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Solutions to improve construction progress management at the construction investment project management board

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ABSTRACT

Projects that progress slowly will have a considerable impact on the socio-economic landscape, leading to the loss and misallocation of state budget resources. It is essential to examine the factors influencing progress in order to identify solutions that enhance the management of construction progress in Tan Thanh district. To ensure the project is implemented on time and to enhance its effectiveness, this study has identified 25 factors that influence the management of construction progress, categorizing them into five distinct groups. The factors will undergo testing for Cronbach's Alpha reliability, utilizing SPSS software for data analysis. The author conducted exploratory factor analysis (EFA) by calculating the Cronbach's Alpha coefficient for the observed variables. Based on the identified influencing factors, the author suggests several solutions aimed at enhancing the management of construction progress in Tan Thanh. These solutions are tailored to address specific groups of factors, including those related to the consulting unit's subjective factors, management and operation methods, investors and project management boards, other contributing factors, construction contractors, and design contractors.

1. Introduction

When overseeing the construction progress of a project, the manager must ensure the following requirements: Construction is conducted in compliance with regulations regarding progress. Meeting the construction deadline as promised to the investor, Utilizing human resources effectively in construction, Investment in construction progress management should be distributed in a thoughtful manner. In Long An, public investment has been prioritized since the start of the year, resulting in commendable disbursement outcomes: The Provincial People's Committee has allocated 9,845.9 billion VND; as of January 10, 2023, 9,541.8 billion VND has been disbursed, achieving 96.91 % of the plan. The provincial capital managed 7,641.7 billion VND, with 7,443 billion VND disbursed, reaching 97.27 % of the plan. Meanwhile, district capital management accounted for 2,204.2 billion VND, with 2,108.8 billion VND disbursed, reaching 95.67 % of the plan. Aim for the disbursement rate in 2023 to achieve 100 % of the plan [1].

The summary data regarding the disbursement rate of investment capital for projects managed by the District Construction Investment Project Management Board indicates the following: In 2021, the disbursement reached 74 % of the plan; in 2022, it reached 84 % of the plan; and in 2023, it reached 82 % of the plan. The disbursement data indicates that the construction status of the projects has not yet achieved the completion progress outlined in the contract. Throughout the implementation process, the management exhibited a blend of scientific rigor, creativity, and decisive action. Alongside the results obtained, numerous projects remain behind schedule, which have considerably impacted the district's development and the quality of the projects... Several factors are contributing to this delay, including the lack of guaranteed selection for construction contractors and design survey consultants, as well as insufficient capital arrangements for payment and settlement of the projects, etc. Consequently, identifying the root causes to address the issues causing delays in progress necessitates tailored solutions that align with the unique characteristics of the district. This process demands strong leadership and involvement from all levels, as well as close coordination and collaboration among relevant units. Additionally, the proposed measures must be thoroughly researched, applicable to the local context, and grounded in scientific principles. The research conducted by the author identified various factors that influence the advancement of construction projects in the Mekong Delta. The study identified 7 groups of factors comprising 33 elements that impact the advancement of projects in the Mekong Delta. The author evaluated the influence of these factors and suggested the application of fuzzy set theory to enhance the planning of construction project timelines in the Mekong Delta area [2].

In this study, the author identified several key factors that contribute to delays and cost overruns during the construction phase of projects. These include weaknesses within the Project Management Board and workforce, inadequate management and supervision structures, outdated construction methods and technologies, the

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financial capacity of investors and contractors, as well as design changes and price fluctuations [3].

Elements influencing expenses and timelines in construction projects. The study offers a broader perspective for project managers, enabling them to manage projects with greater effectiveness and a scientific approach. The study identified a total of seven key factors: four associated with costs and three influencing project implementation time during construction. These are significant elements that must be taken into account when overseeing projects. Nevertheless, the factors outlined by the author do not encompass all the elements involved in the implementation of progress management [4].

The research team concentrated on establishing the duration needed to complete tasks within the construction schedule planning process. The article highlighted the current issues in assessing the time required for tasks within the construction schedule planning process utilized by contractors in Vietnam, and suggested solutions to address these challenges. This study centers on schedule planning, while not addressing the factors that influence the schedule [5].

