

Project Procurement and Supply Chain

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PMG 433

Lecture 5





Foundational knowledge of Project Procurement

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Course Agenda

Chapter

1. Define project procurement.
2. Explain the procurement management process.
3. Understand procurement planning.
4. Identify procurement documents.
5. Differentiate contract types.
6. Explain procurement risks.
7. Understand AI applications in project procurement.

Definition

- Project procurement is the process of acquiring products, services, or resources from external suppliers to complete a project successfully.
- Project procurement ensures that the right goods and services are acquired at the right quality, cost, and time to achieve the project's objectives.

Purpose

- Obtain the required goods and services for the project.
- Achieve the best value for money.
- Ensure quality standards are met.
- Minimize procurement risks.
- Deliver resources on time.
- Comply with legal, ethical, and contractual requirements.

Why importance of Project Procurement matters:

- Reduces project cost
- Improves quality
- Ensures timely delivery
- Provides access to expertise
- Manages supplier relationships
- Supports project success

Importance

Example

Benefit

Ensures Resource Availability

A construction company procures cement and steel before construction begins.

Prevents work stoppages due to material shortages.

Controls Project Costs

A company obtains competitive bids from several suppliers before purchasing equipment.

Reduces procurement costs and improves value for money.

Improves Quality

A hospital purchases medical equipment only from certified suppliers.

Ensures safe, reliable, and high-quality equipment.

Supports Timely Project Completion

An IT company procures servers before software installation starts.

Avoids delays in the project schedule.

Provides Access to Specialized Expertise

A manufacturing company hires an external automation consultant.

Gains technical expertise not available internally.

Reduces Project Risks

A project team selects financially stable suppliers with proven performance.

Lowers the risk of delays, poor quality, or supplier failure.

Ensures Legal and Contractual Compliance

A government project follows formal procurement regulations and tender procedures.

Reduces legal disputes and ensures transparency.

Strengthens Supplier Relationships

A company maintains long-term partnerships with reliable suppliers.

Improves collaboration, service quality, and future negotiations.

- **Plan Procurement** –

Identify what needs to be purchased and prepare the procurement strategy.

- **Solicit Suppliers** –

Request bids, quotations, or proposals from potential vendors.

- **Evaluate and Select Suppliers** –

Compare offers based on cost, quality, experience, and capability.

- **Award and Manage Contracts** –

Negotiate, sign, and administer contracts while monitoring supplier performance.

- **Close Procurement** –

Verify that all contractual obligations have been fulfilled and formally the contract.

Procurement Activity	Description	Example
1. Procurement Planning	Identify what needs to be purchased, when, and from whom.	Determine that AI software, cloud hosting, and consulting services must be procured.
2. Define Requirements	Prepare detailed technical and business specifications.	Create a Statement of Work (SOW) specifying system features, security, AI capabilities, and project schedule.
3. Market Research	Identify potential suppliers and evaluate market conditions.	Research AI software vendors and cloud service providers with relevant experience.
4. Prepare Procurement Documents	Develop procurement documents such as Request for Proposal (RFP), Request for Quotation (RFQ), or Invitation to Bid (ITB).	Issue an RFP requesting suppliers to submit technical and financial proposals.
5. Solicitation of Bids	Invite qualified suppliers to submit proposals.	Send the RFP to five qualified AI software companies.
6. Supplier Evaluation	Assess proposals based on predefined evaluation criteria.	Compare suppliers on cost, technical capability, experience, delivery schedule, and support services.
7. Contract Negotiation	Negotiate pricing, terms, delivery schedules, and service levels.	Agree on implementation milestones, warranty, payment terms, and maintenance support.
8. Contract Award	Select the winning supplier and sign the contract.	Award the contract to the supplier offering the best value for money.
9. Contract Administration	Monitor supplier performance throughout the project.	Track project milestones, review progress reports, and ensure deliverables meet quality standards.
10. Quality Inspection and Acceptance	Verify that goods or services meet contractual requirements.	Conduct User Acceptance Testing (UAT) before approving the AI system.
11. Payment Management	Process payments according to contract milestones.	Release payments after successful completion of each project phase.
12. Procurement Closure	Complete the procurement process and document lessons learned.	Confirm all deliverables are accepted, close the contract, archive procurement records, and conduct a supplier performance review.

