

Lesson 1: Overview of Project Management

Project Management (PM) governs the disciplined delivery of a unique product, service, or result through a temporary endeavor with a defined beginning and end. This lesson summarizes PMI's core definition, the essential characteristics of projects, and the foundational Triple Constraint that shapes decision-making and outcomes.

What Is a Project?



Temporary Endeavor

Projects have a definite beginning and an end. They exist only until objectives are achieved or the initiative is terminated.



Unique Outcome

Each project creates a distinct product, service, or result – not routine operations but one-off efforts tailored to the object.

*The project ends when objectives are met, when it is stopped because objectives cannot be met, or when the need no longer exists.

Core Characteristics of Projects

1. **Unique** – Every project is different in context, constraints, stakeholders, and deliverables.
2. **Temporary** – Defined start and finish dates – projects are not ongoing operational work.
3. **Goal-driven** – Projects finish when goals are met or when viability is lost and termination occurs.
4. **Stakeholder Expectations** – Success is measured by meeting or exceeding stakeholder expectations for scope, quality, time, and cost.

The Triple Constraint: Scope, Cost, Schedule

The Triple Constraint states that every project is influenced by three interdependent factors:

- Scope — the amount of work or features included.
- Cost — the budget and financial resources available.
- Schedule (Time) — the time required to complete the work.

Quality sits at the center: the final quality depends on how well scope, cost, and time are balanced. Changing one factor typically affects one or both of the others.

Schedule Pressure and Its Effects

Shortened Deadlines	Extended Schedules
When the schedule shortens, options include increasing resources (higher cost), reducing scope, or accepting decreased quality.	Extending time may reduce immediate costs but can increase overhead and delay value delivery; it can also allow higher quality or expanded scope.

Trade-off decisions should be documented, and stakeholders must align on the new priority (time, cost, or scope) so quality expectations remain clear.

Key Principle — Manage Trade-offs Intentionally

When scope, cost, or schedule changes, at least one other constraint must change to maintain or redefine quality. Effective project management requires:

- **Early identification of constraint impacts**
- **Clear stakeholder communication about trade-offs**
- **Documentation of decisions and accepted risks**
- **Prioritization aligned with project goals and quality expectations**

These practices preserve transparency and help ensure the project delivers acceptable quality within the revised triangle.

Summary & Takeaways

DEFINITION: Projects are temporary, unique endeavors that create distinct products, services, or results — they end when objectives are met or when no longer viable.

CHARACTERISTICS: Uniqueness, temporariness, goal-driven completion, and stakeholder expectations define what makes a project and how success is judged.

TRIPLE CONSTRAINT: Scope, Cost, and Schedule must be balanced; Quality is the result of managing these trade-offs deliberately.

Lesson 2: The Nature and Importance of Project Management

Project Management is the disciplined process of planning, organizing, executing, controlling, and monitoring work to achieve specific goals within an agreed time, budget, and quality standard. It ensures that temporary efforts—projects—deliver unique products, services, or results and that outcomes meet the desired objectives. Projects are temporary and unique: once the goal is achieved, the project ends.

What Is a Project?

 Example — University Website Developing a university website to provide an online platform for students and faculty. A distinct deliverable with acceptance criteria.	 Example — School Fair A school fair project begins with planning and ends after event evaluation—clear beginning and end.
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What Does "Integrative" Mean in Project Management?

Integrative means bringing different parts together so they work as one. In project management, integration coordinates all aspects of the project so that scope, schedule, budget, quality, people, communication, and risks align toward the same objectives. Poor coordination in one area can negatively affect the entire project.

a. Scope

Defines what work must be done and what is included in the project.

b. Time

Schedules tasks and milestones to meet deadlines

c. Cost

Estimates, budgets, and controls project expenses to stay within funding limits.

d. Quality

Ensures the deliverable meets required standards and specifications.

