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Effect of Construction Efficiency on Factors Causing Failure in Construction Projects in Gombe State, Nigeria

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ABSTRACT
Construction efficiency by professionals for construction success is non-negotiable in the building construction industry. The research was aimed atassessing the effect of construction efficiency on factors causing failurein construction projects in Gombe State, Nigeria, achieved via the following objectives to:evaluate the construction efficiency in building construction project in Gombe State, determine the factors causing failure in building construction projects in Gombe State, and determine the relational effect of construction efficiency on factors causing failure in building construction project in Gombe State.The research adopted a quantitative research design and structured questionnaire was utilised to extract the primary data from the 325 construction professionals (Architects, Builders, Civil Engineers, and Quantity Surveyors domicile in Gombe State).The data was analysed using both inferential and descriptive methods of data analyses with the aid of SPSS tool. The study concluded that construction efficiency in building construction project in Gombe State is moderately efficientwith most dimensions to include cash-flow, cost, time, safety, and quality; lack of experience and knowledge,poor communication,poor monitoring and tracking,unclear scope and goals, and poor planning and scheduling are the most factors causing failure in building construction projects in Gombe State; and there is a positive strong and statistically significant relational effect of construction efficiency on factors causing failure in construction projects in Gombe State ($r = 0.898$ & $p = 0.013 < 0.05$). The study recommended that stakeholders in construction project should ensure strict adherence to the construction efficiency to maximise habitable environment for cultivating healthy structures for client's satisfaction; stakeholders in construction industry should ensure professionalism in execution of responsibilities to avoid causes of building construction project's failures; and respective regulatory bodies of the construction should supervise to ensure that construction professionals embraced construction efficiency in the construction project's delivery all the time.

Keywords: Construction efficiency dimension, Construction planning importance for construction success, Failure factors in building construction projects, Construction project success, Theoretical review, and Empirical review.

I. INTRODUCTION

Construction sector plays a strategic role in the economic structure globally (Durdyevet al., 2018; Alkayet al., 2018; Durdyev& Ismail, 2017). Construction is a labor-intensive industry (Bhavya & Lekshmi, 2022). Therefore, considering efficiency dimension in a construction is very relevant. A project delivery system is a method used to plan, design, and construct a project (Construction Industry Institute, 2019). Decision-making of the project delivery system (PDS) is an important link in the entire lifecycle of a project

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and is one of the critical factors leading to project success (Bingshenget al., 2015). The different delivery systems 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 (Okoreet al., 2017). Zhong et al. (2021) postulated that, the project delivery method reflects the task, organisational, 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 system is 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).

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 et al., 2015). Construction efficiency is the optimal use of resources, such as labour, materials, equipment, and time, to achieve the desired quality, cost, and schedule objectives in a construction project (Construction Business Owner, 2020). Efficiency dimensions 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 success of building construction projects to clients (Silva et al., 2016).

Construction efficiency in Nigeria is a crucial aspect of the country's building industry, considering the significant energy consumption in both residential and public buildings. To improve efficiency, researchers have emphasized the importance of building orientation, building material composition, and climatic conditions (NBS, 2020; ITF, 2018; Ojo, 2017). 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). Literature revealed that construction project delivery systems in Nigeria face significant challenges leading to low efficiency and effectiveness (Ajayi, 2018; Aje, 2018). Several factors contribute to the low construction efficiency and significant challenges faced in construction project delivery systems during construction project in the country.

Construction efficiency in Nigeria is indeed a significant concern (Oyediran, 2019; World Bank, 2019), along with construction project delivery systems affected by many features in Nigeria face significant challenges leading to low efficiency and effectiveness (Ajayi, 2018; Aje, 2018; Oke, 2017; Oladapo, 2016). There is need to investigate the short-term project success on its system of project delivery to ascertain the severity of the features affecting project delivery system so as to ensure the client's satisfaction and value for money is achieved. Issue of low construction efficiency has remained a major concern in both developed and developing countries' building industries (Hasan et al., 2018). Construction firms fail to achieve efficiency dimensions of construction projects and that has repercussion on construction project delivery (Construction Industry Institute, 2019), as it increased costs, reduced profitability, and decreased competitiveness, decreased output (Lean Construction Institute, 2020), project delays, and reduced customer satisfaction (Construction Business Owner, 2020). According to the Associated General Contractors of America, around 60% of construction projects are delayed or canceled, with one of the major reasons being the labor shortage which affects the efficiency in construction projects (Mentz, 2022). Zhong et al. (2021) stated that, choice of construction project delivery has greater influence on the success of that project.

Increased construction efficiency would not only increase revenues and earnings for businesses but also save the industry costs, as a result, there is a pressing need to develop new approaches for increasing construction efficiency (Hasan et al., 2018). Milind Mehta et al. (2022) stated that, the field of construction efficiency remains an area in which much more research is needed to fully understand its entire potential in a practical industry context globally.

Therefore, conducting research on assessing the effect of construction efficiency on factors causing failure in construction projects in Gombe State, Nigeria is paramount. As addressing low construction efficiency in Nigeria will require a concerted effort from government, industry stakeholders, and professionals, as well as

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improving the efficiency and effectiveness of the construction project delivery in Nigeria.
This prompt the research of this kind in the study area.

Aim and Objectives of the Study

The research aimed at assessing the effect of construction efficiency on building construction project delivery system in Gombe State, Nigeria. The specificobjectives include:

i. To identify the construction efficiency in building construction project in Gombe State.
ii. To determine the factors causing failure in building construction projects in Gombe State.
iii. To determine the relational effect of construction efficiency on factors causing failure in building construction project in Gombe State.

II. LITERATURE REVIEW

2.1 Construction Efficiency Dimensions

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 (Sankaranet al., 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, while (Yamin & Sim, 2016). In their research, Landin and Öberg (2014); Timmeret al. (2011), ten (10) basic requirements for efficiency measures were 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;

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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 (Susilet al., 2017), and is represented in this study in the figure 1 below.

