The Project Management Course: Beginner to PROject Manager

Course Notes

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Clear your mind

PM principles, tools and techniques are **very much based on common sense.**

Consider most of the things as **guidelines** and **practical lessons** for you – there is no formula on how best to prepare a project plan.

This **does not mean it is easy** and you do not need good preparation to handle a project yourself.

Try **not to think in absolute terms** – rarely there are black and white options. There are often **many shades of grey in between.**

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Definition of a Project

What is a Project?

"A project is a temporary endeavor undertaken
to create a unique product, service or result."

- Project Management Body of Knowledge PMBOK Guide 5th Ed

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Characteristics of a Project

Has a
beginning and an end

Projects are **temporary** initiatives. This is the main difference between projects and the day to day normal business operations (e.g. Production, Sales, HR, Supply-chain and logistics, IT, Finance & Accounting, etc.).

### Delivers an
unique output

Each project is "unique" in the sense that it creates something never done before. Even if the output of the project is very similar to the one of a previous project, the fact that it will be at a different time with different people makes it distinct.

Includes
complex activities

Projects include complex activities, which need time for coordination. The complexity comes mainly from the fact that projects have constraints (limited time and resources) and need to deal with uncertainty (tasks to be done in the future).

The Triple Constraint in Project Management

Scope

Time   Cost
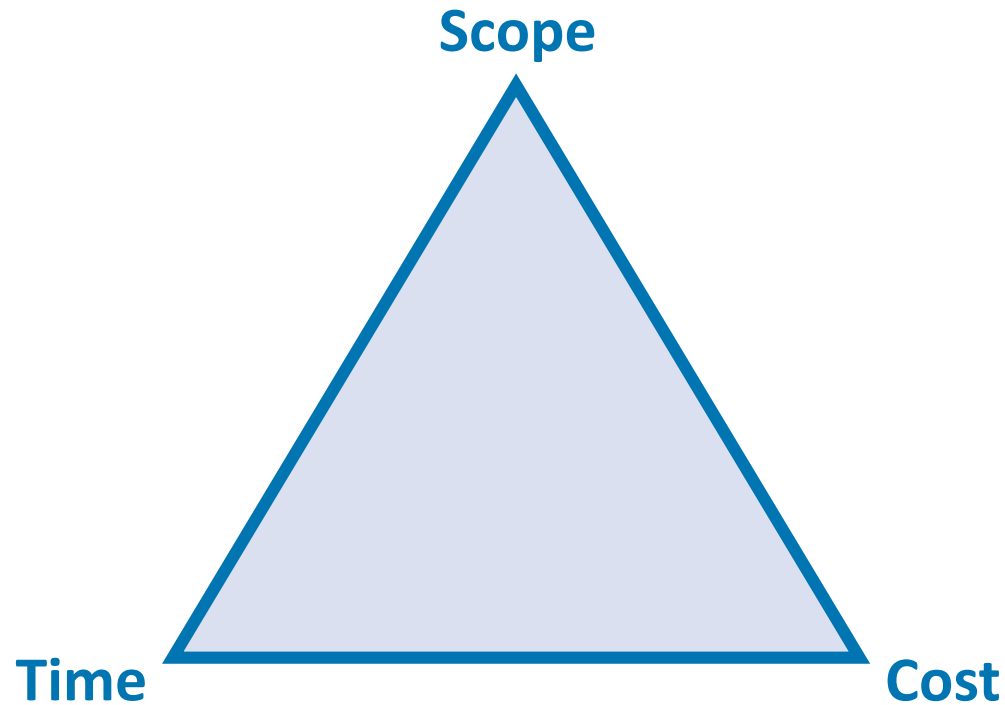
There are 3 fundamental factors for each project:

- Scope = the sum of the activities and work to be performed, in order to reach the project goal. In other words, the scope is everything that needs to be done during the project.
- Time = the available timeframe given for the project to reach its goal.
- Cost = the resources available for the project.

The three dimensions always need to be looked at together because:

If a change is made to 1 of them, one or both the others will change as well

Example: you are planning to build a two floor house (scope) until the end of the summer (time) and within a specific budget (cost). If things change and you decide you need three floors to be constructed (scope change), you will need more resources (cost) and most probably more time.

Another example would be if you decide you need the house ready before the summer (time change). This would mean you need extra workers to complete the construction faster (cost) and/or you might need to simplify the construction - e.g. skip the interior works (scope).

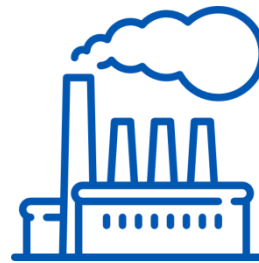365 Careers

Brief History of Projects and Project Management

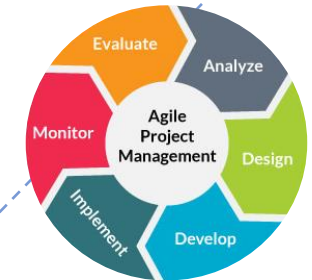| 2570 BC	1400	1800	1900	2000
The Great Pyramid of Giza	**The Age of Discovery**	**Industrial Revolution**	**20th Century**	**21st Century**

PRINCE2

The Economy development Line.
With the increase of production capacity, globalization, competition and technology, the efficient use of resources becomes a key success factor for any business.

What creates demand for a project?

Business need

Example: Reduce companies' cost to remain profitable.

Market need

Example: develop a mobile app as your competitors are introducing one to the market.

Customer request

Example: a customer who accounts for 30% of your total sales requests you to develop a customized product for them.

Legal requirement

Example: any regulation that affects your work / business. E.g. GDPR, Brexit, etc.

Social need

Example: A product that will be used by the citizens: kindergarten construction; highway construction; hospitals; etc.

Ecological impact

Example: Limit emissions; limit the use of plastic; etc.

Technological advance

Example: automate manual processes.

Projects are often triggered by a "mix" from more than one from the above possible reasons.

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Who is the Project Manager?

Project management costs generally total somewhere between 7-15% of the project's Total Installed Cost.

You can think of the PM as the "CEO" of the project

The **accountable** person for the **project's success***.
Project success = accomplish the **specific goal of the project, **within** the time and budget constraints agreed at the beginning.*

Why do you need a PM?
- ✓ To take accountability
- ✓ To steer people and activities
- ✓ To handle risks and issues

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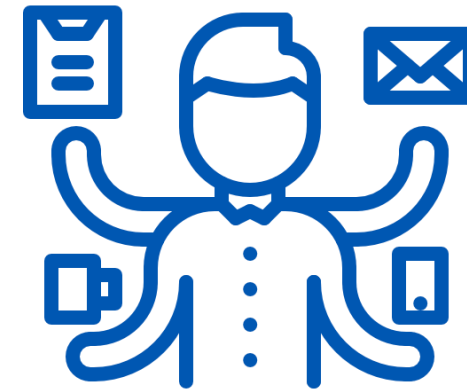
Project Manager Skills

In projects, there are different individuals and organizations that need to work in a coordinated manner for the success of the project. As mentioned, the PM is the "face" of the project, he/she is the single point of contact that has to be able to answer to any questions about his project, including all works streams and tasks performed by other people. PM is accountable for the end result of their collective work.

It might sound easier than it is. So, how to do it? We explained, PMs have the knowledge, skills, attitude and practical experience to "manage" not only their work, but also the work of the others. In addition, by being appointed as a PM, you are being empowered by the project Sponsor to take actions and make decisions. These knowledge, skills, attitude but are not limited to:
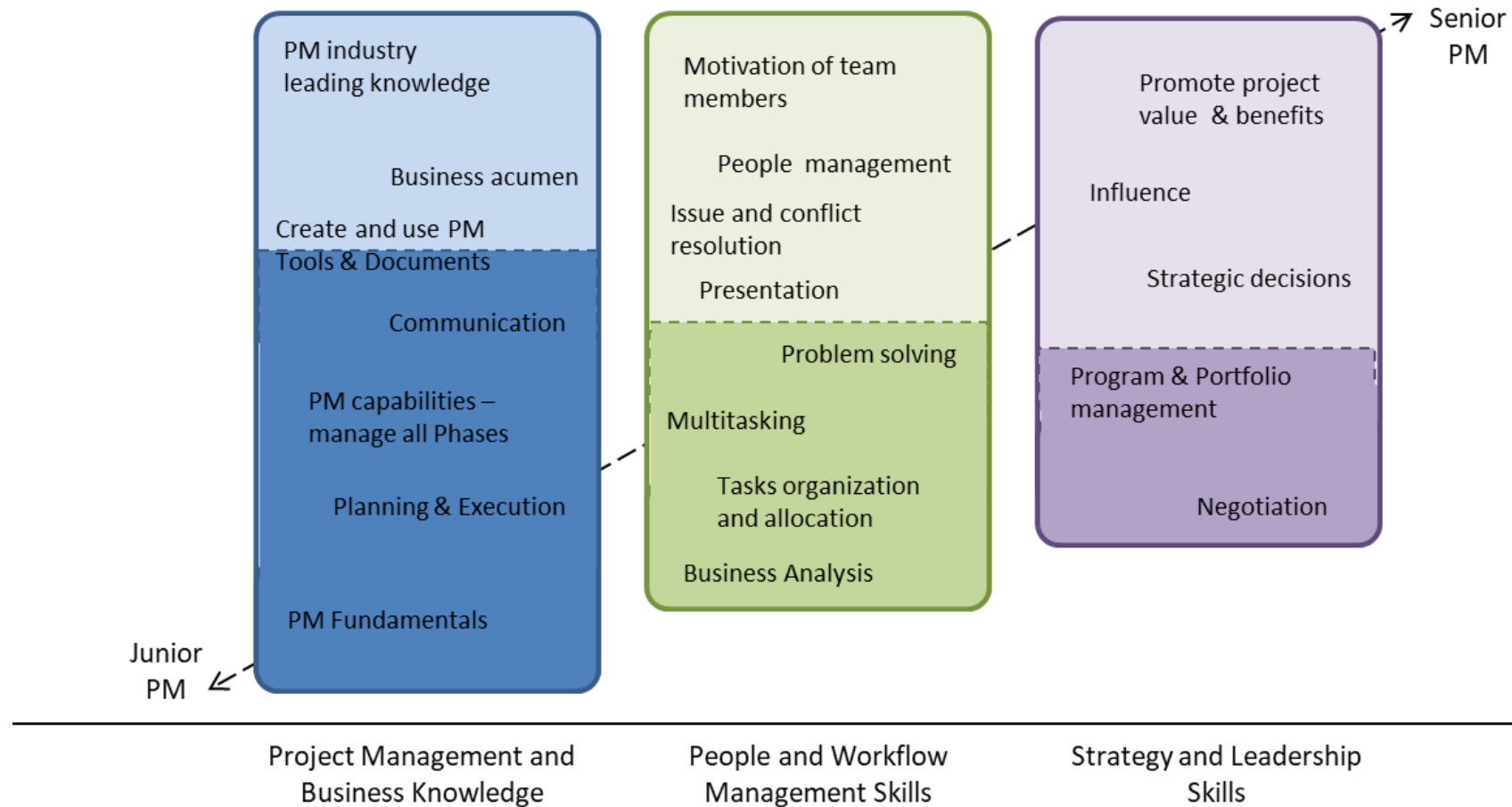
- **Project management and business Knowledge**: Ability to lead project work, know how to address classical project situations; Knowledge of the project lifecycle; Planning quality; management of project critical areas; work with project management tools and documents. Put Controls in place, to be able to track progress. Business analysis skills; Business acumen; Awareness & knowledge of the PM industry standards;
- **People and Workflow Management Skills**: Efficiently Organize project work, define responsible and due date. Issue resolution skills ; People skills - Work with all stakeholders, motivate project team, communicate in a way to create trust among the team members and senior management.
- **Strategy and Leadership Skills**: Negotiate, influence work and stakeholders in the project/program interest; work towards the objectives of the overall program; Ensure work is aligned with the overall corporate strategy Promote the values and benefits of the project/program to the broad organization.

These are all central to the PM role. To this, however, we want to highlight few other characteristics: The attitude, behavior and professionalism of the PM expresses are very important for the Image of the Project - the organization's perception of the work:
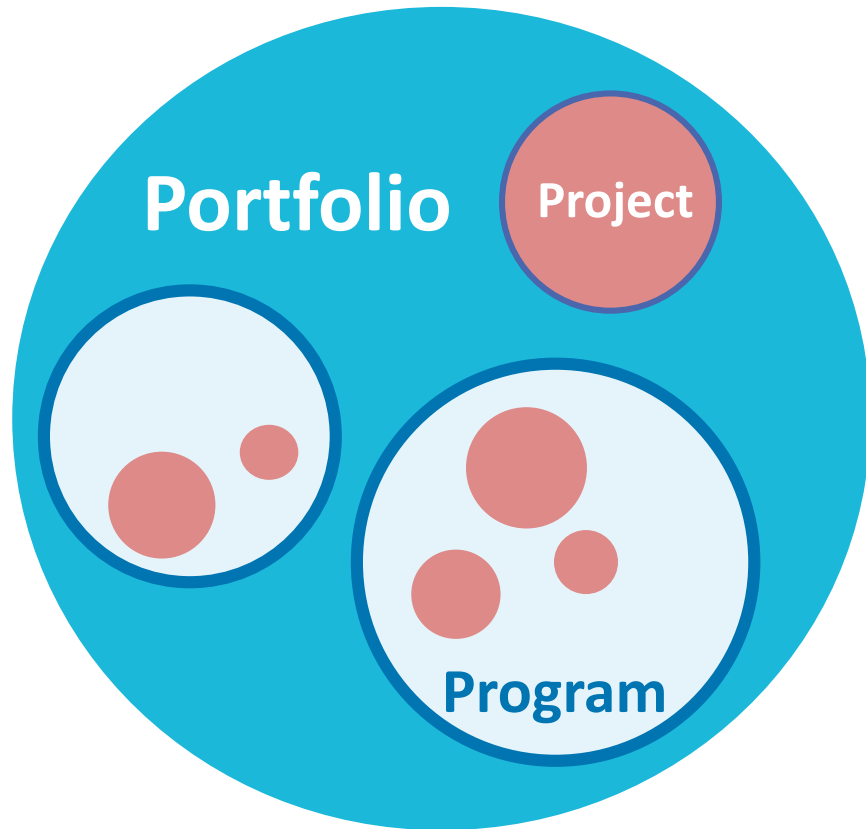
Attitude and behavior: Positive and goal-oriented attitude, especially during difficult times. Projects are complex initiatives which include various subjects, people and personalities, expectations and constraints. There can often be competition for the resources and tension due to the constraints. PM has to be able to handle the pressure and stress that can emerge and in the meantime take the right decisions and trade-offs. A good PM works well under pressure to keep the project on the path to success.

Professionalism – irrespective of the challenges, a PM is a business professional. As such, they need to act as an example, show high morale, ethics and credibility.
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The development of the skills

Senior PM

PM industry leading knowledge

Business acumen

Create and use PM Tools & Documents

Communication

PM capabilities – manage all Phases

Planning & Execution

PM Fundamentals

Junior PM

Motivation of team members

People management

Issue and conflict resolution

Presentation

Problem solving

Multitasking

Tasks organization and allocation

Business Analysis

Promote project value & benefits

Influence

Strategic decisions

Program & Portfolio management

Negotiation

Project Management and Business Knowledge

People and Workflow Management Skills

Strategy and Leadership Skills

Project, Program and Portfolio

A **project** is a temporary endeavor undertaken to create a unique product, service, or result.

A **program** is a group of related projects managed in a coordinated fashion in support of the portfolio.

A **portfolio** refers to a collection of projects and programs managed as a group to achieve strategic objectives.

A **Project Management Office (PMO)** is used to name the department, responsible for managing, coordinating and consulting project-related work.

Definitions and Terminology

Project Sponsor

The individual accountable for the overall project success and for obtaining the expected business benefits of the project. Key responsibilities: approve the project, provide the needed resources, support the activities and resolve issues. Usually a senior or executive manager.

