EFFECT OF CONSTRUCTION EFFICIENCY ON BUILDING CONSTRUCTION PROJECT DELIVERY SYSTEM IN GOMBE STATE, NIGERIA

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ABSTRACT

Achieving construction efficiency for construction success remain a nightmare by the building construction professionals. The study was aimed to assess the effect of construction efficiency on building construction project delivery system in Gombe State, Nigeria. The research adopted a quantitative research design and structured questionnaire tool was utilised to extract the primary from the 216 core construction professionals (Architects, Builders, Civil Engineers, and Quantity Surveyors domicile in Gombe State). The study concluded that, construction efficiency in building construction project in Gombe State are affected by some dimensions which include: cash-flow dimension, cost dimension, time dimension, safety dimension, as well as quality dimension; Severity level of features affecting building construction project delivery system in Gombe State is high; there was strong significant effect of construction efficiency on severity level of features affecting building construction project delivery system in Gombe State. The study recommended that: all stakeholders in building construction project delivery should ensure strict adherence to the construction efficiency to maximize habitable environment for cultivating healthy structures for client's satisfaction; building construction professionals trusted with manning construction projects should ensure self-constant development and practice to always monitor and keep track of building project to avoid adversity of the level of features to affect building construction project delivery system; building professionals should embrace construction efficiency in the construction project's delivery as supervised by the respective regulatory bodies of the core construction professionals.

Keywords: *Construction industry, Construction efficiency dimension, Construction Project and Client's Satisfaction, Building Construction Project Delivery System and Features affecting it, Theoretical review, and Empirical review.*

1.0 INTRODUCTION

Nigeria has a huge infrastructure deficit with total infrastructure stock in the country amounting to 30% of Gross Domestic Product (GDP), falling short of the international benchmark of 70% of GDP set by the World Bank (International Trade Administration: ITA, 2021). The construction sector plays a strategic role in the economic

structure of any country, Nigeria inclusive (Durdyev & Ismail, 2017; Durdyev, Zavadskas, Thurnell, Banaitis & Ihtiyar, 2018; Alkay, Watkins & Keskin, 2018). Utilization of construction is a measure of how much available time is actually used in productive work during construction and understanding it equips you with the skills to do more with less (Ma, Liu & Reed, 2017); and in order to increase construction utilization, stakeholders must be part of the design process. Decision-making of the project delivery system (PDS) is an important link in the entire lifecycle of a project and is one of the critical factors leading to project success (Bingsheng, Tengfei, Qiping, Zhiyong, Junna & Bin, 2015). Traditionally, PDSs are usually chosen based on the decision-makers' experience and knowledge and the project's information, without exploring the inherent dependencies between influencing factors and the PDSs.

Zhong, Tang and Chen (2021) postulated that, the project delivery method reflects the task, organizational, and contractual relationship of the project, where the selection of a project delivery method or system is a crucial step in impacting project success. A project delivery method or system describes the relationship and working methods among project participants in the process of transforming the Client's goal into the completed facilities, which directly affects construction performance including schedule, cost, quality, and efficiency (Noorzai, 2020). According to the Construction Industry Institute (CII), there are only three fundamental project delivery methods: Design-Bid-Build (DBB), Design and Build (D-B), and Construction Manager at Risk (CMR). Oloyede and Anifowose (2017) described various delivery of building construction project to include: Design-Bid-Build (DBB), Design and Build (DB), Turnkey, and Build-Own-Transfer (BOT).

Efficiency in project means meeting cost, time, and scope goals; whereas, success in project means meeting wider business and enterprise goals as defined by key stakeholders (Serrador & Turner, 2015). The main possible cause for this disagreement would be the abstract nature of the concept of project success (Susil, Warnakulasooriya & Bhadra, 2015). Serrador and Turner (2015) also, study on the relationship between project success and project efficiency. Efficiency is shown through analysis to be neither the only aspect of project success nor an aspect of project success that can be ignored. Efficiency dimension of construction project success is a short-term perspective thereby exposing the needs for building construction management to ensure cost, time, quality, safety and, cash-flow management as a safe practice in the building construction firms to remain competitive and to overcome the effect of deadly management diseases that affects the successful of building construction projects to clients (Silva, Warnakulasooriya & Arachchige, 2016).

As vital as construction industry is for rapid economic development, achieving efficiency in the construction projects has been a greater challenge for the industry which most times affects the delivery of the building construction projects. Yet meeting efficiency dimensions of a building construction project ensures client's satisfaction and enhanced the refutation of the industry.

Zhong *et al*. (2021) stated that, choice of construction project delivery has greater influence on the success of that project. Also, meeting a project within cost, quality and time is what is termed as project success using triangle of construction project success (Serrador & Turner, 2015); Also, Gündüz *et al*. (2013) buttressed that, construction project is considered to be successful when it is completed on time, within budget and all the stakeholders are satisfied with its quality. Over the years, Gombe State has been witnessing a lot of developmental construction projects from 1999 till date that better the life of its citizens. Barutha (2018) stated that, commonly used project delivery arrangements do not work well for complex industrial projects due to the large scale of uncertainties, complexities, work processes, and interactions required from project participants.

Therefore, to cope with an ever-increasing population, pressure on land, and growing economic activity, construction projects are in increasing demand and activities are booming in many countries (Haron, Devi, Hassim, Alias, Tahir & Harun, 2017). Construction industry has massive potential, for improving productivity and efficiency, because of the digitalization, innovative technologies and new construction techniques. World Economic Forum (WEF, 2016) confirmed that, the world is changing faster than ever before, when these innovations are implemented and exploited, construction companies will boost productivity, streamline their project management and procedures, and enhance quality and safety. To capture all this potential will require a committed and concerted effort by the industry across many aspects, from technology, operations and strategy to personnel and regulation. Ali, Wang, Soomro and Islam (2020) established that, building construction projects are complex and that, needs a dynamic guidance style to promote creative performance, allowing individuals to contribute toward project success. Kasapo ˘glu (2014) pose that, some studies were examined that the individualistic guidance without giving much importance to the impact of protective guidance can lead to the unrealistic project success.

Dorcas and Charles (2021) conducted research on the impact of Collaborative Processes on the Success of Construction Projects in Nigeria. Davis (2017) conducted a study on an empirical investigation into different stakeholder groups' perception of project success. Durdyev and Ismail (2017) studied the build-operate-transfer model as an infrastructure privatisation strategy for Turkmenistan. Joslin and Müller (2016) studied the impact of project methodologies on project success in different project environments. Fathi and Svetlana (2016) studied a measurement

the Efficiency of Building Project Management. Adebowale and Ayodeji (2015) analysed a Construction-Related Factors Affecting the Efficiency of Construction Labour. Ferrada, Serpell and Skibniewski (2013) conduct a study on selection of Construction Methods: A Knowledge-Based Approach.

However, nothing has been done on construction efficiency on building construction project delivery system; on this note, brings about investigating the effect of construction efficiency on building construction project delivery system in Gombe State.

The paper was based on three objectives as follows:

i. To identify the construction efficiency in building construction project in Gombe State.
ii. To determine the severity level of the features affecting building construction project delivery system in Gombe State.
iii. To determine the effect of construction efficiency on severity level of the features affecting building construction project delivery system in Gombe State.

2.0 LITERATURE REVIEW

2.1 Construction Industry in Nigeria

Construction industry is considered as the most complex compared to any other industry. That made many Scientifics attempt to understand construction projects complexity (Qureshi & ChangWook, 2015). According to Tarik and Adil (2020), there is a sort of consensus that construction should be seen as a complex dynamic system based on the following three axis:

Axis 1: The construction process, which is composed of three different perspectives: transformation, process & value generation.

Axis 2: The production system, which the role is played by the different construction firms, teams… etc.

Axis 3: The social system constituted principally by human resources that work in construction workplaces. As of date, Nigeria's Construction Industry is expected to grow by 3% in 2023-2026, with a previous 5.7% forecast growth in 2022. It suffices to state that the sector has the potential to become a leading non-oil contributor to the economy, alongside technology and entertainment (Adeola, 2023). The construction industry is one of the leaders in the world's economy (U.S. Census Bureau, 2022; McKinsey Global Institute: MGI, 2017). Construction industry plays a major role in development and achievement of the goals of society. Construction industry has complexity in its nature because it contains large number of parties as clients, contractors, consultants, stakeholders, shareholders and regulators (Fathi & Svetlana, 2016). According to the US Department of Commerce's International Trade Association, Nigeria is still far behind the infrastructural benchmark set by the World Bank which requires total infrastructure stock at 70% of GDP. Nigeria's Infrastructure stock is currently around 30% of its GDP.

Construction industry has extensive linkages with the rest of the economy, for example, the manufacturing industry and financial services industry. This industry is responsible for building the nation's physical infrastructure, providing transportation facilities, accommodations, businesses, and institutions (Wesam, Mohd, Noor, 2016). Basically, professional projects can be classified under 5 main categories that is project of different types with unique goals and outputs as shown in figure 1 below.

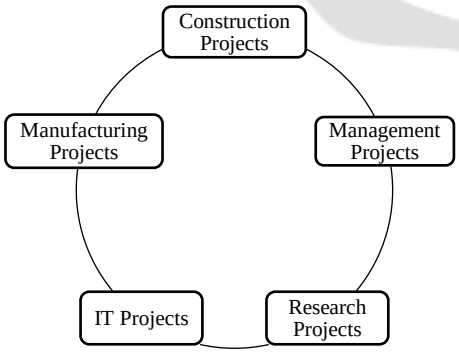

Figure 1: Different types of projects with unique goals and outputs
Source: Wesam *et al.* (2016)

Coordination factors are considered as the main components of coordination process, which affect the performance of building projects. Furthermore, to improve the coordination amongst construction parties, it is important to identify these factors. Furthermore, in construction projects, contractors are the major role players in construction sites, to satisfy the Client's objectives against reasonable profit, under the consultant supervision. Thus, all parties are required to coordinate the tasks before and during the construction phase to ensure its successful delivery (Wesam *et al.*, 2016; Crowston, 1994).