Additional Elements Project Managers Integrate

 Human Resources Recruiting, assigning roles, developing teams, and managing performance.	 Risk Management Identifies, analyzes, and plans responses to potential problems to reduce impact.
 Communication Ensures effective information flow among stakeholders, team members, and sponsors.	 Procurement Acquires necessary goods and services from external suppliers under contract.
These elements must be coordinated so changes in one area (e.g., scope creep) do not derail schedule, cost, or quality.	

Project Management Knowledge Areas — Overview

Project Management is commonly organized into 10 Knowledge Areas that collectively guide planning, execution, monitoring, and successful completion. Each area represents a domain of competence that project managers must coordinate.

Project Integration Management

Coordinates and unifies all project activities and knowledge areas.

Project Scope Management

Defines what work must be done and what is included in the project.

Project Time Management

Plans and controls the project schedule to meet deadlines.

Project Cost Management

Estimates, budgets, and controls project expenses to keep the project funded.

Project Quality Management

Ensures deliverables meet the required specifications and standards.

Project Human Resource Management

Manages people, roles, responsibilities, and team development.

Project Communications Management

Facilitates timely, accurate sharing of project information among stakeholders.

Project Risk Management

Identifies potential problems and plans mitigation and contingency actions.

Project Management Knowledge Areas — Final Group

Project Procurement Management

Acquires materials, equipment, and services from suppliers, including contract management and vendor selection.

Project Stakeholder Management

Identifies stakeholders and manages expectations, engagement, and relationships to secure support and minimize resistance.

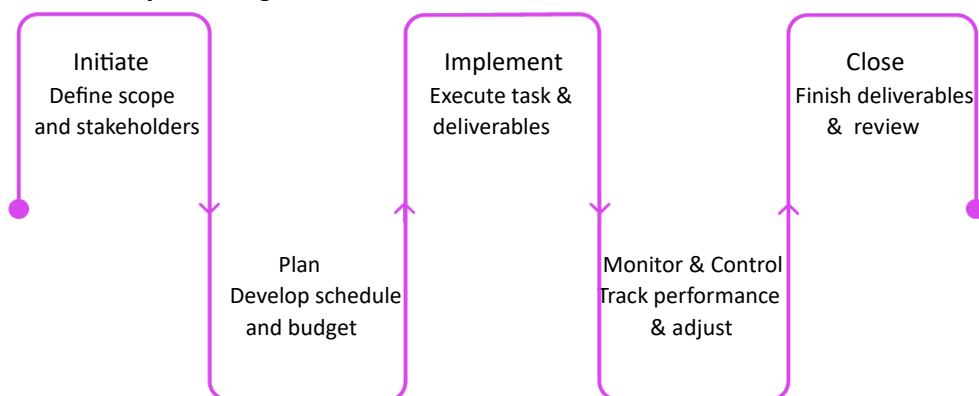
All ten knowledge areas interrelate; effective integration ties them together so project performance meets expectations.

Common Characteristics of Projects

 Target Outcome Every project is created to achieve a specific goal, result, or deliverable (e.g., developing a university website).	 Defined Life Span Projects are temporary with a clear beginning and end (e.g., a school fair from planning to evaluation).	 Cross-Organizational Participation Often requires collaboration across departments, teams, or external partners (e.g., entrepreneurship fair involving administration, faculty, and businesses).
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Projects also produce something new or unique and must meet time, cost, and performance requirements; for example, building a computer lab must be on schedule, within budget, and meet technical specifications.

The Five Project Management Processes



The five core processes describe the lifecycle every project typically follows. They are connected—Monitor and Control occurs continuously during Implementation to keep the project on track with schedule, budget, and quality.