A study was conducted to enhance the execution of project schedules. Throughout the data collection process, 37 factors (referred to as observed variables) influencing construction time were identified and categorized into 6 primary groups: Capacity and Experience, Design, Coordination among parties, Finance, Labor and Materials, as well as Difficult factors arising outside the project. The study primarily offers solutions for the contractor, yet it has not addressed factors associated with the project's implementation, such as the investor, design, and supervision. The research [6] has identified the factors contributing to delays in the execution of construction projects. There are 32 identified causes that can lead to delays, which are categorized into 9 groups. The study involves 130 participants, comprising 39 contractors, 37 investors, and 54 consultants.

The research [7] has explored the various factors that hinder the execution of public service projects in Saudi Arabia. The data were gathered from various sources, comprising 23 construction units, 12 consulting contractors, and 10 individuals from the management agency, the majority of whom are impacted by medium to large-scale public water supply and drainage projects.

A survey and comparison of factors causing delays in the implementation of construction projects in Hong Kong was conducted in research [8]. The research identified 83 reasons for delays, revealing the influence of each factor.

This study identifies the influencing factors and proposes several solutions to enhance the management of construction progress in Tan Thanh, tailored specifically for each group of factors.

2. Materials and Methods

2.1. Geographical location and natural conditions of Tan Thanh

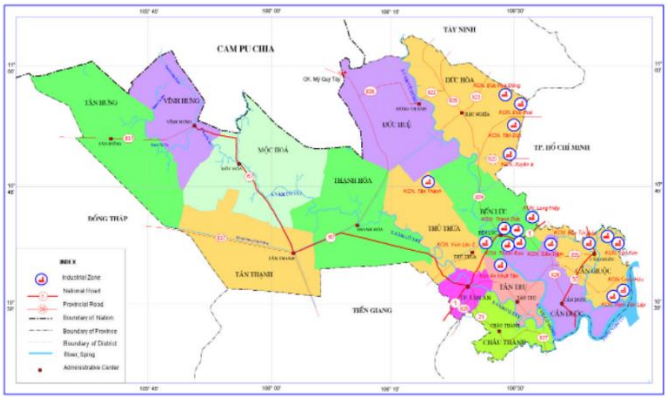

Fig 1. Geographical location and natural conditions of Tan Thanh.

2.2. Factors affecting the management of construction progress of projects using state budget capital at the Management Board of Construction Investment Projects of Tan Thanh

The assignment and decentralization mechanisms intersect, resulting in responsibilities that lack clear and specific definitions. This results in relevant agencies evading and shifting responsibilities, causing the project to be temporarily halted while awaiting agreement among the involved parties. For instance, the project for the District Party Committee Headquarters received appraisal from the Department of Construction, the investment decision was issued by the District People's Committee, the investor was the Construction Investment Project Management Board, and the final settlement was approved by the Department of Finance. Throughout the construction process, various changes and issues arose that needed to be submitted for approval at multiple levels, leading to delays in implementation time.

The assurance of selecting construction units and design survey consultants was lacking. The capacity and experience of construction units and design consultants were limited, resulting in subpar quality of design survey work. This negatively impacted the value of the bid package and the reliability of the design documents, ultimately causing a waste of time to rectify the documents. The construction unit faces challenges with limited financial capacity, inadequate machinery and equipment that do not align with the construction requirements, and a workforce along with technical staff that possess low skill levels. These issues negatively impact the quality and timeline of the projects, leading to delays in addressing the shortcomings of construction workers who fail to meet design specifications.

The revenue from the budget, along with support capital from the Province and the Central Government, is inconsistent, leading to an imbalance in investment capital. The disbursement work is impacted by the failure to meet the capital commitments to the contractor, which in turn affects the mobilization of materials, human resources, and machinery necessary for the construction of the works.

The Tan Binh Primary and Secondary School project received capital allocation for two years; however, the funding for the second year was provided at the end of the year. This timing resulted in financial imbalances for the contractor, which in turn caused delays in the associated work.

The policies regarding compensation and site clearance remain insufficient, particularly in relation to the direct interests of the community. The compensation price is inadequate, the resettlement site does not compare favorably to the previous location, the resolution of issues that arise during the site clearance process is sluggish, and the sanctions are neither timely nor sufficiently robust. For instance, the District Party Committee Headquarters Project is currently 6 months overdue, while the Hau Thanh Dong Secondary School Project is 8 months overdue. The absence of a construction site prevents implementation.