2.2 Construction Efficiency Dimension

In an oraganisation, efficiency is a concept, a tool and a complex variable, concertante and synergistic, which expresses the aggregate performance of the company, its economic value, revealing various aspects of its business results, different perspectives of assessing the company's comprehensive income (Manolescu & Geamănu, 2010). Construction is a labor-intensive industry (Bhavya & Lekshmi, 2022). Therefore, considering efficiency dimension in a construction is very relevant. Although the practice of working on multiple projects simultaneously has become popular for the company's overtime, the important thing is to manage all the projects efficiently so that all projects can be finished according to the plan (Amit, 2009; Collyer & Warren, 2009). The possibility to learn and improve from one project to the next is something that any project organization should be interested in doing. Under the umbrella of project management, the concepts of efficiency, effectiveness and efficacy are commonly used but rarely defined (Youcef & Nils, 2017). Some researchers use the terms when describing how to improve project management methodology itself, as is the case with some authors in International Journal of Managing Projects in Business (Joslin & Müller, 2016; Coetzer, 2016; Lahdenperä, 2016; Ssegawa & Muzinda, 2016; Badi & Pryke, 2015; Messner, 2015; Haji-Kazemi & Andersen, 2014; Mullaly, 2014) apply them in how to improve some parts of project management practice (e.g., leadership, communication, project teams, organisation, project member as an individual, cost, time, quality, and support tools).

According to Merriam-Webster (1984), "Effective, effectual, efficient and efficacious all mean producing or capable of producing a result or results, but they are not freely interchangeable in idiomatic use". When discussing with project management practitioners and reviewing literature on project management, these concepts are used with a variety of meanings. Some authors and many practitioners consider efficiency and effectiveness synonymous. This confusion is often present in project management literature, and is also reported in organisational theory (Ika, 2009). Project efficacy is a rarely used term in project management literature, but there are some examples, including as a synonym for project effectiveness (Sankaran, Hou Tay & Orr, 2009) or project efficiency (Wong & Wong, 2014). Even though this study only concern with construction (project) efficiency.

Ferrada *et al*. (2013) related project efficiency to performance based on cost, time and quality the satisfaction level of clients. Construction (project) efficiency explained as the extent to which the project incurred the lowest possible expenditure to meet the project objectives (Yamin & Sim, 2016). In their research, Landin and Öberg (2014); Timmer, Inklaar, O'Mahony and Ark (2011), ten (10) basic requirements for efficiency measures was established and defined to include:

i. ***Usability:*** —in relation to strategic goals;
ii. ***Low cost*** of data collection and coordination;
iii. ***Reliability:*** —regardless of who is collecting the data and when data are collected, and accurately defined data collection methods with appropriate sampling techniques;
iv. ***Validity:*** –measuring the dimension of what we really want to understand;
v. ***Compatibility:*** -with other quantitative metrics within the same system with other systems-in other industries, other countries—not least official statistics on the industry level;
vi. ***Opportunities:*** to develop and analyze time series, including the choice of periodicity;
vii. ***Short time*** between data collection and data usage;
viii. ***Existence*** of strong incentives to deliver data;
ix. ***Weak*** (or no) side-effects on behavior of the data is used for controlling selection or monitoring of individuals and businesses;
x. ***Little*** (or no) risk of leakage of competitive business-critical information.

Efficient dimension in construction can also be referred to as short-term perspective for construction project success (Susil, Warnakulasooriya & Bhadra, 2017), and is represented in this study in the figure 2 below.

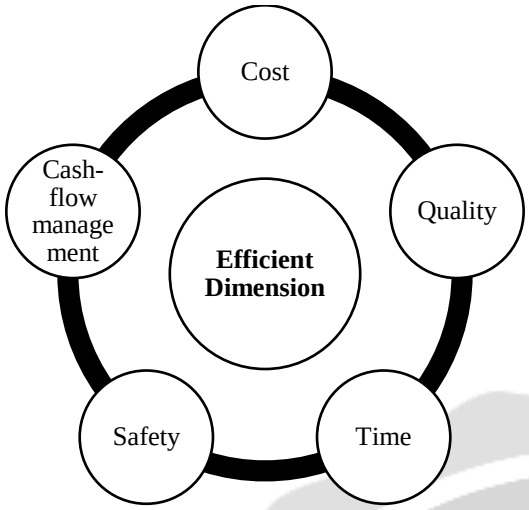

Figure 2: Construction efficient dimension
Source: Susil *et al*. (2017)

Efficient dimension (also, known as short-term perspective) for construction project success, according to Susil, Warnakulasooriya and Bhadra (2017) are as follows:

2.2.1 Cost dimension

The cost level is a very important factor in most construction decisions, and its estimates are prepared during the planning, design and construction phases of a construction project. Various types of cost estimates are made in a construction project, from preliminary estimates to detailed estimates; and all these estimates are important because they invariably influence the expenditure of major expenses (Șerbănoiu & Grădinaru, 2020). Estimates made in the early stages of a project are of particular importance, as they influence the most basic decisions related to the construction project.

A better understanding of the notion of efficiency is critical to dissolve ambiguity about it, yet many confuse efficiency with other supposedly synonymous notions such as profitability, successfulness, competitiveness or productivity (Nábrádi, Petô, Balogh, Szabó, Bartha & Kovács, 2009). In most cases, efficiency is discussed exclusively as the measurable, quantifiable result of activities, however, the authors elucidate efficiency can be examined in terms of national economy, society, regions, corporations and incorporation units as well. According to Narawish, Sharma, Rajest and Regin (2022), cost efficiency is an important and critical aspect that influences the decision-making process. In cases of financial uncertainty, this becomes more basic and significant. Construction clients often demand early and accurate cost advice, because this assists in determining budget, predicting tender price and managing design (Windapo, Moghayedi, Oliphant & Adediran, 2018; Lowe, Emsley & Harding, 2006). However, increases in construction costs also affect the following:

i. Building contract price (Ashuri & Lu, 2010),
ii. Contractors' profit margins (in the absence of any provision in the contract) (Chappel, Cowlin & Dunn, 2010), and,
iii. Create major financial stress and difficulties within the project lifespan.

Windapo *et al*. (2018), there are also effects such as the:

iv. Inability of developers to deliver affordable housing,
v. High tender valuation,
vi. A decrease in tender competition and,
vii. Poor construction industry performance.

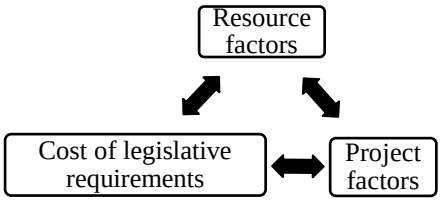

Figure 3: Components of construction costs
Source: Windapo *et al.* (2018)

- Resource factors (labour, materials, plant and subcontractors): Resource factors are the inputs used in the production process to produce an output – this is the final product-building or infrastructure in construction. According to Odediran and Windapo (2014), resource factors contributing to the cost of construction work comprise of labour, materials, equipment and subcontractors.
- Project factors (profit margin, overhead costs, supervision/management, finance, transportation and exchange rates): Regarding project factors, earlier studies by Skitmore, Runeson and Chang (2006) identified overhead costs as a significant contributor to final construction cost. Olatunji (2010), identified transportation costs, interest rates, and fuel price and energy costs as significant contributors to construction costs.
- Cost of legislative requirements (professional fees, transaction costs and permits): Meanwhile, previous studies by Sawhney, Walsh and Brown IV (2004), Akintoye (2000) found that stakeholder requirements such as professional fees (for design and supervision), contract documentation/transaction costs, and legal and financial requirements were significant contributors to construction costs.

2.2.2 Quality dimension

A construction project according to Ashokkumar (2014) goes through different phases such as conceptual planning, feasibility study, design, procurement, construction, acceptance, operation, and maintenance in its life span. According to Oyebisi, Ede, Olutoge, Ngene, Ofuyatan and Oluwafemi (2019), one of the important factors that determines the success of construction projects is quality; and the effective management of construction project in all phases of its life cycle is linked to quality.

The pressure to reduce the initial costs of construction and supervision continue to have had a detrimental effect on quality and is evident in both developed and developing countries; and, lack of quality in construction is manifested in poor or non-sustainable workmanship, and unsafe structures, and in delays, cost overruns and disputes in construction contracts (International Federation of Consulting Engineers; FIDIC. 2019). FIDIC believes that construction should be sustainable, and to this end each party in the construction process should be committed to satisfying its obligations in respect to achieving Quality of Construction.

Construction is considered less progressive than other industrial sectors (Landin & Öberg, 2014; Timmer *et al*., 2011; Bröchner, 2010). There is highly need for improvement in terms of the efficiency of work, for instance in programmes of continual improvement (Landin & Öberg, 2010; Smyth, 2010) or in generative learning (Kululanga, 2009). Improvements can concern a process or be of a purely technical nature, and a variety of factors are considered to be influential in bringing about improvement (Landin & Öberg, 2014). Improvement gives births to quality in projects. As quality remain on of the triangulation that ensures customers satisfaction in construction products.
Quality control, quality assurance, quality improvement, and quality standards were stated as concepts encompassed and embedded in the term "quality management" in the construction firm (Ogunde, Olaolu, Afolabi, Owolabi & Ojelabi, 2017).

