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An Assessment of Monitoring and Evaluation Processes in the Construction Industry in Bauchi State, Nigeria

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Abstract

The study aimed to assess monitoring and evaluation processes in the construction industry in Bauchi State, Nigeria. The objectives of the study were to identify the processes involved in the monitoring and evaluation of projects, assess the level of compliance with the identified processes, and determine the significance of monitoring and evaluation in the construction industry. To obtain a general overview of the subject matter, a total of 40 structured questionnaires were administered to various professionals to assess the monitoring and evaluation processes, of which 32 were successfully retrieved. The data collected were analysed using analysis of variance (ANOVA) and regression analysis as statistical tools. Based on the analysis of the respondents, completion and finishing points, daily inspection reports containing details of construction, initiation, monitoring and control systems, progress reports, planning, designing, and observation were identified as the most frequent processes of monitoring and evaluation in the construction industry. The empirical findings from the regression model and ANOVA test revealed that the monitoring and evaluation process has a positive impact on the construction industry, since the p-value is 0.019, which is less than the 5% (0.05) level of significance. This means that the variable (monitoring and evaluation process) has a positive impact on the construction industry. The regression model coefficient ($Y = 20.960 + 0.360X_1$) of the predictor (monitoring and evaluation process) and the dependent variable (construction industry) also indicates that the monitoring and evaluation process has a positive influence on the construction industry. The study concludes that the reason monitoring and evaluation is not achieving its desired results is due to inexperience within the management team.

Keywords: Monitoring, Evaluation, Professionals, Construction Industry, project.

Introduction

Project monitoring and control is one of the most important tasks of construction management. The Project team needs to be aware of how the project would be executed so that potential problems can be identified in a timely manner and corrective action can be taken when necessary. A successful project completion requires the combination effort of the project team to carry out the various

project activities, and it is the project team who are at the center of the project network. The project manager is responsible for organizing the whole construction process. They have to maintain project network and monitor against slippages in cost, time, and quality for the duration of the project. To achieve this, project manager has to undertake monitoring system that can provide timely solution to project problems (Bartle P. 2019).

Project monitoring and evaluation exercise adds value to the overall efficiency of project planning management and implementation by offering corrective action to the variances from the expected standard. Project team is required to undertake more rigorous monitoring and evaluation of project and develop framework and guideline for measuring impact (Kahilu, 2020).

(Arikawe, 2016) Monitoring performance evaluation and reporting; the quest for value for money in construction activities has brought monitoring and evaluation to the fore of development in construction industry. Within the construction, monitoring and evaluation provide a better means of learning from past experience, particularly as it relates to improving services delivery, as well as planning and allocation of resources. Public sector manager generally use monitoring and evaluation for two overt purpose that is management and accountability

(Lucian O. 2018), Building projects is the process of adding structure to real property. However, all building projects have some similar features such as estimate, design, finance and legal considerations. Money project of varying sizes has reached on undesirable end result, such as cost overrun, structural collapse e.t.c. those with experience in the field make detail plans and maintain careful oversight during the project to ensure positive outcome.

Statement of Problem

In the past, much attention was not paid to monitoring and evaluation in the development process in Nigeria.

Due to small or no attention being paid to project progress monitoring and evaluation, this has led to a large number of uncompleted and abandoned project, while for those that were eventually completed, the completion time became greatly lengthened resulting in cost overrun. The need to address this issue underlines the importance of project monitoring and evaluation in the construction industry. It was discover that the reason why monitoring and evaluation is not achieving its desire result is because of the inexperience from the management team. Ochieng et al (2020), this have become a problem by continue to raises serious issues as to whether the monitoring and evaluation employed is effective enough to achieve project success or the monitoring team perhaps may be lacking the necessary capacity or strength to carry out their work effectively or they may be approaching their work using incorrect method.

Aim and Objectives

The aim of the project is to assess monitoring and evaluation processes in construction industry in Bauchi.

Objectives

i. To identify the processes involve in monitoring and evaluation process.

ii. To assess the level of compliance with the processes identified.

iii. To determine the significance of monitoring and evaluation in the construction industry.

Research Questions:

i. What are the processes involve in monitoring and evaluation in the construction industry?

ii. What are the levels of compliance with the processes identified?

iii. How significance is monitoring and evaluation in the building project?

Methodology

The method adopted in this research work involved literature review from various journals, seminars papers, textbooks, magazine, internet. To get a general overview about the subject matter and to know the extent to which it has been tackled by other researchers, structural questionnaire was administered to professionals and data was collated and analyzed using coefficient variance (ANOVA) and Regression analysis as statistical tools, Conclusion was drawn based on the analyzed data.

Scope and Limitation

This project will cover an assessment of monitoring and evaluation process in construction industry in Bauchi which includes quantity surveying firms, architectural firms and engineering firms within the Bauchi metropolis.

It is directed toward identifying an assessment of monitoring and evaluation process in construction industry in Bauchi.

Monitoring

According to Bartle P. (2019) monitoring is a regular observation and recording of activities taking place in a project or programmed. It is a process of routinely gathering information on all aspect of the project. To monitor is to check on how project activities are progressing. It is observation systematic and purposeful observation. Monitoring also involves giving feedback about the progress of the project to the donor's implementators and beneficiaries of the project.

Purpose of Monitoring:

Monitoring is very important in project planning and implementation. Monitoring provides information that will be useful in

i. Analyzing the situation of the project.

ii. Determining whether the inputs in the project are well utilized.

iii. Identifying the problems facing the project and finding the solution.

iv. Ensuring all the activities are carry out properly by the right people and in time.

v. Using lessons from one project experience on to another.

vi. Determining whether the way the project was planned is the most appropriate way of solving the problem.

Types of Monitoring:

The main types of monitoring are as follow:

i. Result Monitoring: This tracks effects and impacts. This is where monitoring and evaluation merge to determine if the project is not target towards it intended report (output, outcomes, impact) and whether there may be any unintended impact (positive or negative).

ii. **Process Activities Monitoring:** This tracts the use of input and resources, the progress of activities and delivery of output. It examines how activities are delivery, the efficiency in time and resources. It is often conducted in conjunction with compliance monitoring and feeds into the evaluation of impact.

iii. **Compliance Monitoring:** Ensures the compliance with the client regulations and expected result, grant and contract requirements, local government regulation and laws, ethical standards.
iv. Context (Situation) Monitoring: Track the settings in which the project operates, most especially as it affects identified risks and assumptions, but also any unexpected consideration that may arise. It includes the field as well as the large political, institutional, funding and policy context that affect the project.
v. Beneficiary Monitoring: This tracks beneficiary perception of a project, it include beneficiary satisfaction, or compliant with the project includes their participation, treatment, access to resources and their overall experience of change, it is sometimes referred to as beneficiary contact monitoring. It often includes stakeholders compliant and feedback mechanism.
vi. Financial Monitoring: This accounts for cost by input activity within predefined category of expenditure.
vii. Organizational Monitoring: This track the suitability institutional development and capacity building in the project and with its partners. It is often done in conjunction with the monitoring processes of the larger implementation organization.