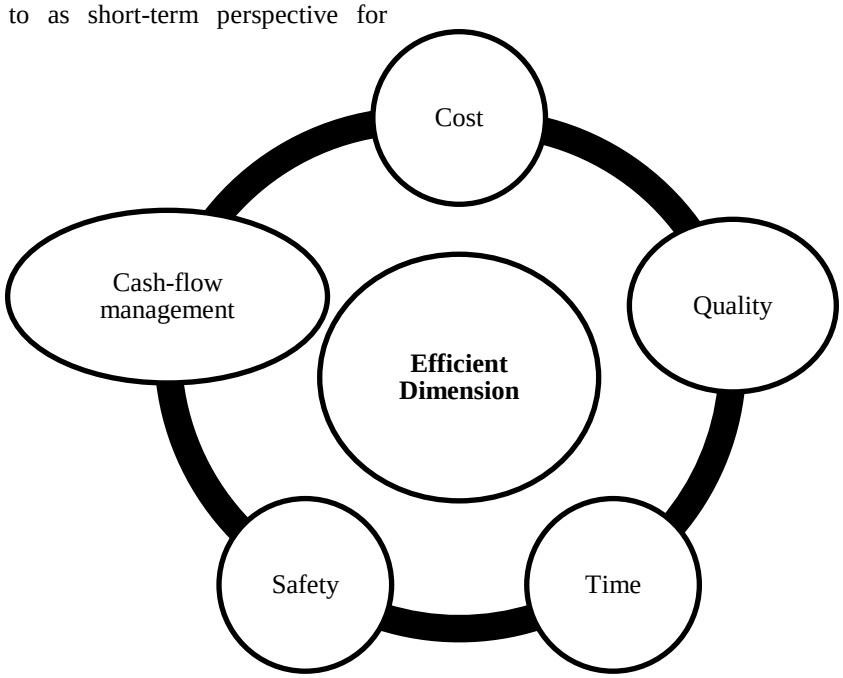

Figure 1: Construction efficient dimension

Source: Susil et al. (2017)

Efficient dimension (also, known as short-term perspective) for construction project success, according to Susil et al. (2017) are as follows:

2.1.1 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 (Nábrádiet al., 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 Narawishet al. (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 (Windapoet al., 2018; Loweet al., 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) (Chappelet al., 2010), and,
iii. Create major financial stress and difficulties within the project lifespan.

Windapoet al. (2018), there are also effects such as the:

i. Inability of developers to deliver affordable housing,
ii. High tender valuation,
iii. A decrease in tender competition and,
iv. Poor construction industry performance.

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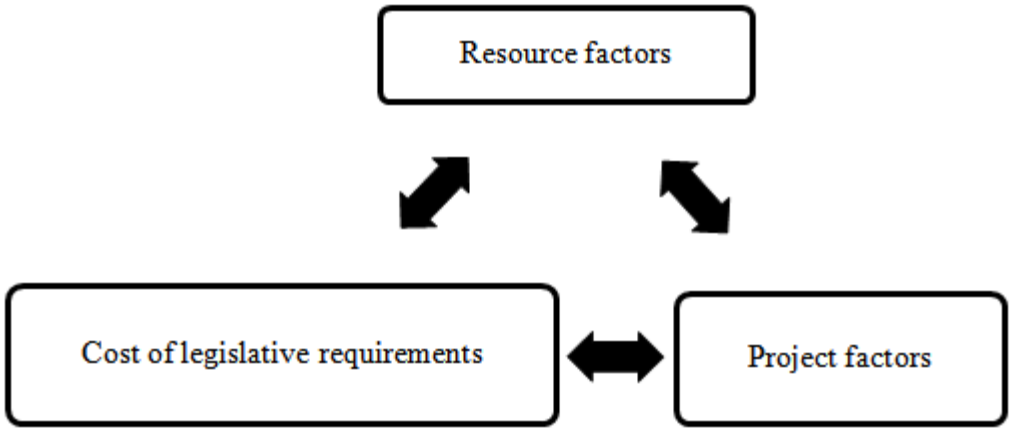

Figure 2: Components of construction costs
Source: Windapoet al. (2018)

- **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 Skitmoreet al. (2006) identified overhead costs as a significant contributor to final construction cost. Olatunji (2010), identified transportation costs, interest rates, 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 Sawhneyet al. (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.

2.1.2 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 et al. (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

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"quality management" in the construction firm (Ogunde et al. 2017).

2.1.3 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 (Tinget al., 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 (Zaidet al., 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 (Sharmaet al., 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. Hekkertet al. (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.

2.1.4 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 (Priyaet al., 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 (Alaghbariet al., 2017).

2.1.5 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).

2.2 Construction Planning Importance for Construction Success

Construction can be characterized as a specific type of project industry, with specific features concerning production, such as temporality, restricted location, and one-off products (Omonori& Lawal, 2015). Bowen et al. (1997) stated that, construction is defined as a complete system industry, through which by-projects, temporary coalitions of firms and heavy customer involvement in the product life cycle are the norm. Therefore, Sami (2009) contributed that, due to the complex nature of construction and the special characteristics of project production, construction has had several problems in producing quality in a customer-oriented manner. In this, manner, construction planning will have an impact

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on the efficient and effective delivery of construction projects.

Construction (project) planning involves determining what needs to be done in terms of scope and deliverables, how will it be accomplished, who will implement it, what is the duration, how much it will cost and what the risks are. The results of the planning process are baseline plans (Clements & Gido, 2012). Project planning as decisions made on how the project will be performed in order to meet the objectives outlined at the initiation stage (Dawson, 2014). In project management there are interdependent goals that should be met which are scope, cost and time (AbuHusseinet al., 2016). The detailed strategy laid out in the plan becomes check method for the cost, schedule, and quality developed during project definition (Verzuh, 2015). Risk management in a project must come into play as they remained an unforeseen condition that has a positive or negative effect on one of the goals such as cost, scope, time and quality (PMI, 2013). At the planning stage, the risks associated with the project are identified (Robb, 2014). Verzuh (2015) risk management is the uncertainty that is measured systematically to increase the probability of meeting project objectives. According to Marcelino-Sádabaet al. (2014) risk management process defines the frequency and the key times to monitor identified risk and the people involved. Risk planning happens continuously throughout the project as it analyses the project environment, deliverables and stakeholders (Verzuh, 2015).

The project planning is one of the core project management processes and, in that stage is where the team singles out all the work to be done. It's an ongoing activity almost to the end of the project with the main priority, during the planning phase, is to plan time, costs and resources for the project (LetsBuild, 2019). Based on those requirements the team is developing the strategy that has to be followed. Construction planning involves a series of steps that determine how to achieve a particular community or organizational goal or set of related goals. This goal can be identified in a community plan or a strategic plan. Project plans can also be based on goals or action strategies developed through meetings and gatherings, tribal council or board meetings, or other planning processes.

