

Evaluation of the Implementation of Quality Management, Costs and Time in The Process of Self-Managed Project Development (Study on House Building Projects Muhammadiyah University Semarang Hospital)

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Abstract: The construction of Universitas Muhammadiyah Semarang (UNIMUS) Hospital employs a self-management approach. During the construction phase, delays and a decline in building quality that did not align with the planning phase were observed. Therefore, a review of the management approach is necessary to ensure timely completion, maintained quality, and cost efficiency. This study evaluates the effectiveness of time, cost, and quality management in the construction project. The analysis method used is the interactive data analysis paradigm, involving data reduction, storage, and analysis using IBM SPSS 20. The analysis results indicate that time and cost management have been effective, with the construction work being completed within the set schedule and the costs not exceeding the Budget Plan. Quality management is rated very good with a score of 4.35, indicating that the construction process is strictly carried out according to specified materials and work procedures. Cost savings are also rated very good with a score of 3.89, indicating effective cost control. Time efficiency is rated good with a score of 4.06, showing that the project can run the schedule efficiently. Based on the research results, the researcher recommends enhancing leadership aspects and increasing active involvement of top management in supervision and strategic decision-making. This study also shows that self-management can promote transparency, efficiency, and high-quality outcomes in construction projects.

Keywords: *Cost; Management; Quality; Self-Management; Time*

1. Introduction

Construction has now entered almost all aspects of human life and its development is increasingly rapid in terms of technology, project capacity, and the funds required[1]. This development creates opportunities and challenges for business actors, especially small and large-scale construction services[2]. This requires many items that are so complex according to the expertise of the work to realize it.

The existence of project management will show the boundaries of the duties, authority, and responsibilities of the parties involved in the project both directly and indirectly, so that there will be no tasks and responsibilities carried out simultaneously[3]. The importance of the existence of project management in a construction project is for the sake of smoothness in managing the project from start to finish[4].

In the implementation of a development project, the use of resources such as labor, tools and materials sometimes does not run according to the needs[5]. So a scientific and intensive resource management method is needed, which is called project management. The basic functions of project management consist of managing the scope of work, time, cost, and quality[6]. Project management is very important to be applied in the company, because the project being worked on can run according to plan[1]. In the implementation of the construction of a construction project, there are three main things, namely cost, quality and time, which are interrelated, where a project can be completed on time with minimal costs and of good quality[7].

One form of project management is self-management. Self-management management is a goods / services procurement activity where the work is planned, carried out and / or supervised by K / L / D / I as the budget bearer, other government agencies and / or community groups[8]. Self-management management tends to be characterized by the direct involvement of the project provider in the management and implementation of the project. Its hallmarks include intensive monitoring of each stage of the project, strict control of costs and time, and active involvement in strategic decision-making. Furthermore, self-management often encourages close collaboration between the project provider and the contractor, promoting transparency, efficiency and high quality in the final outcome of construction projects.

Based on a previous study, it was explained that there were many irregularities in funds due to the lack of knowledge and competence of self-management implementers[9]. In addition, a previous study also explained that one of the obstacles faced in physical implementation is the late issuance of implementation instructions and technical instructions, which has an impact on the narrow implementation time and obstacles in the implementation of non-physical work, one of which is too complicated self-managed work administration[10].

Muhammadiyah University Semarang (UNIMUS) Hospital is an infrastructure designed to support various health services. The building consists of inpatient wards, operating rooms, emergency department, intensive care unit, as well as supporting facilities such as diagnostic laboratory, radiology room, pharmacy, and rehabilitation center. Its physical complexity is evident from various aspects, including architectural design that takes into account accessibility needs for patients, families, and medical staff, as well as user safety and comfort. In addition, technical infrastructure such as utility systems that include electricity, clean water, air conditioning systems, as well as medical waste management systems are also part of Universitas Muhammadiyah Semarang (UNIMUS) Hospital. Emphasis on safety, indoor air quality, and high sanitation standards are also important aspects in the design and construction of the hospital buildings of Universitas Muhammadiyah Semarang (UNIMUS).