According to project management standards, procurement includes:

1. Plan Procurement Management
2. Conduct Procurements
3. Control Procurements

Project Need



Plan Procurement



Prepare Procurement Documents



Request Bids/Proposals



Evaluate Suppliers



Award Contract



Manage Contract



Close Procurement

Procurement Life Cycle Flow Project: Purchase an MRI Machine for a hospital

Stage	Example
Identify the Need	The hospital requires a new MRI machine to improve diagnostic services.
Plan Procurement	Define technical specifications, budget, maintenance requirements, and delivery schedule.
Prepare Documents	Develop the SOW and issue an RFQ or RFP.
Solicit Quotations	Request quotations from approved medical equipment suppliers.
Evaluate Offers	Compare image quality, warranty, maintenance support, training, price, and delivery time.
Award Contract	Select the supplier offering the best value.
Manage Contract	Monitor manufacturing, shipping, installation, staff training, and acceptance testing.
Close Procurement	Confirm successful installation, complete payment, and close the contract.

- Make-or-buy analysis
- Budget estimation
- Risk assessment
- Procurement schedule
- Supplier strategy

Output:

- Procurement Management Plan

- **Statement of Work (SOW)**

Describes the products, services, or work to be performed, including requirements and deliverables.

- **Request for Proposal (RFP)**

Invites suppliers to submit detailed technical and commercial proposals for complex procurements.

- **Request for Quotation (RFQ)**

Requests suppliers to provide price quotations for well-defined goods or services.

- **Invitation to Bid (ITB)**

Invites qualified suppliers to submit competitive bids, usually when requirements are clearly specified.

Bid/Proposal Evaluation Report

Documents the evaluation process and compares supplier proposals based on predefined criteria.

Purchase Order (PO)

A formal document authorizing the purchase of goods or services from a supplier.

Contract Agreement

A legally binding document that defines the rights, responsibilities, terms, conditions, and obligations of both buyer and seller.

Contract Change Order

Authorizes approved changes to the scope, cost, schedule, or other contract terms.

Procurement Performance Report

Tracks supplier performance, delivery status, quality, costs, and compliance with the contract.

Procurement Closure Report Confirms that all contractual obligations have been completed and documents lessons learned before formally closing the procurement.

Project procurement varies by industry, but in every case the company purchases goods, services, or expertise from external suppliers to support a project.

Example 1: Construction Project

Project: Build a 20-story office building

Procurement Items

Cement

Steel reinforcement

Glass façade

Elevators

Air conditioning systems

Electrical wiring

Fire protection systems

Construction equipment rental

Architectural consulting services

Example 2: IT Project

Project: Implement an Enterprise Resource Planning (ERP) system

Procurement Items

- ERP software licenses
- Cloud hosting services
- Servers
- Database software
- Cybersecurity solutions
- IT consulting services
- User training services

Example 3: Hospital Project

Project: Build a new hospital wing

Procurement Items

- CT and MRI scanners
- Hospital beds
- Ventilators
- Laboratory equipment
- Medical gases system
- Nurse call system
- Building construction services

Example 4: Manufacturing Project

Project: Expand a factory

Procurement Items

- CNC machines
- Industrial robots
- Conveyors
- Forklifts
- Packaging machines
- Quality inspection equipment