Benefit of Project Monitoring:
Lawal and Onohachi (2020) opined that monitoring of projects by relevant bodies is essential and of greatest benefit because of the improved insight they provider concerning project completion status. The best laid project can go awry if not properly monitored.
Through proper monitoring, delays can be readily identified; periodic report that is made is also very helpful. There must be professionally qualified personnel appointed to monitor the progress of the project.
Monitoring may be done by the following project consultant who monitor and sign certificates of performance as well as certificates of completion, such certificate provide the basis for payment.
Project completion/commissioning stage before accepting the project as completed, there must be test running to ensure effective performance asper agreement. There must also be appropriate guarantees and performance agreement in place.

Evaluation:
Evaluation is the process of judging value on what project or program has achieve particularly in relation to activities planned overall objective or a process of determining the worth or significance of an activity or policy or program.

Purpose of Evaluation:
Evaluation is very important in the following
i. To demonstrate the program effectiveness.
ii. To improve the implementation and effectiveness of programs.
iii. Better management resources.
iv. Documentation of program accomplishment.
v. Justify current program funding.
vi. Satisfy ethical responsibility to client to demonstrate positive and negative effect of program participation.
vii. Document program development and activities to help ensure successful replication.

Types of Evaluation:

According to Robin Puett (2019) state the various type of evaluation as follows;

i. Context Evaluation: Investigating how the program operates or will operates in a particular social, political, physical and economic environment. This type of evaluation could include a community need or organizational assessment.

ii. Formative Evaluation: Assessing need that a new program should fulfill, examining the early stages of project or program development or testing a program on a small scale before broad dissemination.

iii. Process Evaluation: Examining the implementation and operation of program components.

iv. Impact Evaluation: Investigating the magnitude of both positive and negative change produced by a program. Some evaluators limit these changes to these occurring immediately.

v. Outcome Evaluation: Assessing the short and long term result of a program.

Process of Evaluation:

Evaluation of construction project is very necessary and important in every stage of the construction. Omission of any of the stages could be detriment to the general assessment of the project. It is necessary that evaluation should be done before, during and after implementation.

i. Before Project Implementation: Evaluation is needed in other to make a final decision on what project alternative should be implemented, assist in making decision on how the project will be implemented.

ii. During Project Implementation: Evaluation should be a continues process and should take place in all project implementation activities. This enable the project team to progressively review the project strategies according to the changing circumstances in order to attain the desire activity and project objectives.

iii. After Project Implementation: This is to retrace the project planning and implementation process, and result after implementation.

Evaluation Life Cycle:

i. Preparing: Evaluation is first of all setting its aim and purpose, why is the evaluation necessary? Who need it? Who should involve in doing it?

ii. Designing: Once the purpose of evaluation is clear, there is a need to define its objectives, namely what is going to be evaluate (the use of resources, educational method, the result, the impact) these objective will determine the indicators or criteria (qualitative or quantitative) and when evaluation should start.

iii. Collecting Information: The indicators or criteria established, the next process is actually getting the information (data) needed, (how many people participated, what did they learned, what did they do afterwards). The criteria and objective will determine the way of collecting the information (written record, interview during or after).

iv. Interpreting the Information: What was the data and information we possess mean? The interpretations, like the stages that follow reflect the most difficult challenge in the evaluation.

v. Assessing and Conclusion: The assessment is actually the process of drawing relevant conclusion out of the information acquired. Highly the result can put them into perspective with the original aims and objective of the project.

vi. Implementation Result: All the information and the conclusion drawing from it are, in a way, meaningless if nothing is done with them. The function of evaluation toward social change is lost if there is no desire to change, to admit the result of evaluation.

Benefit of Evaluation:

i. It forces the project team to plan carefully and study how the various part fit into the whole project.

ii. It gives the project team a tool for predicting the impact of schedule changes and be prepared to correct such situations. Bottleneck and potential trouble spots are discovered early enough so as to apply some preventive measures or corrective action.

iii. A large amount of data can be presented in a highly ordered fashion. The task relationship is graphically represented for earlier evaluation individuals in different locations can easily determine their role in the total task requirement.

iv. It result in improved communications, the network provide a common ground for various involved parties such a designer, contractors, project managers and they understand each other's role and contribution.

v. The network will be highly areas that require attention of higher priority so that concentration can be applied to the key work without ignoring the lower priority tasks; this gives the management an opportunity to shift attention to any critical task so that the entire project is completed in time.

vi. It can suitably be used for project such as the establishment of a new department, the introduction of a new product, the conduct of research and developments, the assembling of a large piece of machinery.

Conceptual Framework

Conceptual framework shows the relationship between the independent variable and dependent variable, dependent variable is the variable to be studied while independent variable is the variable that shows how this dependent variables influence the study.

This is illustrated in figure 1

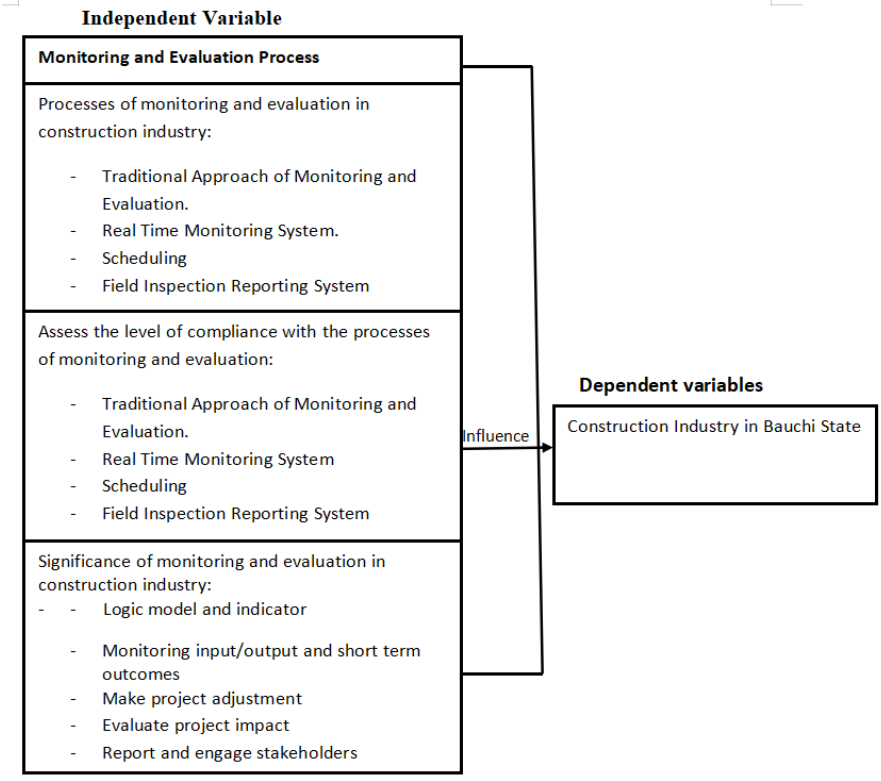


Figure 1

Processes of Monitoring and Evaluation in Construction Industry

Traditional Approach of Monitoring and Evaluation:

Collins and Retic (2016) described the traditional approach for determining the amount of progress by comparing the contractors planned schedule with as built schedule that has substituted actual completion data for all the activities.

Harris and McCaffor (2015) described monitoring as the act of actual progress and actual resource usage against planned and the act of taking the decision to alter the likely future outcome and bring the project back on the planed schedule is control.

Traditional construction management system provides a project team with the various reports such as progress, control, earned value management and resource management. Project team spends most of their time for developing and updating of these reports instead of the execution and to take in time decision to finish the work within the prescribed time scale. The successful project completion require the concerted effort of the project team to carry out the project activities and it is the project team who at the center of the project network is responsible for orchestrating the whole construction process. The project team has to maintain the project network and monitor against slippages in cost, time and quality for the duration of project. In achieving this; the project team relies heavily on a reliable monitoring system that can provide timely signaling of project problems whether they are real or potential.

Processes Involve in Traditional Approach of Monitoring and Evaluation:

a. Initiation: The initiating process determines the nature and scope of the project. If this stage is not performed well, it is unlikely that the project will be successful in meeting the needs. The key project controls needed here are an understanding of the project environment and make sure that all necessary controls are incorporated in to the project. Any deficiency should be reported and a recommendation should be made to fix them.

b. Planning and Design: After the initiation stage, the project is planned and design to an appropriate level of detail. The main purpose is to plan time, activities, cost and resources adequately estimate the work needed and to effectively monitor risk during execution and construction of the project. As with the initiation process group, a failure to adequately plan and design greatly reduces the project chances of successfully accomplishing its goals.

c. Execution and Construction: The stage ensures that the project monitoring team plans deliverables are executed and constructed accordingly. This stage involves proper allocation, co-ordination and monitoring resources such as material, labour, equipment, time and budgets. The output of this stage is the project deliverables.

d. Monitoring and Controlling System: This process consists of those processes performed to observe project execution and construction so that potential problems can be identified in a timely manner and corrective action can be taken, when necessary, to control the execution and construction of the project. The key benefit is that project performance is observed and measured regularly to identify variances from the project monitoring plan.

e. Completion and Finish Point: This process includes the formal acceptance of the project and the ending thereof. Administrative activities include the archiving of the files and documenting all the activities involve in the entire monitoring and evaluation process

Real Time Monitoring System:

Real time monitoring system seeks to assess how well the project adheres to the planned schedule over a period of time.

Real time monitoring is of special interest in construction to provide pertinent feedback of engineered system performance. Real time monitoring offer exciting opportunities to optimize design and to reduce construction cost using the observational method. In the observational method, monitoring play a very achieve role in both design and the construction phase.

The method requires frequent design and/or construction modification that involve all parties (client can produce project cost saving without compromising safety on adoptive management plan combined with advanced measurement techniques and real time monitoring are the most in carrying out any construction project.

Real time monitoring system can also be used for other type of data acquisition construction vibration monitoring. Project team needed to detect any setback in advance, as it gives them the chance to take prompt action to minimize their impact.

Processes Involve in Real Time Monitoring System:

a. Observational: This process consists on using the data from the monitoring system to adjust real time monitoring operations in construction industry. Data is used for safety purposes in the real time monitoring system in the construction industry to optimize the operations. To use this approach, not only settlement data has to be accurate and processed in real time monitoring system but a direct connection has to be established between the monitoring and evaluation team in construction industry.

The observational process is used for compensation where the real time monitoring system is observed in the construction industry to control the operations and ensure the safety of this operation in the construction industry.

b. Monitoring and Control: This is to improve monitoring and evaluation in the construction industries by the application of different techniques to the monitoring and control of an aspect of the construction process. The system to be developed will address the specific characteristics of the construction industry, i.e. 'one of a kind'' construction, complexity, parallel design, procurement and construction, dependency on the large number of contractors and subcontractors, and construction industry remote form.

c. Data Acquisition: The construction industry can improve current project information management practice with the aid of data acquisition system and building information modeling to increase the industries dropping monitoring rates (Teicholz et al 2022) and reduce the waste of resources. In addition, it provides a roadmap for research in the area of construction and includes a discussion on how this area of research could be applied to our construction industry and what the potential benefits would be in the real time monitoring system.

Scheduling:

Most construction project employ scheduling method to monitor and control the progress of work and develop progress report which involves the recording of construction achievement for detection of deviations from actual plan and for forecasting project performance. The primary control system claims in construction industry is construction schedule. The current practice of project control is entirely develops on cost, schedule and quality reports and personal performance reviews. There are variety of ways in which a construction schedule include Gantt chart, activity on the arrow, precedence network and line of balance, Bar chart are powerful communication tools and can be extremely useful, visual and graphical medium in construction scheduling.

The preliminary construction schedule, based on the understanding of the project at that time, the schedule should contain milestone dates established for the construction contractor after award of

construction contract, the contractor will submit detail construction schedule which in some cases, will be updated monthly.
Modification to milestone dates should be included in the monthly construction progress report. The construction schedule should be presented in either tabular or graphical form.