The construction of the University Hospital of Muhammadiyah Semarang (UNIMUS) is a development that uses self-management. During the construction phase, there were delays and a decrease in the quality of the building that was not in accordance with the planning stage. Therefore, it is necessary to review the management used so that the construction can run on time, the quality is maintained and of course the costs used are efficient.

2. Methods

Based on the problem formulation and objectives to be achieved, this research uses quantitative and descriptive qualitative methods. Quantitative methods are used in this research because the research is an assessment in nature and the data to be achieved is quantitative data in the form of a percentage of the performance of the Semarang Muhammadiyah University Teaching Hospital Development Project. The qualitative descriptive method used in this research aims to obtain complete information about the performance of green buildings from those implementing the Semarang Muhammadiyah University Teaching Hospital Construction Project.

2.1. Research Location

The location of this research is the construction project of the Muhammadiyah University Semarang teaching hospital. The planned construction of the UNIMUS Hospital is located on Jalan Kedungmundu, Kedungmundu Village, Tembalang District, Semarang City. This project is planned on an area of 13,727 m², with a total of 9 floors and a total building floor area of around 25,549.47 m². Boundaries location For plan development House UNIMUS pain in parts adjacent north is empty field (moor) and campus UNIMUS , next door south that is road Kedungmundu , next door east that is building commercial and campus UNIMUS and the West is building business or commercial.



Fig. 1. UNIMUS Hospital Project Location



Fig. 2. UNIMUS Hospital Project Site Plan

2.2. Research Procedure

Study This use method quantitative and method descriptive qualitative . In Study This researcher together team will start collect the required data and information from sources involved in development project construction to be researched . Which become source person in study This is a Construction Service Provider Team and Consultant Team Management Construction .

Types of data used in study This are primary data and secondary data . Primary Data obtained through interviews and secondary data such as documentation and study data the literature obtained during the implementation process ongoing, so that the data collected more measurable. The data processing technique in this research adopts an interactive data analysis paradigm and develops from the data collection stage to data analysis. This process includes data reduction, data storage, and data analysis which is carried out at the final stage of the research. Data analysis was carried out with analysis respondents done with a questionnaire analysis aimed at measuring respondents' perceptions of the effectiveness of time, cost and quality management in this project. Besides That data analysis on several criteria:

- Quality aspect criteria, the quality aspect criteria are met if the comparative value of the progress report is in accordance with what is stated in the BQ.
- Time aspect criteria fulfilled if the actual Time Schedule is on time or faster than the planned Time Schedule.
- The cost aspect criteria are met if the costs incurred during construction comply with or do not exceed the budget planned.

3. Results and Discussion

3.1. Respondent Profile

In this research, the identity of the respondent was obtained from the results of a questionnaire filled out by the respondent containing the respondent's age, gender, education level and based on work obtained from data from parties participating in the self-managed construction of the Semarang Muhammadiyah University Hospital Construction Project, such as Consultants, Contractors and Owner.

3.1.1. Respondents Based on Age

In research on the self-management of hospital construction projects, respondents were grouped by age to gain insight into how age influenced their perceptions and experiences of the project. The following is the distribution of respondents based on age categories, data obtained through a questionnaire which can be seen in pie chart Fig. 3.

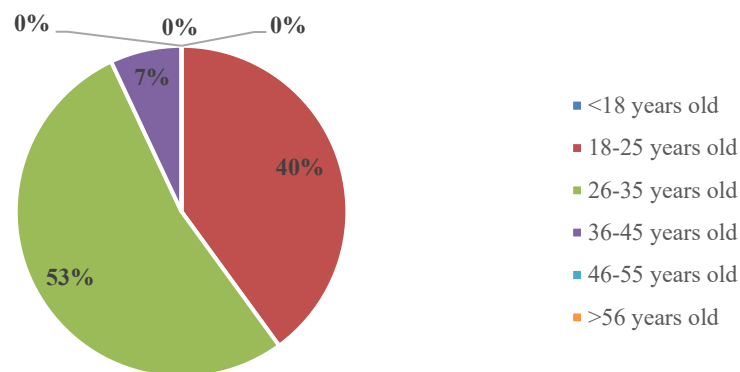


Fig 3. Composition of Respondents Based on Age

3.1.2. Respondents Based on Gender

The distribution of respondents based on gender shows that although the construction industry is dominated by men, women's contribution remains significant and provides added value in understanding the problem of project delays. This grouping helps identify whether there are differences in perceptions between men and women in overcoming project delays. By

understanding these distributions and perspectives, project managers can design a more inclusive and effective approach in dealing with project self-management, ensuring that the views of all gender groups are taken into consideration. The following is the distribution of respondents based on gender categories obtained through a questionnaire which can be seen in the fig. 4.

