mega and multiple infrastructural development projects within Nigeria's built environment. These will make the built environment economically and investment viable in addition to the aforementioned resources (Sadiq *et al.*, 2017). Samuel *et al.* (2016), stated that construction industry is vital for the development of any nation. In many ways, the pace of the economic growth of any nation can be measured by the development of physical infrastructures, such as buildings, roads, etc. According to Project Management Institute – PMI (2017), Projects enable business value creation. These Business value in projects refers to the benefit that the results of a specific project provide to its stakeholders which may be tangible, intangible, or both (Project Management Institute – PMI, 2017).

At any given moment, the portfolio represents a view of its selected components and reflects the strategic goals of the organization; however, specific projects or programs within the portfolio are not necessarily interdependent or directly related. By reflecting investments made or planned by an organization, portfolio management includes the processes for identifying the organizational priorities, making investment decisions, and allocating resources. Therefore, the portfolio represents the work selected to be done, but not necessarily the work that should be done. If a portfolio's components are not aligned with its organizational strategy, the organization can reasonably question why the work is being undertaken. Therefore, a portfolio is a true measure of an organization's intent, direction, and progress. Portfolio management is also an opportunity for a governing body to make decisions that control or influence the direction of a group of components (a sub-portfolio, program, projects, or other work) as they work to achieve specific outcomes. An organization uses the tools and techniques described in this standard to identify, select, prioritize, govern, monitor, and report the contributions of the components to, and their relative alignment with, organizational objectives. It is not concerned with managing the components. The goal of portfolio management is to ensure that the organization is "doing the right work," rather than "doing work right." (Ibid)

Most Projects landscapes are becoming more complex. In addition to effective and efficient single project management, companies require structured and proactive management of the project landscape to stay competitive (Elonen, 2003). PPM is a set of business practices that integrates projects with other business operations and that includes key activities such as decision making on which projects are to be given priority, which projects are to be added to or abandoned /taken out of the portfolio, and how to allocate resources (Archer and Ghasemzadeh, 2004; Dammer and Gemünden, 2006). Among the key issues has been that projects are selected and managed in line with strategy and that resources are allocated to projects with the optimization of the entire portfolio in mind (Archer and Ghasemzadeh, 1999a;1999b; Artto and Dietrich, 2004; Artto *et al.*, 2004; Englund and Graham, 1999).

Project resource issue raises many viewpoints of PPM in practice. On the one hand, projects must share their resources and knowledge, to diffuse good practices and learn from each other (Nobeoka and Cusumano, 1995;1997). Such sharing can clearly benefit the entire portfolio as capability and technology synergies can be exploited and capacity use is minimized. On the other hand, however, projects should try and enhance their autonomy, to optimize their resource use in pursuing their own performance and business goals. Centering resources for a single project can also benefit the entire portfolio as project execution speed may be maximized and new products can be brought to market rapidly. Most of these start with the single projects which is an integral part of a portfolio of an organization (Martinsuo and Lehtonen, 2009).

As the number of projects increases, it is particularly important to guarantee effective and efficient execution of project portfolios. This remains a challenge despite the formalization of single projects, which facilitates faster process implementation and better process quality (Ahlemann *et al.*, 2009; Garcia, 2005). The consistency of processes facilitates the management of interdependencies between projects and the comparison of divergent projects (Cooper, 2008). PPM must deal with the coordination and control of multiple projects. As such, the Project portfolio managers pursue the same strategic goals and compete for the same resources, whereby managers prioritize among projects to achieve strategic benefits (Cooper *et al.*, 1997a). PPM has been developed into global standards as well as practical tool books that are expected to help companies organize and implement their own project portfolio management. Companies have adopted project portfolio management frameworks, including the use of project evaluation and decision criteria, project evaluation and control routines, and other means to formalize their project portfolio management (Benko and McFarlan, 2003; Cooper *et al.*, 2001; Martinsuo and Poskela, 2011; Müller *et al.*, 2008; Project Management Institute, 2008b; Teller *et al.*, 2012).