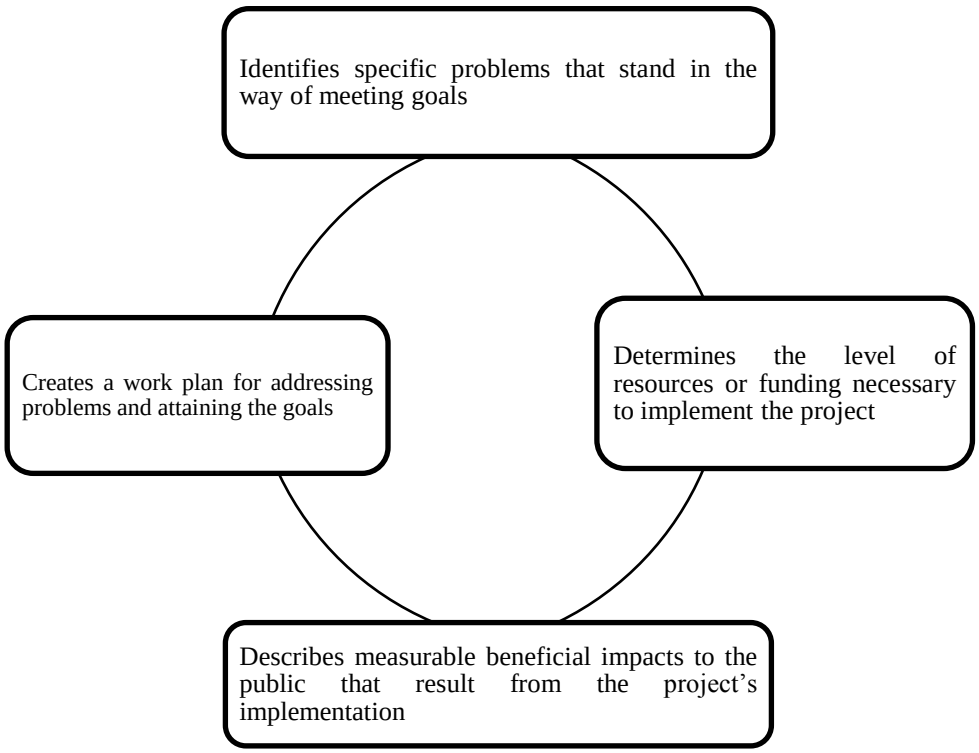

Figure 3: Benefits of Construction Planning

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Table 1: Importance of Construction (project) planning for effective delivery

SN	Construction (project) Planning helps in:	Construction (project) Planning helps to eliminate:
1	Assign resources and responsibilities	Unsustainable projects
2	Make the best use of resources	Unstructured project work plans
3	Motivate staff and the community	Poor planning
4	Clarify goals and develop a vision	Undefined problems
5	Think ahead and prepare for the future	Overambitious projects
6	Identify issues that will need to be addressed	
7	Motivate staff and the community	
8	Choose between options	
9	Consider whether a project is possible	
10	Achieve the best results	

According to Amit (2009), there are two steps of planning is done in the entire project to meet the project objectives.

In the first step of planning: the whole workloads for different project are to be mapped and resources will be allocated as they have allocated so in their different projects. This will help us to know the current situation of multiple simultaneous projects within the company. Each project has been divided into necessary activities to perform to complete it as a whole. Resources are allotted to the activities of each project according to the data have been given by the company. Due to the limitations of resources and sharing of same resources in different projects, the expected date of deploying individual projects will be shifted. So, analysis would be done based on the data that provided and finally to make a conclusion that when all the projects would be completed by using their available shared resources.

In the second step of planning: current situation will be kept as it is and there will be addition of twelve projects of a regular workload. So, the company wants to know the effect of having all the projects if they consider of having one new project with a regular workload comes to their system in each month. It should be mentioned that the company will allot only the current resources they have for those new projects. So, in this case also there will be sharing of same resources which would shift the probable date of deploying for different projects. Finally, the analysis would be concluded that when all the projects would be deployed using their available shared resources and how the new projects affect their current state in terms of time and resources.

2.3 Failure Factors in Building Construction Projects

Several causes of building failure had been attributed to either natural or man-made phenomena, in Nigeria surveys carried out have shown that the use of substandard building materials, poor workmanship, the use of quacks instead of professionals, non-enforcement of building codes or construction regulations, and so on (Hamma-Adama, 2017). According to Amade et al. (2015), construction projects in Nigeria and the world over are confronted with a lot of complexities and ambiguities as a result of uncertainties of not meeting project deadlines which also hinges on low quality, cost overruns which invariably leads to failure and abandonment of such projects. The report identified 65% of project failures were due to softer aspects such as people, organization, and governance (Ernst &Young, 2014), and these failures are the result of misalignment of expectations, incomplete hand-offs between phases, and hierarchical team organization, as well as contentious project delays, change orders, and claims. The construction sector is the provider of physical infrastructure essential for human sustenance and economic development. Moreover, the advancement in vertical city expansion is enormous and to be celebrated; however, in Nigeria, such development comes with huge human and material losses (Hamma-Adama, 2017).

Olagunju et al. (2013) asserted that, no building system can be engineered and constructed to be absolutely risk-free in the presence of numerous sources of uncertainties that arise in the building process or from potential failure initiating events. Dimuna (2010) stated that, developing nations have suffered from frequent collapse of buildings; a country like Nigeria has suffered catastrophic building collapse over the years due to

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predominantly man-made factors. Agwu (2014), Dimuna (2010) describes sub-standard building materials as the cause of building failure and collapse in Nigeria. Moreover, Agwu (2014), Ede (2014), attribute building collapse to faulty design as well as lack of proper supervision. Therefore, most of the issues/problems could be attributed to actions and inactions of the parties involve from design down to construction stage. These parties include client, designers and constructors with the following professionals: architects, civil/structural mechanical and electrical engineers, quantity surveyors as well as builders.

Olagunju et al. (2013) classified causes to building collapse under seven major factors that could be related to: poor design; fault at construction; poor material quality and method of construction; foundation failure; fire disaster; natural phenomena, and inadequate maintenance. However, fire disaster and natural phenomena are known causes with certainty when failure happens. According to the work of Hamma-Adama (2017), there are five major causes that are man-made, where Architecture, Engineering and Construction (AEC) are quite relevant; the causes are connected or fall under one of the following: construction supervision, construction process, monitoring/enforcement, design supervision, and, design process. According to Shahhosseiniet al. (2018), the major critical factors of construction failure include: lack of commitment, inefficient site management, poor site coordination, improper planning, lack of clarity in project scope, lack of communication, and substandard contracts.