2.2.3 Time dimension

Construction duration is defined as the time frame given by the Client of a project use to complete the project under normal working conditions, practice of construction. However, often times, projects faced time overruns (Ting, Darrell, Kueh, Lee & Ng, 2021). The construction industry's influence links to its share volume and its role in sustainable inflation produced from the consecutive economic globalization phenomena. The constellation of construction industry factors towards the human index is not merely concentrating on economic attributes and indicators; it extends on various scales affecting a macro and micro dimension on developments growing (Zaid, Mukhtar, Kherun & Muhamad, 2022). The instruments available to achieve unique development are always related to the critical entity of construction; consequently, all mega superstructure and substructures compel the building's necessary procedure in employment.

Projects have become more time-constrained in recent decades, and the capacity to complete on time has become an increasingly crucial factor in projects (Sharma, Mishra & Selvam, 2022). Client support, according to Gambatese and Hallowell (2011), where process operation time and customer satisfaction are used as indicators of efficiency and effectiveness respectively. Hekkert, Suurs, Negro, Kuhlmann and Smits (2007) discussed that, the progress of a constructor sector depends on the implementation of new developments, including technical innovations, as well as barriers and opportunities. As time of construction project delivery matters a lot to clients nowadays.

2.2.4 Safety dimension

Site safety has always been considered as a tough nut to crack problem in many different places around the globe (Li & Poon, 2013). It costs many deaths and injuries over the past ten years (Poon et al. 2008). As many construction accidents on site occur not because of one or two reasons but when one or more distant and immediate factors go wrong. Safety management, therefore, should not focus solely on the direct causes. The management should also spend effort on eliminating the indirect causes (Li & Poon, 2013).

Safety in the construction industry is considered a major issue in developed and developing countries. The construction sector suffers recently from poor safety and health conditions as safety rules do not exists and work hazards at the workplace are not perceived; and, by implementing safety management is to promote working conditions and work practices that will assure all employees of a safe and healthful work environment for all construction activities (Priya, Kothai & Kohilambal, 2016).

Construction has been presented in the course of history wherever there are human civilization and development, incorporating the usage of environmental resources of land, geography and human innovation, skills, and workforce to be utilized for structures to serve as welfare and continue needs (Zaid *et al*., 2022). By this evidence, the construction industry and enterprise are indispensable components in the whole development process, as a positive result has been beheld by the association of construction in advancing nations into becoming world-leading in commercial, industrial (Alaghbari, Al-Sakkaf & Sultan, 2017).

2.2.5 Cash-flow management dimension

Construction is an important branch of any national economy because it affects many aspects such as production, employment, income, sustainable development. In a crisis, the significant position of this sector is proven through the place it occupies in short, medium and long-term government programs. The stimulation of construction can be achieved by creating better conditions for the construction companies to work and attracting and increasing foreign and national investments. Economic actions and policies are needed, which will have a positive impact on this market, and will have direct and indirect effects on the overall development of the economy, but they depend on the capabilities of each country (Marichova, 2017).

2.3 Construction Project and Client's Satisfaction

In an increasingly competitive environment, companies must be customer oriented and customer satisfaction represents a modern approach for quality in business life and serves the development of a truly customer-oriented culture and management (Omonori & Lawal, 2015); as modern management science's philosophy considers customer satisfaction as a baseline standard of performance and a possible standard of excellence for any business organization. Hence, the client's goal is to attain the desired outcome through good design, good planning, and good construction (Mohamed *et al*., 2020). It is important to make the distinction between a project, something with a defined start and end point, and normal work that recurs. A project is a unique piece of work, with a defined beginning and end. And at least one major crisis. It has been estimated that 30% of the world economy is based on projects, yet 70% of projects fail. Project managers are under constant pressure to deliver on time and on budget. Omonori and Lawal (2015) noted that, as the Nigerian construction customers become more sophisticated, it is now very important that firms within the construction industry determine the factors that are important and relevant to the customers' firm choice decisions. It is almost inevitable for a construction project not to be faced with at least one complex situation which could lead to undesired project outcomes, thereby leaving clients dissatisfied with its overall performance (Chigangacha & Haupt, 2016).

In construction, the client is often taken as the person or organisation that procured a project; and as a result, construction companies strive to keep their customers satisfied as this signifies the customer retention and loyalty (Karna, 2004). Also, the client is the owner of a (construction) project or buyer/seller of products or services (Haddadi, Johansen & Andersen, 2016). Client satisfaction is the extent to which perceived quality matches his expectation (Karna, 2004). A client is an organization or a person who benefits from having a project that is designed and built, and pays the price of construction (Chigangacha & Haupt, 2016; Van Rijn, 2005). In another perspective, client is the project originator who has the responsibility for the production related to any project (Aiyetan, Smallwood &

Shakantu, 2013). According to Mohamed, Sivadass & Ahmmed (2020), client could be portrayed as an individual or an organization who obtains the necessary services through a contract with other parties to start the execution and to complete a project with acceptable satisfaction to all in needs; also, the client has a great influence on construction activities, which will decide the success or failure of a particular project. However, clients wish for a riskless, low cost, good quality project that is completed within the desired timeframe (Chigangacha & Haupt, 2016; Lindblom & Isakson, 2012). Based on Rashvand and Majid (2014) assertion, that the satisfaction of clients is characterised by the delivery of services or products that match or exceed their expectations.

Clients play an essential role in construction projects by determining the project outcomes, and these construction roles often vary depending on each stage of the project and on the systems procurement, followed (Alharthi, Soetanto & Edum-Fotwe, 2014). Moreover, clients needed to recognize the entire anticipated quality as customer's satisfaction (Ramabodu, 2014). The delight of moving into your newly built house on time and on budget quickly by clients fades away when the clients realise that the builder has cut corners. The roof leaks, the heating does not work, the doors will not close properly. Would you prefer a quality job that was delayed by a couple of months and cost a few thousand pounds more? Impressions of quality last for a lifetime of use.

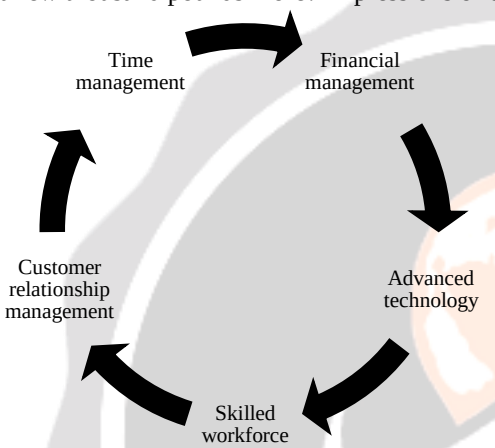

Figure 4: Key influences on client satisfaction

The client always has three common hopes for project delivery: firstly, finished on time; secondly low cost; and the third expectation is achieving high quality (Mohamed *et al*., 2020; Forgues, 2006). The client should consider the three important parameters time, cost, and quality in order to plan and manage a project successfully. To achieve successful project outcomes, client involvement should increase as project complexity increases (Alsolaiman, 2014). Walker (2015) also, suggests that a focused and positive perception of contractors and their project managers in respect of time, cost and quality of product can significantly ensure higher client satisfaction.

In addition, Companies use various forms of customers' satisfaction approaches in developing and monitoring product or service offerings in order to manage and improve customer relationships. However, Omonori and Lawal (2015) stated that, measuring customer satisfaction has several benefits for organizations to include:

i. Evaluation of progress towards the goal
ii. Improvement in communication between parties and enable mutual agreement
iii. Monitoring and reporting accomplished results and changes, and,
iv. A recognition of the demand of improvement in the process.

2.3.1 Features of Customer Satisfaction in Construction

In construction, customer satisfaction could be determined by the extent to which a physical facility (product) and a construction process (service) meet and/or exceed a customer's expectations. This definition recognizes the importance of understanding, evaluating, defining, and managing expectations so that the customers' requirements are met (Omonori & Lawal, 2015). In construction, the completed facility refers to the physical product left standing when the work has been completed and the contractor-customer interactions involved in it are over.

2.4 Building Construction Project Delivery System and Features affecting BCPDS in Nigeria

Building construction project delivery system or method are numerous in nature and the choice of engaging in any of the system/ or method [(BCPDS)/ or (BCPDM)] depends on the owner (client) which also guaranteed the

project success at long run. Ezeokoli, Bert-Okonkwor, Okongwu, Fadumo, Ohaedeghasi and Okoye (2021) stated that, construction industry in Nigeria has achieved a great feat not only in the provision of labour and GDP but as well as the ripple effect that emanates from setting up a construction site a particular location, such as market to building/construction materials vendors, work to both skilled/unskilled/casual labourers, and market to local food sellers, to name but a few. For the past few decades, the industry continuously has witnessed tremendous change in design and construction of buildings and other civil works.

The polarization of construction from design stage in the construction industry has risen above the expected efficiencies due to specialization and perceived need for independent design and construction. But resulting from fragmentation and adversarial contractual principles, which has been seen by stakeholders as an unfortunate departure from the single-point procurement provided by the master builder of centuries ago (Okore, Akpan & Amade, 2017). Barutha (2018) stated that, commonly used project delivery arrangements do not work well for complex industrial projects due to the large scale of uncertainties, complexities, work processes, and interactions required from project participants. Delivery of building construction project system/method can be categorised as a framework designed to achieve the satisfactory completion of a construction project from conception to occupancy (CMAA, 2012). Oloyede and Anifowose (2017) stated that, both public and private sector of the building construction industry can choose any of the listed building project delivery system/method but no matter the system/method chosen in delivering a building construction project, it has to be ensured that all the rules and regulations guiding the system/method chosen are followed diligently in order to avoid failures during and after delivery of the building construction project.

Okore *et al*. (2017) stated that, a project delivery method equates to a procurement approach and defines the relationships, roles, and responsibilities of project team members and sequence of activities required to complete a project. Construction industry in both developed and developing countries is a great contributor and/or a critical component to economic growth and development. Furthermore, according to Okore *et al*., 2017), attempts to redress these imbalances have led to experimentation with a proliferation of procurement options. These include different approaches such as:

i. The allocation of design, construction, supervision and management functions.
ii. Distribution of risk as reflected in the various contract conditions.
iii. Mode of payment.
iv. Selection of project team and sub-teams.