Holistic project portfolio management frameworks have been developed and indicate that project portfolio management could well be seen as an overarching system and approach for managing product development (Archer and Ghasemzadeh, 1999a; Benko and McFarlan, 2003; Cooper *et al.*, 2001; Dye and Pennypacker, 1999). The frameworks and models for project selection, resource allocation, and overall portfolio management portray project choices as a rational decision-making process, which definitely has its merits. Successful firms have been shown to have a systematic approach to their portfolio evaluation, decision making and resource allocations 2002, (Cooper *et al.*, 1997a;1997b; Fricke and Shenhar, 2000);, and some studies show clear positive associations between some systematic methods of project portfolio management and selected measures of performance (Artto *et al.*, 2004; Dammer and Gemünden, 2007; Fricke and Shenhar, 2000; Müller *et al.*, 2008).

2.2. PPM Theories and Practices in Organizations within the Construction industry

Theory and practice have to be developed concurrently, similarly to other science-based fields, where theory is explicated, tested and refined in a continuous dialogue between the scientific and practitioner communities". Reviewing these theories enables us to have a better understanding of Portfolio management (Pfm) and outline a framework which can be used to further develop the discipline of Pfm. The theories presented here were chosen due

to the many-to-many relationship with the components described in the definition of PfM by [Koskela and Howell \(2002\)](#); as cited and explained by [Enoch and Labuschagne \(2014\)](#). This relationship is explored here:

- Modern portfolio theory provides the financial investment management metaphor upon which PfM has been derived. It provides a way of looking at how investments are chosen based on objectives, the application of limited resources to these investment choices, and assessing the realization of benefits (ibid);
- Multi-criteria utility theory offers a means for evaluating portfolio components using multiple criteria. This informs the selection, categorization, and prioritization processes which are essential in PfM (ibid);
- Organizational theory refers to the whole organization and is relevant for PfM as it is practiced within the context of the organization. Understanding organization design, structures, relationships, and behavior of managers is necessary when designing solutions for problems that affect the organization (ibid);
- Systems theory is applied in understanding dynamic processes and is suitable for PfM, which is a dynamic management approach that considers the total organization and its multiple disciplines (ibid);
- Organizations are complex entities operating in complex business environments. Complexity theory helps us understand complex settings and enables us to successfully manage project portfolios and their components (ibid).

According to [Project Management Institute PMI \(2015\)](#), report, PPM executives are recognizing a link between the management of individual portfolios and an organization's success in achieving its strategic goals and objectives by using portfolio management to make better-informed decisions about how and where to best deploy resources. These involve PPM frame work/practices listed and briefly discussed below:

- *Connect project execution to strategy fulfillment*: A formal and disciplined portfolio management infrastructure—one that aligns projects and programs to an organization's strategic roadmap—is the way to yield better results in achieving business goals and objectives (ibid).
- *Seek simplicity*: The less complicated the approach to portfolio management, the more likely an organization can sustain its success. The adage, “simple is better” is appropriate when managing a portfolio. Organizations that excel in this area include the pieces of information they need, not everything available (ibid).
- *Create a portfolio-minded culture*: When portfolio management becomes part of an organization's DNA, senior leaders devote the time, education, and resources necessary to instill the practice into how everyone—from team members to executives—thinks, believes, and acts (ibid).
- *Develop strong capabilities*: Successful organizations cultivate competencies around specific portfolio management practices and portfolio decision-making capabilities in their journey to greater maturity (ibid).

Managing Portfolios requires an effective strategy that will ensure success, reduce risk and achievement of the organizational objectives. Portfolio Management Strategies refer to the approaches that are applied to the efficient portfolio management in order to generate the highest possible returns at lowest possible risks. These include Active Portfolio Management Strategy, Passive Portfolio Management Strategy, Patient Portfolio Management Strategy, Conservative Portfolio Management Strategy and Patient Portfolio Management Strategy ([Sushant, n.d.](#)).

[Sadiq et al. \(2017\)](#), identified, discussed and concluded that: Strategic Alignment; Resource Allocation; Single Projects' Performances; The PPM frameworks and models; Project Portfolio Tools and techniques; Organizational Culture, Adopted PPM Theory and practice as the major factors shaping PPM in Nigeria's built environment. These models include Portfolio, Programme, and Project Management Maturity Model (P3M3); while the PMI model in PMBOK (project management body of knowledge) is used for single projects. Other models include Projects in a controlled environment (PRINCE-2).

