Unit 4

CSBS Sem VIII

- Risk Analysis
- Project Control
- Project Audit
- Project Termination

Risk Management

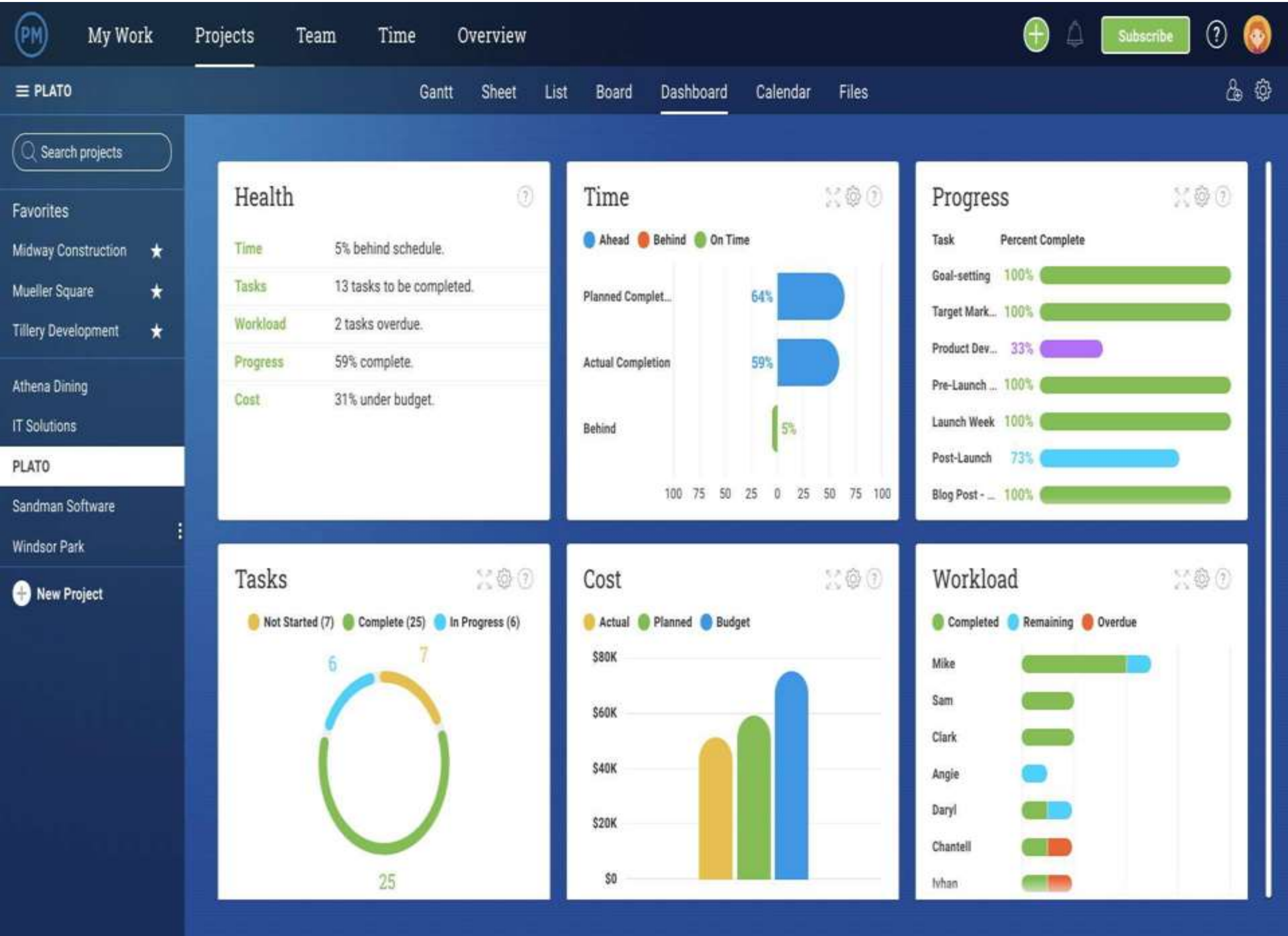
- Risk Management is the process of defining how to conduct risk management activities for a project.
- **Most Common Project Risks**
- **Cost risk**, typically escalation of project costs due to poor cost estimating accuracy and scope creep.
- **Schedule risk**, the risk that activities will take longer than expected. Slippages in schedule typically increase costs and, also, delay the receipt of project benefits, with a possible loss of competitive advantage.
- **Performance risk**, the risk that the project will fail to produce results consistent with project specifications.

Risk Management

- **Other Types of Risks**
- There are many other types of risks of concern to projects. These risks can result in cost, schedule, or performance problems and create other types of adverse consequences for the organization. For example:
- **Governance risk** relates to board and management performance with regard to ethics, community stewardship, and company reputation.
- **Strategic risks** result from errors in strategy, such as choosing a technology that can't be made to work.

Risk Management

- **Operational risk** includes risks from poor implementation and process problems such as procurement, production, and distribution.
- **Market risks** include competition, foreign exchange, commodity markets, and interest rate risk, as well as liquidity and credit risks.
- **Legal risks** arise from legal and regulatory obligations, including contract risks and litigation brought against the organization.
- **Risks associated with external hazards**, including storms, floods, and earthquakes; vandalism, sabotage, and terrorism; labor strikes; and civil unrest.


PM
My Work
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Favorites
Midway Construction
Mueller Square
Tillery Development
Athena Dining
IT Solutions
PLATO
Sandman Software
Windsor Park
New Project
Health
Time
5% behind schedule.
Tasks
13 tasks to be completed.
Workload
2 tasks overdue.
Progress
59% complete.
Cost
31% under budget.
Time
Ahead
Behind
On Time
Planned Complet...
64%
Actual Completion
59%
Behind
5%
100 75 50 25 0 25 50 75 100
Progress
Task
Percent Complete
Goal-setting 100%
Target Mark... 100%
Product Dev... 33%
Pre-Launch ... 100%
Launch Week 100%
Post-Launch 73%
Blog Post - ... 100%
Tasks
Not Started (7)
Complete (25)
In Progress (6)
6
7
25
Cost
Actual
Planned
Budget
$80K
$60K
$40K
$20K
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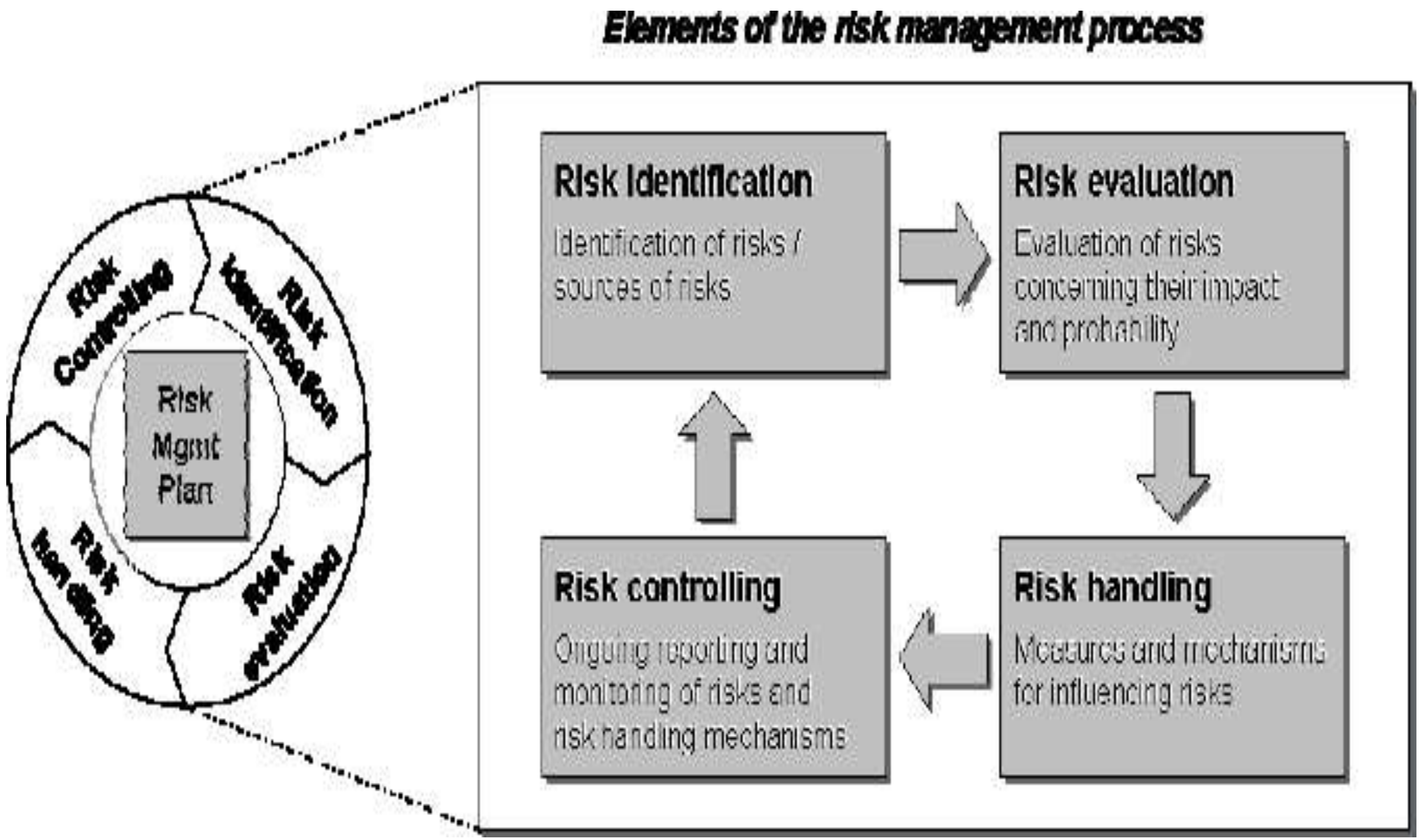
Workload
Completed
Remaining
Overdue
Mike
Sam
Clark
Angie
Daryl
Chantell
Ivhan