Process Details: Initiate → Close

1. **Initiate** – start the project: identify the idea, purpose, goals, feasibility, and key stakeholders. Key question: why are we doing this project? Example: approving an Entrepreneurship and Innovation Fair.
2. **Plan** – Create a detailed roadmap: define tasks, responsibilities, schedule, cost estimates, risk identification, and resource allocation. Key question: how will we do it?
3. **Implement** (Execute) – Perform the work according to the plan: coordinate team members, manage resources, and communicate with stakeholders. Key question: are we doing the work?
4. **Monitor and control** – ongoing throughout implementation: track schedule and budget. Measure performance, manage risk and issues, and take corrective actions as needed. Key question: are we on track?
5. **Close** – finalize and evaluate the project: confirm objectives were met, obtain stakeholders acceptance, document lessons learned, and formally close contracts and accounts. Key question: did we achieve our objectives?

Lesson 3 — Project Management Steps

This lesson condenses the five core phases of the Project Management Life Cycle: Initiation, Planning, Execution, Monitoring & Control, and Closure. Each phase is described with focused purpose statements, key activities, and concrete examples using a 3-Day University Entrepreneurship & Innovation Fair as the running case. Follow the sequence: Initiate → Plan → Execute → Monitor & Control → Close.

Phase 1 — Project Initiation

Purpose: Decide whether the project should start by evaluating purpose, value, and feasibility. Initiation produces core decision documents such as the Business Case and Feasibility Study and identifies high-level stakeholders and objectives.

- Key Outputs – Business Case, Feasibility Study, Stakeholder register, High-level Objectives.
- Main Activities – Define project need, clarify purpose, assess benefits, assess constraints (budget, venue, manpower)
- Example – Entrepreneurship Fair – organizers evaluate student benefit, budget availability, venue suitability, and staffing before approving the event.

Phase 2 — Project Planning

Purpose: Build a detailed roadmap that turns approval into an executable plan. Planning defines scope, schedule, budget, resources, risk responses, communication strategies, and assigns responsibilities. Good plans include contingency measures and clear ownership.

 Scope and Schedule Develop a program of activities, map timeline and create a day-by-day schedule for the 3-day fair.	 Resources & Responsibilities Assign committees, define roles (logistics, marketing, sponsorship), and allocate manpower.	 Risk & Contingencies Identify potential issues (weather, speaker cancellations) and create contingency plans and triggers.
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Example: For the Entrepreneurship Fair the team prepares a detailed budget, books speakers, plans venue layout, and prepares contingency steps for bad weather or last-minute speaker changes.

Phase 3 — Project Execution

Purpose: Carry out the work defined in the plan. Execution mobilizes teams and resources to produce deliverables, implement activities, and realize the project objectives. Effective execution emphasizes coordination, communication, and adherence to the plan while remaining responsive to on-the-ground realities.

 Communications

Run promotions, manage invitations, coordinate with sponsors and speakers.

 Operations

Set up booths, produce competition materials, manage logistics for each day of the fair.

 Team Coordination

Direct volunteers and committees, ensure tasks are completed as scheduled, maintain resource availability.

Example: The organizing committee runs marketing campaigns, coordinates exhibitors, sets up the venue, and conducts the fair activities according to the schedule.

Phase 4 — Monitoring & Control

Purpose: Ensure the project stays on schedule, within budget, and meets quality standards by continuously tracking progress, comparing actuals to the baseline, and making corrective actions where necessary. This phase runs in parallel with Execution.

1 Measure Progress

Track task completion, milestone achievement, and schedule performance.

2

Control Cost

Monitor expenditures against the budget and adjust allocations when necessary.

3

Quality & Change Management

Inspect deliverables, manage change requests, and implement corrective measures rapidly.

Example: If booth construction falls behind, the project manager reassigns labor or adjusts the schedule; if registrations lag, increase marketing to boost attendance.

Phase 5 — Project Closure

Purpose: Formally complete the project by handing over deliverables, releasing resources, obtaining stakeholder approval, documenting lessons learned, and recognizing contributors. Closure captures learnings for future projects and ties up loose ends.

Final Deliverables

Submit final reports, deliverables, and documentation to stakeholders for acceptance.

