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Resit Gulec, PMP®, MBA, ITIL®

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INFORMATION ABOUT PMP® CERTIFICATION	11
Why should I get PMP® Certification?	11
PMP® Certification Requirements	11
35 Contact Hours Project Management Education Requirement for PMP®	13
PMP® Exam Structure	13
SECTION 1 - ENVIRONMENTS IN WHICH PROJECTS OPERATE	15
Definition of Project	16
Why a Project is Initiated?	16
The Example of a Project	17
Definition of Operational Work	17
Definition of Project Management	18
Process Groups	18
Knowledge Areas	18
Definition of Program & Portfolio	20
What is a Program?	20
What is a Portfolio?	20
Interrelationships of Project, Program & Portfolio	21
Comparative overview of Project, Program, and Portfolio	22
How does project, program and portfolio differ in terms of management?	23
How is success measured in project, program, and portfolio?	23
Project Management Office (PMO)	24
Structures of PMOs	24
What does Project Management Office do in an organization?	25
Role of the Project Manager	26
Competencies of a Project Manager	26
Interpersonal Skills of a Project Manager	27
Objectives and Management By Objectives (MBO)	28
Objectives	28
Management by Objectives	29
Constraints	29
Organizational Process Assets	30
Enterprise Environmental Factors	31
Stakeholders	32
Example: Stakeholders of Golden Gate Bridge	33
Project Governance	34
Project team	34
Organizational Structure	35
Functional Organizations	36
Projectized Organizations	37

Matrix Organizations	38
Comparative Overview of Organizational Structures	42
Other Types of Organizational Structures	42
Advantages & Disadvantages of Different Organization Types	44
Advantages of Functional Organization	44
Disadvantages of Functional Organization	44
Advantages of Projectized Organization	45
Disadvantages of Projectized Organization	45
Advantages of Matrix Organization	46
Disadvantages of Matrix Organization	46
Project Management Process Groups	47
Lifecycle	48
Product Life Cycle	50
Project Life Cycle	51
Project and Development Lifecycles	53
Development Life Cycle Types	54
Project Phases	55
Phase Gates	56
Project Business Case	56
Benefits Management Plan	57
Tailoring	58
Lessons Learned	59
Quiz – Section 1	61
Answers	70
Mapping Game – Section 1	71
Answers	73
SECTION 2 – PROJECT MANAGEMENT PROCESSES	76
Project Management Processes	77
Initiating Process Group Activities	80
Planning Process Group Activities	81
Executing Process Group Activities	84
Monitoring & Controlling Process Group Activities	86
Closing Process Group Activities	88
Initiating Process Group	89
The major outputs of the initiating process group	89
Progressive elaboration	90
Assignment of the project manager	90
Business Case	90
High-Level Planning	90
The reasons to start the initiating process	91

Planning Process Group	91
The major outputs of the planning process group	92
Rolling Wave Planning	93
The reasons for starting planning process	93
Executing Process Group	94
Meetings	94
Reasons for starting executing phase	95
Monitoring & Controlling Process Group	95
The Reasons for Initiating the Monitoring & Controlling Processes	97
Closing Process Group	98
The Reasons for Closing Processes	99
Project Management Process Group and Knowledge Area Mapping	99
Quiz – Section 2	104
Answers	109
Mapping Game – Section 2	110
Answers	111
SECTION 3 – INTEGRATION MANAGEMENT	114
Overview of Integration Management	115
Integration Management Processes	116
Develop Project Charter	117
Project Charter Example	117
Benefits of Project Charter	120
Project Selection Models	122
Economic Value Added	127
Develop Project Management Plan	133
Project Management Plan	135
Baseline	136
Requirements Management Plan	138
Change Management Plan	139
Change Control System	140
Configuration Management Plan	140
Configuration Management System	141
Process Improvement Plan	141
Summary of Steps	142
Project Documents	144
Project Management Plan Approval	144
Kick-Off Meeting	145
Direct and Manage Project Work Process	145
Corrective Action, Preventive Action & Defect Repair	147
Manage Project Knowledge Process	148
Monitor and Control Project Work Process	149
Perform Integrated Change Control Process.	150
Change Control Board (CCB)	153

Process for Making Changes	153
High Level Process for Making Changes	155
Close Project or Phase Process	155
Quiz – Section 3	157
Answers	167
Mapping Game – Section 3	168
Answers	169
SECTION 4 – SCOPE MANAGEMENT	171
Overview of Scope Management	172
Product & Project Scope	174
Plan Scope Management Process	175
Scope Management Plan	175
Requirements Management Plan	176
Collect Requirements Process	177
Tools & Techniques for Collecting Requirements	178
Requirements Documentation	181
Balance Stakeholder Requirements & Resolve Competing Requirements	183
Requirements Traceability Matrix	184
Define Scope Process	185
Project Scope Statement	186
Constraints and Assumptions	187
Create Work Breakdown Structure (WBS) Process	188
Rules for Creating WBS	190
Benefits of Using WBS	191
Relationship of Levels in WBS	194
WBS Dictionary	195
Validate Scope Process	197
The inputs of the Validate Scope process	198
The outputs of Validate Scope process	199
Steps of Validate Scope Process	199
Control Scope Process	200
Steps for Control Scope process	201
Quiz – Section 4	203
Answers	209
Mapping Game – Section 4	210
Answers	211
SECTION 5 – SCHEDULE MANAGEMENT	213
Overview of Schedule Management	214
Plan Schedule Management Process	216
Schedule Management plan	217

Define Activities Process	218
Define Activities Process Example	219
Sequence Activities Process	220
Types of Relationships in PDM	222
Types of Dependencies	223
Leads & Lags	224
Benefits of Network Diagrams	225
Sequence Activities Process Example	226
Important Points About Estimating	227
Estimate Activity Durations Process	228
One-Point Estimation Technique	229
Analogous Estimating (Top-Down)	230
Parametric Estimating	230
Heuristics Estimating	231
Three Point Estimating (PERT Analysis)	231
Three Point Estimating PERT Analysis Example	233
Estimate Activity Durations Process Example	234
Reserve Analysis	235
Develop Schedule Process	236
Critical Path Method (CPM)	238
Critical Path Method (CPM) Exercise	240
Notes about Critical Path Method	245
Schedule Compression (Fast Tracking & Crashing)	245
What-if Scenario Analysis	247
Resource Leveling	248
Critical Chain Method	249
Agile Release Planning	249
Project Schedule	250
Schedule Baseline	252
Develop Schedule Process Example	253
Control Schedule Process	254
What are the activities in control schedule process?	254
Re-estimating	255
Quiz – Section 5	257
Answers	262
Mapping Game – Section 5	263
Answers	263
SECTION 6 – COST MANAGEMENT	266
Overview of Cost Management	267
Plan Cost Management Process	268
Cost Management Plan	268
Life Cycle Costing & Value Engineering	270
Estimate Costs Process	271
Types of Costs	274
Inputs to Estimating Costs	275
Estimating	276
Contributors to Creation of Estimates	277
Accuracy of Estimates	278

Determine Budget Process	279
Determine Budget Process Example	280
Cost Baseline & Project Budget Components	282
What to Do After Determine Budget	284
Control Costs Process	285
Progress Reporting	286
Earned Value Management	288
Earned Value Management Exercise	288
Variances in Earned Value Management	289
Variances in Earned Value Management Exercise	291
Forecasting in Earned Value Management	292
Forecasting in Earned Value Management Exercise	295
Important Notes About EVM	296
Quiz – Section 6	299
Answers	306
Mapping Game – Section 6	307
Answers	308
 SECTION 7 – QUALITY MANAGEMENT	 310
Overview of Quality Management	311
Terms About Quality	312
Quality Theorists	313
Concepts of Quality Management	313
Differences of Quality Management Process	315
Plan Quality Management Process	317
Tools & Techniques Used in Quality Management Processes	318
The 7 Basic Quality Tools (7QC Tools)	322
Outputs of Plan Quality Management Process	330
Manage Quality Process	331
The Tools and Techniques used in Manage Quality process	331
The Outputs of Manage Quality process	332
Control Quality Process	333
Terms & Concepts About Control Quality Process	334
Outputs of Control Quality Process	335
Tips About Quality Management Processes	336
Quiz – Section 7	337
Answers	342
Mapping Game – Section 7	343
Answers	344
 SECTION 8 – RESOURCE MANAGEMENT	 346
Overview of Resource Management	347
Roles & Responsibilities	349
Role of the Project Sponsor (Initiator)	349
Role of the Project Team	352
Role of the Stakeholders	353

Role of the Functional Manager	354
Role of the Project, Portfolio & Program Manager	355
Plan Resource Management Process	356
Inputs for Plan Resource Management Process	357
Organization Charts & Position Descriptions	358
Resource Management Plan	361
Staffing Management Plan	362
Resource Histogram	363
Recognition & Rewards Systems	363
Estimate Activity Resources Process	364
Estimate Activity Resources Process Example	366
Acquire Resource Process	367
Inputs of Acquire Resource Process	368
Tools & Techniques Used in Acquire Resources Process	368
Virtual Teams	370
Halo Effect	372
Develop Team Process	372
Team-Building Activities	374
Tools & Techniques Used in Develop Team Process	375
Manage Team Process	377
Tools & Techniques Used in Manage Team Process	378
Powers of the Project Manager	380
Conflict Management	381
7 Common Sources of Conflicts	382
Conflict Resolution Techniques	383
Important Terms & Topics	384
McGregor's Theory of X and Y	385
Maslow's Hierarchy of Needs	385
David McClelland's Theory of Needs	387
Herzberg's Theory.	387
Control Resources Process	388
Quiz – Section 8	390
Answers	398
Mapping Game – Section 8	399
Answers	399
SECTION 9 – COMMUNICATIONS MANAGEMENT	402
Overview of Communications Management	402
Potential Dimensions in Communications Management Processes	403
Effective Communication Skills	404
Plan Communications Management Process	406
Number of Communication Channels	407
Communication Technology	407
Communication Models	408
Communication Methods	410
Communications Management Plan	410
Manage Communications Process	412