Example 5: Renewable Energy Project

Project: Construct a solar power plant

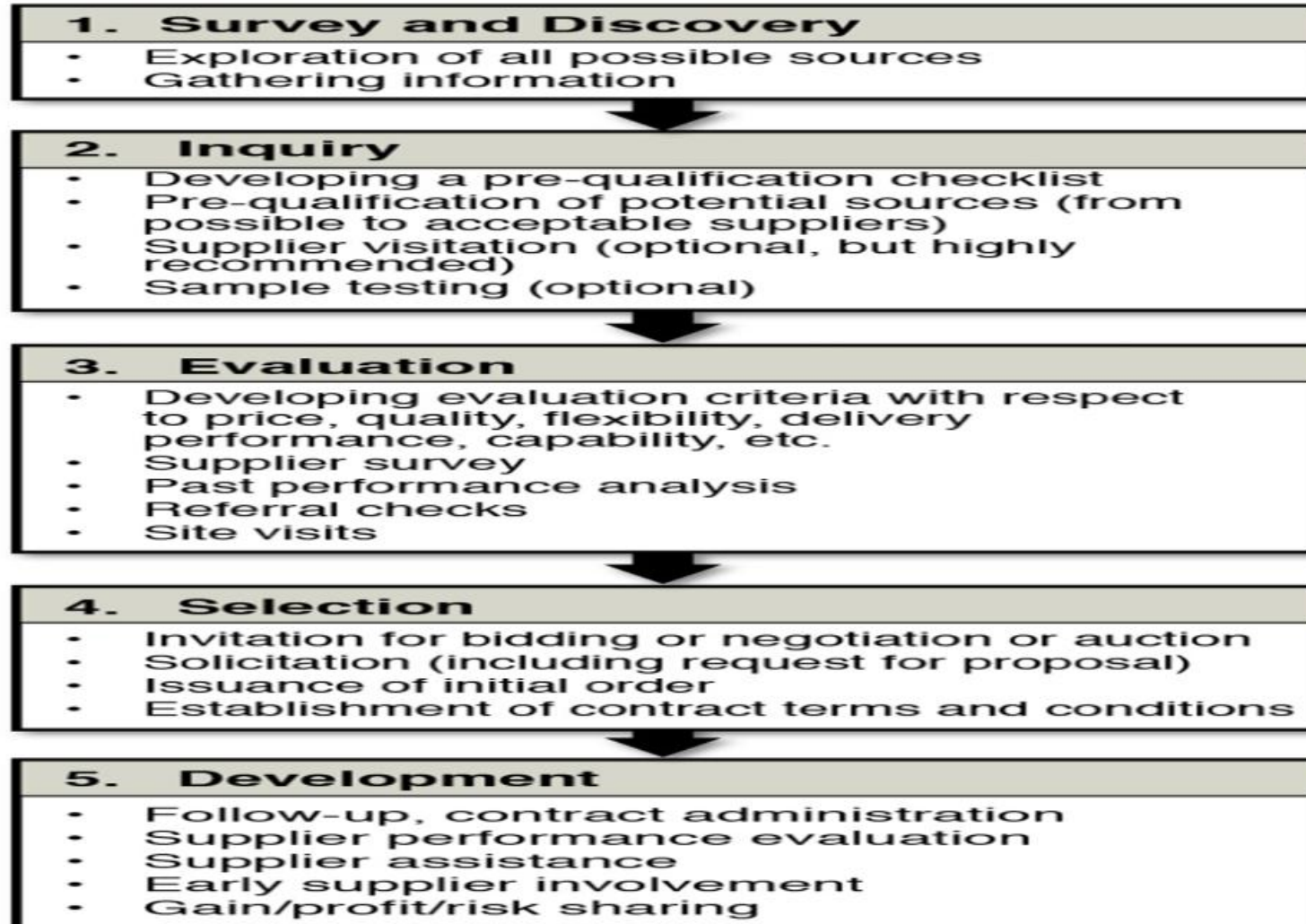
Procurement Items

- Solar panels
- Inverters
- Batteries
- Transformers
- Monitoring systems
- Civil construction services
- Electrical installation services

Steps:

1. Issue solicitation
2. Receive proposals
3. Technical evaluation
4. Financial evaluation
5. Negotiation
6. Contract award

Supplier Selection Process



SELECT SUPPLIERS

Basic sourcing methods

Sole source supplier

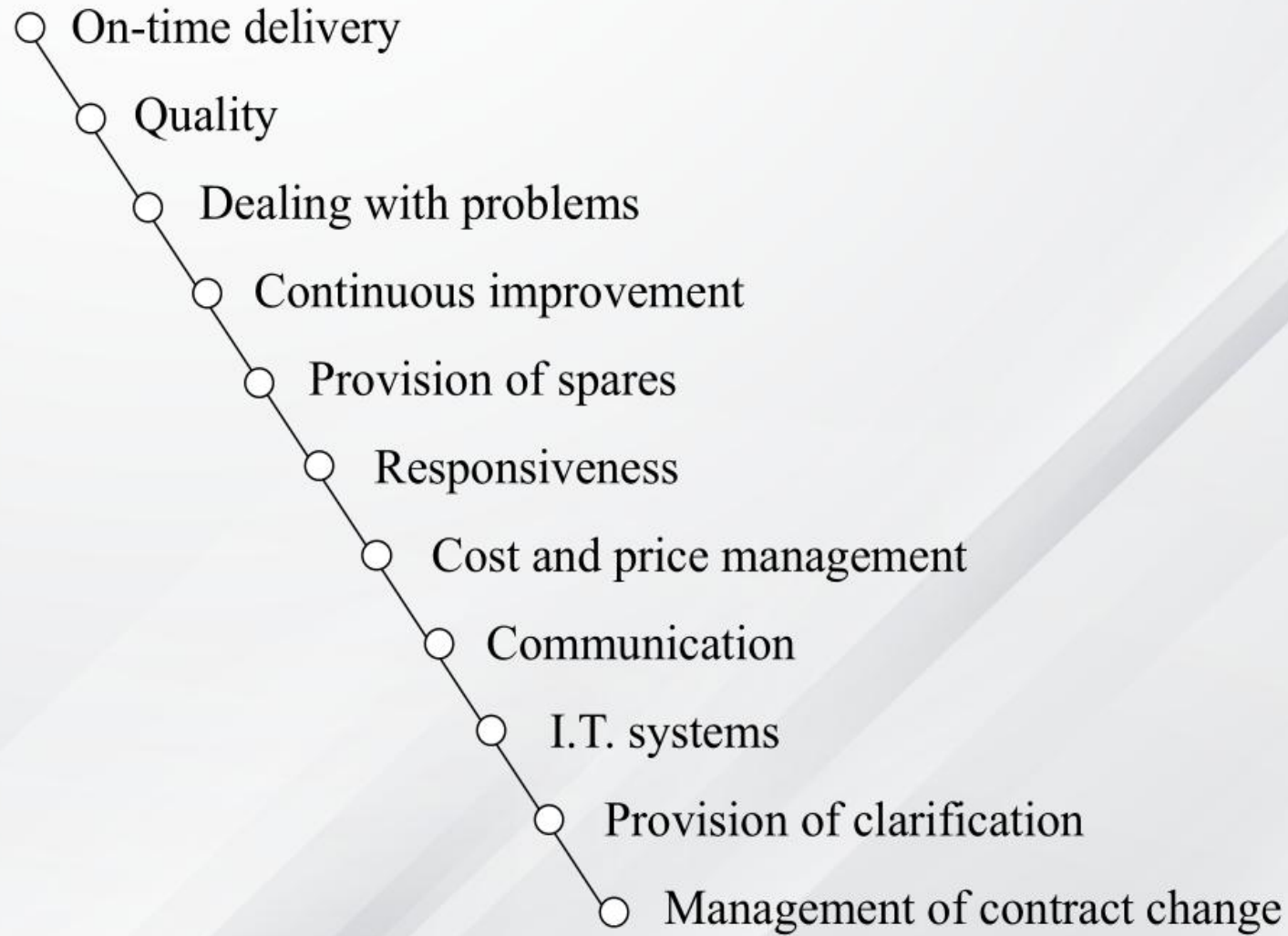
Single source
supplier

Multi-sourcing

Selection criteria

- Assign weight then rank suppliers per factor
 - Technical & manufacturing capabilities
 - Location
 - Price
 - Reliability
 - Supply chain maturity
 - Service offerings
 - Management attitude and culture fit.

