

Resource Optimization Techniques and Sustainability of Gated Community Construction Projects in Nairobi County, Kenya

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Abstract

Rapid urbanization in developing countries has made planners re-thing housing models that combine aesthetics, safety as well as reasonable costs. Gated communities are among the top most considered models when it comes to residential planning in Kenya. The study aimed to investigate how resource optimization techniques influence long-term viability of gated community building projects in Kenya's Nairobi County. The focus was resource leveling. Research method adopted was descriptive survey. The investigation's target audience and research participants were project managers, project supervisors, contractors and clients. The target population consisted of 1204 respondents broken down as 16 project managers, 31 project supervisors, 21 contractors and 1136 customers. After computation, the sample size of 849 was arrived at using Yamahe (1967) formulae. Data was collected using questionnaire and primary data was obtained from Knight Frank database. Descriptive statistics, such as frequency, percentage distributions, mean values, and standard deviations were used. Additionally correlation was used to determine relationships between variables. Findings showed that there was a significant correlation between resource leveling and project sustainability ($r = 0.627$, $p = 0.000$). The study concluded that resources are moved from non-critical to critical activities; efficient operations and the successful completion of projects are supported by proper equipment distribution. The study recommends that, to increase sustainability of projects, project managers, contractors, and supervisors should make sure that roles are clearly defined for individuals, teams, tasks and departments.

Keywords

Gated Community, Resource Optimization, Resource Leveling, Sustainability

1. Introduction

This paper is about resource optimization techniques and sustainability of gated community construction projects in Nairobi County, Kenya. Specifically the paper focused on resource leveling technique. It is divided into five sections. Section one presents background of the study in which a global, regional and country overview of gated community construction projects are discussed. The section also has statement of the problem and research objective. Section two presents literature review and the gap the study filled. Section three contains research methodology that was utilized. Section four presents findings of the study while section Five has discussions, conclusions and suggestions for future action.

1.1. Background of the Study

Gated communities are residential neighborhoods with restricted access aiming to monopolize public spaces. Streets, parks, sidewalks, rivers, beaches, as well as playgrounds are all examples of public spaces (Hedayati-Marzbali, Tilaki, & Abdullah, 2017). These resources would be available and shared by all residents of a community if there were no gates or walls. Non-residents are prohibited from entering these communities because they are gated and have clearly defined boundaries, which are often in the form of walls or fences. Gated communities' developers promote their developments as being secure, nicer, and additionally financially secure than typical urban or suburban areas (Alkan-Gökler, 2017).

Globally, gating has long been considered an "American" characteristic, despite the fact that gated residential districts can be found in cities all over the world (Polanska, 2010). Other parts of the globe, such as Saudi Arabia, Lebanon, and Latin America, have also been known to have gated communities (Saidu & Shakantu, 2017). This phenomenon is referred to by a variety of labels. "Closed condominiums", "gated communities", "enclosed neighborhoods", "gated enclaves", and "fenced-in places" are only a few examples (Sweis et al., 2019). The key cause for the creation of gated communities has been identified as the rising crime rate in an area. Several nations, like the United States of America and Brazil, are home to residents who have made the conscious decision to avoid "dangerous" environments by relocating to private, gated communities.

Project delays and budget overruns are a prevalent problem when seen from a global perspective, and customers' expectations are often addressed as a result of increased resource efficiency. By maximizing resource use, repetitious construction projects such as motorways, high-rise buildings, and housing developments may be completed in a fraction of the time and for a fraction of the cost. The completion of a project within the allotted time, money, and other resources is what determines whether or not it was a successful endeavor in the eyes of the project management (Oberlender, 2014). When these crucial restrictions are not satisfied, projects frequently go behind schedule, incur huge cost overruns, and fail to satisfy clients and stakeholders. Construction cost overruns and delays are widespread in wealthy nations such as the United Kingdom, the United States, Afghanistan, India, and Australia, and are a main source of anxiety for the con-

struction sector (Saidu & Shakantu, 2017; Niazi & Painting, 2017; Venkateswaran & Murugasan, 2017). According to Al-Kharashi & Skitmore (2019) the inability to finish a project on time is one of the most typical problem that occurs in the building and construction sector in Saudi Arabia. It is noted therefore that projects suffer similar challenges regardless of the level of economic development of a region.

