JOURNAL OF MARKETING INNOVATION AND BUSINESS RESEARCH
E-ISSN: 3163-5474
Volume: 01, (2), 2026
Homepage: https://ojs.polnes.ac.id/index.php/jmibr

Research Article

JOURNAL OF MARKETING, INNOVATION, AND BUSINESS RESEARCH

Page: 212-228

Digital Project Performance Monitoring Using Microsoft Project: A Case Study of a Small-Scale Construction Project

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Article History

Received:
1 August 2026

Accepted:
27 August 2026

Published:
31 August 2026

Abstract

This study examines the use of Microsoft Project and Work Breakdown Structure (WBS) for monitoring the performance of a single-storey shop house construction project. A descriptive quantitative approach was employed using project data comprising 11 major work packages, activity schedules, resource allocations, work-hour records, and cost information. The analysis focused on project progress, schedule conditions, cost utilisation, and resource utilisation at the work-package level. The results show that the project achieved an overall task completion of 79%, while 3,434.63 actual work hours were recorded from 3,681.66 planned work hours, representing approximately 93% utilisation of planned work hours. Progress was uneven across work packages, with Electrical Work recording the lowest completion at 29%, followed by Ceiling Work at 54% and Finishing Work at 62%. These work packages therefore require closer monitoring because incomplete activities in later construction stages may affect project continuity. The findings indicate that integrating WBS and Microsoft Project can support structured monitoring of project activities, resource allocation, and work-package progress. The study also highlights the importance of establishing a reliable project baseline when EVM is intended to be applied for formal cost and schedule performance measurement.

Keywords: *Microsoft Project; Work Breakdown Structure; project monitoring; construction project; Earned Value Management.*

1. Introduction

The construction sector plays an important role in supporting infrastructure and housing development. Small-scale construction projects may involve numerous interdependent activities and require coordination of schedules, costs, resources, and work progress (Zaneldin & Ahmed, 2024). Without structured project planning and systematic monitoring, deviations in cost, schedule, resource utilization, and work progress may become difficult to identify at an early stage. Therefore, effective project control is essential for systematically monitoring project information and identifying potential deviations that may require timely managerial responses (Okoro et al., 2024).

Project management integrates planning, organizing, executing, monitoring, and controlling activities to achieve project objectives within the required time, cost, scope, and quality constraints Click or tap here to enter text.(Anastasiu et al., 2023; Aprillia et al., 2023; Mazlum & Güneri, 2015)(Metwally et al., 2025). In this context, digital project management tools can provide an integrated environment for organizing project activities, assigning resources, managing costs, establishing activity relationships, and monitoring project progress. Microsoft Project is one digital project management tool that supports these activities through structured scheduling, resource management, cost tracking, progress monitoring, critical path analysis, and project reporting. Such integration can provide project managers with more structured information for monitoring project conditions and identifying activities that require managerial attention (Ningsih et al., 2025; Sigit et al., 2024; Surahman et al., 2024; Moradi et al., 2020).

A key component of structured project management is the Work Breakdown Structure (WBS), which decomposes the overall project scope into smaller and measurable work packages (Odedairo, 2024). A properly structured WBS facilitates the organization of project activities, allocation of resources, estimation of costs, and monitoring of work progress (Cerezo-Narváez et al., 2020). When implemented within digital project management software, WBS can provide a consistent structure for connecting project scope with schedule, cost, resource, and progress information. This integration is particularly relevant to small-scale construction projects, where project information needs to be organized efficiently to support project monitoring and managerial decision-making (Khahro et al., 2023).

Earned Value Management (EVM) is another established approach for integrating scope, schedule, and cost information in project performance measurement (Priyo, 2021). Standard EVM uses Planned Value (PV), Earned Value (EV), and Actual Cost (AC) to derive performance indicators such as Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), and Schedule Performance Index (SPI). However, the application of EVM requires a reliable project baseline, time-phased planned values, objectively measured progress, and actual cost data recorded at clearly defined status dates (Chauhan, 2025). The availability and quality of these data are therefore important for ensuring that EVM indicators can be calculated and interpreted appropriately. In the context of digital project management, the use of project software should consequently be accompanied by appropriate baseline establishment and data validation.

Despite the availability of digital project management tools and established project control approaches, their practical application in small-scale construction projects remains relevant for further examination, particularly in integrating work breakdown structures, schedules, costs, work utilisation, resources, and progress information within a single digital environment. Previous studies have generally examined project planning, EVM-based performance measurement, or individual project management functions, while less attention has been given to how this information dimensions can be organised and interpreted together at the work-package level using a digital project management tool. This gap is particularly relevant when project data are incomplete or inconsistent, because the availability of digital software alone does not guarantee reliable performance measurement (Gertzen et al., 2022).

