

Evaluation of Perception of Stakeholders on Key Performance Indicators for U.B.E Building Projects

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Abstract—A project performance can be measured traditionally by three factors, which are co, time and quality. Researchers however argued that the measure of project success can no longer be restricted to the traditional indicators. Key performance indicators vary from project to project. Despite much work on the subject, there is no commonly agreed framework of performance measurement on projects. To bridge this gap, this research targets to investigate the perception of stakeholders on key performance indicators (KPIs) in the context of Universal Basic Education (U.B.E) building project in Niger state, Nigeria. The study explores key performance indicators in perspective of various stakeholders within (client, consultants, contractors, principal/teacher, parent, pupil/student and member of community) within U.B.E. Data for the study were sourced from a total of seventy (70) structured questionnaire administered to the stakeholders of the selected U.B.E primary school projects using the simple stratified sampling technique. The data collected were analyzed using the descriptive method comprising of the mean score and ranking methods. It was found out that the traditional measures of the iron triangle (on-time, under-budget and according to specifications) are most criteria for measuring delivery of projects, it also shows that project executed by U.B.E are delivered within time, on budget and quality. It also revealed that stakeholders are satisfied with the UBE building project.

Keywords: Perception, stakeholders, Key performance indicators, Universal Basic Education (U.B.E), Building projects.

1.0 Background of the study

Recent studies have indicated that project completion time as well as budget goals are not met or fail to satisfy the customers and company expectation. *Roxanne, Cheung and Turner (2012)* assert that in order to deliver good performance, it is crucial for the stakeholder in the building process to have a common understanding of the need and requirement of the end-users. Both side need to have a shared understanding of the desired outcomes. In other words industry professionals need to captivate, understand and define user and stakeholder needs before they start thinking about the solution. Construction project are becoming more and more complex and involving many stakeholders of different background and professional expertise.

The high failure rate of major project has been attributed to lack of attention to stakeholders (*Legris and Collette, 2006*). Consequently, negative attitude of stakeholder towards a project can cause cost overruns and time schedule, delays due to conflict over project design and implementation (*Olander and Landin 2005*). If the stakeholder is not satisfied the project may not be considered a complete success by the stakeholder group and possibly other stakeholder group as well.

Turner (2009) opined that the success of a project is judged by different stakeholder against different criteria. Some stakeholders such as the owner, consumer or operators are the recipients of the project output and hence their perceptions of project success are very important.

Roxanne, et-al (2012) study revealed the need for project manager to know what criteria is important to each stakeholder group. Not all stakeholders are

interested in the same project success criteria. For example *Bryde and Robinson (2005)* found that contractors put more emphasis on minimizing project cost and duration. While client put more focus on meeting stakeholders need. In addition, stakeholder analysis approaches are difficult to implement due to lack of clarity regarding how to identify stakeholder and determine their importance and how to identify stakeholders' expectations.

The truth is that stakeholder satisfaction is the acid test of value creation yet we have very little guidance let alone tools and technique to help us measure stakeholder appreciation. (*Bryde and Robinson, 2005*). A project performance can be measured traditionally by three factors, which are cost, time and quality. Researchers however argued that the measure of project success can no longer be restricted to the traditional indicators (*Low and Chuan, 2006*). They advocated that the expansion of success measurement towards project management success or product success or both. Other researchers have stated that key performance indicators (KPIs) are useful as a tool to investigate and manage changes in construction projects (*Low and Chuan 2006*).

This research is aimed at evaluating the perception of stakeholder's on key performance indicators for Selected Universal Basic Education (UBE) primary schools Building projects in zone B, Niger State. The specific objectives of the study are;

1. To identify common key performance indicators used by the stakeholders for UBE building projects.
2. To assess the perception of stakeholders on key performance indicators use in measuring project success.
3. To ascertain the level of stakeholder satisfaction with the completed UBE building project.