Organizations can only choose certain portfolios among a wide range of portfolios, which requires evaluation processes. The evaluation step is an enabler for the portfolio selection as it makes components comparable. Such tools and techniques for evaluation include but are not limited to General business criteria, Financial criteria, Risk-related criteria, Legal/regulatory compliance criteria, Human resources (HR)-related criteria, Marketing criteria, and Technical criteria ([Project Management Institute, 2008b;2013](#)). The portfolio management team also applies expert judgment to identify relationships between components that are under consideration. Such relationships may be independent components or components coupled together which include: Dependencies, Redundancies, Partial overlap, and Mutual exclusivity of components ([Project Management Institute –PMI, 2008a](#)).

According to [Adesina et al. \(2015\)](#), Average PPM performance is not strong, but some organizations employ highly effective PPM practices. PPM performance measures correlate strongly with new product success rates. These findings suggest that for better innovation outcomes, management should place a priority on developing and improving PPM processes. Strategic methods have the strongest positive influence on portfolio performance while financial methods correlate with positive performance on the only one-PPM measure and do not lead to higher value projects in the portfolio as expected.

Portfolios represent the organization's plans and operations within the business environment. The global environment comprises industries, markets, companies, clients, and competitors. Consequently, there exist corresponding analyses on the micro-level. Suppliers, customers, and competitors representing the microenvironment of a company are analyzed within the industry analysis ([Dillerup and Stoi, 2006](#)). This Environmental scanning helps a business improve their decision-making process in times of risk to the external and internal environments the business is in [Kroon \(1995\)](#).

The table below summarizes and outlined fourteen PPM practices identified from the literature above.

Table-1. PPM Practices

S/N	Project Portfolio Management Practices
1	Aligning Project portfolios to organizational objectives
2	Wise Portfolio Investment decision based on organizational resources
3	Use of effective PPM strategies
4	Effective and timely allocation of resources to portfolios
5	Adopting workable PPM theories into practices
6	Use of PPM evaluation criteria to select portfolios
7	Employing effective Tools and techniques in PPM
8	Connect PPM execution to strategy fulfillment
9	Simplifying PPM approaches and frameworks
10	Creating a portfolio-minded culture within the PPM team
11	Developing and enhancing strong PPM capabilities
12	Ensuring good performances of single projects within the portfolio
13	Scanning the Global Business Environment
14	Use of Expert judgment in PPM where necessary

Source: Authors from the literature reviewed

3. Research Methods

The research reviewed data from journals, conference/seminar/workshop papers, textbooks, newspapers, magazines and the internet etc. on the Project Portfolio Management (PPM), Organizations, Business and its Operations related areas which helps to identify and narrow fourteen PPM practices within the Nigerian and Global Context. These identified practices form the backbone of the research questionnaire which was structured using a 5-point Likert scale and randomly administered to various professionals working on projects within portfolios in Nigeria's construction industry. Also, the research data was structured, obtained and analyzed along the following:

- i. Robert and Daryle (1970) table of determining sample size for any given population to determine the research sample size which fixes 384 as the sample size of a maximum number for a given population of 1,000,000. As such, up to 740 number of questionnaires were distributed to enable the retrieval of the required sample number.
- ii. A 5-point Likert scale was used in obtaining and analyzing the fourteen-PPM practices based on the perceptions of various professionals working in the organizations' PPM teams.
- iii. Cronbach's Alpha was used to measure the reliability of the responses from the 5-point Likert scale. Mohsen and Reg (2011), concluded that Cronbach's Alpha is an important concept in the evaluation of assessments and questionnaires. It is mandatory that assessors and researchers should estimate this quantity to add validity and accuracy to the interpretation of their data. The table below shows the corresponding interpretation of the values for Cronbach's alpha.