This study examines a small-scale construction project that was organized and monitored using Microsoft Project. The project consists of 11 major work groups and was scheduled from

October 1, 2025, to December 29, 2025. The available project reports provide information on task completion, work completion, cost utilization, remaining cost, work hours, resource utilization, and critical activities. These data provide an empirical basis for examining how project information generated through Microsoft Project can be organised and interpreted to monitor project performance and identify work packages requiring managerial attention.

Accordingly, this study aims to evaluate the use of Microsoft Project and WBS for digital monitoring of project performance in a small-scale construction project. The analysis focuses on project cost distribution, task and work completion, work-hour utilisation, resource utilisation, critical activities, and the identification of work packages requiring managerial attention. The study contributes practical evidence on how multiple project information dimensions can be integrated at the work-package level within a digital project management environment. It also highlights the importance of reliable baseline and progress data when standard EVM-based performance measurement is intended.

2. Literature Review

This section reviews the theoretical and empirical foundations relevant to digital project performance monitoring in small-scale construction projects. The discussion focuses on project management and digital project monitoring, Work Breakdown Structure (WBS), and Earned Value Management (EVM) as a framework for project performance measurement. The reviewed concepts are subsequently used to establish the research gap and position the present study within the context of digital project monitoring.

2.1 Digital Project Monitoring

Project management integrates planning, organizing, executing, monitoring, and controlling activities to achieve project objectives within defined time, cost, scope, and quality constraints (Sima, 2022). This function is particularly important in construction projects because project execution involves the coordination of multiple resources, including personnel, materials, equipment, and financial resources. Effective project monitoring therefore requires project information to be organized systematically so that managers can identify changes in project progress, resource utilization, and cost expenditure (Elserougy et al., 2024).

The development of digital project management tools provides an opportunity to integrate these types of project information within a single working environment (Wang & Chen, 2023). Microsoft Project, for example, supports project scheduling, activity relationships, resource allocation, cost management, progress tracking, and critical path analysis. The integration of these functions allows project information to be organised according to project activities and work packages and presented through project reports. From a project management perspective, digital monitoring can therefore support managers in obtaining a more structured view of project conditions and identifying activities that require attention.

2.2 Work Breakdown Structure

The Work Breakdown Structure (WBS) is a project management approach for decomposing the overall project scope into smaller and manageable work packages. According to the *PMBOK Guide*, the WBS organizes the total scope of a project into components that can be planned, estimated, scheduled, monitored, and controlled (Varajão et al., 2025). This structure provides a basis for linking project scope with schedule, resources, cost, and progress information.

The application of WBS is particularly relevant to construction projects because construction activities consist of multiple work packages with different resource and cost requirements. A more structured division of construction work can improve the clarity of resource requirements and support cost and procurement planning (Soeparyanto et al., 2024). Ayu Herzanita (2019) emphasized the role of a standardized WBS in improving accountability in budget allocation across project work packages. Panquet et al. (2024) further indicated that linking work packages with schedule, cost, and progress information can support more consistent project control.

2.3 Earned Value Management

Earned Value Management (EVM) is an established project performance measurement framework that integrates information concerning planned work, completed work, and actual expenditure. The standard EVM framework uses Planned Value (PV), Earned Value (EV), and Actual Cost (AC) to derive cost and schedule performance indicators. Cost Variance (CV) is calculated as the difference between EV and AC, while Schedule Variance (SV) is calculated as the difference between EV and PV. Performance indices such as the Cost Performance Index (CPI) and Schedule Performance Index (SPI) can subsequently be used to evaluate cost and schedule performance (Widyarso et al., 2025).

Previous studies have demonstrated the usefulness of EVM for identifying project cost and schedule deviations during project execution. Proaño-Narváez et al. (2022) demonstrated that EVM can provide early information about potential deviations and support corrective decision-making. Mayo-Alvarez et al., 2022) demonstrated that earned value analysis can be used to identify cost and schedule problems before project completion.

However, the reliability of EVM depends on the quality of the underlying project data. Standard EVM requires an established project baseline, time-phased planned values, objectively measured earned value, actual cost information, and clearly defined status dates. Without a validated baseline and consistent progress measurement, EVM indicators cannot be interpreted reliably. Therefore, the use of project management software alone does not guarantee the availability of valid EVM performance measures; appropriate baseline establishment and data management are also necessary.

2.4 Research Gap and Conceptual Positioning

Previous studies have established the value of WBS for structuring project scope and EVM for measuring cost and schedule performance. Other studies have also demonstrated the application of these approaches in construction project control. However, previous studies have generally examined these approaches as formal project management techniques, while less attention has been given to the use of project management software as an integrated monitoring environment for small-scale construction projects, particularly when information on task completion, cost utilization, work hours, resources, and critical activities is generated from the same project model.

This study addresses this gap by examining the practical use of Microsoft Project and WBS to organise and monitor multiple dimensions of project performance in a small-scale construction project. The study does not propose a new EVM model or optimization algorithm. Instead, it examines how digitally structured project information can support the identification of work packages requiring managerial attention. In addition, the study highlights the importance of baseline readiness as a prerequisite for rigorous EVM implementation. The absence of a validated baseline in the analyzed project provides an important methodological observation: digital project management software can organize and report project information, but reliable performance measurement still depends on the completeness and validity of the underlying project data.