In recent years, the idea of guarded or gated communities has seen a meteoric rise in appeal throughout the whole of Africa. Since the early 1990s, there has been a rise in the number of gated communities in South Africa, mainly in the metropolitan districts of Gauteng and the areas that surround these cities. In today's Nigeria, the notion of gated communities is a rapidly developing solution to security and safety, since non-gated communities across the country are plagued by instability (Ajibola, Oloke, & Ogungbemi, 2011). In Africa, the problem has been thoroughly investigated, however, it is yet to be entirely fixed. As proven by the Ugandan Civil Aviation Authority (CAA), delays in schedule and cost overruns have sustained to wreak havoc on the public projects' performance due to inefficient resource efficiency (Alinaitwe, Apolot, & Tindiwensi, 2013). Effective project management is a recurring difficulty in Botswana, Egypt, Zambia, and South Africa (Mukuka, Aigbavboa, & Thwala, 2015). The reasons for construction project delays in Libya, with an emphasis on how they affect project performance are frequently tied to resource optimization techniques (Sweis et al., 2019). Nigeria is also confronted with the same problem (Amusan et al., 2017).

The growing trend of GCs in Kenya may be traced back to the capital city of Nairobi, but it is expanding rapidly to other towns. They are quickly gaining favor in the housing industry, with 90% of all such projects occurring in the last five years. Boru (2016), Mwawasi & Gituro (2017), Kwatsima (2017) and Seboru et al. (2016) have all looked at the building business, however there has not been enough focus on gated community residential development projects. Since there is rapid expansion of gated community projects, it is crucial to comprehend the impact of resource optimization techniques on the projects timeliness and expense. It is necessary to investigate important resource optimization techniques, with a particular focus on their impact on the success of gated community housing developments. In developing nations, construction projects contribute to the economy in terms of job creation and taxation. Hence, there is a need to evaluate the success of gated community residential construction projects.

1.2. Statement of the Problem

Gated communities have become well-known housing projects. These construction projects contribute to the economy, a significant issue for project managers. In terms of long-term economic viability, gated communities provide a solid foundation for raising the standard, security, and quality of residential property value (Gituro & Mwawasi, 2017). A study by He, Li and Wang (2021) highlighted that it is crucial for project managers in the construction business to think about resource allocation arrangement challenges from several angles. As a

result, managing resources in the construction industry has grown difficult. However, their analysis did not consider resource leveling but only looked at project execution time, cost, and energy usage a gap that this study filled.

Findings of a research conducted by *Koyi, Miroga, and Otinga (2021)* showed that timely completion of road construction in Kakamega County, Kenya was greatly influenced by the effective allocation and sequencing of resources. The appropriate scheduling of resources enables a number of solutions to be found for problems relating to the availability of resources and the efficiency of work. The present study will fill the gap left by this study's failure to examine the effects of resource leveling.

Just as there is a growing unpredictability of world economies with regard to financial, technological and development process, the construction sector is also dynamic and unpredictable, providing considerable hurdles to project completion. Delays in project completion induce stress because of cumulative interest rates charged by commercial banks, cost overruns, inflation, and the likelihood of disputes and claims resulting in litigation or arbitration. In Nairobi County, around 48% of projects are currently unfinished, with 10% of these projects fully halted. GC housing developments in Nairobi County continue to experience challenges, according to *Musyoka, Gakuu, and Kyalo (2017)*, despite the higher threshold that is needed and the nature of the projects in terms of project management. As a result, the purpose of this study was to investigate effect that resource-optimization strategies have on the long-term viability of construction projects in gated communities located across Nairobi County in Kenya.

1.3. Research Objective

The objective of the study was to examine the influence of resource leveling on sustainability of construction projects in Nairobi County gated communities.

2. Literature Review

2.1. Introduction

This sections looks at literature related to resource leveling and how it relates to construction projects globally and locally. The aim is to bring out what has been done on the subject matter and the gaps that this study filled.

2.2. Sustainability of Construction Projects

Project sustainability is seen as the ongoing management of resources to guarantee that both the current and future generations continue to benefit from them. Sustainability evaluates the development, upkeep, and/or deterioration of resources that have an impact on the environment and human well-being (*Dungumaro & Madulu, 2013*). A study by *Nikkah and Redzuan (2010)* posits that sustainability pointers and metrics are attempts to meet the long-term demands and service expectations of communities.

Sustainability means a resilient economy that can support its undertakings.