Project Team

The team members are the experts responsible for the actual execution of the work (e.g. developers on a software project).

Project Stakeholders

All individuals or organizations, that can be interested in the project work and result and influence it– participants, management, competitors, vendors, clients and in some cases – the society (e.g. public infrastructure projects).

Project Phases

- As we defined at the beginning of the course, each project is unique. The specificity of the desired result, the involvement of different people and personalities, different time and circumstances all contribute to separate each project from the rest.
- Nevertheless, the PM discipline has established a common view on how each project evolves from the start to the end. The world's leading project management professional organization – "Project Management Institute" or "PMI", has determined projects have 5 phases (or process groups):
  1. Initiation – This is a preliminary phase during which the project foundations are laid, by the Project Sponsor. The overall objective, concept or problem to be resolved is defined. Overall timeline (Expected date for completion) and budget are suggested. These are all documented in the project Business Case. A Project Manager is identified and assigned to start working on the project.
  2. Planning – Essential part in any project, which often makes the difference. Good planning increases the chances of completing a project within time and budget. During this phase, the PM has to do substantial preparation - to correctly define the work to be done, to organize the way the work will be executed, estimate and define timelines, the necessary budget, resources, management attention, etc. PM has to ask the right questions and then work with other project stakeholders to find the needed information. What do we need to do to meet the objective? How we will do everything? Who will do what work? When should the tasks finish, in order not to slowdown the next ones? How we will make sure issues are quickly identified? Which are the risks that can hurt the project? How to make sure we don't spend more dollars than needed? Which people are expected to cause problems? How do we keep the project safe from them and many other questions. The way the PM will answer those questions is key. It can maximize the chances of meeting the project goal, but, if not performed well, it can expose the work to many additional risks and create an environment of insecurity. Planning = also your Strategy how to win.
  3. Execution – This is the phase during which the actual project work is performed, the deliverables are created. In construction projects, this would include constructing the building or infrastructure, in process improvement projects these would be all actions aimed at identifying the opportunities and implementing the changes in the organization. In software development, this would represent the coding and programming, etc. The key role of the PM will be to keep the project environment good, to motivate the team and help to resolve any issues that come up along the way.
  4. Monitoring & Control – this phase goes hand in hand with Execution. The project manager uses the control systems developed, to track if all project work streams are progressing with the speed and quality to be completed within timeline and budget. If there are any slow downs, delays, gaps, these will be identified and the manager will have to take actions to "fix" them.
  5. Closure – after all work is done, all deliverables are finalized, PM still has some work to do to formally complete the project. This would include doing a formal handover of the project product to the department or people it was designed for. Formal approval and sign-off has to be given by the project Sponsor, confirming the mission describer in the initiation phase has been achieved. Last but not least, the PM has to gather the team and stakeholders into a meeting to discuss the Lessons Learnt – what went well, what did not went that well and can be better done during the next similar project. Continuous improvement is very important also in projects, as PMs constantly learn new things and build on their expertise. Formally documenting the feedback for the project is a key driver to this process.

Initiation → Planning → Execution / Monitoring & Control → Closure

Initiation Phase Steps

Define the goal of the project

Review the business case

Outline the project scope

Conduct feasibility study

Assess risks and expectations

Assign a project team

All projects are created for a reason. Someone identifies a need or an opportunity and devises a project to address that need.
A **business case** is created to define the problem or opportunity and identify a preferred solution for implementation.
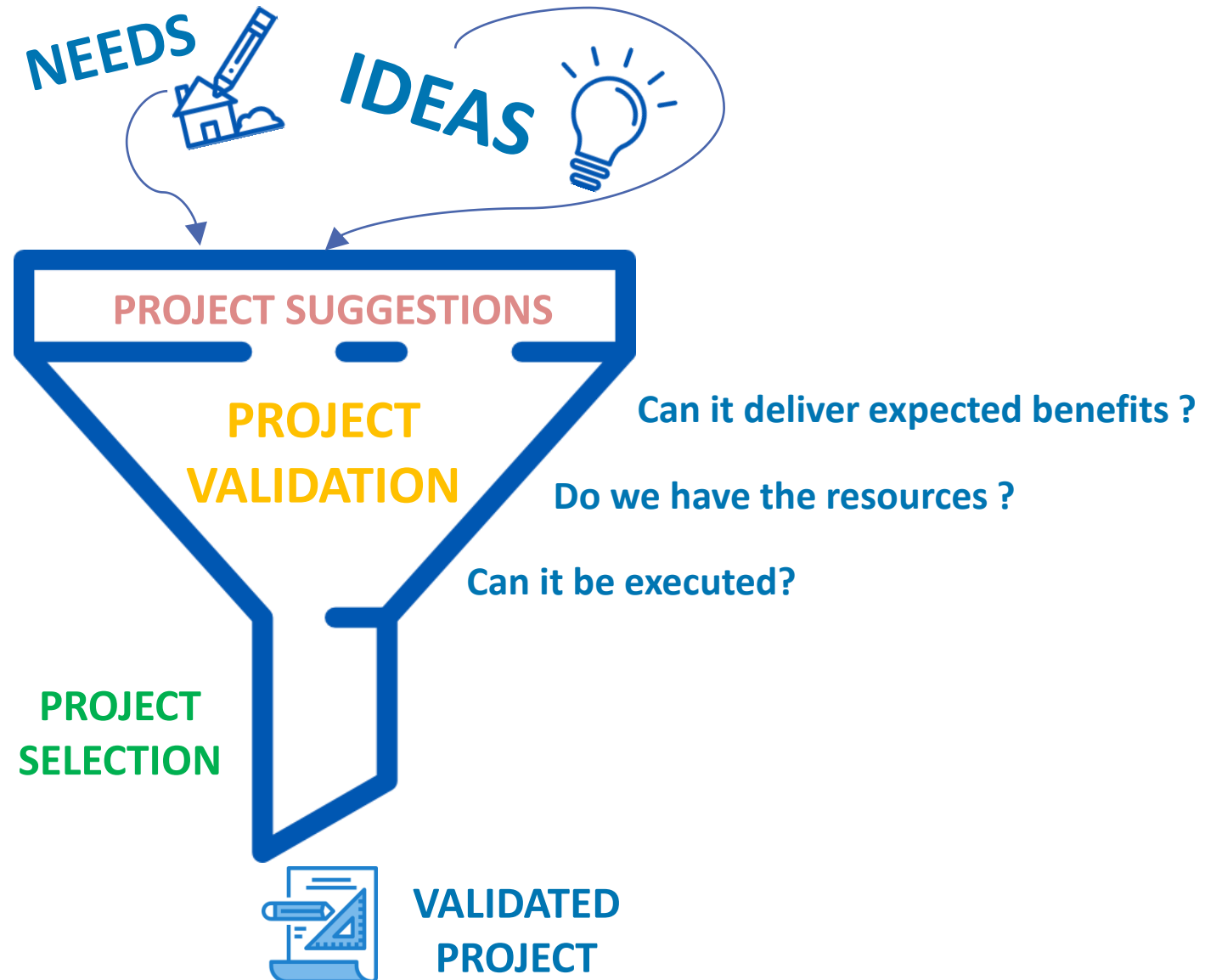
A **feasibility study** is used to determine the viability of the project idea. Each project is tested in 5 areas:
- ✓ Technical feasibility
- ✓ Economic feasibility
- ✓ Legal feasibility
- ✓ Operational feasibility
- ✓ Scheduling feasibility

A **project sponsor** determines if the project is worth undertaking or should be terminated through **project selection process**.

The project sponsor issues a **project charter** to authorize the existence of an approved project and to appoint a project manager. Resources are preassigned to work on the project planning.

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Project Selection

NEEDS

IDEAS

PROJECT SUGGESTIONS

PROJECT VALIDATION

Can it deliver expected benefits ?

Do we have the resources ?

Can it be executed?

PROJECT SELECTION

VALIDATED PROJECT

Project Charter

The project charter is "a document issued by the **project sponsor** that formally **authorizes the existence of a project**, and provides the project manager with the **authority** to apply organizational resources to project activities."

- Project Management Body of Knowledge PMBOK Guide 5th Ed

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Characteristics of a Project Charter

Provides a **big-picture view** of the project	Gives the PM **authority** to use organization's resources	Defines objectives and **success criteria** for the project
A **project charter** is a broad statement of the : ✓ Scope ✓ Major milestones ✓ Stakeholders ✓ High-level assumptions ✓ High-level risks ✓ Project constraints These components are specified in detail during the planning phase.	A project charter serves as a **contract between the project sponsor and the project manager.** It defines the authority of the project manager to spend money and to commit resources.	The project objective is clearly stated following the **SMART** protocol. This defines the **success criteria** that should be met for the project to be successfully completed. The project charter specifies who should **endorse the completion of the project**.

Project Phases

Initiation → Planning → Execution / Monitoring & Control → Closure

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Planning Phase

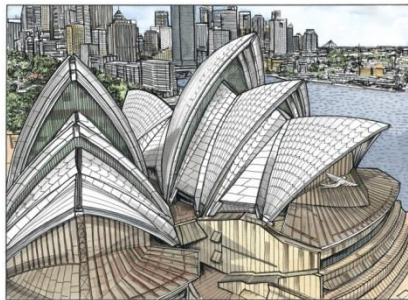**Planning** is thinking and deciding how to do something and only then do it, instead of doing it directly.

It is the process of analyzing, evaluating, deciding and organizing the activities in advance.

Planning Phase

Lack of proper planning and control, results in **delays, higher cost and / or lower quality of output.**
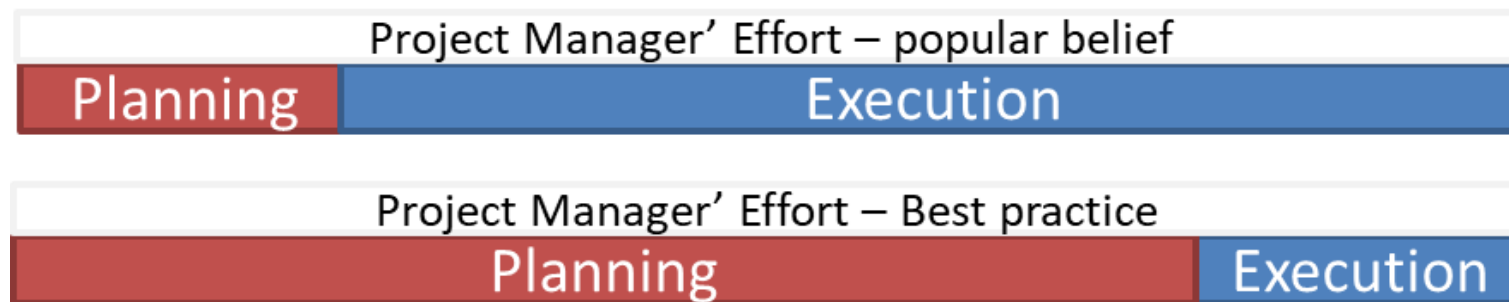
Example: Sydney Opera

Expectations: 6 years, $ 7 Million.

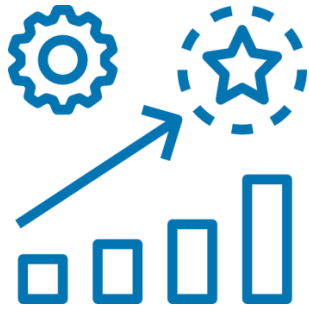**Reality: 16 years, $ 102 Million.**
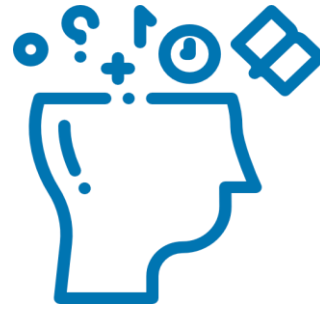
Planning in Project Management

Planning is Often underestimated – people think PM effort has to be during Execution, but it is the other way around. It is yet another case following the **80/20** rule: If PM spends a lot of efforts in planning, this will pay-off with much less thins to run after in the long execution phase.

Project Manager' Effort – popular belief	
Planning	Execution

Project Manager' Effort – Best practice	
Planning	Execution

The 3 Fundamental Steps of Planning

1.
**Define
the goal**

2.
**Evaluate
options**

3.
**Choose & confirm
best option**

Role of the PM in the planning phase

PM plans for:

i   **What we know and can control**
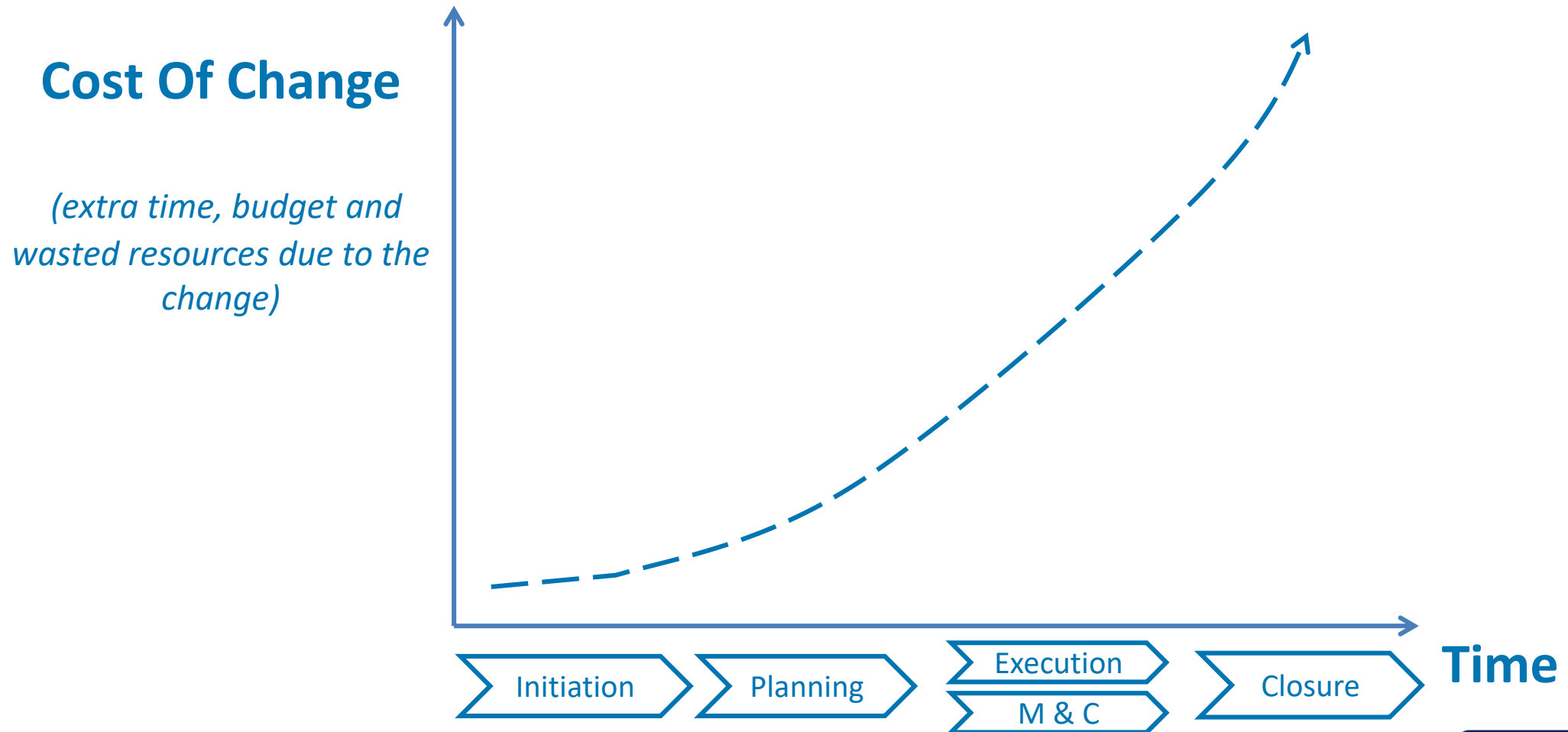
?   **What we don't know and can't control**

The more things the PM plans for, the higher the chances to complete the project with success – meet the goal, timelines, and budget.