Oloyede and Anifowose (2017) described various delivery of building construction project in the figure below.

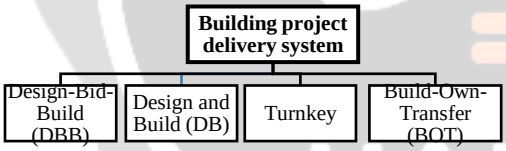

Figure 5: Common System/Method of Building construction project delivery in Nigeria
Source: Oloyede and Anifowose (2017)

However, according to Okore *et al*. (2017), the different delivery methods of projects are distinguished by their approach, the contract between the owner, the designer, and contractor are formed and the technical relationship that evolve between each party in these contracts. According to the Construction Industry Institute (CII), there are only three fundamental project delivery methods: Design-Bid-Build (DBB), Design and Build (D-B), and Construction Manager at Risk (CMR). Although there are other multitude of names for project delivery methods throughout the industry, but the CII has simplified the categorization process by focusing specifically on the contract's content and the roles of each contracting party.

2.4.1 Design-Bid-Build (DBB) method of building construction project delivery

Design Bid Build is the traditional project delivery method in which a client either completes the design using own design professionals or retains a designer to provide complete design services. Then advertises and awards a distinct construction contract based on the completed construction documents. The owner maintains most of the risk and is responsible for the details of the design. After the completion of the project, the owner is responsible for operating and maintaining of the project. In a Design Bid Build, the client "owns" the details of design during construction and as such is financially liable for the cost of any errors or omissions encountered in construction. This is called the "Spearin Doctrine". Public DBB projects are generally awarded on a low-bid basis. There is no contractual incentive for the contractor to minimize the cost growth in this delivery system. A contractor who has submitted a low

bid may need to look to post-award changes as a means to make a profit on the project after bidding the lowest possible margin to win the project (Okore, 2014). Design-Bid-Build (DBB) projects can also be awarded on a negotiated basis and a best-value basis. In both cases, the probability that the project will be awarded to a contractor who has submitted a mistakenly low bid is reduced, and regardless of the award method, DBB is distinguished by little contractor input to the design. Thus, the owner relies heavily on the designer alone for constructability review.

Bo *et al*. (2016) poses that, the characteristics of (DBB) Delivery System are the unique attributes that differentiate it from other available project Delivery Systems. The effectiveness and successful management of characteristics of (DBB) Delivery System have a considerable impact on the success or failure of a project. Therefore, having clearer understanding and being familiar with the attributes of the (DBB) delivery system is considered to be the most important competency of owners, designers, constructors and various consultants.

Many researchers have posed the characteristics of this system/method of building construction delivery of projects to include: Owner controls design and construction (WSDOT, 2015), Design changes easily accommodated prior to start of construction, Design is complete prior to construction award (Bo *et al*., 2016), Construction cost is fixed at contract award (until Change Orders) (Bo *et al*., 2016, WSDOT, 2015), Low bid cost, maximum competition (Bo *et al*., 2016), Relative ease of implementation, Owner controls design/construction quality (WSDOT, 2015), Requires significant owner expertise and resources (WSDOT, 2015), Shared responsibility for project delivery, Owner at risk to contractor for design errors (Bo *et al*., 2016; WSDOT, 2015), Design and construction are sequential, typically resulting in longer schedules (Bo *et al*., 2016; WSDOT, 2015), Construction costs unknown until contract award (WSDOT, 2015), No contractor input in design, planning, or value engineering (VE) (Bo *et al*., 2016; WSDOT, 2015).

2.4.2 Design and Build (DB) method of building construction project delivery

The Design-Build (DB) method dates back to the construction of pyramids, when it was referred to as master builder. According to Siemiatycki (2015), Design-Build (DB) is a project delivery method in which the client procures both design and construction services in the same contract from a single, legal entity referred to as the design-builder. The method typically uses request for qualifications (RFQ)/ request for proposals (RFP) procedures rather than the DBB invitation for bids procedures. There are a number of variations on the DB process, but it all involves three major components. Firstly, the client develops an RFQ/RFP that describes essential project requirements in performance terms. Secondly, proposals are evaluated, and thirdly, with evaluation completed, the owner engages in some process that leads to contract award for both design and construction services.

The Design and Build (DB) entity is liable for all design and construction costs and normally provides a firm, fixed price in its proposal. Therefore, if the client fulfils entire contract obligations as at when due, he/she would not be liable for any future cost growth. The contractor/builder has early constructability input to the design process as the client no longer owns the details of design and its relationship with the design-builder is based on a strong degree of mutual professional trust. The design-builder literally controls this project delivery process, and the Design and Build (DB) delivery method has the greatest ability to compress the project delivery period and as a result of this is often used for "fast-track" or "Quick Win" projects. The Design-Build delivery methods are modified to suite different types of projects depending on the scope of the project (Oloyede & Anifowose, 2017).

Ellis (2023) stated that, Design-build is a construction project delivery method where the designer and builder work together under a single contract from the beginning of the project in order to ensure unity and collaboration throughout the process, and the method is one of the most progressive methods of project delivery and is quickly becoming an industry standard. The characteristics include the following: Design-build creates one entity under one contract, It makes a more unified flow of work compared to traditional methods with multiple entities and contracts with a less unified approach, It increased project speed, It reduced costs, It increased more collaboration, It increased less risk, and, it encouraged fewer mistakes.

2.4.3 Turnkey method of building construction project delivery

Turnkey contracts have its origins within the real-estate sector and is a metaphor for the simplicity of turning the key and opening the door to your house (Mimoso, 2020). Turnkey describes a project in which the service provider or the contractor takes the single point responsibility to complete the project in all aspects and hands over to owner/client in a ready to use state (Vignesh & Chandan, 2018). A turnkey project is a delivery method in which a contractor works with a project owner under a single contract to complete all project stages from detail engineering through construction. Turnkey projects can eliminate inconveniences for the project owner by placing responsibilities on the contractor that would otherwise fall on the owner in a traditional design-bid-build (DBB) delivery (H+M Industrial EPC, 2023). Nowadays, the owner or promotor of any major infrastructure project takes the rout of turnkey contract. The advantage of turnkey contract is that the complete responsibilities and the risk of project completion lies

with the turnkey contractor or service provider. According to Vignesh and Chandan (2018), any project execution has to take care of schedule (timeline), cost and quality.

2.4.4 Build-Own-Transfer (BOT) method of building construction project delivery

Build-Operate-Transfer is a concept used to describe an aspect of public-private initiative in executing capital intensive projects, and it is a process whereby public can partner with private sector in executing capital project and infrastructure (Amusan, Joshua & Oloke, 2013). Also, this could be referred to as a form of project financing mechanism that helps a private entity to obtain a concession from public to finance, design, construct and manage a facility. On a typical BOT project, the financier looks primarily to the project as only means of loan repayment in case loan facility is accessed in the project financing; this is usually premised on the credit worthiness assessment of the project at feasibility stage. So also, it involves security assurance, security taken on a typical BOT project which is often restricted within the project portfolio. BOT mechanism is a complex structure comprising multiple, inter-dependent agreements among various parties. Some of such parties includes: government, private company (concessionaire), lenders (banks), equity investors, contractors, suppliers, operators and financial advisers. Government grants concession to the private sector (concessionaire), through concession agreement. The concessionaire is responsible for design, finance, construction, and operation of the facility.

2.4.5 Construction Manager at Risk (CMR) method of building construction project delivery

In Construction Manager at Risk (CMR), there are two types of construction manager (CM) arrangement namely: Construction Manager at Risk (CMR) and Construction Manager at Fee (CM @ Fee). Construction Manager at Risk (CMR) projects are characterized by a contract between a client and a construction manager who will be at risk for the final cost and time of construction. The original idea of CMR is to furnish professional management at all phase of a project life for a client whose organization may not have that capacity internally. In this arrangement, the client authorizes the construction manager to provide inputs during the project design stage. The Construction Manager (CM) acts as the general contractor during construction, that is, the Construction Manager holds the risk of subletting the construction work to trade subcontractors and guaranteeing completion of the project for a fixed, negotiated price which is the Guaranteed Maximum Price (GMP). Above this price, the client is not responsible for payment, if the project scope change after the Guaranteed Maximum Price (GMP) has been established. Often, this contract also includes incentive clauses in which the Construction Manager at Risk (CMR) and the client can share any cost saving realized below the GMP. However, in this scenario, the Construction Manager (CM) also provides advisory professional management assistance to the client prior to construction, offering schedule, and budget and constructability advice during the project planning phase. Thus, instead of a traditional general contractor, the owner deals with a hybrid construction managers/ general contractor. In addition to providing the owner with the benefit of pre-construction services which may result into advantageous changes to the project, the CM-At-Risk scenario offers the opportunity to begin construction prior to completion of the design. The CM can bid and subcontract portions of the work at any time, often while design of unrelated portion is still not complete. Furthermore, CM may allow performance specifications or reduced specifications to be used, since the CM's input can lead to early agreement on preferred materials, equipment types and other project features. However, most commonly, the client retains the traditional responsibility of keeping a separate design contract team to furnish the CMR with a full set of plans and specifications upon which all construction subcontracts are based. According to Project Delivery System for Construction the characteristics of the CMR are that: The designer and the CMR hold separate contracts with the owner (as opposed to DB), The CMR is chosen based on a criterion other than just the lowest construction cost (as opposed to DBB).