This may be explained in terms of the ecosystem's carrying capacity using input-output models of resource use (Boons, 2013). Unsustainable activities can be compensated for by either creating sustainable operations or by making plans for a time when the resources needed now won't be available (Oino, Towett, Kirui, & Luvega, 2015). Organizational success is centered on sustainability, which is linked to all other important factors (Oino, Towett, Kirui, & Luvega, 2015). Some of the most important characteristics of a sustainable organization are a well defined goal and strategic direction, the ability to get money from a range of sources, the ability to manage resources effectively and efficiently, and any efforts to regenerate the organization (Nalivata et al., 2022). Therefore, it is possible to consider that the idea of sustainability has an effect on initiatives and more so on urban construction projects.

Project sustainability, in relation to the implementation of projects, is the likelihood that the project will continue to grow even after external funding has ended (Haysom & Battersby, 2016). All beneficiaries of community initiatives must engage in the finance objective for sustainability to be attained. Some signs of a project's viability include its profitability, especially after the financiers have left, recorded growth, achievement of its goals, and improvement in standards (Almahmoud & Doloi, 2015). Beneficiary satisfaction, operational effectiveness, project dependability, preservation of project deliverables and procedure, financial strength of the projects, and infrastructure growth are the sustainability metrics considered in this study.

2.3. Resource Leveling and Sustainability of Construction Projects

The goal of the project management and scheduling technique known as resource leveling is to minimize the amount of fluctuation in resource demand that occurs during the course of the project. The term "resources" refers to the many types of personnel and equipment required to complete project tasks.

The overall daily need for each resource is calculated by aggregating the resource loading from all scheduled activities for that day (Shadrack, 2018). The daily resource staffing levels may then be calculated using the resource profile produced by resource loading. Optimizing the use of personnel and equipment, according to Gido and Clements (2014), is crucial in the resource leveling process. The basic premise is that in construction projects, the most desirable outcome is to utilize the fewest resources possible (Badawiyeh, 2010). Project managers use the same personnel and equipment on a regular basis since it is more efficient and saves money on employing new staff and acquiring new equipment. According to Shadrack (2018), resource loading is essential because it brings together the underlying interdependencies that exist between planned tasks and the resources that are necessary to finish them. Another popular resource management strategy is to change the logical links between distinct tasks.

A study by Badawiyeh (2010) mainly focused on various resource leveling techniques employed by constructors in Kenya, this study was intended to establish the influence of resource leveling technique on sustainability of construction

of gated community projects in Kenya. Badawiyeh's work was important to this study as it already identified the most commonly used resource leveling techniques; however, their effectiveness on sustainability of construction projects were not covered. This study therefore filled this gap by establishing the place of resource leveling on sustainability of construction industry and more specifically the gated community model.

Findings of [Badawiyeh \(2010\)](#) research showed that resource leveling influences the entire company, resulting in improved overall operations. Resource leveling is widely accepted as a management strategy that frees up time for executives to devote to other important areas of the company's operations. This is due to the fact that they are not overburdened with everyday resource management tasks. Second, resource leveling helps to boost employee morale. This is because they are assured job stability and are not at risk of being dismissed if there is no work available. Maintaining a somewhat consistent workforce decreases labor turnover and, as a result, the expense of investing in labor training. Any site's human retention leads to enhanced experience, which reduces expensive mistakes in task execution. This lowers production costs, enhancing project profitability. These findings are in agreement with this study since good administrative techniques lead to sustainability of any project and more so gated communities, which are seen as long-term investments.

[Vignesh \(2018\)](#) study looked at Resource optimization of construction project using Primavera P6. The findings were that many businesses use an organized approach to resource leveling. A structure based on work is created outlining the scope of the project and how responsibilities have been structured and assigned to diverse team members. The framework aids the project team in completing project responsibilities in a timely, effective, and efficient manner, [Vignesh \(2018\)](#). This study though related to current study in that it looked at resource leveling, it was limited to Primavera P6, which is a project portfolio management tool. The current study is broad-based and takes into consideration other leveling approaches such as resource availability, profile, assigning and inherent limitations.

2.4. Summary of Literature Review

In the foregoing literature, it is noted that resource leveling is considered important by most construction project managers. Scholars reviewed have looked at resource leveling techniques commonly used by developers and Primavera P6 a portfolio model for resource leveling. This study's focus however is on how resource leveling contribute to sustainability of gated construction residential projects. Sustainability is considered an important element more so because gated residential communities are long-term ventures.

