Project Execution, Monitoring and Control

Topics of the lecture as follows:

- PDCA cycle
- Project execution processes by PMBOK
- Project monitoring and controlling processes by PMBOK
- Project vital signs

PDCA Cycle

Management processes (concerning also projects) are based on PDCA cycle model:

- PLAN: design or revise a process to achieve the desired results
- DO: implement the plan and measure its performance
- CHECK: analyze the metrics and review the results
- ACT: decide what changes are needed to improve the process

This cycle is shown on the next figure:

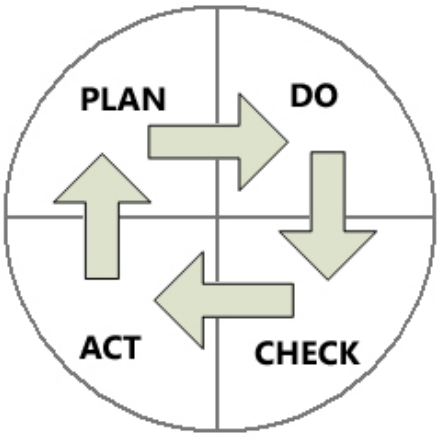

Figure 1.PDCA Cycle

In the context of information system development it means:

- planning is design or revise a information system development process to achieve the desired information system
- doing is developing information system and measuring its performance
- checking is analyzing of metrics and reviewing development results
- acting is deciding what changes are needed to improve development process

Pictorially expressed on the next figure:

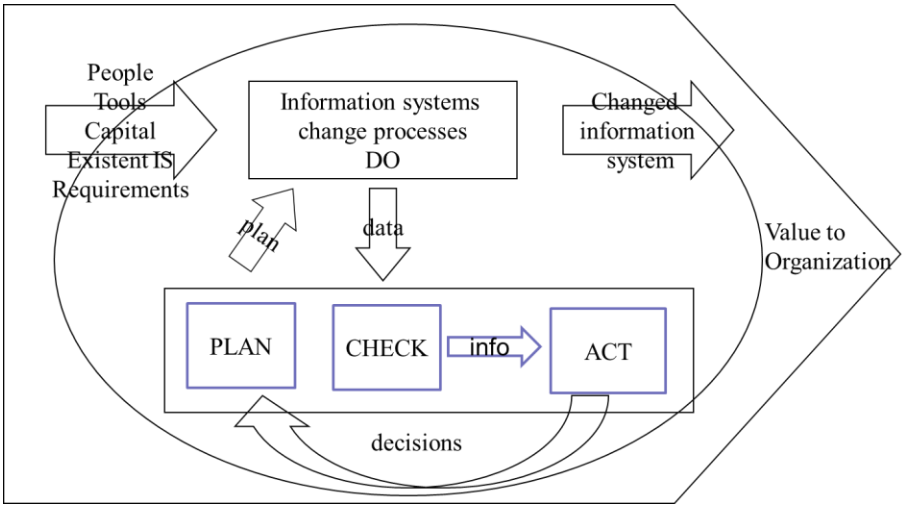

Figure 2. PDCA Cycle in the Context of Information System Development

Project Execution, Monitoring and Control

PDCA cycle processes are presented also in PMBOK. To planning are corresponding project planning processes (planning process group); to doing are corresponding executing processes (executing processes group); to checking and acting are corresponding monitoring and controlling processes (monitoring and controlling process group). Relationships between these process groups through corresponding inputs and outputs are presented on the next figure. Semantics of abbreviations used on the figure are as follows:

PM Plan – project management plan

OPA – organizational process assets

EEF - enterprise environmental factors

WPI – work performance information

CR – change request

QCM – quality control measurements

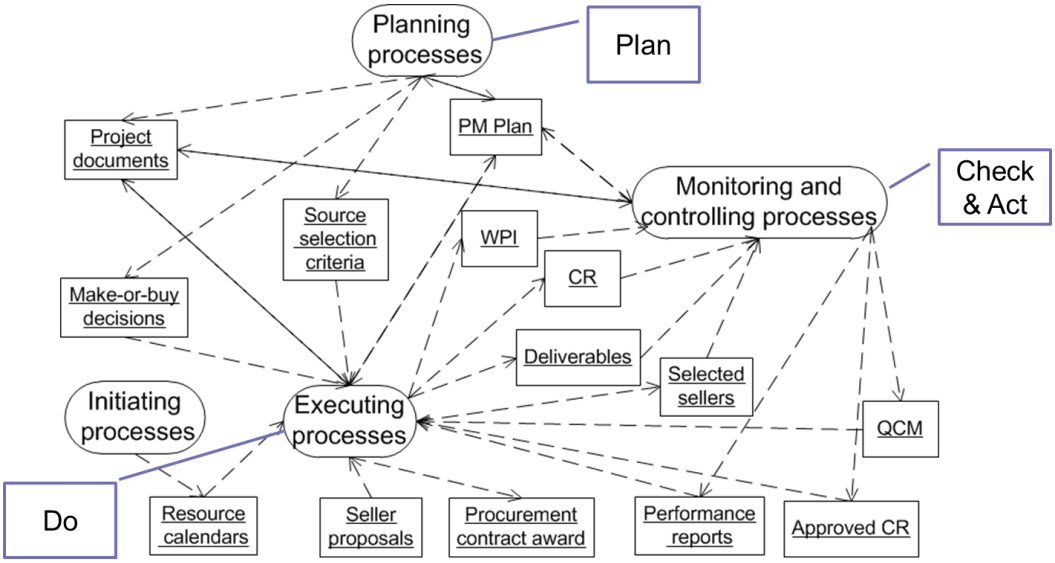

Figure 3. Relationships between Project Process Groups

Project execution processes holds in accordance process named “direct and manage project execution”. Monitoring of project performance holds in accordance process named “monitor and control project work”. Changes regarding all manageable aspects in project holds in accordance process named “perform integrated change control”. All these mentioned processes are subject of this lecture.