Tools Used in Construction Scheduling in Monitoring and Evaluation:
i. Gantt Chart: Gantt chart are excellent models for scheduling and for budgeting and for reporting and presenting and communicating project plans and progress easily and quickly, you can construct a Gantt chart using MS excel or a similar spreadsheet. Every activity has a separate line, create a time-line for the duration of the project. You can color code the time blocks to denote the type of activity (for example, intense watching brief, directly managed,) you can schedule review and insert break point at the end of each line you can show as many cost columns for the activities as you need.
ii. Line of Balance: Also referred to elemental trend analysis, is a project planning techniques used for planning and controlling of repetitive or one-off projects. (Kraemar, et al, 2014; Harries and McCaffor, 2015; Michael, 1998), Line of balance propose planning activities in accordance to production capacity and as such, it is concerned with how many units a crew can produce in a certain time (Kraemar, et al, 2014), the line of balance is presented in graph format with axis of units of work against time.
iii. Bar Chart: the bar chart is a pictorial device that consist of two co-ordinate axis, one showing the time and the other showing project operation or activity, and each operation (activity) is shown by a bar Abubakar et al, (2019).
The duration of activity is indicated by the length of the bar; the right end shows the ending time, (Bharikasti 2020; Krishnamurthy and Ravindra 2020).
The simplicity and visual clarity of the bar chart makes it a very valuable medium for displaying job schedule information. It provides an easy and convenient way to monitor and evaluate project progress, schedule equipment and crews and record project advancement.

Processes Involves in Construction Scheduling in Monitoring and Evaluation:
a. Monitor: When determining how often a monitoring should run, it is recommended that monitoring team should review the current schedule for the target project. The schedules are assigned in the form of the project in the construction industry.
b. Control: this determines how to control the condition and all the activities involve in the construction project, how it runs and it is recommended that monitoring team should control all the activities and condition in the form of scheduling in the construction industry.
c. Develop Progress Report: Write a progress report to inform the monitoring and evaluation team about progress made in a period of time. The project can be design, construction or repair of the project, developed and implement the work breakdown structure, work item lists, timetable, preliminary master schedule, development, resource and costs analysis and report in scheduling in the construction industry.
d. Record Construction Achievement: Record the construction achievement in a schedule format by the monitoring and evaluation team collectively to the construction industry, recording all the progress and development of the project.

Field Inspection Reporting System:
Field inspection reporting system is inspection criteria, can transfer operations and documentation. A training program for field engineers and inspectors may also be included in inspection plan. The daily

inspection report is prepared by the inspectors and provides a means of recording the contractor's daily operations. Report is written when there is a construction activity. If there is no construction, there should be no daily report for documentation, a report will note when construction stopped and another report will note when construction began. The report should cover all important factors affecting job condition and progress of the work and can be used later as a basis reference to determine the exact history of work at any given time. The report should include such items as description of activities performed, types of equipment used, materials incorporated in to the work, description of any problems requiring correction and corrective action taken, detailed description of any instruction given to the contractor and any other information necessary to document the contractor activities and progress during the shift. The original report would be filed with the office of Engineer and copies returned by the senior Engineer and the inspector

Types of Reporting:

There are two types of field reporting system namely, verbal and writing reporting.

a. Verbal report: This is a process where report is done orally. It is the commonest means of reporting.

Advantages of Verbal Report:

i. The ability of the wide proportion of the laborers to participate. Some of the laborers are illiterate and cannot write. Those that can write find the writing of report time and resources consuming which makes them reluctant to document all the information acquired during project monitoring.

ii. Clarity and timely distribution of information verbal reporting is always done immediately after an event. This makes the information arising out of the process to be relatively valid, reliable and up to data than the information that is documented. The people that give the reports get an opportunity to discuss with the management team and get immediate feedback. This help in decision making.

Disadvantages of Verbal Reporting:

i. Wrong reporting; some laborers may deliberately disseminate wrong information verbally to protect their interest.

ii. Storage, replication and consistency, since during verbal reporting information is neither documented nor recorded, it is very difficult to keep and retrieve it for further use.

This information is only kept in the mind of people who participated in the implementation of the project. This therefore makes it difficult to share the information with people beyond the construction environment especially in instances where those people who know the information cannot or are not willing to reveal it. The information collected is also not likely to be consistent especially in case where past information is needed to generate new data.

b. Writing Report: During monitoring, it is important to report about the result of activities, not just the activities but what you observed along with reviewing report of technical people.

Advantages of Writing Report:

i. The provides reliable information for management purpose (written).

ii. Report can be cross checked over time with other information to ascertain accuracy.

iii. It helps to provide information from technical people.

iv. The reports that are written are easy to manage.

Disadvantages of Writing Report:

i. Day to day writing during project monitoring activities is always ignored.

ii. Documentation of report is very costly time and money.

Reasons for Field Inspection Reporting System:

According to Arikawa 2016 state that the reasons for field inspection reporting are as follows:

i. To formally inform management; it ensures management particularly the project coordinator, supervisors, or project team is formally appraised of the progress made in the project implementation and the supervisor or the project management team are aware of an early of actual and potential problems and remedial action taken.

ii. To validate request for further funding; it ensure that the budget office is kept informed of all aspect of the project implementation. The budget office, together with project coordinator can then ensure that disbursed fund have been properly used before authorize any more release of funds.

iii. To serve as an audit and evaluation draft; maintain the record of all action taken during project implementation, it therefore constitutes a vital resource for auditors and evaluations in accordance with the rule and regulations and as efficiently and effectively as possible.

iv. To serve as a reference for future project; to serve as a vital resources for ensuring that lessons learned (project successes failure best practices) though project implementation are available for consideration when formulating and implementing future project,

v. To report to client on the project progress; after reporting is requested by the client as he has shared interest in the success of the project.

Client sometimes fund project contingent upon satisfactory progress. He increasingly asked for progress and final report at the result and objectives level rather than at the level of output or activity delivery.

Process Involve in Field Inspection Reporting System:

a. Daily Inspection Report Containing Details of Construction: Day-to-day records of project activity and progress are extremely important. The project monitoring team is responsible for ensuring project records are kept, and that they are accurate and adequate records of the progress of the project. General daily progress report, all personnel associated with the project monitoring team must use the general daily progress report form or the project monitoring team dairy, form to record project activities and events. The project monitoring team must ensure that all appropriate information for a project is recorded on a daily basis.

Assess the Level of Compliance with the Processes of Monitoring and Evaluation in Construction Industry, Traditional Approach of Monitoring and Evaluation:

Monitoring and evaluation of construction project has taken an increasing importance. A traditional phased approach a sequence of step to be completed. In the traditional approach fire developmental components of a project can be distinguished.

Typical development phases of an engineering project.

- **i.** Initiation.
- **ii.** Planning and design.
- **iii.** Execution and construction.
- **iv.** Monitoring and controlling system.
- **v.** Completion and finish point.

Not all project will have every as project can be terminated before they reach completion, some project do not follow a structured planning and/or monitoring process and some project will go through multiple times.