Table-2. Cronbach's alpha Values and their corresponding Remark

Cronbach's Alpha Values	Internal Consistency Remark
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

- iv. The 5-point Likert scale enabled the computation of the Mean Item Score (MIS). The respective values of the mean item scores were used to pass remarks on the PPM practices analyzed using Excellent for all values between 4.5 to 5; Very Good for all values between 3.5 to 4.4; Good 2.5 to 3.4; Satisfactory for all values between 1.5 to 2.4 and Poor for all values between 0.5 – 1.4.
- v. Relative Importance Indices (RII) were used to rank the perceptions. The RII was computed for all the fourteen PPM practices assessed based on the 5-point Likert scale. The values for the RII allows for ranking of the fourteen PPM practices in terms performances.
- vi.

4. Data Presentation and Analyses

4.1. Research Response Rate, Data and Reliability Test

The responses from the research questionnaires that were distributed electronically and manually were shown in the table below.

Table-3. Electronically and Manually distributed Questionnaire Responses

Questionnaires	Distributed	Returned	Non-Returned	Percentage
Electronically distributed	400	211	189	54.1%
Manually distributed	340	178	162	45.9%
Total	740	389	351	100%

The table above clearly shows that 740 number of questionnaires were distributed, out of which 351 number (47%) were not returned; while 389 number (53%) were returned. Among the responsive 389 number of questionnaires, 211 number (54.1%) were responses from the electronically distributed questionnaires (E-Questionnaires) while 178 number (45.9%) were responses from the manually distributed questionnaires. As such, the response from E-Questionnaires was higher in this study.

The table below shows the research data on the fourteen-PPM practices based on the perceptions of various professionals working on projects within portfolios.

Table-4. Perceptions of various professionals on the fourteen-PPM practices

S/N	Performances of Project Portfolio Management Practices	Excellent = 5	Very Good = 4	Good = 3	Satisfactory = 2	Poor = 1	Total
1	Aligning Project portfolios to organizational objectives	88	119	168	9	5	389
2	Wise Portfolio Investment decision based on organizational resources	122	49	134	83	1	389
3	Use of effective PPM strategies	81	54	216	38	0	389
4	Effective and timely allocation of resources to portfolios	171	186	24	6	2	389
5	Adopting workable PPM theories into practices	163	137	59	30	0	389
6	Use of PPM evaluation criteria to select portfolios	78	169	140	1	1	389
7	Employing effective Tools and techniques in PPM	88	36	78	101	86	389
8	Connect PPM execution to strategy fulfilment	15	44	25	256	49	389
9	Simplifying PPM approaches and frameworks	181	162	29	11	6	389
10	Creating a portfolio-minded culture within the PPM team	13	44	201	85	46	389
11	Developing and enhancing strong PPM capabilities	60	14	178	135	2	389
12	Ensuring good performances of single projects within the portfolio	121	68	161	28	11	389
13	Scanning the Global Business Environment	48	115	49	129	48	389
14	Use of Expert judgment in PPM where necessary	87	101	128	29	44	389

From the data in table 4 above, Cronbach’s alpha was used to measure the reliability of the responses from the 5-point Likert scale. The computation and result are shown in table 5 below.

Table-5. Cronbach’s Alpha Reliability Test and Remarks

Questions & Their Scale Components	Cronbach's Alpha	Internal Consistency Remark
5-Points Scale	0.89	Good
4-Points Scale	0.87	Good
3-Points Scale	0.77	Acceptable
2-Points Scale	0.74	Acceptable
1-Point Scale	1.03	Excellent
Average	0.86	Good

These clearly indicate that there is a good internal consistency of scores from the Likert scale by the various respondents with both the 1-point scales having *Excellent* remark; the 5-points and 4-points scales having *Good* remarks; 3-points and 2-point scales having *Acceptable* remarks. As such, the average or overall reliability of for internal consistency of the responses analyzed in this study, regarding PPM practices is 0.86; which is deemed good and reliably consistent for the overall analysis.

4.2. PPM Practices and Their Respective Performances

The 5-point Likert scale enabled the computation of the Mean Item Score (MIS) for each of the PPM practices which allows passing a remarks using: Excellent for all values between 4.5 to 5; Very Good for all values between 3.5 to 4.4; Good 2.5 to 3.4; Satisfactory for all values between 1.5 to 2.4 and Poor for all values between 0.5 – 1.4. Relative Importance Indices (RII) were used to rank the perceptions. The RII was computed for all the fourteen PPM practices assessed based on the 5-point Likert scale. The values for the RII allows for ranking of the fourteen PPM

practices in terms performances. The table below shows the assessments and ranking of the fourteen-PPM practices from the table 4 above.