Project Execution Processes

The Executing Process Group consists of those processes performed to complete the work defined in the project management plan to satisfy the project specifications. This Process Group involves coordinating people and resources, as well as integrating and performing the activities of the project in accordance with the project management plan. During project execution, results may require planning updates and re-baselining. This can include changes to expected activity durations, changes in resource productivity and availability, and unanticipated risks. Such variances may affect the project management plan or project documents and may require detailed analysis and development of appropriate project management responses. The results of the analysis can trigger change requests that, if approved, may modify the project management plan or other project documents and possibly require establishing new baselines

All execution processes in Project Execution Process Group are presented on the next figure:

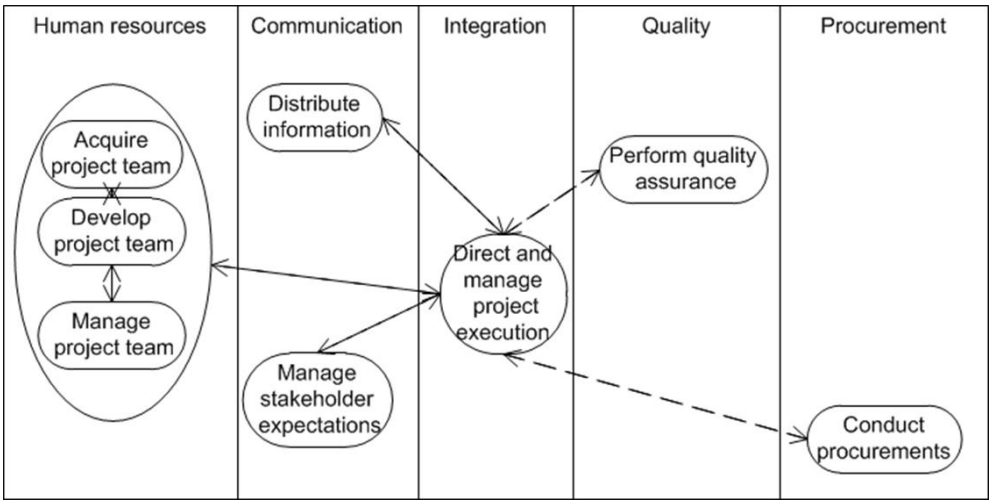

Figure 4. Project Execution Processes

In the centre of these processes is directing and managing project execution. Its responsibility is to ensure that planned work gets done.

Direct and Manage Project Execution

Direct and Manage Project Execution is the process of performing the work defined in the project management plan to achieve the project's objectives. The project manager, along with the project management team, directs the performance of the planned project activities, and manages the various technical and organizational interfaces that exist within the project. This process is directly affected by the project application area. Deliverables are produced as outputs from processes performed to accomplish the project work planned and scheduled in the project management plan. Work performance information, about the completion status of the deliverables and what has been accomplished, is collected as part of project execution and is fed into the performance reporting process. The work performance information will also be used as an input to the Monitoring and Controlling Process Group.

Process activities include, but are not limited to:

- perform activities to accomplish project requirements;
- create project deliverables;
- staff, train, and manage the team members assigned to the project;
- obtain, manage, and use resources including materials, tools, equipment, and facilities;
- implement the planned methods and standards;
- establish and manage project communication channels, both external and internal to the project team;
- generate project data, such as cost, schedule, technical and quality progress, and status to facilitate forecasting;

- issue change requests and adapt approved changes into the project's scope, plans, and environment;
- manage risks and implement risk response activities;
- manage sellers and suppliers; and
- collect and document lessons learned, and implement approved process improvement activities

Direct and Manage Project Execution also requires implementation of approved changes covering:

- **Corrective action.** Documented direction for executing the project work to bring expected future performance of the project work in line with the project management plan.
- **Preventive action.** A documented direction to perform an activity that can reduce the probability of negative consequences associated with project risks.
- **Defect repair.** The formally documented identification of a defect in a project component with a recommendation to either repair the defect or completely replace the component.

Direct and manage project work process inputs and outputs are presented on the next figure:

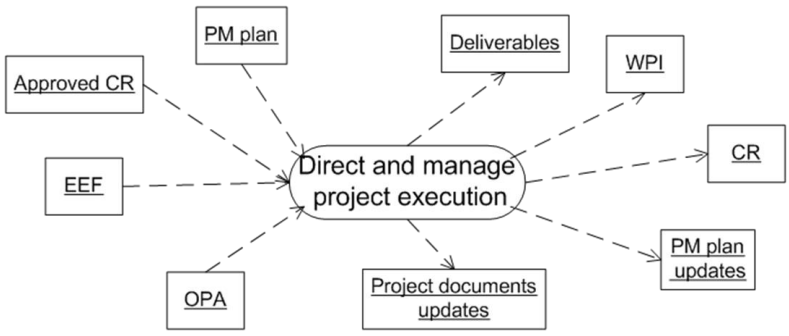

Figure 5. Project Execution Inputs and Outputs

Organizational Process Assets (OPA)