Risk Management



Risk Management

1. Risk Identification

Risks are to be identified and dealt with as early as possible in the project.

Risk identification is done throughout the project life cycle

Risk identification is one of the key topics in the regular project status and reporting meetings.
Some risks may be readily apparent to the project team—known risks; others will take more rigor to uncover, but are still predictable.

Risk Management

- Risk Identification :
- Risk Sources

Risk Source	Description
Risk repository	The risk repository is the history data containing the list of risks identified for completed projects. The risk repository can be used to arrive at a list of potential risks for the project. This risk repository can also be filtered based on risk sources, categories, and projects.
Checklist analysis	The risk identification checklist is a questionnaire that helps identify gaps and potential risks. It is developed based on experience and project type.
Expert judgement	Risk identification is also done by brainstorming with or interviewing experienced project participants, stakeholders, and subject matter experts.
Project status	The project status includes project status meeting reports, status reports, progress reports, and quality reports. These reports provide the current project progress, issues faced, and threshold violations. These provide insight into the status of the project and potential new risks.

Risk Management

- 2. Risk Category

Risk category provides a list of areas that are prone to risk events. The organization recommends high-level, standard categories

Risk Category	Extended categories
Technical	Requirements, Technology, Interfaces, Performance, Quality, etc.
External	Customer, Contract, Market, Supplier, etc.
Organizational	Project Dependencies, Logistics, Resources, Budget, etc.
Project Management	Planning, Schedule, Estimation, Controlling, Communication, etc.

Risk Management

- Risk analysis involves examining how project outcomes and objectives might change due to the impact of the risk event.
- Once the risks are identified, they are analysed to identify the qualitative and quantitative impact of the risk on the project so that appropriate steps can be taken to mitigate them.

Risk Management

- Probability of Risk Occurrence

High probability – $(80\% \le x \le 100\%)$
Medium-high probability – $(60\% \le x < 80\%)$
Medium-Low probability – $(30\% \le x < 60\%)$
Low probability $(0\% < x < 30\%)$

- Risk Impact

High – Catastrophic (Rating A – 100)
Medium – Critical (Rating B – 50)
Low – Marginal (Rating C – 10)

Risk Management

Project Objective	C Rating 10	B Rating 50	A Rating 100
Cost	Cost increase > 0 % or > 0 €	Cost increase 5 - 10% or > 50.000 €.	Cost increase > 10 % or > 100.000 €.
Schedule	overall project schedule delay > 0 days	overall project schedule delay > 1 week	overall project schedule delay > 2 weeks *
Scope	Scope decrease barely noticeable	Minor areas of scope are affected	Major areas of scope are affected; scope reduction unacceptable to the client
Quality	Quality reduction barely noticeable	Quality reduction does not affect vital functionality	Quality reduction requires client approval

Risk Management

3. Risk Exposure

- Risk Exposure or Risk Score is the value determined by multiplying the Impact Rating with Risk Probability.

		Probability			
		1 = high (80% ≤ x ≤ 100%)	2 = medium high (60% ≤ x < 80%)	3 = medium low (30% ≤ x < 60%)	4 = low (0% < x < 30%)
Impact	A=high (Rating 100)	(Exposure – Very High) (Score 100)	(Exposure – Very High) (Score 80)	(Exposure – High) (Score 60)	(Exposure – Moderate) (Score 30)
	B=medium (Rating 50)	(Exposure – High) (Score 50)	(Exposure – Moderate) (Score 40)	(Exposure – Moderate) (Score 30)	(Exposure – Low) (Score 15)
	C=low (Rating 10)	(Exposure – Low) (Score 10)	(Exposure – Low) (Score 8)	(Exposure – Low) (Score 6)	(Exposure – Low) (Score 3)

Risk Management

- Risk Occurrence Timeframe

Timeframe	Description
Near	Now- until one month
Mid	next 2-6 months
Far	>6 months

Risk Management

- Risk Classification Examples:

Risk event	Probability	Impact rating	Score
The hardware will be delivered 10 days late, leading to an overall project delay of 10 days in a project that is of minor importance to the customer	100%	B (50)	50
The hardware will be delivered 10 days late, leading to an overall project delay of 10 days. Delivery on time is important to the customer. High penalties for each day of delayed delivery are agreed.	100%	B (50)	50, but because of special circumstances is upgraded to 100
The acceptance test scope of work is not confirmed by the customer by integration test completion. From experience, it may be expected that the customer will require a certain number of additional test cases, leading to schedule delay and additional costs.	70%	B (50), because a risk of 6% cost increase and 10 days project schedule delay are expected	40
At C130 the customer has confirmed half the features described in the R-Spec, but informs Nokia Siemens Networks that the other half, as well as some additional requirements, are still under discussion. The final scope of the project is therefore very unclear. Major changes are to be expected.	80%	A (100), because a risk of more than 10% cost increase and more than 2 weeks project schedule delay, as well as major changes in scope, are expected	100

Risk Management

4. Risk Response Planning

- There may not be quick solutions to reduce or eliminate all the risks facing a project. Some risks may need to be managed and reduced strategically over longer periods. Therefore, action plans should be worked out to reduce these risks. These action plans should include:
- Risk description with risk assessment
- Description of the action to reduce the risk
- Owner of the risk action
- Committed completion date of the risk action

Risk Management

Risk Response Plans

- For each risk, a risk response must be documented in the risk register in agreement with the stakeholders. This should be ensured by the project manager.
- Risk response plans are aimed at the following targets:
- Eliminating the risk
- Lowering the probability of risk occurrence
- Lowering the impact of the risk on the project objectives

Risk Management

Risk event	Risk Response
Schedule delay to be expected if the hardware is delivered late.	Agree on penalties with the hardware supplier for delayed delivery. • Evaluate ways to shorten the timeline for onsite activities like installation, commissioning, etc. • Shorten the acceptance phase by reducing acceptance test cases or inviting the customer to a joint system test before customer release.
Time, cost, and scope deviation to be expected if requirements not final at project kick-off.	• Make sure that the requirements specification has been internally reviewed by all concerned parties and is internally agreed as complete and feasible. • Inform the customer about the latest possible date for input into the final version of the requirements specification and about the version that is to be used as basis for the development if no further input is available until then. • Open a claim against the customer. • Agree with the customer that all issues not clarified until project kick-off will be treated as change requests with possible impacts on time and cost.

Risk Management

5. Risk Ownership:

- The ground rule is that responsibility for managing all risks in the project lies with the project manager.
- Based on this ground rule a Risk Owner (who is not necessarily the project manager) must be determined and named in the Risk Register.

Risk Management

Risk event	Risk owner
Schedule delay to be expected if the hardware is delivered late.	Technical Order Manager and Service Account Manager
Time, cost, and scope deviation to be expected if requirements will not be final at project kick-off.	Project Manager
Overall project schedule delay to be expected if customer release will not be reached in time.	System Test leader

Risk Management

6. Risk monitoring and control :

- Identifying new risks and planning for them
- Keeping track of existing risks to check if:
  - Reassessment of risks is necessary
  - Any of risk conditions have been triggered
  - Monitor any risks that could become more critical over time
  - Tackle the remaining risks that require a longer-term, planned, and managed approach with risk action plans

Risk Management

7. Risk reporting:

- The risk register is continuously updated, from risk identification through risk response planning and status update during risk monitoring and control. This project risk register is the primary risk reporting tool and is available in the central project server, which is accessible to all stakeholders.