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Cost of change

As time passes, the cost of change increases significantly. Example: your scope is about construction of a shopping mall. If an year after the construction has started, the owners decide it needs to be used as a residential building, the extra time and resources to transform it would be enormous. If, on the other hand, the same request comes during the planning stage, before construction has even started, the cost of change would be much smaller (maybe few weeks of planning).

Cost Of Change

(extra time, budget and wasted resources due to the change)

Initiation > Planning > Execution / M & C > Closure

Time

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Planning for your Planning

?   **What knowledge do I have about the required work? Is it sufficient to build a comprehensive plan?**

?   **What knowledge or specific expertise do I lack to make a good estimation of the work? Who can support the planning for this area?**

?   **Have I or any of my colleagues worked on a similar project?**

?   **Are all expectations for the end result clearly understood by everyone?**

?   **How much time do I need to put all pieces together and complete the project plan?**

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Non-straight forward process

How to "extract" the needed information from a stakeholder, expert, etc.? This can be a difficult process, as the information the PM is looking for cannot be directly understood (in some cases).

We can call this a **Non-straight forward process.**

Tips: when organizing a meeting / interview / workshop to start planning – make sure you create a good agenda, including the goal of the meeting and listing all topics that need to be covered and questions to be answered. Then – follow the list, during the meeting to ensure you exit the room with the needed answers. Or in case the answers could not be given, with a view on who can provide the needed.

Although PM does not need to be a real "expert" in all fields, they must be able to understand how things operate in each field, in order to correctly manage the project work. Along with the fact that in each project there are many parts to be planned and executed (as we will see now in the following lectures), it is the PM's core responsibility to perform Integration management (PMI quote) or in other words be successful in managing simultaneously all different aspects of the project, factoring all interdependencies.

Scope
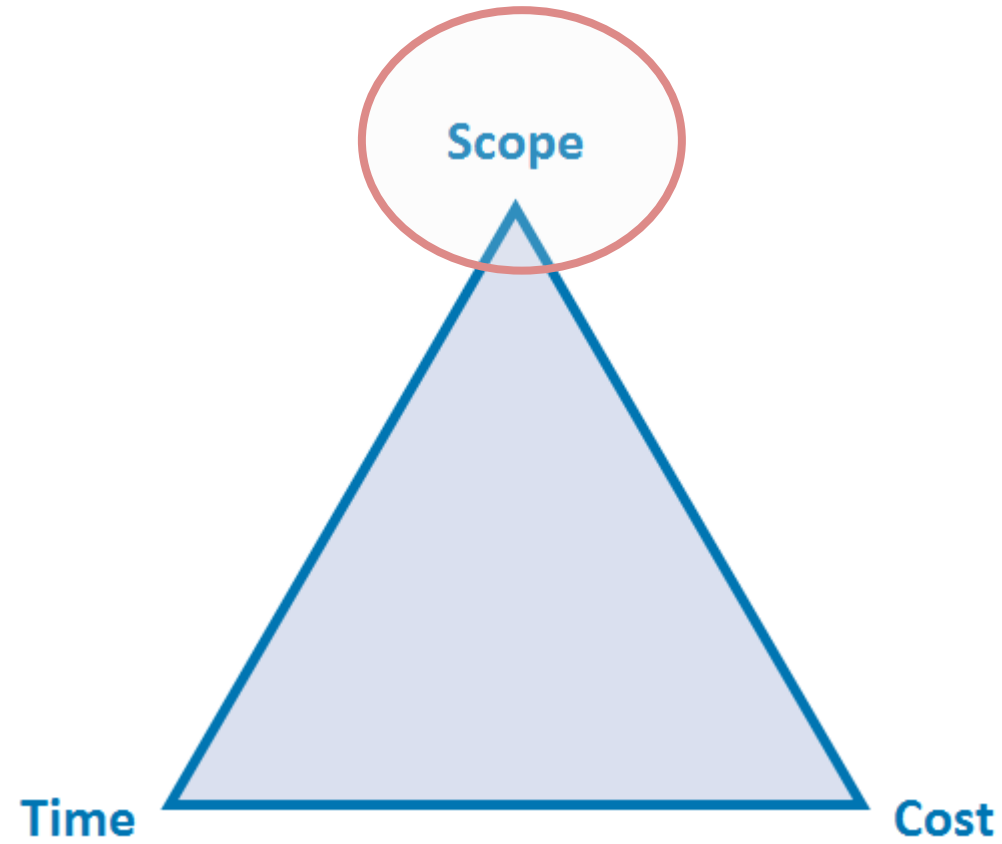
Scope: broader than just the "product" of the project

Scope = **All project outputs (product, service, result)** **+** **any additional work that has to be done, in order to complete the project outputs**

Example: construction project: you need to build a house. However, there I an old smaller house on the land, on which you want to build the new one. Although the old house is not your project output, it has to be demolished and removed so that you can achieve create your project output – the new house. The Scope will include the activities for demolishing and removing the old house as well.

How to plan your Scope?

1. **Analyze the available information about the project scope**

2. **Gather detailed requirements and expectations**

3. **Document the scope**

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Work Breakdown Structure

The Goal of the project needs to be broken down in more details, so that the project manager and project team can plan and execute. If the goal is "increase sales, by creating a showroom to exhibit new cars ", this information is too high-level and vague, hence not useful for planning purposes.
The project manager has to transform this information into smaller pieces. A very useful exercise is to design the Work Breakdown Structure.
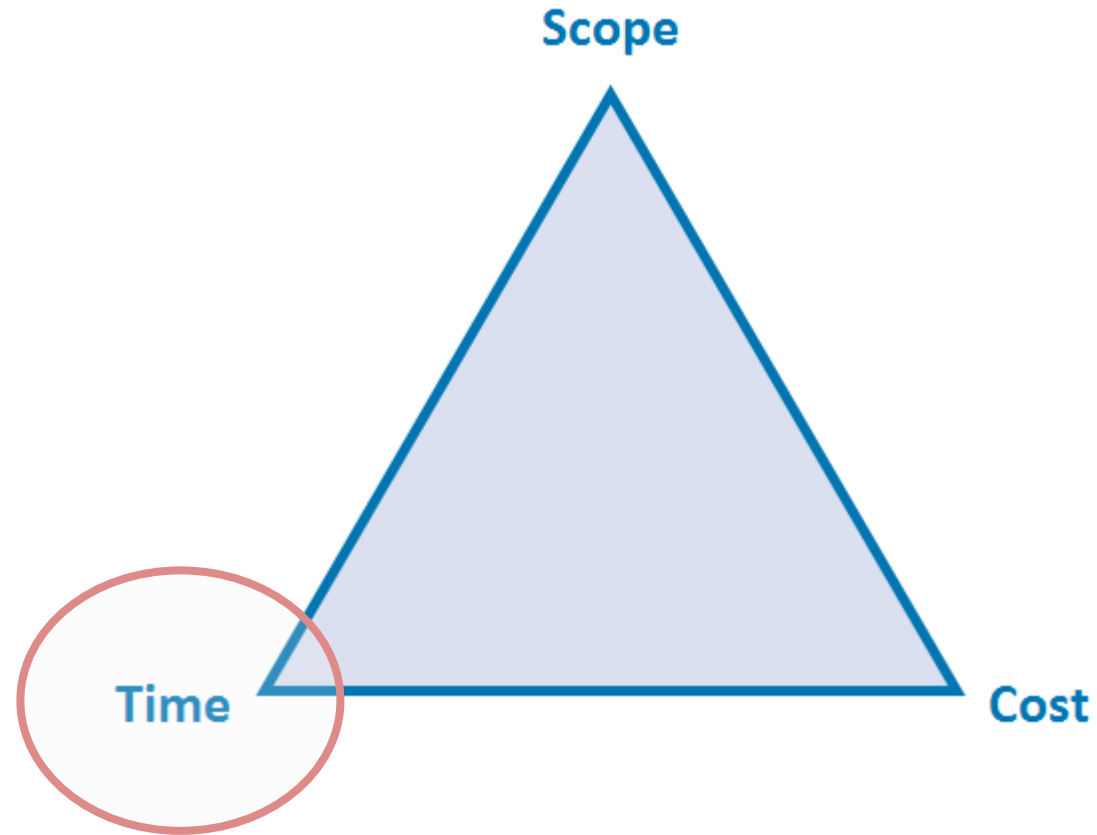
The Work Breakdown Structure (WBS) is a visual representation of the project Scope. Starting from the project goal (high-level), you go down a level and define the major groups of activities or "work streams". This could be "build a 1 storey showroom of 500 m^2", "manufacture 6 new cars", "recruit 10 employees to work as sales staff in the showroom".
Then, one more additional level below each work stream, until you reach a task level. The task needs to be big enough to be easily explained and managed by 1 person. Example: "Put a safety fence around the construction field".
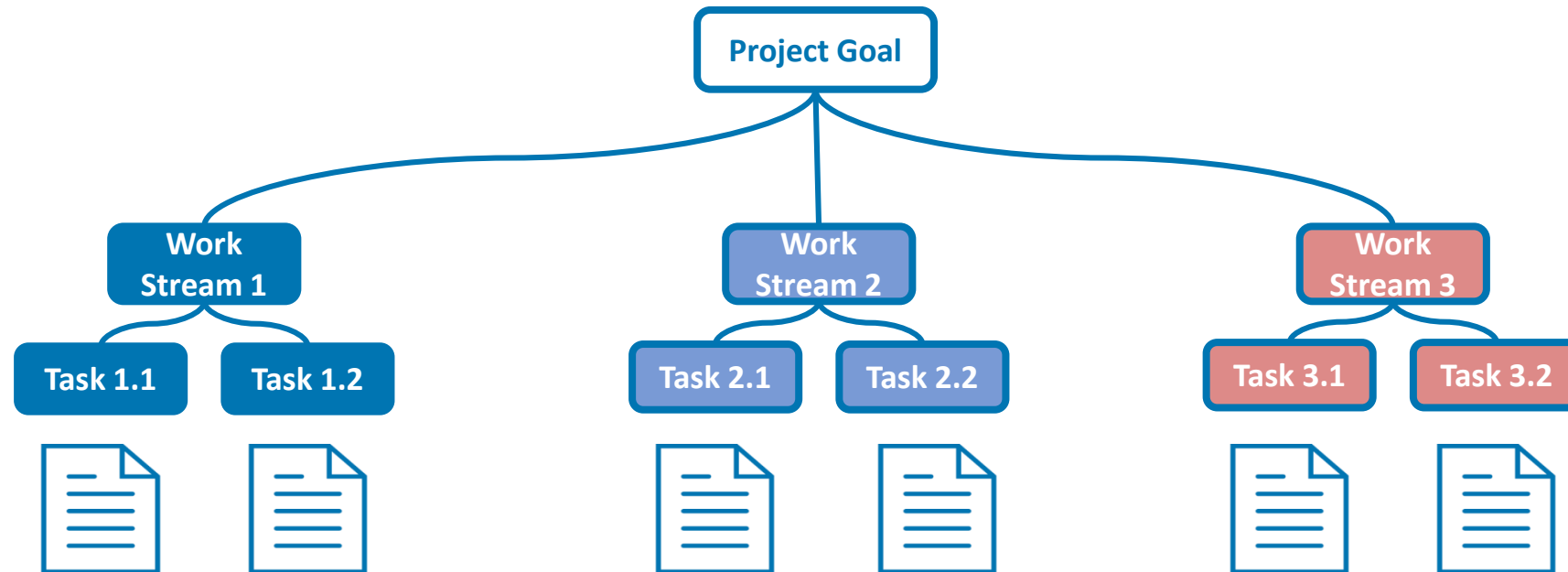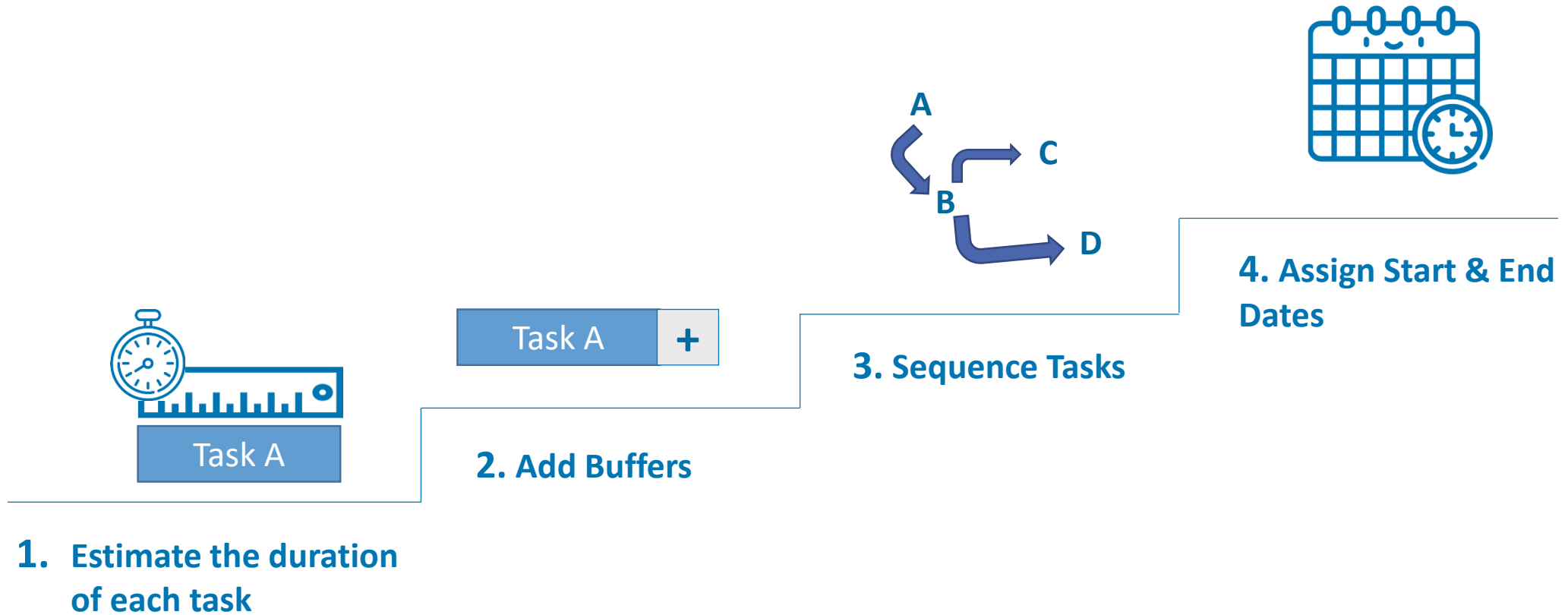

The sum of the detailed tasks is often referred to as an "Activity List". It will be used as the "skeleton" of the Project Plan.

Time

Project schedule and timelines

A

C

B

D

Task A +

4. **Assign Start & End Dates**

3. **Sequence Tasks**

Task A

2. **Add Buffers**

1. **Estimate the duration of each task**

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Estimate Durations

Planning Pitfalls:

- Optimism bias: focusing on the "positive" future scenarios and missing to consider the "not so good ones". If the negative scenarios are forgotten during planning, this will come as a surprise during Execution. Planning is done for future events, so we need to limit our own biases.

- Illusion of control: being overconfident that you can control the future events.

Estimate Durations

3 Point Estimate

Step 1: define three scenario points:

- **O**ptimistic case
- **N**ormal case
- **P**essimistic case

Step 2: Apply the 3 point estimate formula to identify the Estimate (E):

$$E = \frac{O + 4N + P}{6}$$

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Buffers

The amount of buffer to be added is strictly dependent on the specific case at hand. Manage on ad-hoc basis.