- standardized guidelines and work instructions;
- communication requirements defining allowed communication media, record retention, and security requirements;
- issue and defect management procedures defining issue and defect controls, issue and defect identification and resolution, and action item tracking;
- process measurement database used to collect and make available measurement data on processes and products;

- project files from prior projects (e.g., scope, cost, schedule, performance measurement baselines, project calendars, project schedule, network diagrams, risk registers, planned response actions, and defined risk impact);
- issue and defect management database containing historical issue and defect status, control
- information, issue and defect resolution, and action item results

Work Performance Information (WIP)

Gathering and analysis of work performance information is essential to the project management plan and should be considered a priority. Work performance information contributes to the efficient use of resources, identifies potential trouble spots and problems, and serves as an effective project management tool. It is useful as input data for quality control measures and programs. WIP can include following data items:

- status information on schedule progress
- whether deliverables have been completed, or not
- start and finish status of schedule activities
- quality standards expectation results
- authorized costs vs. costs incurred to date
- estimated completion time for scheduled activities in progress
- percentage of physical completion of in-progress schedule activities
- experience based knowledge acquired, documented, and posted to knowledge base
- details of resource utilization

Monitoring and Controlling Processes

The Monitoring and Controlling Process Group consists of those processes required to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes. The key benefit of this Process Group is that project performance is observed and measured regularly and consistently to identify variances from the project management plan. The Monitoring and Controlling Process Group also includes:

- controlling changes and recommending preventive action in anticipation of possible problems,
- monitoring the ongoing project activities against the project management plan and the project performance baseline, and

- influencing the factors that could circumvent integrated change control so only approved changes are implemented

This continuous monitoring provides the project team insight into the health of the project and identifies any areas requiring additional attention. The Monitoring and Controlling Process Group not only monitors and controls the work being done within a Process Group, but also monitors and controls the entire project effort. In multi-phase projects, the Monitoring and Controlling Process Group coordinates project phases in order to implement corrective or preventive actions to bring the project into compliance with the project management plan. This review can result in recommended and approved updates to the project management plan. For example, a missed activity finish date may require adjustments to the current staffing plan, reliance on overtime, or trade-offs between budget and schedule objectives.

Project monitor and control processes are presented on the next figure:

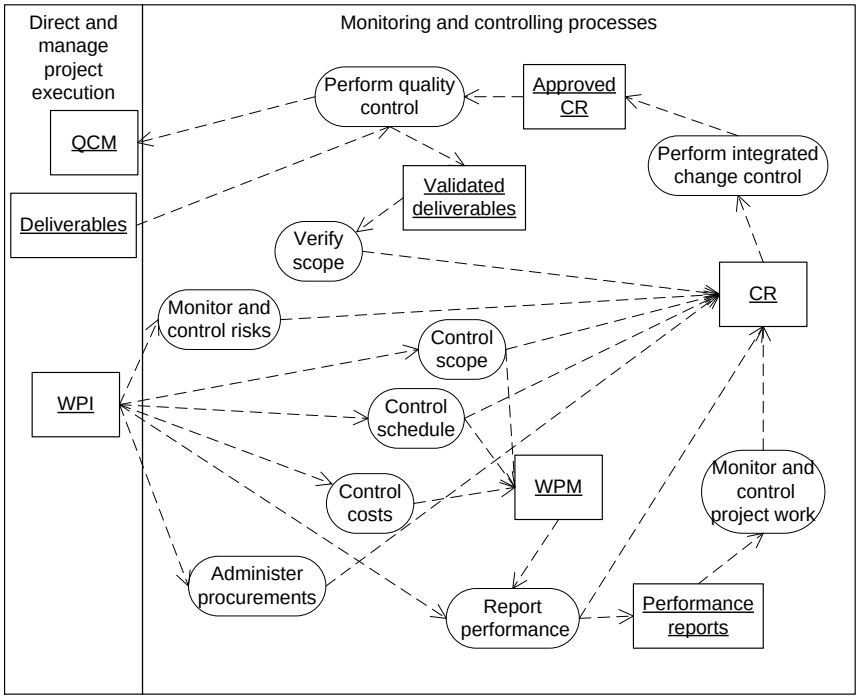

Figure 6. Project Monitor and Control Processes

In the centre of project monitor and control are 2 processes: *monitor and control project work* and *perform integrated change control*. These processes are mutually related through change request life cycle management. Following monitor and control processes are described more detailed:

- Monitor and Control Project Work
- Verify Scope
- Scope Control

- Schedule Control
- Cost Control
- Report Performance

Other monitor and control processes (performing quality and integrated change control) are discussed in separate lectures.

Monitor and Control Project Work

Monitor and Control Project Work is the process of tracking, reviewing, and regulating the progress to meet the performance objectives defined in the project management plan. Monitoring includes status reporting, progress measurement, and forecasting. Performance reports provide information on the project's performance with regard to scope, schedule, cost, resources, quality, and risk, which can be used as inputs to other processes. Monitor and Control Project Work is the process of tracking, reviewing, and regulating the progress to meet the performance objectives defined in the project management plan. Monitoring is an aspect of project management performed throughout the project.

Monitoring includes collecting, measuring, and distributing performance information, and assessing measurements and trends to effect process improvements. Continuous monitoring gives the project management team insight into the health of the project, and identifies any areas that may require special attention. Control includes determining corrective or preventive actions or replanning and following up on action plans to determine if the actions taken resolved the performance issue.