Project Monitoring & Control

- Project controlling is the application of processes to measure performance against the plan.
- Controlling helps identify deviations from the plan.
- Project management helps manage different processes, while project control ensures they are performed as planned.
- Project Control focuses on the following:
- Project Budget
- Project Schedule
- Project Quality

Project Monitoring & Control

- Features:

1. It is Forward-Looking

Controlling helps organizations plan and manage their projects. It allows an organization to identify areas of risk and realize opportunities.

2. **It Exists at all Levels**

- Controlling is from the top management to the operational level. This ensures plans are aligned with operations and resources are used efficiently.

Project Monitoring & Control

3. It is a Continuous Process

- Controlling is not a one-time event; project managers continually monitor their progress and compare it with the planned progress.
- This allows organizations to be proactive rather than reactive when managing resources.

Project Monitoring & Control

4. It is a Preventive Mechanism

- Controlling helps organizations identify and address potential problems before they escalate. This allows organizations to take corrective action before it’s too late.

5. It Provides Feedback

- Feedback provides organizations with information about the effectiveness of their strategies and how to improve further.
- The controlling mechanism provides an organization with valuable feedback.

Project Monitoring & Control

6. It is Flexible

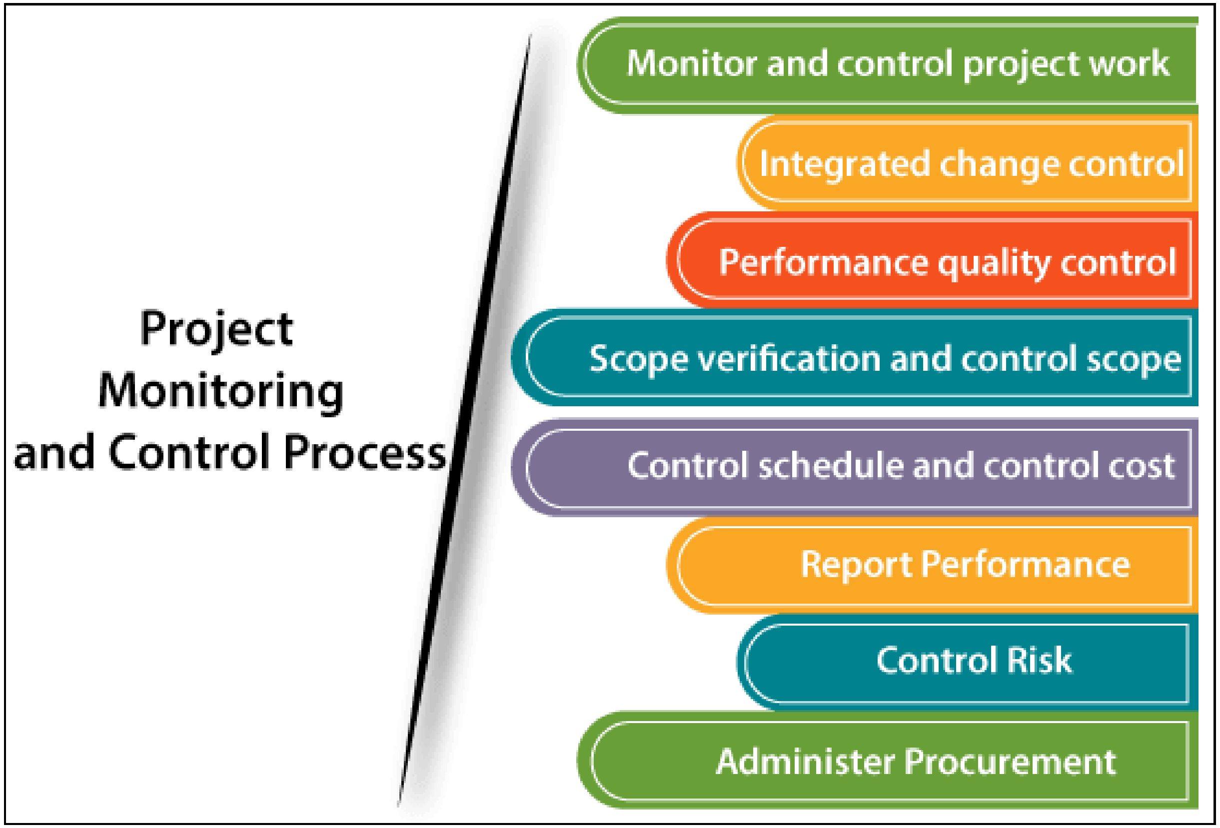
- Controlling can be adjusted according to the project needs, such as changes in market conditions or new government regulations.
- This allows organizations to adapt their controlling processes when necessary.

Project Monitoring & Control

- Project monitoring and control process includes procedures which are performed to observe project performance so that potential problems are identified, and appropriate action can be taken to meet the desired performance of the project.
- The goal of Project Monitoring and Control (PMC) is to ensure that whether the project proceeds according to the activities that are planned or not. It helps to develop an understanding of project progress, which helps in taking appropriate actions to control deviations of plans.

Project Monitoring & Control

- **There are several processes in Project Monitoring and Control as follows:-**



Project Monitoring & Control

- **Monitor and control project work -** It helps to check whether the team is working according to plan or not and able to complete the project on time. Project managers make performance measures or use previous performance measures to analyze project performance at regular intervals during the development of the project.

Project Monitoring & Control

- **Integrated change control -** Project manager, always try to avoid the changes and control them if changes occur. Change is required, but there is no compulsion. If it requires a change, the project manager discusses with the consultants, senior management, or other stakeholders, including customer and try to find out the solution.

Project Monitoring & Control

- **Activities during this change control:**
- Keeps a record of all the changes made to the previous baseline to reach a new baseline
- Identify all items to define the software configuration
- Monitor status of change requests
- Complete listing of all changes since the last baseline
- Allows tracking of progress to next baseline
- Allows to check previous releases/versions to be extracted for testing

Project Monitoring & Control

- **Scope verification and control scope -** The project manager controls the scope all over the development phases. The customer will verify the scope to check whether the developed product fulfills all the requirements of the customer’s or not. If it meets the requirements, then it is delivered to the customer's site, and if not, then it should again go back to the development stage.

Project Monitoring & Control

- **Control schedule and control cost -** With the help of Earned Value Management (EVM), the project manager controls the schedule and cost of the project. With the help of Earned Value Management (EVM), the project manager control the timing and cost of the project, and depending upon the results of CPI(Cost Performance Index) and SPI(Schedule Performance Index) project is monitored and controlled.

Project Monitoring & Control

- **Planned Value (PV)**
  - It is the planned expenditure of funds to the date of analysis.
  - PV = Planned Completion (%) * BAC
  - Where BAC = budget at completion
- **Earned Value (EV)**
  - It is the actual progress of the task to the date of analysis.
  - Earned Value = Actual Completion (%) * BAC
- **Actual Cost (AC)**
  - It is the actual expenditure of funds to the date of analysis.

Project Monitoring & Control

- **Cost Variance (CV)**
  - The amount that the project is above or below the budget at the point of analysis.
- **Cost Performance Index (CPI)**
  - The amount that the project is above or below budget, relative to the overall size of the project.
  - If CPI > 1, Project Cost is below Budget.
  - If CPI < 1, Project Cost is over Budget.