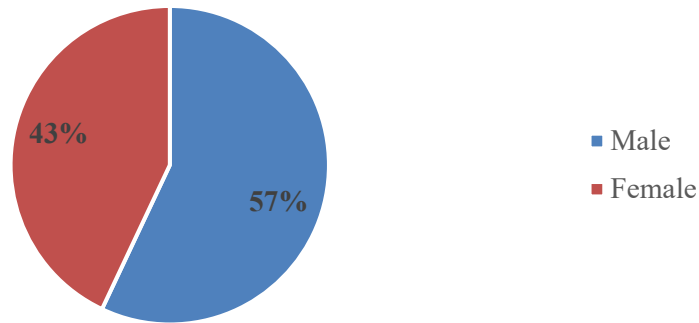


Fig 4. Composition of Respondents Based on Gender

3.1.3. Respondents Based on Education Level

The distribution of respondents by education level provides important insight into how educational background influences perceptions and approaches to project self-management. Respondents with higher education tend to have a more comprehensive understanding and more effective strategies in dealing with lateness problems. By understanding this distribution, project managers can adjust communication and project management strategies to take advantage of the diverse skills and perspectives of each education level, ensuring projects run more smoothly and the risk of delays is minimized. The following is the distribution of respondents based on education level, data obtained through a questionnaire which can be seen in Fig. 5.

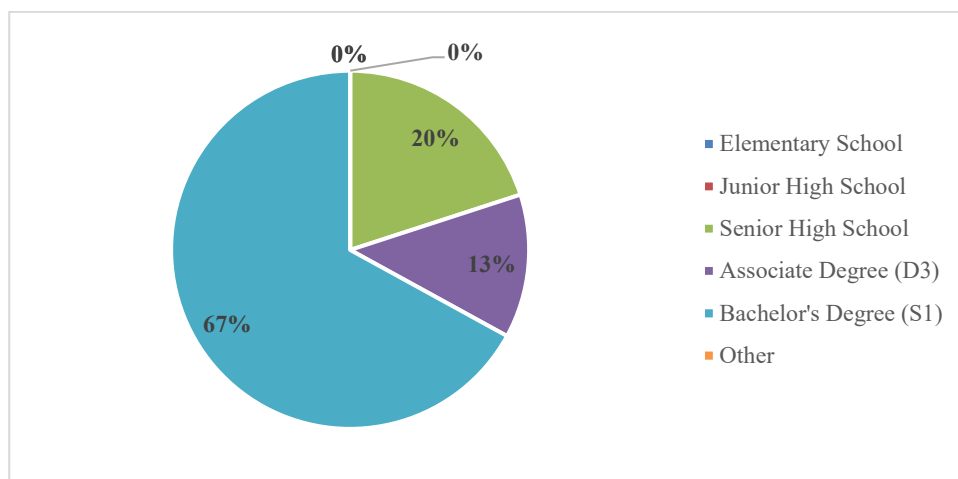


Fig 5. Composition of Respondents Based on Education Level

3.1.4. Respondents Based on Position

The distribution of respondents by job title provides valuable insight into how different roles in a project influence views on delays. Each role brings a unique perspective based on their responsibilities and work focus. By understanding this distribution, project managers can adapt their communication and management strategies to take advantage of the views and expertise of various roles, ensuring that all aspects of the project are addressed and the risks of self-management are minimized. The following is the distribution of respondents based on education level, data obtained through a questionnaire which can be seen in pie chart image 4.11 below:

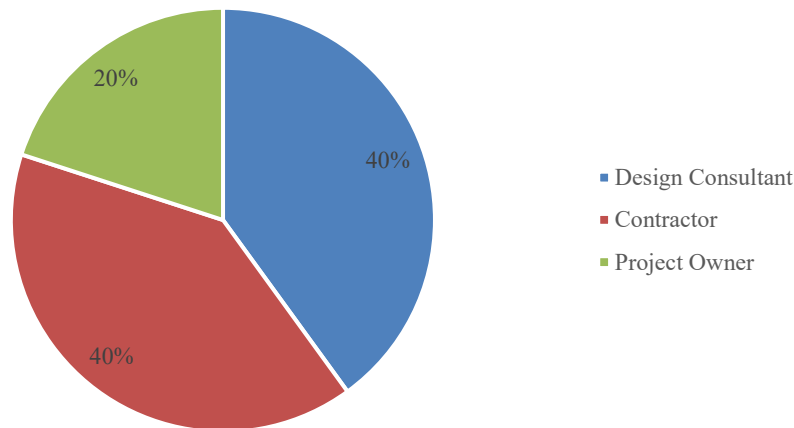


Fig 6. Composition of Respondents Based on Position

Table 1. Questionnaires Distributed

Information	Frequency
Distributed questionnaires	30
Returned questionnaire	30
Failed questionnaires	0

Source: Author's data, 2024

3.1.5. Respondent Analysis

Based on the respondent profile data, it can be explained that there are 17 male employees who show a percentage of 57% and 13 female employees who show a percentage of 43%. Thus, male employees are more numerous than female employees at the Muhammadiyah University Hospital Construction in Semarang. This is because men work more in the field than in the office. Meanwhile, according to the latest education, there are 0 respondents who graduated from elementary school, showing a percentage of 0%, junior high school totaling 0 people with a percentage of 0%, high school totaling 6 people showing a percentage of 20%, D3 for 4 people with a percentage of 13%, S1 for 20 people and the percentage 67%. Therefore, the higher a person's level of education, the more mature his or her mindset will be in making decisions and carrying out tasks. Education is defined as an individual's effort to improve understanding and evaluation of various aspects, and a person's level of education can reflect their capacity which has the potential to influence their thinking patterns and behavior.

3.2. Variable Validity and Reliability Test

3.2.1. Validity Test

Validation tests are used to test the validity of each variable marker used in this research. The validity of a point in research can be confirmed by comparing the SPSS calculated r value with the table r value. If the SPSS calculated r value is positive and greater than the table r value, then the variable or point is considered valid. Conversely, if the SPSS calculated r value is negative and smaller than the table r value, then it can be concluded that the variable is invalid. The following are the steps used to check the validation of the questionnaire statements that will be made. The calculation of the validity test in the level of implementation of the Quality, Time and Cost Management System is in accordance with SPSS calculations and uses values from the correlation coefficient table (r Table) listed in attachment 4 as follows:

a. Quality Management Variables

The results of the questionnaire validity test using SPSS calculations of quality management variables with 9 statements are as follows:

Table 2. SPSS calculation of validity test of quality variables (A)

Quality Management Variables				
	Scale Mean	Scale Variance	Corrected Item-Total Correlation	Cronbach's Alpha
A.1	33.83	6,626	,460	,742
A.2	33.87	6,878	,366	,755
A.3	33.93	6,685	,490	,739
A.4	33.97	7,068	,263	,769
A.5	34.23	6,668	,309	,768
A.6	34.27	6,340	,459	,742
A.7	33.83	5,661	,680	,702
A.8	33.77	6,254	,603	,721
A.9	33.90	6,576	,425	,747

Source: Author's Processed Data, 2024

From the nine SPSS calculation variables, Cronbach's Alpha value was > 60%, so it can be concluded that all of these variables are valid and can be used as measuring tools in research.

b. Time Management Variables

The results of the questionnaire validity test using SPSS calculations of time management variables with 9 statements are as follows:

Table 3. SPSS calculation of time variable validity test (B)

Time Management Variables				
	Scale Mean	Scale Variance	Corrected Item-Total Correlation	Cronbach's Alpha
B.1	31.13	11,292	,226	,765
B.2	32.17	9,730	,287	,780
B.3	31.13	10,395	,497	,732
B.4	31.10	8,921	,529	,723
B.5	31.17	10,213	,529	,727
B.6	30.83	9,178	,736	,692
B.7	30.83	10,833	,324	,753
B.8	30.67	10,161	,432	,739
B.9	30.70	9,941	,570	,720