Factors:

? Level of uncertainty

! Criticality of the task

👷 Owner of the task
(Experience, track record)

High

Buffer

Low
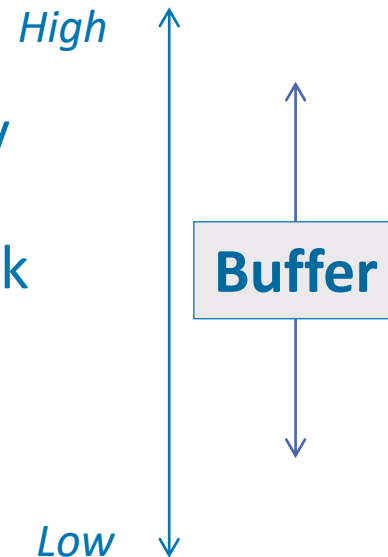
When the task is uncertain (e.g. doing it for the first time), more critical compared to the rest or the Owner of the task is less experienced, a bigger buffer should be used.

Positioning Buffers:

On each Task

| Task **A** | + | Task **B** | + | Task **C** | + |

On groups of Tasks

| Task **A** | Task **B** | + | Task **C** | + |

On the whole Project

| Task **A** | Task **B** | Task **C** | + |

Tips:
- Avoid big buffers on single tasks (Parkinson's law)
- Avoid putting the whole buffer on one place – at the end of the project.
- Aim to use buffers after groups of tasks and avoid labelling them as "buffers". You can use "Validation" or "Checkpoint".

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Sequence Activities

Dependencies

Logical	Resources	External	Soft
• Logic-based correlations • Physical dependency	• Limited resources put two tasks in dependency	• Regulations • Seasonality • Other factors	• Such that the PM decides to apply • Subjective

Types

Finish To Start (FS)	Finish To Finish (FF)
Start To Start (SS)	Start To Finish (SF)

Result:
Identified dependencies

A → B

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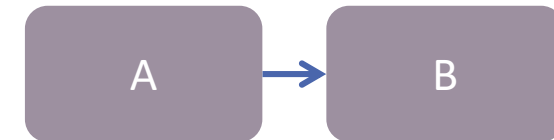
Critical Path Method 1/2

Critical Path Method:

- On the basis of the available information (Tasks, Durations, Dependencies), create a network diagram with Boxes and Arrows. Also called PERT Chart

- Identify the longest path from Start to Finish.

Critical Path:

The longest chain of dependent activities in the project.
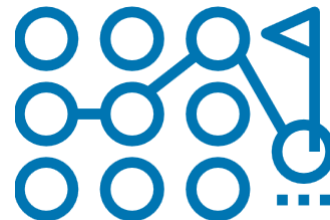
Benefit:

Indicates the fastest possible way to complete the whole project

How to perform the Critical Path Method:

1. Use the information available:

   - Activity List; Durations; Dependencies

2. Build the network diagram, by drawing **Boxes** with Task Name and Duration and **Arrows** to indicate dependencies

3. Calculate the Longest chain of dependent tasks (the Critical Path)

Start and End dates: the Gantt Chart

- To the left (Y-axis), the activities are listed (you can take from the Activity list / WBS).
- At the top (X-axis), a calendar is inserted. It can be with days, weeks or months, depending on what you find most convenient for the work you are planning.
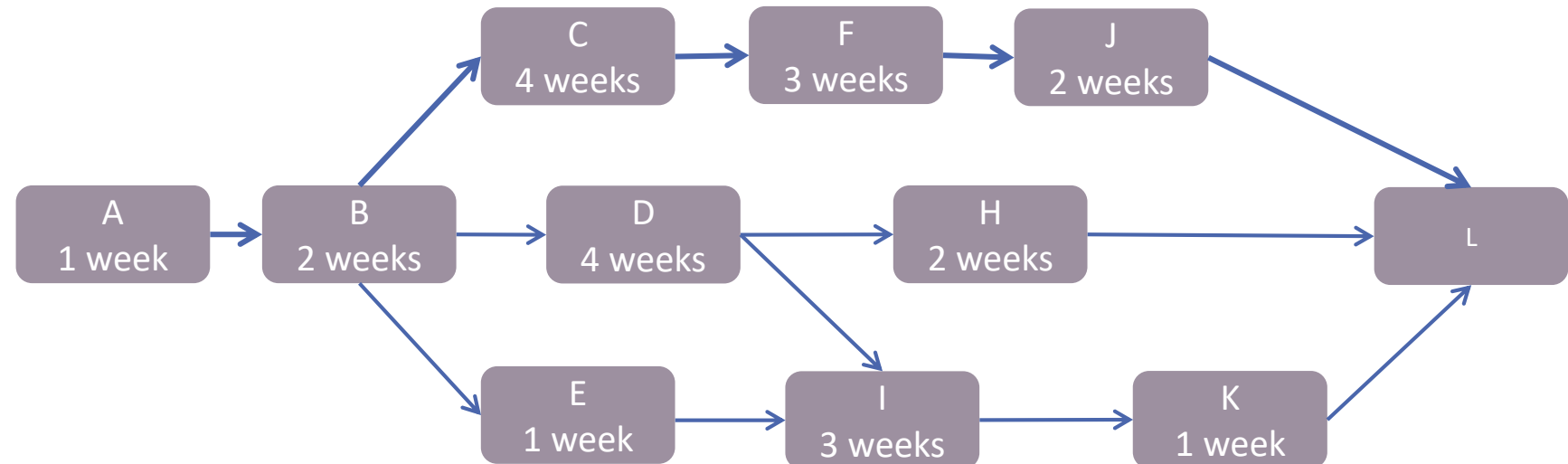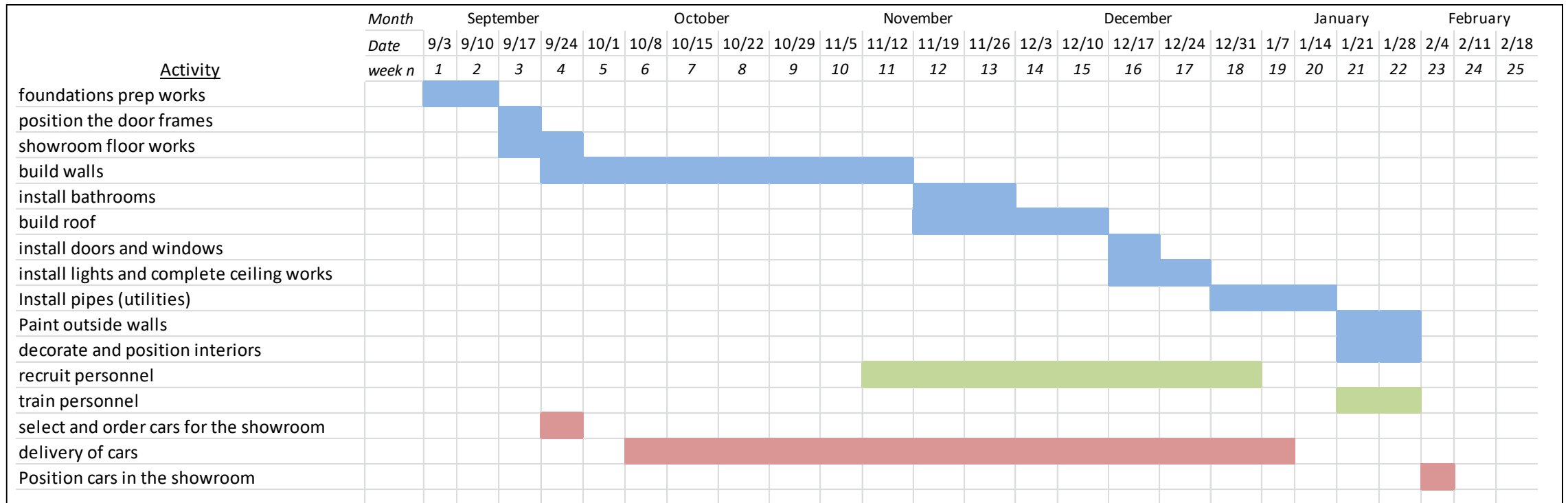- The tool is a bar char (horizontal), where each bar is limited by the start and the end date of a specific activity. The length of the bar represents the duration of the activity. All activities are listed on the side and to the right calendar days are displayed. With this graph it is very easy to represent the activities and get a good feel about the duration and when is each one to be executed.
- Can be used for monitoring, but is also extremely helpful during the planning phase.
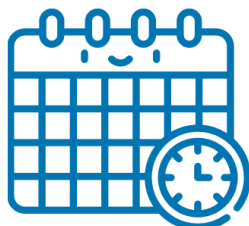- Strongly suggest to use it when forming the project schedule

Month	September				October					November				December					January				February		
Date	9/3	9/10	9/17	9/24	10/1	10/8	10/15	10/22	10/29	11/5	11/12	11/19	11/26	12/3	12/10	12/17	12/24	12/31	1/7	1/14	1/21	1/28	2/4	2/11	2/18
Activity / week n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
foundations prep works	▓																								
position the door frames		▓																							
showroom floor works			▓																						
build walls				▓	▓	▓	▓	▓	▓	▓	▓														
install bathrooms												▓	▓												
build roof														▓	▓										
install doors and windows																▓									
install lights and complete ceiling works																	▓								
Install pipes (utilities)																		▓	▓						
Paint outside walls																				▓	▓				
decorate and position interiors																									
recruit personnel											▓	▓	▓	▓	▓	▓	▓								
train personnel																				▓	▓				
select and order cars for the showroom				▓																					
delivery of cars						▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓								
Position cars in the showroom																								▓	

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Building the Project Plan

Project Plan (or Schedule)

Activity List

Durations
(incl. buffers)

Task A +

Critical Path

Dates
(Start & End)

ID	Task Name	Duration	Start	Finish	Predecessors
1	Lamborrari: Project Kick Off	0 wks	Mon Jan 6	Mon Jan 6	
2	**Prepare land for construction works**	**3 wks**	**Mon Jan 6**	**Fri Jan 24**	
3	Assemble and position safety barriers	3 days	Mon Jan 6	Wed Jan 8	
4	Clear building site (demolition/deconstruction, removal of objects)	6 days	Thu Jan 9	Thu Jan 16	3
5	Build and position support facilities (lifts, etc.)	6 days	Fri Jan 17	Fri Jan 24	4
6	Excavate foundations (Digging)	2 wks	Mon Jan 27	Fri Feb 7	2
7	**Build foundation structure**	**4 wks**	**Mon Feb 10**	**Fri Mar 6**	**6**
8	Construct main load-bearing structure	1 wk	**Mon Feb 10**	Fri Feb 14	
9	**Install Utilities systems**	**6 days**	**Mon Feb 17**	**Mon Feb 24**	
10	Plumbing	2 days	Mon Feb 17	Tue Feb 18	8
11	Sewerage	2 days	Wed Feb 19	Thu Feb 20	10
12	Electrical wiring	2 days	Wed Feb 19	Thu Feb 20	10
13	Communication fibers	2 days	Fri Feb 21	Mon Feb 24	12
14	Thermal Insulation	2 days	Wed Feb 19	Thu Feb 20	10
15	Build underground level floor (concrete and steel constructions)	1 wk	Mon Feb 17	Fri Feb 21	8
16	Build underground walls (non-bearing)	1 wk	Mon Feb 24	Fri Feb 28	15
17	Build ground-level floor	1 wk	Mon Mar 2	Fri Mar 6	16
18	**Build Showroom spaces (floor 1)**	**9 wks**	**Mon Mar 9**	**Fri May 8**	**7**
19	Construct main load-bearing structure	4 wks	Mon Mar 9	Fri Apr 3	17
20	Build bearing walls	2 wks	Mon Apr 6	Fri Apr 17	19
21	Wall framing in house construction	1 wk	Mon Apr 20	Fri Apr 24	20
22	Build interior spaces / rooms partitions	2 wks	Mon Apr 27	Fri May 8	21
23	**Complete Roof works**	**6 wks**	**Mon May 11**	**Fri Jun 19**	**18**
24	Build top floor / roof (concrete and steel constructions)	3 wks	Mon May 11	Fri May 29	22
25	Install Water-resistive barrier	2 wks	Mon Jun 1	Fri Jun 12	24
26	Install covering for flat roof	1 wk	Mon Jun 15	Fri Jun 19	25
27	Main construction Completed	0 days	Fri Jun 19	Fri Jun 19	
28	**Install doors and windows**	**3 wks**	**Mon Jun 22**	**Fri Jul 10**	**23**
29	Install Windows	2 wks	Mon Jun 22	Fri Jul 3	23
30	Install External doors	1 wk	Mon Jul 6	Fri Jul 10	29
31	**Finalize external building façade**	**2 wks**	**Mon Jul 13**	**Fri Jul 24**	**28**
32	Install Insulation	2 wks	Mon Jul 13	Fri Jul 24	28

Page 1

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Cost

Project Budget

Task A
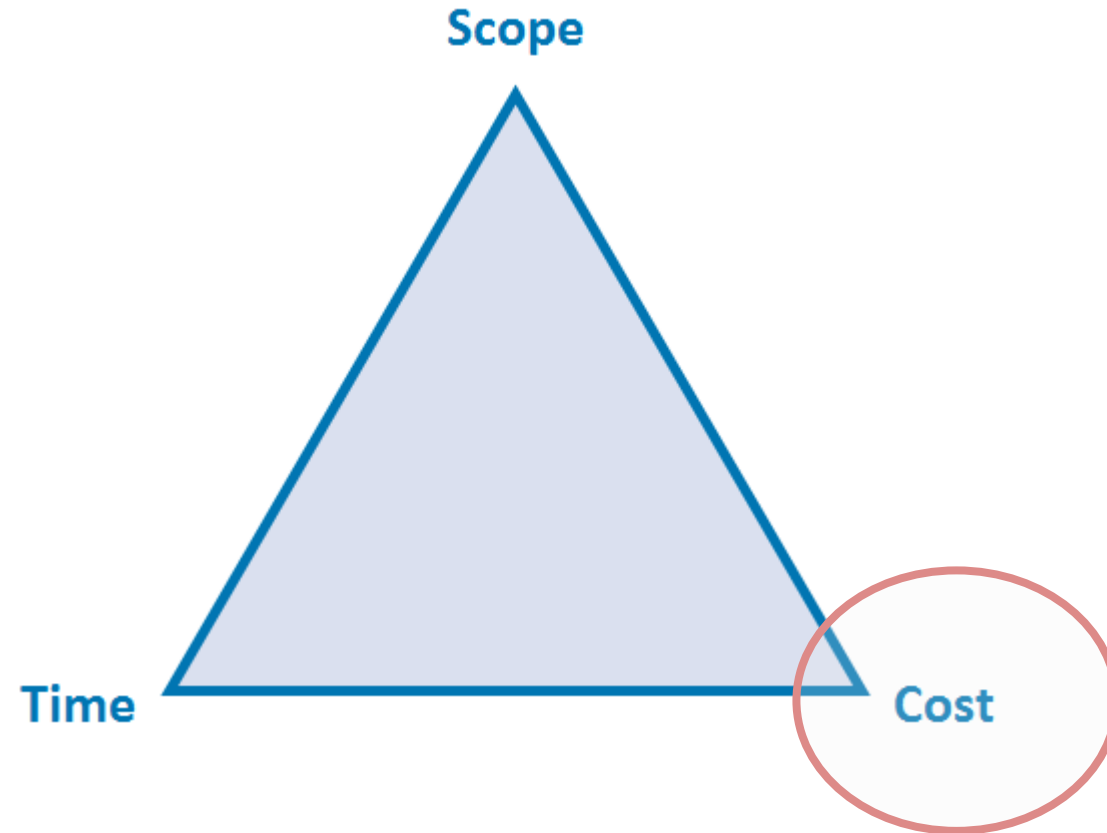
1. Identify the cost-generating activities from the project. Start with the WBS or Activity list created.