Project Monitoring & Control

- **Schedule Variance**
  - The amount that the project is ahead or behind schedule at the point of analysis.
- **Schedule Performance Index**
  - The amount that the project is ahead or behind schedule, relative to the overall size of the project.
  - If SPI > 1, Project is ahead its Schedule
  - If SPI < 1, Project is behind its Schedule

Project Monitoring & Control

- **Problem 1: Suppose you have a budgeted cost of a project at $900,000. The project is to be completed in 9 months. After a month, you have completed 10 percent of the project at a total expense of $100,000. The planned completion should have been 15 percent. Calculate Planned value and earned value.**

Project Monitoring & Control

- Given,
  - BAC = $ 900,000
  - AC = $ 100,000
- Calculate,
  - Planned Value
  - Earned Value
- We have,
  - planned completion (%) = 15 %
  - actual completion (%) = 10 %

Project Monitoring & Control

- PV = Planned Completion (%) * BAC
- = 15% * $900,000
- = $135,000
- EV = Actual Completion (%) * BAC
- = 10% * $900,000
- = $90,000

Project Monitoring & Control

- Calculate,
  - CPI
  - SPI
- CPI = EV/AC
- = 90,000/ 100,000
- = 0.90
- SPI = EV/PV
- = 90,000/ 135,000
- = 0.67
- CV = EV – AC
- SV = EV – PV

Project Monitoring & Control

- **Problem 2: Suppose you are managing a software development project. The project is expected to be completed in 8 months at a cost of $10,000 per month. After 2 months, you realize that the project is 30 percent completed at a cost of $40,000. You need to determine whether the project is on-time and on-budget after 2 months.**

Earned Value Analysis

- Given,
  - BAC = 8 * 10,000 = $ 80,000
  - AC = $ 40,000
- Calculate,
  - Planned Value, CV, SV
  - Earned Value
- We have,
  - planned completion (%) = 2/8 = 25 %
  - actual completion (%) = 30 %

- PV = Planned Completion (%) * BAC

  =

  =
- EV = Actual Completion (%) * BAC

  =

  =
- CV = EV – AC
- SV = EV - PV

Earned Value Analysis

- Given,
  - BAC = 8 * 10,000 = $ 80,000
  - AC = $ 40,000
- Calculate,
  - Planned Value
  - Earned Value
- We have,
  - planned completion (%) = 2/8 = 25 %
  - actual completion (%) = 30 %

- PV = Planned Completion (%) * BAC

  = 25 % * 80,000

  = 20,000
- EV = Actual Completion (%) * BAC

  = 30 % * 80,000

  = 24,000

Earned Value Analysis

- Calculate,
  - CPI
  - SPI
- CPI = EV/AC

  =

  =
- SPI = EV/PV

  =

  =
- CPI 1, Project is Budget.
- SPI 1, Project is Schedule.

Earned Value Analysis

- Calculate,
  - CPI
  - SPI
- CPI = EV/AC

  = 24,000/ 40,000

  = 0.6
- SPI = EV/PV

  = 24,000/ 20,000

  = 1.2

- CPI < 1, Project is Over Budget.
- SPI > 1, Project is Ahead Schedule.
- Calculate CV and SV

Project Monitoring & Control

- **Perform quality control -** Before delivering the product to the customer, the developed product is verified again to check that the product we are giving to the customer is delivered with the required quality. There are a lot of quality tools and processes to check the quality of the product, like test cases, Root Cause Analysis, Control chart, Histogram, etc.

Project Monitoring & Control

- **Report performance –** Large projects would have many stakeholders. The project manager will update the project performance to the stakeholders. This process collects performance information like status reports, progress reports, and forecasts.
- **Control risk –** Project managers also monitor the risks involved with the project. The project may have different types of risks, including process, people (internal, customer, vendor), tools, and technology.

Project Monitoring & Control

- **Administer Procurement -** If any process is handed over to the third-party, their performance should also be monitored. Based on their performance, the outcome of the project is decided. The project manager also needs to monitor the role and responsibility of the third-party.
- **Benefits of Process Monitoring and Control**
- It helps in the better control of the project
- It provides an in-depth knowledge of the progress of the project.
- It helps in maintaining coordination among team members.
- It helps in monitoring and managing the project process.

Project Audit

- **A project audit** is a **formal review of a project,** often intended to assess the extent to which project management standards are being upheld.
- **Audits** are generally carried out by a specially designated **audit department**, the **Project Management Office**, an **approved management committee** or an **external auditor**.

Project Audit

Objectives of project audit:

1. **Ensure the quality of products and services**

- A **project audit** acts as a **quality assurance tool**. It reviews the project life cycle evaluating the results yielded during the different stages, from the design phase to implementation.
- When reviewing the design phase, a project audit evaluates the thoroughness of the design concepts, including the analysis of alternative designs.
- **The identification of the errors during the process** contributes to the resolution of the problems and to understand if the project should continue through a go/no-go decision at each stage.

Project Audit

2. **Ensure the quality of project management**

A **project audit** ascertains that the project management satisfies the standards by assessing whether it complies with the organization's **policies, processes and procedures**.

It evaluates the methodology used to help identify gaps in order to introduce the required improvements.

Project Audit

3. Identify the business risk

- Project audits support the identification of business factors where **risks may reside**, which could affect **budget, time, environment and quality**.
- The project audit assesses the feasibility of the project in terms of affordability and performance by providing transparency and assessing costs, time and resources.

Project Audit

4. Improve project performance

- The monitoring of the various phases of the project life cycle can contribute to the **improvement of the project team's performance**.
- The audit also helps to improve the budget and resource allocation.
- Identifying priorities, corrective measures and preventive actions can lead to a positive project outcome.
- The troubleshooting process allows the project team to provide solutions and helps prevent similar problems from recurring in the future.

Project Audit

- **5. Learn**
- A project audit can deliver **learning opportunities** through assessments of project management expertise.
- Providing reviews and feedback allows individuals and project teams to ponder their own performance.

Project Audit

- Steps in Project Audit
- **1.** *Project Audit Initiation* This step involves starting the audit process, defining the purpose and scope of the audit, and gathering sufficient information to determine the proper audit methodology.

Project Audit

- **2.** *Project Baseline Definition* This phase of the cycle normally consists of identifying the performance areas to be evaluated, determining standards for each area through benchmarking or some other process, ascertaining management performance expectations for each area, and developing a program to measure and assemble the requisite information.

Project Audit

- **3.** *Establishing an Audit Database:* Once the baseline standards are established, execution of the audit begins. The next step is to create a database for use by the audit team.

Depending on the purpose and scope of the audit, the database might include information needed for assessment of project organization, management and control, past and current project status, schedule performance, cost performance, and output quality, as well as plans for the future of the project. The information may vary from a highly technical description of performance to a behaviorally based description of the interaction of project team members.

Project Audit

- **4.** *Preliminary Analysis of the Projec*t After standards are set and data collected, judgments are made. Some auditors do judgment on the grounds that such a delicate but weighty responsibility must be reserved to senior management.

The auditor must analyze the data and then present the analysis to managers in ways that communicate the real meaning of the audit's findings. It is the auditor's duty to brief the PM on all findings and judgments *before* releasing the audit report management.

Project Audit

- **5.** *Audit Report Preparation* This part of the audit life cycle includes the preparation of the audit report, organized by whatever format has been selected for use.

A set of recommendations, together with a plan for implementing them, is also a part of the audit report. If the recommendations go beyond normal practices of the organization, they will need support from the policy-making level of management.

Project Audit

Summary of Recommendations

Further development of VALID techniques:

- Make the method more field-friendly
- Increase accessibility and further verify usefulness of different tracers and doses
- Further establish guidelines for interpreting VALID techniques
- Further validate the method for different population groups, especially children and pregnant and lactating women
- Design studies with sufficient statistical power for specific conditions
- Determine how vitamin A status and other population characteristics influence vitamin A absorption, distribution, and metabolism
- Consider designs with paired comparisons and both positive and negative controls

Further application of VALID techniques to benefit public health:

- Monitor the safety and effectiveness of high dose supplementation to young children in developing countries
- Assess alternative vitamin A interventions
- Determine the effectiveness of routinely supplementing with or feeding β-carotene, rather than retinol
- Investigate the usefulness of VALID techniques to assess vitamin A status in populations affected by inflammation
- Improve understanding of the influence of iron or zinc deficiencies on vitamin A metabolism and status evaluation

Project Termination

A project can be said to be terminated when work on the substance of the project has ceased or slowed to the point that further progress on the project is no longer possible

- There are four fundamentally different ways to close out a project:
- extinction, addition, integration, and starvation.

Project Termination

- 1. **Termination by Extinction**
- The project is stopped. It may end because it has been successful and achieved its goals
- The new product has been developed and handed over to the client, or the software has been installed and is running.
- The project may also be stopped because it is unsuccessful or has been superseded:

e.g: The new drug failed its efficacy tests; there are better/faster/cheaper/prettier alternatives available;

or it will cost too much and take too long to get the desired performance.

Project Termination

- A special case of termination by extinction is "termination by murder."* There are all

sorts of murders. They range from political assassination to accidental projecticide. When senior executives vie for promotion, projects for which the loser is champion are apt to suffer. Corporate mergers often make certain projects redundant or irrelevant.

Project Termination

- When a decision is made to terminate a project by extinction, the most noticeable event is that all activity on the *substance* of the project ceases.
- A great deal of organizational activity, however, remains to be done. Arrangements must be made for the orderly release of project team members and their reassignment to other activities if they are to remain in the parent organization.

Project Termination

2. Termination by Addition

- Most projects are “in-house,” that is, carried out by the project team for use in the parent organization.
- If a project is a major success, it may be terminated by institutionalizing it as a formal part of the parent organization.
- When project success results in termination by addition, the transition is strikingly different from termination by extinction.