Monitor Communications Process	412
Quiz – Section 9	414
Answers	417
Mapping Game – Section 9	418
Answers	418
 SECTION 10 – RISK MANAGEMENT	 421
Overview of Risk Management	422
Risk Management Concepts	423
Plan Risk Management Process	425
Risk Management Plan	427
Identify Risks Process	428
Tools & Techniques for Risk Identification.	428
Risk Register	430
Perform Qualitative Risk Analysis Process	431
Outputs of Perform Qualitative Risk Analysis Process	434
Perform Quantitative Risk Analysis Process	435
Tools & Techniques for Quantitative Risk Analysis	436
Outputs of Perform Quantitative Risk Analysis	441
Plan Risk Responses Process	441
Risk Response Strategies for Negative Risks	442
Risk Response Strategies for Positive Risks	445
Contingent Response Strategies	445
Outputs of Plan Risk Responses Process	446
Important Notes about Plan Risk Responses	447
Implement Risk Responses Process	448
Monitor Risks Process	449
Quiz – Section 10	452
Answers	460
Mapping Game – Section 10	461
Answers	462
 SECTION 11 – PROCUREMENT MANAGEMENT	 464
Overview of Procurement Management	465
Procurement Concepts	465
Project Manager’s Role in Procurement	467
Centralized-Decentralized Contracting	469
Plan Procurement Management Process	470
Fixed Price Contracts	470
Cost Reimbursable Contracts	473
Time & Material Contracts	475
Terms & Concepts about Contracts	476
Tools & Techniques Used in Plan Procurement	480

Procurement Management Plan	482
Procurement Statement of Work	484
Procurement (Bid) Documents	484
Source Selection Criteria	485
Other Terms & Concepts About Procurement	487
Noncompetitive Forms of Procurement	489
Conduct Procurement Process	490
Tools & Techniques Used in Conduct Procurements Process	491
Outputs of Conduct Procurements Process	495
Control Procurements Process	495
Tools & Techniques Used in Control Procurements	496
Closing a Procurement	498
Key Outputs of Procurement Processes	499
Quiz – Section 11	501
Answers	508
Mapping Game – Section 11	509
Answers	510
SECTION 12 – STAKEHOLDER MANAGEMENT	512
Overview of Stakeholder Management	512
Identify Stakeholders Process	514
Tools & Techniques Used in Identify Stakeholders	515
Stakeholder Register	517
Plan Stakeholder Engagement Process	518
Tools & Techniques of Plan Stakeholder Engagement	518
Stakeholder Engagement Plan	521
Manage Stakeholder Engagement Process	522
Monitor Stakeholder Engagement Process	523
Quiz – Section 12	524
Answers	526
Mapping Game – Section 12	527
Answers	527
SECTION 13 – SAMPLE PMP® PRACTICE EXAM	529
SECTION 13 – SAMPLE PMP® PRACTICE EXAM ANSWERS & RATIONALES	567

Information About PMP® Certification

Before we dive into the details of knowledge areas, it is better to know details of PMP® and CAPM® certification.

Why should I get PMP® Certification?

PMP certification is the most recognized professional certificate for project management profession around the world. Many of the employers seek PMP certification in project management positions when they are hiring. Also, they seek PMP certification as a prerequisite for their current employees when they are promoting their employees to project management positions.

Based on several surveys, PMP certification holders command ~20% higher income than their uncertified counterparts. Therefore, importance of the PMP certification has grown rapidly in recent years.

PMP certification itself does not prove any competence or experience. But, PMP certification warrants at least a certain level of knowledge on project management area. However, PMI's PMP application process and audits seek for relevant experience and education requirements to be a PMP very strictly. Therefore, companies or organizations give very high credit to PMP certification compared to other certificates in the industry.

Strict process of PMI to check PMP certification requirements is the foundation of this high credit given by employers. Because, an employer will know that a PMP certification holder met the strict PMP certification requirements which proves a certain level of project management knowledge and practice.

PMP certification is not an easy sit and pass exam. There are PMP eligibility requirements that every PMP certification aspirant must meet. Let's see these PMP certification requirements now.

PMP® Certification Requirements

You might wonder why there are requirements for PMP certification. There are two fundamental reasons for this. The first main reason is project management is a serious profession that requires communication with several stakeholders throughout the project. While delivering a scope of work, project managers must be careful about communication, attitude and how to manage expectations of different people. Otherwise, the project delivery might fail. Therefore, having a solid project management experience is one of the requirements for PMP certification.

The second main reason for having requirements for PMP is project management requires solid theoretical knowledge on project management techniques. There are knowledge areas that a project manager has to be proficient in order to pass the PMP certification exam. These knowledge areas are tested in different project management process groups. In order to pass the PMP certification exam, a PMP candidate must score above a certain level from these project management process groups.

Because of these two reasons, requirements for PMP exam include PMP experience requirement and PMP education requirement. PMP experience requirement will show that the PMP candidate has enough soft skills to sit for the PMP exam. PMP education requirement will show that the PMP candidate has enough theoretical background to manage a project.

Following table summarizes the PMP certification requirements that a PMP aspirant must meet to apply for the PMP exam.

Education Level	Project Management Experience	Project Management Education
Bachelor's Degree (4 years of College/University Education)	4,500+ hours (equivalent to 3+ years of experience)	35 contact hours
Secondary Degree (High School or 2-year pre-undergrad education)	7,500+ hours (equivalent to 5+ years of experience)	35 contact hours

In order to apply for PMP certification, you need to have at least a secondary degree, for instance a high school or equivalent education level. If your highest attended education level is secondary degree, in order to apply for PMP certification, you need to satisfy following three PMP certification requirements.

- 1-) 5 years of project management experience (7,500 hours)
- 2-) 35 contact hours of project management education.

Note that, project management experience point in PMP certification requirements does not seek for active management of a project. Participating in a project environment also counts for this 5 years of experience requirement. However, 7500 hours of these 5 years, which makes around 3.5 years, need to be spent of leading and directing projects. Again, this doesn't mean that you should have enrolled in a project as a project manager. A leading or directing role can be supervisor of a junior team member or team members, team leader of a group, assisting project manager in some of the project management activities etc.

If your education level is a four-year degree or above, you should be looking for following PMP requirements. If your highest attended education level is a four-year degree or above, for instance bachelor's degree or equivalent, master's degree, doctorate etc. in order to apply for PMP certification, you need to satisfy following three PMP certification requirements

- 1-) 3 years of project management experience (4,500 hours)
- 2-) 35 hours of project management education.

Note that, project management experience point in PMP certification requirements does not seek for active management of a project. Participating in a project environment also counts for this 3 years of experience requirement. However, 4500 hours of these 3 years, which makes around 2 years, need to be spent of leading and directing projects. Again, this doesn't mean that you should have enrolled in a project as a project manager. A leading or directing role can be supervisor of a junior team member or team members, team leader of a group, assisting project manager in some of the project management activities etc.

35 Contact Hours Project Management Education Requirement for PMP®

Regardless of your education level, you must attend in a 35 contact hours project management education to be eligible to sit for PMP exam. There are several education providers for PMP certification exam. However, you must be careful when selecting your PMP training.

PMI expects you to attend in a 35 contact hours instructional PMP course. So, following only a book or studying by yourself through PMP resources will not satisfy PMP certification requirements. You must attend in an online (self-paced or instructor-led) or in-person PMP classroom training.

Once you satisfy the PMP certification requirements, you can proceed to create your profile in PMI website and apply for the PMP exam.

PMP® Exam Structure

There are 200 multiple-choice questions in PMP exam. Total duration of the exam is four hours. 25 out of the 200 questions in the exam are not scored and used by PMI for quality control purposes. However, you will never know which of these 25 questions. They come randomly during you take the PMP exam.

Following table summarizes the PMP exam structure.

Number of Questions	Duration	Style
200	4 hours	Multiple Choice

There are different types of questions in the PMP exam. Situational, interpretation, formula, definition, knowledge and ethics questions will appear during the PMP exam.

Section 1

Environments in Which Projects Operate



Section 1 - Environments in Which Projects Operate

Before you step into the details of project management, you must understand the foundations of project management and critical terms about project management. If you are familiar with project management, you might have heard about what you will learn during this section. However, keep in mind that, what you must know for PMP® exam might differ from what you know from “practical” project management.

What will you learn in this section?

- Project
- Operational Work
- Project Management
- Program
- Portfolio
- Project Management Office (PMO)
- Objectives
- Constraints
- Stakeholders
- Organizational Structure
- Life Cycle
- Project and Development Lifecycles
- Project Phases & Phase Gates
- Business Case
- Benefits Management Plan
- Lessons Learned

There is always a misconception between project and operational work. Although some operational work might look like projects, there are differences between them. There is a hierarchy between project, program, and portfolio and a role of the project management office and project manager.