The Monitor and Control Project Work process is concerned with:

- Comparing actual project performance against the project management plan;
- Assessing performance to determine whether any corrective or preventive actions are indicated, and then recommending those actions as necessary;
- Identifying new risks and analyzing, tracking, and monitoring existing project risks to make sure the risks are identified, their status is reported, and that appropriate risk response plans are being executed;
- Maintaining an accurate, timely information base concerning the project's product(s) and their associated documentation through project completion;
- Providing information to support status reporting, progress measurement, and forecasting;
- Providing forecasts to update current cost and current schedule information; and
- Monitoring implementation of approved changes as they occur.

Inputs and outputs of this process are presented on the following figure:

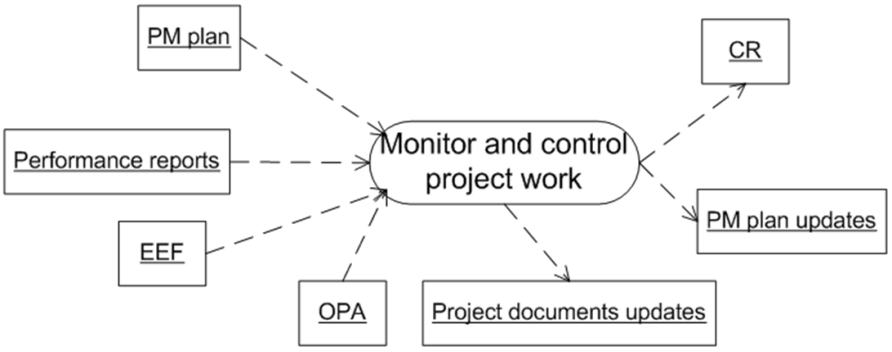

Figure 7. Project Work Monitor and Control Inputs and Outputs

Relationships with other processes are shown on the next figure:

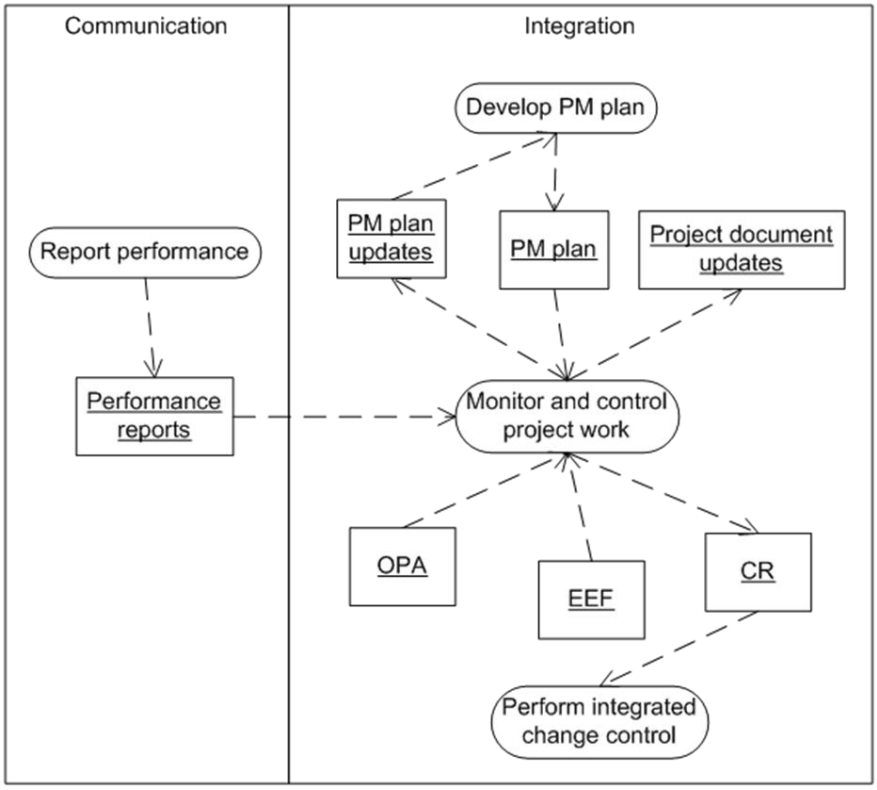

Figure 8. Monitor and Control of Project Work Process Relationships to Other Processes

This subject will be covered more detailed in a separate lecture.

Performance Reports

Reports should be prepared by the project team detailing activities, accomplishments, milestones, identified issues, and problems. Performance reports can be used to report the key information including, but not limited to:

- current status
- significant accomplishments for the period

- scheduled activities
- forecasts
- issues

Organization Process Assets

Available organizational process assets for monitoring and control of project work can be as follows:

- organization communication requirements,
- financial controls procedures (e.g., time reporting, accounting codes, expenditure and disbursement reviews, and standard contract provisions)
- issue and defect management procedures
- risk control procedures including risk categories, probability definition and impact, and probability and impact matrix,
- process measurement database used to make available measurement data on processes and products
- lessons learned database

Verifying Scope

Verifying scope is the process of formalizing acceptance of the completed project deliverables. It includes reviewing deliverables with the customer or sponsor to ensure that they are completed satisfactorily and obtaining formal acceptance of deliverables by the customer or sponsor. Scope verification differs from quality control in that scope verification is primarily concerned with acceptance of the deliverables, while quality control is primarily concerned with correctness of the deliverables and meeting the quality requirements specified for the deliverables