2.0 Project stakeholders in the construction industry

Any individual or group, inside or outside the construction project, that has a stake in, or can influence, the construction performance is known as a stakeholder. Stakeholders are known to be actively involved in the project, as their interest may be positively or negatively affected as a result of the project execution or project completion (*Legris and Colletette, 2006*).

Stakeholders are individuals organizations and groups who are influenced by the and / or have some power to influence the project which could be internal and external (*Cleand 1986*) and include for example the owner, consumer, operators, project executive, lead contractors, others contractors and public groups. Definition of project stakeholder is summarized in table 1;

2.1 key project performance indicators (KPIs)

Comparism of actual and estimated performance in terms of effectiveness, efficiency and quality of both

workmanship and product are measured using Key Performance Indicators, (*KPI Working Group, 2000*). KPIs are one of the factors that make up the project achievement criteria. They are supportive to compare the actual and estimated project performance in terms of efficacy, efficiency, the quality of workmanship and product. KPIs can be used to measure the performance of project operation and are usually used in construction industry (*Torbica and Stroh, 2001*). Moreover, performance measurement can be carried out by establishing KPIs which offers goal criteria to measure project success. Cost, time and project quality are the factors traditionally used to measure project performance (*KPI Working Group 2000*).

Table 1 Definition of project stakeholders.

Stakeholder Group	Definitions
1. Owner / sponsors	Are people or group who pay for the project.
2. Consumers	Are people or group of people who acquire the product and attain the benefit from the project outcome
3. Operator / End users	Are people who will exploit the product and or tune the project?
4. Project executives	Are senior manager from the owner or sponsors organization.
5. Legal contractor	Are people who design/ manage the project?
6. Other contractor/ supplier	Are people who provide goods / materials / works/ service used by the project?
7. Public stakeholders	Are people who about the project or product environmental, social, or economical impacts such as media.

Source: Cleand (1986)

Researcher argued that the measure of project accomplishment can no longer be limited to the conventional indicators. They advocated the extension of success measurement towards project management success or product success or both. Other research has stated that KPI is a useful tool to investigate and manage the change in construction project. Time is the extent for carrying out the project. It is scheduled to enable the building to be used by the client on a specific period. (*Hatush and Skitmore, 1997*). *Alarcon and Ashley (1996)* raised 'effectiveness' as a success criterion. They defined effectiveness as a measure of how well the project was implemented or the degree to which targeted time and cost from the start-up phase to full production were achieve. Timely completion of a construction project is frequently seen as a major criterion of project success by clients, contractors and consultants alike. The failure of the construction

industry to deliver projects on time has brought about universal criticism, (*Newcomord, and Fellows 1990*). *NEDO (1983)* states that disciplined management efforts are always needed to complete a construction project on time, and that this concerted management effort will help to control both costs and quality.

Another important measurement factor is cost. Cost is defined as the degree to which the general conditions promote the completion of a project within the estimated budget (*Bubashait and Almohawis, 1994*).

Kometa, Olomolaiye and Harris (1995) opined that there would be no point in undertaking a project if it does not fulfill its intended function at the end of the day. The value of functionality is thereby highlighted. This indicator correlates with expectations of project participation and can best be measured by the degree of conformance to all technical performance specifications (*Chan, Scott and Lam 2002*). Quality, technical performance, and functionality are closely related and are considered important to the owner, designer, and contractor (*Torbica and Stroh 2001*).

Ensuring that the completed projects meet the end users expectation and satisfaction is essential as the end Users are those who will actually work or live in the final products, they are the ones who spend most of time in the constructed facilities. *Liu and Walker (1998)* consider satisfaction an attribute of success. The project can be considered successfully completed in the long run if end-users are satisfied, *Torbica and Stroh (2001)*.

Participants' satisfaction has been promoted to be an important measure in the last decade. The client, design team leader and construction team leader are known to be the Key participants in a typical construction project. Their level of satisfaction can also be taken as an indicator of project success.