Project Termination

- Project personnel, property, and equipment are often simply transferred from the dying project to the newly born division.
- The metamorphosis from project to department,

to division, and even to subsidiary is accompanied by budgets and administrative practices that conform to standard procedure in the parent firm, by demands for contribution profits.

Project Termination

- **Termination by Integration**
- This method of terminating a project is the most common way of dealing with successful projects, and the most complex.
- The property, equipment, material, personnel, and functions of the project are distributed among the existing elements of the parent organization.
- The output of the project becomes a standard part of the operating systems of the parent, or client.

Project Termination

- Following is a list of a few of the more important aspects of the transition from project to integrated operation that must be considered when the project functions are distributed:
- 1. Personnel 2.Accounting/Finance
- 3. Information system/software 4. Marketing
- 5. Purchasing 6. Risk Identification& mgmt

Project Termination

- 4. **Termination by Starvation**
- It is “slow starvation by budget decrement.” Almost anyone who has been involved with projects over a sufficient period of time to have covered a business recession has had to cope with budget cuts.
- In some firms, for example, it is politically dangerous to admit that one has championed a failure, and terminating a project that has not accomplished its goals is an admission of failure.

Project Termination

- In such a case, the project budget might receive a deep cut—or a series of small cuts—large enough to prevent further progress on the project and
- to force the reassignment of many project team members.
- In effect, the project is terminated, but the project still exists as a legal entity complete with sufficient staff to maintain some sort of presence.

Project Termination

- **WHEN TO TERMINATE A PROJECT**
- Is the project still consistent with organizational goals?
- Is it practical? Useful?
- Is management sufficiently enthusiastic about the project to support its implementation?
- Is the scope of the project consistent with the organization's financial strength?
- Is the project consistent with the notion of a "balanced" program in all areas of the organization's technical interests? In "age"? In cost?
- Does the project have the support of all the departments (e.g., finance, manufacturing, marketing, IT, legal, etc.) needed to implement it?
- Is organizational project support being spread too thin?
- Is support of this individual project sufficient for success?
- Does this project represent too great an advance over current technology? Too small an advance?

Project Termination

- Is the project team still innovative, or has it gone stale?
- Can the new knowledge be protected by patent, copyright, or trade secret?
- Could the project be farmed out without loss of quality?
- Is the current project team properly qualified to continue the project?
- Does the organization have the required skills to achieve full implementation or
exploitation of the project?
- Has the subject area of the project already been "thoroughly plowed"?
- Has the project lost its key person or champion?
- Is the project team enthusiastic about success?
- Can the potential results be purchased or subcontracted more efficiently than developed
in-house?
- Does it seem likely that the project will achieve the minimum goals set for it? Is it still profiable? timely?

Case Study 1

- Tornado IPT Case Study
- Working with Tornado IPT
- The Tornado Integrated Project Team (Tornado IPT) is part of the UK Ministry of Defence’s (MoD’s) Defence Equipment and Support (DE&S) organisation. It is responsible for the provision of logistical support and capability development for the RAF Tornado F3 (Air Defence Variant) and the GR4 (Ground Reconnaissance) fleet until 2025, when it is due to be replaced by the Eurofighter Typhoon. Between now and then it is the task of the IPT to ensure the platform’s capability is developed to meet the UK’s changing defence requirements.
- The requirement to drive down defence costs whilst maintaining outputs to the end customer has led the IPT instigating a transformation programme which has resulted in the development of a series of availability-based contracting solutions with industry. The Tornado IPT draws Case study on the extensive aircraft design, development, operational and repair expertise of a team that includes the RAF, BAE Systems, Rolls Royce Defence Aerospace and QinetiQ.

Case study 2

- Working with LLW Repository Ltd
- LLW Repository Ltd (LLWR) is a waste management company that provides services to customers to treat and dispose of low-level radioactive waste (LLW). It manages the national Low-Level Waste Repository in West Cumbria on behalf of the Nuclear Decommissioning Authority (NDA), overseeing a National LLW Programme to ensure that lower activity waste is managed effectively across the UK.
- After a competitive evaluation, LLWR appointed Risk Decisions to implement an integrated risk database solution to embed risk management.
- **Challenge**
- Prior to 2007, when LLWR was established as an independent Site Licence Company, LLWR' s risk team had very little control over its shared systems. Moving away from spreadsheet-based methods towards more scalable solutions was part of the business's growth plans.
- LLWR's Project Controls Manager, Sarah Moore, explains, "A new parent body organisation taking ownership of **LLWR** in 2008 was the opportunity for change. To that point, risk management was something that had been done to the organisation as opposed to being embedded within it. We wanted to have a tool that the organisation could use to demonstrate the value of our risk processes."
- "We were looking for a tool that would integrate all of our risk data, and provide us with analytical capability – basically a one-stop-shop for risk management. Given the industry we work in, the tool also needed to have a robust audit trail."

Unit 5

- Agile Principles
- Agile Methodologies
- Relationship between Agile & Scrum
- Lean
- DevOps
- IT Service Management

Agile Values & Principles

- The Four Values of The Agile Manifesto
- The Agile Manifesto is comprised of four foundational values and 12 supporting principles which lead the Agile approach to software development.
- Each Agile methodology applies the four values in different ways, but all of them rely on them to guide the development and delivery of high-quality, working software.

Agile Values and Principles

- **1. Individuals and Interactions Over Processes and Tools**
  The first value in the Agile Manifesto is “Individuals and interactions over processes and tools.” Valuing people more highly than processes or tools is easy to understand because it is the people who respond to business needs and drive the development process. If the process or the tools drive development, the team is less responsive to change and less likely to meet customer needs. Communication is an example of the difference between valuing individuals versus process. In the case of individuals, communication is fluid and happens when a need arises. In the case of process, communication is scheduled and requires specific content.

Agile Values and Principles

- **2. Working Software Over Comprehensive Documentation** Historically, enormous amounts of time were spent on documenting the product for development and ultimate delivery. Technical specifications, technical requirements, technical prospectus, interface design documents, test plans, documentation plans, and approvals required for each.
- The list was extensive and was a cause for the long delays in development. Agile does not eliminate documentation, but it streamlines it in a form that gives the developer what is needed to do the work without getting bogged down in minutiae.
- Agile documents requirements as user stories, which are sufficient for a software developer to begin the task of building a new function.
  The Agile Manifesto values documentation, but it values working software more.

Agile Values and Principles

- **3. Customer Collaboration Over Contract Negotiation** Negotiation is the period when the customer and the product manager work out the details of a delivery, with points along the way where the details may be renegotiated. Collaboration is a different creature entirely.
- With development models such as Waterfall, customers negotiate the requirements for the product, often in great detail, prior to any work starting. This meant the customer was involved in the process of development before development began and after it was completed, but not during the process.
- The Agile Manifesto describes a customer who is engaged and collaborates throughout the development process, making. This makes it far easier for development to meet their needs of the customer. Agile methods may include the customer at intervals for periodic demos, but a project could just as easily have an end-user as a daily part of the team and attending all meetings, ensuring the product meets the business needs of the customer.

Agile Values and Principles

- **4. Responding to Change Over Following a Plan** Traditional software development regarded change as an expense, so it was to be avoided.
- The intention was to develop detailed, elaborate plans, with a defined set of features and with everything, generally, having as high a priority as everything else, and with a large number of many dependencies on delivering in a certain order so that the team can work on the next piece of the puzzle.
- With Agile, the shortness of an iteration means priorities can be shifted from iteration to iteration and new features can be added into the next iteration. Agile's view is that changes always improve a project; changes provide additional value.

Agile Values and Principles

- The Twelve Agile Manifesto Principles
- The Twelve Principles are the guiding principles for the methodologies that are included under the title “The Agile Movement.”
- They describe a culture in which change is welcome, and the customer is the focus of the work. They also demonstrate the movement’s intent as described by Alistair C, one of the signatories to the Agile Manifesto, which is to bring development into alignment with business needs.
- The twelve principles of agile development include:

Agile Values and Principles

- **Customer satisfaction through early and continuous software delivery** – Customers are happier when they receive working software at regular intervals, rather than waiting extended periods of time between releases.
- **Accommodate changing requirements throughout the development process** – The ability to avoid delays when a requirement or feature request changes.
- **Frequent delivery of working software** – Scrum accommodates this principle since the team operates in software sprints or iterations that ensure regular delivery of working software.
- **Collaboration between the business stakeholders and developers throughout the project** – Better decisions are made when the business and technical team are aligned.
- **Support, trust, and motivate the people involved** – Motivated teams are more likely to deliver their best work than unhappy teams.
- **Enable face-to-face interactions** – Communication is more successful when development teams are co-located.