Agwu (2014) also stated that, poor construction supervision is another cause of failure in building construction. Hamma-Adama (2017) poses many causes of failures to include: construction supervision, construction process, monitoring/enforcement, design supervision, design process.Causes of failure in building construction projects can include: poor project management (Innocent, 2019; El-sokhn& Othman, 2014; Otim et al., 2012), poor site management (Innocent, 2019; Ling et al., 2010), poor monitoring and tracking (Innocent, 2019; Symonds, 2011), inaccurate cost estimation (Innocent, 2019; Symonds, 2011), poor management of expectations (Innocent, 2019; Symonds, 2011), poor planning and scheduling (Innocent, 2019; Nguyen et al., 2013), poor design, frequent design changes & design errors (Innocent, 2019; Nguyen et al., 2013), unclear scope and goals (Innocent, 2019; Otim et al., 2012), poor communication (Innocent, 2019; Otim et al., 2012), bureaucracy and corruption (Innocent, 2019; Othman, 2013), leadership problem (Innocent, 2019; Othman, 2013), delay in payment (Innocent, 2019; Nguyen et al., 2013), inefficient resources allocation (Innocent, 2019; Othman, 2013), lack of experience and knowledge (Innocent, 2019; Nguyen et al., 2013), lack of financial capacity (Innocent, 2019; Nguyen et al., 2013); subcontractor failure (Innocent, 2019; Luu et al., 2008a), lack of technical performance (Innocent, 2019; Othman, 2013), poor contractor performance (Innocent, 2019; Nguyen et al., 2013), poor quality (Innocent, 2019; Young et al., 2009), weather and social environment (Innocent, 2019; Nguyen et al., 2013), and cultural differences in global projects (Innocent, 2019; Symonds, 2011).

2.4 Construction Project Success

According to Craik (2018), Davies (2017), project success is evaluated when considering the attainment of: longer-term, more strategic ‘outcomes’, and short-term, more tactical, outputs. Outcomes would variously include the realization of project benefits, impact, relevance, and sustainability aspirations, as well achieving stakeholder satisfaction. Project success criteria have been measured in a variety of ways. Although the conventional measurement of project success has focused on tangibles, the current thinking is that, ultimately, project success is best judged by the stakeholders, especially the primary sponsor (Turner & Zolin, 2012). As assessing success is time-dependent, as time goes by, it matters less whether the project has met its resource constraints; in most cases, after about one year it is completely irrelevant (Serrador& Turner, 2015).

In contrast, after project completion, the second dimension, impact on the customer and customer satisfaction, becomes more relevant. According to Fathi and Svetlana (2016), success of construction projects depends mainly on success of performance.

Here in this work, project success is based on whether the project outcome meets the strategic objectives of the investing organization based on five dimensions of project Success adopted.

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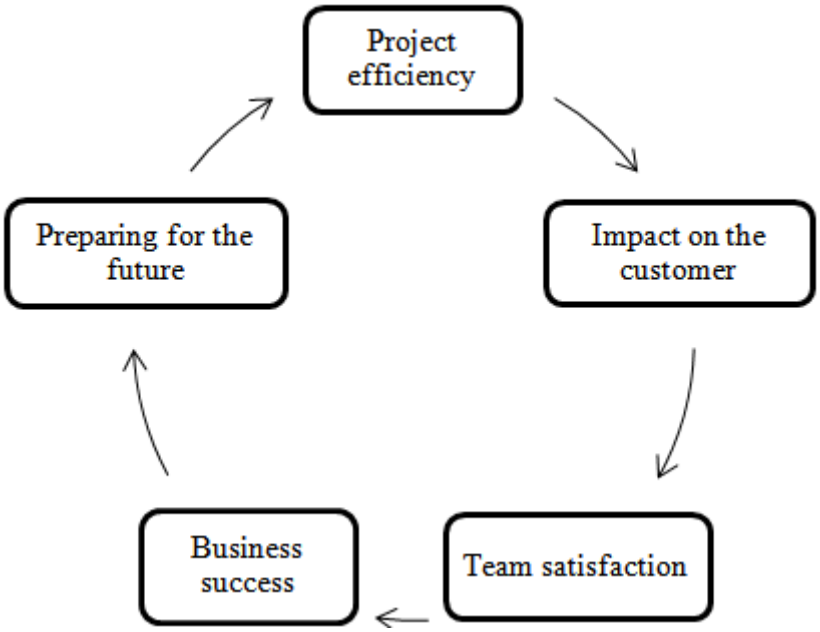

Figure 4: Adopted Five Dimensions of Project Success
Source: Serrador and Turner (2015); Shenhar and Dvir (2007)

2.4.1 Project efficiency

Project managers from different areas struggle to find universal set of factors to achieve high project efficiency. Since project-based organisations are often struggling with the balance between time, cost and quality, they are interested in doing this as efficient and effective as possible (Sundqvistaet al., 2014). However, the project efficiency assessment varies across industries, making it difficult to apply general concepts and guidelines in the specific project environment (Orazalyet al., 2020). However, meeting schedule goal, and budget goal is what is termed as project efficiency (Serrador& Turner, 2015; Shenhar& Dvir; 2007). Also, according to Sundqvistaet al. (2014), based on quality management, efficiency refers to doing things right, i.e., whatever is performed, it is performed in the most suitable way, given the available resources (high efficiency).

According to Palesa and Chipo (2018), several factors have been identified that influence the efficiency of project execution of an organization; some of these contributing factors are related to planning and others to the execution of projects to include:

i. Poor leadership within the project management unit.
ii. Lack of relevant stakeholder's involvement and management.
iii. Inadequate and inefficient communication within project teams and the organizational environment.
iv. Shortage of skills, training and development of project team.
v. Improper allocation and usage of resources.
vi. Organisational culture not supportive of completing projects on time.

2.4.2 Impact on the customer

A construction project is considered to be successful when it is completed on time, within budget and all the stakeholders are satisfied with its quality (Gündüz et al., 2013). Completing projects within the contract time is often regarded as an indicator of efficiency (Pei-Yuan et al., 2017). However, unique features of construction projects, such as long execution period, complicated processes, high sensitivity to environmental influences, the diverse interests of the different stakeholders and the dynamic structure of project teams, often make the delivery of projects on time very challenging (Zou et al., 2007). Meeting functional performance, technical specifications, fulfilling customer's needs, solving a customer's problem, the customer is using the product, as well as, customer satisfaction is what should be known as impact on the customer (Serrador& Turner, 2015; Shenhar& Dvir; 2007).

The impact of the development of the construction business is the growing numbers of

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construction service companies, so that competition between companies getting tougher. Every company must be able to innovate and have advantages so that it can compete with other construction service companies; and, one of the things that must be achieved by the company is the ability to improve performance in completing every job given by the owner, so that the owner will feel satisfied (Prasetya&Soehari, 2020). The achievement of project objectives as planned will be able to increase customer satisfaction from stakeholders, especially from the project Customer satisfaction is someone's happy or disappointed feelings resulting from comparing a product/work produced to the desired expectations (Kotler & Keller, 2009). Customer satisfaction obtained for project work can increase the competitiveness of a company (Prasetya&Soehari, 2020).