2.2 Type of KPIs

Key performance indicators (KPIs) are the indicators, which evaluate the performance of the building out of a chosen aspect. KPI are measureable and has a unit and can also be referred to as key success indicators (KSIs) (*KPI Working Group, 2000*).

Some of the more commonly used stakeholder metrics by (*Kerzner 2012*) include;

- i. Percentage of work package adhering to the schedule.
- ii. Percentage of work package adhering to the budget
- iii. Number of assigned funds in opposition to designed resources.
- iv. Percentage of actual against considered baseline completed to date
- v. Percentage of definite as opposed to planned best practice used.
- vi. Project complexity feature.
- vii. Client satisfaction ratings.

- viii. Number of critical assumption that have changed.
- ix. Number of price revision.
- x. Quantity of schedule revision.
- xi. Number of range modify review meeting.
- xii. Number of imperative constraints.
- xiii. Percent of job package with critical risk designation.
- xiv. Net operating margins.

KPIs are one of the factors that comprise the project accomplishment criteria (*Toor and ogunlana, 2010*). KPIs are supportive to evaluate the definite and vague project performance in terms of efficacy, competence, and eminence of workmanship and product (*cox and Ahems, 2003; Toor and ogunlana, 2010*). KPIs can be used to gauge the performance of project procedure and usually used in construction project. Moreover, performance measurement can be carried out by establishing KPIs which offer objective criteria to measure project success (*Toor and Ogunlana, 2010*).

It should be implicit that a given metric may be seen as KPIs by one stakeholder but recognised as just an ordinary metric and KPIs can vary between project and over the life cycle phases of a single project. This let stakeholders know early on in a project whether or not the project is fully staffed. If the project is not staffed properly, then there could be a noteworthy calendar work stoppage downstream. It is important to use this metric as early as possible in the project (*KPI Working Group, 2000*).

The UK working groups on Key Performance Indicators have identified 10 parameters for benchmarking projects in order to achieve a good performance as cited by (*Egan 1998*). These indicators are;

- i. Construction cost.
- ii. Construction time.
- iii. Defects.
- iv. Client contentment with the product and service.
- v. Prosperity and productivity.
- vi Encourage result orientated thoughts, whereas inevitability of design cost and time, and predictability of construction cost and time, and safety can be regarded as procedure orientated philosophy.

2.4 Perception of stakeholders on KPIS

According to *Cox, Issa and Aherns (2003)*, as construction is becoming more multifarious, a more sophisticated approach is necessary to deal with initiating, planning, financing, designing, approving, implementing and completing a project. The widespread assessment of the success of construction projects is that they are delivered on time, to budget, to technical specification and meet

client satisfaction (Chan, 1999).

According to Pinto and Slevin, (2001), stakeholders meet their requirements, individually and collectively when flourishing construction project performance is achieved. However, in order to convene their requirements and recurrent contribution, it is important for the stakeholders to address and differentiate the three orientation criteria that exist in the life cycle of a project: the 'procurement', the 'process' and the 'result' orientation. .

It is arguable that an objective measure such as timely delivery, within time, to the required specification tells us nothing about the primary success factor – stakeholder satisfaction and appreciation. Perhaps the best test of project success and the key sustainable business growth is client satisfaction.

There is no better or simpler way to measure value than to ask stakeholder (internal and external) how satisfied they are? The truth is that stakeholder satisfaction is the acid test of value creation yet we have little guidance let alone tools and techniques to help us measure stakeholder appreciation.

2.6 Importance of Stakeholder Satisfaction

Roxanne et al (2012) submitted that the high failure rate of major projects has been attributed to a lack of attention to stakeholder towards a project can cause cost overrun and time schedule delay due to conflict over project design and implementation (Olander & Landin, 2005). Some stakeholders such as the owners, consumers or operators are the recipient of the project outputs. Hence their perceptions of project success are very important if a stakeholder is not satisfied, the project may not be considered as complete success by that stakeholder group and possibly other stakeholders group as well. Other stakeholders who may not be the inclined recipient of the project output may also be affected by the project and have the power to influence the project, including for example external public stakeholder groups. Indeed, stakeholders who are affected by the project will react to alter the design and implementation of the project in ways that are more consistent with their interests (Boonstra, 2006). This includes stakeholder groups who might try to have the project limited or cancelled altogether.