Source: Author's Processed Data, 2024

From the nine SPSS calculation variables, Cronbach's Alpha value was $> 60\%$, so it can be concluded that all of these variables are valid and can be used as measuring tools in research.

c. Variable Cost Management

The results of the questionnaire validity test using SPSS calculations of cost management variables with 9 statements are as follows:

Table 4. SPSS calculation of cost variable validity test (C)

Variable Cost Management				
	Scale Mean	Scale Variance	Corrected Item- Total Correlation	Cronbach's Alpha
C.1	32.67	6,782	,261	,781
C.2	32.57	7,220	,356	,743
C.3	32.43	7,357	,331	,746
C.4	32.43	7,495	,460	,733
C.5	32.57	6,668	,563	,710
C.6	32.53	7,154	,419	,733
C.7	32.40	7,007	,527	,719
C.8	32.50	6,672	,573	,709
C.9	32.70	6,631	,589	,706

Source: Author's Processed Data, 2024

From the nine SPSS calculation variables, Cronbach's Alpha value was $> 60\%$, so it can be concluded that all of these variables are valid and can be used as measuring tools in research.

Based on the observation table in Appendix 4, figures were obtained from the illustration (N) with a total of 30 respondents. The r table value for a sample of this size is 0.361. Based on the results of the validity test, all variables produce an SPSS calculated r value that is greater than the r table, namely 0.361. This shows that the research instruments used in this research are considered valid. On the other hand, if the SPSS calculated r value for a variable is smaller than the table r value of 0.361, then it can be concluded that the research instrument is invalid.

3.2.2. Variable Reliability

After all the variable data is obtained then enter the numbers in the SPSS formula to test reliability as in the calculation below:

For reliability test calculations in the Quality Management System Implementation Level (A), Time Management (B) and Cost Management (C) according to the formula attached in the attachment. Data reliability testing is carried out using a bivariate correlation approach, which can be seen in the table below:

Table 5. Average Calculation Results of the Variables Quality Management (A), Time Management (B) and Cost Management (C).

Alpha Cornbach Quality Management		Alpha Cornbach Cost Management		Alpha Cornbach Time Management	
Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
.754	9	.760	9	.760	9

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Table 6. Data Reliability Test Results

No.	Variable	r table	Cronbach's Alpha (r)	Status
a.	Quality Management (A)	0,361	0,766	Reliabel
b.	Time Management (B)	0,361	0,760	Reliabel
c.	Cost Management (C)	0,361	0,754	Reliabel

Source: Author's Processed Data, 2024

3.3. Quality in the Work Process

Quality in the construction work process refers to the quality standards applied during project implementation to ensure that all work complies with established specifications and meets stakeholder expectations. In hospital construction projects, maintaining quality in the work process is very crucial because it involves safety, comfort and satisfaction of end users, namely patients and medical staff. The analysis results obtained from statements regarding quality management can be seen in table 7.

Table 7. List of Questionnaire Statements Regarding Quality Obtained in the Work Process

No	Statement	Answer	V4	V5	V6	V7	V8	V9	V10	V11	V12	Total Average Score
		STS		TS		RR		S	.	SS	.	.
		1		2		3		4	.	5	.	.
A.1	The construction work carried out is in accordance with the working drawings (bestek) and technical requirements.	0	1	0	2	0	3	19	4	11	5	4.367
A.2	The quality of the work is quite good.	0	1	0	2	0	3	20	4	10	5	4.333
A.3	Visually, the results of the construction work are quite good, neat and strong.	0	1	0	2	0	3	22	4	8	5	4.267
A.4	There are efforts to improve the quality of work from established specifications.	0	1	0	2	1	3	21	4	8	5	4.234
A.5	Until now, none of the building construction results have been damaged.	0	1	0	2	6	3	19	4	5	5	3.967
A.6	The results of the work can provide benefits beyond existing technical specifications.	0	1	0	2	6	3	20	4	4	5	3.933

