

Comprehensive Analysis of Construction Time and Cost for Mass Housing Projects under Affordable Housing- Review Paper

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Abstract: In India, there are no affordable housing construction guidelines, which is a policy void that must be addressed immediately. To ensure the long-term viability of upcoming affordable housing projects, a radical design and planning approach is needed. We used an architectural and site-based research route to conduct a cross-sectional assessment of Affordable housing layouts in this report. We hypothesize that better natural-ventilation in the living spaces, which is a feature of the housing layout, would result in a better indoor climate in affordable housing. In construction planning and management, minimizing project time and expense at the same time is critical. To maximize the overall construction project benefit, tradeoff optimization between these two variables is needed. In the case of mass housing construction, construction technique plays a critical role in keeping the Project Triangle successful, i.e. Cost, Time, and Quality. Early decisions on a building project have a major effect on the project, and different situations depending on the owner's specifications should be considered when making decisions. The knowledge available about a construction project at the start is generally minimal and ambiguous. As a result, preparing and managing the project is challenging (especially cost planning). As a result, a cost model that could be adjusted according to the needs of the owner was developed.

Keywords – Construction, Housing Project, Policy.

I. INTRODUCTION

From a construction standpoint, high-rise buildings have three main parameters: time, expense, and efficiency. Quality is the most critical dimension of construction. Because of recent developments in the construction industry, quality has become one of the most important factors. In any sector, the item must be manufactured to the required standard in order to provide the value of money. Quality is described as the client's satisfaction with the venture's execution, appearance, and unwavering quality in the long run.

The illusion of owning a home is becoming a daunting reality for many low- and middle-income families. As a result, it has become necessary to implement cost-effective, creative, and environmentally sustainable housing technologies for the construction of houses and buildings so that ordinary citizens can afford to build houses.

Scope of Project: The word "affordable housing" refers to dwelling units with a total housing expense that is considered "affordable" to a group of people with a certain income range. In India, the technology for housing components should be tailored to fit the level of skills and handling

facilities available in metropolitan, urban, and rural areas.

II. LITERATURE REVIEW

The needs of a growing population are growing at a faster rate than the population. Individuals are searching for more space to accommodate their evolving lifestyles. Settlement is unmistakably one of the most important requirements for any business or entity in the long run. Concrete and bituminous asphalt are being applied to the ground. To meet the needs of individuals in this situation, high-rise buildings are the most important arrangement, both aesthetically and practically. In this paper, I will discuss the requirements for elevated structures, their interest, and the construction procedures with refined innovations and green ideas for a higher quality of life, well-being, and flourishing of tenants, which gave the structures stability and solidarity.

High-rise structures are one of the most common modern structures today. Today, almost every single development company is working on it. The most recent developments are being implemented, and others are still being researched. Due to a lack of land in view of the rapidly growing population, people are unable to pursue their interests, and high-rise buildings are being constructed to meet their needs.

As a result of these high-rise buildings, people with better offices have better living quarters. The two most closely related callings for the tall structure plan are engineering and structure. Until the end of the only remaining century, high-rise buildings are still built of solid block stonework.

High-rise structures are intricately designed structures that necessitate a thorough inspection, pre-planning, pre-construction work, final structure and plan, creation, and execution. Another aspect of this technique that should not be overlooked is quality assurance. Throughout the construction process, the essence of the work performed, the materials used, and the standard of labor must be maintained on the job site.

Michael Atafo Adabre, *, Albert P.C. Chan, Amos Darko, Robert Osei-Kyei, Rotimi Abidoye, Theophilus Adjei-Kumi (2020),

The achievement of sustainability of affordable housing for low-income earners is critical for a significant success in global sustainable growth. Identifying barriers to achieving sustainability is essential for effective policy implementation. From an international perspective, the aim of this paper is to identify key barriers (CBs) to sustainable affordable housing (SAH). To that end, a systematic literature review identified 26 obstacles, and an observational questionnaire survey was conducted with 51 affordable housing experts from around the world. Five components emerged from a factor study of identified CBs: Barriers to green retrofitting, land market-related incentives, housing market-related barriers, and infrastructure-related barriers. Furthermore, a rank agreement review of the components revealed high levels of agreement between experts from developing and industrialized countries on 'incentive-related barriers' and 'housing market-related barriers.' The findings of the study will help policymakers and practitioners implement tactical steps to combat SAH around the world. Furthermore, in most countries, the identified CBs serve as a suggested collection of barriers for further empirical research to unearth local variations and context-specific barriers to SAH.