Every activity, operation, action will have an objective in a company. Similarly, projects have their own objectives and constraints that affect the progress of the project critically.

Stakeholders are the people or organizations who may be affected by a project and the organizational structures are important in terms of the approach of a company to the project management. There are three different types of organizational structures in organizations and all have advantages and disadvantages.

There is a life cycle of a project and this helps project managers to focus on different aspects of projects at different times easily. As well, there is development lifecycles. There are several differences of predictive, iterative, incremental and adaptive lifecycles. Depending on the project nature, one of the project lifecycles is adapted when managing the project. Projects are divided into phases. These phases include related activities of a project and in order to complete a phase, predetermined phase gate rules must have been completed.

The Business case is the reason why projects are initiated. Benefits management plan covers the benefits that will be gained once the project is completed. Lessons learned documents constitute very precious knowledge and experience database for a company.

Generally, in this section, all the above mentions and the critical project management terms, definitions and their purposes will be described in detail.

Definition of Project

Project is a temporary endeavor with a beginning and an end. This is important. The project should have a beginning and it should have an ending. A project cannot go over time periodically.



Projects are temporary endeavors which create unique product, service or result.

Projects should create a unique product, service or result. If it is not unique, for instance, if you are producing the same product in an assembly line, then you are not working on a project.

Why a Project is Initiated?

The most common project initiation reasons are listed here:

- **Market Demand:** A project might be initiated due to market demand. For example, women drivers prefer to use smaller cars in traffic. Due to this market demand in the last years, car manufacturers are producing small cars, especially for women. Producing a small car for women might be the reason for a project for a car manufacturer.
- **Strategic Opportunity/Business Need:** There might be a harsh competition in the sector. For example, in the smartphone industry, there is a harsh competition between Samsung and Apple. Two rivals try to beat each other. They release new versions of their smartphones with extended features and functionalities frequently. This might be a reason for a project in Samsung or Apple.
- **Social need:** Food is a basic need of humanity. There are several African countries fighting with hunger. In order to provide food for the children in Africa, UNICEF might start a project and this would be an example of social need.
- **Environmental Consideration:** Water and air pollution are becoming major problems in big cities around the world. Several cautions are taken and several projects are initiated to reduce air and water pollution in cities around the world. For instance, green buildings, buildings that generate their own electricity or reuse the water are examples for this category.

- **Customer Request:** There are several service companies and vendors in the market. For instance, for a telecom operator, Ericsson, Nokia, and Huawei are examples of major telecommunication vendors. When a mobile operator asks for a new system in their network, this would be an example of customer request from a vendor point of you.
- **Technological Advance:** A new project can be initiated in order to do an existing activity or process better. For instance, if a new machine will increase the production speed in a factory, in order to take advantage of this technological advance, a new project might be initiated to integrate this new machine.
- **Legal requirement:** Consider that, there are problems in regulations of miner stations in a country. In order to improve the conditions of the mineworkers, the government has released some regulations and each mine station employer has to obey these rules by the government. In order to improve these conditions of the miner stations, the mine stations may want to start a new project.

Although these are the major reasons for project initiation, there might be other cases that can start projects in organizations.

The Example of a Project

Consider “the construction of the Golden Gate Bridge of San Francisco” as an example of a project.

The project is started in 1933 and ended in 1937. It has a beginning and an ending. It was temporary. It did not take until today to build this bridge. Besides, the Golden Gate bridge has been built only once and it is unique in the world. There is not any identical Golden Gate bridge in somewhere else around the world.




Definition of Operational Work

Operational work is the most of the work performed in organizations. User registration in a company, fixing the technical problem of a customer, giving support on the phone to a customer, providing a new laptop to a new employee are all examples of operational work done in a company.

Operational work differs from the project in terms of being **ongoing** and **repetitive**. The results of the operational work are not unique or they do not have a definite end. For instance, a company must support its customers and this will be an ongoing activity as long as the company continues to provide its services and products to its customers.



 Operational works are “ongoing” and “repetitive”.


As an example of the operational work: The yearly maintenance of the Golden Gate Bridge is an example of operational work.

Maintenance happens every year and most probably certain steps and processes are repeated on a predefined interval on the bridge to check whether the bridge is safe.

Therefore, maintenance of the Golden Gate Bridge is not a project.

Definition of Project Management

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. There is a scope of a work that needs to be done, a timeline that the customer expects it to finish and of course, there will be quality requirements.

 Project management ensures that the scope of the required work is delivered on time as per the quality requirements.

Project Management profession is growing rapidly in recent years. The main reason for this is the competition in the market. Because the faster you deliver, the better you take the position. The cheaper you produce, the more competitive your product will be. The project management mainly aims to deliver a scope on time, on budget and with agreed quality. This is why project management is a growing profession in recent years.

Project Management follows a systematic process. For each topic and area, **project management has processes that have inputs, tools and techniques and outputs**. These ensure to deliver successful results respectively.

Process Groups

Each process of project management will be discussed in the further sections.



Knowledge Areas

Process of project management belongs to the knowledge areas. There are 10 knowledge areas in project management. These are:

- Integration Management
- Scope Management
- Schedule Management
- Cost Management
- Quality Management
- Resource Management
- Communications Management
- Risk Management
- Procurement Management
- Stakeholder Management

Integration Management: Integration management mainly aims to control all processes and cohesive execution of the project in accordance with all project management processes.

Scope Management: Scope Management mainly aims to define the boundaries of the work that will be delivered in the project and helps to protect this scope until the end of the project.

Schedule Management: Schedule Management mainly aims to complete the project on time.

Cost Management: Cost Management targets to deliver the agreed scope based on the planned budget.

Quality Management: Quality management helps to ensure that the project meets its quality requirements.

Resource Management: Resource Management mainly aims to manage people and other resources of a project. Conflict resolution, staff planning, coaching, etc. are all done as part of human resource management. However, there will be other tools, equipment and vehicles you will use to complete the project. These are all managed under the resources management knowledge area.

Communications Management: There will be several stakeholders in a project. Each stakeholder will have a varying interest to the project and each stakeholder will require a different set of information. Communications management knowledge area ensures effective and efficient communication in a project.

Risk Management: Risk Management ensures to keep the up to date status of risks and their response strategies if those risks occur. Its main objective is being prepared for unexpected situations during the project.

Procurement Management: Projects require purchasing or leasing of tools, equipment, resources or people. This is under control of procurement management.

Stakeholder Management: People, groups or institutions that might be affected positively or negatively from the outcome of the project are stakeholders. Stakeholder management aims to treat each stakeholder accordingly to meet the balance of stakeholder requirements in a project.

Definition of Program & Portfolio

What is a Program?

A program is a group of projects. Several projects can come together to constitute a program, however, these projects should be interrelated. Programs are constituted in order to manage interrelated projects better. If projects somehow do not relate to each other or do not affect each other, then there is no need to group these projects under a program.



A program is a group of interrelated projects.

Example of a Program

As an example, consider there is a program of “Manufacturing of a new version of an Airbus plane”, and under this program, there can be several projects such as avionic systems, communication systems, entertainment systems, security system, etc. All these projects are interrelated with each other because the airplane will be completed only if all these systems are merged and works properly.

What is a Portfolio?



A portfolio is a group of programs to achieve a business goal. In order to achieve a strategic objective of the company, **several programs can come together to constitute a portfolio.**

Although a program might not be directly related to another program, if it is serving for the same business goal, these programs can be grouped under the same portfolio. For the programs under a portfolio, it is important to serve for same business goal.



A portfolio is a group of programs to achieve a strategic objective of the company

Example of a Portfolio

Consider that Airbus will develop three new airplane versions in six years.



The development of each version of these airplanes can go independently from each other and these programs can be grouped under portfolio.

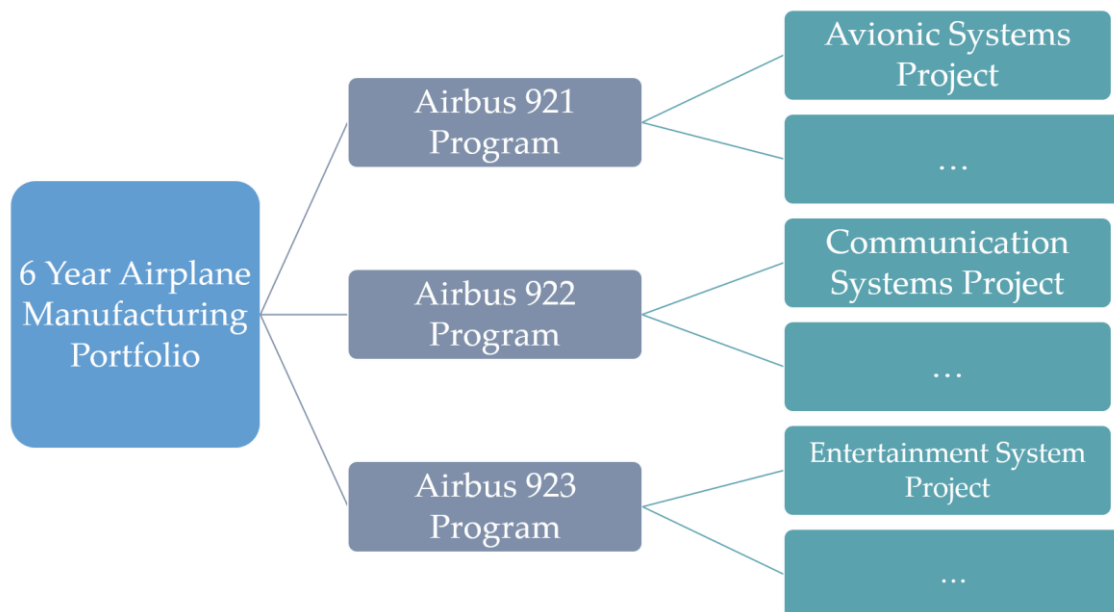
What is the strategic goal of this portfolio?

