*L*ecture Notes on Project Management Metrics and Formulas

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Introduction

In project management, performance metrics are crucial for assessing the progress and efficiency of a project. These metrics help project managers identify potential issues and take corrective actions to keep the project on track. The following sections provide a detailed explanation of key project management formulas, their descriptions, and their applications.

1 Key Metrics and Formulas

1. Planned Value (PV)

Planned Value (PV)

Formula:

$$PV = (PlannedWorkPercentage) \times (TotalBudgetoftheProject(BAC))$$

Example: If 40% of the work is planned and the total budget is $100,000, then: PV = 0.40 \times 100,000 = 40,000$

2. Earned Value (EV)

Earned Value (EV)

Formula:

$$EV = (CompletedWorkPercentage) \times (TotalBudgetoftheProject(BAC))$$

Example: If 50% of the work is completed and the total budget is $100,000, then: EV = 0.50 \times 100,000 = 50,000$

3. Actual Cost (AC)

Actual Cost (AC)

Formula:

$$AC = TotalCostIncurredfortheCompletedWork$$

Example: If the total cost incurred for the completed work is $45,000, then: AC = 45,000$

4. Budget at Completion (BAC)

Budget at Completion (BAC)

Formula:

$$BAC = TotalPlannedBudgetoftheProject$$

Example: If the total planned budget of the project is $100,000, then: BAC = 100,000$

5. Schedule Performance Index (SPI)

Schedule Performance Index (SPI)

Formula:

$$SPI = \frac{EV}{PV}$$

Example: If EV $= 50,000 and PV =$40,000, then:

$$SPI = \frac{50,000}{40,000} = 1.25$$

6. Cost Performance Index (CPI)

Cost Performance Index (CPI)

Formula:

$$CPI = \frac{EV}{AC}$$

Example: If EV $= 50,000 and AC =$45,000, then:

$$CPI = \frac{50,000}{45,000} \approx 1.11$$

7. Estimate to Complete (ETC)

Estimate to Complete (ETC)

Formula:

$$ETC = \frac{BAC - EV}{CPI}$$

Example: If BAC $= 100,000, EV =$50,000, and CPI $= 1.11$, then:

$$ETC = \frac{100,000 - 50,000}{1.11} \approx 45,045.05$$

8. Estimate at Completion (EAC)

Estimate at Completion (EAC)

Formula:

$$EAC = \frac{BAC}{CPI}$$

Example: If BAC $= 100,000 and CPI = 1.11, then : EAC = \frac{100,000}{1.11} \approx 90,090.09$

9. Variance at Completion (VAC)

Variance at Completion (VAC)

Formula:

$$VAC = BAC - EAC$$

Example: If BAC $= 100,000 and EAC =$90,090.09, then:

$$VAC = 100,000 - 90,090.09 \approx 9,909.91$$

10. Cost Variance (CV)

Cost Variance (CV)

Formula:

$$CV = EV - AC$$

Example: If EV $= 50,000 and AC =$45,000, then:

$$CV = 50,000 - 45,000 = 5,000$$

11. Schedule Variance (SV)

Schedule Variance (SV)

Formula:

$$SV = EV - PV$$

Example: If EV $= 50,000 and PV =$40,000, then:

$$SV = 50,000 - 40,000 = 10,000$$

2 Applications in Project Management

1. Monitoring Progress

- These metrics help in identifying whether the project is on schedule and within budget. - SPI and CPI are key indicators for schedule and cost performance.

2. Forecasting

- ETC and EAC assist in predicting the remaining costs and the total cost of the project, enabling better financial planning.

3. Decision Making

- VAC, CV, and SV provide insights into potential issues and areas that require corrective actions.

4. Risk Management

- By comparing planned and actual performance, these metrics help in identifying risks early.

Conclusion

Project management metrics are essential tools for ensuring project success. By understanding and applying these formulas, project managers can effectively monitor, control, and forecast project performance, ensuring timely and cost-effective delivery.