Administrative Closeout

Release unused resources, close contracts, finalize financials and archives.

Lessons Learned

Conduct a post-mortem, document what worked and what didn't, and circulate recommendations for future events.

Example: After the Entrepreneurship Fair, organizers prepare a final report, thank sponsors and participants, recognize committee members, and document improvements for the next event.

Project Life Cycle — At a Glance

The life cycle guides projects from concept to completion. Each phase has a distinct purpose but overlaps with others: Initiation authorizes work; Planning maps it; Execution does the work; Monitoring & Control keeps it aligned; Closure completes and records it. Remember: the phases are iterative — monitoring informs corrective actions that may require replanning or scope adjustments.

Practical Checklist — Applying the Five Phases

- 1. Initiate** - Write a Business Case, do a Feasibility Study, identify stakeholders and go/no-go criteria.
- 2. Plan** - Create scope statement, schedule (Gantt), detailed budget, assign roles, and list risks with responses.
- 3. Execute** - Mobilize teams, implement communications, run operations, and produce deliverables.
- 4. Monitor & Control** - Track KPIs, compare actual vs plan, manage changes, and take corrective action promptly.
- 5. Close** - Deliver final outputs, secure approvals, document lessons, and recognize contributors.

Use this checklist at the start of each phase to confirm essential deliverables and responsibilities are in place.

Summary Table — Phases, Purpose & Example

Phase	Purpose	Example — Entrepreneurship Fair
Initiation	Determine if project is worthwhile and feasible.	Assess benefits, budget, and resources; decide to proceed.
Planning	Create a detailed roadmap: scope, schedule, budget, risks.	Prepare schedule, budget, committees, and contingency plans.
Execution	Carry out planned activities and produce deliverables.	Promote event, set up booths, coordinate exhibitors and sessions.
Monitoring & Control	Track progress, compare performance, and apply corrective actions.	Monitor costs, deadlines, and quality; reassign resources as needed.
Closure	Officially complete the project and capture lessons learned.	Submit final report, thank sponsors, release resources, and evaluate results.

This compact reference is ideal for quick decision making during each phase of the project lifecycle.

Memory Aid & Final Takeaways

Mnemonic

I → P → E → C → C : Idea, Prepare, Execute, Check, Complete—an easy way to remember the five phases.

One-Sentence Summary

Decide whether to do the project, plan it, do the work, monitor results, then close and learn.

Practical Tip

Keep monitoring continuous and practical: small corrective actions early cost far less than late fixes.

Final action steps: use the checklist at the start of every phase; document decisions and lessons; celebrate and recognize contributors at closure. For an Entrepreneurship Fair, these steps ensure the event is viable, well-run, and that improvements are captured for the next iteration.

☒ Theme colors used for emphasis: #3371A5 (primary), #E282B7, #FAF1E6, #FCF9F3. Keep this deck as the living reference for managing student events from idea to completion.

Lesson 4 - Project Management Organizational Structures

Lesson 4: How organizations structure work determines project authority, resource allocation, budget control, and ultimately how effectively projects deliver. This deck explains the two broad categories of work and the four primary organizational structures—Functional, Project-Oriented, Matrix (weak → strong), and Composite—highlighting the dynamics, authority, and implications for project managers and teams.

Two Categories of Organizational Work



Ongoing Operational Work –

Routine, repetitive activities that sustain the business and sales channels—daily manufacturing, standard customer service, and other steady-state functions that prioritize continuity over change.



Capital Projects –

One-time, unique endeavours with a defined goal, set budget, and clear start and end dates—examples include launching a new product line, building a facility, or major system implementations.

Understanding which category dominates in an organization helps explain why structures vary and why project control, speed, and resource access differ so widely between companies.

Structure 1 — Functional Organization

In a functional organization, the company is organized around specialized departments that focus on delivering ongoing services rather than unique projects. Projects are executed inside these departmental silos and typically rely on existing managers to take on project duties in addition to their regular roles.