To be the world's most passenger-carrying airplane company. This strategy might be for beating Boeing in the market for instance.


Interrelationships of Project, Program & Portfolio

The interrelationship of project, program and portfolio will be shown over an example.

Consider the “six-year airplane manufacturing portfolio of Airbus” as a portfolio example from our previous examples. This portfolio includes three programs, which cover manufacturing of three different versions of Airbus airplanes.



Airbus 921 program, Airbus 922 program and Airbus 923 program. Note that, these three programs serve for the same strategic business goal but they do not interfere or they do not depend on each other.

 The interrelationship of project, program and portfolio is:
Portfolio > Program > Project

Under each program, there are interrelated projects. The examples are given in avionics systems project, communication systems project and entertainment system project for each program. Same projects might be the input for different several programs as well.

Comparative overview of Project, Program, and Portfolio

Look at how project, program, and portfolio differ from each other in terms of scope, change, planning, management, success and monitoring.

Organizational Project Management			
	Projects	Programs	Portfolios
Scope	-defined objectives -scope is elaborated throughout the project life cycle	-relatively larger scopes -produces more important benefits	-serves for an organizational scope -organization's strategic targets determines scope
Change	-changes are inevitable and managed through processes	-changes can come from inside or outside of the program	-changes can come from internal sources or from external environment
Planning	-high-level information is used and detailed plans are created	-overall program plan is created and high-level plans are created at the component level	-Processes are created and communication is critical
Management	-Project managers manage the project team	-Program managers manage the program staff and project managers	-Portfolio managers manage the portfolio staff, program managers and project managers
Success	-measured by produced product/service -time, budget, customer satisfaction are key metrics	-Realization of the program objectives	-return on investment, benefits realization
Monitoring	-Project managers monitor & control products/services	-Program managers monitor the program components – overall goals, schedule, budget and benefits	-Portfolio managers monitor strategic changes, resource allocation, performance results and risks

In terms of scope, projects have more definitive and narrower tasks.

The scope is progressive throughout the project lifecycle. This means, new change requests might come from the customer or business and this might affect the scope of the project.

However, programs have a larger scope, and provide benefits that are more significant. Because **several projects come together for a program**. Therefore, the program's scope will be bigger respectively.

In the portfolios, the scope is more different. Instead of what needs to be done, strategic goals or business vision of a company defines the scope of a portfolio. Projects deal with the changes that might affect their project. These changes often happen internally.

Program managers deal with both internal and external changes. For instance, a change or risk that is happening in one of the projects under the program might affect each other since they are interrelated. Therefore, the program manager must look broader.

Portfolio managers continuously monitor changes in the broader internal and external environment. Because **the portfolio serves for a strategic goal of a company** and a market or economic change might affect the portfolio as well.

In terms of planning, project managers progressively elaborate high-level information into detailed plans throughout the project lifecycle. The planning of a project includes detailed work package planning, detailed task planning which includes tasks that can be completed in a few days or even in hours.

In the programs, program managers develop the overall program plan and create high-level plans to guide the detailed planning at the component levels. **The programs do not dive into details of planning.** They keep track of whether components within a project have been completed or not.

In portfolios, portfolio managers create and maintain necessary processes and communication relative to an aggregate portfolio. Instead of a task and component monitoring, portfolio planning deals with whether the strategic goal or business plan will be achieved.

How does project, program and portfolio differ in terms of management?

Project Managers manage the project team and ensure that the project objectives are met.

A program manager manages the program staff, for instance, program assistant, and project managers under the program.

Portfolio managers manage the portfolio staff and program managers.

How is success measured in project, program, and portfolio?

Success is measured by product and product quality, timelines, and budget in projects. If the agreed scope is met in agreed quality, on agreed time and budget, projects are considered successful, however, **in programs; all projects under the program must meet their objectives, timeline and budget respectively.**

For portfolio, success a bit different. **If projects and programs help to achieve the business goal of the portfolio, then portfolios are considered as successful as well.**

The last point is Monitoring. Project managers are the ultimate observer of projects health. In programs, program managers are responsible for the progress of programs and they need to take proper preventive and corrective actions if there are risks that might affect the program.

For portfolios, the portfolio manager must monitor whether the portfolio keeps going towards the strategic goal that has been determined. If there are any internal or external risks that might affect the portfolio, the portfolio manager must act respectively.

Project Management Office (PMO)

Project management office is abbreviated as PMO. The main role of this department is centralizing the overall project management of the company.

A company executes several projects at a time. Project Management Office ensures the successful management and coordination of these several projects with its processes and tools.

Information, documents, coordination and management are done mainly with the help of Project Management Office department. Depending on the size of the company, the number of projects and size of the projects, size and hierarchy of the department might change as well.

Structures of PMOs

There are fundamentally three structures for Project Management Offices;

1. **Supportive:** Supplies templates, best practices, training, lessons learned...etc. Acts as a repository. (Low degree of control)
2. **Controlling:** Supports and requires compliance with tools, methods. (Moderate degree of control)
3. **Directive:** Directly manages the projects. (High degree of control)

Supportive: Supportive PMO supplies templates, best practices, training, lessons learned documentation, etc. to the other departments and projects. This type of PMO actually acts as a repository of the company. This PMO structure is like an archive of the company and gives information and documentation when necessary but it does not have a solid control on projects.

Controlling: Controlling PMO supports and requires compliance with tools and methods. They follow whether required documents are submitted in a project, or relevant steps are executed based on the processes, etc. This type of PMO has a moderate degree of control in projects.

Directive: Directive PMO manages the projects and it is the sole accountable from the success of projects. They do have a strong position in the company and a relevant authority respectively. Directive PMO has the highest degree of control among other types of PMO.

What does Project Management Office do in an organization?

- PMO may **manage interdependencies between projects**. There might be several projects ongoing in a project and one project might affect each other. For instance, Project A might be started only if Project B finished. These kinds of or even more complex interdependencies of projects are managed by PMO.
- PMO may **help providing resources to the projects**. When there is a new project, PMO assigns the project manager of the project. Alternatively, if the PMO is directive, all project resources of the company might be reporting to the PMO. For instance, software developers, analysts, test engineers, etc. In this case, PMO will be responsible for constituting the overall project team structure.
- PMO may **terminate projects**. If PMO sees that the objectives of the project will not be met anymore, it can discuss with the business or customer to terminate the project.
- PMO may **monitor compliance with organizational processes**. In order to initiate a project or close a project, several processes within an organization might be executed. For instance, if you will need a tool or equipment for a project, this will require procurement. To purchase this tool or equipment, processes of finance department might be executed. PMO will initiate and follow it in this case.
- PMO may **collect the lessons learned documentation from projects**. Projects experience several situations that show the weaknesses and strengths of the company. These should be documented and collected by PMO. These must be used in future projects to improve weak points or take preventive and corrective actions for the problems encountered in a past project.
- PMO may **provide templates**. A project requires several documents such as planning template, budget template, risk register template ... etc. In order to have a standard type of documentation, PMO may provide templates for the projects.
- PMO may **provide guidance**. If a project faces a problem or if there is a conflict that needs to be escalated, PMO will guide in this case.
- PMO provides **centralized communication about the projects**. Coordination and management of projects in a company are centralized in PMO therefore; PMO may provide centralized communication about the projects as well.
- PMO may **be part of the change control board**. Change control board approves whether a change will be implemented in a project. As the department managing and coordinating projects, PMO may be part of the Change Control Board respectively.
- PMO may **be a stakeholder**. A stakeholder is a person or organization who might be affected positively or negatively from the outcomes of a project. By its nature, since PMO is managing and controlling projects, it will be a stakeholder as well.



Other lots of tasks and activities are done by PMO in a company.

Role of the Project Manager

The project manager is the person assigned by the organization to lead the team that is responsible for achieving project objectives.

Roles and duties of a project manager might change depending on the organization but project managers play a vital role in the success of a project. They act as a single point of contact most of the times whenever information is required from a project.



A project manager is the ultimate accountable of a project's success

Depending on the type of organization, the project manager can report to three types of other managers.

- Functional Manager
- Program Manager
- Portfolio Manager

Functional manager: Functional managers are responsible for resources for a specific domain. For instance, if software developers of a company are under the software development line, then the software development line manager is a functional manager in this case. Depending on the PMO and project management structure of the company, project managers might report to functional managers.

Program Manager: Project managers might report to a program manager if their project is part of a program.

Portfolio Manager: They might report to a portfolio manager if their project belongs to a portfolio.

The main role of the project manager is, he **acts as the link between strategy and team**. A company has objective, strategies, and vision. In order to reach its goal, several projects are executed in a company. A project is a part of the overall success to reach a business goal.