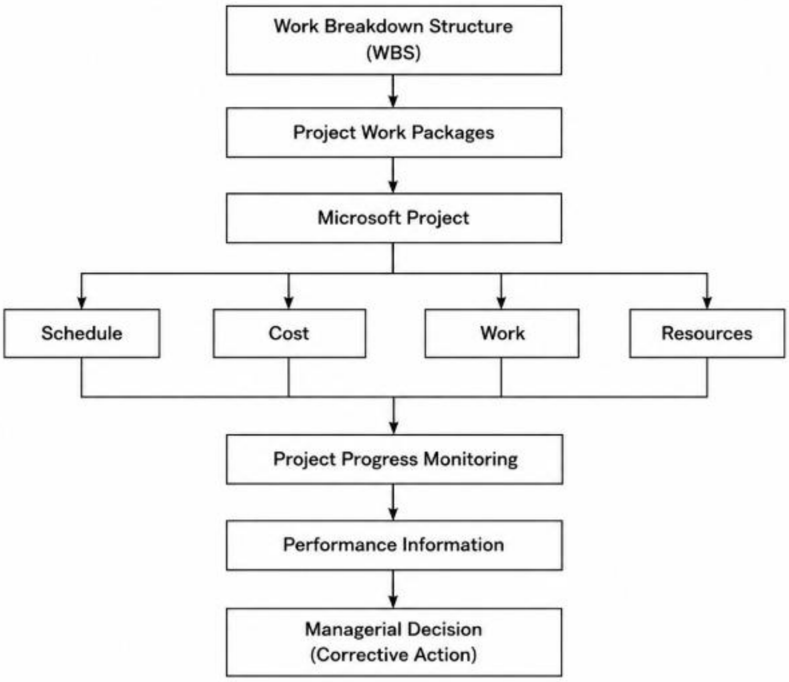


Figure 2.1 Conceptual Framework of Digital Project Performance Monitoring Using Microsoft Project

The conceptual framework illustrates the relationship between the WBS, Microsoft Project, and project performance monitoring. The WBS provides the structure for organizing project work packages, while Microsoft Project integrates schedule, cost, work, and resource information. The resulting project information is used to monitor project progress and identify work packages that require managerial attention. This framework forms the basis for analyzing the project data available in the present study. Standard EVM is not applied as the primary measurement approach because a validated project baseline and time-phased performance data were not available for the project.

3. Research Methodology

3.1 Research Design

This study adopts a descriptive quantitative case study approach to examine project scheduling and performance monitoring using Microsoft Project. The analysis is conducted on a small-scale single-story construction project covering activities from site preparation to final finishing. The project was modeled in Microsoft Project by organizing construction activities into a hierarchical Work Breakdown Structure (WBS), defining activity durations and predecessor relationships, assigning labor resources, recording project costs, and updating activity progress.

The project was scheduled from October 1, 2025, to December 29, 2025. The project model contains 11 major work groups and four categories of human resources: Foreman, Master

Craftsman, Mason, and Laborer. The available project records include activity schedules, WBS codes, predecessor relationships, resource assignments, costs, work hours, and progress percentages.

The analysis focuses on the project information that can be directly obtained from the available Microsoft Project records. These include task completion, work-hour utilization, cost utilization, remaining cost, resource allocation, and schedule relationships. Because a formal project baseline was not established, standard EVM indicators are not used as the primary quantitative measures.

3.2 Data Sources

The project was initially configured in Microsoft Project using a start date of October 1, 2025. The project used the Standard Calendar with five working days per week, from Monday to Friday. Working hours were set at eight hours per day, from 08:00 to 16:00, with a one-hour break. Holidays and special non-working days were incorporated into the project calendar when applicable.

Project activities were entered through the Gantt Chart view using Summary Tasks and Sub-tasks. Summary Tasks represent the major work groups, while Sub-tasks represent detailed construction activities. WBS codes were also assigned to individual tasks to provide unique identification for project activities.

The project configuration and data parameters are summarized in Table 3.1.

Table 3.1. Project Configuration and Data Sources

Parameter	Description
Project type	Single-story construction project
Project start	October 1, 2025
Planned completion	December 29, 2025
Working calendar	Standard Calendar
Working days	Monday–Friday
Working hours	08:00–16:00
Break	1 hour
WBS structure	Summary Task and Sub-task
Major work groups	11
Human resource categories	4
Main project data	Activities, duration, predecessors, resources, cost, work, progress
Progress tracking	% Complete, actual work, remaining work
Software	Microsoft Project
Baseline status	Not established; baseline cost = Rp0

Source: Processed Data (2026)

The project comprises 11 major work groups: Preparation, Foundation, Concrete Pouring, Wall, Floor, Ceiling, Door and Frame, Roofing, Electrical, Plumbing, and Finishing Work.