1. **Dual-Role Managers** - Projects are usually initiated and run by divisional managers who act as part-time project leads or "Project Coordinators," balancing project duties with day-to-day responsibilities.
2. **Limited Authority** - The person leading the project has low formal authority: little control over budgets, timelines, or personnel decisions, because functional managers control those levers.
3. **Resource Struggle** - Because the organization is optimized for operations, securing staff, equipment, or approvals for projects requires negotiation with functional heads—projects can be slow and fragmented.

Project influence is minimal: team members report to functional managers, and projects often move slowly because operational priorities take precedence.

Structure 2 — Project-Oriented Organization

Project-oriented organizations are built around delivering projects. Common in construction, consulting, and architecture, these companies orient resources, governance, and incentives to project delivery rather than ongoing operations.

1. **Dedicated Project Managers** - Project managers are full-time, often with one manager per project; smaller firms may have managers covering multiple projects. Their role is central and permanent for delivery.
2. **High Authority & Autonomy** - PMs control schedules, budgets, and tasks directly—decision making is fast and aligned to project needs without heavy departmental approvals.
3. **Streamlined Resourced Access** - Support functions exist but act as shared expert pools. Projects draw resources with minimal bureaucracy, keeping delivery rapid and focused.

Project influence is maximum: team members are assigned to projects and report to the PM for their project tasks; at project end, teams move to new projects or are released.

Structure 3 — Matrix Organization (Overview)

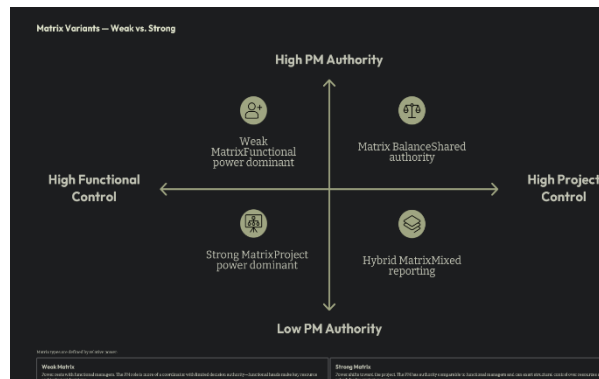
The matrix structure blends functional and projectized approaches. Team members hold dual reporting lines: a functional manager for their discipline and a project manager for project work. The matrix tries to combine deep functional expertise with project focus—its effectiveness depends on how authority is balanced between the two reporting lines.

Hybrid Goals

Gain operational efficiency from functions while adding project responsiveness through project managers.

Dual reporting

Staff receive technical direction from functional managers and project direction from PMs—coordination and clarity of authority become central management challenges.



Matrix: PMO and Structural Setup

Many matrix organizations formalize project authority by creating a Project Management Office (PMO). The PMO establishes standards, provides governance, and can centralize project management capability while functional departments continue to supply specialist roles.

PMO Role

Standardizes processes, supports PMs with tools and governance, and can escalate decisions where cross-functional trade-offs are needed.

Staffing Model

Functional departments still supply staff; PMs coordinate assignments. Success depends on conflict resolution mechanisms and clear role definitions.

Key Challenge

Dual accountability requires deliberate leadership, clear priorities, and frequent communication to avoid competing objectives between operations and projects.

Structure 4 — Composite Organization

A composite structure places a project-oriented division and a functional operational division side-by-side, both reporting directly to the top executive. Unlike a matrix, the two arms operate in parallel with clear, separate mandates—one focused on capital projects and the other on ongoing operations.

Side by side Coexistence

Distinct divisions run independently—project teams are insulated from operational reporting lines and processes.

Direct Executive Reporting

Leaders of both divisions sit at the same hierarchical level and report directly to the chief executive, ensuring parity and clarity of accountability.

Clear Boundaries

Projects do not operate inside functional departments; they belong to the project division—avoiding the blended reporting complexities of a matrix.