The team responsible for managing construction progress currently lacks sufficient capacity and experience, significantly impacting the advancement of projects in the area. For the Bac Hoa Primary School and Tan Thanh Town Secondary School projects, the management staff experienced a deficiency in supervision and inspection, resulting in a delay of 6 months behind schedule. No specific, consistent, or scientific measures for progress management exist. Primarily, they are executed following distinct procedures rooted in the individual experiences of the supervisors. For the Tan Binh Primary and Secondary School project, the Department of Education and Training Headquarters project involved new construction. The construction unit received capital allocation for 2 years, leading them to proceed with construction based on the allocated funds. This approach resulted in a decline in material prices, which in turn impacted the quality of the project. The Hau Thanh Dong Old Market Park project has chosen a contractor lacking the necessary competence, which has negatively impacted both the progress and public perception. The survey documents for the Tan Lap Commune People's Committee Hall project do not accurately reflect reality, leading to additional work and impacting the project's timeline... In the analysis process, the author evaluates the reasons for the delay in progress, attributing it to objective factors such as overlapping legal documents that cause investor hesitance in decision-making, unusual weather conditions, and a lack of initiative in material supply... Subjective factors include the casual approach to selecting contractors, insufficient coordination with relevant units during the implementation process, and the capabilities of management staff...

2.3. Factors affecting construction progress in Tan Thanh

- Factors due to the Project Management Board and the investor
- Factors due to the construction contractor
- Factors due to the construction supervision consultant
- Factors due to the design consultant
- Other factors

2.4. Factors affecting construction progress management

Table 1. Factors affecting the management of construction progress in Tan Thanh.

	Influencing factors	Reason for choosing
Factors due to investors and project management boards		
NT1	Late handover of construction site	If the site handover is delayed, the construction unit will not have the site to construct the project.
NT2	Limited capacity and experience	The limited management capacity results in a less effective approach to addressing both existing and emerging tasks, largely due to inexperience and other contributing factors. Impacts the progress management plan
NT3	Lack of supervision, urging, and determination in construction progress management	Without inspection and supervision, construction units delay, depend on others, and neglect building and installation. Changes progress management strategies.
NT4	Indecisive in penalizing contractors when projects are behind schedule	Lack of punishment for construction units with the mentality of no binding sanctions, not being decisive... Affecting progress management plan
NT5	Slow to organize acceptance of completed work	Failure to organize the acceptance in time means the construction unit cannot proceed to the next phase. Affecting the progress.
NT6	Slow processing of design adjustments arising from approved design documents	Slow processing of Design Adjustments, resulting in the construction unit being unable to proceed to the next phase. Affecting progress.
NT7	Lack of binding in the terms of the contract with the contractor when the contractor is behind schedule	Lack of binding in the terms of the contract will make it impossible to apply sanctions when the parties violate.

	Influencing factors	Reason for choosing
Factors caused by the contractors		
NT8	Poor management and operational capacity and experience	Poor capacity and experience will cause many errors when implementing the project, slowing down the progress.
NT9	Building a schedule that does not match actual conditions	Building an inappropriate progress plan such as: materials, human resources, equipment... Delaying work and causing delays
NT10	The ability to meet human resources and equipment requirements is not in accordance with the proposed schedule.	Labor and machinery are the direct subjects of construction work. Failure to meet these requirements will greatly affect progress.
NT11	Poor financial capacity does not meet the proposed progress	Poor finance will not be able to mobilize labor, materials, machinery, etc. The project will not be implemented according to plan.
NT12	No application of IT or new methods in progress management	Not applying new technology and construction methods slows down the reception of information, processing or changes, affecting construction work.
NT3	Unreasonable construction site management methods.	Improper site management will cause work congestion, not ensuring construction space, wasting time, and not having enough work volume.
NT14	Using outdated technology and techniques so as not to meet progress	Do not apply technology that uses mainly human power, causing waste of time in performing work.
NT15	Unreasonable financial distribution in construction stages	Not focusing finances on upcoming projects will make things difficult in the next phase.
Factors due to construction supervision consultant		
NT16	Poor management and professional capacity of supervision consultants	Poor supervision will lead to many errors during construction, not boldly proposing problems, wasting time in the handling process.
NT17	Not urging progress, not advising the investor in a timely manner when the project is behind schedule	If the investor is not notified of the delay, the investor will not be able to promptly handle the situation, affecting the implementation time.
NT18	Failure to promptly accept work according to schedule	If the construction unit cannot promptly organize the acceptance, it will not be able to carry out the next phase. This will affect the progress.
Design consultant factor.		
NT19	The design contractor's capacity is still limited, leading to the need to adjust the design documents, affecting the progress.	Limited design contractor capacity will cause inappropriate and incomplete documents that must be changed and edited before and during construction, affecting the project implementation plan.
NT20	The design consultant is far away, so coordinating and handling design changes takes a lot of time.	The design unit is far away and cannot respond when there is urgent work to be done on site, which also delays the implementation of subsequent work.
NT21	Little or no author monitoring	Not performing author supervision during construction through stages if not in accordance with design requirements will take a lot of time to process and waste time to fix.
Other Factors.		
NT22	Legal documents change during construction	Newly issued documents do not have specific instructions, so we are waiting for instructions, so we cannot carry out the project, affecting the implementation plan.
NT23	Subjects participating in the construction of the project to change leadership staff	Changing leadership will cause a lot of unprocessed work to remain and approaching new work will also take a lot of time, affecting management and operations, taking a certain amount of time.
NT24	Lack of materials leads to construction delays	Material supply directly affects progress. Without materials, construction cannot be carried out.
NT25	Unusual weather	Rain and storms will prevent construction (new construction has not yet completed the rough construction) affecting construction progress.