A.7	Measure, monitor and analyze worker activities during the project.	0	1	0	2	2	3	15	4	13	5	4.367
A.8	Check whether the work results contain irregularities/errors or not.	0	1	0	2	0	3	17	4	13	5	4.434
A.9	Identify and select competent suppliers	0	1	0	2	1	3	19	4	10	5	4.300
Total												38.190
Total average.												4.244

Based on the results of the analysis obtained regarding quality management, the implementation of self-management from the quality aspect was declared very good with a score of 4.24 out of 5. Because the work on the construction project for the Muhammadiyah University Semarang (UNIMUS) Teaching Hospital has gone through a testing process which shows that the quality is good. implemented during the work process is in accordance with the expected standards. In its implementation, the quality of work has been very well controlled to ensure that each implementation stage meets the specified quality criteria. The use of quality materials in accordance with the quality standards specified in the work plan and requirements (RKS) document attached to attachment 4, the implementation of strict work procedures, and consistent supervision in the field contribute to achieving optimal results. This shows that the quality management system implemented is effective in ensuring the quality and consistency of work results, in accordance with actual conditions in the field. This has been carried out by field supervisors who have fulfilled their competence regarding the requirements, stages and results of the tests carried out.

The following are several activities to ensure quality in the construction of the Semarang Muhammadiyah University (UNIMUS) Teaching Hospital in Semarang, such as supervision during the installation of iron and formwork (Fig. 7), implementation of the Hammer Test (Fig. 8), and Slump testing in the casting (Fig.9).



Fig. 7. Installation of steel bar and formwork



Fig. 8. Implementation of the Hammer Test



Fig. 9. Slump testing in the casting

3.4. Time in Work Process

Time is one of the key factors in project management, especially in construction projects such as building hospitals. Effective and efficient time management ensures that projects are completed on time according to the predetermined schedule, avoiding delays that can result in increased costs and decreased quality. The analysis results obtained regarding time management can be seen in table 8.

Table 8. List of Questionnaire Statements Regarding Time Gained in the Work Process

No	Statement	Answer	V4	V5	V6	V7	V8	V9	V10	V11	V12	Total Mean Score
		STS		TS		RR	.	S	.	SS	.	.
		1		2		3	.	4	.	5	.	.
B.1	Completion of construction work does not exceed the schedule that has been made/determined.	0	1	0	2	7	3	21	4	2	5	3.834
B.2	The time required is not enough.	1	1	13	2	8	3	7	4	1	5	2.800
B.3	Completion of work according to the time planned in the planning document.	0	1	0	2	7	3	21	4	2	5	3.834
B.4	Completion of construction work does not exceed the budget year.	0	1	3	2	4	3	17	4	6	5	3.867
B.5	Completion of construction work was faster than existing plans.	0	1	0	2	8	3	20	4	2	5	3.800
B.6	Work in the field is in accordance with the S curve created.	0	1	0	2	4	3	18	4	8	5	4.134
B.7	Compare the schedule with project progress	0	1	0	2	3	3	20	4	7	5	4.134
B.8	Plan and implement corrective actions	0	1	0	2	3	3	15	4	12	5	4.300
B.9	Measuring and creating project progress reports	0	1	0	2	2	3	18	4	10	5	4.267
Total.												34.970
Total Mean												3.885

Based on the results of the analysis obtained regarding time management, the time efficiency produced after the evaluation was assessed as good with a total score of 3.89 out of 5. This analysis is based on data which shows that the duration used in the work process for the Semarang Muhammadiyah University Teaching Hospital construction project (UNIMUS) in accordance

with predetermined plans. It can even be said to be 2 months faster than the 12 month plan time for building A and 3 weeks faster than the 18 week plan time for the construction of building B, evidence of this can be seen in attachment 5. The implementation of time management in the field has been running effectively, with All stages of work are carried out according to the schedule and target time that has been determined, and when there is a delay the number of workers is increased along with the workers' overtime hours. Actual conditions in the field reflect efficient and well-controlled time management practices, which ensure smooth and accurate project completion. This indicates that the time management strategy implemented is able to meet expectations and expected standards. So that time control in this self-managed project is considered good and effective.