Mitchell's stakeholder's salience framework proposes that the claims of stakeholders who have greater power, legitimacy and urgency will be given priority (Mitchell, Agle and Woods 1997). Hence, considerable project management effort is devoted to managing stakeholders (Peters and Randolph, 2009), which began with identifying stakeholders, determining what they want and predicting what they will do, which will be based upon their perception of

the project. A large part of rain process is based upon the project managers, understanding of the stakeholder's perception of the project success as it relates to the stakeholders group.

3.0 Research Methodology

The population for this research was the stakeholders who were involved in the UBE building project and this includes the client's representatives, consultant, contractor, parent, pupils, principal and members of the community. The study deals with stakeholders' perception on key performance indicators, the study focused on executed construction project by Universal Basic Education (UBE) for selected primary schools within the study area, generally from year 2007 to 2011. Niger state has twenty five (25) local government area divided into three (3) Federal constituency namely; zone A, zone B, and zone C, for the purpose of this research only zone B Federal constituency was studied and it consist of eight (8) LGA namely, Suleija, Paikoro, Chanchaga, Bosso, Rafi, Munya, Tafa and Shiroro.

Sample size of 120 questionnaires was administered in the course of this study to the stakeholder and 70 questionnaires were returned.

In order to obtain suitable and sufficient responses from the respondents, an amalgamation of fixed response and closed end type of questionnaire was arranged in such a way that the options of the respondents was obligatory on the subject of the research, stratified sampling method was employed for the local government areas in zone B. The collected data were analysed using a descriptive methods. This includes the mean item score was used to rank in order of importance key performance indicators.

4.0 Data presentation, analysis and discussion of results

Table 2 shows the frequency of project type executed between 2007 and 2011. The result revealed that construction of classroom have the highest frequency representing 62.9%, 58.6%, 51.4%, 57.1% and 37.1% for the year 2007, 2008, 2009, 2010 and 2011 respectively. However the frequency of renovation of classroom came second represented by 14.3%, 17.1%, 20%, 18.6% and 34.3% from 2007 – 2011. While, teacher/pupil furniture came third with percentage ranges between 7.1% - 17.1%. The other type of project such as borehole, electricity and VIP toilets percentage ranges between 1.4% - 5.7% for 2007 – 2011. It is worth to note that while the percentage of frequency was decreasing (62.9% - 37.5%) between 2007 - 2011 for construction of new classroom, the renovation of classroom was increased from 14.3% - 34.3%.

Table 2 Type of U.B.E project executed between 2007 - 2011.

Project Type	2007 no of project executed		2008 no of project executed		2009 no of project executed		2010 no of project executed		2011 no of project executed		Grand total	Grand %
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%		
Construction of new classroom	44	62.9	41	58.6	36	51.4	40	57.1	26	37.1	187	53.42
Renovation of classroom	10	14.3	12	17.1	14	20	13	18.6	24	34.3	73	20.86
Teacher/Pupil furniture	10	14.3	10	14.3	13	18.6	5	7.1	12	17.1	50	14.29
Borehole	2	2.9	3	4.3	1	1.4	1	1.4	2	2.9	9	2.57
Electricity	2	2.9	1	1.4	2	2.9	4	5.7	2	2.9	11	3.14
V.I.P	2	2.9	3	4.3	4	5.7	7	10	4	5.7	20	5.71
Total	70	100	70	100	70	100	70	100	70	100	350	99.99

Source: Author's field survey, 2012.

Table 3 Identifications of KPI used for U.B.E projects delivery by stakeholders.