2.4.3 Team satisfaction

Team satisfaction is defined as a project manager's perception on how team members feel about events within the project team which includes satisfaction with project works, satisfaction with team members and satisfaction with being part of the project team (Fung & Siow, 2013; Nguyen et al., 2008). Today more and more organizations are using project teams to deliver products or services as well as resolving problems especially on complex tasks. This is because project performance through team is more rewarding than individual performance as the team outcomes exceeds the sum of individual outputs (Fung & Siow, 2013). It is imperative to manage team members for satisfaction that can lead to the realization of organizational goals. Team management according to Pm4Dev (2019), includes the processes required to make the most effective use of the people involved with the project. The project team includes the project manager and the project staff who have been assigned with the responsibility to work on the project. Gabreaet al. (2017) also, contributed that, the very nature of the project team's work underpins a collective task much more complex than that assumed by other types of work teams.

Projects are initiated by human beings, designed for human beings and executed by human beings; this makes the human element the single most critical aspect in the project execution process from conceptualization to handing over (Manuel, 2018). This means therefore that the life cycle of a project revolves around correct management of the people involved in it. Therefore, imagine how complex the construction industry is, and when team members are satisfied, together they perform those specific complex tasks which brings about because, the team comprise of individuals with interrelated and interdependent subtasks (DeChurch & Mesmer-Magnus, 2010), the members' have complementary skills, which build up to the requirements for the accomplishment of the objectives set up. Projects are delivered by different teams that need to cohere with each other to avoid clashes. Team morale, skill development, team member growth, team member retention is also known as team satisfaction (Serrador& Turner, 2015; Shenhar& Dvir, 2007). Effective teamwork and management with clear and transparent communication between team members and client service are highly beneficial in delivering the project successfully and thus delivering higher client satisfaction – that give the team satisfaction (Alinaitwe et al., 2013). This view according to Hazır (2015), highlights how mutual coordination and cooperation are practical and helpful for organising the operations and processes of a project; also, Alzahrani and Emsley (2013), implementing team leadership, project monitoring and feedback, can team satisfaction; also, can lead to contributing to higher client satisfaction (Alinaitwe et al., 2013).

Team satisfaction characterizes the overall extent to which members are satisfied with the team and the team's outcomes (Standifer et al., 2015), such as decisions made by the team, communication among team members, and relationship climate among members of the team. It describes both a positive feeling and an evaluation of the team and its work. Therefore, the concept of team satisfaction is proposed to have both an affective component and a cognitive component (Manuel, 2018).

A study by Santos and Passos (2013) highlighted the relevance of team processes, conflict and shared cognitions concerning team satisfaction; where they established that conflict limits the development of team mental models, therefore decreasing satisfaction. Their study shows that it is important that teams develop conflict management skills and know how to use conflict management strategies to avoid conflict in order to feel satisfied. For instance, according to Manuel (2018), disagreements among team members about the content of a task or about the result of it are less relevant and have a smaller impact on team satisfaction than disagreements about who does what (i.e., delegation of tasks) or disagreements about interpersonal issues, such as team members not getting along with each other

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due to personality differences or attitudes from their colleagues with which they do not agree with. In fact, in some cases, task conflict may actually have a positive effect on satisfaction since its existence allows for a more critical evaluation of different points of view and well-informed decision-making. However, task conflict may also have a negative impact on team satisfaction when group members interpret their group members' different points of view as a negative assessment of their own capabilities. Therefore, in situations where conflict results in negative group emotions it might be a predictor of team dissatisfaction. In other words, if teams do not feel happy or motivated to work, for instance due to conflicts within the team, they will tend to feel less satisfied with team members, their work and decisions that they make as a team.

2.4.4 Business success

The business world today is considered diverse and more intricate than it was just 10years ago. To survive and grow in this new millennium, business must move towards innovation in a way to build and sustain competitive advantage (Ali et al., 2011).

Construction projects are naturally high risky and complex due to their wide divergence of project sites, high pressure on demanding construction time and cost, involve many project participants with different objectives as well as increasing complexity on construction techniques (Silva et al., 2016). Construction project is viewed as high-value, time bound, special construction mission creating a construction facility or service, with predetermined performance objectives defined in terms of quality specification, completion time, budgeted cost and other specified constraints (Chitkara, 2013). The implementation of project management helps in creating strategic value chains that enable an organisation to have competitive advantage in high-risk sectors and international markets. The ability to execute projects on time within a specific budget, often determines if a company will be able to get other business opportunities (Palesa & Chipo, 2018).

In this present environment, businesses whether gigantic or tiny will not get far success if lack hard work, commitment or devotion (Ali et al., 2011); and for effective transformation of business into a success story there must be a shared vision divided into different success factors or different milestones leading towards ultimate success. Commercial success, and, creating a large market share is known as business success (Serrador& Turner, 2015). There are certainly few factors that play vibrant role to take the business towards success. Companies and businesses should have an adaptive style to incorporate the demands of changed market conditions (Ali et al., 2011).

If an individual with zeal to excel work consistently then certainly success is guaranteed. Most of the businesses fall short of desired growth because of heavy reliance at profit making rather to satisfy customers, yielding low quality products and distorting customer relations. Customer requires good quality and if he is not satisfied than the business surely lose customers. There is a saying; "We're obviously going to spend a lot in marketing because we think the product sells itself" (Jim Allchin quotes) Therefore, keeping in view the needs and wants of customers, business must be focused on quality products and services.

Research by Radihaet al. (2009) made a determinants of small business success as professed and experienced by rural entrepreneurs and they empirically discovered that internal and external factors are vital for the success of small business. Their conclusion was that, eight factors of business success are: External Environment, Market Accessibility, Entrepreneurial Quality, Human Resource, and Market Support by the Government Pricing, Delivery and Service. Also, Rogoffet al. (2004) revealed that external and internal factors are determinants of business success; as the internal factors include characteristics of the business owner, business size and years in business, the ability to attract outside capital investment, management, financing, planning, experience, and skill to implement any identified projects. The external or environmental factors are sales tax rates, infrastructure expenditure.

2.4.5 Preparing for the future

Construction is one of the first businesses that humankind developed, and it continues to shape our daily life in unique ways. Virtually all other businesses rely on the construction industry to provide and maintain their accommodation, plants and infrastructure, and construction is a determinant of where and how almost everyone lives, works and plays (World Economic Forum; WEF, 2016). For nearly the entire population of the world, the built environment heavily influences quality of life as the building and the materials used in its construction and finishing have a major impact on the health and well-being of its occupants. For countries to enjoy inclusive and sustainable growth, modern and efficient infrastructure is essential. According to a 2014

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estimate by the International Monetary Fund (IMF, 2014), if advanced economies invested an extra 1% of GDP into infrastructure construction, they would achieve a 1.5% increase in GDP after four years.