Scope verification process inputs and outputs are presented on the following figure:

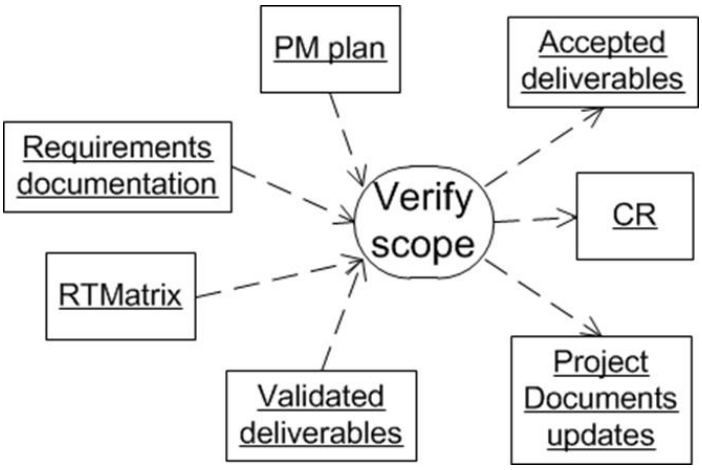

Figure 9. Scope Verification Inputs and Outputs

Main inputs to the process are validated deliverables that have been completed and checked by quality control process. Main outputs from scope verification are in positiive case by the customer or sponsor accepted deliverables; in negative case not accepted delievrables with documented reasons for non-acceptance. Those deliverables require a change request for defekt repair.

Control Scope

Control Scope is the process of monitoring the status of the project and product scope and managing hanges to the scope baseline. Controlling the project scope ensures all requested changes and recommended corrective or preventive actions are processed through the Perform Integrated Change Control process. Project scope control is also used to manage the actual changes when they occur and is integrated with the other control processes

Control scope process inputs and outputs are presented on the following figure:

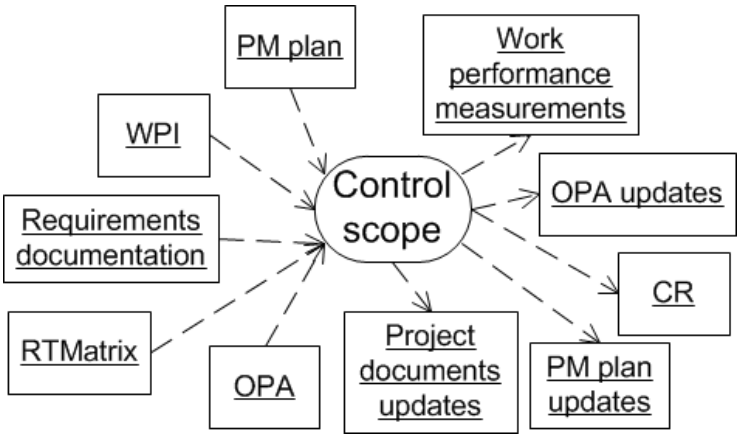

Figure 10. Scope Control Inputs and Outputs

WPI (Work Performance Information) is information about project progress, such as which deliverables have started, their progress and which deliverables have finished.

WPM (Work Performance Measurements) can include planned vs. actual technical performance or other scope performance measurements. This information is documented and communicated to stakeholders.

CR (Change Request) – to the scope baseline or ohter components of the project management plan. Change requests can include preventive or corrective actions or defect repairs. Change requests are processed for review and disposition according to the Perform Integrated Change Control process.

Control scope tool and technique is variance analysis. Project performance measurements are used to assess the magnitude of variation from the original scope baseline. Important aspects of project scope control include determining the cause and degree of variance relative to the scope baseline and deciding whether corrective or preventive action is required

Control Schedule

Control Schedule is the process of monitoring the status of the project to update project progress and manage changes to the schedule baseline. Schedule control is concerned with:

- Determining the current status of the project schedule,
- Influencing the factors that create schedule changes,
- Determining that the project schedule has changed, and
- Managing the actual changes as they occur.

Control schedule process inputs and outputs are presented on the following figure:

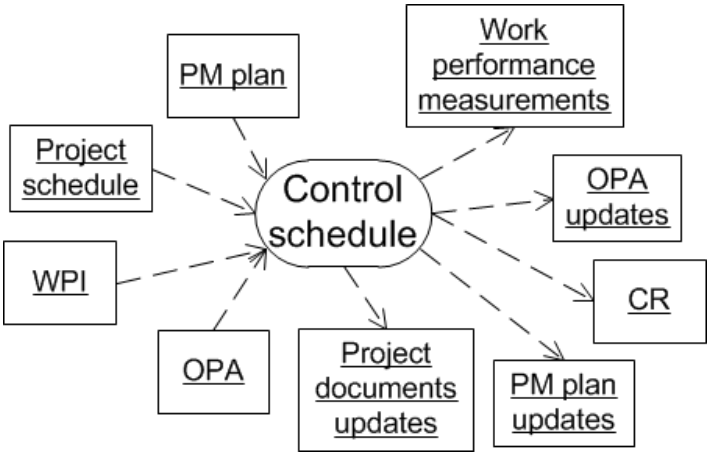

Figure 11. Control Schedule Inputs and Outputs

WPI is Information about project progress, such as which activities have started, their progress, and which activities have fi nished. WPM are the calculated SV and SPI values for WBS components, in particular the work packages and control accounts, are documented and communicated to stakeholders.