Agile Values and Principles

- **Working software is the primary measure of progress** – Delivering functional software to the customer is the ultimate factor that measures progress.
- **Agile processes to support a consistent development pace** – Teams establish a repeatable and maintainable speed at which they can deliver working software, and they repeat it with each release.
- **Attention to technical detail and design enhances agility** – The right skills and good design ensures the team can maintain the pace, constantly improve the product, and sustain change.
- **Simplicity** – Develop just enough to get the job done for right now.
- **Self-organizing teams encourage great architectures, requirements, and designs** – Skilled and motivated team members who have decision-making power, take ownership, communicate regularly with other team members, and share ideas that deliver quality products.
- **Regular reflections on how to become more effective** – Self-improvement, process improvement, advancing skills, and techniques help team members work more efficiently.

Agile Methodologies

Toyota working model :

- Error prevention to eliminate mistake
- Stop production where action is required
- Identify and learn
- JIT
- Voice areas of improvement
- Understand the working environment
- Business information to be shared openly
- Kanban
- Actions and process must be transparent

Agile Methodologies

- Kanban for software teams:
- Agile software development teams today are able to leverage these same JIT principles by matching the amount of work in progress (WIP) to the team's capacity. This gives teams more flexible planning options, faster output, clearer focus, and transparency throughout the development cycle.
-

Agile Methodologies

- According to Kanban practices, big changes at the beginning of any process are discouraged. When you do begin to make changes, be sure to do so gradually to ensure your team is comfortable with the new process.
- Kanban principles also encourage team members to understand and respect everyone’s role within the organization. This means knowing everyone’s job title and understanding what that role entails. Kanban encourages collaboration when it comes to identifying any changes that are needed.
- Kanban also encourages equal contributions from all team members when it comes to offering ideas. Even entry-level employees can provide useful input that can help to improve overall efficiency.

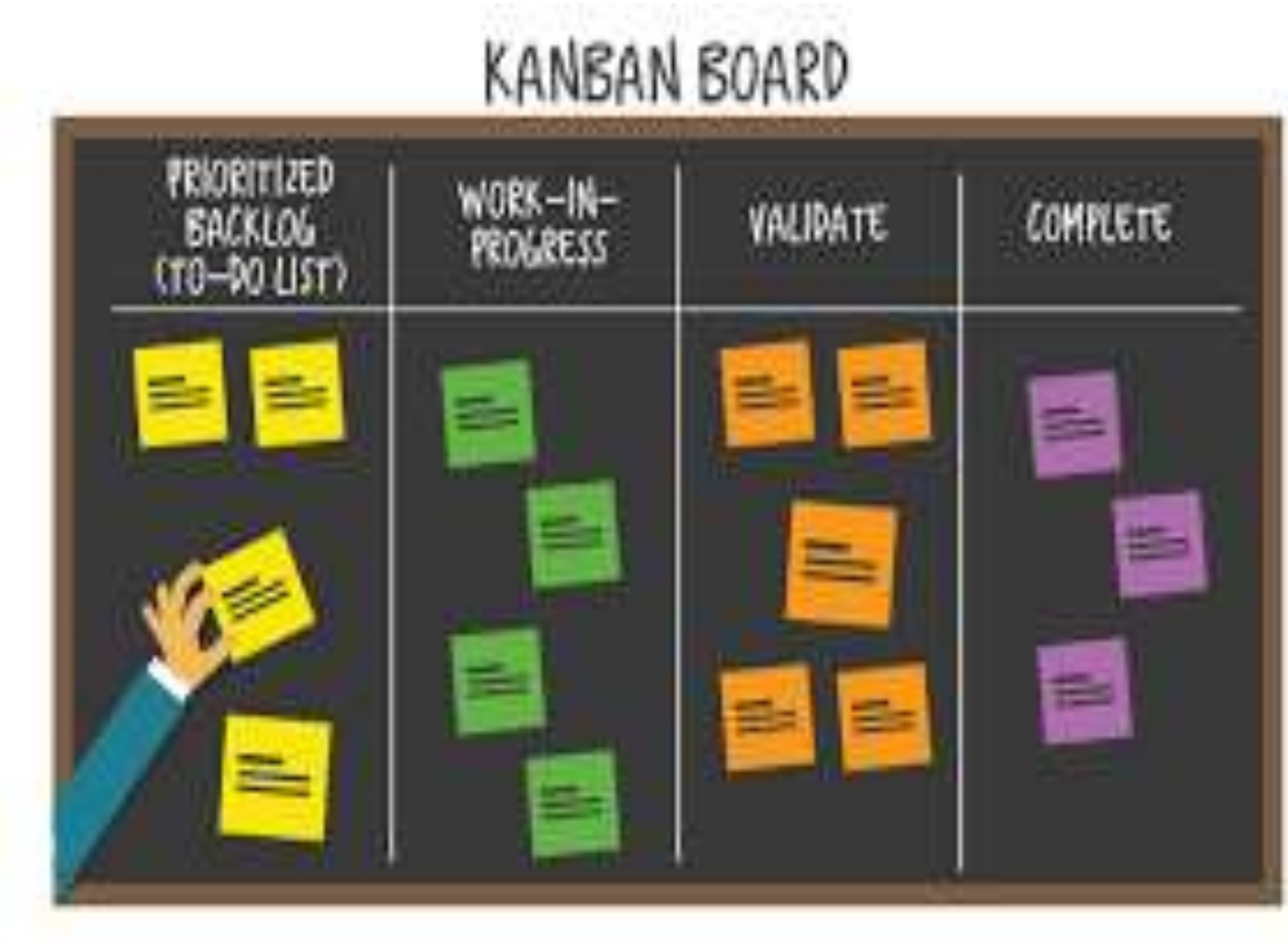
Agile Methodologies

- Kanban boards
- The work of all kanban teams revolves around a kanban board, a tool used to visualize work and optimize the flow of the work among the team.
- virtual boards are a crucial feature in any agile software development tool for their traceability, easier collaboration, and accessibility from multiple locations.

Agile Methodologies

- A basic kanban board has a three-step workflow: To Do, In Progress, and Done.
- The kanban methodology relies upon full transparency of work and real-time communication of capacity

Agile Methodologies



Agile Methodologies

- Lean : Lean is both a philosophy and a discipline which, at its core, increases access to information to ensure responsible decision making in the service of creating customer value.
- originally sprouted in Japan at Toyota Production System
- Lean methodology originated in the Japanese automobile industry in the late 1940s and 1950s, specifically at Toyota Motor Corporation.
- It was developed to respond to the inefficiencies and waste of traditional mass production methods. The goal of Lean was to eliminate waste and improve quality and efficiency.

Agile Methodologies

- 5 core principles:
- Value: Understand what customers value in a product or service
- Value Stream: What goes into maximizing value and eliminating waste throughout the entire process from design to production
- Flow: All product processes flow and synchronizes seamlessly with each other
- Pull: Flow is made possible by “pull,” or the idea that nothing is made before it is needed, thereby creating shorter delivery cycles
- Perfection: Relentlessly pursue perfection by constantly engaging the problem-solving process

Agile Methodologies

- Another key to lean is its definition of waste, of which there are eight types:
- Motion: Unnecessary movement of people or processes (equipment and manufacturing machinery, for example). Repetitive movements that do not add value translates to wasted time and resources.
- Over-processing: Doing unnecessary processes or steps than what is required to create a valuable product.
- Extra-processing: Products require more work or quality than necessary to deliver value to the customer.

Agile Methodologies

- Defects: Manufacturing processes create defective products — which becomes wasted materials.
- Transport: Like motion, but over greater distances to include the transport of tools, inventory, people, or products further than necessary.
- Human Potential: Underused skills and talent due to poor employee management and team structure lead to a lack of morale and productivity.
- Waiting: Idle equipment and waiting on materials or equipment can slow down processes and efficiency.
- Inventory: Excessive products and inventory take up space, reveal overproduction, and create backwork.

Agile Methodologies

- Pillars of Lean Methodology
- Elimination of waste: The aim is to eliminate anything that does not add value to the customer.
- Continuous improvement: Lean methodology stresses the importance of continuous improvement and encourages individuals to look for ways to improve processes constantly.
- Respect for people: Lean recognizes people's importance and ability to contribute to continuous improvement.
- Focus on the customer: Lean methodology places the customer at the center of everything and focuses on delivering value to the customer.
- Continuous flow: Lean aims to create a smooth and uninterrupted flow of work, from the customer's order to the delivery of the final product.
- Pull-based production: Lean methodology is based on "pull-based" production, where work is only started when there is customer demand.

SCRUM

Unit 6

Contents

- Various terminologies used in Scrum (Sprint, product backlog, sprint backlog, sprint review, retro perspective),
- various roles (Roles in Scrum),
- Best practices of Scrum (https://www.developer.com/project-management/scrum-best-practices/)

What is Scrum?

