



A Study On The Delay Of The Apartment Housing Project In Central Java Province In The 2021 Budget

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ABSTRACT

The construction phase represents a critical stage in which the construction process unfolds, with the contractor or service provider playing a pivotal role. In the construction project for the acquisition of apartment housing in Central Java Province in the 2021 fiscal year, which had an average implementation period of 120 calendar days and was executed towards the end of the year during a period of high rainfall intensity, significant delays were encountered. This study aims to assess the factors contributing to the delays in the apartment housing procurement project, rank the risks associated with these delays, and propose proactive measures to address and mitigate any potential delays. The significant influencing factors on the role of the Service Provider during the construction phase encompass variables related to planning, scheduling, and cost estimation (X1), resource allocation (X2), administrative bureaucracy (X5), and external contextual conditions (X6). The regression coefficients for these variables are as follows: the variable associated with planning, scheduling, and cost estimation (X1) carries a coefficient of 0.366, the resource allocation variable (X2) bears a coefficient of 0.312, the administrative bureaucracy variable (X5) exhibits a coefficient of 0.538, and the external contextual condition variable (X6) demonstrates a coefficient of 0.204. The variable associated with planning, scheduling, and cost estimation (X1) holds the highest level of significance in influencing the role of the Service Provider during the construction phase, with a regression coefficient of 0.366, indicating its paramount impact. The consequences of delays encompass deferred project milestones, buildings unable to meet their intended function according to the established schedule, subpar work quality, cost overruns, and the project's ultimate completion falling behind the initially planned timeline. To pre-empt and manage these delays effectively, it is imperative for the contractor or service provider to diligently identify and assess project-specific attributes, thoroughly comprehend the scope of work, and promptly seek and implement solutions from the project's inception.

Keywords: *Contractor service provider role, Statistical analysis, Apartment housing Construction, Risk, Anticipation*

1. INTRODUCTION

Apartment housing construction projects cater to a diverse range of demographics, including industrial workers. Presently, the government is vigorously pursuing the development of new industrial zones as part of a strategic economic recovery and transformation policy. This initiative, led by the Ministry of Public Works and Public Housing, is aimed at creating abundant employment opportunities. To complement these efforts, the ministry's Directorate General of Public Housing has introduced a rental apartment scheme, designed to provide accessible housing solutions to industrial workers, aligning with the specific goals of the apartment housing sector. As part of the strategic plan for 2020-2021, the government is actively promoting and facilitating the construction of 51,341 rental apartments

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(under the KAK JT G21-09 program). The study aims to investigate and address construction delays in relation to the predefined project timeline.

2. MATERIALS AND METHODS

The research methodology adopts a mixed-method approach, integrating both qualitative and quantitative methods. Quantitative research, as a component, aims to generate novel insights through statistical procedures or other quantification methodologies, concentrating on specific phenomena in human life, often in the form of variables. This approach scrutinizes the relationships among these variables using statistical tools and objective theories, drawing information primarily from the project's time schedule, overall survey findings, and measurements. On the other hand, qualitative research, as another component, encompasses a comprehensive examination of a specific subject. In this mode, the researcher assumes the central role and employs data to articulate findings primarily through words, emphasizing meaning over generalization. Qualitative research relies on sources such as interviews, questionnaires, drawings, and photographic documentation. The effective integration of both qualitative and quantitative methodologies is regarded as pivotal, contributing to a holistic understanding of the research issue at various stages of the research process, as suggested by Bryan (1992).

2.1 Research Objects

The research sample is focused on the Apartment Housing Provision Project implemented during the 2021 fiscal year in Central Java Province. This project encompasses the following various subcomponents:

1. Construction of Low-Cost Apartment Housing in Kendal Regency (JTGRSN21-05)
2. Construction of Apartment Housing for Al Hamidiyah Islamic Boarding School (JTGRSN21-07)
3. Construction of Apartment Housing for Tahfidz Yanbuul Quran Menawan Islamic Boarding School (JTGRSN21-08)
4. Construction of Apartment Housing for Baitul Munir Islamic Boarding School (JTGRSN21-09)
5. Construction of Apartment Housing for Al Huda Sragen Islamic Boarding School (JTGRSN21-11)
6. Construction of Apartment Housing for Al Mukhlisin Tegalgede Islamic Boarding School in Karanganyar Regency (JTGRSN21-12)
7. Construction of Apartment Housing for Al Masudiyah Blater Islamic Boarding School in Semarang Regency (JTGRSN21-13)
8. Construction of Apartment Housing for Pabelan Islamic Boarding School in Magelang Regency (JTGRSN21-14)
9. Construction of Apartment Housing for Riyadlotul Uquul Islamic Boarding School in Purworejo Regency (JTGRSN21-17)
10. Construction of Apartment Housing for Al Hidayah Islamic Boarding School in Temanggung Regency (JTGRSN21-18)
11. Construction of Apartment Housing for Darul Quran Islamic Boarding School in Rembang Regency (JTGRSN21-19)
12. Construction of Apartment Housing for Riyadlotul Salam Islamic Boarding School in Banjarnegara Regency (JTGRSN21-20)
13. Construction of the Second Phase Apartment Housing for the Muhamadiyah University Surakarta Apartment Housing (JTGRSN21-22)

2.2 Sample

A sample, in the context of research, is a subset carefully selected from the entire population under study, with the intention of serving as a representative cross-section of that population. In the present study, the sample is drawn from the Apartment Housing Provision Project for the 2021 fiscal year in Central Java

Province. It encompasses a selection of key participants involved in the project; the Commitment Maker Officials (PPK), the Technical Team, and staff members representing the Provincial Housing Procurement Implementation Unit of Central Java Province, which functions as the project owner. Furthermore, the sample incorporates planning consultant teams, comprising entities such as CV. Rizkytama Abadi, CV. Arvinas Engineering, CV. Bina Graha, CV. Sembada, CV. Prisma Kreasi, CV. Maju Mulia, CV. Damar Kumala, PT. Permata Citra, PT. Cipta Arta Kreasi Konsultan, CV. Majapahit, and CV. Maju Mulia. In addition, the Construction Consultant teams are included, with participants like PT. Bentareka Cipta, PT. Saranabudi Prakarsaripta, CV. Rancang Prima, CV. Maju Mulia, CV. Damar Kumala, PT. Tujuh Jaya Konsultan-PT. Tata Nusa Consultant KSO, PT. Cipta Arta Kreasi Konsultan, CV. Bumi Cipta Jaya Selaras, and CV. Ediyasa. Finally, the sample encompasses the contractor teams responsible for the project's execution, which includes entities such as PT. Mekar Mulia Contractor, PT. Reka Esti Utama, PT. Aya Sophian Primatama, PT. Dame Uli Jadianman Indah, PT. Pubagot Jaya Abadi, PT. Yudha Perkasa Utama, CV. Zilhanna Sukses Selalu, PT. Intishar Berkah Globalindo, and CV. Melati Kurai.

3. RESULTS AND DISCUSSION

Table 1. Validity Test

Variable	Sub-variable	r Value	Critical r	Description
X1	X1.1	0,805	0,374	Valid
	X1.2	0,772	0,374	Valid
	X1.3	0,722	0,374	Valid
	X1.4	0,619	0,374	Valid
X2	X2.1	0,742	0,374	Valid
	X2.2	0,486	0,374	Valid
	X2.3	0,650	0,374	Valid
	X2.4	0,624	0,374	Valid
	X2.5	0,755	0,374	Valid
X3	X3.1	0,671	0,374	Valid
	X3.2	0,541	0,374	Valid
	X3.3	0,677	0,374	Valid
	X3.4	0,618	0,374	Valid
X4	X4.1	0,781	0,374	Valid
	X4.2	0,738	0,374	Valid
	X4.3	0,882	0,374	Valid
X5	X5.1	0,922	0,374	Valid
	X5.2	0,905	0,374	Valid
X6	X6.1	0,905	0,374	Valid

X6.2	0,905	0,374	Valid
X6.3	0,905	0,374	Valid
X6.4	0,905	0,374	Valid
X6.5	0,905	0,374	Valid

The findings from the validity test conducted on all variables examined in this research reveal that the calculated correlation coefficient (*r* Value) exceeds the critical correlation coefficient (Critical *r*), with a value greater than 0.374. These results substantiate the validity of all statements pertaining to the variables assessed in the questionnaire.