3. Results and discussions

The survey took place over 45 days in 13 communes and towns in Tan Thanh and units inside and outside Tan Thanh participating in construction activities in Tan Thanh.

- Total number of ballots issued: 160 ballots
- Total number of ballots received: 154 ballots
- Total number of suitable ballots: 150 ballots

Thus, there are a total of 150 suitable ballots, the author used SPSS software to analyze the results received:

3.1. Cronbach's Alpha Analysis

The Cronbach's Alpha test (Table 2) was conducted for 25 observed variables across 5 groups of factors: (1) Factors by the investor, Project Management Board, (2) Factors by the construction contractor, (3) Factors by the construction supervision consultant, (4) Factors by the design consultant, and (5) Other factors. The results indicate that all factors exhibit high Cronbach's Alpha coefficients: 0.758, 0.812, 0.708, 0.700, and 0.671 for the 5 groups of factors. The total correlation coefficient for the 25 observed variables varies between 0.076 and 0.643. The three observed variables are below 0.3: NT1 has a correlation coefficient of 0.076, NT8 has a correlation coefficient of 0.206, and NT25 has a correlation coefficient of 0.266. Therefore, the three factors mentioned are eliminated. Consequently, the exploratory factor analysis includes 22 observed variables.

In particular, when evaluating Cronbach's Alpha for the factor group "Investor, Project Management Board" (NT1 to NT7), the factor's Cronbach's Alpha coefficient is 0.758, which exceeds 0.6, indicating that the scale is entirely appropriate for factor analysis. One observed variable associated with NT1 has a correlation coefficient of 0.076, which is less than 0.3, leading to its elimination. The author concludes that the elimination of NT1 is justified in the context of Tan Thanh, as the ongoing site clearance efforts are progressing effectively. Construction projects are completed and delivered punctually. The positive outcomes mentioned above stem from the agreement among the populace and the limitations within the local framework (if any project is not transferred within one month from the date of the construction commencement decision, the funds will be reclaimed and the project roster will be diminished).

The next step involves the Cronbach's Alpha test for the factor group "Factors by the contractor" (NT8 to NT15). The test result shows a Cronbach's Alpha coefficient of 0.812, which exceeds the standard threshold of 0.6. Within the group, NT8 has a coefficient of 0.206, which is less than 0.3, leading to its elimination. In NT8, despite concerns regarding "poor management and operation capacity and experience," most respondents indicated that the management and operational capabilities are quite strong. This is evident from the data collected and the actual situation in Tan Thanh, where the contractor's management and operational efforts are being executed effectively. The contractor selection process is implemented and controlled very closely. The primary causes of delays in the construction unit are financial capacity, labor issues, and outdated construction equipment.

The Cronbach's Alpha result for the factor group "Construction supervision consultant" includes three observed variables (NT16 to NT18). The Cronbach's Alpha coefficient for this factor is 0.708, which is greater than 0.6, indicating that the scale is well-suited for factor analysis. The total correlation coefficient of the observed variables exceeds 0.3.

The Cronbach's Alpha analysis for the factor group "Design consultant" includes three observed variables (NT19 to NT21). The Cronbach's Alpha coefficient for this factor is 0.7, which exceeds the threshold of 0.6, indicating that the scale is well-suited for factor analysis. The correlation coefficients of the observed variables exceed 0.3.