Felix SK Agyemang, Nicky Morrison (2017)

Housing low-income households is a herculean task for policymakers all over the Global South, especially in Africa, where previous attempts to deliver State-funded affordable housing projects have failed miserably. The aim of this article, which uses Ghana as a case study, is to discuss the rationale for and obstacles to securing affordable housing through the planning system. On the one hand, a lack of central government commitment, poor enforcement of planning regulations, and low ability of local planning authorities, and on the other hand, the dominance of customary land ownership and the informal nature of housing delivery, are main factors that would stymie successful policy implementation. Despite this, the article indicates that there is an opportunity cost in not attempting

to obtain some kind of economic rent from the private sector, based on a mapping exercise of large-scale formal residential developments constructed across Greater Accra in recent years. With a well-established nationalized development rights mechanism and a growing formal real estate market, there is potential to introduce planning obligations in the future although completely establishing and enforcing this type of land value capture legislation takes time due to necessity, there are transferable lessons across Africa and the Global South if the principles can be established.

Morshed Alam, Patrick X.W. Zou, Rodney Stewart, Edoardo Bertone, Oz Sahin, Chris Buntine, Carolyn Marshall (2019)

The effectiveness of these types of complex retrofitting programmes depends on understanding the challenges and coping mechanisms for retrofitting government buildings for energy efficiency. This paper used thematic results from two focus groups of government workers from two Australian states to compile a detailed list of obstacles to energy efficiency retrofitting of public buildings and related methods to overcome them. The main obstacles to public building energy efficiency retrofitting programmes, according to the thematic report, are a lack of political will, funding protocols, department/agency capacity, industry capability, quality assurance, and misaligned incentives. According to study, a top-down strategy championed by the government is expected to overcome such barriers. Allowing government departments and agencies to take on debt to finance retrofit projects that would yield short-medium-term returns in terms of reduced energy utility costs was described as a key strategy. A mandatory energy efficiency retrofitting programme, a dedicated funding system, a flexible procurement model, and a facilitation team were all relevant strategies.

Ronita Bardhana, Ramit Debnatha, Jeetika Malik, Ahana Sarkar (2018)

A key strategy was identified as allowing government departments and agencies to take on debt to fund retrofit projects that would deliver short-medium-term returns in terms of lower energy utility costs. Specific initiatives included a mandatory energy management retrofitting programme, a dedicated financing scheme, a flexible procurement model, and a facilitation team. This study hypothesizes that better wind-driven natural-ventilation in the living spaces, which is a feature of the housing layout, would result in a better indoor climate in LIG housing. The study's specific goals were to: i) investigate the effect of socioarchitectural and geometric parameters on LIG housing layouts using CFD simulations; and ii) investigate the effect of site-wind flow on LIG housing layouts using CFD simulations. The case study was conducted in Mumbai's BDD chawls. The current form of the LIG houses had a weak indoor atmosphere and social interaction spaces, while the hypothesized iterated layout 'Form A' performed better in all

socio-architectural and wind-flow metrics that can foster a higher quality of life. This study is the first step toward establishing regulatory guidelines for LIG housing design that is environmentally friendly.

Min-Yuan Cheng and Duc-Hoc Tran (2014)

Concurrent project time and expense minimization is a critical concern in construction planning and management. To maximize the overall construction project benefit, tradeoff optimization between these two variables is needed. To address these issues, this paper proposes a two-phase differential evolution (DE) model this model will accurately account for time–cost effects as well as resource constraints. To evaluate the execution mode that best optimizes the time–cost balance, we first implement a novel multiple-objective algorithm, the chaotic initialized multiple objective differential evolution with adaptive-mutation strategy dependent time–cost tradeoff. Then, to produce a feasible schedule, use a DE-based resource-constrained process. The proposed algorithm is then demonstrated using a real-world construction case study Performance comparison with the no dominated sorting genetic algorithm, multiple objective particles warm optimization, and multiple objective differential evolution further demonstrate the proposed algorithm's efficiency and effectiveness.