3.3 Work Breakdown Structure

The project WBS is organized hierarchically using Summary Tasks and Sub-tasks in Microsoft Project. The Summary Tasks represent the 11 major work groups, while the Sub-tasks provide more detailed construction activities. The hierarchical structure enables progress recorded at the activity level to be aggregated and displayed at the corresponding Summary Task level. Each task is also assigned a WBS code as an identifier.

The 11 major work packages are presented in Table 3.2.

Table 3.2. Major Work Packages

No.	Major Work Packages
1.	Preparation Work
2.	Foundation Work
3.	Concrete Pouring Work
4.	Wall Work
5.	Floor Work
6.	Ceiling Work
7.	Door and Frame Work
8.	Roofing Work
9.	Electrical Work
10.	Plumbing Work
11.	Finishing Work

Source: Processed Data (2026)

The WBS is therefore represented by three hierarchical levels: the overall construction project, the major work groups, and the detailed sub-tasks. This structure provides the basis for organizing schedule, cost, work, resource, and progress information at the work-package level.

3.4 Activity Scheduling

Activity duration was determined based on the estimated time required to complete each construction activity. Activity duration was estimated based on work volume, the number of allocated workers, average labor productivity, and work complexity. Duration was entered in working days in the Microsoft Project Gantt Chart.

Activity duration was estimated based on work volume, daily productivity, and the number of workers assigned to each activity. The following relationship was used:

$$Duration = \frac{Work\ Volume}{Daily\ Productivity \times Number\ of\ Workers}$$

The estimated duration was determined according to the characteristics of each construction activity and was subsequently entered into Microsoft Project in working days. Activities with different work volumes and resource requirements consequently received different durations.

Predecessor relationships were then assigned to establish the logical sequence among activities. Microsoft Project used these relationships together with the defined calendar and activity durations to generate the project schedule.

The project schedule provides planned start and finish dates for each major work group. For example, Preparation Work was scheduled from October 1–7, Foundation Work from October 8–30, and Concrete Work from October 31–November 19, followed by the subsequent work groups. This information is important because it allows the schedule to be examined at the work-package level rather than relying only on the overall project completion percentage.

3.5 Progress Tracking

Project progress was monitored through Microsoft Project by updating the completion status of individual activities. The progress records included % Complete, actual work hours, remaining work, and actual start and finish information.

For the available project data, two completion indicators are distinguished:
Task completion, represented by the overall % Complete reported by Microsoft Project; and Work completion, represented by actual work relative to planned work.

These two indicators are therefore treated separately because they represent different aspects of project progress.

3.6 Performance Indicators

Based on the available project data, the analysis uses task completion, work completion, cost utilisation, resource utilisation, and schedule status as the main performance indicators. Task completion represents the percentage of activities reported as completed in Microsoft Project, while work completion is assessed from the relationship between actual and planned work hours.

$$Work\ Completion = \frac{Actual\ Work}{Planned\ Work} \times 100\%$$

Cost utilization is examined using the available total cost, actual cost, and remaining cost recorded in Microsoft Project. Resource information is examined based on the four labor categories assigned to project activities. Schedule status is examined through activity start and finish dates, predecessor relationships, and critical-path information generated by Microsoft Project. These indicators are analysed together at the work-package level to identify areas requiring managerial attention.

3.7 Data Analysis

The analysis is performed at the major work-group level. The 11 work groups are compared based on completion percentage, total cost, actual cost, remaining cost, work hours, and schedule information. Particular attention is given to work groups with lower completion percentages, substantial remaining work, or relevant schedule dependencies.

Schedule information is also examined to identify critical activities. Critical activities were identified using the Critical Path Method (CPM) based on activities with no available float

3.8 EVM Applicability

Earned Value Management (EVM) is considered in this study as a framework for project performance measurement. Standard EVM requires a project baseline from which Planned Value (PV), Earned Value (EV), and Actual Cost (AC) can be established at defined status dates. However, a formal project baseline was not established. The project record showed a baseline cost of Rp0 because no formal baseline had been established. Consequently, the Cost Overruns output reflects recorded actual costs rather than baseline-referenced cost variance.

Therefore, the reported Cost Variance (CV) and Schedule Variance (SV) values are not treated as valid standard EVM results. A baseline value of zero does not provide a meaningful reference for calculating EVM-based cost or schedule deviations. Consequently, standard EVM indicators such as CV, SV, CPI, and SPI are not used as the primary quantitative results of this study. Instead, the analysis focuses on project performance information directly supported by the available Microsoft Project records, including task completion, work-hour utilisation, cost utilisation, resource allocation, schedule relationships, and critical activities., and critical activities.