Many industries use variation of those project stages. For example when working on a brick and mortar design and construction project will typically progress through stages like pre-planning, conceptual design, schematic design, design development, construction drawing.
Traditional approach to monitoring and evaluation brings together program and evaluation expertise in an integrated way comprised of four person team staff oversees external construction that assist in conduction specific evaluation. Project assessment focus on consistent, ongoing collection and analysis of information with the goal of strengthen projects grand cluster assessment, assess systematic change to achieved by multiple projects for the purpose of clarifying the strategies of foundation program initiative and informing sector policy. Foundation wide assessment moving to a model with a review of overall foundation strategy, as well as grant clusters and projects to inform allocation of resources and program priorities.

Real Time Monitoring System:
When monitoring is required at a frequently exceeding that possible (or practical) by manual survey method an automatic data collection system will be required. It is necessary to provide a real time definition for the project. An initial project stance is often that real time monitoring is necessary because the equipment is capable of it. The approach will produce a very large quality of data with its attendant processes and storage problem. It is more manageable to operate such system taking reading at less frequent interval, say hourly and escalate frequencies in those areas of particular interest when necessary to allowed detail evaluations to be carried out in the project.
The response time required between data collection and availability for use by the monitoring team will equate to a contract definition for real time monitoring. A strict definition of real time is virtually instantaneous availability of result, but survey type monitoring will not normally provide on a variety of point because that is a finite time for an instrument to physically more from one project to another.
Real time monitoring is at special interest in construction to provide pertinent feedback of engineered system performance. Geotechnical solution is sometime designed using simplified model that are assumed to be conservative but are often a gross simplification of the actual condition. As a result, one of two things may happen parts of the system may not meet performance expectation due to localized difference but when the actual and assumed ground condition, or the system performance meet or exceed performance expectation.
Real time monitoring often exciting opportunities to optimize design and reduce construction cost using observational method, monitoring play a very active role in both design and the construction phase. The method requires frequent design and/or construction modification that involves all parties (client, engineer, and contractor). It is a risk-based method that can produce perfect cost saving without compromising safety. An adaptive management plan, combined with advanced measurement techniques and real time monitoring are a must when monitoring project.

Scheduling:
According to Abdul–Eahman (2019), this is a programming techniques used to monitor and evaluate date of material requirements and deliveries. The author's survey and personal observation indicate the lack of modern planning techniques used in project management by local contractor. The monitoring team should start their work from the planning stage. If the construction of a project is to proceed efficiently and at the scheduled rate, it is necessary to know accurately the types, quantities and qualities of resources that will be needed and the date on which they will be required.

Scheduling of construction project is based on uncertainties, project team are very much responsible for the overall success of the project. They develop a schedule for directing and controlling resources in coordinated and timely manner. Project schedule take into account critical activity construction planners determine the sequence of the activity as a critical activity. The practical difficulties faced during the execution of the work are to be studied and the project engineer must be suitably guided to prepare the schedule to take care of the difficulties. These factors will be the critical factor for monitoring project failure to do so will delay the project completion.

Field Inspection Reporting System:

Field inspection is essential for any field based project. Field inspection should be planned well in order to be of maximum use. The following consideration may help plan an effective field inspection.

Field inspection serve the purpose of validation, they validate the result reported by programmed and projects. They are of particular importance large, key programs and project that are essential for outcome. They involve an assessment of progress, result and problem and may also include visit to the project management.

A field inspection may take place at any stage of the project, just after the review, it may be oriented towards the validation of the results. If undertaken in the latter part of the year, the field inspection should provide the latest information on progress towards annual and outcome review processes. The report of field inspection should be action, oriented and brief, submitted within a week of return to the office to the members of the respective project board, program board and the outcome group consideration and appropriated action if required.

Field inspections are increasingly joint monitoring effort of several partners working on a cluster of programs and project targeting an outcome or result. Joint inspection also supports ownership of the results. A team of staff from one or more partners may make inspection to project that are contributing to one particular outcome or in a specific geographical area addressing a specific development condition, the emphasis should be an observing and ascertaining credible information on progress being made toward the attainment of result output and outcomes as well as their quality and sustainability. Those undertaking the field inspection should discern other initiatives.

Significance of Monitoring and Evaluation in Construction industry

Logic Model and Indicator:

It is used for planning and managing development project, Logical model framework analysis promote a structural approach to evaluation by setting out the intervention logic of programmed and identifying appropriate key indicators.

After finalizing logic model for planning and management purposes, associated indicators should be created to consultation with stakeholders to monitor achievement at every step of the project from input and activities to outputs and outcome.

Indicator Performance

Indicator project execution progress to include procurement and production of goods and services, works and infrastructure, and use of resources, human and monetary resources and uses the achievement of its goods and specific output, and they are also used to evaluate performance. A list of performance indicator along with their baseline value, measured perimeter, and means of verification are found.

It is worthwhile to note that indicators reviewed during the execution of the project baseline values adjusted and new perimeter may be added as needed. The monitoring of these indicators is assisted by project management.

Monitoring Input/output and Short Term Outcomes:

A project specific data collection cycle will depend on the timeline for its target, though periodic dada collection in line with a company quarterly reporting effectors is a good way to integrate people into business process. Data collection should ideally be participatory by involving the people in monitoring, stakeholders can keep abreast of progress and make suggestion or course corrections while the project partners can benefit from increased support and buy in as a result of such transparency.

Make Project Adjustment:

Engaging stakeholders through data collection and reporting will help project managers.
Information on how project should be adjusted to better ensure that goals are consistently being not. Adjustment to should be made to improve performance.
This is an interactive cycle that should be repeated throughout the projects life.

Evaluate Project Impact:

Project evaluation occurs after a project has been completed. It is an analysis that helps to explain why the project did or did not produce a particular result. Unlike monitoring, it is not used for ongoing management, but focuses on final outcomes. Evaluation can be large scale survey executed by an external group with statistical and social science expertise likewise, it can be a small-scale rapid assessment that uses participatory methods such as group interviews and key in formals as well as available data such as case studies.

Report and Engage Stakeholders:

The final step in monitoring and evaluation is to safe information on project impacts with stakeholders, people and the public at large through multiple channels. Reporting should not been seen as an end in itself but rather as an initiation to dialogue with external stakeholders. The company can use monitoring and evaluation to inform the public of project progress and learning as well as to invites feedback on the company wider people efforts.

Theory of Fit

Monitoring and Evaluation

Making monitoring and evaluation operational within project programs (Bhola 2018). The advance in the theory and practice have provided a new frame to operationalize built-in or in built monitoring and evaluation system.