- Scrum is an agile framework for developing software applications.
- Scrum has been in use since the early 1990s. It is a flexible and holistic approach to project management.
- Scrum focuses on continuous improvement, learning, and adjusting to the changing market, user requirements, and technology.
- Scrum involves a set of events, tools, and roles that work together to help teams structure and manage a project.
- Within software development, requirements, market, technology, and other external factors change quite often.
- Scrum embraces the changes as the product is built in a series of iterations called sprints.

What is Scrum?

- Big projects are broken into smaller pieces that are delivered in several sprints, making the project easier to manage.
- Every sprint is released to users, and feedback is collected. Speed to market is also increased.
- Scrum is all about continuous learning and adapting to changes.
- a scrum team is a small team made of highly adaptive and flexible individuals.

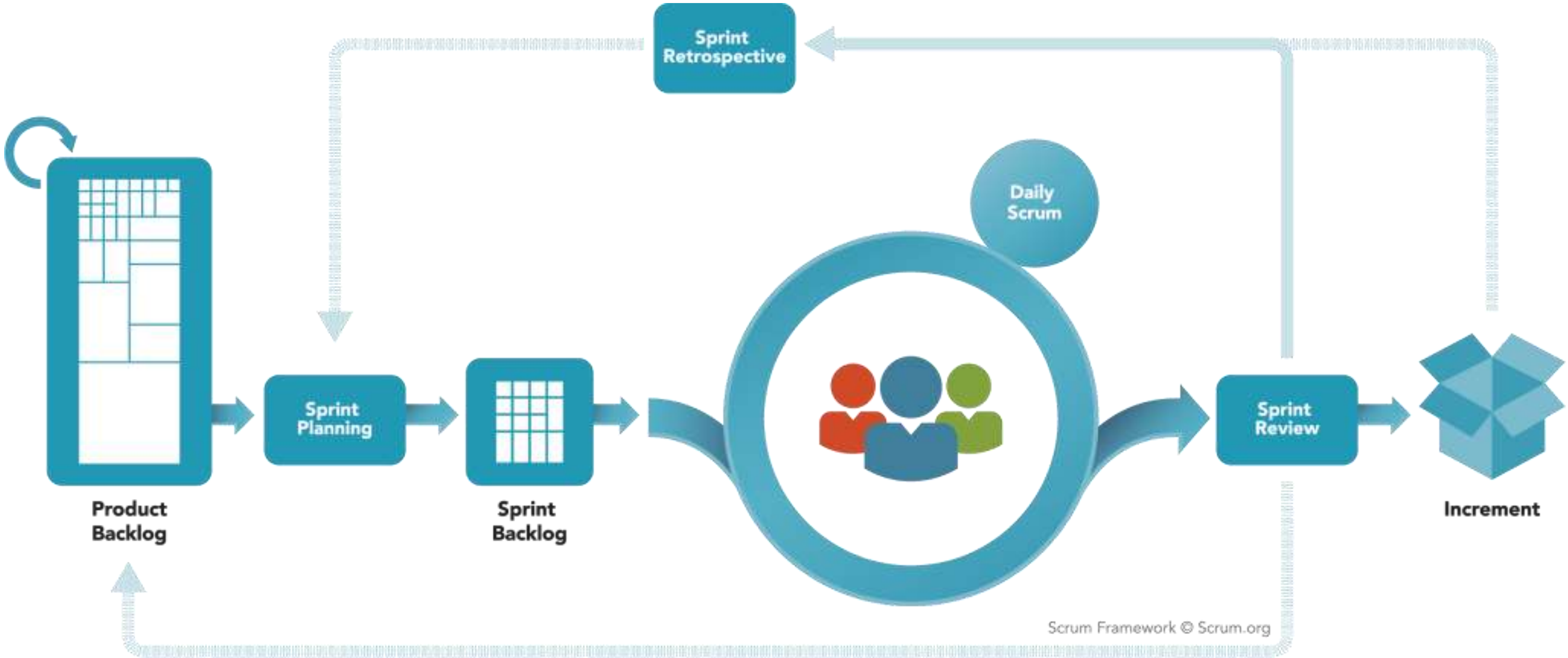
Scrum

- Scrum is an empirical process, where decisions are based on observation, experience and experimentation.
- **Scrum** has three pillars: **transparency**, **inspection** and **adaptation**.
- there are **accountabilities**, **events** and **artifacts** that make up the Scrum Framework

Scrum


SCRUM
Transparency
Inspection
Adaptation
TRUST
COURAGE
Scrum Team members have courage to do the right thing and work on tough problems
FOCUS
Everyone focuses on the work of the Sprint and the goals of the Scrum Team
COMMITMENT
People personally commit to achieving the goals of the Scrum Team
RESPECT
Scrum Team members respect each other to be capable, independent people
OPENNESS
The Scrum Team and its stakeholders agree to be open about all the work and the challenges with performing the work
Credit: ABN AMRO Bank N.V.

Scrum



Sprint Retrospective
Daily Scrum
Sprint Planning
Sprint Review
Product Backlog
Sprint Backlog
Increment
Scrum Framework © Scrum.org

Scrum events

- Each event is time-bound to a maximum duration.
- Strict scrum events reduces the need of meetings that are not defined in the scrum framework.
- The events are created to foster transparency and inspection within the scrum team.
  - Sprint
  - Sprint planning
  - Daily Scrum
  - Sprint review
  - Sprint Retrospective

Scrum events: Sprint

- The sprint is the backbone of scrum. A sprint takes 1 to 4 weeks.
- During this period, a potentially shippable product increment is created.
- A list of product backlog items, selected during sprint planning, are worked on during each sprint.
- A new sprint starts immediately after the end of the previous one.
- If a sprint took more than a month, the definition or market of what is being developed might change, increasing complexity and risk.
- Each successful sprint constitutes an increment in the final product.

Scrum events: Sprint Planning

- The scrum team discuss the items to be worked on during the sprint and creates a sprint goal.
- Top priority product backlog items to be worked on during the sprint are selected.
- The primary purpose of Sprint Planning is to address “What can be done during the next sprint?” and “How to do the work required to provide the increment?”
- Sprint planning takes at most eight hours for a four weeks Sprint.

Scrum events: Daily scrum

- It is a fifteen-minute Stand-up event for the development team held daily.
- Preferably, it should be held at the same venue and time.
- The team discusses what they have completed in the last 24 hours and plan for the next 24 hours' work.
- A check on the progress towards the sprint goals is also done in the stand-up meeting.

Scrum events: Sprint Review

- Sprint Review is held towards the end of the Sprint.
- This is an opportunity for the team to showcase the completed work to the product owner and partners.
- This review process is meant to encourage collaboration and to get feedback.
- It takes at most four hours for a one-month sprint.
- The development team discuss what worked out during the sprint, the challenges encountered, and how they were addressed.
- They also discuss how they will improve the process in the future.
- Sprint review provides important input to the upcoming sprint planning.
- The deliverable of a Sprint Review is an updated product backlog items for the coming sprint.

Scrum events: Sprint Retrospective

- This event happens before the next sprint planning.
- It takes at most three hours for a one-month Sprint. The scrum team discusses the following:
- What worked well?
- What could be improved?
- What will the team commit in the next sprint?
- Scrum Team members make actionable commitments. The deliverables of this meeting are improvements to be implemented in the next sprint by the Scrum Team.