4. Result And Discussion

4.1 Project Structure and Schedule

The construction project was organized into 11 major work packages using a hierarchical Work Breakdown Structure (WBS). The project schedule covered the period from October 1, 2025, to December 29, 2025. Each work package was divided into detailed activities and assigned a planned duration and predecessor relationship in Microsoft Project. This structure provided the basis for examining project progress at the work-package level.

Table 4.1 Planned Schedule of Major Work Packages

No.	Work Package	Planned Period
1.	Preparation Work	October 1–7, 2025
2.	Foundation Work	October 8–30, 2025
3.	Concrete Pouring Work	October 31–November 19, 2025
4.	Wall Work	November 20–December 3, 2025
5.	Floor Work	December 4–10, 2025
6.	Ceiling Work	December 11–15, 2025
7.	Door and Frame Work	December 16–18, 2025
8.	Roofing Work	December 19–22, 2025
9.	Electrical Work	December 23–25, 2025
10.	Plumbing Work	December 26–27, 2025
11.	Finishing Work	December 28–29, 2025

Source: Authors' analysis based on project data (2026)

The planned schedule shows a sequential progression of the major construction activities, with predecessor relationships defining the logical dependencies between work packages. This structure also provides a reference for comparing planned activities with their subsequent completion status and identifying work packages that may require further attention during project execution.

4.2 Project Progress

Project progress was assessed using two complementary indicators: task completion and work-hour completion. Task completion reflects the percentage of activities recorded as completed in Microsoft Project, whereas work-hour completion reflects the proportion of actual work performed relative to the planned work. The distinction between these indicators is important because they describe different dimensions of project progress.

The Project Overview indicates an overall task completion of 79%. At the work-package level, five work groups had reached 100% completion, while several other work groups remained partially completed. Electrical Work recorded the lowest completion at 29%, followed by Ceiling Work at 54% and Finishing Work at 62%. These results show that project progress varied across the work packages.

Table 4.2 Task Completion by Major Work Package

No.	Work Package	Completion
1.	Preparation Work	100%
2.	Foundation Work	100%
3.	Concrete Pouring Work	100%
4.	Wall Work	100%
5.	Floor Work	100%
6.	Ceiling Work	54%
7.	Door and Frame Work	100%
8.	Roofing Work	100%
9.	Electrical Work	29%
10.	Plumbing Work	100%
11.	Finishing Work	62%

Source: Authors' analysis based on project data (2026)

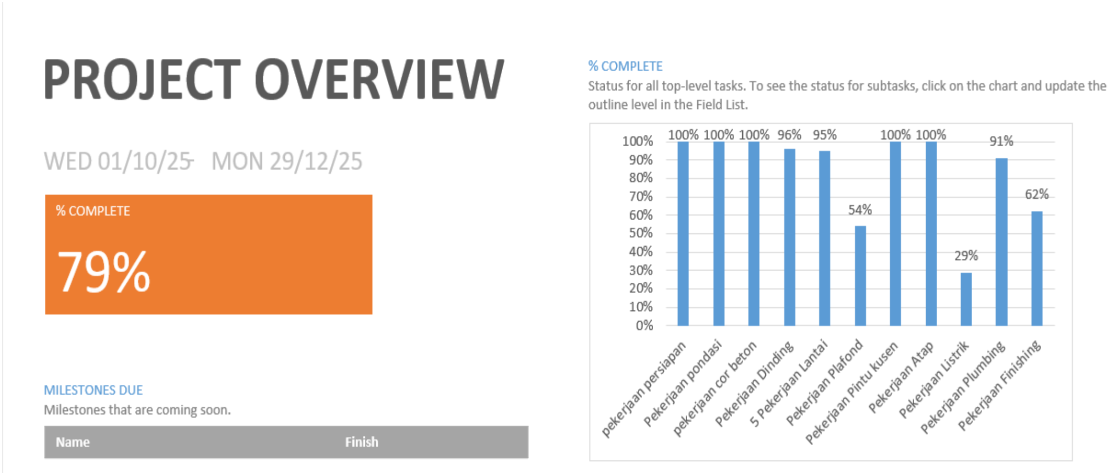


Figure 4.1 Project Overview of the Construction Project

The Project Overview provides a consolidated view of project completion and the status of individual work packages. The 79% overall completion reflects the aggregated task completion recorded in Microsoft Project, while the differences among work packages indicate that project progress was not evenly distributed across the construction activities. The project records also indicate 3,681.66 planned work hours and 3,434.63 actual work hours. The relationship between these values gives approximately 93% work completion when measured from the work-hour perspective. This value should not be interpreted as physical construction progress because work-hour utilization and physical task completion represent different measures of project status.

The difference between the 79% task completion and approximately 93% work-hour completion suggests that project progress cannot be represented adequately by a single indicator. The higher work-hour completion indicates that a substantial proportion of the planned labor effort had already been consumed, while several work packages still had incomplete tasks. Therefore, examining both task completion and work-hour utilization provides a more informative basis for identifying work packages that require further managerial attention.