Ultimately, the test result for the factor "Other factors" with observed variables from (NT22 to NT25) indicates that the Cronbach's Alpha coefficient is 0.671, which exceeds 0.6, demonstrating that the scale adheres to the required standards. One NT25 has a coefficient of 0.266, which is less than 0.3, so it was eliminated. NT25 "Uncommon weather patterns" The influence of weather has been removed, which aligns with the current circumstances in Tan Thanh. The investment preparation work in Tan Thanh was initiated very early, not just through the number of survey questionnaires. Consequently, the projects were initiated at the start of the year (dry season), and as the rainy season approached, the rough construction was finalized, allowing for a proactive approach in the face of storms.

Table 2. Cronbach's Alpha Analysis.

Influencing factors	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Group 1: Factors due to investors and project management boards Cronbach's Alpha = 0.758		
NT1. Late handover of construction site	0.076	0.806
NT2. Limited capacity and experience	0.486	0.728
NT3. Lack of supervision, urging, and determination in construction progress management	0.522	0.721
NT4. Indecisive in penalizing contractors when projects are behind schedule	0.588	0.703

Influencing factors	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
NT5. Slow to organize acceptance of completed work	0.620	0.695
NT6. Slow processing of design adjustments arising from approved design documents	0.623	0.693
NT7. Lack of binding in the terms of the contract with the contractor when the contractor is behind schedule	0.486	0.728
Group 2: Factors caused by the contractors Cronbach's Alpha = 0.812		
NT8. Poor management and operational capacity and experience	0.206	0.838
NT9. Building a schedule that does not match actual conditions	0.481	0.797
NT10. The ability to meet human resources and equipment requirements is not in accordance with the proposed schedule.	0.602	0.781
NT11. Poor financial capacity does not meet the proposed progress	0.614	0.778
NT12. No application of IT or new methods in progress management	0.625	0.775
NT13. Unreasonable construction site management methods.	0.615	0.777
NT14. Using outdated technology and techniques so as not to meet progress	0.600	0.780
NT15. Unreasonable financial distribution in construction stages	0.536	0.790
Group 3: Factors due to construction supervision consultant Cronbach's Alpha = 0.708		
NT16. Poor management and professional capacity of supervision consultants	0.413	0.768
NT17. Not urging progress, not advising the investor in a timely manner when the project is behind schedule	0.634	0.499
NT18. Failure to promptly accept work according to schedule	0.554	0.581
Group 4: Design consultant factor Cronbach's Alpha = 0.700		
NT19. The design contractor's capacity is still limited, leading to the need to adjust the design documents, affecting the progress.	0.483	0.656
NT20. The design consultant is far away, so coordinating and handling design changes takes a lot of time.	0.643	0.449
NT21. Little or no author monitoring	0.438	0.702
Group 5: Other Factors Cronbach's Alpha = 0.671		
NT22. Legal documents change during construction	0.431	0.618
NT23. Subjects participating in the construction of the project to change leadership staff	0.514	0.562
NT24. Lack of materials leads to construction delays	0.638	0.483
NT25. Unusual weather	0.266	0.728

3.2. Exploratory factor analysis EFA

In determining the Cronbach's Alpha coefficient for the observed variables, the author conducted exploratory factor analysis (EFA), a quantitative analysis method that can remove certain variables, including those that are correlated with one another. This process results in a more concise set of variables, known as factors, which enhance their significance and more clearly represent the essence of the original variable. Factor analysis is applied in situations where: Understanding the relationships and connections among various variables in a given set. Identifying a small set of new variables that are independent from one another provides a foundation for analyzing numerous subsequent variables. Alternatively, recognizing a few impactful variables from a larger set can be beneficial for later multivariate analyses. The author employs Principal Components Analysis (PCA) with Varimax rotation for this topic, achieving a Kaiser-Meyer-Olkin value within the range of $0.5 \leq KMO \leq 1$ and a significance level of Sig. = 0.000, indicating a statistically significant effect. However, it is also applicable that a Multivariate Data Analysis from 0.5 indicates a good quality observed variable, with the minimum threshold set at 0.3 [9].

The results of the initial exploratory factor analysis (EFA) for

the research model on the topic will be presented in the following three tables:

Table 3. KMO and Bartlett analysis.