Built in monitoring and evaluation is seen as a system carefully constructed from a systematic and systematic analyses of a program which is also seen as a system with its four parameters contracts, inputs, processes, and products. The program system and the monitoring and evaluation system are seen as mutual integrated and to be fully and functionally interfaced in terms of programs aspects. The second essential element of the Built in monitoring and evaluation system is to make the agent of action also the agent responsible for evaluation by self-evaluation or co-evaluation. The built in monitoring and evaluation is thus a system in which information is used immediately at the level where it is produced

and then send upward. The evidence from monitoring and evaluation activity can be used to build on the analyses undertaken at the appraisal stage by testing and refining the assumption made.
Research shows that project management play a key role and have a proper emphasis must be placed in selecting the project team that ensures proper decision making at various stages of project life cycle and result in timely project completion hence project success Ara and Atmudi might (2019) management and leadership as well as project team, also play a key role in supporting monitoring and evaluation of project Yang et' al (2019). Research also show that some of the best project management practice includes managing communication, management stakeholders monitoring and knowledge transfer, planning, testing and monitoring the progress of the project work are some of the key processes used to manage the project work Gonjiora and Allan (2019). Fine dimension of assessing project success is the most common aspect brought out Pretorius et al (2020) completion of project within the budget is another dimension that is used to measure project success. Cost can be computed in form of unit cost percentage of not variation over final cost and so an (Chanzon) identifying technical performance as one of the project success factors among other such as schedule performance and cost performance, quality achievement by project is also another dimension of assessing project success, the quality of projects and project information has a significant influence on project success (Raymond and Bergoron (2019).

Empirical Studies

Charles G. Kamau and Human Bin Mohamed (2015), Efficacy of Monitoring and Evaluation Function in Achieving Project Success in Kenya.

The research uses literature review approach to analyze data.
The truly identify management support as a mediating factor between monitoring and evaluation in project success.
The study recommend that an effective monitoring team approaches should be used in monitoring and evaluation of project.
Standard guideline which are widely accepted and consistently applied is an important tool in project monitoring and evaluation success.

Joseph Kimini Mwangi, Ben Maisiba Nyang Wara and Jackson Lemomo ole Kulet. (2015), Factors Affecting the Effectiveness of Monitoring and Evaluation of Constituency Development Fund Project.

Data was collected using questionnaire and descriptive and information statistic, mean, standard deviation, correlation an ova and multiple regression there used to analyze data.
Study finding shows that there is an increase in the effectiveness of monitoring and evaluation programs for CDF projects. This was attributed to the multi-disciplinary composition of the team where members of the monitoring team comprised Accountant, Engineers, Surveyors, Teachers and other commonly members with diverse skills.
The research recommends efficient monitoring and evaluation on project in order to achieve the intended objective.
Devolution of resources to the decentralized unit of management should be engaged.

Otieno F. A, (2019), The Roles of Monitoring and Evaluation in Project.

The research uses literature review to analyses the study.
The research reveal that monitoring and evaluation are carried out by using the right time and place.

Its recommends that education by given to many project manager in the aspect of monitoring and evaluation so as to encourage them to use these tools often and correctly.
Project managers and developers should attempt to develop suitable monitoring and **evaluation mechanisms.**

Gap
From the above literatures has provided an insight on the key issues concerning monitoring and evaluation of building project. The insight have particularly identified the major factor affecting monitoring and evaluation of building project as lack of skills in project management, failure of the management to implement the recommendation of monitoring and evaluation team, political and social demand.
These may be different from those other countries in nature or relative level of practicing. This study around to fill this knowledge gap.

Research Design
This research work uses survey design, for this study because the research work is done through field survey as it effectively assess professional opinion as regard to monitoring and evaluation process in construction industry in Bauchi.

Population
The population of the study comprises professionals such as Builders, Quantity Surveyor, Architects and Engineers as members of the construction team.

Target Population
The target population of this research work comprises of professional; such as Quantity Surveyors, Builders, Architect and Engineers. In Bauchi state metropolises this will help the researcher to collect valid data from the population on monitoring and evaluation process in construction industry in Bauchi.

Accessible Population
A total of 40 questionnaires were administered to the professional as to assess monitoring and evaluation process in construction industry and 32 were return.

Sample Size
Due to the vastness of the study area, the researcher considers that, it will not be feasible to treat the whole construction firms in Bauchi. However, a conscious effort was made in selecting from the total number of construction firm to give a truly representative sample. The selecting of the professional and construction firm is based on the construction service render. All the firms and professionals sampled are within Bauchi metropolis.

Sampling Techniques
This research work uses random sampling techniques; random sampling techniques is the selection of an element in the population either by pick and obey in which every individual populace has an equal chance of being selected. A total of 40 forty people were selected for the study.

Instrument for Data Collection

The instrument used for data collection was structured questionnaire, design by the researcher, the respondent is limited to a list of options and the answers are restricted to those available in the option. The questionnaire was divided into 2 sections A and B section A contained respondent information and B questions on monitoring and evaluation process in construction industry.

Validity of the Research Instrument

The questionnaire was given to the project supervisor who ensured that the questionnaires are related to the study and make, necessary corrections and was approved for the use of research work.

Pilot Test

Due to the importance and need to detect and determine weaknesses in the instrument that was applied in the research study, the questionnaire was pre-tested before distributing it to the whole sample. The researcher used a colleague and respondents to evaluate and refine the measuring instrument and gathered proposed suggestions for amendments and adjustments were made to produce an instrument for use in the field.

Data Analysis

The methodology used for this research is form review of relevant literature, current journals, and the content was analyzed using coefficient variance (ANOVA) and Regression analysis as statistical tools. For the purpose of decision making, an interval scale of 0.5 will be used with its upper limit of 3 being 3.00 and lower limit of 3.50. therefore, the items with mean 3.00 and above will be accepted while those with mean below 3.00 will be rejected.

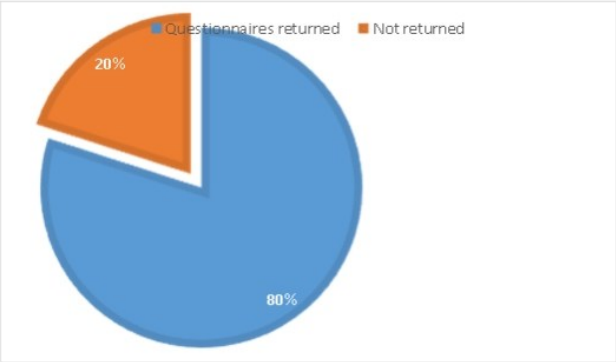
Data Presentation and Analysis

A total of 40 questionnaires were administered and only 32 were responded to and returned representing 80%. This becomes the accessible population that the research used throughout this study.