4.3 Cost Performance

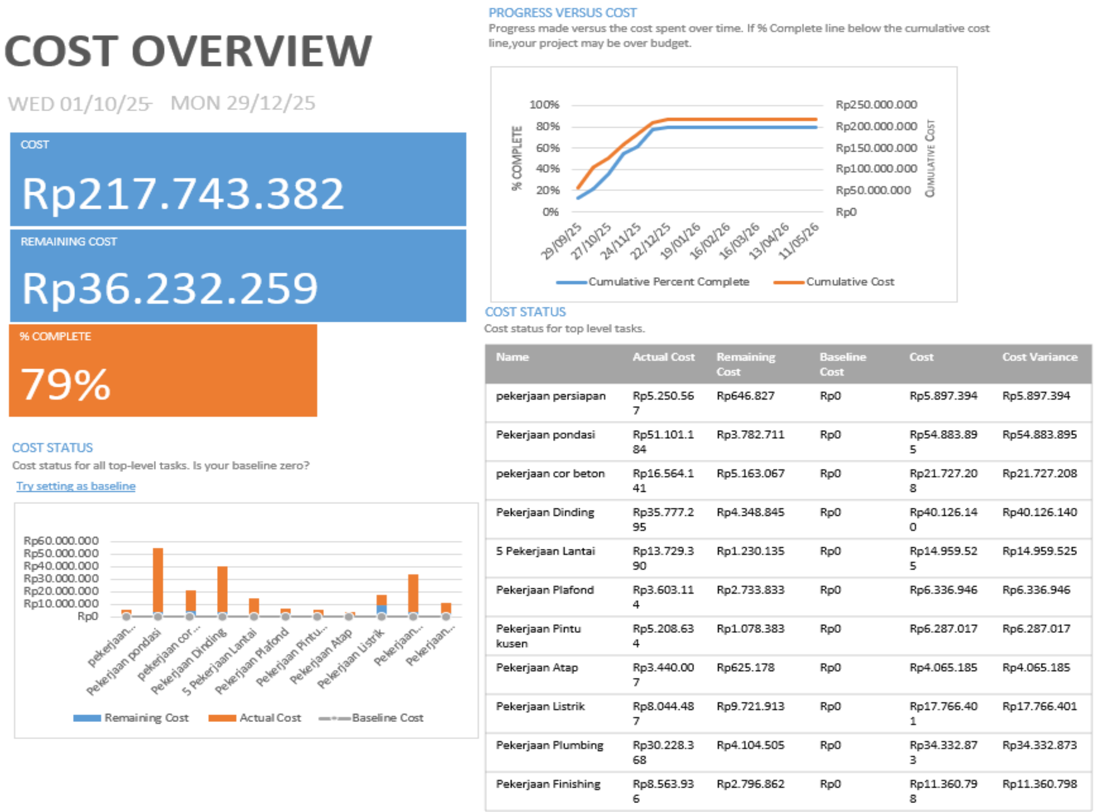
Project cost utilisation was examined using the total cost, actual cost, and remaining cost recorded in Microsoft Project. At the project level, the recorded total cost was IDR 253,975,641, consisting of IDR 217,743,382 in actual cost and IDR 36,232,259 in remaining cost. The actual cost represented approximately 85.7% of the recorded total cost, while approximately 14.3% remained as projected expenditure.

Table 4.3 Project-Level Cost Summary

Cost Component	Amount (IDR)	Percentage
Total Cost	253,975,641	100.0%
Actual Cost	217,743,382	85.7%
Remaining Cost	36,232,259	14.3%

Source: Authors' analysis based on project data (2026)

The recorded cost information provides an additional perspective for interpreting project progress across the major work packages. Work packages with higher resource requirements and greater work volumes contributed more substantially to the overall project cost. The cost information therefore provides an additional perspective on the observed differences in project progress across work packages.



Name	Actual Cost	Remaining Cost	Baseline Cost	Cost	Cost Variance
pekerjaan persiapan	Rp5.250.567	Rp646.827	Rp0	Rp5.897.394	Rp5.897.394
Pekerjaan pondasi	Rp51.101.184	Rp3.782.711	Rp0	Rp54.883.895	Rp54.883.895
pekerjaan cor beton	Rp16.564.141	Rp5.163.067	Rp0	Rp21.727.208	Rp21.727.208
Pekerjaan Dinding	Rp35.777.295	Rp4.348.845	Rp0	Rp40.126.140	Rp40.126.140
5 Pekerjaan Lantai	Rp13.729.390	Rp1.230.135	Rp0	Rp14.959.525	Rp14.959.525
Pekerjaan Plafond	Rp3.603.114	Rp2.733.833	Rp0	Rp6.336.946	Rp6.336.946
Pekerjaan Pintu kusen	Rp5.208.634	Rp1.078.383	Rp0	Rp6.287.017	Rp6.287.017
Pekerjaan Atap	Rp3.440.007	Rp625.178	Rp0	Rp4.065.185	Rp4.065.185
Pekerjaan Listrik	Rp8.044.487	Rp9.721.913	Rp0	Rp17.766.401	Rp17.766.401
Pekerjaan Plumbing	Rp30.228.368	Rp4.104.505	Rp0	Rp34.332.873	Rp34.332.873
Pekerjaan Finishing	Rp8.563.936	Rp2.796.862	Rp0	Rp11.360.798	Rp11.360.798