How Structure Affects Project Managers & Teams

Implications For Authority

Functional → low PM authority; Projectized → high PM authority; Matrix → mixed authority depending on weak/strong orientation; Composite → PMs in the project division enjoy clear mandate within their arm.

Implications for Resource Allocation

Functional organizations require negotiation for resources. Projectized organizations grant quick access. Matrix requires shared resource planning and conflict resolution; composite separates resource pools by division.

- **Team Reporting & Incentives**
Reporting lines determine performance evaluations, career paths, and incentives. Teams in functional structures advance within disciplines; projectized teams build project delivery experience; matrixed staff may balance both career tracks.
- **Speed vs. Stability Trade-off**
Projectized and strong-matrix models favor speed and decisiveness; functional models favor operational stability. Composite aims to preserve both but requires strong executive governance to balance competing priorities.

Choosing & Managing the Right Structure

There is no one-size-fits-all structure. Organizations should choose based on their strategic focus (operations vs projects), industry norms, the volume and size of capital projects, and cultural readiness for matrixed accountability. Effective implementation requires clear governance, defined roles, conflict-resolution processes, and—where relevant—a PMO to standardize practices.

When to Use Functional	When to Use Project-Oriented	When to Use Matrix / PMO	When to Use Composite
Best for organizations that prioritize efficiency in stable, repetitive operations with occasional small projects.	Ideal for firms whose core output is projects (construction, consulting, product development at scale) and that need fast, decisive delivery.	Choose when both functional expertise and project focus are strategically important; invest in PMO and governance to manage dual reporting tensions.	Appropriate when operations and capital projects must run as separate, high-priority streams—requires executive alignment and clear boundary management.

❏ Key takeaway: Align structure to strategic priorities, then invest in governance, role clarity, and resourcing mechanisms so projects and operations both thrive.

Lesson 5 — Project Management Selection Methods

Project selection methods let organizations decide which projects to invest in by aligning proposals with strategic goals, resource limits, and expected returns. This lesson organizes the methods into two primary categories: Benefit Measurement Methods (comparative, scoring-based) and Constrained Optimization Methods (mathematical, algorithmic). Each approach serves different decision contexts — from quick, intuitive scoring to rigorous portfolio optimization under strict constraints.

Overview: Two Categories of Selection Methods

1. Benefit Measurement Methods

Comparative and scoring approaches that evaluate projects side-by-side using financial estimates, weighted criteria, and intuitive scoring. Widely used for business projects due to ease and familiarity.

2. Constrained Optimization Methods

Mathematical and algorithmic methods (LP, NLP, Integer, Dynamic, Multi-objective) that find optimal portfolios under resource and interdependency constraints. Essential for complex, interconnected decisions.

Design note: Use comparative methods when speed and interpretability matter; use constrained optimization when interdependencies, discrete choices, and multiple resource limits require rigorous solutions.

Financial & Return-Based Tools (A)

1. Net Present Value (NPV)

NPV = present value of future cash inflows minus the initial investment, discounted for time and risk. Rule: Choose projects with NPV > 0 and prefer the highest positive NPV.

2. Internal Rate of Return (IRR)

IRR is the discount rate that makes NPV = 0. Rule: Prefer the highest IRR that exceeds the organization's minimum required rate of return.

3. Payback Period

Time required to recover the initial investment from project-generated cash flows. Rule: Choose the shortest payback.
Note: Ignores cash flows after payback.

These tools prioritize direct financial return and liquidity. They are intuitive, rely on forecasts of cash flows, and are commonly used to screen and rank projects.

Further Financial Measures & Considerations

Benefit-Cost Ratio (BCR)

BCR = Total Benefits / Total Costs. Rule: BCR > 1 indicates benefits exceed costs; prefer the highest BCR when comparing mutually exclusive options.