Control schedule tools and techniques are:

- Performance reviews what measure, compare, and analyze schedule performance such as actual start and finish dates, percent complete, and remaining duration for work in progress.
- Variance analysis where Schedule performance measurements (SV, SPI) are used to assess the magnitude of variation to the original schedule baseline. The total float variance is also an essential planning component to evaluate project time performance. Important aspects of project schedule control include determining the cause and degree of variance relative to the schedule baseline and deciding whether corrective or preventive action is required.
- Adjusting Leads and Lags is used to find ways to bring project activities that are behind into alignment with plan.

- Schedule Compressing techniques to find ways to bring project activities that are behind into alignment with the plan

Control Cost

Control Costs is the process of monitoring the status of the project to update the project budget and managing changes to the cost baseline. Updating the budget involves recording actual costs spent to date. Any increase to the authorized budget can only be approved through the Perform Integrated Change Control process. Monitoring the expenditure of funds without regard to the value of work being accomplished for such expenditures has little value to the project other than to allow the project team to stay within the authorized funding. Thus much of the effort of cost control involves analyzing the relationship between the consumption of project funds to the physical work being accomplished for such expenditures. The key to effective cost control is the management of the approved cost performance baseline and the changes to that baseline.

Project cost control includes:

- Influencing the factors that create changes to the authorized cost baseline,
- Ensuring that all change requests are acted on in a timely manner,
- Managing the actual changes when and as they occur,
- Ensuring that cost expenditures do not exceed the authorized funding, by period and in total for the project,
- Monitoring cost performance to isolate and understand variances from the approved cost baseline,
- Monitoring work performance against funds expended,
- Preventing unapproved changes from being included in the reported cost or resource usage,
- Informing appropriate stakeholders of all approved changes and associated cost, and
- Acting to bring expected cost overruns within acceptable limits.

Control schedule process inputs and outputs are presented on the following figure:

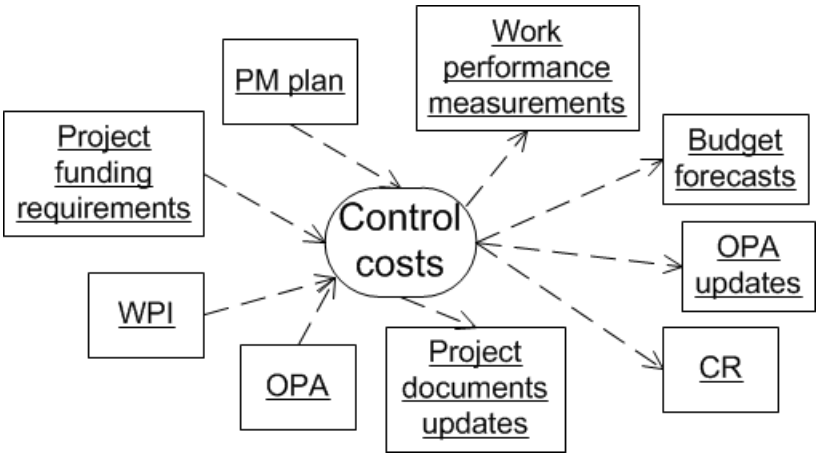

Figure 12. Control Costs Inputs and Outputs

Work performance information includes information about project progress, such as which deliverables have started, their progress and which deliverables have fi nished. Information also includes costs that have been authorized and incurred, and estimates for completing project work.

Work Performance Measurements are the calculated CV, SV, CPI, and SPI values for WBS components, in particular the work packages and control accounts. They are documented and communicated to stakeholders.

Control costs main method is earned value management (EVM) to measure performance. It integrates project scope, cost, and schedule measures to help the project management team assess and measure project performance and progress. It is a project management technique that requires the formation of an integrated baseline against which performance can be measured for the duration of the project. EVM develops and monitors three key dimensions for each work package and control account:

- Planned value (PV) is the authorized budget assigned to the work to be accomplished for an activity or work breakdown structure component. It includes the detailed authorized work, plus the budget for such authorized work, allocated by phase over the life of the project. The total planned value for the project is also known as Budget At Completion (BAC).
- Earned value (EV) is the value of work performed expressed in terms of the approved budget assigned to that work for an activity or work breakdown structure component. It is the authorized work that has been completed, plus the authorized budget for such completed work. Project managers monitor EV, both incrementally to determine current status and cumulatively to determine the long-term performance trends.
- Actual cost (AC) is the total cost actually incurred and recorded in accomplishing work performed for an activity or work breakdown structure component. It is the

total cost incurred in accomplishing the work that the EV measured. The AC has to correspond in definition to whatever was budgeted for in the PV and measured in the EV (e.g., direct hours only, direct costs only, or all costs including indirect costs).

Variances from the approved baseline will also be monitored:

- Schedule variance (SV) is a measure of schedule performance on a project. It is equal to the earned value (EV) minus the planned value (PV). The EVM schedule variance is a useful metric in that it can indicate a project falling behind its baseline schedule. The EVM schedule variance will ultimately equal zero when the project is completed because all of the planned values will have been earned. Equation: SV = EV – PV.
- Cost variance (CV) is a measure of cost performance on a project. It is equal to the earned value (EV) minus the actual costs (AC). The cost variance at the end of the project will be the difference between the budget at completion (BAC) and the actual amount spent. The EVM CV is particularly critical because it indicates the relationship of physical performance to the costs spent. Any negative EVM CV is often non-recoverable to the project. Equation: CV= EV – AC.