2. Estimate the cost of each task/deliverable. Add buffers and understand uncertainties.
Buffers for the Cost should be bigger than those used for the Time.

3. Schedule the expenses, by putting expected dates (look at the Gantt chart). It is very important to know when the financial resources will be needed (Time value of money and Approval process).

4. Determine the project Budget. Consolidate the estimations and calculations performed.

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Project Budget 1/2

Budget Estimations:

- Gather information (Price is available; Alternatives; Gathering information through quotations (RFQ, RFP)

- Calculations (Lump sum; time & materials; units)

- Buffers – Usually, bigger than the Time buffers, because it is easier to allocate additional time and harder to get some more money
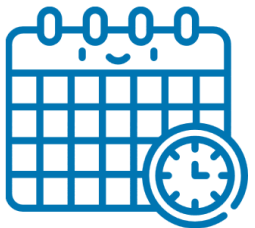
Timing the Budget – plan and indicate WHEN an expense is expected to take place (Time value of money; Financial processes)

If the project has more work streams and more types of costs to incur, it is recommended to have a dedicated budget for each separate work stream or cost type.

Consolidate the budgets, displaying the totals per month. This will be the overall budget per month (or quarter or week, depending on the needs).

Project Overall Budget	2018				2019				Total Budget (per activity)
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
foundations prep works	$ 23,000								$ 23,000
position the door frames	$ 1,000								$ 1,000
showroom floor works	$ 10,000								$ 10,000
build walls	$ 2,000	$ 27,000	$ 15,000						
install bathrooms			$ 7,000	$ 13,000					$ 20,000
build roof				$ 67,000	$ 16,000				$ 83,000
install doors and windows				$ 21,000					$ 21,000
install lights and complete ceiling works				$ 24,000					$ 24,000
Install pipes (utilities)					$ 16,000	$ 11,000			$ 27,000
Paint outside walls					$ 17,000	$ 7,000			$ 24,000
decorate and position interiors					$ 7,000	$ 10,000			$ 17,000
recruit personnel			$ 4,000	$ 3,000					$ 7,000
train personnel					$ 5,000				$ 5,000
select and order cars for the showroom	$ 3,600								$ 3,600
delivery of cars		$ 11,000	$ 11,000	$ 11,000					$ 33,000
Position cars in the showroom						$ 4,000			$ 4,000
Total Budget (per Month)	$ 39,600	$ 38,000	$ 37,000	$ 139,000	$ 61,000	$ 32,000	$ -	$ -	**$ 302,600**

Planning - Resources: Procurement 1/2

It is often the case that an organisation will not have the required resources that a project needs. Therefore, the PM here has the responsibility to procure what they need externally. By this point they should be very familiar with the details of the contract in order to properly assess the costs and the risks of any transaction. They must be aware of timelines, due dates and quality levels of all resources they are procuring.

There are 3 main types of contract that we will run through now. It is up to the PM to find the best contract because it is their main tool for keeping track of vendor work and behaviour.

So, the first one is called **fixed price** and it is the simplest type of contract. The vendor commits to doing the work for a set amount within a certain timeframe.

The pros of this is that any additional spending will be taken on by the vendor – no risk for you. Perfect!

Or is it?

You see that they are aware that with this kind of contract, if the costs are higher than expected then they will incur losses. Therefore, there is a chance they will put a big buffer on the initial price.

Or if they find that costs are getting too high they may try to decrease the scope or the quality in order to compensate.

So, know that this is beneficial to use when the scope is clear to all parties, but a good analysis is important prior to making agreements.

The second type is called **Cost Plus** – This is where the buyer agrees to pay any cost incurred by the vendor performing the work. This can be a fixed additional fee, a variable fee or a mix of the two. Either way it gives the buyer the flexibility to adapt the spending in accordance with the work being done.

But with that comes the risk of covering all extra costs, along with the chance that the vendor may keep the work going longer than needed or adding extra items to the 'to-do list'.

This contract makes more sense if the scope is not easy to define. But proper controls need to be put in place to ensure money is only spent on things essential for the project. A fancy new haircut for the vendor doesn't fall into this category.

The third type of contract is called time and materials and it's a mixture of fixed price and cost plus. Its where the vendor charges the buyer an hourly or daily rate. For example, when consultants or technicians charge per day of their services. It's another good contract to jump into when the scope is not clear, and the work is more labour based than material based. It runs a similar risk to the cost-plus contract but that just means the same counter measures can be taken.

Well, there we have three types of contract but there can be many variations and of course they can all be tailor-made. The PM could add incentives for the vendor to complete work faster or to better quality. The contract can even include inflation if the project spans a long time.

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Human Resources

1. Define the needed resources:

- Engineers, IT Developers, Business Analysts, etc.

Start with the Scope – list of activities. The PM needs to understand what king of support is needed to execute the project. PM has to identify all needed experts to perform the work – developers, engineers, analysts, etc. This depends on the scope of the project.

2. Estimate the effort needed

- Number of team members
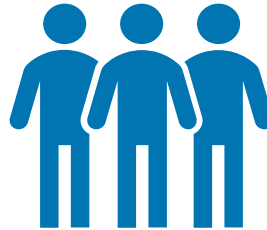
3. Validate Resource Availability

- Time that can be dedicated
- Vacations, Bank Holidays

a) Create a schedule – who needs to do what and when. Use an actual calendar (holidays to be accounted). Create a simple template (add an example - see next slide
b) Obtain a confirmation from the departments' heads that each employee can participate in a project.

4. Define Roles and Responsibilities
(see next slides)

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HR: Roles & Responsibilities

Standard Form:

Role	Name	Responsibilities	Contact
Project Sponsor	Johnson	• Accountable for the project success • Supports PM in resolving high-level issues • Owner of the Budget, Timeline and Business Case. Approves any changes	J.Johnson@company.com
Project Manager	Philips	• Accountable for the project planning, execution and closure. • Daily management of project team and activities • Manages resources, risks, communications, stakeholders	P.Philips@company.com
Functional Team Lead – Software development	Matthews	• Provides status updates (progress, variance, potential issues, etc.) to Project Manager • Supports, guides and coordinates team members in completing their daily project tasks • Supports other ad-hoc project tasks	M.Matthews@company.com
Team Member – Software Development	Henry	• Works directly to create the project deliverables (scope) • Uses subject matter expertise • Provides progress updates, communicates potential issues, seeks support • Suggests improvements • Supports other ad-hoc tasks (e.g. testing, trouble shooting, etc.)	H.Henry@company.com

The Standard form is simple and easy to use and apply. It is more appropriate for smaller projects with not too many people. You need to document the Role, the Name and the specific Responsibilities (in this field, you need to go in detail). Contact details (e-mail, telephone) are also valuable information to add.

Note! Always discuss the responsibilities with the people before you finalize the document.

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HR: Roles & Responsibilities

RACI Matrix:

Activity / Deliverable	Project Sponsor	Project Manager	Marketing Director	Marketing analyst	Production Director	Chief engineer
	PMO		Marketing Department		Production Department	
Project Management						
Appoint PM and support project	A		I		I	
Project Planning and Kick-Off	C	A/R	C		C	
Weekly Status Report	I	A/R	I	C	I	C
Work-Stream 1: Marketing						
Marketing Study		A	C	R		
Marketing Report with findings	I	A	C	R	I	
Work-Stream 2: Production						
Analyze future capacity needs		I			R	C
Build additional capacity / upgrades	I				A	R
Work-Stream 3: Supply-Chain						
…						

R - Responsible
A - Accountable
C - Consulted
I - Informed

RACI Matrix crosses the specific Activities (Y axis) and the people involved in the project (X axis). For each activity, a person can be either:

- **Responsible**: the person actually doing the work
- **Accountable**: the person that must ensure the task is successfully completed, even if she or he is not the one doing it (Responsible)
- **Consulted**: can be asked to provide advice and guidelines, based on the own expertise
- **Informed**: has to be kept updated on the progress of the activity. Usually senior management.

RACI Matrix is very useful in bigger projects, where more people are involved (bigger project team). Also, in projects where more people work on the same tasks / deliverables.

Note! When describing Roles and Responsibilities in a project, do not forget any project management related activities.
Example: team members reporting on their progress regularly to the Project Manager.

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Quality

What is Quality?

"The standard of something as measured against other things of a similar kind; the degree of excellence of something" *Oxford Dictionary*

In Project Management:

Customer satisfaction with the project product, service or result.

Defining Quality Requirements: Each project has a Goal. Its output (product, service or result) has to satisfy a specific need of the organization or of the project client (person / organization). To define what is a successful satisfaction of the need, the PM has to be analyzed and written as "quality requirements".

Example: the goal is to produce the fastest and fanciest car on the market, accelerating 0 to 100 km/h in 3 seconds. The Scope is the automobile. The project team delivers the car in the agreed time and budget. The car is luxurious and looks exactly as per the plans. However, accelerates 0 to 100 km/h in 4.2 seconds. Project is not successful.

Standard	**Quality Requirements**	**Performance**
• Physical characteristics (Specs)		• Physical (e.g. Durability, etc.)
• Low variation in output		• Speed (e.g. Website response)
• Meeting a specific Criteria		• Achieving a Result without impacting other functions
• Scoring; Y/N		

Quality Planning
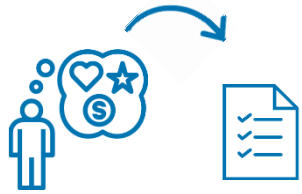
1. Define the Quality Requirements

Review all available information on the project:
- Project Documents
- Meetings and Workshops with the stakeholders
    - **Note**: Always involve the project client
- Lessons Learnt

2. Set Quality Targets

For each of the criteria identified, specify the targets to be met. This has to come also from the above process of reviewing the standards with the various stakeholders. :
- Process design to ensure "fit for purpose"
- Define KPIs
- Training the project team on how to meet the standards

3. Plan Quality Control "QC"

Plan the control mechanisms to be used
- Plan how/when/who to measure

4. Finalize the Quality plan and Perform Quality Control *(Monitoring & Control phase)*

- Perform variance analysis to ensure KPIs are on target
- Take actions, fix issues and bring parameters back on track

Note: After planning Quality, always check for changes triggered to other fields, already planned – scope, cost, time, roles & responsibilities, risks)

Expectations 1/2

As a PM it is important to be able to understand human nature and psychology.

A project involves a lot of people, and if expectations are not the same across the board, some of the people involved will be disappointed that the project didn't meet their expectations.

An expectation is the psychological picture we create in our heads for a future event. And, depending on the situation, it can be easy to set expectations and predict outcomes.
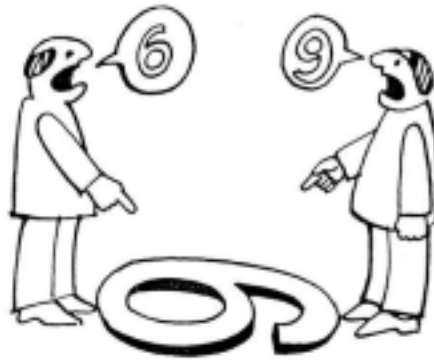
When given more room for interpretation we are likely to fill our imagination with our own subjective views and desires and the more people there are imagining how something could end up, the more chance there is that expectations will vary.

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Expectations 2/2

The process of getting everyone on the same page is done mostly when defining the scope, during workshops and when meeting with stakeholders. The PM must be able to clearly communicate their expectations and hold sessions in a way that encourage stakeholders to share their expectations in order to identify any gaps.

Some example questions the PM could ask are "How do you think the final product of the project will be useful to the organization? Do you believe something can be added to significantly improve the result? Do you agree with the way the scope is described in the project documents?" plus many others because the more thorough the better.

The PMs job of leveling everyone's expectations does not stop there. Not only must the project manager keep all stakeholders up to date during the various meetings carried out through the scope phase, but they must also keep in constant communications for the whole project as any changes occur. The whole idea behind keeping everyone in the loop, constantly, is to eliminate any opportunities for the stakeholders' imagination to run wild.

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Assumptions

An assumption is when something is believed to be true when there is no definite proof. While the planning process aims to clarify all areas of a project, we must assume that there are areas that we cannot be 100% certain of. For example, we cannot be 100% sure that all team members will be as productive as they usually are, but we have to assume they will.

Of course, a PM will be more certain of their assumption if they have worked with the team before, but it is still an assumption.

The more past data a PM has, the safer their assumptions will be. Imagine Lamborarri needs to hire a certain number of mechanics to deal with any problems the show-cars may have. You, as the PM, could look at previous data where a similarly trained mechanic from a previous showroom project was able to properly care for 5 cars. You plan to have 20 cars in your showroom, therefore you can assume you will need to hire 4 mechanics. While there is still a level of uncertainty it is a lot less than if you had no previous data.

Risk Planning

What is a Risk?

Exposure to the possibility of loss, injury, or other adverse or unwelcome circumstance; a chance or situation involving such a possibility. *Oxford English Dictionary*

PM Context:

More difficult to plan than the cost, time, scope.. You don't see them. They are the result of the uncertainties that expect us in the future.
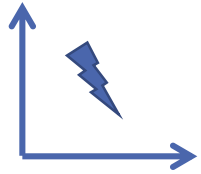
Risk Management – What to do:

1. Identify the project Risks
2. Analyze the Risks
3. Develop Risk response strategies

Risk Planning

1. Identify the project Risks

Review all available information on the project, to identify risks:
- Project Documents (Project Charter, Business Case, WBS and Activity List, Quality Specifications & Requirements)
- Lessons Learnt

Consult relevant stakeholders and experts. Perform:
- Meetings (1 to 1, Interviews)
- Workshops (Brainstorming sessions)

2. Analyze the Risks

Two Characteristics to be evaluated for each risk

Severity – What would be the impact of the event on the project scope, budget, timeline? Standard is to rank by using 3 levels – Low, Medium, High. Of course, this can be customized according to the specific needs: e.g. impact from 1 (very low) to 10 (catastrophic event). These can also be translated in expected impact to the project (e.g. "2 months delay" or "up to 40 K $ financial loss", etc.).

% **Probability of occurrence** – How likely is that the event actually happens? You can use a standard scale (Low, Mid, High) or more sophisticated one, depending on the project needs (e.g. probability %).

3. Develop Risk Response Strategies

1) Mitigation
- Eliminate the Risk (e.g. avoid doing the risky task)
- Reduce the Severity
- Reduce the Probability of occurrence

2) Contingency (Plan B)
- Define what the project team needs to do to limit the damage, if the risk becomes reality
- Document the findings and decisions

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Risk Log - example

No.	Risk	Description	Severity	Probabilty of Occurrence	Contingency and Mitigation Actions (incl. "Plan B")
1	Injuries during construction works	Risk of People Injuries during construction works. Impact to people health. Possible financial impact in terms of fines, due to miscompliance with regulatory requirements (up to 50 K$ per person).	Medium	Medium	1) Instruction of all workers on how to prevent incidents; 2) Provide full equipment and clothing (helmets, gloves, boots, etc.); 3) Shift leaders to control and check each day if workers follow the requirements; 4) Insurance coverage for all workers;
2	Bad weather to interrupt construction works	Risk of bad weather conditions during autumn to interrupt or slow down construction works and/or damage equipment.	High	Low	No control over weather (Probability of Occurrence). PM team can only act on decreasing the Severity (damage control): 1) Prepare for bad weather conditions and have a Plan - identify a place to store equipment that can be damaged (e.g. projectors, insulation materials, etc.). 2) When forecast indicates higher risk of heavy rains, store fragile equipment and perform tasks that cannot be impacted by weather (e.g. preparation for follwoing activities). 3) Instruct all workers and shift leads on what to do during such weather;
3	Connectivity failures of the Car 3D Visualization effects	Risk of connectivity issues software-hardware not fully resolved before the Opening event. Impact: Customers will not see the visual effects in the first days.	Low	Medium	1) Testing systems as early as possible; 2) Contract incentives and clauses (phased payment) with vendor; 3) Plan B: In case functionality is not fully ready 2 weeks before Opening day - print paper catalogues for customers (booklets).