Evaluation criteria for supplier selection



- Quality and process control
 - Continuous improvement
 - Facility environment
 - Customer relationship
 - Delivery
 - Inventory and warehousing
 - Ordering
 - Financial conditions
 - Certifications
 - Price

- A **contract** is a mutually binding agreement that obligates the seller to provide the specified products or services and obligates the buyer to pay for them
- Contracts can clarify responsibilities and sharpen focus on key deliverables of a project
- Because contracts are legally binding, there is more accountability for delivering the work as stated in the contract
- A recent trend in outsourcing is the increasing size of contracts

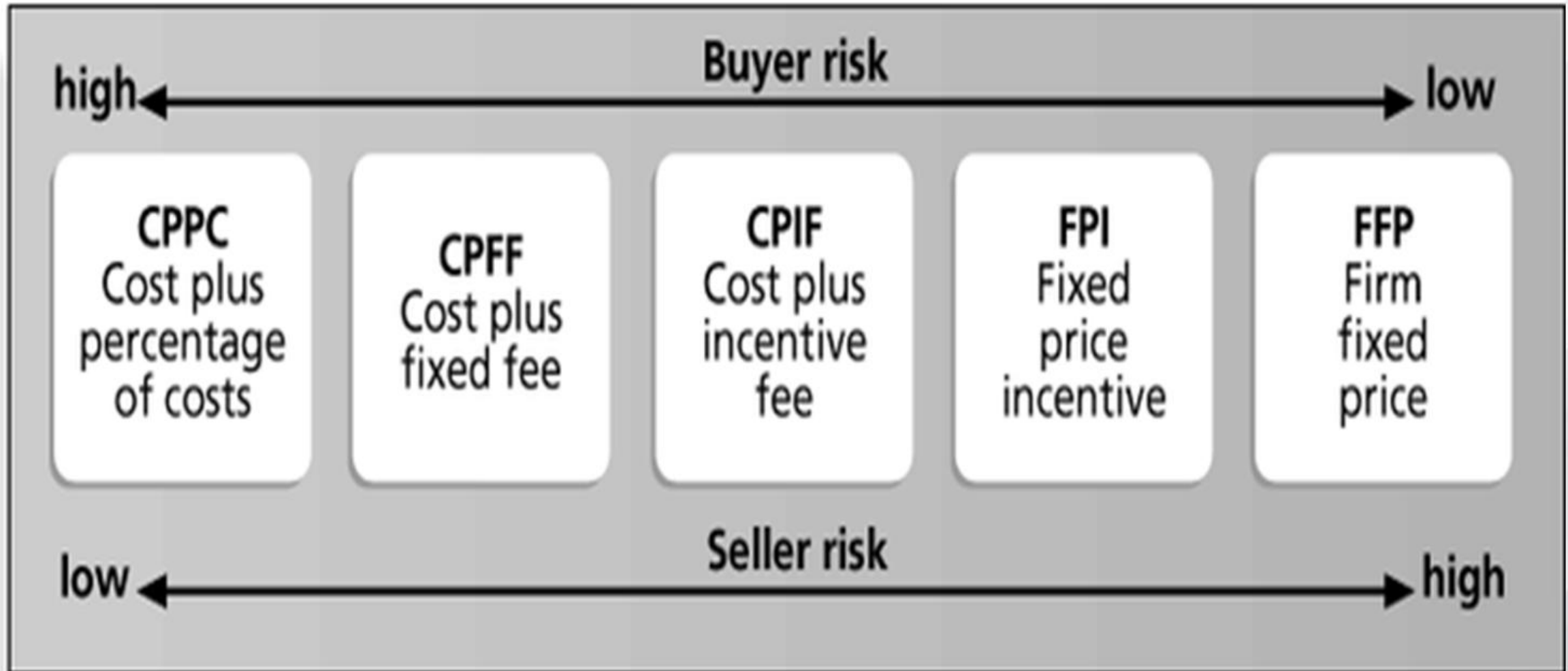
Types of Contracts

- Different types of contracts can be used in different situations
 - **Fixed price or lump sum contracts:** involve a fixed total price for a well-defined product or service
 - **Cost reimbursable contracts:** involve payment to the seller for direct and indirect costs
 - **Time and material contracts:** hybrid of both fixed price and cost reimbursable contracts, often used by consultants
 - **Unit price contracts:** require the buyer to pay the seller a predetermined amount per unit of service
- A single contract can actually include all four of these categories, if it makes sense for that particular procurement

Cost Reimbursable Contracts

- **Cost plus incentive fee (CPIF):** the buyer pays the supplier for allowable performance costs plus a predetermined fee and an incentive bonus
- **Cost plus fixed fee (CPFF):** the buyer pays the supplier for allowable performance costs plus a fixed fee payment usually based on a percentage of estimated costs
- **Cost plus percentage of costs (CPPC):** the buyer pays the supplier for allowable performance costs plus a predetermined percentage based on total costs

Contract Types Versus Risk



Contract Statement of Work (SOW)

- A **statement of work** is a description of the work required for the procurement
- If a SOW is used as part of a contract to describe only the work required for that particular contract, it is called a **contract statement of work**
- A SOW is a type of scope statement
- A good SOW gives bidders a better understanding of the buyer's expectations

Statement of Work (SOW) Template