KMO		0.806
Bartlett analysis	Approximate chi-square value	1633.679
	df	276
	Sig.	0.000

The outcome of the factor analysis indicates that the KMO index is 0.806, which exceeds 0.5, demonstrating that the information utilized for the analysis is highly appropriate. Bartlett's test yielded a result of 1633.679, with a significance level of Sig. = 0.000, which is less than 0.05. This indicates that the observed variables are not correlated with one another in the overall model. This indicates that the hypothesis suggesting a relationship among the variables within the same matrix is rejected, implying that the variables are indeed interconnected and meet the criteria for factor analysis.

3.3. Factor Score Matrix Analysis

Table 4. Factor Score Matrix Analysis.

Factors	Observation variable					
	1	2	3	4	5	6
Group 01: “Factors due to the subjective factors of the consulting unit”						
NT18: Failure to promptly accept work according to schedule	0.380					
NT20: The design consultant is far away, so coordinating and handling design changes takes a lot of time.	0.308					
NT19: The design contractor's capacity is still limited, leading to the need to adjust the design documents, affecting the progress.	0.300					
NT16: Poor management and professional capacity of supervision consultants	0.295					
NT17: Not urging progress, not advising the investor in a timely manner when the project is behind schedule	0.255					
Group 02: “Factors due to management and operation methods”						
NT14: Using outdated technology and techniques so as not to meet progress		0.404				
NT13: Unreasonable construction site management methods.		0.351				
NT15: Unreasonable financial distribution in construction stages		0.322				
Group 03: “Factors caused by investors and project management boards”						
NT3: Lack of supervision, urging, and determination in construction progress management			0.427			
NT4: Indecisive in penalizing contractors when projects are behind schedule			0.384			
NT5: Slow to organize acceptance of completed work			0.281			
NT2: Limited capacity and experience			0.253			
Group 04: “Other factors”						
NT23: Subjects participating in the construction of the project to change leadership staff				0.392		
NT24: Lack of materials leads to construction delays				0.350		
NT22: Legal documents change during construction				0.302		
NT21: Little or no author monitoring				0.271		
Group 05: “Factors caused by the construction contractor”						
NT10: The ability to meet human resources and equipment requirements is not in accordance with the proposed schedule.					0.380	
NT11: Poor financial capacity does not meet the proposed progress					0.369	
NT9: Building a schedule that does not match actual conditions					0.348	
NT12: No application of IT or new methods in progress management					0.189	
Group 06: “Contractor-designed factors”						

Factors	Observation variable					
	1	2	3	4	5	6
NT7: Lack of binding in the terms of the contract with the contractor when the contractor is behind schedule						0.441
NT6: Slow processing of design adjustments arising from approved design documents						0.148

3.4. Proposing solutions to improve the management of construction progress of projects in Tan Thanh from state budget capital

a. Group of solutions due to subjective factors of the consulting unit

- The choice of a supervision contractor is crucial. Selecting a skilled contractor will guarantee the project's quality, fulfilling the specifications set by the investor. Enforce the terms of the contract rigorously, particularly the penalties, in the event of a violation. It is essential to have adequate deterrent measures, such as administrative fines or contract termination, to strengthen the sense of responsibility within the supervision unit. These measures should be implemented and applied decisively in accordance with Decree 16/2022/ND-CP [10].

- The contract must include strict binding clauses, such as: not paying 100 % of the volume until the project has been handed over, requiring weekly reports on work progress to the investor, and ensuring the maintenance of supervision warranty.

- The investor consistently observes and verifies the integrity of the supervision contractor throughout the implementation process.

- Consulting contractors consistently offer professional training and development opportunities for responsible staff to enhance their skills and qualifications, thereby improving their ability to effectively contribute to the project at hand. - Establish protocols and engage in overseeing authors. It may be beneficial to incorporate provisions in the contract.

b. Group of solutions by management and operation method

- Local authorities (District People's Committee) should facilitate contractors' access to new and modern construction technologies and establish capital support policies to enable easier technology adoption for contractors. Local authorities should serve as a link to connect technology suppliers with contractors by organizing product introduction seminars, facilitating study tours, and implementing funds from the state budget or socialization tailored to local conditions.

- Investors consistently review the technology and equipment present at the construction site in relation to the contractor's bidding documents. Firmly and decisively address any non-compliance with the bidding documents regarding the specified equipment and technology. Contractors are required to adopt new technology and techniques from that point onward. It is essential to communicate and promote to construction units in the district that the adoption of technology and techniques in construction is unavoidable in this era of industrialization and modernization.