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Change process 1/2

In a project, frequent changes will incur excessive costs, for budget, scope, quality or time. And the PM tries to eliminate as much of this cost as possible with a detailed plan. But a good PM is also not stubborn and will adapt to change.

Basically, it is the PMs job to limit the need for changes on one hand and on the other to efficiently manage the changes in way that the project could benefit.

First is what we've been doing in the course so far, limiting the potential for change through comprehensive planning. By using the methods that we have been discussing, any PM will miss fewer details in the execution phase and therefore they will not need to make many changes.

If they do need to make changes though, a PM should implement a **change control process**. Before moving to execution, it must be agreed how to manage changes, and as with most parts of the planning a process needs to be established.
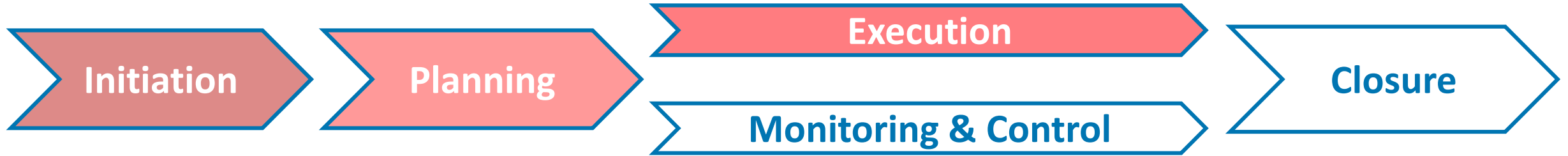
The thing that will start the process is a change being requested and that request needs to be analysed. What are the benefits of the change? What is needed in order to implement the change and what is its impact on the project? Of course, a formal document must be created to collect this data - a **change request form**. The PM must understand the proposal, fill in the form and then send it for approval.

Who will the PM send the change request form to? The **project sponsor,** of course; since they have provided the needed resources, they should also determine if the additional needs are worth it. If the PM has concluded that the change will benefit the project, they must then convince the project sponsor.
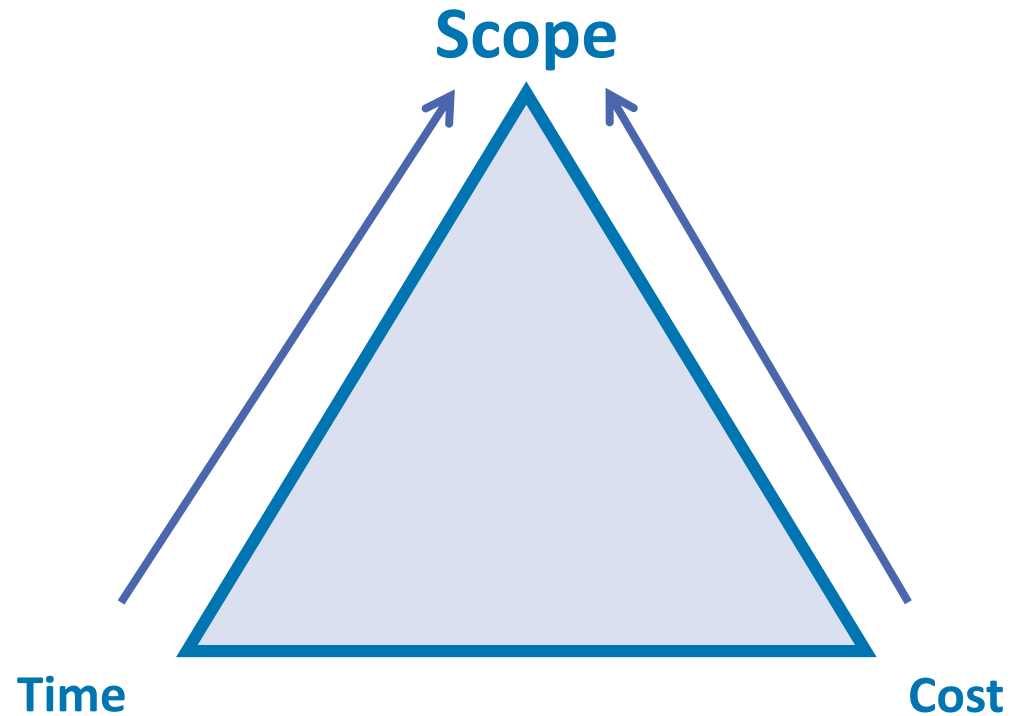
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Change process 2/2

Project Name [Change Request NN]	
Date:	Insert date when change is requested
Change No:	Insert the number of the change request. I.e. If this is the first change requested for this project, number can be "01". Put number also in the title box.
Description:	Describe what the change is about.
Reason:	Describe the reason for the requested change and how will it help the project.
Scope Impact:	Describe the impact of the change on Scope (if any)
Timelines Impact:	Describe the impact of the change on Time and Project Plan (if any)
Budget Impact:	Describe the impact of the change on Budget (if any)
Other Impact:	Describe any other impact of the change on the project (Resources, Quality, Communication, etc.)
Change Requested By:	Insert Name and Role of the person suggesting the change.
Approver:	Name and Approval confirmation (e.g. Project Sponsor Name and date of approval)

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Project Phases

Initiation → Planning → Execution / Monitoring & Control → Closure

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Execution

Scope

Time

Cost

Execution phase starts with the Kick-off meeting and finishes with the delivery of the last deliverable.

Main project manager's activities during execution are:

- ✓ Work on the scope
- ✓ Track progress
- ✓ Monitor quality, resource usage
- ✓ Watch out for risks and issues, conflicts within the team

…and remember: Time is not on your side!

The Kick-off Meeting: Objectives

Validate Project plans

Go through the plans, one by one. Explain and answer questions anyone could raise. Then, ask if it is ok to validate it and move to the next topic. If someone refuses to agree – understand why.

Understand if there are any expectations not discussed so far.

Agree Project Governance and validation points

Discuss how will the deliverables be approved and how will the overall Project be approved as completed?

Define the Success Criteria and who will "approve" the project completion. Usually, this would be the client.

Agree how often the PM has to provide update on the status of the project.

Promote the project

Do your best to have the client and senior stakeholders satisfied after the meeting.

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Kick-off Meeting Delivery

**Project
Manager**

The purpose of the Kick-off meeting is to announce the start of the project and to ensure that everyone is familiar with its details and with the people working on it.

✓ **Schedule the Kick-off**

✓ **Schedule pre Kick-off, if needed**

✓ **Prepare presentation**

✓ **Introduce everyone in the meeting**

✓ **Introduce the project**

✓ **Promote the project**

✓ **Agree Project governance and validation points**

✓ **Agree on project reporting**

✓ **Wrap up & follow up**

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Manage Project Work and Project Team

Project Manager

Gather performance data.

Update the project management plan and project documents.

Implement changes.
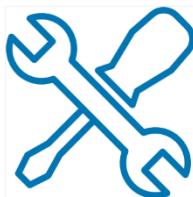
Be of service to the team and help them get the work completed.

Remove roadblocks.

Ensure a common understanding of the project among stakeholders.

Keep everyone focused and informed.

Work

People

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Manage Project Work

The most important things the PM should do:

- **Supervise Critical Path activities** – PM needs to ensure high productivity on these activities. If you get delayed on any of them – you delay the overall project, remember? PM needs to put extra care:

  - **Productivity** of the on-going activity: the work needs to progress at a good rate, in order not to get delayed. The productivity needs to be high enough to complete the work on time. But what is Productivity? It essentially is the output you get out of a given input, or the ratio between the two (output/input). In project world – the output is pieces of the scope and the input is essentially resources and time – see this is again our triangle, but this time – put in motion. Available Time and resources will be decreasing and the Scope will be becoming real (see graph). So the PM will need to maintain the productivity high, especially on the critical path. How to measure the productivity in projects? It will be again different for the different projects (scope is unique). In construction, the productivity could be measured in constructed stories per moth (e.g. 2 stories per month built). In software development this can be number of new functionalities programmed. Etc. Whatever it is, PM need to ensure the rate is good.

  - **Readiness** of the following activities to start: keeping the best productivity on activity A high is good, but you can still fail, in case the next activity for any reason is not ready to start on time. The upcoming activities in the chain need to start on time (B, C, etc.). PM needs to ask the question – is everything ready to start on time? Example: In the showroom case for example, lets say the construction works are progressing on-track to be entirely completed (including pipelines, etc.) in the remaining 2 weeks. However, turns there have been some additional discussion on the design of the interiors and more specifically – the effects around the car podiums and the next activity may not be ready to start as planned ("decorate and position interiors).

- Look for **opportunities to optimize** the Workflow, using your business knowledge, project management experience and common sense (it can be stronger than you think ☺). As the project progresses, the PM and project team become more knowledgeable of the work at hand. Hence, often there are ideas of how to it better, faster or both. Is this activity valuable? Are there better ways of sequencing the work – starting more activities in parallel to win some time? Keep asking these questions.

- Don't forget - **Other project activities** (e.g. legal documents, etc.), the ones that are not on the critical path. Forget?? You cannot forget – you have the recipe! If not supervised or underestimated, activities outside the critical path may become part of the critical path (if delayed significantly).

Project Manager's Typical Day

The project managers must start their day by looking at 2 things:

Detailed Project Plan

What is on-going?
Which deadlines are approaching?
What activities must start soon?

Project Diary (Action Log)

What are the open actions?

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Project Diary (Action Log) Format

ACTION - What needs to be done?

OWNER - by Whom?

DUE DATE – by When?

The Action Log is supplementary to the project plan and is used to record actions, which occur ad-hoc and are not included in the project plan.

Characteristics of Project Diary (Action Log)

The Action Log is a Formal document.

The Project Manager must make it clear to the project team members when an action is added for them.

Team members need to commit to each action, logged against their name.

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Project Diary (Action Log) - Example

No.	Action	Owner	Due Date
1	Update Project Schedule to reflect new duration of the "recruit personnel" activity. Increase to 11 weeks. If PM pushes the Due Date by 3 weeks, this will be the new Critical path. Hence, PM to change the start date, in order to keep the initial buffer: -Change start date to 13-Apr, instead of 4-May. Update project plans	Project Manager	4-Feb
…			
13	Negotiate and sign an agreement with a new Design agency in the next 2 weeks. Marketing manager to participate the negotiation, in order to ensure the requirements are understood by the new vendor and added to the contract.	Finance manager Assistant	3-Jun
14			
15			
16			
17			

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Manage People

Project Team

Before
- ✓ Prepare adequately the team

During
- ✓ Lead and coordinate
- ✓ Correct and make changes if necessary
- ✓ Motivate

After
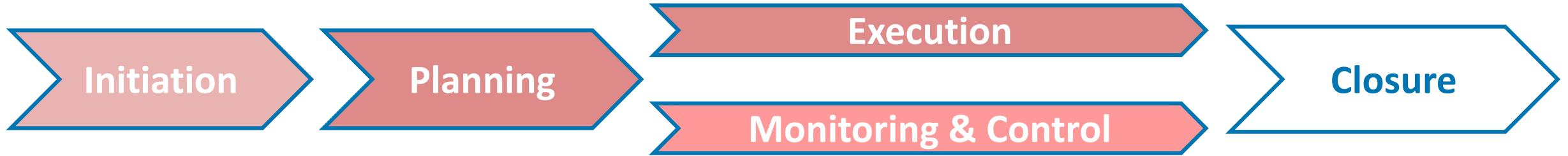- ✓ Give feedback
- ✓ Congratulate

Stakeholders

- ✓ Provide regular updates
- ✓ Establish and follow agreed communication channels
- ✓ Be proactive in the communication
- ✓ Keep key stakeholders engaged

Be the first one to deliver bad news or you may lose your credibility!

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Project Phases

Initiation → Planning → Execution / Monitoring & Control → Closure

Monitoring and Control

In Project Management, Monitoring & Control phase is basically about analyzing the actual with the target and understanding early on, through numbers, if something is not working "fast enough" or "well enough". In other words, measuring project performance against the project plan.

Monitoring and Control consists of 3 key activities :

➢Define Metrics & Targets

➢Collect Actuals

➢Identify any areas in which changes are required

➢Initiate changes, where needed

Measure Project Performance

Metrics & KPIs

The project manager defines metrics and key performance indicators (KPIs) to measure the project performance. Optimally, three to five KPIs should be selected for each project.
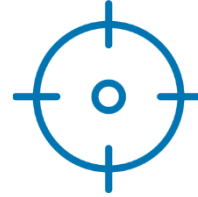
Target

The project performance baseline is used as a benchmark.

Actual

Collection and Reporting of Actuals. PM to establish:

- **Responsible**: PM will predominantly perform the tasks, but also other team members participate.
- **Frequency**: data collection has to happen Regularly (daily/weekly/monthly) and not only around the end of the project.

Metrics and Targets – For each of the criteria identified, specify the targets to be met. This has to come also from the above process of reviewing the standards with the various stakeholders. Let's see few examples of standards in different fields:

- Construction – most of the quality standards are set by regulation. Here the standards to be met are many and require engineering expertise to be properly managed. Example of regulation topics: structural stability, fire safety, air ventilation, drainages, electrical safety, quality of materials, etc. Meeting the quality standards is crucial to the project success, as the building may not get the needed Authorization documents.
- Production – a popular standard and metric is around the defect rate. If the production volumes are 100 000 units per month, the company decides to have a target of less than 50 defected units per month. The target would translate in 0.05% tolerance. As it would cost too much time and money to test all 100 000 units, a sample is selected – let's say 1000 units. Out of those, 0.05% would be the maximum units with a defect. We will take a deeper look in the last part of the project (Improvement projects, 6-sigma).
- Customer service – let's say a company has outsources a call center to a vendor. It will be critical to keep the customers happy also after the shift of service. Here, quality standards can be set for the vendor like: calls lost (target <5 / month); cases resolved (target >98%); collect survey from customer on the satisfaction after each call on a scale from 1 to 5 (target >4);

Variance is the difference between target and actual

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Earned Value Analysis (EVA)

Earned Value Analysis (EVA) or Earned Value Management is a tool to measure project performance against all 3 project baselines. Earned Value Management has three basic elements:
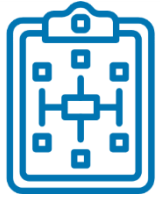
Planned Value (PV)

Approved value of the work to be completed **as per schedule**

PV = Planned % Complete x Budget

Earned Value

Value of the work **actually** completed to date

EV = Actual % Complete x Budget

Actual Cost (AC)

There is no special formula to calculate Actual Cost. It is an amount that has been spent

Example:

You have a project to be completed in 12 months. The budget of the project is 100, 000 USD. Six months have passed and the schedule says that 50% of the work should be completed[1]. 60, 000 USD have been spent, but on closer review, you find that only 40% of the work has been completed so far.

Planned Value (PV) = 0.5 x 100, 000 USD = 50, 000 USD

Earned Value (EV) = 0.4 x 100, 000 USD = 40, 000 USA

Actual Cost (AC) = 60, 000 USD

1. Assuming equal distribution of cost (spend the same monthly amount)

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Variance Analysis

The variance analysis gives you information about the project's **progress or health.** With variances, you find the difference between two values. The result comes in dollar form.

Schedule Variance (SV)
= Earned Value – Planned Value

Cost Variance (CV)
= Earned Value – Actual Cost

Variance interpretation
Positive is GOOD (ahead of schedule or under budget)
Negative is BAD (behind schedule or above budget)

Example:

We've already found that:
PV = 50, 000 USD
EV = 40, 000 USD
AC = 60, 000 USD

Hence,
SV = 40, 000 – 50, 000 = -10,000 USD
or the project is behind schedule

CV = 40, 000 – 60, 000 = -20, 000 USD,
Or the project is above budget

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Performance Index Analysis

The Performance index is the ratio between two parameters. This makes it possible to compare projects. SPI and CPI help you analyze the **efficiency** of any project.