Enhanced constructability, real-time construction pricing capability, and speed of implementation are the major reasons why a client would select the CMR method. Unlike DBB, CMR brings the contractor/builder into the design process at a stage where definitive input can have a positive impact on the project. The construction Manager at risk CMR can and is expected to provide realistic project cost estimates early in the project life cycle. Traditionally, project delivery system/methods are usually chosen based on the decision-makers' experience and knowledge and the project's information, without exploring the inherent dependencies between influencing factors and the project delivery system/methods. However, Bingsheng *et al*. (2015) assert that, decision-making of the project delivery system/method is an important link in the entire lifecycle of a project and is a critical factor leading to project success. Therefore, many factors and/or characteristics are reported in the work of Bingsheng *et al*. (2015) to be affecting the construction project delivery system/methods in the construction industry, and these include the following:

i. Responsibility
ii. Client's level of construction complexity
iii. Familiarity

iv. Ability to state clear end user's requirements
v. Client's experience with similar projects and available human resources.
vi. Consultant's experience with similar projects
vii. Client's in-house technical capability and financial capability
viii. Consultant's staffing level to attend to contractor
ix. Risk allocation
x. Client's willingness to be involved and Client's trust of other parties
xi. Maximizing and minimizing the Client's controlling role and involvement
xii. Client's level of construction complexity and requirement for an aesthetic building
xiii. Client's requirement for low maintenance cost and willingness to control over design.

2.5 Theoretical Review

The research adopted and pinned the study on efficiency and reinforcement theories as shown below.

2.5.1 Efficiency Theory

Balanced portfolio postulated by Atemnkeng (2006) has provided useful knowledge on organisations' profitability. These ideas are linked to the productivity of organisation costs and the reasons. As the market power principle suggested by Tregenna (2009) states, there is a clear connection between the output of an organisation and the sector's market structure. Two separate approaches to the principle of market forces are systemic efficiency (SCP) and relative market power (RMP). The SCP method notes that the degree of concentration in the banking sector increases the organisation potential strength, which increases their profitability. Organisation competing in concentrated markets may decrease deposit rates and charge higher lending rates for monopolies that produce abnormal returns. Businesses with less concentrated economies do not possess this privilege despite their productivity. Despite the others, the RMP theorem demonstrates how the market share impacts the cost competitiveness of organisations.

It implies that only the major organisation can sell distinguished goods thus raising their income will affect rates. Tregenna (2009) notes that major organisations can wield pricing control to create non-competitive profits. Another hypothesis, named the theory of performance, is based on the horoscope that banks receiving high income are more effective than those not. This principle is further broken down into the hypothesis of X-efficiency and Scale-effectiveness. The approach to x-efficiency is focused on the belief that lower cost to a more productive organization explains why higher returns are produced. Athanasoglou (2006) notes that these businesses will acquire greater market shares that allow them to attain a higher degree of market concentration without any clear relation between concentration and cost-effectiveness.

2.5.2 Reinforcement Theory

Psychologist Skinner contends that human behaviours are directly related to the results of their acts. By applying reinforcement, people's behaviours will change (Courtland *et al*., 1993). Monetary incentives, such as cash allowance, increase in salary and non-monetary incentives such as being named ''Achiever of the Week'', can motivate or positively reinforce employees to do good work (Davidsom & Griffin 2006). By offering pleasant consequences, positive reinforcement can motivate people to do the work. Usually, there are too few winners in any incentive programme, distrust and corruption among members of organization can lead to much greater concern. Moreover, monetary incentives can be costly and useful in short term only. It is quite often that they do not encourage long-term improvements (Li & Man 2006). Successful positive reinforcement strategy, therefore, can also motivate safety officers or workers with computer knowledge to share their safety knowledge by means of IT. Sometimes, employees will do work in one way because they know that if they do in another way, they will have negative consequences. In this way, their behaviours are reinforced by avoidance learning (Courtland *et al*., 1993). Negative reinforcement, however, can offset positive punishment reinforcement. Sometimes, positive values of co-workers are so great which lead the workers to accept punishment instead (Schermerhoen *et al*., 2003). In order to achieve some of the companies' objectives and implement new innovative policies, newly implemented policies are usually associated with penalties for those violators.

2.6 Empirical Review

A study was conducted by Faten Albtoush, Doh, Rahman and Al-Momani (2022) on the Critical success factors of construction projects in Jordan: an empirical investigation. The researchers x-rayed that, the construction sector is considered one of the most important engines of the national economy in any country; in addition to that, it clearly contributes to improving the quality of life of individuals. In the construction industry, project success is

crucial, because it reflects positively on the growth of the national economy, in partnership with other sectors related to it directly and indirectly. However, construction projects often come with disappointment in completion within time, cost, and quality, for multiple reasons throughout the project life cycle. The data were collected and analysed from the final reports of a number of projects that had been implemented in 15years. The result illustrates that the most significant and vital factors for the success of the construction project are: quality-related factors, cost-related factors, time related factors, contract-related factors, and related external factors. Results help project stakeholders improve construction project performance by identifying factors that have affected project success. This allows them to take appropriate measures for every worker to ensure the success of their projects. In addition, this study contributes to the current body of knowledge by being one of the few studies that analyse project data to identify critical success factors for construction projects in developing countries.

Another study was conducted by Amoah, Berbegal-Mirabent and Marimon (2021) on 'What makes the management of a project successful? The case of construction projects in developing countries. They noted that, many developing countries (DCs) are currently spending on construction projects due to the high demand resulting from rapid urbanization. However, the results of these projects in terms of time, cost and quality do not tend to meet the expectations of the stakeholders. Despite the relevance and high visibility of this situation in many DCs, this topic has received little research attention. This study examines the combined effect of six factors that are commonly signalled in the project management literature as determinants of successful project management in construction projects. The ultimate goal was to identify the extent to which traditional factors play a role in project management in DCs, as recent studies have highlighted the uniqueness of project management in these countries, therefore, requiring specific analysis within this context. To empirically address this goal, they rely on an ad-hoc survey that collects the responses from 120 project management practitioners in Ghana. First, building upon existing works, we construct and validate a scale that evaluates project management practices in DCs. Next, we use qualitative comparative analysis to scrutinize which combination(s) of the aforementioned six factors lead to successful project management in construction projects. The findings support the initial intuition about the existence of distinct pathways, suggesting that there is no unique formula, but that different situations (i.e., combinations of factors) might require the adoption of diverse project management practices. The primary contribution of this research stems from adding to the project management body of knowledge the understanding of how a combination of factors can assist construction engineers and project managers to plan and implement successful construction projects in DCs.

In 2021, Dorcas and Charles (2021) conducted a study on the Impact of Collaborative Processes on the Success of Construction Projects in Nigeria. They noted that, Collaboration is essential to the success of construction projects and a defined collaborative process is one of the key elements of a successful relationship in construction. Although the consultant and contractor are key stakeholders in construction yet it is not being proven how their relationship affect projects in Nigeria's construction industry. In their study, quantitative study was conducted and primary data were collected through structured questionnaire on collaborative processes, success factors of projects in relation to collaboration and the impact of consultant-contractor collaboration on project success. The data collected from 135 consulting and construction firms in Lagos, Nigeria was analysed using frequency distribution, mean score, ANOVA and multiple regression. The finding of the study revealed that the consultants and contractors are involved in the collaboration processes though they are mostly involved clear roles and responsibility, information sharing, cooperation and coordination, improved communication and collaborative governance. Also, the finding revealed that efficient coordination and dedicated team are the collaborative factors that contribute more to project success. Conclusively, the finding depicts that effective and efficient collaboration between consultant and contractor significantly impact the success of construction projects with R^2 as 0.7403. The implication of the study is that project actors should continually accept and practice all levels and processes of collaboration and so as achieve a successful project delivery and pave way for the implementation of digital collaboration in Nigeria's construction industry.

Omoniyi, Akinola and Alake (2021) conducted a study on Impact of Characteristics of Design-Bid-Build Delivery System on Construction Project Performance in Nigeria. The study examined the impact of characteristics of Design-Bid-Build (DBB) delivery system on construction industry with a view to enhancing project delivery. A total of 13 DBB distinguishing attributes were obtained via literature review. Primary data were used for this study. Structured questionnaire was administered to consultants and contractors' personnel in Lagos State, Nigeria. A total of 200 copies of questionnaires were administered and 148 copies which represent a combined response rate of 74% were retrieved. Data were analysed using frequency distribution, percentages and spearman's rank order correlation. The findings indicated that Construction cost is fixed at contract award (until Change Orders), Design is complete prior to construction award, Relative ease of implementation, Low bid cost and maximum competition, Owner at risk to contractor for design errors and Design and construction are sequential have positive direct effect on cost overrun. This study concluded that characteristics of Design-Bid-Build (DBB) delivery system had significant impact on the

expected performance of construction project and recommended that stakeholders should have clear knowledge of unique characteristics of DBB delivery system for successful project execution.

Gunduz and Almuajebh (2020) conducted an investigation on Critical Success Factors for Sustainable Construction Project Management. They posed that; it is necessary to identify critical success factors (CSFs) that affect the construction process. The contribution of this paper is to categorize project success factors into categories and quantify the effect of each category taking into account the effect of all stakeholders on project efficiency and progress. To achieve this objective, a comprehensive literature review was carried out. After literature review, 40 success factors were compiled into seven categories: project-related factors, company- and work-related factors, client-related factors, project management factors, design-team-related factors, contractor-related factors, project-manager-related factors. Consequently, a survey including these listed success factors was prepared and distributed to various experts in the construction field to be ranked; 148 responses were received. Employing the Relative Importance Index (RII) and traditional Analytic Hierarchy Process (AHP) method with Saaty random index that prioritizes these CSFs, the collected data were analysed after receiving responses. Even though there were disagreements in stakeholders' views and their goals, significant areas have been identified as project financial issues, managerial aspects, and authorities' approval mechanism. The outcome of this paper would be used by construction industry professionals to support, evaluate, and measure the success of projects for better allocation of resources.