In this respect, the project manager will guide its team to reach its project objectives and respectively the project will help to achieve the overall success of the company in its business goals and objectives.

Competencies of a Project Manager

A project manager should have the following competencies:

- Knowledge (about project management)
- Performance (how he applies knowledge)
- Personal (behavior, skills)

Knowledge about project management: Project management includes several knowledge areas like integration management, scope management, time management, people management, etc. In order to manage a project successfully, the project manager must have this competence.



Performance: Knowledge or theory without practical implication is not that much valuable. You might know the project management theories and knowledge areas very well, however, if you cannot perform them well on the field when executing a project, your project will suffer most probably.

Personal: A project manager spends 90% of his time with communication. This can be either written, face-to-face or informal. Therefore, a project manager must know how to reach people and how to encourage them to perform better.

Interpersonal Skills of a Project Manager

A Project Manager must have several interpersonal skills but the most important ones are listed here.

- Leadership
- Team building
- Motivation
- **Communication**
- Influencing
- Decision Making
- Political & Cultural Awareness
- Negotiation
- Trust building
- Conflict Management
- Coaching

 The topmost skill that a project manager must have is **Communication**.
 A project manager spends 90% of his time with communication

Communication: If you are not good at communicating with other people, this will automatically affect your project success. You can be a perfect software developer, perfect civil engineer or a perfect test engineer. Unless you do not have good communication skills, even if you have very good knowledge of project management, it will affect the success of your projects.

Leadership, team building, motivation, influencing, decision making, political and cultural awareness, negotiation, trust building, conflict management and coaching are other interpersonal skills that a project manager should have to manage projects better.

Objectives and Management By Objectives (MBO)



Objectives are what needs to be achieved as a result of the project. Each project will have unique objectives.

For instance, a new feature development can be a project objective, increasing revenue or decreasing costs can be a new project objective, or producing a new product can be objective of a project.

Golden Gate Bridge construction project was our project example. Objectives of this project can be:

- The bridge must have 6 lanes in total, 3 for each side.
- The bridge must carry at least 2,5 million kilograms
- It must resist an at least 8.5 Richter scale earthquake.

Constructing a bridge, which will be connecting two sides of a city, will have several other objectives. Note that if objectives of a project cannot be met, that projects will be considered as failed.



If you have lots of requirements, then most probably you will have lots of objectives.

Objectives

- Projects are considered as done, once objectives are met. Therefore, the project manager must monitor project objectives and if there are any risks that can cause not meeting any of the objectives, then preventive and corrective actions should be taken accordingly.
- A reason for terminating a project before completion is that the project objectives cannot be met. If the Golden Gate Bridge could not have carried 2.5 million kg, that would be the reason for the project to be failed.
- Project Manager is the ultimate accountable of meeting project objectives. Therefore, Project Manager must keep track of objectives and ensure that project activities, tasks and deliverables will help to meet project objectives.
- Quality activities are for checking whether the project meets its objectives. For example, consider the Golden Gate Bridge project. After the construction finishes, you cannot open it directly to the traffic right? You need to test whether it will carry the traffic. Therefore, quality activities are for ensuring to meet project objectives.

- There is a trade-off between requirements and objectives. If you have many requirements, then most probably you will have many objectives.

Management by Objectives

Management by objectives is a management philosophy that ensures to complete a work, task or activity by managing the objectives that will bring you to the completion. Management by Objectives philosophy has three steps:

1. **Establishing clear and realistic objectives.** This is important because subjective objectives will not be sufficient. “We will produce a very good car”. Is this an objective? No. Because good, bad, fast, slow are all subjective. A very fast car can be very slow for another driver. Therefore, the objectives must be quantitative. “We will produce a car that will reach 100 km/h in 8 seconds”. This is an objective because quantitative values are determined.
2. **Periodically evaluating if project objectives are met.** Projects might take for months or even years to complete. Sometimes, several resources can work on a package for a long time. Therefore, you need to check the outputs of the work being produced whether it meets the project objectives. Otherwise, your product or deliverable might deviate from what you desired to get in the beginning.
3. **Implementing corrective actions if there are problems.** You set the objectives, work started to complete the project but there are problems in the middle of the work and you see that the objectives will not be met. You need to take corrective actions. This can be inadequate personnel in your project team, quality of the materials or a tool missing, etc. Whatever the reason is, you need to find the problem, fix the root cause.

Constraints

Constraint means a limitation or restriction by dictionary definition. It is similar in project management as well. Projects have constraints and the project manager must manage these constraints.

There are seven common constraints of projects. These are **Cost, Scope, Quality, Customer satisfaction, Risk, Resources and Time.**



Generally, there is a trade-off between these constraints. If you improve positive aspects of a constraint, this will bring a negative aspect on one of the other constraints.



For example, in order to reduce the delivery duration of the project, or in order to deliver project earlier than the scheduled time, you need to put extra resources to deliver the same amount of work in a shorter time. This means an increased cost or if you will not put extra resources, you need to reduce your scope to deliver less work in a shorter timescale.

If you try to deliver more with the same amount of resources but in a shorter timescale, this will cause to deliver your deliverables with faults, which means less quality. This will also lead to a decrease in customer satisfaction in the end.



One impact on one constraint might affect all other constraints in the chain.

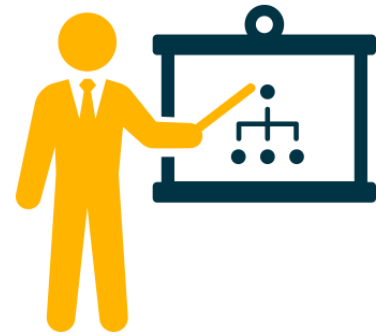
Therefore, once you are trying to change one of the constraints in a project, you have to keep an eye on what will be the impact of this change on other constraints.

Organizational Process Assets

Organizational process assets are:

- Plans, processes, policies, procedures and knowledge bases specific to and used by the performing organization.
- For instance, project plan template, security policies, procurement procedures and company knowledge base are all categorized as organizational process asset.

- Organizational process assets include the lessons learned documentation from previous projects and historical information about the company. Therefore, it acts as the archive or repository of the company.
- Many documents, policies or procedures are under organizational process assets. They are used as input to most planning processes. For instance, if the company is trying to initiate a new project which is very similar to a project they finished in past, looking to lessons learned documentation of the past project will bring many insights during the planning of a new project.
- The corporate knowledge base is used for storing and retrieving information from this knowledge base when needed. This corporate knowledge base includes lots of useful information not only about the projects but also about many other topics such as how to get a work visa for a new country, how to fix a defect in software, tips on making more efficient meetings, etc.

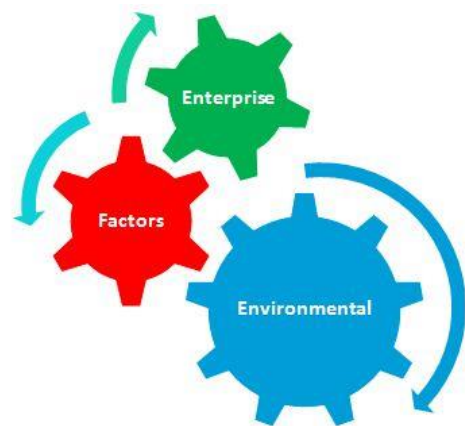


Enterprise Environmental Factors

Enterprise environmental factors are inputs to many processes in Project Management.

Conditions that are not under the control of the project team that influence, constrain or direct the project are categorized as Enterprise Environmental Factors.

Enterprise environmental factors are input to most planning processes. It is better to give some examples for Enterprise Environmental Factors to illustrate these factors better in your mind.



- Organizational culture, structure, and governance
 - Government or Industry Standards
 - Political Climate
 - Marketplace Conditions
- **Organizational culture, structure and governance** is an example for Enterprise Environmental factor. Because as a project manager, you cannot affect the management of your company or management hierarchy of your company. However, the approach of your management and hierarchy in the company directly affects project management in a company.

- **Government or Industry standards:** For example, if you want to produce health product, e.g. a blood pressure monitor, this must be in compliant with the standards of World Health Organization (WHO) and if you will market this product in the USA, it needs to be compliant and approved by FDA. Since these standards will affect your project scope, these are considered as Enterprise Environmental Factors as well.
- **Political climate:** Political climate is very important for projects. For example, if your project will be executed in a country that has an embargo, most probably you will have procurement issues. Alternatively, during the execution of a government project, the country of your company and your customer's company started to have a diplomatic crisis. This might affect your business as well. Therefore, a political climate is an important Enterprise Environmental Factor.
- **Marketplace conditions:** If you are working in a company, which is having an economic crisis, this affects the revenue of your company directly. Respectively, your projects might be affected as well.