The SV and CV values can be converted to effi ciency indicators to refl ect the cost and Schedule performance of any project for comparison against all other projects or within a portfolio of projects. The variances and indices are useful for determining project status and providing a basis for estimating project cost and schedule outcome.

- The schedule performance index (SPI) is a measure of progress achieved compared to progress planned on a project. It is sometimes used in conjunction with the cost performance index (CPI) to forecast the final project completion estimates. An SPI value less than 1.0 indicates less work was completed than was planned. An SPI greater than 1.0 indicates that more work was completed than was planned. Since the SPI measures all project work, the performance on the critical path must also be analyzed to determine whether the project will finish ahead of or behind its planned finish date. The SPI is equal to the ratio of the EV to the PV. Equation: SPI = EV/PV.
- The cost performance index (CPI) is a measure of the value of work completed compared to the actual cost or progress made on the project. It is considered the most critical EVM metric and measures the cost efficiency for the work completed. A CPI value less than 1.0 indicates a cost overrun for work completed. A CPI value greater than 1.0 indicates a cost underrun of performance to date. The CPI is equal to the ratio of the EV to the AC. Equation: CPI = EV/AC.

Report Performance

Report Performance is the process of collecting and distributing performance information, including status reports, progress measurements, and forecasts. The performance reporting process involves the periodic collection and analysis of baseline versus actual data to understand and communicate the project progress and performance as well as to forecast the project results.

Report performance process inputs and outputs are presented on the following figure:

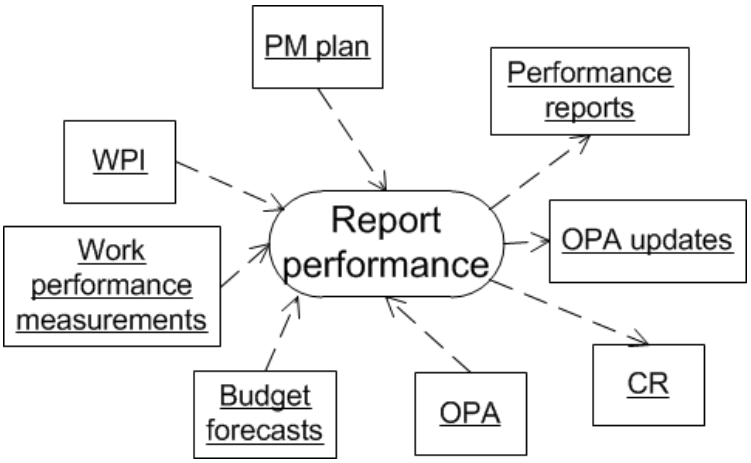

Figure 13. Report performance Inputs and Outputs

Performance reports are issued periodically and their format may range from a simple status report to more elaborate reports. A simple status report might show only performance information such as percent complete, or status dashboards for each area (e.g., scope, schedule, cost, and quality). More elaborate reports may include:

- Analysis of past performance,
- Current status of risks and issues,
- Work completed during the reporting period,
- Work to be completed during the next reporting period,
- Summary of changes approved in the period,
- Results of variance analysis,
- Forecasted project completion (including time and cost), and
- Other relevant information to be reviewed and discussed.

For summary purposes all executing, monitoring and controlling processes are presented in the following table:

Table 1.Executing & Monitoring & Controlling Processes over Aspects

Management aspect	Executing processes	Monitoring & controlling processes

Integration	Direct and Manage Project Execution	Monitor and Control Project Work Perform Integrated Change Control
Scope		Verify Scope Control Scope
Time		Control Schedule
Cost		Control Costs
Quality	Quality Assurance	Quality Control
Human Resource	Acquire Project Team Develop Project Team Manage Project Team	
Communications	Distribute Information Manage Stakeholder Expectations	Report Performance
Risks		Monitor and Control Risks
Procurement	Conduct Procurements	Administer Procurements

Project Vital Signs

Comprehensive method for monitoring, reporting, and taking timely actions to correct problems during IT project. By Gopal K. Kapur - ProjectHALT Methodology
These vital signs are following:

- Status of the Critical Path
- Mileston Hit Rate
- Deliverable Hit Rate
- Issues
- Cost-to-Date vs. Estimated Cost-to-Date
- Actual Resources vs. Planned Resources
- High Probability, High Impact Risk Events
- General Disposition of the Team
- Sponsor's Commitment and Time

Status of the Critical Path

Communicates whether the project is on schedule, ahead of schedule, or behind of it.
Delay, what is:

- < 10% - a fairly normal fluctuation from the norm and can usually be recovered with strong guidance from the project manager and focused by the team
- 10% - 20% - problems resulting in the breach of the critical path are beyond the control of the team, and the project manager and the sponsor need to make sure the team has a viable plan to recover the delay
- > 20% - extremely difficult to recover from such delays without compromising the other 3 key components of the project – scope (functionality), budget, and quality. Unless the underlying problems are corrected, the project is sure to continue on its downward slide

Milestone Hit Rate

Indicates the number of milestones the team was planning to hit and the number of milestones they actualy hit during a specific reporting period
Methodology authors recommend 2 separate monitoring cycles:

- To-date performance - the total number of milestones planned to be hit vs. The total number of milestones actually hit
- A shorter monitoring cycle - every 2 weeks: the total number of milestones planned to be hit vs. The total number of milestones actually hit

The to-date hit rate tells of the overall speed and progress of the team, and the shorter monitoring cycle indicates the team´s recent progress