In a study conducted by Ibrahim and Daniel (2020) on the Influence of Project Planning Processes on Construction Project Success in Nigeria. The established that, success or failure of any construction project begins from the planning stage. During the study, a structured questionnaire was developed by using Likert scale and applied on 60 respondents. A total of three organizations in the Federal Capital Territory were surveyed. Construction project success acts as independent variable while project planning processes as dependent one. The method used for the research is quantitative and applied survey instrument for data collection. For data analysis purpose, SPSS is used for descriptive statistics. The results have shown that Creation of Work Breakdown Structure (WBS), Program Evaluation Review Technique (PERT) or Gantt chart, Project Schedule Network, Determine Budget and Quality Management Plan have the highest awareness and usage by the selected firms and WBS has been found to be the most significant planning process. Additionally, the correlation between total level of planning and project success rho (60) = -.493 with p=.032, and between total level of planning and the efficiency component of project success rho (60) = -0.618 with p = 0.005, were statistically significant, given $\alpha = .05$ (two tailed) while the correlation between total level of planning and the effectiveness component of project success was not statistically significant. Overall, an increasing awareness of project planning processes was observed and that has also led to the success of construction projects. The findings of this research therefore signify the necessity of frequent use of some other project planning processes like risk management plan, activity resource requirements in other to see better performance of construction projects. Continuous development seminars and trainings in project management should also be organized for all professionals in the sector both in private and government organizations.

A study by Okore *et* al. (2017) on the construction industry is an important sector of every economy the world over and as such it has its own peculiar problems, one of which is cost overrun. The study aimed at investigating the effects of cost overrun factors on the various types of project delivery methods in Nigeria. Data for the study was elicited through questionnaires administered to experts and stakeholders in Edo and Delta States respectively. The questionnaire contained 32 cost overrun factors which were sub-divided into various groups according to their sources. Ninety-six (96) of the questionnaires were sent to the respondents comprising 24 each from four groups that were randomly selected using the stratified random sampling technique. Descriptive and inferential statistics were both deployed in analysing the data viz; fuzzy set analysis, analysis of variance (ANOVA) and earned value management (EVM) methodology. The study shows that a substantial relationship exists between project cost overrun and the delivery methods used in project execution in the study area. The results revealed that inaccurate cost estimates by cost estimators, changes in work scope by client and low price bidding by contractors top the list of major causes of cost overruns in Nigeria. The findings further revealed that the rate of project cost overruns was 45.56%, while the rate of project cost overruns lies between 30% and 58% of the total project cost. The results further revealed that the client is more prone to risk (65%) in Design Bid-Build (DBB) delivery method, while contractors are more prone to risk (54%) in Construction Manager at Risk (CMR) delivery methods; both clients and contractors bear 20% and 33% risks respectively in Design and Build (DB) delivery methods. The study concludes by recommending that government should discourage the use of Design-Bid-Build as the main official procurement method, and the need to adopt other viable alternative procurement methods that will protect the client from cost overrun tendencies.

Also a study by Hamma-Adama (2017) on causes of Building Failure and Collapse in Nigeria: Professionals' View. To investigate this phenomenon, primary data were collected through a questionnaire survey from professional construction consultants, contractors and clients. 150 structured questionnaires were randomly distributed of which 99 number were successfully retrieved for analysis. The 99 number questionnaires were analysed using simple

statistics and charts. The result reveals that the frequency of building collapse in Nigeria is at an alarming rate and the impact is moderately major; substandard reinforcement, structural steel and cement used for the production of foundations, columns, beams and slabs are the main causes of building collapse (in descending order). While all these are associated with lapses in construction supervision with a relative importance index (RII) of 0.812 (ranked 1st) followed by construction process with RII of 0.709. Professions/professionals linked to the problems were also examined and recommendations are made based on the findings of the research.

Research conducted by Zhao, Jiang, Li and Liu (2017) on the Analysis of Factors Affecting Project Success in Chinese Context Based on Interpretative Structural Modelling. The study confirmed that, in the field of engineering management practice in today's China, the theoretical research of project success is still a hot topic. On the basis of literature and Chinese context, the project success factors are summarized for the Chinese construction projects, and the hierarchical structure model of project success factors is constructed by interpretation structural modelling. The results show that the different factors of project success have different effect on project success, but the abilities and experiences of the project owner and project manager are still the most important influencing factors for project success in today's China.

Another study was conducted by Adebowale and Ayodeji (2015). Analysis of Construction-Related Factors Affecting the Efficiency of Construction Labour. They posed that, irrespective of significant relevance of construction industry to economic growth of developed and developing nations, labour efficiency in the construction industry remains relatively low and thus affects construction project delivery and client's satisfaction. The study adopts mixed methodological approach, administering closed ended questionnaires to construction professionals on Western Cape and Gauteng construction sites, while experienced construction site supervisors were interviewed to validate quantitative data obtained. Statistical Package for Social Sciences (Version 22) and content analysis were used respectively to analyse data obtained. Communication ability of site managers, construction skills of site supervisors and effective site planning ability of contractors were found as the predominant construction related factors affecting the efficiency of construction labour. This study was restricted to contractors, site supervisors and site managers' related factors affecting the efficiency of construction labour. Adequate application of findings presented in this study will significantly reduce the current prevalent construction time and cost overruns through an improved construction workforce performance. Enhanced construction productivity is a product of construction labour efficiency that ensures achievement of construction project objectives and heightens contribution to South African economic development.

Bingsheng *et al.* (2015) conducted a study on 'which Owner Characteristics Are Key Factors Affecting Project Delivery System Decision Making? Empirical Analysis Based on the Rough Set Theory'. This paper mainly aimed at the Client's characteristics and researched the key factors affecting the decision-making of the PDSs; other two aspects will be studied in the subsequent research. Twenty-two influencing factors of Client's characteristics are summarized through a literature review, and 14 relatively important and high frequency factors with high frequency are chosen after discussion with specialists. Based on this, the Client's characteristics information from 76 Chinese construction projects, collected through questionnaires, is taken as the research sample. Then, rough set method is applied to reduce the redundant factors and result indicates that (1) responsibility, (2) the Client's willingness to be involved, (3) the Client's in-house technical capability, (4) risk allocation, and (5) the Client's willingness to control overdesign are the Client's five most key characteristics factors affecting PDSs decision-making. The research result provides a valuable reference for owner choosing appropriate PDSs and enriches the research methods in the field of PDSs. Although design-build (DB), design-bid-build (DBB), and engineering-procurement-construction (EPC) are deeply studied in the research reported in this paper, the other PDSs such as turnkey, construction management, and project management (PM) would be taken into consideration in further researches.

In research conducted by Serrador and Turner (2015) on the Relationship between Project Success and Project Efficiency. The research used a survey of 1,386 projects, and found out that project efficiency correlates moderately strongly to overall project success (correlation of 0.6 and R^2 of 0.36); as efficiency was shown through analysis to be neither the only aspect of project success nor an aspect of project success that can be ignored. Broader measures of success have been recommended.

A study by Alzahrani and Emsley (2013) titled impact of contractors' attributes on construction project success: A post construction evaluation. The study noted that, the success of construction projects is a fundamental issue for most governments, users and communities. In the literature that deals with construction project success and causes of time and cost overruns in the construction industry, there is some literature that highlights the role of the contractors in project success. While most studies rank contractors' success attribute from tendering, prequalification, and a long-term historical perception perspective, this paper aims to study the impact of contractors' attributes on project success from a post construction evaluation perspective to identify what critical success factors (CSFs) that greatly impact the success of project. In an attempt to understand and investigate this impact, a questionnaire survey is used to establish construction professionals' perception of CSFs of contractors that greatly impact on the success of

construction projects. Factor analysis was used which revealed nine underlying clusters namely: (i) safety and quality; (ii) past performance; (iii) environment; (iv) management and technical aspects; (v) resource; (vi) organisation; (vii) experience; (viii) size/type of pervious projects; and (ix) finance. Logistic regression techniques were used to develop models that predict the probability of project success. Factors such as turnover history, quality policy, and adequacy of labour and plant resources, waste disposal, and size of past projects completed, and company image are the most significant factors affecting projects success. Assuming that project success is repeatable, these findings provide clear understanding of contractors' performance and could potentially enhance existing knowledge of construction project success.

3.0 MATERIALS AND METHOD

In this light, quantitative research design approach specifically the descriptive survey was adopted in conducting the research; which was guided by the research objectives (Inuwa, 2014; Oso & Onen, 2011). Because of the fair flexibility in nature of approach of the design which allows for meaningful comparison of responses across the participants involved in the study on the meaningful way of enquiring on the subject matter and the range of responses likely to be obtain.

The targeted population for the research was four-hundred and sixty-six (466) core professionals in the construction industry namely: Architects, Builders, Civil Engineers, and Quantity Surveyors domicile in Gombe State. Hence, the study population is heterogeneous constituting experienced and core construction projects professionals.

Table 1: Population Distribution of the Professionals

SN	Profession	Registered Members
1	Architect	137
2	Builder	119
3	Civil Engineer	101
4	Quantity Surveyor	109
	Total	**466**

Source: Secretariats of the Respective Professional Bodies in Gombe State (2024)

The sample size for the study was extracted from the total number of the 466 core professionals in Gombe State using a formula for calculating sample size by Yamane (1967) shown in equation (i) below.

$$n = \frac{N}{1 + Ne^2} \quad \text{- - - (i)}$$

Where:
n = Sample size to be calculated.
N = Total population of the study.
e = Margin of error @95% level of confidence = 0.05.

$$\Rightarrow n = \frac{466}{1 + (466*0.05*0.05)} = 215.2 \approx \mathbf{215}$$

215 core professionals were determined as the sample size, where it was increased by 1 to be **216 core professionals** for equal distribution among the professionals in the study area as demonstrated in table 2 below.