3.5. Costs in the Work Process

Cost is an important element in construction project management, including in hospital construction. Effective cost management ensures that the project is completed within the set budget, avoiding cost overruns that can affect the continuity and success of the project. The analysis results obtained regarding cost management can be seen in table 9.

Table 9. List of Questionnaire Statements Regarding Costs Obtained in the Work Process

No	Statement	Answer	V4	V5	V6	V7	V8	V9	V10	V11	V12	Total Mean Score
		STS		TS		RR		S		SS		.
		1		2		3		4		5		.
C.1	Construction costs do not exceed the Budget and Cost Plan.	0	1	1	2	8	3	13	4	8	5	3.867
C.2	The cost components are in accordance with those in the Cost Budget Plan document.	0	1	0	2	4	3	21	4	5	5	4.033
C.3	There are strategies to reduce costs without reducing the quality of work.	0	1	0	2	2	3	21	4	7	5	4.167
C.4	The funding distribution model is in accordance with the specified stages.	0	1	0	2	0	3	25	4	5	5	4.167
C.5	The material costs and craftsman costs used do not exceed the current market price.	0	1	0	2	4	3	21	4	5	5	4.033
C.6	The cost of carrying out work can accommodate all components of project activities.	0	1	0	2	4	3	21	4	5	5	4.033
C.7	The amount of remaining or wasted material is not large and is not scattered.	0	1	0	2	3	3	22	4	5	5	4.067

C.8	Exchange of inappropriate materials in the field rarely occurs.	0	1	0	2	1	3	22	4	7	5	4.200
C.9	The tools that support the work are available and complete so there is no need to buy more.	0	1	0	2	6	3	21	4	3	5	3.900
Total.												36.460
Total Mean												4.060

Based on the results of the analysis obtained regarding cost management, the cost savings that occurred after the evaluation process on the self-managed project was declared very good, because the total score obtained was 4.06 out of 5. This analysis shows that the allocation and use of costs in the work process for the house construction project The University of Muhammadiyah Semarang (UNIMUS) Education Hospital has become more economical than originally planned. The implementation of cost management in the field has been running very efficiently, with all expenditures carried out according to the predetermined budget and activities that are less effective can be selected. Actual conditions in the field reflect effective cost control and save 23.16% from the planned budget of Rp. 46,768,872,000.00 to Rp. 35,724,841,000.00 which ensures optimal use of financial resources, can be seen in attachment 6. This indicates that the cost management strategy implemented is able to meet expectations and expected standards, as well as supporting the achievement of project goals efficiently. Almost the same as time management for cost management, there are also some costs at work that have increased and come out of the committee's budget ceiling due to changes in the image of the owner or committee in the middle of the work. However, overall project financing is still under control and is not out of budget, even below the initial budget plan.

4. Conclusion

The implementation of self-management from the quality aspect was declared very good with a score of 4.24 because it successfully fulfilled the nine criteria listed on the questionnaire and had been determined in the initial plan. The construction process is carried out strictly according to the material specifications and work procedures that have been determined, as well as through an effective supervision system to monitor each stage of the work. The resulting time effectiveness after the evaluation was assessed as good with a score of 3.89. This is reflected in the project's ability to run the predetermined schedule efficiently. Activity scheduling was carried out carefully and regularly, allowing the project to achieve or even exceed the time target set in the initial plan for building structure A from 12 months to 10 months and building B construction from 21 weeks to only 18 weeks without reducing quality. Good supervision and coordination between the project team as well as implementing adjustment strategies if delays or obstacles occur also contribute to the success of this time management. The cost efficiency that occurred after the evaluation process was carried out on the self-managed project was declared very good with a score of 4.06 because it succeeded in managing the budget according to the initial plan which was initially IDR. 46,768,872,000.00 to Rp. 35,724,841,000.00. Expenditures during the development process can be controlled effectively, ensuring that the costs incurred do not exceed those prepared in the Budget Plan. Findings study show that mark application to aspects the Already fine , I will but Still Can potential For improved become more optimal. Therefore That 's expected management peak can more active involved directly in the field For do monitoring and socializing understanding related regulations and standards to all over ranks management . Besides it , delivers training to all human resources are also needed for them more competent in understand applicable regulations and standards , so can increase process quality or results end work .

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