Table 1 Questionnaire Distribution

Questionnaires	Number	Percentage
Questionnaires administered	40	100
Questionnaires returned	32	80
Not returned	8	20

Source: Field Survey 2026



Source: Field Survey 2026

Fig 2: Pie Chart Showing Distribution of Questionnaires

From table 2, 31.2% of the respondent have 0 - 5years work experience, 28.1% of the respondent have working experience of between 6 - 10years,21.9% of the respondent have working

experience of between 11 - 15years, and 18.8% of the respondent have a working experience of between 16 and above working experience

Table 2: Years of Working Experience

Years of experience	Number of respondent	Percentage
0 – 5yrs	10	31.2
6 – 10yrs	9	28.1
11-15yrs	7	21.9
16 and above	6	18.8
Total	**32**	**100**

Source: Field Survey 2026

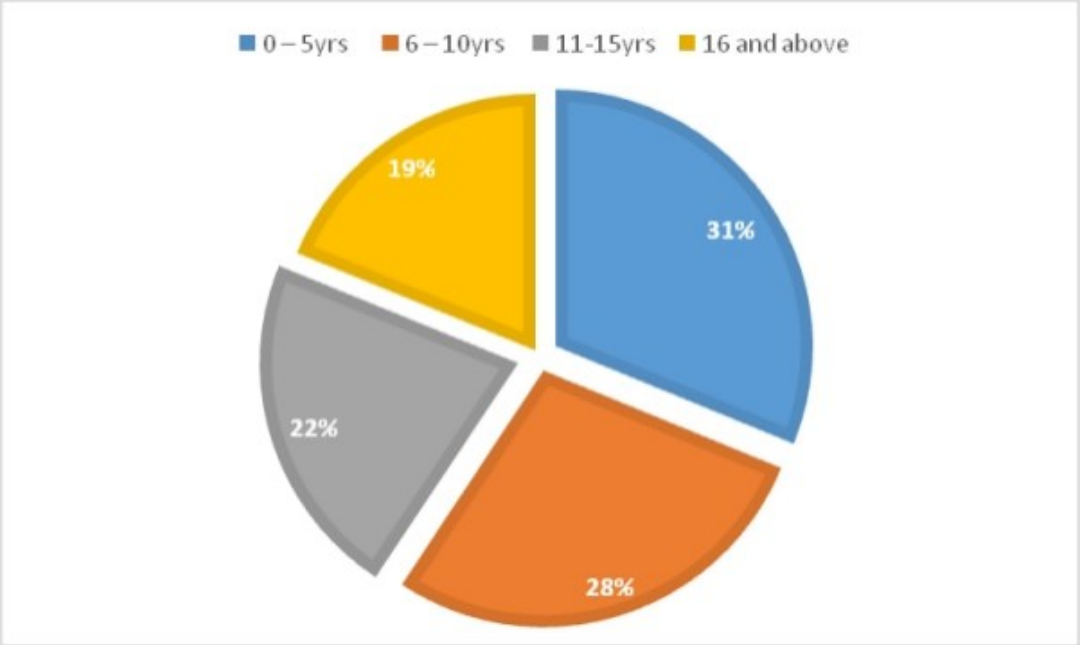


Fig. 3: Pie Chart Showing Respondent's Work Experience
Source: Field Survey 2026

From table 3, 37.5% of the respondents work in consulting and contracting firm, 18.5% of the respondent work in consulting/contracting firm and 06.2% of respondent work in government agency.

Table 3: Nature of Organization

Organization	Number of respondent	Percentage
Consulting	12	37.5
Contracting	12	37.5
Consulting/Contracting	6	18.8
Government	2	06.2
Total	**32**	**100**

Source: Field Survey 2026

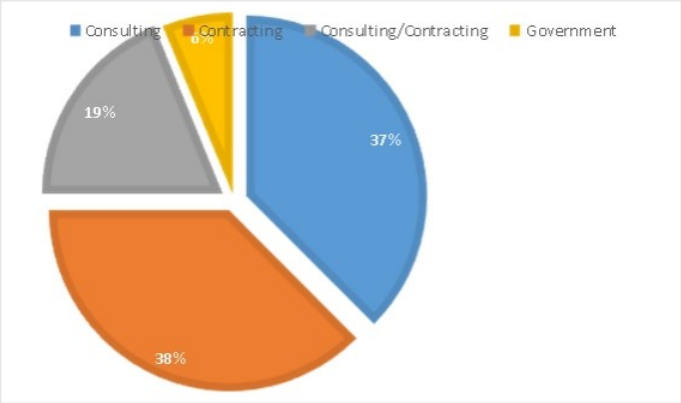


Fig. 4: Pie Chart Showing Respondent's Nature of Organization
Source: Field Survey 2026

From table 4, 18.8% of respondent have OND, 43.8% of respondent have HND/B.sc., 25.1% of respondent have B.Sc., and 12.5% of respondent have other qualifications.

Table 4: Qualification of Respondent

Qualification	Number of respondent	Percentage
OND	6	18.8
HND/BSc.	14	43.8
M.Sc. and above	8	25.1
Others	4	12.5
Total	**32**	**100**

Source: Field Survey 2026

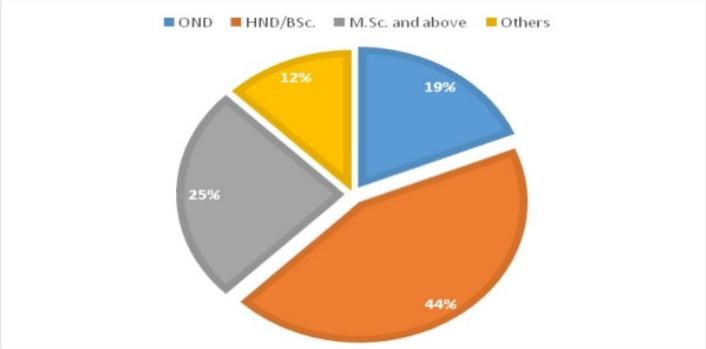


Fig. 5: Pie Chart Showing Respondent's Qualification
Source: Field Survey 2026

Objective I: What are the processes involved in monitoring and evaluation in the construction industry

Note: SA = Strongly Agree, A = Agree, SD = Strongly Disagree, and D = Disagree

Table 5 Monitoring and Evaluation Processes in Construction Industry

S/N	Factors	SA 4	A 3	D 2	SD 1	MEAN	REMARK
1.	Completion and finish point	12	14	4	2	3.13	Accepted
2.	Daily inspection report containing details of construction	9	17	4	2	3.03	Accepted
3.	Initiation	10	14	7	1	3.03	Accepted
4.	Monitoring and controlling system	8	17	7	0	3.03	Accepted
5.	Develop progress report	10	15	5	2	3.00	Accepted
6.	Planning and design	8	16	6	2	2.94	Accepted
7.	Observational	9	13	8	2	2.91	Accepted
8.	Execution and construction	7	12	10	3	2.72	Rejected
9.	Record construction achievement	7	10	10	5	2.59	Rejected
10.	Data acquisition	4	6	15	7	2.22	Rejected