Table 2: Sample frame

SN	Profession	Registered Members	Sample size
1	Architect	137	54
2	Builder	119	54
3	Civil Engineer	101	54
4	Quantity Surveyor	109	54
	Total	**466**	**216**

Source: Secretariats of the Respective Professional Bodies in Gombe State (2024)

Probabilistic sampling technique specifically random sampling was adopted as the sampling technique in order to reduce the likelihood of bias during the research. This was utilised in selecting the respondents of the study in order to enable every professional in the study to stand the chance of getting selected for the study.

The study utilised questionnaire as the instrument for data which was structured based on the objectives of the study and in a closed-ended questions to avoid the respondents from going outside the scope and for the respondents to choose their choice on a range of questions.

The questionnaire instrument was validated by the Supervisor and the experts in the field of measurement from the Faculty of Environmental Technology of the Abubakar Tafawa Balewa University, Bauchi. All the corrections made by the Supervisor was carefully altered to captured the corrections made and then the instrument was administered in the field for the purpose of collecting data from the targeted respondents. Reliability test of the instrument was generated based on the reliability tool using the Statistical Package for Social Science (SPSS version 23) especially the internal consistency reliability test where Cronbach's coefficient alpha (α) come into play which determined the internal consistency of the construction of the section. Value closer to 1, the internal consistency was higher; hence, a value greater than 0.80 was considered good for significant consistency; value between 0.70 and 0.80 was acceptable for significant consistency; while value lesser than 0.70 was considered poor (Sekaran & Bougie, 2009).

Table 3 below depicted the reliability of the variables used in the study with all the Cronbach's alpha values ranging from 0.75 – 0.81; which means acceptable and good reliabilities. The overall Cronbach's alpha value revealed a value of **0.78** which meant acceptable it measured what supposed to be measured.

Table 3: Cronbach's Alpha (α) measurement of consistency for reliability test

SN	Objectives	No. of Items)	α – Value	Decision
1	To identify the construction efficiency in building construction project in Gombe State.	10	0.75	Acceptable
2	To determine the severity level of the features affecting building construction project delivery system in Gombe State.	12	0.81	Good
	Total	**22**	**0.78**	**Acceptable**

Source: SPSS version 23.

Self-administered questionnaire was administered face-to-face to the core construction professionals which comprised of Architects, Builders, Civil Engineers, and Quantity Surveyors as the study respondents utilizing three (3) additional research assistants to hasten the administration and retrieval of the questionnaire for analysis. The questionnaire instrument was designed in closed-ended questions developed to prompt responses relevant to achieve aim of the study. A pilot test was run on two participants prior to the actual study leading in order to make amendments to the questionnaire questions. Participants' responses were recorded as in the questionnaire and they were given good 24hours to responds to the questionnaire to be able to obtain a good response from the core professionals in the study area.

The data collected was analysed using both descriptive and inferential statistical methods of data analyses; with descriptive to include: frequency count and percentages used in analysing the respondent's demographic information; mean scores and standard deviations were used in the analysing of objectives 1: to identify the construction efficiency in building construction project in Gombe State; objective 2: to determine the severity level of the features affecting building construction project delivery system in Gombe State. While, objective 3: to determine the effect of construction efficiency on the severity level of the features affecting building construction project delivery system in Gombe State, was analysed using inferential tool such as regression. A known software called Statistical

Package for Social Sciences (SPSS) was used as a tool for data analysis in analysing the data collected via the research instrument (questionnaire).

Decisions:

Any item with a mean score ≥ 3.0 was regarded as accepted (A); while, item with a mean score < 3.0 was regarded as not accepted (NA); this was deduced from the 5-points Likert-Scales of:

$$\frac{1 + 2 + 3 + 4 + 5}{5} = \frac{15}{5} = \mathbf{3.0}$$

For severity level: 0.00 – 1.0 Not Severe (NS); 1.00 – 2.00 Less Severe (LS); 2.00 – 3.00 = Moderately Severe (MS); 3.00 – 4.00 = Severe (S) & 4.00 – 5.00 = Highly Severe (HS) as adopted from Miller (2020).

The result of each objective was presented using table for clarity purposes as supported by secondary data and quotes from the data showing the basis of interpretations.

4.0 PRESENTATION OF DATA ANALYSES AND DISCUSSION OF FINDINGS

The study administered 216(100%) questionnaires to the core construction professionals' domicile in Gombe State. However, only 179(83%) well filled questionnaires were returned for analyses.

4.1 Demographic Information of the Participants

Table 5 depicts the demographic information of the participants. 11(6.1%) of the participants are females while, 168(93.9%) are males. 12(6.8%) of the participants are HND holders, 50(28.4%) are Degree holders, 85(48.3%) are PGD holders, 23(13.1%) are Master's holders, while 6(3.4%) are Doctors of Philosophers (Ph.D) holders. 2(1.1%) of the participants are between the age of 25 – 30years, 46(26.1%) are between the age of 31 – 36years, 98(55.8%) are between the age of 37 – 43years, while 30(17%) are above 43years of age. The professional status of the respondents ranges between Architects, Builders, Civil Engineers, and Quantity Surveyors with 44(25%) each, registered with their respective professional bodies (NIA, NIOB, NSE, and NIQS). 4(2.3%) of the participants have less than 5years of practice experience, 21(11.9%) are having 6 – 10years of practice experience, 33(18.8%) have 11 – 15years of practice experience, 98(55.6%) have 16 – 20years of practice experience, while 20(11.4%) have above 20years of practice experience.

Table 4: Demographic Information of the Participant

SN	Variables	Frequency (F)	Percentage (%)
1	**Gender:**		
	Female	11	6.1
	Male	168	93.9
	Total	179	100.0
2	**Highest Educational qualification:**	12	6.8
	HND	50	28.4
	Degree	85	48.3
	PGD	23	13.1
	Master's	6	3.4
	Ph. D	179	100.0
	Total		
3	**Age:**		
	25 – 30years	2	1.1
	31 – 36years	46	26.1
	37 – 43years	98	55.8
	Above 43years	30	17.0
	Total	176	100.0
4	**Professional Status:**		
	Architects	44	25.0
	Builders	44	25.0
	Civil Engineers	44	25.0
	Quantity Surveyors	44	25.0
	Total	176	100.0

5	**Registration Status:**		
	MNIA	44	25.0
	MNIOB	44	25.0
	MNSE	44	25.0
	MNIQS	44	25.0
	Total	176	100.0
6	**Years of practice experience:**		
	Less than 5years	4	2.3
	6 – 10years	21	11.9
	1 – 15years	33	18.8
	16 – 20years	98	55.6
	Above 20years	20	11.4
	Total	176	100.0

4.2 Objective One: To identify the construction efficiency in building construction project in Gombe State

Table 6 below shows the respondent's agreement on construction efficiency in building construction project in Gombe State.

Cash-flow dimension for adequate funding of the project is identified with a mean score of 3.9034 and standard deviation of 1.07911 as the efficient for construction projects in Gombe State. Companywide education on the concept of risk is identified with a mean score of 2.3125 and standard deviation of 1.10129 as not efficient for construction project in Gombe State. Time dimension to ensure prompt delivery of the project is identified with a mean score of 3.6989 and standard deviation of 1.07314 as efficient for construction project. Effective communication and commitment is identified with a mean score of 2.7614 and standard deviation of 1.10991 as not efficient for construction project. Safety dimension to protect the labourers and equipment on site for effective delivery of project is identified with a mean score of 3.6989 and standard deviation of 1.20091 as efficient for construction project. Project competencies and project management skills is identified with a mean score of 2.9886 and standard deviation of 0.99321 as not efficient for construction project. Quality dimension to satisfy the clients and ensure good refutation of the industry is identified with a mean score of 3.6023 and standard deviation of 1.05526 as efficient for construction project. Resource planning and identification is identified with a mean score of 3.0227 and standard deviation of 1.00991 as efficient for construction project. Cost dimension to enhance adequate specification of the project is executed is identified with a mean score of 3.8920 and standard deviation of 1.38502 as efficient for construction project. Effective benefits delivery and management process is identified with a mean score of 2.9716 and standard deviation of 1.26671 as not efficient for construction project.

This with average total mean score (ATMS) value of 3.3642 revealing the agreement of the respondents in accepting that there are dimensions affecting construction efficiency in building construction projects in Gombe State.

Table 5: Construction efficiency in building construction project in Gombe State

Statements	Mean	Std. D	Decision
Cash-flow dimension for adequate funding of the project.	3.9034	1.07911	Efficient
Companywide education on the concept of risk.	2.3125	1.10129	Not Efficient
Time dimension to ensure prompt delivery of the project.	3.6989	1.07314	Efficient
Effective communication and commitment.	2.7614	1.10991	Not Efficient
Safety dimension to protect the labourers and equipment on	3.6989	1.20091	Efficient

site for effective delivery of project.			
Project competencies and project management skills.	2.9886	.99321	Not Efficient
Quality dimension to satisfy the clients and ensure good refutation of the industry.	3.6023	1.05526	Efficient
Resource planning and identification.	3.0227	1.00991	Efficient
Cost dimension to enhance adequate specification of the project is executed.	3.8920	1.38502	Efficient
Effective benefits delivery and management process.	2.9716	1.26671	Not Efficient
Average Total Mean Score (ATMS) = ∑X/n = 33.6421/10	**3.3642**		**Efficient**

Decision Rule (miller, 2020) 0.00 – 1.0 Not Efficient (NE); 1.00 – 2.00 Less Efficient (LE); 2.00 – 3.00 = Moderately Efficient (ME); 3.00 – 4.00 = Efficient (E) & 4.00 5.00= Highly Efficient (HE).