Schedule Performance Index = (SPI)

$$\frac{\text{Earned Value}}{\text{Planned Value}}$$

Cost Performance Index = (CPI)

$$\frac{\text{Earned Value}}{\text{Actual Cost}}$$

Variance interpretation
>1 is GOOD
SPI: more work is completed than planned
CPI: more money is earnt than spent
<1 is BAD
SPI: less work is completed than planned
CPI: less money is earnt than spent

Example:

We've already found that:
PV = 50, 000 USD
EV = 40, 000 USD
AC = 60, 000 USD

Hence,
SPI = 40, 000 / 50, 000 = 0,8
or less work has been completed than the planned work.
The project is behind schedule.

CPI = 40, 000/ 60, 000 = 0,7
or the project has earnt 0,7 USD for every 1 USD invested.
The project is above budget.

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Quality Control

Remember what Quality is in projects – the characteristics of the project's final deliverable.

Project work needs to be executed in a way to guarantee that the final product possesses the desired characteristics and capabilities.

During planning the Quality piece, the PM has collected all requirements, set quality targets and prepared a plan of quality control (measurement of actuals vs targets). The quality standards, targets and how they are controlled will be very different from one project to another, as is the scope, but we will highlight common things that need to be done in the Control Quality activities. The Actuals are collected through quality audits, checks and inspections (this corresponds to the registration of Actual values – which we reviewed for Timelines and Cost (again, Data, data, data ☺). Our Quality control efforts are aimed at answering one general question: **Are the quality targets being met?**

In order to answer the question, the quality may be analyzed on three points: **Input-Process-Output**.

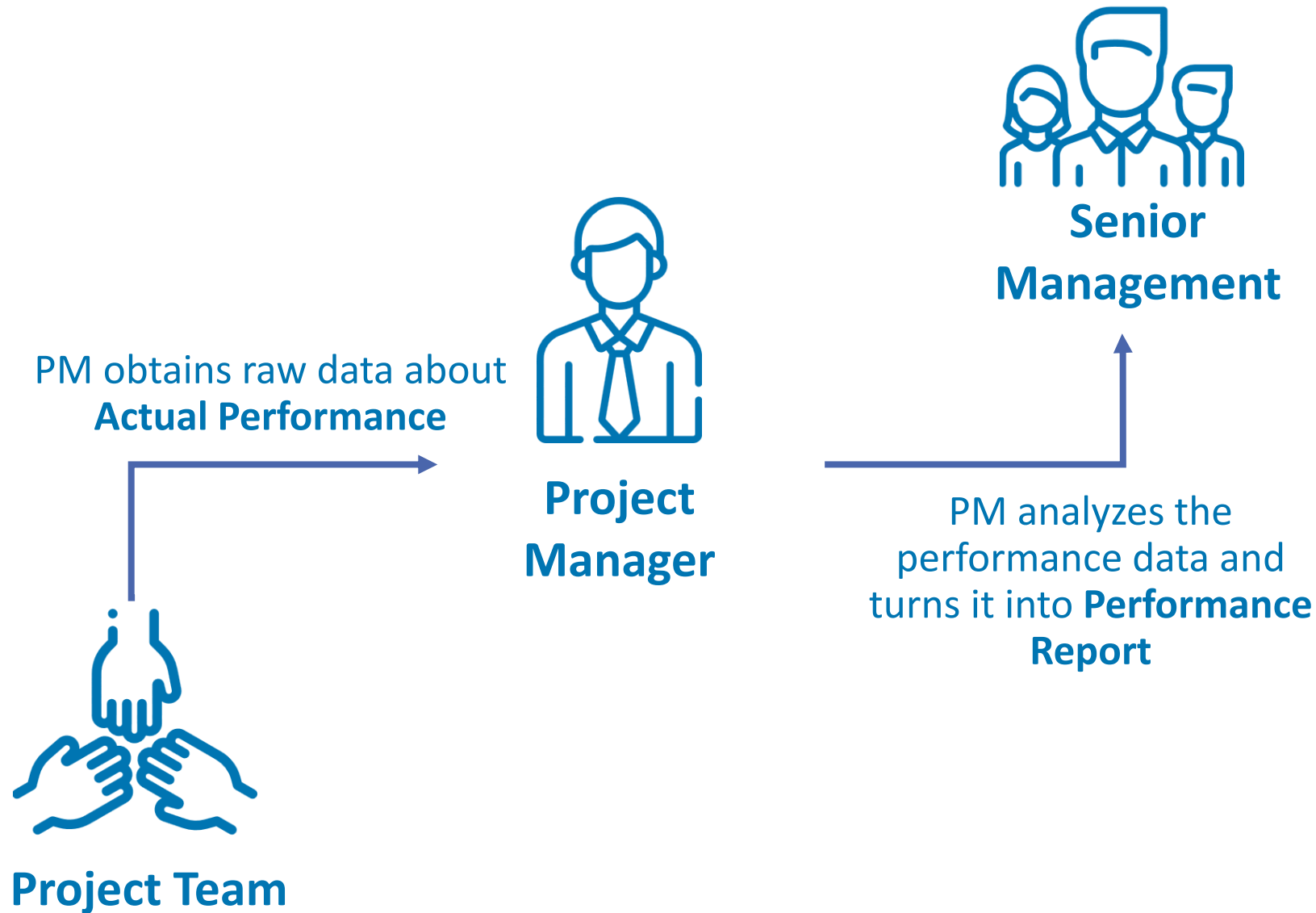Let's see a couple of different quality checkpoints that can be controlled, just in our Lamborrari project:
- **Input**: Here, the PM must be sure the works start with the right foot. Are all the needed inputs ok for us to reach the goal? If we need to start with resources that cannot be transformed in the desired scope – why start at all? In our case, these would be the construction materials – verify if the meet all standards. A logical step would be for the responsible of the construction work stream to do an initial validation of the construction materials procured. They will be the appropriate team member, as this is a specific field, which needs to be validated by an expert (engineer). Checklist would be an appropriate tool to go through all these.

  Same verification can be done for the car production – are all materials procured meeting the established standards (by regulation and / or internally set)? Examples: Car body, doors, windows, Electronics, Interior, etc.
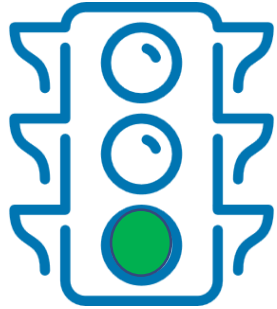- **Process**: Here the PM needs to be checking if all steps required in an activity are being completed. For example, in the preparation of the staff, newly hired, to engage with customers there is a program which each one needs to take. Each sales person need to know specific details about each model. Although that would be the most important piece of the training, the management decides they all need to do a 2 day customer service training – learning the important soft skills and customer satisfaction. If that step (training) is skipped, Lamborrari may have great technical consultants there, but the lack of customer care and appropriate behavior may be sufficient to push away clients. Not what we want! Here the control can be assigned to a sales or marketing employee who would deliver the training to put a checklist and mark each time some passes this training.
- **Output**: These will be the quality checks at the completion point of the various deliverables (or sub-deliverables..). Note, this is before the final validation of the project with all its parts. Here PM needs to understand, as deliverables are being completed, is everything meeting the standards. For example, the augmented reality effects on the displayed cars that is being prepared. Is the connectivity speed sufficient – i.e. when a customer selects on a monitor to see the car in a different color, a projector needs light the car in the selected color. The target is below 3 seconds. 9 out of 10 times it has to be under 3 seconds. Is that criteria met?

Performance Reporting

Senior
Management

Project
Manager

PM obtains raw data about
Actual Performance

PM analyzes the
performance data and
turns it into **Performance
Report**

Project Team
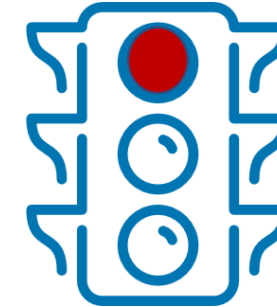
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Project Status Indicator (RAG)

Green = On Track

➢ Progress according to the plan

Amber = At Risk

➢ Issues that put At-Risk the completion of the project

Red = Off Track

➢ Project is seriously getting delayed, project scope is not being met and/or resources are becoming exhausted

➢ Sponsor's attention and support is needed

Issues Management – 4Rs

**REACT** – assess the damage and perform damage control.

READ – understand the reason and the root cause of the problem.

RESPOND – create an action plan and take steps to correct the issue.

RESOLVE OR REPEAT – confirm the issue is resolved from your response through monitoring. If so, carry on with the execution. If not, go back a step or two. Change something until step four is resolved.

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Project Phases

Initiation → Planning → Execution / Monitoring & Control → Closure
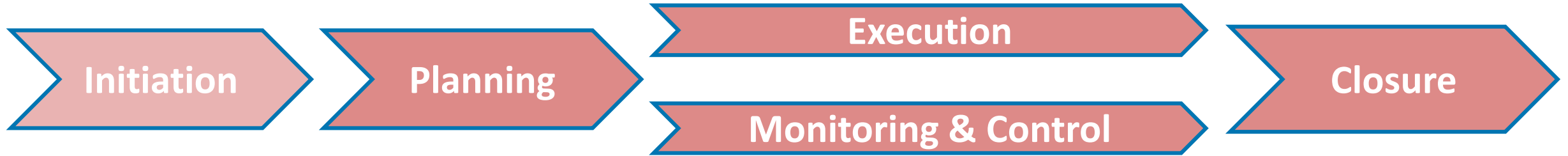
Closure

Why are Closure activities important?

Official sign-off of deliverables

- The deliverables may be completed, but a formal acceptance is needed to effectively close the project. Note: During the Kick-Off meeting (or earlier) the Sponsor and stakeholders have confirmed how and who will give the final approval
- All contractual agreements (made at the beginning of the project) need to be closed
- All outstanding payments need to be finalized

Resources are no longer available

- Projects are temporary initiatives. The project team can now be released as their responsibilities for the project tasks are now over
- This includes the Project Manager
- Formal communication has to be done by the PM that the project is over

Lessons learnt

- Projects are unique. The product, work and/or combination of people, circumstances and problems encountered always bring something new
- The PM has to organize a meeting with all key stakeholders to document:
  - What worked Well? What did not work Well? How to overcome such a challenge or issue the next time we do a similar project?
- The Lessons learnt are a key source of information and knowledge for a Project Manager

Celebrate success

- Projects are complex initiatives. People from various departments, background and culture are brought to work together towards a common goal
- Working on new activities with new people and under a time constraint always costs a lot of energy
- People need to be explicitly congratulated and recognized as their efforts have led to a successfully reaching the project Goal. Accountable for this work is again – the PM

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Project Management Methodologies

"Waterfall" (standard) Project Management

In the standard project management, the Planning is performed before the execution starts. Efforts are invested in detailed planning, where the PM and project team structure all the work to be done (see pic.1). The execution plan consists of sequenced activities, according to their dependency. As a result, on a calendar (on the Gantt chart), the plan resembles a waterfall (see pic.2).
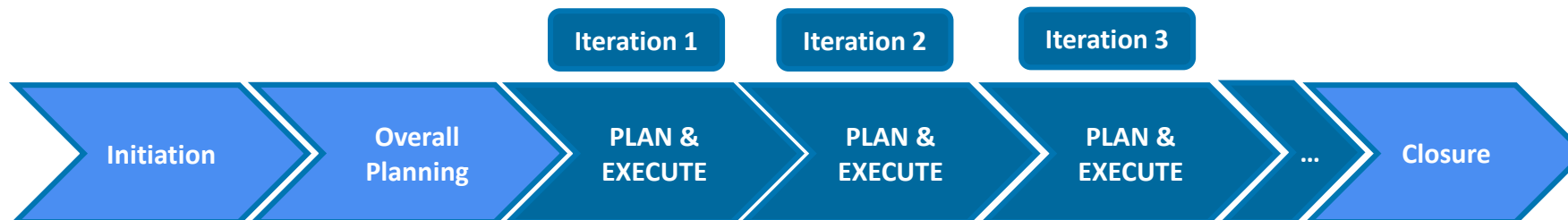
Pic.1:

```
Initiation → Planning → Execution
                         M & C      → Closure
```
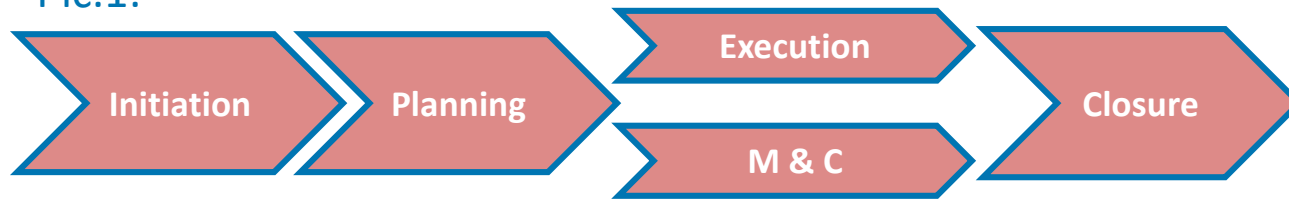
Pic.2:

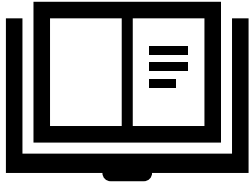	Year 2020		January				February				March			April			May	
		1/6	1/13	1/20	1/27	2/3	2/10	2/17	2/24	3/2	3/9	3/16	3/23	4/20	4/27	5/4	5/11	5/18
Ind	Activity	1	2	3	4	5	6	7	8	9	10	11	12	16	17	18	19	20
A	Prepare land for construction works																	
B	Excavate foundations (Digging)																	
C	Build foundation structure																	
D	Build Showroom spaces (floor 1)																	
E	Complete Roof works																	

AGILE Project Management

In the past 20-30 years, project complexity has increased significantly. Internet, new technology and globalization have changed the business world. Projects and project management have inevitable been also impacted. The project goals and furthermore their scope have become much more difficult to describe in advance. Hence, planning with a great level of detail, without making multiple changes to this plan is almost impossible. AGILE has been introduced as a new approach, addressing this challenge. The method suggests to plan and execute pieces of the scope and factor any changes in between these pieces. They are called "Iterations" and include detailed planning and the respective execution.

```
                    Iteration 1      Iteration 2      Iteration 3
Initiation → Overall Planning → PLAN & EXECUTE → PLAN & EXECUTE → PLAN & EXECUTE → ... → Closure
```

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Agile Manifesto

We are uncovering better ways of developing
software by doing it and helping others do it.
Through this work we have come to value:

Individuals and interactions over processes and tools

Working software over comprehensive documentation

Customer collaboration over contract negotiation

Responding to change over following a plan

That is, while there is value in the items on
the right, we value the items on the left more.