Table 2. Reliability Test

Variable	Cronbach Alpha	Critical r value	Description
X1	0,704	0,374	Reliable
X2	0,648	0,374	Reliable
X3	0,710	0,374	Reliable
X4	0,710	0,374	Reliable
X5	0,800	0,374	Reliable
X6	0,857	0,374	Reliable
Y	0,768	0,374	Reliable

The outcomes of the reliability assessment encompassing all the examined variables in this study demonstrate that Cronbach's alpha surpasses the established threshold, with a value exceeding 0.374. These findings affirm the reliability of all the statements related to the variables assessed in the questionnaire.

Table 3. T-test results

No.	Independent variable	T-table	T-Test	Sig.	Description
1.	The variable based on the aspect of Planning, Scheduling, and Cost Estimation (X1)	1,697	3,175	0,004	Significant
2	The variable based on the aspect of Resources (X2)	1,697	2,706	0,013	Significant
3	The variable based on the Execution Management Aspect (X3)	1,697	1,021	0,318	Not significant
4	The variable based on the Contractual Aspect (X4)	1,697	0,572	0,573	Not significant
5	The variable based on the Bureaucratic Administration Aspect (X5)	1,697	2,368	0,027	Significant

6	The variable based on the External Conditions Aspect (X6)	1,697	2,182	0,04	Significant
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Table 4. HE Causative Factor For Time Overrun

No.	Variable	Main factors	Variable	Sub-factors
1			X1.1	Inadequate preparation in cost estimation and project scheduling.
2			X1.2	Reviewing the design, which differs from the field conditions, leading to design changes.
3	X.1	The aspect of planning, scheduling, and cost estimation	X1.3	Additional work or addendums.
4			X1.4	Financial patterns and contractor payments in completing the work, where irregular payment patterns to contractors disrupt the contractor's cash flow.
5			X2.1	Inconsistent labor force provision.
6			X2.2	Inappropriate contractor qualifications, such as contractors using another company's credentials.
7	X.2	The aspect of resources	X2.3	Financial difficulties of the contractor.
8			X2.4	Procurement of materials that no longer meet specifications.
9			X2.5	Long lead times for both manufactured and custom materials.
10			X3.1	Poorly structured identification, duration, and work sequencing plans.
11			X3.2	Inappropriate execution methods.
12			X3.3	Reduction in essential/technical personnel as initially designated.
13	X.3	The aspects of execution management	X3.4	The contractor's process of creating working drawings.
14			X3.5	Insufficient coordination and communication between the contractor, consultant, and project owner.
15			X3.6	The contractor handling multiple projects simultaneously, leading to poor organizational structure.
16			X4.1	Changes in work items based on user requests.
17	X.4	The contractual aspect	X4.2	Extremely low project bids, leading to construction costs exceeding the budget.
18			X4.3	The unavailability of materials in the market due to non-standard specifications.
19			X5.1	Incomplete detailed drawings from planning consultants.
20	X.5	The bureaucratic administration aspect	X5.2	Inspection, control, and work evaluation factors, including delays in the owner's approval process for material selection.

21		X6.1	Difficulties in accessing the project site.
22		X6.2	Unstable material prices and scarcity of materials meeting the required specifications.
23		X6.3	Weather-related factors, especially work delays caused by rain.
24	X.6 The external condition aspect	X6.4	The impact of the COVID-19 pandemic, including restrictions on the movement of materials, equipment, and labor due to large-scale social distancing measures.
25		X6.5	Environmental security concerns, such as open project sites leading to material theft.

4. CONCLUSION

Drawing conclusions from the analysis and discussion, the following key findings emerge:

1. The role of Service Providers during the construction phase is significantly affected by variables related to planning, scheduling, and cost estimation (X1), resource allocation (X2), bureaucratic administration (X5), and external conditions (X6). Each of these variables has a specific regression coefficient: X1 - 0.366, X2 - 0.312, X5 - 0.538, and X6 - 0.204. Notably, the variable associated with planning, scheduling, and cost estimation (X1) exerts the most significant influence on the role of Service Providers during construction, as evidenced by its regression coefficient of 0.366 (as derived from regression equation analysis on pages 131-135).
2. To enhance the role of Service Providers during the construction phase, a set of strategic actions can be formulated to address various challenges and contributing factors. These strategies encompass improving cost estimation and project scheduling preparations, streamlining coordination between design and field conditions, and effectively managing additional work or addendums. Sound financial practices and contractor payment procedures can be implemented to maintain a smooth cash flow. Consistency in labor force provision and the enhancement of contractor qualifications are crucial, preventing the use of borrowed credentials. Addressing financial difficulties faced by contractors and managing material procurement challenges, including the scarcity of materials meeting specified standards, are essential steps. Streamlining procurement schedules for both factory and custom materials can significantly contribute to project efficiency. Additionally, addressing bureaucratic administration aspects, improving inspection, control, and work evaluation procedures, and expediting the owner's approval process for material selection can further enhance project outcomes. Managing accessibility to challenging project sites, adapting to weather-related disruptions, and addressing the impact of the COVID-19 pandemic are integral components of these strategies. Furthermore, enhancing environmental security measures at open project sites is crucial to prevent material theft.
3. The risks associated with time overrun, ranked in order of significance, encompass a range of challenges:
 - a) Delays in contract terminations for both contractors and consultants.
 - b) Inability of the building to be functional or usable within the scheduled timeframe.
 - c) The need to rush finishing work, potentially leading to compromised work quality.

- d) Accumulation of numerous small or finishing tasks left undone, as more significant tasks take precedence.
 - e) Simultaneous execution of structural, architectural, and MEP work leading to less orderly work.
 - f) Frequent disassembly and reassembly of components, as MEP work, which should have been completed before architectural work, is carried out later.
 - g) Project completion being pushed beyond the originally set schedule.
 - h) Escalation of project costs.
 - i) Incurred losses for contractors, consultants, and owners.
 - j) Delays affecting other related work, causing a domino effect.
 - k) Necessity for rescheduling work to accommodate delays.
 - l) Increased material costs due to extended project timelines.
4. The anticipatory measures to address time overrun, ranked by priority, include:
- a) Increasing the workforce.
 - b) Extending working hours.
 - c) Ensuring detailed drawings or shop drawings are prepared before work commencement.
 - d) Enforcing strict occupational health and safety measures to minimize accidents.
 - e) Enhancing cost and time control systems.
 - f) Improving work methodologies.
 - g) Comprehensive early identification and prompt problem-solving (Contractors should thoroughly understand the project's characteristics and scope of work to expedite project completion). These strategies are derived from an analysis of anticipatory measures to address time overrun, involving 38 variables with a cumulative percentage of 100% (data sourced from time overrun anticipation analysis on page 146).

5. SUGGESTION

In light of the research results, several suggestions can be provided:

1. The research findings should serve as a point of reference, especially for stakeholders involved, including Service Providers, Owners, Supervisory Consultants, Construction Management (CM) Consultants, and Planning Consultants. It is essential to give careful consideration to the Service Providers' role in project progress and attainment since the variable related to planning, scheduling, and cost estimation significantly influences their performance during the construction phase.
2. To enhance this study, it is possible to include additional independent variables beyond the six mentioned earlier, or expand the research to encompass different research locations.
3. The attention of Service Providers during project execution should be directed towards task allocation. Approximately 30-40% of the project is allocated to structural work, 25-35% to architectural work, and 25-35% to mechanical, electrical, and plumbing work. Although architectural work carries a lower weight, it often involves longer implementation periods, particularly during the finishing stage. Accelerating the structural work is essential to prevent project delays.
4. Prior to the commencement of the project, there are several important aspects that contractors or service providers should take into consideration:
 - a. It is imperative to conduct a thorough initial assessment and promptly seek viable solutions. Contractors should meticulously study the project's characteristics and scope to ensure effective project completion.
 - b. Ensure that design drawings are finalized to minimize the need for subsequent modifications.

- c. Verify that the land handover for the project aligns with all necessary permits and regulations.
- d. Expedite the permitting process before commencing the project, not only for the project site but also for material quarry locations and transportation routes. Additionally, proactive engagement with the local community is crucial to prevent objections that could impede progress.
- e. Contractors must implement an Environmental Management and Monitoring Work Plan (RKPPL) for each activity. This approach not only helps minimize workplace accidents but also reduces social impacts and mitigates potential harm to the environment.

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