The construction industry is concerned with the health and safety not only of workers but also of the people who actually live or work in the buildings (WEF, 2016). Employee health and productivity are linked to the quality of the indoor environment, and that quality is largely determined by decisions made during project development and construction. The construction sector's responsibility does not end with the delivery of the project: the entire operations or use phase is affected by the initial selection of materials. The safer the materials, the better for health and the environment. Materials constitute an extremely powerful lever for innovation. The European Commission (EC, 2014a), estimates that 70% of product innovation across all industries is derived from new or improved materials. With approximately one-third of construction cost attributed to building materials, the scope for applying advanced building materials (ABMs) is considerable. Still the solutions, according to WEF (2016) emerging from the building material industry are numerous and wide-ranging-from the incremental innovation of traditional materials and existing characteristics, to the generation of new material combinations with additional multifunctional characteristics, to radically innovative materials with entirely new functionalities.

Creating a new market, creating a new product line, as well as, developing a new technology is called preparing for the future according to Serrador and Turner (2015).

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 noncompetitive 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 behaviors are directly related to the results of their acts. By applying reinforcement, people's behaviors 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 behaviors

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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 (Schermerhoenet 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 Albtoushet al. (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 analyzed 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 analyze project data to identify critical success factors for construction projects in developing countries.

Another study was conducted by Amoah et al. (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 signaled 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.

Innocent (2019) conducted a study on failure factors affecting building project success in Nigeria: Design and construction phase. The main objective of this research study is to identify the PFFs that affect building project success and determine their relative importance in the stages of building process. A thorough literature review was carried out to generate a set of factors that affect project success. A questionnaire survey, based on 28 identified factors was conducted to collect data from three groups of respondents: professionals in construction industry, contractors and clients. Out of 310 questionnaires distributed, 193 were returned, representing 62.2% response rate. Using the mean score, relative importance index, and mean score average method, the most PFFs were identified. Spearman's rank correlation was used to analyse the agreement of survey respondents on those most PFFs. A one-way analysis of variance was then performed to determine whether the mean scores among the various groups of respondents were statistically significant. The survey findings revealed that the top 5 most important PFFs in the design and construction phase of building process

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are as follows: Unclear scope and goals, culture or ethical misalignment, poor monitoring and tracking, design errors, and poor management of expectations. An understanding of PFFs would help all interested stakeholders in the construction industry to improve building project success. And finally, the results of this study would help construction professionals and other practitioners in the industry take proactive measures for effective building project management.

Sa'ad (2019) conducted a study on contributing factors for construction projects failure (The Case of Construction projects Hargeisa, Somaliland). There are more factors affect construction projects failure and during study the researcher selected 52 factors to underline their major and minor influence and research resulted the major factors contribute construction projects failure. Method used the research is quantitative method, especially descriptive design, also the way of analyzed data is Relative Importance Index method to determine the relative importance of the various causes and effects of project failure. The same method is going was adopted in this study within various groups (i.e. clients, consultants or contractors). The seven-point scale ranged from 1 (very low) to 7 (very high) was adopted and transformed to Relative Importance Index (RII). Scope of the study was Hargeisa that is a city of Somaliland and construction projects booming last two decades. There is a result about respondent's answers to the questionnaire that are most important factors from overall results that ranked five most important factors contribute construction projects failure are low productivity and efficiency of equipment, Client interference, inaccurate cost estimation, late procurement of materials, slow response and inspection. To minimize the impact of these factors the project manager should function the initiative plan such as good cost estimation and appropriate schedule, make good communication with the project stakeholders, the companies working construction projects, to get right contract in the authority, avoid delay and change order of the materials, accurate estimation according to the market value, to activate their management sector such as project management and construction management.

Research conducted by Zhao et al. (2017) on the Analysis of Factors Affecting Project Success in Chinese Context Based on Interpretative Structural Modeling. 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 modeling. 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.

III. MATERIAL AND METHODS

The study was conducted in Gombe State quantitatively using descriptive survey research design on 466 Architects, Builders, Civil Engineers, and Quantity surveyors target population for the study. The sample size for the research was determined to be 361 Architects, Builders, Civil Engineers, and Quantity surveyors from the formula for determining sample size by

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Yamane (1967) as adopted to determine the sample size for the research below.

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

Where:
n = Sample Size; N = Total Population; e = Confidence interval (0.05).

Table 2: Sample frame

SN	Profession	Registered Members	Sample size
1	Architect	137	102
2	Builder	119	92
3	Civil Engrs.	101	81
4	Quantity/S.	109	86
	Total	**466**	**361**

The data was collected with the used of questionnaire instrument administered to the respondents at simple randomly selected for the study aided by3 research assistants.

The data collected in this study was analysed using both descriptive and inferential statistical methods of data analyses; with descriptive tool to include frequency count and percentage for analysing the demographic information of the participants. Mean scores and standard deviations were used in the analysing of objectives objective 1: to identify the construction efficiency in building construction project in Gombe State, objective 2: to determine the factors causing failure in building construction project in Gombe State. While, objective 3: to determine the relational effect of construction efficiency on factors causing failure in building construction project in Gombe State, was analysed using inferential tool such as Pearson Product Moment of correlation (r) to reach the decision making.

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

IV. RESULT AND DISCUSSION

4.1 Presentation of Data Analyses

The study administered 361(100%) questionnaires to the construction professionals' domicile in Gombe State. However, the rate of questionnaire returned (RQR) shown in table 3 depicts that only 325(90.0%) questionnaires were properly filled and returned for analyses with Architects 92(25.5%), Builders 83(23%), Civil Engineers (C/Engrs) 73(20.2%), and Quantity Surveyors (Q/S) 77(21.3%).

The percentages guidelines for determining whether the collected data is sufficient for meaningful analysis was proposed by Mugenda and Mugenda (2003). According to Mugenda and Mugenda (2003), 50–70% of data is suitable for analysis for descriptive research; for analytical research, 70–80% of the data is suitable for analysis; while, for experimental research, 80–90% of the data is suitable for analysis.

Hence, the data collected for this study was sufficient for meaningful analysis.

Table 3: Rate of questionnaire returned (RQR)

SN	Profession	Administered	Returned	% of returned questionnaire
1	Architects	102	92	25.5
2	Builders	92	83	23.0
3	C/sEngrs	81	73	20.2
4	Q/S	86	77	21.3
	Total	**361**	**325**	**90.0**

Table 4 depicts the demographic information of the participantswas analyzed using descriptive tool such as the frequency count and percentage.