Stakeholders

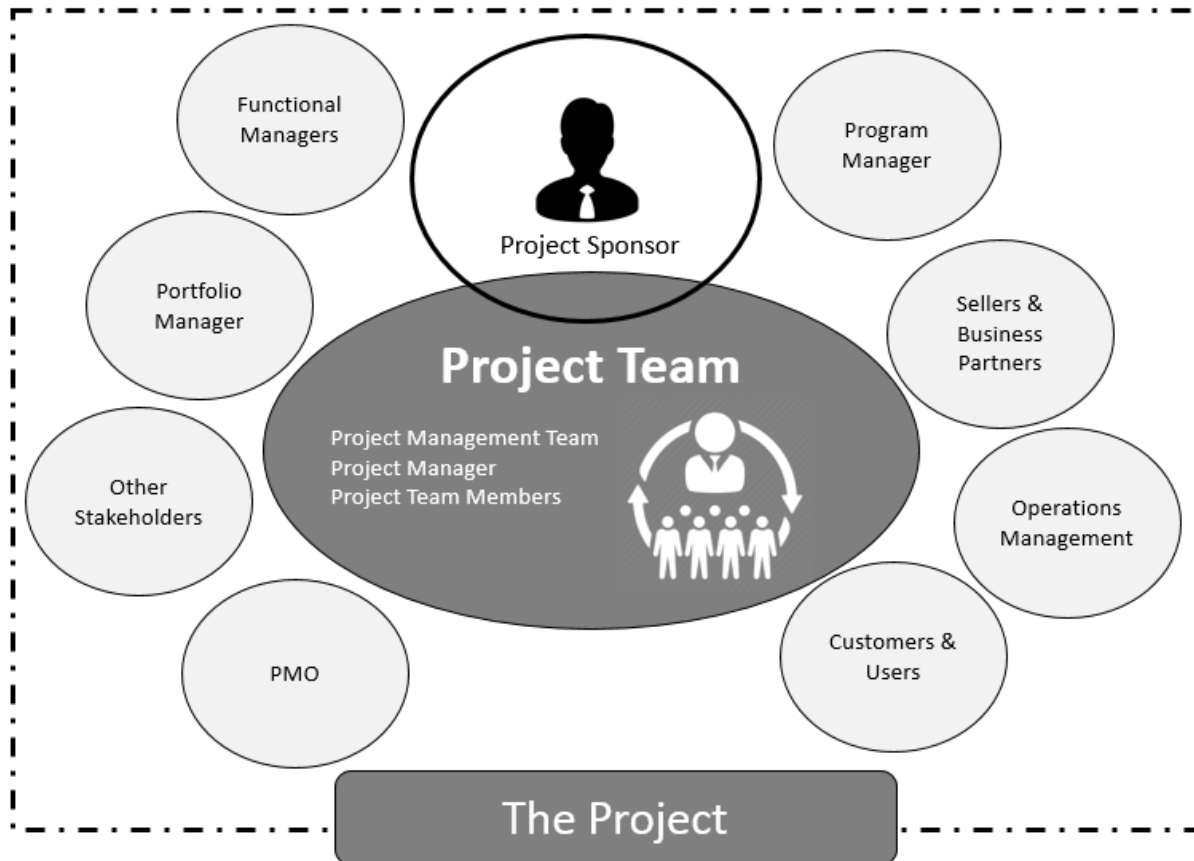


Stakeholders are people whose interests may be positively or negatively impacted by the project. **Anybody who can benefit or who may be distracted by the outcomes of a project are classified as stakeholders.**

Stakeholders include all members of the project team. Because as a direct contributor to the project, they directly affect the project.

Identifying stakeholders, understanding their relative degree of influence on a project, and balancing their demands, needs and expectations are critical to the success of the project.

A factory construction project that is expected to produce water and air pollution in a city. This will cause a big resistance from the residents of the city. There might be even protests and actions from the city management to stop the project. Therefore, stakeholder management is a very important aspect of project management.



This figure illustrates the project team, sponsor and other organizations or people that can be stakeholders of a project. The project team is an inner circle. The stakeholders in the project team are the internal stakeholders and the other stakeholders in the grey areas are external stakeholders.

For example, portfolio managers, program managers, project management office, operations management, functional managers, sellers, business partners, customers, users are all external stakeholders of a project. Sponsor is on the intersection of internal and external stakeholder area. Because the sponsor is the spokesperson of the project supports, the project financially and protects the project from external risks.

Example: Stakeholders of Golden Gate Bridge

- All workers, the project team are stakeholders of the project as the internal stakeholders when the bridge was being built.
- Government is a stakeholder as the sponsor of the project. Because the government or management of the city finances the construction of the project. Any risk or problem that could have happened during the construction of the



project would affect the government as well.

- Sea transporters between the two sides of the bridge. Because they were making money with these transfers but with the construction of the bridge, most people or carrier companies might have switched to pass the bridge instead of using a Ferry for instance.
- People residing closer to the bridge are stakeholders as well. Their properties became more valuable or maybe they had been distracted because of the construction.

There might be several other stakeholders of a project but this list is just to illustrate stakeholders better in your mind.

Project Governance



Project Governance provides the project manager and team with structure, processes, decision-making models, and tools for managing the project. It gives all the necessary things to the project manager to manage a project. For instance, how to control the budget, how to control schedule etc. are all defined in the processes included in the project governance.

Project Governance involves stakeholders, procedures, standards, responsibilities and authorities. It does not include only tools, processes or models. The Stakeholders, procedures, standards, responsibilities, etc. are also part of the project governance.



Project governance as a whole package assists in reaching project success

Project team

Project Manager and the group of individuals who perform the project work is called the project team.



A contributor cannot be considered as a project team member. For instance, the sponsor supports the project financially but he is not a member of the project team actually.

Team members must be assigned with a project activity and perform their work respectively.

A project manager is the leader of the team and the project manager must have the highest authority in the project.



Project manager is a member and the leader project team

Because the project manager is the ultimate accountable of a project's success. Therefore, he should be able to direct project team members and to do this he should have the highest authority within the team.

Organizational Structure

The organizational structure of a company affects which department is powerful, which department has more decision taker, which departments are weaker etc.



Organization structure is one of the main factors affecting projects in an organization. Depending on the market conditions, competition, industry and history of the company, companies can adopt different organization structures at different times.

There are three types of organizations in terms of project management in a company.

- Functional
- Projectized

- Matrix

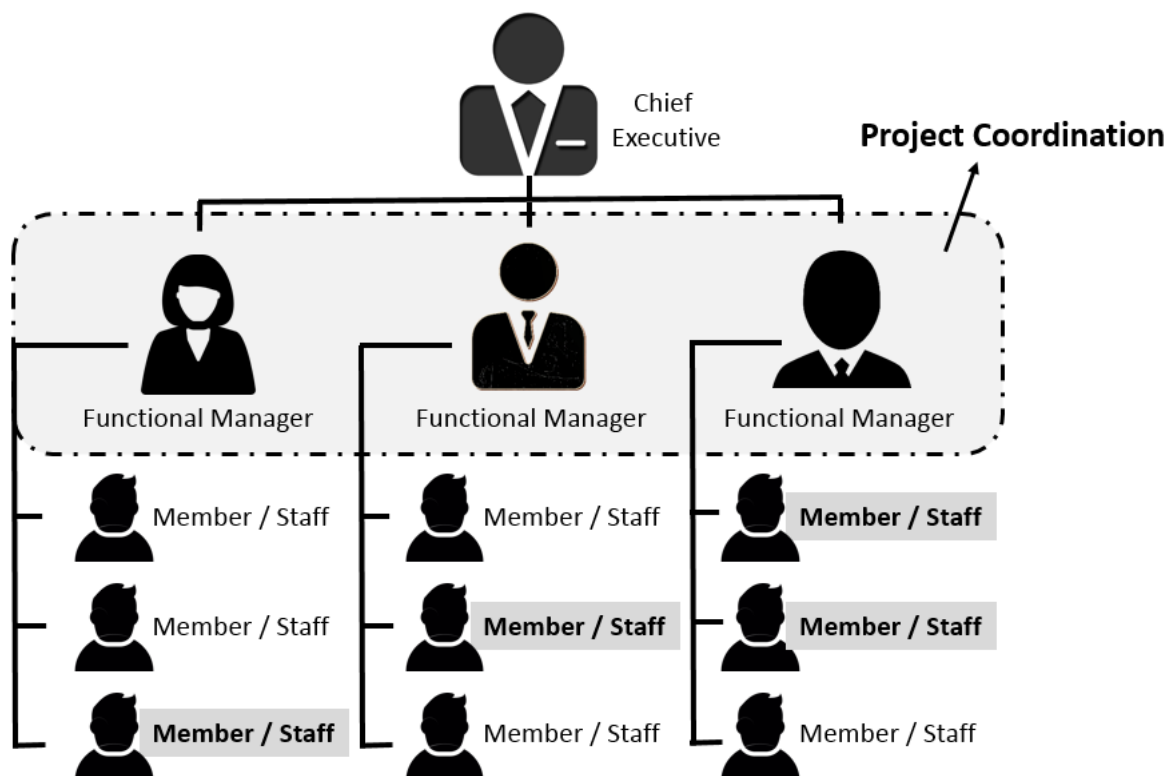
Functional Organizations

Functional organization structure is the most common type of organization in the industry. Many multinational and big companies in several industries adopt it.

In a functional organization structure, people are grouped by areas of specialization. For instance, marketing professionals are grouped under the marketing department; human resources professionals are grouped under the human resources department, technical people are grouped under IT department, etc. Depending on the size of these groups, managers, directors, vice presidents lead these groups.


If a department will need information or will initiate a request from another department, this is transmitted through the head of these departments. For instance, if marketing department needs a new software that will segment their customers and ease their marketing activities, head of marketing department will communicate with the head of IT department, and ask for this software request.

In functional organizations, team members do both project work and departmental work. For instance, if a software engineer in the IT department is assigned to a project, he has to complete his assignments in the project. On the other hand, if there are defects or problems that need to be resolved which is under the responsibility of the software department, he has to deal with these as well.