- A gap of 10% to 20% - the team is beginning to fall. Project manager need to review the situation, devise a plan for recovery, and work with the team to ensure it begins to increase its milestone hit rate
- > 20% - there is little progress on the project, the team is barely crawling, it has lost its focus and momentum. This type of slow down is sure to result in considerable delay in the currently promised delivery date of the project

Deliverable Hit Rate

Deliverables tell us about team´s accomplishments. It is important to monitor the team´s accomplishments in terms of deliverables planned for completion versus the number of deliverables actually completed. The failure of the team to maintain a consistent deliverable hit rate suggests that there are deep rooted issues that need to be resolved
2 separate monitoring cycles:

- To-date performance: the total number of deliverables planned to be completed to-date vs. The total number of deliverables actually completed
- A shorter monitoring cycle – every 4 weeks: the total number of deliverables planned to be completed vs. The total number of deliverables actually completed

The to-date completion rate of deliverables tells about the rate of the “build” of the project, and the shorter monitoring cycle indicates the ongoing progress

The total number of deliverables planned to be completed vs. The total number of deliverables actually completed, what has/is:

- A gap of 10% to 20% - some of the team members are encountering obstacles which are keeping them form finishing their deliverables. Critical path will soon be breached
- > 20% - too many delievrables are remain incomplete or have not yet been started. This could be due to such problems as shortage of resources, lack of appropriate skills, poor specifications, ad hoc change management process, or discovery of new functionality

Cost-to-Date vs. Estimated Cost-to-Date

As the project proceeds down its development path, it is imperative that the actual cost-to-date be compared to the estimated cost. Project manager must carefully monitor any overspending

If the actual cost-to-date is:

- Between 10% to 20% higher than the estimated cost-to-date
    - The return on investment (ROI) will be affected
    - The benefit to the bottom line will be considerably less than what was promised to the client at the time of original estimates
- > 20% higher than estimated cost
    - The projects actual cost is running at a rate that may fail to return any financial benefits at all

For organizations that do not monitor the total cost, emthodology authors suggest capturing Effort-to-Date vs. Estimated Effort-to-Date

If the actual effort-to-date is:

- Between 10% to 20% higher than the estimated effort-to-date
    - Original estimates were too optimistic, or
    - The team members are discovering complexities they had not forecast at the start of the project, or
    - Work environment is not very productive and too much time is being lost due to interruptions, or
    - Scope creep
- > 20% higher than estimated effort
    - Any return on investment promised to management at the time of project approval is breached
    - Overtime by the project team is present; excessive overtime, in turn leads to eventual low productivity and low quality of the end product as well team burnout

Actual Resources vs. Planned Resources

There are 2 measurements of resources

- The gap between the number of full time equivalent (FTE) team members actually working on the project vs. The number of FTE team members initially planned
- The amount of unplanned turnover – the number of FTE team members that have left the team unexpectedly

The gap of less than 10% - If short term, usually does not result in any appreciable hit on schedule, functionality, or quality of the end product
If the project is under resourced by 10 to15% - serious hit on the quality of the end product, as there will be a little less testing, a little less documentation, and little less prototyping as planned
A resource gap > 15 % - in addition to a hit on the quality of the product, there will be a hit on the scope of the project: client does not get what was promised
A resource gap > 20 % - SOS – the schedule, scope, and quality of the project are all in jeopardy

Unplanned staff turnover

Based on 41 medium to large projects

- Unplanned turnover of a core team member causes the critical path to slip behind schedule by 4 to 6 weeks
- Unplanned turnover of a project manager delays a project by 6 to 9 weeks
- The change of a sponsor jeopardizes the entire project, as a new sponsor often wants to re-approve the projects budget, schedule, and mission

Project health report card

Table 2. Project Vital Signs

Vital Sign	Variance	Value
1. Status of the Critical Path (Delay)	‹10%	0
	10% to 20%	1
	›20%	2
2. Milestone Hit Rate (Gap)	‹10%	0
	10% to 20%	1
	›20%	2
3. Deliverable Hit Rate (Gap)	‹10%	0
	10% to 20%	2
	›20%	4

4. Issues	No Issues	0
	Issues ‹ Deliv.	1
	Issues › Deliv.	2
5. Cost-to-Date vs. Estimated Cost-to-Date (Higher)	‹10%	0
	10% to 20%	1
	›20%	2
6. Actual Resources vs. Planned Resources (Shortage)	‹10%	0
	10% to 15%	2
	›15%	4
7. High Probability, High Impact Risk Events	1-3 Risks	1
	4-5 Risks	3
	6-7 Risks	4
Assessment: 1-5 Green; 6-10 Yellow; 11-20 Red	Total	

Summary

One thing is plan, another thing is acting according to that plan. To ensure that project is under control, project manager must have overview of what is happening and knowledge about what should be häppening. Project manager must track “signs” of projects health or powerlessness and have knowledge and wisdom to act respectivelly.

Used Literature

- PDCA cycle, http://en.wikipedia.org/wiki/PDCA
- IEEE Guide--Adoption of the Project Management Institute (PMI(R)) Standard A Guide to the Project Management Body of Knowledge (PMBOK(R) Guide)--Fourth Edition, http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=6086683
- ProjectHALT Methodology, http://www.center4pm.com/ProjectHALTt.pdf
- Work Performance Information, http://project-management-knowledge.com/definitions/w/work-performance-information/