Table-6. Performances of various PPM Practices and their Ranking

S/N	Project Portfolio Management Practices	Mean Item Score	Remark	Relative Importance Index (RII)	Rank
1	Aligning Project portfolios to organizational objectives	3.71	Very Good	0.74	5th
2	Wise Portfolio Investment decision based on organizational resources	3.53	Very Good	0.71	7th
3	Use of effective PPM strategies	3.46	Good	0.69	8th
4	Effective and timely allocation of resources to portfolios	4.33	Very Good	0.87	1st
5	Adopting workable PPM theories into practices	4.11	Very Good	0.82	3rd
6	Use of PPM evaluation criteria to select portfolios	3.83	Very Good	0.77	4th
7	Employing effective Tools and techniques in PPM	2.84	Good	0.57	12th
8	Connect PPM execution to strategy fulfilment	2.28	Satisfactory	0.46	14th
9	Simplifying PPM approaches and frameworks	4.29	Very Good	0.86	2nd
10	Creating a portfolio-minded culture within the PPM team	2.72	Good	0.54	13th
11	Developing and enhancing strong PPM capabilities	2.99	Good	0.60	10th
12	Ensuring good performances of single projects within the portfolio	3.67	Very Good	0.73	6th
13	Scanning the Global Business Environment	2.96	Good	0.59	11th
14	Use of Expert judgment in PPM where necessary	3.41	Good	0.68	9th

Source: Authors, 2018 statistical computations

The following deductions were from the above statistical computations:

- i. Seven of the PPM practices have *Very Good* performances (representing 50%); Six of the PPM practices have *Good* performances (representing 43%); whereas only one of the 14-PPM practice has *Satisfactory* performance (representing 7%).
- ii. The PPM practices such as Effective and timely allocation of resources to portfolios (1st), Simplifying PPM approaches and frameworks (2nd), Adopting workable PPM theories into practices (3rd), Use of PPM evaluation criteria to select portfolios (4th), Aligning Project portfolios to organizational objectives (5th) were the top five PPM practices with the highest performances based on the ranking.
- iii. Ensuring good performances of single projects within the portfolio (6th), Wise Portfolio Investment decision based on organizational resources (7th), Use of effective PPM strategies (8th), Use of Expert judgment in PPM where necessary (9th) were the middle ranked PPM practices based on performances.
- iv. Developing and enhancing strong PPM capabilities (10th), Scanning the Global Business Environment (11th), Employing effective Tools and techniques in PPM (12th), creating a portfolio-minded culture within the PPM team (13th), Connect PPM execution to strategy fulfilment (14th) were the least ranked PPM practices based on performances.

These clearly indicate that PPM organizations Adopting workable PPM theories and apply them to full practice. These are normally done by simplifying such theoretical practices into practical approaches and frameworks that is practicable, workable, doable and well understood within the PPM team by taking into considerations the available resources of the organization that can be effectively and timely allocated and utilized into projects and programs within a portfolio. These limited resources play a vital role in the evaluation criteria to select portfolios that aligned to organizational objectives.

The selected portfolios were normally broken down into projects because of wise investment decisions and the available resources of the organization. These individual projects were planned and coordinated to ensure good performances, as they invariably affect the overall portfolio performances. Such will involve the use of Expert judgment in PPM where necessary to ensure results conform to organizational targets of the portfolio.

PPM organization developed and enhanced strong PPM capabilities by creating a portfolio-minded culture within the PPM team through training, staff development and or brainstorming sessions. These allow the PPM team to understand the task at hand, PPM requirements, targets, and practices that will connect the PPM execution to strategy fulfillment of the organization. These will also involve employing effective Tools and techniques in PPM

while Scanning the Global Business Environment, reporting to the PPM team and organizational top management cadre in a feedback/communication structured system that will enable timely decisions.

4.3. Testing the Research Hypothesis

The values of the mean item scores for all the questions structured using the Likert scales (in table 3 and 4) were used to calculate the T-test statistics and the result is shown in table 6 below.