Members in gray boxes are in the project team

This is an example of the blueprint or organization chart of a functional organization structure. Gray backgrounded staffs are engaged in project activities and white backgrounded staffs are dedicated to departmental activities.

 In Functional organizations, the project coordination is done over the functional managers of each department.


Staffs from different departments work in a project in functional organizations. They turn back to their departmental work when their assignment in projects finish.

Projectized Organizations

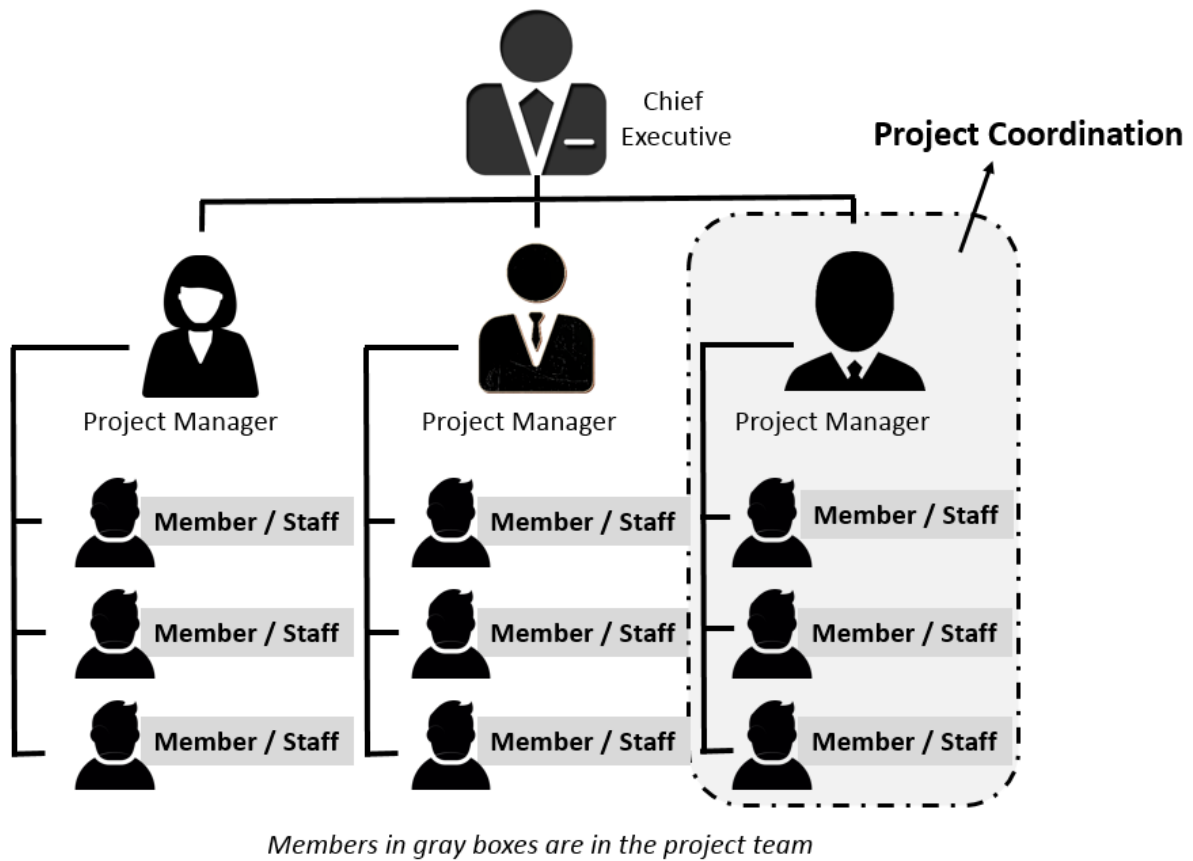
- In projectized organizational structures, the entire company is organized by projects. The resources of the project are fully dedicated to the project activities.



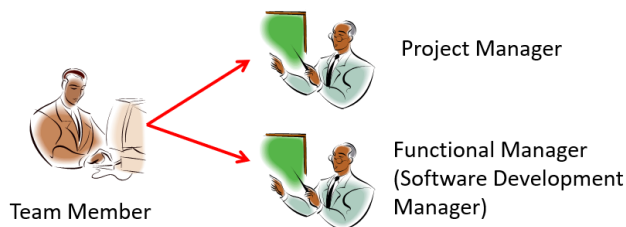
- Project Managers have control of projects. Resources only report to the project manager and the project manager has the ultimate control of resources.
- There are not any departments so resources do not belong to a department. They report to their project managers only.
- When the project is over, the project resources either are assigned to a new project or need to find a new job.

 In Projectized organizations, the project manager has the ultimate control of resources.

This is an example of the blueprint or organization structure of a projectized organization. Staffs backgrounded in gray are engaged to project activities. They all belong to project activities; there is not any other alternative. Project coordination is done over each project.



Matrix Organizations



Matrix organizational structure attempts to get strengths of projectized and functional organization.

Projectized organizations ensure the dedication of project resources to the project therefore; projects have a higher probability of success.

Functional organizations ensure the sustainability of the organization since the resources turn back to their departments once the project is over. Therefore, Matrix organizations aim to get the benefits of these two organizational structures.

In Matrix organizations, team members report to their project manager and their functional managers. Because their actual managers are their functional manager but if they are assigned to a project, they will be reporting to their project manager as well. Consider a software engineer. If he is not working on a project, he will be reporting to his functional manager, for instance, a software development line manager. Once the software development line manager assigns this software engineer to a project, this engineer will start to report the project manager as well.

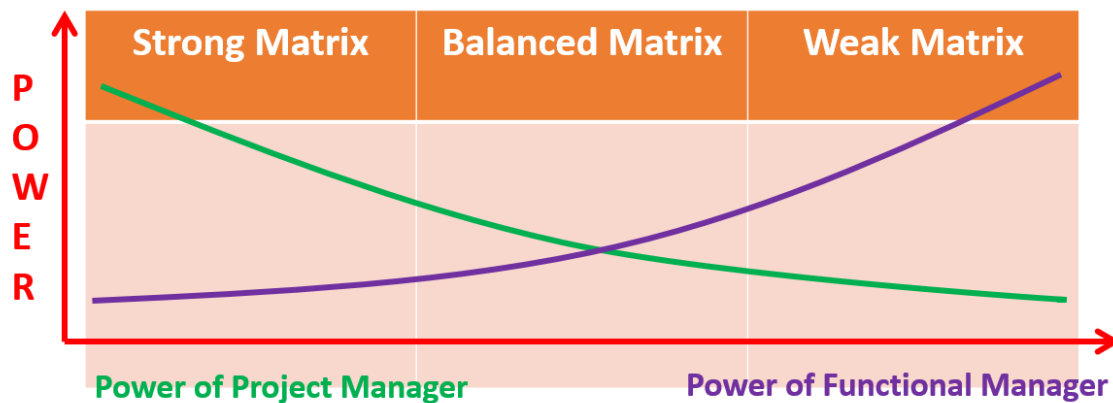
In Matrix organizations, the power of the functional manager and project manager varies in different matrix organizations

Matrix organization is divided into 3 sub-categories.

- Strong
- Balanced
- Weak Matrix

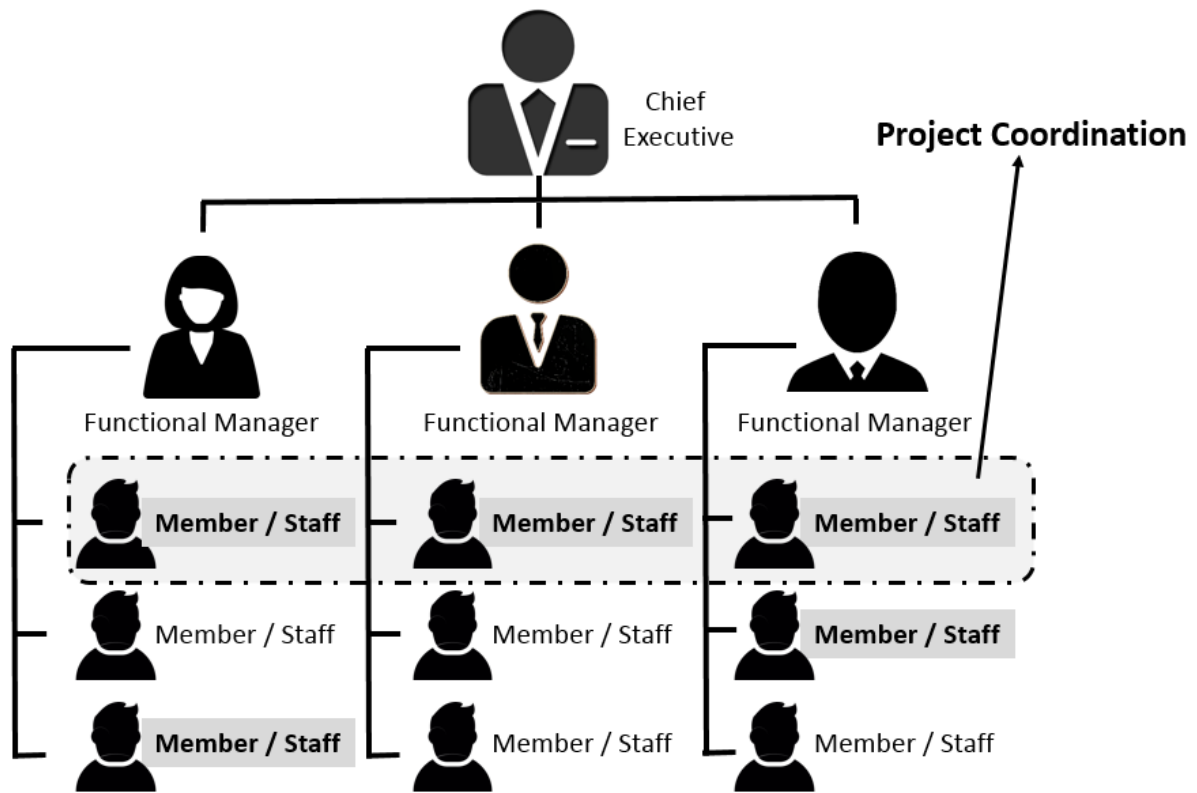
The below figure shows how the power of the functional manager and project manager switches in each type of matrix organizations.