KPIs	Frequency of Respondents			
	Agreed		Undecided	
	Total	%	Total	%
Time	68	97.14	2	2.8
Budget	51	72.85	19	27.14
Quality	51	72.85	19	27.14
Requirement	50	71.43	20	28.57
Efficiency	46	65.71	24	34.29
Effectiveness	47	67.14	23	32.86
Expectation	49	70	21	30

Source: Author's field survey, 2012

The study revealed that (97.14%) of the respondents identified time as one of the highest KPIs .While Budget, Quality, Meet users requirements and Expectations were identified by stakeholders with 72.85 72.35%, 71.43% and 70% respectively. The other KPIs identified were Efficiency (Users of resources) and Effectiveness (Doing the right thing) with 65.71% and 67.14% respectively.

However, 2.8% respondents were undecided about on time, while on budget, Quality, Requirements, Efficiency, Effectiveness and stakeholders' expectations were between the ranges of 27.1% to 34.29% of undecided respondents.

Ranking based on importance of KPIs for UBE building project on table 4 revealed that on time, on budget, quality, and conform to stakeholders expectations representing 61.4%, 78.6%.60%,and 62.9% were ranked most important KPIs. While meet users requirement (64.3%), Efficiency (52.9%), Effectiveness (68.6%) and minimized construction dispute and conflict (74.3%) were ranked second as

important KPIs.

Tables 5, 65.7% of the stakeholders agreed that time; cost and quality are always achieved under UBE projects. A lesser preponderance believes that time, quality and cost objectives are some time achieved with 34.3%. It seems likely that the stakeholders' responses are habituated by the responsibility they perceive themselves playing in attaining clients' objectives. Parent respondents are most positive about their capacity to always meet client objectives

Table 6 analyzed stakeholder's level of satisfaction on UBE projects executed between 2007-2011.The result showed that 95.7% of the total respondents were satisfied with construction of new classrooms and renovations, 92.9% with teacher/pupil furniture supplied. While Borehole (71.4%), electricity (68.6%) and VIP toilet (72.1%) were also satisfied by stakeholders. This implies that majority of the stakeholders were satisfied with UBE projects therefore it could be rated as a successful project.

Table 4 Ranking of key performance indicators in U.B.E Building projects

KPIs	Most important		Important		Least important		Freq
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Total
On Time	43	61.4	26	37.1	1	1.4	70
On Budget	55	78.6	15	21.4	0		70
Quality	42	60	27	38.6	1	1.4	70
Meet user requirement	22	31.4	45	64.3	3	4.3	70
Efficiency (use of resources)	31	44.3	37	52.9	2	2.9	70
Doing the right thing (effectiveness)	22	31.4	48	68.6	0	0	70
Conform to stakeholders expectations	44	62.9	25	35.7	1	1.4	70
Minimized construction aggravation, disputes, and conflicts	11	15.7	52	74.3	7	10	70

Source: Author's field survey, 2012.

Table 5 Shows the percentage of stakeholders in respect to time, quality and budget on UBE building projects

KPIs	Client representative	Consultant	Contractor	Principal /Teacher	Parent	Pupils /Student	Member of community	Total
Always	6	3	5	8	13	7	4	46
	13.0%	6.5%	10.9%	17.4%	28.3%	15.2%	8.7%	65.71%
Some time	4	4	2	1	4	2	7	24
	16.7%	16.7%	8.3%	4.2%	16.7%	8.3%	29.2%	34.29%
Total	10	7	7	9	17	9	11	70
	14.3%	10.0%	10.0%	12.9%	24.3%	12.9%	15.7%	100.00%

Source: Author's field survey, 2012.