26(8%) of the participants are females while, 299(92%) are males. 48(14.8%) of the participants are HND holders, (26.5%) are Degree holders, 121(37.1%) are PGD holders, 62(19.1%) are Master's holders, while 8(2.5%) are Doctor's of Philosophers (Ph.D) holders. 7(2.2%) of the participants are between the age of 25–30years,

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94(28.9%) are between the age of 31–36years, 146(44.9%) are between the age of 37–43years, while 78(24%) are above 43years of age. The professional status of the respondents ranges between 92(28.3%) are Architects, 83(25.5%) are Builders, 73(22.5) are Civil Engineers, and 77(23.7%) are Quantity Surveyors, registered with their respective professional bodies (NIA, NIOB, NSE, and NIQS). 6(1.9%) of the participants have less than 5years of practice experience, 57(17.5%) have 6–10years of practice experience, 69(21.2%) have 11–15years of practice experience, 59(18.2%) have 16–20years of practice experience, while 134(41.2%) have above 20years of practice experience.

Table 4: Demographic Information of the Participant

Variables	**F**	**%**
Gender:		
Female	26	8.0
Male	299	92.0
Total	**325**	**100.0**
HighestEducationalQualification:		
HND	48	14.8
Degree	86	26.5
PGD	121	37.1
Master's	62	19.1
Ph. D	8	2.5
Total	**325**	**100.0**
Age:		
25 – 30years	7	2.2
31 – 36years	94	28.9
37 – 43years	146	44.9
Above 43years	78	24.0
Total	**325**	**100.0**
Professional Status:		
Architects	92	28.3
Builders	83	25.5
Civil Engineers	73	22.5
Quantity Surveyors	77	23.7
Total	**325**	**100.0**
Registration Status:		
MNIA	92	28.3
MNIOB	83	25.5
MNSE	73	22.5
MNIQS	77	23.7
Total	**325**	**100.0**
Years of practice experience:		
Less than 5years	6	1.9
6 – 10years	57	17.5
11 – 15years	69	21.2
16 – 20years	59	18.2
Above 20years	134	41.2
Total	**325**	**100.0**

F= frequency; % = percentage; N = 325.

Objective 1: To identify the construction efficiency in building construction project in Gombe State.

Table 5 depicts theresponsesof construction efficiency in building construction project in Gombe State, and was analyzed using descriptive tool such as the mean score, standard deviation and decision making which gauged on 5-points Likert-scales.

Cash-flow dimension for adequate funding of the project is identified with a mean score (M = 3.903) and standard deviation (SD = 1.079) as

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efficient for construction projects in Gombe State. Cost dimension to enhance adequate specification of the project is executed is identified with M = 3.892, SD = 1.385 as efficient for construction project. Time dimension to ensure prompt delivery of the project is identified with M = 3.699, SD = 1.073 as efficient for construction project. Safety dimension to protect the labourers and equipment on site for effective delivery of project is identified with M = 3.699, SD = 1.073 as efficient for construction project. Quality dimension to satisfy the clients and ensure good refutation of the industry is identified with M = 3.602, SD = 1.055 as efficient for construction project. Resource planning and identification is identified with M = 3.023, SD = 1.010 as moderately efficient for construction project. Project competencies and project management skillsis identified with M = 2.989, SD = 0.993 as moderately efficient for construction project. Effective benefits delivery and management process is identified with M =2.972, SD = 1.267 as moderately efficient for construction project.Effective communication and commitment are identified with M = 2.761, SD = 1.110 as moderately efficient for construction project. Companywide education on the concept of risk is identified with M = 2.313, SD = 1.101 as less efficientfor construction project in Gombe State.

This with average total mean score (ATMS) value of 3.364 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 Score**	**Std. D**	**Decision**
Cash-flow dimension for adequate funding of the project.	3.903	1.079	Efficient
Cost dimension to enhance adequate specification of the project is executed.	3.892	1.385	Efficient
Time dimension to ensure prompt delivery of the project.	3.699	1.073	Efficient
Safety dimension to protect the labourers and equipment on site for effective delivery of project.	3.699	1.073	Efficient
Quality dimension to satisfy the clients and ensure good refutation of the industry.	3.602	1.055	Efficient
Resource planning and identification.	3.023	1.010	Moderately Efficient
Project competencies and project management skills.	2.989	.993	Moderately Efficient
Effective benefits delivery and management process.	2.972	1.267	Moderately Efficient
Effective communication and commitment.	2.761	1.110	Moderately Efficient
Companywide education on the concept of risk.	2.313	1.101	Less Efficient
Average Total Mean Score (ATMS) = 33.6421/10	**3.364**		**Moderately Efficient**

Decision Rule (Miller, 2020): 0.00 – 1.49 = Not Efficient (NE); 1.50 – 2.49 = Less Efficient (LE); 2.50 – 3.49 = Moderately Efficient (ME); 3.50 – 4.49 = Efficient (E) & 4.50 – 5.00 = Highly Efficient (HE).

The study revealed an average total mean score (ATMS) value of 3.364, which meant the agreement of the respondents in accepting the building construction projects in Gombe State have moderate construction efficiency; with 5 most dimensions to include: cash-flow with M = 3.903, cost with M = 3.892, time with M = 3.699, safety with M = 3.699, and quality with M = 3.602.

The objective outcome agrees with the outcome of the previous researchers like Susil et al. (2017) and, Warnakulasooriya and Bhadra (2017) that, efficiency dimension in construction project is paramount and is known to be as short-term perspective for construction project success. Because, construction is a labour-intensive industry, therefore, considering efficiency dimension in a construction is very relevant (Bhavya & Lekshmi, 2022).

Objective 2: To determine the factors causing failure in building construction projects in Gombe State

Table 6 shows the responses of factors causing failure in building construction projects in Gombe State, analyzed using descriptive tool such as the mean score, standard deviation and decision making which gauged on 5-points Likert-scales.

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Lack of experience and knowledge is determined with M = 3.909, SD = 1.1641 as a factor causing failure in building construction project in Gombe State. Poor communication is determined with M = 3.852, SD = 1.192 as a factor causing failure in building construction project in Gombe State. Poor monitoring and tracking are determined with M = 3.830, SD = 1.280 as a factor causing failure in building construction project in Gombe State. Unclear scope and goals are determined with M = 3.750, SD = 1.234 as a factor causing failure in building construction project in Gombe State. Poor planning and scheduling are determined with M = 3.750, SD = 1.234 as a factor causing failure in building construction project in Gombe State. Lack of technical performance is determined with M = 3.716, SD = 1.216 as a factor causing failure in building construction project in Gombe State. Cultural Differences in global projects is determined with M = 3.693, SD = 0.7121 as a factor causing failure in building construction project in Gombe State. Poor quality is determined with M = 3.688, SD = 1.465 as a factor causing failure in building construction project in Gombe State. Poor project management is determined with M = 3.682, SD = 1.117 as a factor causing failure in building construction project in Gombe State. Inefficient resources allocation is determined with M = 3.665, SD = 1.117 as a factor causing failure in building construction project in Gombe State. Bureaucracy and corruption are determined with M = 3.659, SD = 0.892 as a factor causing failure in building construction project in Gombe State. Lack of financial capacity is determined with M = 3.648, SD = 1.122 as a factor causing failure in building construction project in Gombe State. Delay in payment is determined with M = 3.597, SD = 1.261 as a factor causing failure in building construction project in Gombe State. Poor design, frequent design changes & design errors is determined with M = 3.517, SD = 1.234 as a factor causing failure in building construction project in Gombe State.