Strong matrix organizations are closer to projectized organizations. Therefore, power resides more on the project manager. Weak matrix organizations are closer to functional organizations. Therefore, power resides more on functional managers. Balanced matrix organizations are in the middle and power of functional and project managers are equal.



In weak matrix organizations, project managers generally have two roles.

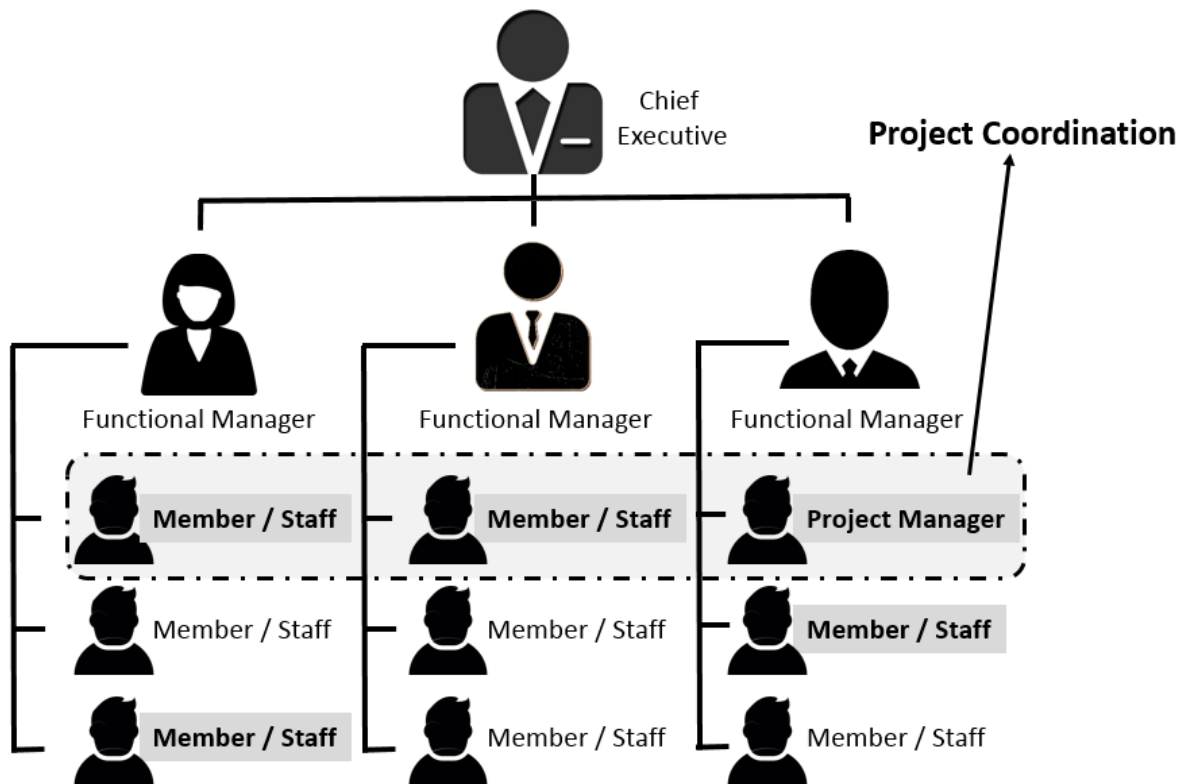
- **Project Expediter:** Project expediter acts as a staff assistant and communications coordinator. They cannot take any decision. They do paperwork of the project, deal with the administrative issues such as bureaucratic communication between departments, etc. They do not have any influence on the project resources.
- **Project coordinator:** Project Coordinator acts like project expediter, but has some power and can take some decisions. They have slightly higher power and influence over the project compared to project expediters.



Members in gray boxes are in the project team

It is a blueprint example of a weak matrix organization.

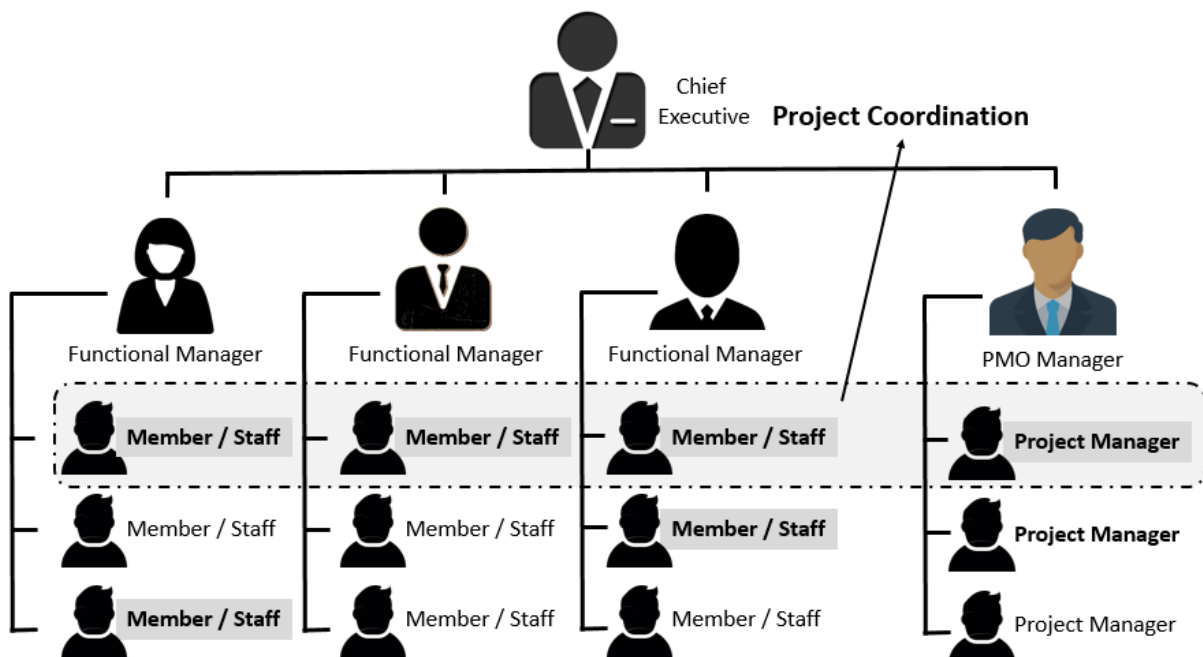
Gray backgrounded staffs are assigned to projects and reporting mainly to the functional managers. Project coordination is done over the assigned staff maybe with the help of a project expediter or coordinator.



Members in gray boxes are in the project team

It is the blueprint example of a balanced matrix organization.

Gray backgrounded staffs are assigned to projects. Project resources, including the project manager, report to their functional manager, however, the project coordination is done with the control of the project manager. Functional managers also have power and influence on their resources.



Members in gray boxes are in the project team

It is the blueprint example of a strong matrix organization.

Gray backgrounded resources belong to a project. The project manager coordinates and manages these resources and project activities. The difference from the balanced matrix is, project managers report to the managers or project managers, for instance, the head of project management office. In a balanced matrix organization, the project manager reports to a functional manager.

Comparative Overview of Organizational Structures

	Functional	Matrix			Projectized
		Weak	Balanced	Strong	
Project Manager's Authority	Little/None	Low	Low-Medium	Medium-High	High-Full
Availability of Resources	Little/None	Low	Low-Medium	Medium-High	High-Full
Who manages the project budget?	Functional Manager	Functional Manager	Mixed	Project Manager	Project Manager
What is the Project Manager role?	Part-time	Part-time	Full-time	Full-time	Full-time
Administrative Staff	Part-time	Part-time	Part-time	Full-time	Full-time

The table above, Project managers authority, resource availability, who manages the project budget, project managers role and how project management administrative staff works are compared and listed on different organizational structures.

Project manager's role, resource availability, control of the project manager on the project are highest in projectized organizations, while the functional manager's is the lowest. In functional organizations, Project manager's role, resource availability, control of the project manager on the project are lowest in functional organizations.

Matrix organizations keep the power and influence of functional and project managers in balance.

Other Types of Organizational Structures

- 1. Organic or simple:** In this organization type, people work side-by-side in the same office. Generally, the operation manager or owner of the work manages the team. The project manager has little or no authority on the team.
- 2. Multi-divisional:** The organization is structured based on products, processes or geographic regions, etc. The functional manager manages the team in this type of organizations and project manager has little or no authority.