3. Research Methodology

3.1. Introduction

This section gives a summary of the research method that was used as well as an

explanation of the reasoning behind the decision to utilize that specific strategy. The chapter also examines the research's target population, sample size and sampling procedure, data collecting techniques, data analysis and presentation, as well as ethical concerns related to the study.

3.2. Research Design

Descriptive research design was used for the study. By analyzing data and drawing inferences from them, researchers may employ a descriptive research technique to make precise predictions. The design also enables one to get more data from a bigger population in less time and at a lesser cost by having study participants fill out questionnaires.

3.3. Target Population

The target population included residents of nine gated community-building projects in Nairobi County managed by real estate broker Knight Frank Kenya Ltd. According to Knight Frank, Kenya Ltd, database 2015-2019, there are nine active projects. These projects were included in this analysis. The target population for the study included 16 project managers, 31 project supervisors, 21 contractors, and 1136 clients as depicted in **Table 1**.

3.4. Sample Size and Sampling Procedure (Table 2)

Nine home development projects in gated communities made up the sample frame for this study. The data was obtained from Knight Frank Kenya Ltd. a real estate listing. The study utilized Yamane's (1967) method for finite population to establish the sample size for the clients that participated in the study while census was used for managers, supervisors and constructors.

Table 1. Target population.

Gated Community	Managers	Supervisors	Contractors	Clients
Edermann Properties	2	2	3	126
Lordship Africa	1	3	2	119
Stanlip	2	2	2	133
Kiewa Group	2	4	1	111
KCB	2	5	2	142
Jabavu Village Limited	1	2	1	121
Technofin	3	4	3	132
Karen Hills	1	3	4	115
Directline Assurance	2	6	3	137
Total	16	31	21	1136

Source: Knight Frank Kenya Ltd (2020).

Table 2. Sample size and sampling procedure.

Gated Community	Clients	Procedure	Sample Size
Edermann Properties	126	126/1136 * 781	87
Lordship Africa	119	119/1136 * 781	82
Stanlip	133	133/1136 * 781	91
Kiewa Group	111	111/1136 * 781	76
KCB	142	142/1136 * 781	98
Jabavu Village Limited	121	121/1136 * 781	83
Technofin	132	132/1136 * 781	91
Karen Hills	115	115/1136 * 781	79
Directline Assurance	137	137/1136 * 781	94
Total	1136		781

Source: by author.

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{1136}{1 + 1136(0.02)^2} = 781 \text{ clients}$$

where *n* is the sample size, *N* is the population size, and *e* is the sampling error at a 98% confidence level.

Therefore, the study selected 16 managers of projects, 31 project supervisors, 21 contractors and 781 clients to participate in the study giving a sample size of 849.

3.5. Data Collection Instruments

To collect data, the researcher used questionnaires. Open ended and closed questionnaires were developed by the researcher and distributed to respondents by means of research assistants. A total of 849 questionnaires were distributed and 781 were returned back dully filled. This indicated a response rate of 92 percent, which is way above 60 percent recommended return rate for social science studies. Secondary data was also used and were obtained from Knight Frank Kenya Ltd. database. The use of secondary data was expressly to obtained valid data on active projects that formed the population of the study.

3.6. Validity of the Instrument

To verify face validity, a team of specialists evaluated the study research instruments to see whether they accurately captured all the elements they were designed to measure. Both concept and content validity were employed in this investigation. It was necessary to break the questionnaire in order to ensure that

each part addressed a separate aim and maintained tight ties to the sub-constructs that were specified in our conceptual framework for the research. This was done to ensure construct validity. By giving the instrument to a carefully chosen focus group of five professionals in the field of project sustainability, content validity was sought. The questionnaire's validity was originally examined by going over it with the supervisor. To improve the content validity of the questionnaire, their opinions were assessed and taken into consideration. This is in line with Meyers, Gamst, and Guarino's (2016) suggestion that researchers should always establish face, content, construct, and concurrent validity.

3.7. Reliability of the Instrument

Questionnaires were tested for reliability. In this inquiry, the internal consistency technique was applied to establish dependability. To establish how items associated with one another, Cronbach's alpha was determined. According to Serakan and Walter (2003), the closer the reliability coefficient goes to 1.0, the better, with reliabilities less than 0.60 considered low, 0.70 considered good, and 0.80 considered excellent. This study used a figure of 0.70 or greater to determine the reliability of the instruments.

4. Data Analysis and Presentation

4.1. Introduction

This section presents demographic information of respondents, analysis of data obtained in the field, which are presented in tables as well as discussion arising from the analysis.