Discounted Cash Flow (DCF)

Converts future cash inflows to present value using a discount rate to account for time value of money, inflation, and risk. Compare total discounted inflows to initial investment to assess value.

Opportunity Cost

The value or benefits forgone by choosing one project over the next-best alternative. Managers should select the portfolio that maximizes total return while minimizing opportunity cost.

Comparative & Scoring Tools (B)

These methods combine qualitative and quantitative criteria into a single score to compare projects when many non-financial factors matter.

Scoring Models (Weighted Scoring)

Assign criteria (e.g., strategic fit, market risk, customer impact), set weights, and score projects on each. Sum weighted scores to rank projects. Useful when strategic alignment and qualitative factors are key.

Economic Value Added (EVA)

EVA measures net value created after subtracting the cost of capital. It quantifies whether a project generates returns above capital costs and informs value-driven prioritization.

Use scoring models for portfolio-level prioritization when many dimensions must be balanced and stakeholders require traceable, explainable rationale for choices.

Why Use Constrained Optimization Methods?

When projects are interdependent, resources are limited, or decisions are discrete, constrained optimization methods provide mathematically optimal solutions rather than heuristic rankings. These methods handle multiple variables, explicit constraints, and trade-offs across objectives.

Core Mathematical Methods — Part 1

Linear Programming (LP)

Optimizes a single objective (e.g., maximize profit) subject to linear constraints. Best when relationships between variables are linear and resources/requirements can be modeled precisely.

Non-Linear Programming (NLP)

Handles problems with non-linear relationships (e.g., diminishing returns). More realistic for complex systems but computationally harder to solve than LP.

Integer Programming

Enforces whole-number decision variables (e.g., build 1 or 2 factories, not 1.5). Essential when projects cannot be fractionally funded or are discrete by nature.

Core Mathematical Methods — Part 2

Dynamic Programming

Breaks a complex optimization into smaller subproblems, solves each once, and assembles the global optimal solution. Useful for sequential decision-making and staged investments.

Multiple Objective Programming (MOP)

MOP (Multi-Objective Optimization) balances multiple, conflicting objectives simultaneously (e.g., maximize ROI while minimizing risk and time). Produces trade-off solutions (Pareto front) so decision-makers select the preferred compromise.

Practical Considerations

Mathematical models require accurate data, clearly defined constraints, and computational tools. They can produce optimal portfolios but may be sensitive to parameter errors and require stakeholder interpretation of trade-offs.

Decision Guidance: Matching Method to Context



When to Use Benefit Measurement

Quick decisions, limited data, projects evaluated mostly on financial metrics or straightforward strategic fit. Tools: NPV, IRR, Payback, BCR, scoring models.



When to Use Constrained Optimization

Complex portfolios with resource constraints, discrete choices, interdependent projects, or multiple objectives. Tools: LP, Integer Programming, NLP, Dynamic Programming, MOP.



Hybrid Approach

Use comparative methods to screen and reduce candidate projects, then apply constrained optimization (or MOP) to construct the final portfolio subject to constraints and trade-offs.

Practical rule: Start simple (financial screening + scoring) to focus on finalists; escalate to mathematical optimization when constraints, discreteness, and interdependencies materially affect the outcome.

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Key Takeaways & Next Steps



Understand the question

Are you choosing one project or an optimal portfolio? Clarify objectives, constraints, and whether choices are discrete.



Use the right tool

Benefit measurement methods are fast and interpretable. Constrained optimization is rigorous for complex, multi-constraint problems. Combine both as needed.



Operationalize selection

Establish consistent financial assumptions (discount rates), scoring criteria and weights, data quality checks, and a decision workflow that scales from screening to optimization.



Manage trade-offs

When multiple objectives conflict, use MOP or present Pareto-optimal options to stakeholders so they can select the portfolio consistent with strategic priorities.

☐ Next step: Apply these methods to your organization's actual project pipeline—start with NPV/weighted scoring to shortlist, then apply optimization where constraints and interdependencies are critical.

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