Kent Beck
Mike Beedle
Arie van Bennekum
Alistair Cockburn
Ward Cunningham
Martin Fowler

James Grenning
Jim Highsmith
Andrew Hunt
Ron Jeffries
Jon Kern
Brian Marick

Robert C. Martin
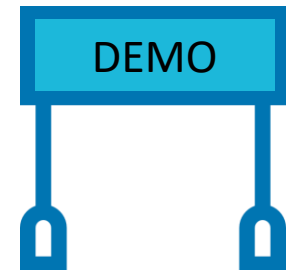Steve Mellor
Ken Schwaber
Jeff Sutherland
Dave Thomas

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Project Structure

- The main phases in an Scrum projects are standardized "SPRINTS"

- The sprints are of the same duration, usually between 1 and 4 weeks

- Each sprint has to deliver specific part of the product backlog

```
Initiation → Overall Planning → Sprint 1 → (D) → Sprint 2 → (D) → Sprint 3 → (D) → ... → Closure
```
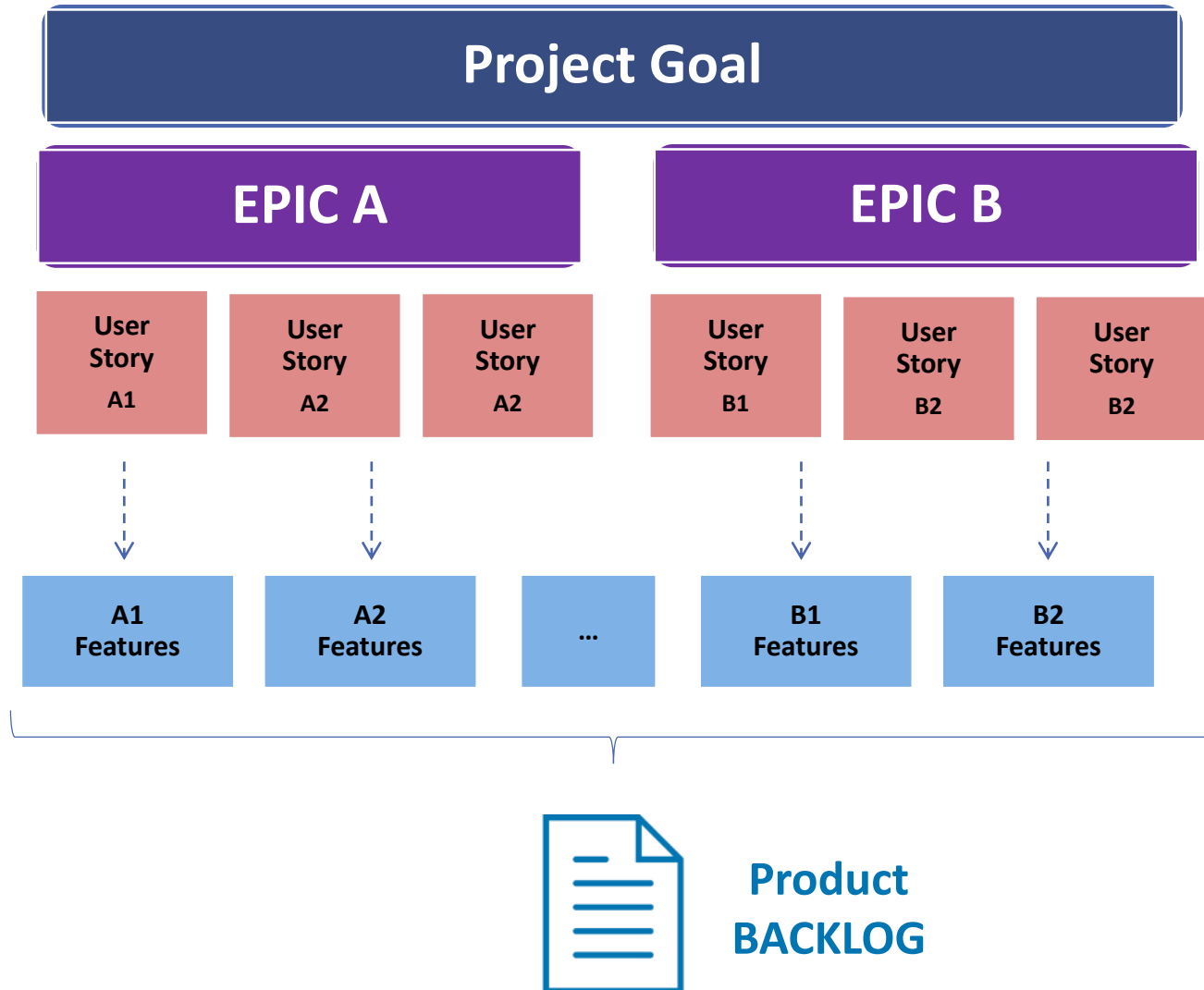
- A "Demo" (D) meeting is organized at the end of each sprint. The goal is to show the completed work to the product owner and stakeholders

DEMO

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Defining the Scope

Defining the Scope:

Project Goal

EPIC A   **EPIC B**

| User Story A1 | User Story A2 | User Story A2 | | User Story B1 | User Story B2 | User Story B2 |

| A1 Features | A2 Features | ... | B1 Features | B2 Features |

Product BACKLOG

User Story
(*format*)

As a user I want to be able to ...

SCRUM: Concepts

Defining the Scope:

The scope is structured from high to low level, in the following way:

- As always, you start from the Project **Goal** definition: E.g. As an extend to the existing financial services of the company – "Create a mobile payment application"

Then, you proceed with the high-level requirements. They are called **EPICs**:

- EPIC example: *"Creation of an electronic wallet"; "Creation of an electronic wallet"; "Deposit funds to e-wallet"; "Transfer funds to recipients";*

EPICS are still high-level so we move down to the details by defining "**User Stories**". They are detailed descriptions of what the customer or user of the product wants to be able to do. Their main goal is to translate the user expectations, desires, wishes, into separate easy-to understand *requirements or "stories".*
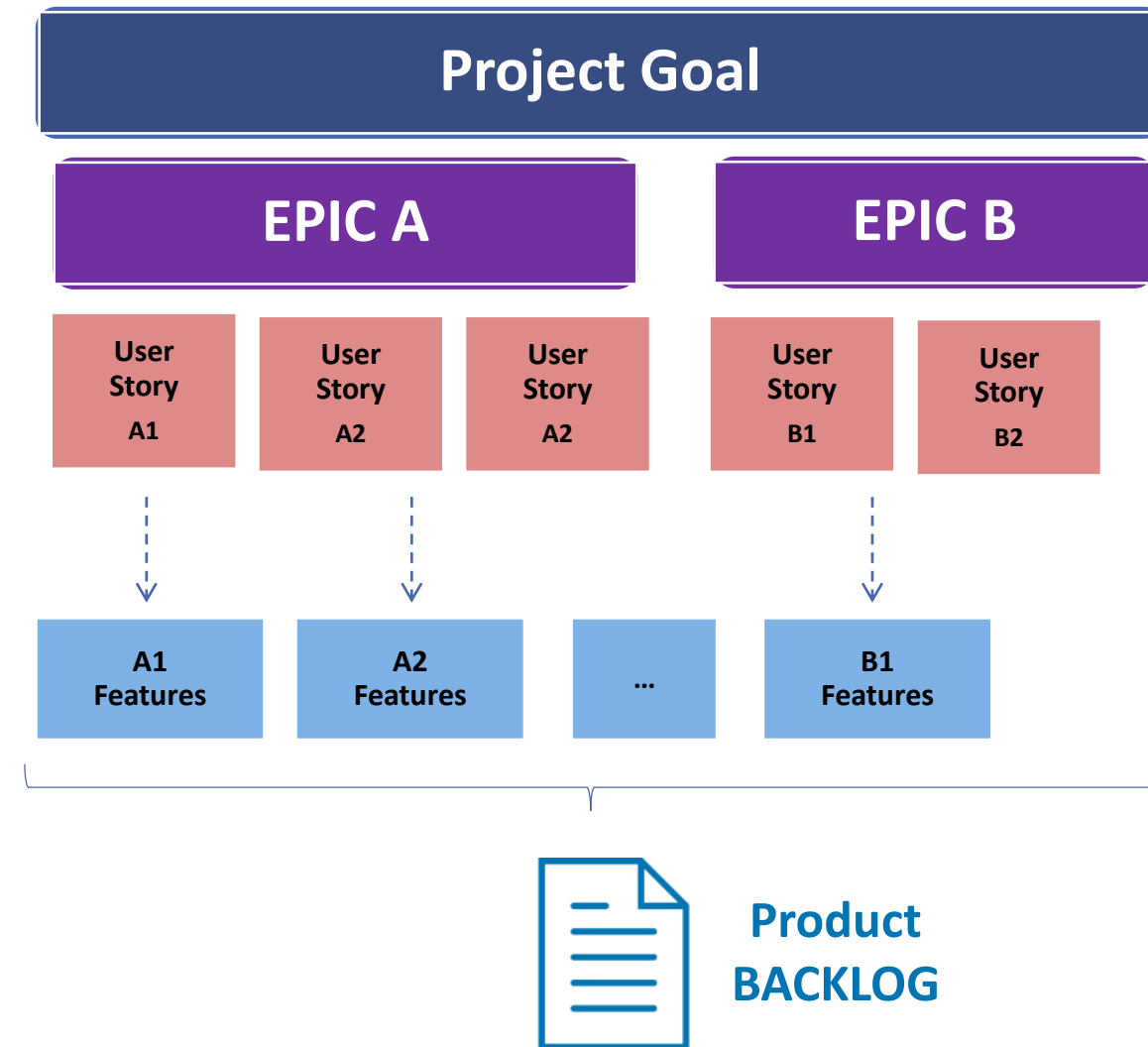
- User Story example: *"As a user, I want to create wallet via registering through e-mail; "As a user, I want to be able to top-up my wallet by using Bank account";*

The User stories finally give the needed granularity. However, one more step is needed for the developers – the User Stories need to be translated into technical tasks. They are called "**Features**":

User Story	Feature
I want to create wallet via registering through e-mail;	• Implement registration wizard for first time users • Implement Secure Log-in using Username and Password • Implement Log-out
I want to be able to upload a profile picture	• Implement a dialogue to upload a profile picture (. jpeg; .png;)

Note: 1 user story may correspond to one or more Features

Finally, all Features and User Stories are collected in a list. This list is the backbone of the project Scope and is called "**Product Backlog**"

Project Goal

EPIC A | EPIC B

User Story A1 | User Story A2 | User Story A2 | User Story B1 | User Story B2

A1 Features | A2 Features | ... | B1 Features

Product BACKLOG

Defining the Scope: Example

Create a mobile payment application

Deposit funds to e-wallet

Transfer funds to recipients

I want to create wallet via registering through e-mail

I want to be able to top-up my wallet by using Bank account

I want to be able to upload a profile picture

User Story B1

User Story B2

User Story B2

As a user I want to be able to ...

Implement registration wizard

Implement Secure Log-in using Username and Password

Implement an integration to a Bank API

Implement a dialogue to upload a profile picture (. jpeg; .png;)

B1 Features

B2 Features

Product BACKLOG

Roles and responsibilities

Development (or delivery) team

Scrum Master responsibilities:

- Leads the Scrum team
- Guides the Product Owner in defining the backlog priorities
- Works to ensure the Sprint commitments are met
- Works to remove roadblocks for the development team
- Facilitates Daily Stand-Up meetings (DSUs)
- Facilitates Demo Sessions
- Facilitates Backlog grooming and Retrospective sessions

Scrum Master

Development team responsibilities:

- Perform work as per backlog priority
- Deliver ready to use product each Sprint
- Work with customer to translate user stories into features
- Develop software features according to priority
- Resolve technical issues and test solutions

Everyone needs to Collaborate

Product Owner responsibilities:

- Is or represents the product's customer or user
- Defines the backlog
- Reviews and accepts the completed backlog
- Prioritizes the backlog for each Sprint
- Approves/requests changes to the backlog priority

Product Owner

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The standard phases of software development include Designing the solution, Coding and finally – Testing the software. The original way of structuring such similar work included performing these steps only once (designing the whole work, coding the whole program and only then – testing the entire software created).
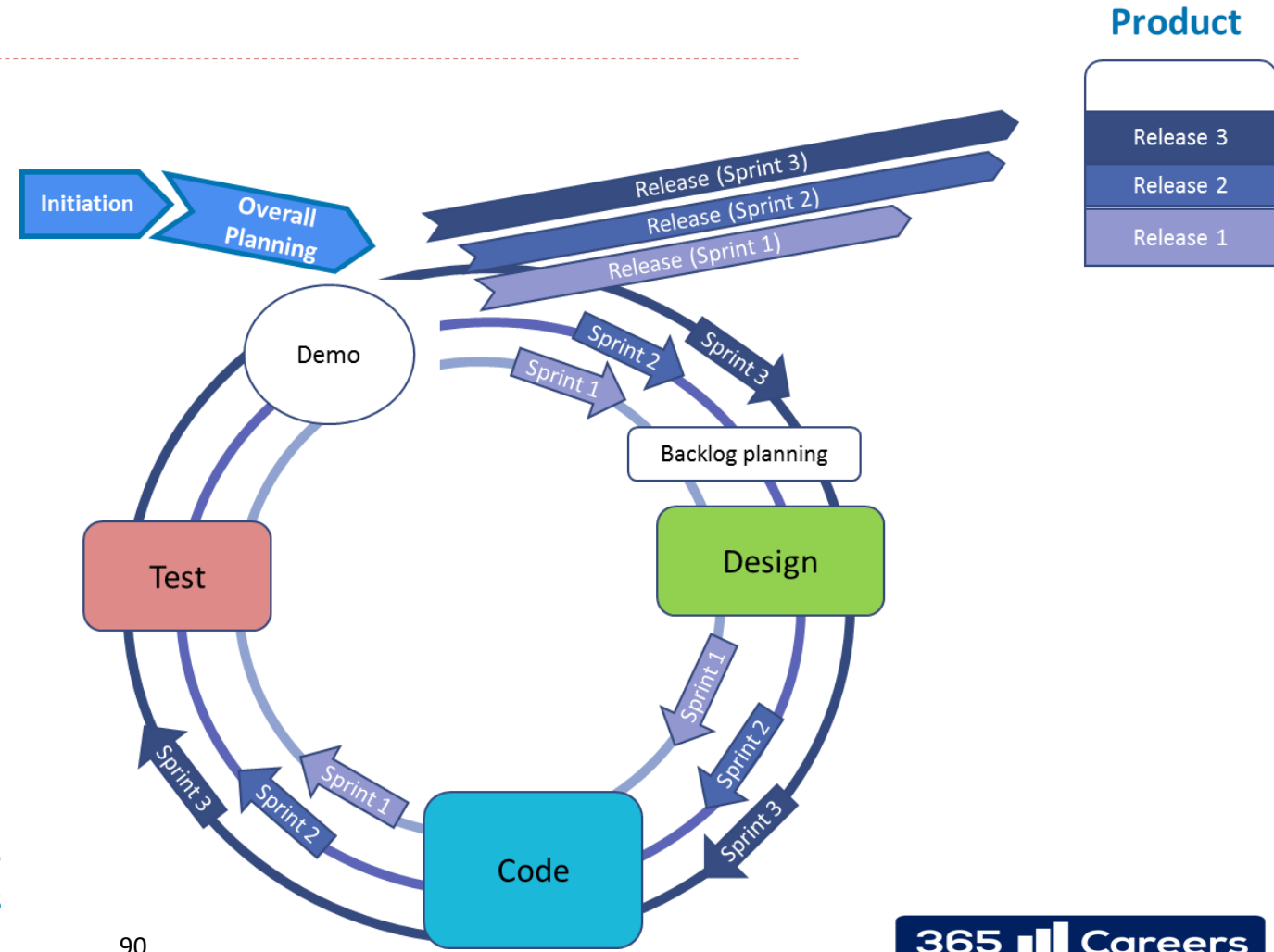
This has been leading very often to heavy reworks and multiple changes in a single project.

Start	→	Design	→	Code	→	Test	→	End

The lifecycle of a **Scrum** project suggests, on the other hand, to work step by step – designing, coding and testing one part, before moving to the next one:

- ❖ Overall Planning (Sprint 0)
- ❖ Sprint 1:
  - Backlog Planning
  - Execute work
  - Demo
  - Release of completed product
- ❖ Sprint 2:
  - Backlog Planning
  - Execute
  - Demo
  - Release of completed product
- ❖ Sprint 3 (...)

In order to ensure the work meets expectations and needs, the Product Owner has to play a very active role. The PO has to always attend the Planning and Demo sessions of each Sprint.

Product

Release 3
Release 2
Release 1

Initiation → Overall Planning

Release (Sprint 3)
Release (Sprint 2)
Release (Sprint 1)

Demo

Sprint 1 Sprint 2 Sprint 3

Backlog planning

Design

Sprint 1
Sprint 2
Sprint 3

Code

Sprint 3 Sprint 2 Sprint 1

Test

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