Figure 4.2 Cost Overview of the Construction Project

The Cost Overview provides a consolidated representation of project-level expenditure and remaining cost. The actual cost of IDR 217,743,382 together with the remaining cost of IDR 36,232,259 corresponds to the recorded total cost of IDR 253,975,641. This relationship provides a basis for examining cost utilization at the project level.

Cost information should, however, be interpreted separately from standard EVM cost variance. Since no formal project baseline was established, the recorded cost values cannot be used to derive a valid baseline-referenced Cost Variance (CV) or Cost Performance Index (CPI). The cost analysis in this study therefore focuses on actual and remaining expenditure rather than standard EVM variance measures.

4.4 Schedule Status

Schedule status was assessed by examining the planned sequence of activities, activity completion, predecessor relationships, and critical-path information established in Microsoft Project. The project schedule was planned from October 1 to December 29, 2025, with construction activities arranged sequentially according to their dependencies. The completion results indicate that schedule status was not uniform across the major work packages. Although five work packages had reached 100% completion, Ceiling Work, Electrical Work, and Finishing Work remained incomplete at 54%, 29%, and 62%, respectively. The lower completion levels in these work packages indicate that a portion of the planned activities remained unfinished within the project monitoring period.

Electrical Work represents the main area requiring attention because it recorded the lowest completion level among the 11 work packages. Ceiling Work and Finishing Work also require attention because their completion remained substantially below the completed work packages. These conditions are particularly relevant because activities in the later stages of construction may depend on the completion of preceding work and may subsequently affect the continuity of finishing activities. Microsoft Project also provides critical-path information through the Critical Path Method (CPM). Activities with no available float were identified as critical because delays in these activities may affect subsequent activities and the planned project completion. Critical-path information therefore provides an additional basis for identifying activities that require closer schedule monitoring.

The schedule findings indicate that project monitoring should not rely solely on the overall completion percentage. Examining individual work packages, activity dependencies, and critical-path information provides a more detailed view of schedule conditions and helps identify activities that may require corrective managerial action.

4.5 Resource Utilization

Resource utilization was examined based on the work hours and labor resources assigned to the project activities. Four labor categories were included in the project model: Foreman, Master Craftsman, Mason, and Laborer. The allocation of these resources was linked to individual construction activities within the Microsoft Project schedule, allowing labor requirements to be examined together with activity duration and project progress. The project recorded 3,681.66 planned work hours and 3,434.63 actual work hours, leaving 247.03 hours of remaining work in the project model.

Table 4.5 Planned and Actual Work Hours

Work Measure	**Hours**
Planned Work	3,681.66
Actual Work	3,434.63
Remaining Work	247.03
Actual Work / Planned Work	93.3%

Source: Authors' analysis based on project data (2026)

The work-hour distribution provides an additional perspective on project progress. Although the overall task completion was 79%, the utilization of planned work hours had reached approximately 93%. This difference indicates that labor effort was relatively high compared with the proportion of tasks recorded as completed. Such a condition may occur when substantial labor effort has been allocated to activities that remain incomplete and therefore should be considered when evaluating project efficiency. The resource information also provides a basis for examining the relationship between labor allocation and activity completion. Activities requiring different combinations of labor resources may have different work-hour requirements, and therefore resource utilization should be interpreted together with activity duration and completion status rather than as an isolated indicator.

The work-hour information is particularly relevant to the incomplete work packages identified in the project. Electrical Work, Ceiling Work, and Finishing Work recorded lower completion percentages than the completed work packages. Examining their associated work requirements and resource allocation can help identify where additional monitoring or resource adjustment may be needed during project execution.