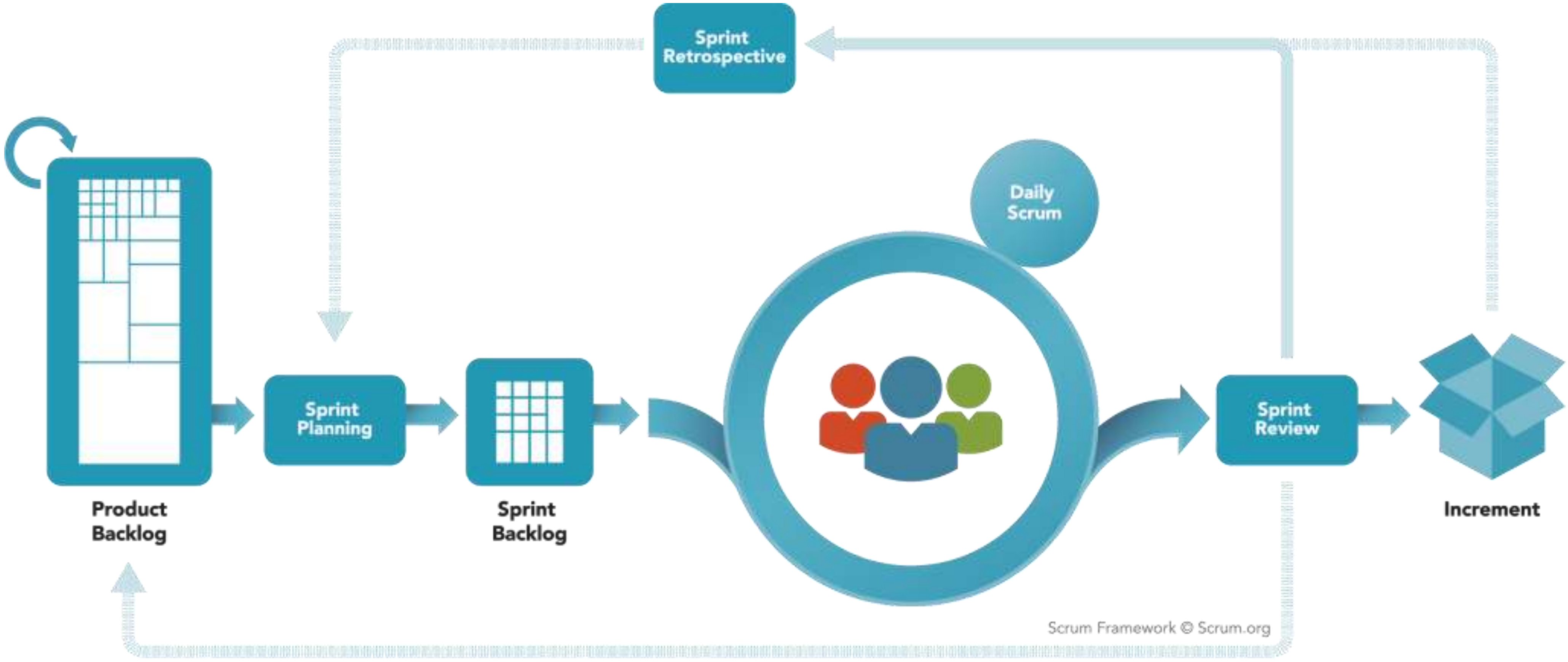
Scrum Artifacts

- Artifacts are there to ensure and maximize the transparency of information.
- Every team member must have the same interpretation of an artifact.
- The **product backlog** consists of a list of features, functions, enhancements, and fixes needed.
- It is the only source of requirements for the Scrum Team.
- The product owner is responsible for its content, availability, and ordering. Since the requirement never stops changing, so does the product backlog. All the requirements are broken down, with the most prioritized at the top.

Scrum Artifacts

- The current **sprint backlog** items are selected from high priority features in the product backlog. It is the output of the sprint planning event. The sprint backlog is modified throughout the sprint. Burndown charts are used to monitor sprint progress.
- **Increment**
- The sum of all product backlog completed and “done” during a sprint is referred to as an increment. Each Scrum Team has a definition of “done.” “Done” means in a usable condition as per the Scrum Team definition.

Scrum



Sprint Retrospective
Daily Scrum
Product Backlog
Sprint Planning
Sprint Backlog
Sprint Review
Increment
Scrum Framework © Scrum.org

Scrum Roles

- The team is cross-functional and self-organizing. The team decides how best to accomplish the work and has all the necessary expertise to do it.

- Product Owner
- Scrum Master
- The Development Team

Scrum Roles

- **Product Owner**:
- The product owner plays in the part of a client or stakeholder.
- He/She is one person and not a group of people.
- He or she is responsible for managing the product backlog by clearly expressing items that need to be addressed.
- The product owner ensures that the product backlog items are clear for the development team.

Scrum Roles

- **Scrum Master**:
- The scrum master is a “servant leader” responsible for protecting the team and the process. The scrum master helps everyone understands the scrum framework as defined in the scrum guide. Other responsibilities include:
- Ensuring a good working bond between the development team and the product owner
- Protecting the team from outside interactions and disruptions
- Facilitating scrum events
- Providing optimal techniques for optimal product backlog management
- Removing any obstacle that may affect the development team progress

Scrum Roles

- **The Development Team**:
- It is a team with the necessary skills to create a product increment by itself.
- That is why it is said to be cross-functional and self-organizing. Members lay multiple roles such as design, business analysis, operations, programming, and testing.
- Thus, the team recognizes no title for any of its members. Team members may have some particular competencies and areas of specialization, but they are accountable as one.
- The team size can consist from three to nine members.

Benefits of Scrum

Disadvantages of Scrum

Case study#1

- Mayden is a small and successful U.K. company that develops managed Web applications for the health care sector. They specialize in flexible, cloud-based software, delivered by a team of 44 from two locations in England
- Mayden has built a track record of delivering value to its customers
- The company did have a reputation for being responsive to customer needs, but it tried to execute within a traditional project management environment
- CEO Chris May explains the problems that surfaced as a result of trying to be flexible in a Waterfall environment: "Our best-laid plans were continually being hijacked for short-priority developments. The end result was that we reached a point where we had started lots of things but were finishing very little."

Case study

- projects were frequently assigned to only one person, so the work "often took months to complete." From a development team standpoint, this approach created individual expertise and worked against a team environment.
- People were seen as specialists, and some developers had a large backlog of work while others had insufficient work — but they were unable to assist their colleagues because they didn't have that specialist knowledge.
- This created individual silos and led to lack of variety as well as boredom and low morale.
- From a company standpoint, it also led to poor skills coverage, with multiple "single points of failure" in the development team.

Case study

- Transition:
- Reduced lead time for delivery of new features to the customer
- Increased skill coverage across the development team, creating a more consistent work flow
- More frequent deadlines, keeping the development team alert and focused
- Empowered staff who now all contribute and comment on the best way to approach stories
- Increased quality of coding due to ongoing assessment from teammates

Case study

- Advice:
- Even though they were told in training that while Scrum concepts were easy, putting them into practice could be difficult.
- If you do choose to implement Scrum, you can't do it halfheartedly; you have to commit to it. Embrace it company-wide and you'll be amazed by the results.
- the dynamics of the team may change, which requires an open mind and trust. "The quiet person in the corner who doesn't say much may just well surprise you and become the star of the team, if given the opportunity and environment in which to flourish. We've experienced that firsthand, and Scrum was the catalyst.“
- https://resources.scrumalliance.org/Article/case-study-maydens-transformation-waterfall-scrum

Case study#2

- **How can you build a truck with innovative unique selling propositions in just 18 months, if the regular development cycle is at least five years? MAN Truck & Bus was confronted with this challenge at the end of 2016.**
- The answer was a cross-functional team and a new way of working for MAN: Scrum. Thanks to the consistent establishment of the agile framework, a 100% dedicated development team including Scrum Master and Product Owner could be set up very quickly.

Case study

- When asking the team about the decisive success factors, especially the following points were mentioned: 100% availability of the team members and their co-location, daily coordination with colleagues in the workshop, full support and regular and pragmatic involvement of stakeholders, as well as transparency and communication with related departments.
- The most important point, how-ever, is openness and the courage to try something new.

- https://www.agile-academy.com/en/organizational-development/case-study-man/

Best Practices of Scrum

- Teamwork and collaboration are essential for the scrum framework to work and help agile software developers create quality products.
  - Integrate the scrum framework within the development process from beginning to end. You can ensure desired results if the scrum framework guides every development stage.
  - Get the assistance of a scrum expert to use the framework effectively.
  - Avoid creating too many scrum teams to avoid confusion and miscommunication.
  - Make sure every team member knows and understands the product goal.
  - Prepare the team for new requirements based on the changing project requirements every day.
  - Test the product every day and implement product owner feedback.
  - Keep the whole team and investors/stakeholders on the same page about the project direction.
  - Make sure the meetings and feedback are face-to-face to avoid miscommunications.
  - Confirm the absence of micromanagement in every scrum team.
  - Avoid burnout in team members by giving them a small break between sprints

What would you do?

- You work with a scrum team that has sprints of a week. Upto this point, you have been doing an hour long weekly sprint retrospective as part of this cycle. the product owner isn’t always present due to scheduling conflicts. Also the development team suggests doing a sprint retrospective every other sprint. Their experience is that the weekly sprint retrospective doesn't really result in anything useful anyways.
- As a scrum master , would you go along with the suggestion of the development team? If yes, why? If no, why?

What would you do?

- Several important customers of your product are unhappy. Users are running into lots of bugs, performance is low and features are delivered well beyond set release dates
- Henry, the product owner of your team, agrees with this assessment. He asks you as the scrum master- to resolve this with the development team.
- How would you respond to this request? How would you connect this with the scrum values?

Useful links

- https://www.ailoitte.com/blog/software-development-scrum/