Table 6 Analysis of stakeholder's level of satisfaction on UBE projects

Project Type	Satisfied		Dissatisfied		Freq
	Frequency	Percentage (%)	Frequency	Percentage (%)	Total
Construction of new classroom	67	95.7	3	4.3	70
Renovation of classroom	67	95.7	3	4.3	70
Teachers/Pupil furniture	65	92.9	5	7.1	70
Borehole	50	71.4	20	28.6	70
Electricity	48	68.6	22	31.4	70
VIP toilet	51	72.1	19	27.1	70

Source: Author's field survey, 2012.

Table 7 percentage of responses using KPIs on project success

Project success	Frequency	Percentage (%)
On budget	12	17.1
On time	28	40
Quality requirement	30	42.9
Total	70	100

Source: Author's field survey, 2012.

Table 7 shows that 42.9% of the total respondents agree that project success is majored with meeting quality standards and if this is achieved, project will be completed within client stipulated time and budget.

4.3 Discussion of findings

1. From the analysis carried out, seven (7) key performance indicators were identified as those performance tools used by stakeholders for UBE projects. It was found out that "on time", "Budget" and "Quality" meet the users requirement and expectation and are referred to as the major KPI while others are Efficiency and Effectiveness.

2. On assessing the perception of stakeholders on key performance indicators use as a measurement tool in assessing UBE project delivery. The result shows that on time percentage of response ranges between 10.3- 25 percent, from review of literature NEDO (1983) states that a closely controlled management endeavor is needed to complete a construction project on time, and that this intensive management effort will assist to manage both expenditure and quality, this is why there is a higher response to the factor of time. Budget and quality percentage of response ranges between 5.9- 25.5 percent, Alarcon and Ashley (1996)

3. Meet user requirement percentage of response ranged between 6-26 percent, efficiency ranges between 6.5- 25.3 percent, effectiveness ranges between 6.4-27.7 percent and expectation ranges between 6.1- 34.7 percent. Ensuring the complete projects meets the users' expectation and satisfaction is essential. Liu and Walker (1998) consider satisfaction an attribute of success. Alarcon and Ashley (1996) raised 'effectiveness' as a success criterion and efficiency are also important factors in measuring success of UBE project from the analysis carried out.

3. On the level of stakeholder's satisfaction on U.B.E building project delivery. The result from table 6 shows that 95.7 percent of the total respondents are satisfied with construction of new classroom and the highest, while 4.3 percent of the total respondents were unsatisfied with the construction of new classroom and renovation of classroom. Teacher/pupil

furniture was ranked second with 92.9 percent level of satisfaction and 7.1 percent unsatisfied. Borehole with 71.4 percent satisfied and 28.6 percent unsatisfied. Electricity was ranked the least with 68.6 percent and 31.4 percent unsatisfied. V.I.P toilets with 72.9 percent satisfied and 27.1 percent unsatisfaction.

5.0 Conclusion and Recommendations

From the analysis of data, the following conclusions were made:

On the identification of key performance indicators seven (7) major KPIs were identified but the major three used all the time for assessing the UBE project include "on time", "On budget", and "Quality", Others include meet user requirement, efficiency, effectiveness and meet user expectations.

On the perception of stakeholders on key performance indicators as measuring tool for project delivery. It was proven that on time of project has the highest rank and was identified as the most appropriate criteria adopted in stakeholder's perception of measurement performance.

On the level of stakeholder's satisfaction on completed U.B.E building projects. It was discovered that construction of new classroom and renovation of classroom were ranked as the highest level of stakeholder's satisfaction on U.B.E building projects delivery. Teacher/pupils furniture was ranked second and electricity to the communities was ranked the least.

Based on the findings and factors identified, the study recommends the following;

1. Stakeholders perception on key performance indicators as it relate to project delivery should be implemented by the construction industry in order to achieve conformance with their expectations, thereby helping the construction industry develop higher level of performances.
2. The construction industry should re examine the way they conduct their operations and become aware of the stakeholders perception on performance measurement and take them seriously for better organization management.
3. Performance measurement call for more all-inclusive and should include not only the quantitative and purpose criteria but also more prejudiced and qualitative criteria.

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