- Establish direct links from the Project Management Board (PMB) to consultants and contractors (through Zalo, Messenger, phone, etc.) to stay informed about the current progress and any outstanding issues within the project, enabling prompt solutions to maintain progress. Weekly meetings should be organized to report on project issues.

c. Solution group by investor, Project Management Board

- Organizing staff participation in the competency certification test for each position is essential. As new staff currently lack competency certificates, their experience is somewhat restricted. Assign key personnel and professional staff responsible for progress management to attend specialized training courses focused on project management, including topics such as bidding, budget preparation, and construction supervision. Currently, while implementing the government's regulations on project management in accordance with the BIM model, the Board remains disinterested and lacks a plan for applying BIM to future projects. It is essential to collaborate in order to educate the Board's management team on the application of BIM in project management.

- The Project Management Board should recommend to the District People's Committee the organization of study trips aimed at sharing experiences related to progress management specifically, and project management more broadly, between the district and its neighboring localities, as this initiative has not yet been undertaken.

- Implement a prompt reward and recognition system for employees who have effectively managed progress in line with the contract. To foster a sense of team spirit that will motivate staff to excel in upcoming projects (as the Board has yet to implement this).

- The investor is assertive, resolute, manages and addresses contractors who breach the contract (particularly those who are delayed), and lack a willingness to collaborate. Recommend that the District People's Committee exclude contractors known for their slow-progress construction from participating in district projects.

- Enhance the reform of administrative procedures within the unit. Simplify complex procedures that hinder units involved in the project implementation. View it as a collaboration to fulfill the responsibilities of all involved parties.

- Enhance accountability in public service, combat corruption, and address negativity within the Project Management Board. Consistently monitor and oversee management personnel to ensure prompt guidance and direction.

- Recommend and suggest an increase in the capital balance for the project to ensure timely completion.

- The investor must review the labor and machinery in accordance with the proposed bidding documents. This work has not yet been directed towards local matters.

- The investor must establish a binding contract detailing labor and equipment requirements for each specific project, including specific penalties or the option to suspend the contract in the event of a violation (this has not been implemented yet). To ensure that the contractor takes greater responsibility, remains more aware during the construction process, and improves performance in the future.

d. Group of solutions due to other factors

- Managers should take the initiative to address any pending tasks before transitioning to new roles. Refrain from shifting responsibility when embracing new tasks, as this will impact progress management. The incoming manager ought to honor the previous manager's approach to the work in order to maintain consistency in handling methods, as any changes could impact the project's progress. A strong relationship is essential for managers to effectively exchange tasks, fully delegate responsibilities, and support one another in managing outstanding work.

e. A collection of solutions executed by the contractor

The contractor's selection and recruitment of workers holds significant importance. The selection of workers must be competent, responsible, and ethical; otherwise, it can negatively impact all aspects of the implementation process. The locality is presently relying on seasonal workers who lack the necessary skills, expertise, and a strong sense of responsibility.

f. A collection of solutions crafted by the contractor

- Initially, choosing a design contractor is essential. Select a contractor who demonstrates professional skill, accountability, and a willingness to collaborate effectively.

- The design consultant must advocate for and implement BIM within the design process.

- Refrain from paying the entire contract amount prior to the final settlement. To achieve greater binding.

- Pay attention to monitoring the time and progress of completion; when documents are available, thoroughly review the design documents.

- The contract should stipulate that any changes in work volume resulting from design errors by the contractor will be self-adjusted, with no associated costs incurred.

4. Conclusions

Based on the results of the study lead to the following conclusions:

1. Enhancing the efficiency of project progress management is a pressing need for investors. The effectiveness of progress management is evaluated based on the quality of the established progress and the quality of project implementation in relation to that progress. Thus, it is essential to comprehend the requirements and factors influencing these contents in order to offer solutions that assist investors in ensuring and enhancing the quality of progress management for their construction investment projects.

2. The results obtained from the survey and the analysis of the factors influencing the progress management of construction projects in Tan Thanh district indicate that the current state of progress management in the area remains insufficient and constrained. The author identified six groups of factors, comprising a total of 22 factors. Factors like these significantly impact the situation, and the thesis suggests the aforementioned groups of solutions that will undoubtedly be effectively implemented, aiding in the enhancement of Construction Progress Management at the Tan Thanh District Construction Investment Project Management Board.

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