Grand mean= $\Sigma x/_n = 28.6/_{10} =$ **2.86**

Source: Field Survey 2026

The views of the respondent were based on the most frequent processes of monitoring and evaluation in Bauchi construction industry as shown in table 5 above.Completion and finish point(mean3.13),daily inspection report containing details of construction(mean3.03),initiation(mean3.03),monitoring and controlling sysyem(mean3.03),develop progress report(mean 3.00),planning and designing(mean 2.94) and observational(mean 2.91**)**

Objective II: What is the Level of Compliances with the Processes of Monitoring and Evaluation in Bauchi State Construction Industry?

Note: SA = Strongly Agree, A = Agree, SD = Strongly Disagree, and D = Disagree

Table 6 Level of Compliance with the Process of Monitoring and Evaluation Processes in Construction Industry

S/N	Factors	SA 4	A 3	D 2	SD 1	MEAN	REMARK
1.	Planning and design	19	13	0	0	3.59	Accepted
2.	Observational	16	14	2	0	3.44	Accepted
3.	Execution and construction	12	20	0	0	3.38	Accepted
4.	Record construction achievement	14	12	6	0	3.25	Accepted
5.	Develop progress report	14	10	8	0	3.19	Accepted
	Initiation	9	9	14	0	3.16	Accepted
6.	Completion and finish point	10	16	6	0	3.13	Rejected
	Monitoring and controlling system	8	17	7	0	3.03	Rejected
7.	Data acquisition	10	16	6	0	3.00	Rejected
8.	Daily inspection report containing details of construction	5	10	10	7	2.41	Rejected

Grand mean = $\Sigma x/_n = 31.6/_{10} =$ **3.16**

Source: Field Survey 2026

Based on the analysis of the respondent in table 6,the level of compliance with the process of monitoring and evaluation in the construction industry are planning and design (mean3.59), observational (3.44), execution and construction(mean3.38),record construction achievement(3.25)develop progress report(mean3.19) and initiation(mean3.16).

Objective III: How Severe Do the Following Affect Monitoring and Evaluation in Building Project?

Note: SA = Strongly Agree, A = Agree, SD = Strongly Disagree, and D = Disagree

Table 7 Assessment of the following factors in Monitoring and Evaluation

S/N	Factors	SA 4	A 3	D 2	SD 1	MEAN	REMARK
1.	Monitoring input/output and short term outcome	13	14	5	0	3.25	Accepted
2.	Make project adjustment	12	17	3	0	3.28	Accepted
3.	Report and engage stakeholders	12	12	8	0	3.13	Accepted
4.	Logical model and indicator	9	13	8	2	2.91	Rejected
5.	Evaluate project impact	5	18	5	4	2.75	Rejected

Grand mean = $\Sigma x/_n = 15.3/_5 =$ **3.06**

Source: Field Survey 2026

Based on the analysis of the respondent in table 7 above, the following factors affect monitoring and evaluation in the construction industry. Monitoring input/output and short term outcome (mean 3.25), project adjustment (mean 3.28) then report and engage stakeholders (mean 3.13)

Regression Model of monitoring and Evaluation Process in Construction Industry Model of Variable (monitoring & evaluation process)

Table 8 Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.152[a]	0.023	0.116	7.77668

a. Predictors: (Constant), monitoring & evaluation process

Source: Field Survey 2026

Table 8 shows the regression model summary result. The values of R and R^2 are ***0.152***and ***0.023*** respectively. The R-value of ***0.152*** indicates a positive relationship between ***monitoring & evaluation process*** and ***construction industry***. Since the value of R-value is close to 1.

Table 9 Regression Model of ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.988	3	9.996	0.165	0.019[b]
	Residual	1270.012	21	60.477		
	Total	1300.000	24			

a. Dependent Variable: monitoring & evaluation process

b. Predictors: (Constant), construction industry

Source: Field Survey 2026

Table 9 show the result of regression model of ANOVA test which reveals that ***monitoring & evaluation process*** have a positive impact on the ***construction industry***. Since the P-value is ***0.019*** which is less than 5% (0.05) level of significance. This means that the variable (***monitoring & evaluation process)*** will impact positively to ***construction industry*** in Bauchi State**.**

Table 10 Regression Model of Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	**Std. Error**	**Beta**		
1	(Constant)	20.960	13.931		1.505	0.021
	M & E Process	0.360	0.689	-0.171	-0.523	0.019

a. Dependent Variable: construction industry

Source: Field Survey 2026

Table 10 show the result regression model of ***Coefficients*** ($Y = 20.960 + 0.360X_1$) of the predictors (***monitoring & evaluation process***) and the dependent variable ***(construction industry)***. The result indicates that ***monitoring and evaluation process*** will have positive influence in ***construction industry in Bauchi State.***

Regression Equation

$Y = \beta_o + \beta_1 X_1$

Where: Y = *Dependent Variable (construction industry),*
β_o = *Coefficient of the intercepts,*
β_1 = *Coefficient of the slop,*
X_1 = *monitoring & evaluation process*

Therefore, $\beta o + \beta_1 X_1 = (20.960 + 0.360 X_1)$

Conclusion

Based on the findings made the following conclusions were drawn:

This research work is aimed to assess monitoring and evaluation process in construction industry. In general, it is agreed that the reason why monitoring and evaluation is not achieving its desire result because of the inexperience from the management team. In other to ensure that project goals are achieve, there is the need to produce a good plan for the work, set the project objective and work toward achieving it.

The major processes of monitoring and evaluation in construction industry are Traditional approach of monitoring and evaluation, Real time monitoring system, Scheduling, and Field inspection reporting system.

Monitoring of projects Good materials planning, storage systems, effective communication, accurate scheduling, training of store keeper/site personnel and adherence to design detail will greatly improve material management on construction sites.

Recommendations

1. The client should appoint competent professional that will stand on his behalf to monitor and evaluate the project.
2. The project monitoring team should be able to gather competent labourers that will work toward achieving the project objective.
3. The project monitoring team needs to monitor and co-ordinate the activities of workers to make sure that they do not move away from the project plan and each labourer live up to his responsibility.
4. Stakeholders in the construction industry should be engage in every phases of the monitoring and evaluation.

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