4.2. Demographic Information of the Respondents

For objectivity, the researcher sought the following information from respondents. Gender, designation or trade, specialization in project management (academic and professional), additional professional project management training to academic accomplishments, and the number of gated community housing projects in Nairobi City County. **Table 3** presents conclusions drawn from the investigation:

The research found that 68.0% of participants were males and 32.0% were women, as shown by the gender results. Gender bias was less of an issue in this study since data came from both male and female participants. Because of this, the percentage makeup of the sample was not skewed since the data obtained reflected the viewpoints of both gender.

Table 3. Gender of the respondents.

Gender	Frequency	Percent
Male	531	68.0
Female	250	32.0
Total	781	100.0

4.3. Data Analysis

This section presents both descriptive and inferential data analysis for the main variable in the study.

4.4. Resource Leveling and Sustainability of Projects

The objective of this study was to examine the influence that resource leveling could have on the sustainability of gated community development projects in Nairobi City County. **Table 4** presents the findings of the inquiry.

Results from this study show that resource leveling had a normal univariate distribution, with an aggregate mean of 4.28 and standard deviation findings that indicate that the data was spread out over an extensive range. The study results on the influence of resource leveling on sustainability of projects indicated that 88.4% (mean = 4.42) were of the opinion that Resource levelling is used when there is resource scarcity, 91.6% (mean = 4.58) were of the opinion that Resource levelling prevents resource overestimation; in order to minimize spikes, the strategy often lengthens project duration, 91.8% (mean = 4.59) were of the opinion that Resources are transferred from non-critical activities to critical ones, 67.0% (mean = 3.35) were of the opinion that to balance the burden of primary resources during the course of the projects, project planning resource leveling is employed while 89.0% (mean = 4.45) were of the opinion that Resource assigning assists in the successful delivery of the project.

4.5. Sustainability of Projects

The study's ultimate goal was to identify the metrics for measuring the sustainability of gated community development initiatives in Nairobi City County. The study's findings were summarized in **Table 5**.

Table 4. Resource leveling and sustainability of projects.

Statements		SD	D	U	A	SA	Total	Mean	Std. Dev
Resource levelling is used when there is resource scarcity	F	0	0	95	264	422	781	4.42	0.905
	%	0	0	12.2	33.8	54	100	88.4	
Resource levelling prevents resource overestimation; in order to minimize spikes, the strategy often lengthens project duration	F	0	0	28	264	489	781	4.58	0.899
	%	0	0	3.6	33.8	62.6	100	91.6	
Resources are transferred from non-critical activities to critical ones	F	0	0	28	264	489	781	4.59	0.860
	%	0	0	3.6	33.8	62.6	100	91.8	
To balance the burden of primary resources during the course of the projects, project planning resource leveling is employed	F	56	112	219	287	107	781	3.35	1.165
	%	7.2	14.4	28.1	36.7	13.7	100	67.0	
Resource assigning assists in the successful delivery of the project	F	0	0	84	259	438	781	4.45	0.275
	%	0	0	10.8	33.1	56.1	100	89.0	
Aggregate Mean								4.28	

Source: By author.

Table 5. Sustainability of gated community construction projects.

Statements		SD	D	U	A	SA	Total	Mean	Std Dev
The end result of a sustainable construction project must be an environmentally friendly building or environment	F	0	23	67	359	33	781	4.49	0.606
	%	0	2.9	8.6	46	42.4	100	89.8	
Timely delivery of project deliverables determines the sustainability of a project	F	0	0	95	264	43	781	4.52	1.446
	%	0	0	12.2	33.8	54	100	90.4	
Completion time is an indicator of project sustainability	F	0	0	28	264	49	781	4.28	0.860
	%	0	0	3.6	33.8	62.6	100	85.6	
Successful completion of projects is shown by delivery of such projects within the allocated budget	F	0	0	28	264	49	781	4.49	0.899
	%	0	0	3.6	33.8	62.6	100	89.8	
Aggregate Mean								4.45	

Source: By author.