Jaeho Cho¹ and Jaeyoul Chun (2015)

In the design development stage, cost estimating approaches for reinforced concrete structures based on 3D design can be divided into quantity takeoff (estimation) and quantity prediction Concrete and formwork are the key estimation elements that can be considered in a quantity takeoff, while reinforcing bars in the design creation stage are the quantity prediction factor. This research proposes a cost estimation method that uses automated quantity takeoff and parameterized quantity prediction. To begin, a quantity takeoff's logic calculates the quantity of formwork based on the object details Upon obtaining physical shape information from the 3D-object, the Standard Method of Measurement (SMM) automatically estimates the quantity of formwork. Second, using data mining techniques including the Decision Tree Model (DTM) and Case Based Reasoning, the logic of quantity estimation estimates the quantity of reinforcing bars (CBR). Information Gains (IG) of design attributes are evaluated to predict the quantity of reinforcing bars, and then the valid attributes are chosen as the parameters. By generating decision tree nodes, the parameters will statistically identify the quantity of reinforcing bars.

D F Cooper*, D H MacDonald-f and C B Chapman*(1985)

The author discusses a risk analysis of a construction cost estimate for a major hydroelectric project. The study's aim was to include an unbiased check on the estimate's reliability and the contingency allowance's adequacy The base-cost estimation, the risk analysis methodology, the sources of risk considered, the specifics of the risk analysis process, and the

risk analysis implementation are all covered in this document The connection between this form of risk analysis and the cost estimation method is explored in depth. The conclusion is that a hybrid solution could be feasible, with significant benefits.

Bashir O.Ganiyu, Julius A Fapohunda, Rainer Haldenwang (2015)

In developed countries, the construction industry has been very slow to This has little to do with the need for long-term shelters to house the rising population or the need for supporting infrastructure to improve people's living standards. Building energy efficient homes not only improves living standards but also improves the atmosphere, resulting in the development of sustainable communities The current literatures show that there is a lot of talk about sustainable growth, but there isn't much action. This paper aims to present a novel approach to housing construction for low- and middle-income people in developing countries that will be more sustainable The data was gathered using quantitative techniques, and the research participants were construction professionals from the South African construction industry. The information was analyzed using descriptive statistical methods The study focuses on four building methods and the factors that influence them in order to improve housing sustainability. The key factors that, if accomplished, would reduce building costs to a minimum, reduce the negative effect of construction on the

Qiong He 1, S. Thomas Ng 2*, Md. Uzzal Hossain 2 and Martin Skitmore (2019)

Since windows are a key component in transmitting heating and cooling between the indoor and outdoor environments, an appropriate window system is one of the most critical retrofit strategies for existing buildings for energy conservation As a result, this research introduces a method based on a theoretical case study to investigate how window retrofitting can increase energy efficiency in a typical high-rise residential building. With 20 common potential glazing alternatives being analyzed to predict the potential energy savings in the same case building with identical located in a variety of climate zones in China, a building energy design model in Design builder was created Based on various criteria and considerations, the results revealed that low-e window glazing has the best energy output in all climate zones, but is insufficiently similar to conventionally glazed windows in terms of energy efficiency to prevent its adoption at this time. Instead, in a hot summer/warm winter setting, a single dark conventional glazed window is favored, double dark traditional glazing in a hot summer/cool winter climate, and a double transparent conventional window in a cold climate Based on the simulation results, a guideline for selecting an appropriate window system for residential building retrofitting in the studied climates or similar climatic regions was given.

Eziyi Offia Ibem (2019)

The Public–Private Partnership (PPP) is a relatively new approach to housing provision that was implemented in Nigeria to solve the country's growing housing problems. To date, little is known about the contribution of this strategy to raising low-income earners' chances of obtaining good and affordable housing in this country's urban areas. This study found that, like most previous public housing delivery methods, the Public–Private–Partnership strategy has not made a significant contribution to housing low-income earners; rather, it is biased towards providing housing for high- and middle-income earners, based on data collected from a survey of selected government housing agencies in six cities in southern Nigeria. This paper attributes this trend to the state-market system of Public–Private Partnerships and the lack of a National Policy on Public–Private Partnerships in Housing in Nigeria. As a result, it indicates that developing and adopting a uniform National Policy on Public–Private Partnership in Housing, government land provision at no cost to private developers, lowering of high building standards, and incorporating assisted-self-help and incremental housing into the Public–Private–Partnership housing delivery framework would result in better performance.

III. CONCLUSION

In PPP projects, cost components play an important role. Construction Methodology is a central feature of Mass Housing Projects, as shown by the analysis of the above article. Conventional Methods of Construction Practices and Aluminum Construction Practices have two separate tales, as do precast or Prefab Construction Practices. Though the traditional method of practice is efficient and reliable in terms of cost, aluminium formwork technology provides the best results in terms of reducing time and cost. This study provides a brief overview of the most appropriate methodology for cost and time optimization.

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