Table-7. Testing the Research Hypotheses

Project Portfolio Management Practices	Mean	Standard Deviation	Standard Error	N	D F	Alpha (level of Significance)	P-value	Tcal	Ttab _{0.05, 13}	Significance
Fourteen outlined PPM Practices	3.44	0.61	0.16	14	13	0.05	0.0000	5.72	1.77	Yes

With 13 degrees of freedom (DF) and 5% level of significance, the T-test calculated (Tcal = 5.72) is greater than T-test tabulated (T-tab_{0.05, 13} = 1.77); the significance level (alpha = 0.05) is greater than the Probable value (P-value = 0.000). As such, the null hypothesis was rejected and the alternative hypothesis was accepted; which clearly states that the “Project Portfolio Management Practices used by PPM organizations in Nigeria’s construction industry are significantly effective”.

These clearly indicate that the 14 identified / outline, assessed and ranked PPM Practices used by various PPM organizations in Nigeria’s construction industry are effective and will perform significantly to organizations PPM as perceived by the professionals.

5. Discussion of Results

The analyses above clearly indicates that PPM organizations Adopting workable PPM theories and apply them to full practice. These are normally done by simplifying such theoretical practices into practical approaches and frameworks that is practicable, workable, doable and well understood within the PPM team by taking into considerations the available resources of the organization that can be effectively and timely allocated and utilized into projects and programs within a portfolio. These limited resources play a vital role in the evaluation criteria to select portfolios that aligned to organizational objectives.

The selected portfolios were normally broken down into projects because of wise investment decisions and the available resources of the organization. These individual projects were planned and coordinated to ensure good performances, as they invariably affect the overall portfolio performances. Such will involve the use of Expert judgment in PPM where necessary to ensure results conform to organizational targets of the portfolio.

PPM organization developed and enhanced strong PPM capabilities by creating a portfolio-minded culture within the PPM team through training, staff development and or brainstorming sessions. These allow the PPM team to understand the task at hand, PPM requirements, targets, and practices that will connect the PPM execution to strategy fulfillment of the organization. These will also involve employing effective Tools and techniques in PPM while Scanning the Global Business Environment reporting to the PPM team and organizational top management cadre in a feedback/communication structured system that will enable timely decisions.

The Research Hypotheses tested shows the fourteen-PPM practices that were identified, assessed, ranked and statistically tested were significantly effective in terms of good performances if used by various PPM organizations in Nigeria’s construction industry. Such PPM practices provide frameworks to plan and undertake portfolios that will align the PPM to organizational objectives within the organizational limited resources to its advantage based on the obtainable information from the dynamic business environment.

6. Summary, Conclusions and Recommendations

This research identifies fourteen-PPM practices Seven of the PPM practices have *Very Good* performances (representing 50%); Six of the PPM practices have *Good* performances (representing 43%); whereas only one of the fourteen PPM practice has a *Satisfactory* performance (representing 7%). PPM organizations Adopt workable PPM theories and apply them to full practice through the PPM team who uses the available resources to evaluate and to select portfolios that aligned to organizational objectives. These teams use Expert judgment in PPM where necessary to ensure results and all individual projects perform very well as they affect the overall portfolio performance. These include creating a portfolio-minded culture within the PPM team and employing effective Tools and techniques in PPM. The organizational objectives in a given portfolio also involve Scanning the Global Business Environment and reporting to the PPM team and organizational top management cadre in a feedback/communication structured system that will enable timely decisions. Such decisions are critical to organizational survival as they allow for prioritization of projects within a given portfolio.

In the overall analyses, these fourteen-PPM practices are significantly effective in terms of good performances in PPM organizations in Nigeria’s construction industry. If these practices were effectively employed and practiced they will provide positive results on the overall PPM performances in achieving the organizational objectives in the portfolios.

The following recommendations were proffered based on the research-limited scope:

- i. The impact of stakeholder’s on the organizational PPM practices and performances in Portfolio management in Nigeria’s construction industry.

- ii. Hindrances to effective PPM practices and performances in Nigeria's construction industry / built environment.
- iii. Effects of Expert Judgement in PPM planning, execution, and performances in a dynamic business environment of the construction industry.

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