4.3 Objective Two: To determine the severity level of the features affecting building construction project delivery system in Gombe State

Table 7 below shows the respondent's agreement on severity level of the features affecting building construction project delivery system in Gombe State.

Client's experience with similar projects and available human resources is determined with a mean score of 3.1080 and standard deviation of 1.05335 as a feature affecting building construction project delivery system in Gombe State. Client's in-house technical capability and financial capability is determined with a mean score of 3.9886 and standard deviation of 0.95491 as a feature affecting building construction project delivery system in Gombe State. Consultant's experience with similar projects is determined with a mean score of 3.8068 and standard deviation of 1.30266 as a feature affecting building construction project delivery system in Gombe State. Risk allocation is determined with a mean score of 3.8068 and standard deviation of 1.30266 as a feature affecting building construction project delivery system in Gombe State. Client's requirement for low maintenance cost and willingness to control over design is determined with a mean score of 3.5170 and standard deviation of 0.95928 as a feature affecting building construction project delivery system in Gombe State. Familiarity is determined with a mean score of 3.2841 and standard deviation of 1.37619 as a feature affecting building construction project delivery system in Gombe State. Client's willingness to be involved and Client's trust of other parties is determined with a mean score of 3.2330 and standard deviation of 1.30382 as a feature affecting building construction project delivery system in Gombe State. Maximizing and minimizing the Client's controlling role and involvement is determined with a mean score of 3.8239 and standard deviation of 1.01415 as a feature affecting building construction project delivery system in Gombe State. Consultant's staffing level to attend to contractor is determine with a mean score of 3.0909 and standard deviation of 1.16801 as a feature affecting building construction project delivery system in Gombe State. Client's level of construction complexity and requirement for an aesthetic building is determine with a mean score of 3.0568 and standard deviation of 1.28621 as a feature affecting building construction project delivery system in Gombe State. Responsibility is determined with a mean score of 3.6989 and standard deviation of 1.07911 as a feature affecting building construction project delivery system in Gombe State. Ability to state clear end user's requirements is determined with a mean score of 3.6193 and standard deviation of 1.21991 as a feature affecting building construction project delivery system in Gombe State.

The average total mean score (ATMS) revealed a value of 3.5028 which means the respondents accepted that the severity level of features affecting building construction project delivery system in Gombe State is high.

Table 6: Severity level of the features affecting building construction project delivery system

Statements	Mean	Std. D	Decision
Client's experience with projects and available human resources.	3.1080	1.05335	Severe
Client's in-house technical capability and financial capability.	3.9886	.95491	Not severe
Consultant's experience with projects.	3.8068	1.30266	Severe
Risk allocation.	3.8068	1.30266	Severe
Client's requirement for low maintenance cost and willingness to control over design.	3.5170	.95928	Not Severe
Familiarity.	3.2841	1.37619	Severe
Client's willingness to be involved and Client's trust of other parties.	3.2330	1.30382	Severe
Maximizing and minimizing the Client's controlling role and involvement.	3.8239	1.01415	Severe
Consultant's staffing level to attend to contractor.	3.0909	1.16801	Severe
Client's level of construction complexity and requirement for an aesthetic building.	3.0568	1.28621	Severe
Responsibility.	3.6989	1.07911	Severe
Ability to state clear end user's requirements.	3.6193	1.21991	Severe
Average Total Mean Score (ATMS) = ∑X/n = 42.0341/12	**3.5028**		**Severe**

Decision Rule (Miller, 2020): 0.00 – 1.0 Not Severe (NS); 1.00 – 2.00 Less Severe (LS); 2.00 – 3.00 = Moderately Severe (MS); 3.00 – 4.00 = Severe (S) & 4.00 – 5.00 = Highly Severe (HS).

4.4 Objective Three: To determine the effect of construction efficiency on severity level of features affecting building construction project delivery system in Gombe State

Table 8 below display the model summary of the regression coefficient of the influence of construction efficiency on severity level of features affecting building construction project delivery system in Gombe State.

Regression coefficient R = 0.770 explains that there is a strong relational effect between the independent variables (construction efficiency) on dependent variables (severity level of features affecting building construction project delivery system), thus an increase in the independent variables (construction efficiency) lead to an increase in dependent variables (severity level of features affecting building construction project delivery system) and vice versa. The adjusted R^2 = 0.543 shows that an increase in the independent variables (stirring factors) will increase significant factors by 54.3% and vice versa. Thus, 54.3% variation in significant factors is explained by construction efficiency and 45.7% could be due to other factors which were not considered in the study.

Table 7: Effect of construction Efficiency on Society Level of Features affecting Building Construction Project Delivery System in Gombe State

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.770[a]	.549	.543	4.84542

a. Predictors: (Constant), Construction efficiency

Table 9 below display the analysis of variance (ANOVA) regression coefficient of the effect of construction efficiency on dependent variables (severity level of features affecting building construction project delivery system in Gombe State. The table shows the effect of the independent variable (construction efficiency) are statistically significant at 5% level of significance on dependent variables (severity level of features affecting building construction project delivery system) with a calculated F value of 70.987 being greater than the theoretical F value, thus there is enough statistical evidence to conclude that the independent variable (construction efficiency) has positive and significant effect relationship with dependent variable on dependent variables (severity level of features affecting building construction project delivery system).

Table 8: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1666.641	1	1666.641	70.987	.000[b]
	Residual	2042.595	87	23.478		
	Total	3709.236	88			

a. Dependent Variable: Severity level of features affecting building construction project delivery system

b. Predictors: (Constant), Construction efficiency

Table 10 below display the regression coefficient of the effect of Construction efficiency (CE) on severity level of features affecting building construction project delivery system (SLoFABCPDS) in Gombe State. The table 13 generates the specific regression equation as:

$$\mathbf{CE = SLoFBCPDS(\beta_1) + error\ (\varepsilon).} \quad \mathbf{. (1)}$$

Where:

Construction efficiency = CE,

Severity level of features affecting building construction project delivery system = SLoFABCPDS

$$\mathbf{CE = 0.670\beta1 + \varepsilon} \quad \mathbf{. \quad . \quad (2)}$$

In equation 2 above the regression coefficient for Construction efficiency (β_1) = 0.670 implies that 1% increase in Construction efficiency (CE) increases severity level of features affecting building construction project delivery system by 67% if other variables are kept constant and its T value of 8.425 which is greater than the critical T at the 5% level of significance shows that there is enough statistical proof that an increase in Construction efficiency (CE) will lead to an increase in severity level of features affecting building construction project delivery system (SLoFABCPDS).

Finally, the omission of the constant value in the regression equation shows that construction efficiency (CE) cannot be achieved in the study without the influence of the independent variables (severity level of features affecting building construction project delivery system).

Table 9: Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	7.496	3.846		1.949	.054
	Construction efficiency	.867	.103	.670	8.425	.000

a. Dependent Variable: Severity level of features affecting building construction project delivery system

Discussion of Findings

The findings revealed that the respondents of this study are very adequate in terms of their demographic characteristics based on the needed level of education and profession, even though majority of them were males, and their working experience was adequate.

Objective One: Construction efficiency in building construction project in Gombe State

Table 6 found that the construction efficiency in building construction project in Gombe State to be affected by some dimensions, with most dimensions to include: cash-flow dimension for adequate funding of the project with a mean score of 3.9034, cost dimension to enhance adequate specification of the project with a mean score of 3.8920, time dimension to ensure prompt delivery of the project and Safety dimension to protect the labourers and equipment on site for effective delivery of project with a mean score of 3.6989 each, as well as quality dimension to satisfy the clients and ensure good refutation of the industry with a mean score of 3.6023.

This with average total mean score (ATMS) value of 3.3642 revealing the agreement of the respondents in accepting that there are dimensions affecting construction efficiency in building construction projects in Gombe State.

Objective Two: Severity level of the features affecting building construction project delivery system in Gombe State

Table 7 found that the severity level of features affecting building construction project delivery system in Gombe State is high, with four most features to include: Client's in-house technical capability and financial capability with a mean score of 3.9886, consultant's experience with similar projects and risk allocation with a mean score of 3.8068 each, maximizing and minimizing the Client's controlling role and involvement with a mean score of 3.8239, as well as responsibility with a mean score of 3.6989.

The average total mean score (ATMS) revealed a value of 3.5028 which means the respondents accepted that the severity level of features affecting building construction project delivery system in Gombe State is high.

Objective three: Effect of construction efficiency on severity level of the features affecting building construction project delivery system in Gombe State

Table 8 found the regression coefficient R value to be 0.770 which meant that there is a strong relational effect between the independent variables (construction efficiency) on dependent variables (severity level of features affecting building construction project delivery system). Also table 9 and 10 found that, the independent variable (construction efficiency) has positive and significant effect relationship with dependent variable on dependent variables (severity level of features affecting building construction project delivery system).

Conclusions

The study is concluded based on the research findings as follows:

i. The construction efficiency in building construction project in Gombe State are affected by some dimensions which include: cash-flow dimension, cost dimension, time dimension, safety dimension, as well as quality dimension.
ii. The severity level of features affecting building construction project delivery system in Gombe State is high.
iii. There is strong significant effect of construction efficiency on severity level of features affecting building construction project delivery system in Gombe State.

Recommendations

The study recommended based on the research conclusions as follows:

i. All stakeholders in building construction project delivery should ensure strict adherence to the construction efficiency to maximize habitable environment for cultivating healthy structures for client's satisfaction.
ii. Building construction professionals trusted with manning construction projects should ensure self-constant development and practice to always monitor and keep track of building project to avoid adversity of the level of features to affect building construction project delivery system.
iii. Building professionals should embrace construction efficiency in the construction project's delivery as supervised by the respective regulatory bodies of the core construction professionals.

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