Whereas, inaccurate cost estimation is determined with M = 3.494, SD = 0.892 as a factor causing moderate failure in building construction project in Gombe State. Poor management of expectations is determined with M = 3.148, SD = 0.712 as a factor causing moderate failure in building construction project in Gombe State. Weather and social environment is determined with M = 3.097, SD = 1.465 as a factor causing moderate failure in building construction project in Gombe State.

Table 6: Factors causes failure in building construction project in Gombe State

Statements	**Mean Score**	**Std. D**	**Decision**
Lack of experience and knowledge cause failure.	3.909	1.164	Failure
Poor communication cause failure.	3.852	1.192	Failure
Poor monitoring and tracking cause failure.	3.830	1.280	Failure
Unclear scope and goals cause failure.	3.750	1.234	Failure
Poor planning and scheduling cause failure.	3.750	1.234	Failure
Lack of technical performance cause failure.	3.716	1.216	Failure
Cultural Differences in global projects cause failure.	3.693	.712	Failure
Poor quality cause failure.	3.688	1.465	Failure
Poor project management cause failure.	3.682	1.117	Failure
Inefficient resources allocation cause failure.	3.665	1.117	Failure
Bureaucracy and corruption cause failure.	3.659	.892	Failure
Lack of financial capacity cause failure.	3.648	1.122	Failure
Delay in payment cause failure.	3.597	1.261	Failure
Poor design, frequent design changes & design errors cause failure.	3.517	1.234	Failure
Inaccurate cost estimation cause failure.	3.494	.892	Moderate Failure
Poor management of expectations cause failure.	3.148	.712	Moderate Failure
Weather and social environment cause failure.	3.097	1.465	Moderate Failure
Average Total Mean Score (ATMS) = 61.5682/17	**3.622**		**Failure**

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Decision Rule (Miller, 2020): 0.00–1.49 = No Failure (NF); 1.50–2.49 = Less Failure (LF); 2.50–3.49 = Moderate Failure (MF); 3.50–4.49 = Failure (F) & 4.50–5.00 = High Failure (HF).

The study revealed that the 5 most factors causing failure in building construction projects in Gombe State were: lack of experience and knowledge with M = 3.909,poor communication with M = 3.852,poor monitoring and tracking with M = 3.830,unclear scope and goals with M = 3.750,and poor planning and scheduling with M = 3.750.

The finding of this objective conforms with the outcome of Innocent (2019), Sa'ad (2019), Shahhosseiniet al. (2018), Hamma-Adama (2017), Amade et al. (2015), Agwu (2014); and validates the earlier assertion by Ernst and Young (2014) that identified 65% of project failures were due to softer aspects such as people, organization, and governance. Even though, Manuel (2018) earlier asserted that, projects are initiated by human beings, designed for human beings and executed by human beings; this makes the human element the single most critical aspect in the project execution process from conceptualization to handing over.

Objective 3: To determine the relational effect of construction efficiency on factors causing failure in building construction project in Gombe State

Table 7shows the responses about the relational effect of construction efficiency on factors causing failure in building construction projects in Gombe State, analyzed using Pearson Product Moment of correlation(r) toreach the decision making.

Coefficient of correlation (r), measures the strength and direction of the linear relationship between two variables (Field, 2018). The values of r range from -1 (perfect negative correlation) to 1 (perfect positive correlation), with 0 indicating no correlation. It also measures the extent to which two variables move together. If the variables tend to increase or decrease together, the correlation is positive; if one variable tends to increase when the other decreases, the correlation is negative (Field, 2018).

Table 7: Relational effect between construction efficiency and factors causing failure

		CE	**FCF**
Construction efficiency (**CE**)	Pearson Correlation	1	.898**
	Sig. (2-tailed)		.0013
	N	325	
Factors causing failure (**FCF**)	Pearson Correlation	.898**	1
	Sig. (2-tailed)	.0013	
	N		325

Source: SPSS version 23 (Output).

Therefore, in this current study, Table 7 shows the investigation of the relational effect between the two variables of the study: construction efficiency (**CE**) as independent variable, and factors causing failure (**FCF**) in building construction projects as dependent variable in construction projects in Gombe State.

The result from the analysis of the relational effect between the **CE** and **FCF**is stated to be:

i. Correlation Coefficient (r) = 0.898(89.8%): indicates a strong positive correlation between the two variables (construction efficiency, and factors causing failure). As one variable increases, the other variable also tends to increase.
ii. Significance Level (p) = 0.013: it means that the probability of observing this correlation by chance is very low (less than 1.3%). Since $p < 0.05$, it can be concluded that the relational effect of the correlation is statistically significant.

Therefore, there was a positive strong relational effect between the construction efficiency, and factors causing failure, and the correlation is statistically significant, indicating that it is unlikely to be due to chance ($r = 0.898$ & $p = 0.013 < 0.05$).

The findings agree with the finding of Abdullahi et al. (2018).

V. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The research concluded based on the findings as follows:

i. There ismoderate construction efficiency in building construction projects in Gombe State

with most dimensions to include: cash-flow, cost, time, safety, and quality.

ii. Lack of experience and knowledge,poor communication,poor monitoring and tracking,unclear scope and goals, and poor planning and scheduling are the most factors causing failure in building construction projects in Gombe State.

iii. There is a positive strong and statistically significant relational effect of construction efficiency on factors causing failure in construction projects in Gombe State ($r = 0.898$ & $p = 0.013 < 0.05$).

Recommendations

The recommendations deduced from the conclusion as follows:

i. Stakeholders in construction project should ensure strict adherence to the construction efficiency to maximise habitable environment for cultivating healthy structures for client's satisfaction.

ii. Stakeholders in construction industry should ensure professionalism in execution of responsibilities to avoid causes of building construction project's failures.

iii. Respective regulatory bodies of the construction should supervise to ensure that construction professionals embraced construction efficiency in the construction project's delivery all the time.

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