Findings presented in **Table 4** demonstrate that the data were contained within a relatively broad range, which indicates that they followed a normal univariate distribution, and that the mean score for project sustainability was 4.45. According to the conclusions of the research on several indices of project sustainability. In addition, 89.8 percent of respondents (mean = 4.49) agreed that an ecologically friendly structure or environment must be produced by a sustainable construction project for it to be considered sustainable. On the other side, 90.4% of respondents (mean = 4.52) agreed that the timely completion of project deliverables is the most important factor in determining a project's sustainability. In addition, 85.6% (mean = 4.28) of respondents stated that a project's sustainability may be determined by the amount of time it takes to finish it. The likelihood that a project will continue to thrive even after external funding has ended is known as project sustainability. All beneficiaries must be included in the financing goal for community initiatives to be sustainable. Some signs of a project's viability include its profitability, especially after the financiers have left, recorded growth, achievement of its goals, and improvement in standards (Almahmoud & Doloi, 2015). Beneficiary satisfaction, operational effectiveness, project dependability, preservation of project deliverables and procedure, financial strength in the projects, and infrastructure growth are the sustainability metrics considered in this study.

4.6. Correlational Analysis

The goal of the study was to determine how the factors related to one another. The study's findings on the connection between resource optimization techniques and project sustainability are shown in **Table 6**.

Resource leveling and project sustainability had a substantial correlation ($r = 0.627$, $p = 0.000$). The resource leveling and project sustainability were strongly positively correlated, as indicated by the Pearson correlation coefficient of 0.627.

Table 6. Relationship between study variables.

		Correlations				
		Resource leveling	Sustainability of projects			
Resource leveling	Pearson Correlation	1				
	Sig. (2-tailed)					
Sustainability of projects	Pearson Correlation	0.627**				
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	
N		781	781	781	781	781

** . Correlation is significant at the 0.01 level (2-tailed).

5. Summary of Findings, Discussion, Conclusion and Recommendations

5.1. Introduction

This section presents summary of findings arising from data analysed, discussion, conclusion and recommendations arising from the findings of the study.

5.2. Summary of Findings and Discussion

Resource leveling which is a technique used in project management to resolve over allocation was the subject of this research. One of the findings indicate that resource leveling is used when there is resource scarcity. This is crucial if the available resources are to meet the target of the project. This finding is in line with that of [Badawiye \(2010\)](#) who found that leveling in a way, frees management to concentrate their energy in more critical areas. Moreover, 91.6% of the respondents were of the opinion that resource leveling prevents overestimation of project costs. This is an important area in project outcome as it ensures that the budget is not overly exaggerated to the extent that it may discourage implementation. According to [Gido and Clements \(2014\)](#), the basic premise in construction process is to utilize the list resources possible. Findings of this study also indicate that resources are usually transferred from non-critical to critical areas of the project. This was the opinion of 91.8% of the respondents. The ability of project teams to be flexible in the management of project resources is therefore seen to contribute to sustainability of gated community projects. As [Shadrack \(2018\)](#) puts it, project loading brings together underlying interdependencies that exist between planned tasks and resources that are necessary to finish them. Lastly, on resource assigning, 89% indicated that it assists in the successful delivery of projects. Of course, project delivery is the goal of any project manager. Deliberate efforts are therefore made through project leveling to assign resources. By using Gantt chart, project managers may assign resources to march time and personnel available.

5.3. Conclusion

The investigation concluded that resource leveling has influence on sustainabili-

ty of gated community construction projects in Nairobi County, Kenya. When resources are moved from non-critical to critical tasks, progress is made towards timelines of the project. All project's delivery team have a big impact on whether it succeeds or fails. Even the most meticulously planned projects have a chance of failing to meet their goals if the project team does not carry out their responsibilities to the best of their abilities. A well-oiled project team is very crucial to the project's success when it comes to finishing the project on time and within budget.

The study came to the further conclusion that efficient equipment distribution supports efficient operations and successful project completion. The project may be finished in the lowest amount of time and according to schedule if resources are allocated properly, ensuring that no project activity is stalled due to a shortage of facilities and equipment. Further, for gated construction projects to be sustainable, all beneficiaries must be included in the financing goal. This ensures that the communities continue to thrive beyond the financiers' departure.

5.4. Recommendations

According to job and efficiency requirements, the research suggested scheduling resources such that there would be more workers available during peak hours and fewer during off-peak hours. Planning should be done in a way that it effectively addresses the needs of the project, is focused on making the greatest use of the knowledge of the assets, is completed well in advance, and simultaneously considers worker satisfaction and confidence.

When assigning resources and leveling them, project managers, contractors, and supervisors should make sure that they clearly identify duties for the people, teams, tasks, or departments in order to maximize the project's sustainability. It is essential for the entire team system that everyone understands and follows the procedures. The position in the team comes with a set of duties that each team member must accept

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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