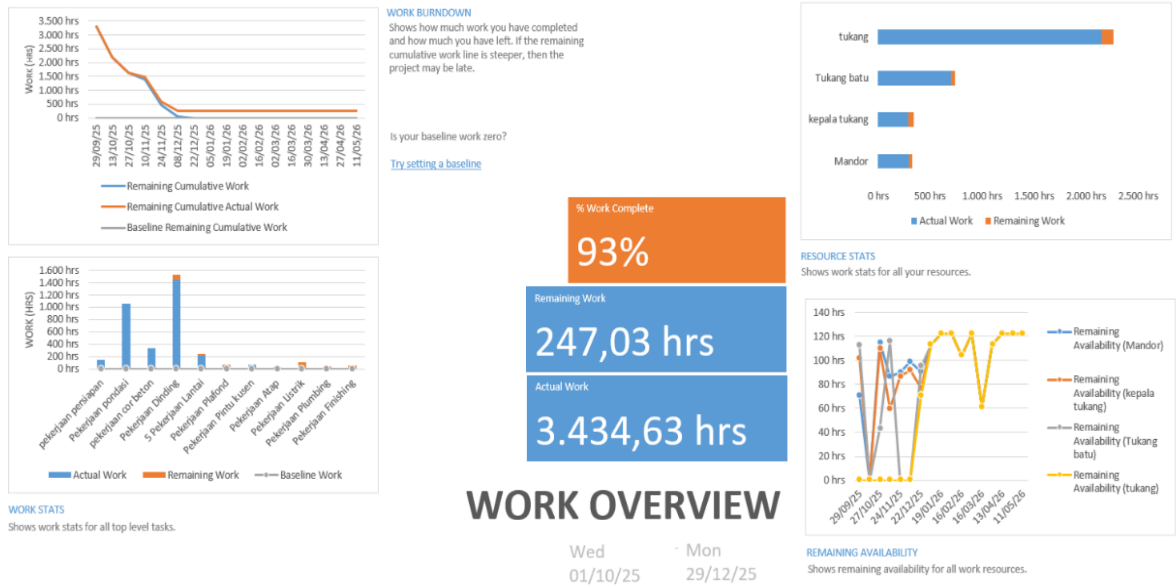


Figure 4.3 Work Overview of the Construction Project

4.6 Managerial Implications

The results indicate that project performance should be interpreted across several dimensions rather than through a single completion measure. The project recorded an overall task completion of 79%, while actual work reached approximately 93% of the planned work hours. At the same time, the distribution of completion across work packages was uneven, with Electrical Work, Ceiling Work, and Finishing Work recording substantially lower completion levels than the completed work packages. The difference between task completion and work-hour utilisation provides an additional perspective on project status. A relatively high proportion of planned work hours had been recorded as actual work while several activities remained incomplete. Electrical Work, Ceiling Work, and Finishing Work represent priority areas for closer monitoring because their completion levels remain below those of the completed work packages. Work-hour utilization should therefore be considered together with activity completion and remaining work.

The work-package analysis further indicates that Electrical Work requires the greatest attention because it recorded the lowest completion level at 29%. Ceiling Work and Finishing Work also remained incomplete, with completion levels of 54% and 62%, respectively. These work packages should be monitored in relation to their predecessor relationships, resource requirements, and remaining work so that potential effects on subsequent activities can be identified. From a managerial perspective, the integrated use of WBS and Microsoft Project provides a structured basis for prioritizing project monitoring. Rather than treating the project as a single unit, managers can focus on specific work packages that show lower completion, higher remaining work, or schedule dependency. This approach can support more targeted decisions concerning resource allocation, activity sequencing, and follow-up actions during project execution.

The results also highlight the importance of establishing a reliable project baseline before applying standard Earned Value Management. Although the project contains cost, work, schedule, and progress information, the absence of a formal baseline limits the interpretation of baseline-referenced EVM indicators. Consequently, the current analysis provides a practical monitoring framework based on directly available project information, while a validated baseline would be required for subsequent implementation of standard EVM measures such as PV, EV, CV, SV, CPI, and SPI. Overall, the findings demonstrate that digital project monitoring can provide a more detailed view of project conditions when schedule, cost, work, resources, and activity completion are examined together. The resulting information can assist project managers in identifying priority work packages and directing managerial attention toward activities that may influence project completion.

5. Conclusion

This study examined the use of Microsoft Project and a Work Breakdown Structure (WBS) to support the monitoring of a single-story shop house construction project. The project was structured into 11 major work packages, enabling the construction activities to be organized according to their scope, sequence, dependencies, resources, and completion status. The analysis showed that project progress was not evenly distributed across the work packages, with an overall task completion of 79%.

The analysis also identified differences between task completion and work-hour utilization. The project recorded 3,681.66 planned work hours and 3,434.63 actual work hours, indicating that approximately 93% of the planned work hours had been consumed. Electrical Work recorded the lowest task completion at 29%, followed by Ceiling Work at 54% and Finishing Work at 62%. These work packages therefore represent important areas for closer monitoring because incomplete activities at later stages may affect the continuity of subsequent project activities.

The findings demonstrate that the combination of WBS and Microsoft Project can provide a structured basis for monitoring construction activities at the work-package level. By integrating information on project progress, cost, schedule, work hours, and resource allocation, project managers can identify activities that require greater attention and support more targeted resource and scheduling decisions. However, the available project data did not include a validated time-phased baseline required for a full standard Earned Value Management implementation. Therefore, future studies should establish a formal baseline and incorporate Planned Value (PV), Earned Value (EV), Actual Cost (AC), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), and Schedule Performance Index (SPI) to enable a complete EVM-based evaluation.

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