- I. **Scope of Work:** Describe the work to be done to detail. Specify the hardware and software involved and the exact nature of the work.
- II. **Location of Work:** Describe where the work must be performed. Specify the location of hardware and software and where the people must perform the work
- III. **Period of Performance:** Specify when the work is expected to start and end, working hours, number of hours that can be billed per week, where the work must be performed, and related schedule information.
- IV. **Deliverables Schedule:** List specific deliverables, describe them in detail, and specify when they are due.
- V. **Applicable Standards:** Specify any company or industry-specific standards that are relevant to performing the work.
- VI. **Acceptance Criteria:** Describe how the buyer organization will determine if the work is acceptable.
- VII. **Special Requirements:** Specify any special requirements such as hardware or software certifications, minimum degree or experience level of personnel, travel requirements, and so on.

A well-written Statement of Work should answer the following questions:

- **What** work will be done? (Scope)
- **Why** is the project being undertaken? (Purpose and objectives)
- **Who** is responsible? (Roles and responsibilities)
- **When** will the work be completed? (Schedule)
- **How** will success be measured? (Acceptance criteria and success metrics)
- **How much** will it cost? (Budget and payment milestones)

- Supplier delays
- Poor quality
- Cost overruns
- Contract disputes
- Supply shortages
- Currency fluctuations

Procurement Risk	Example in a Company	Potential Impact	Mitigation Strategy
Supplier Delay	A steel supplier delivers materials two weeks late for a construction project.	Project schedule delays and increased costs.	Use reliable suppliers, monitor delivery schedules, and maintain backup suppliers.
Poor Quality	A manufacturer receives defective machine parts from a supplier.	Rework, production delays, and higher costs.	Conduct supplier quality audits and inspections before acceptance.
Cost Overruns	The price of raw materials increases after the contract is signed.	Budget overruns and reduced project profitability.	Use fixed-price contracts or include price adjustment clauses.
Supplier Bankruptcy	A software vendor goes out of business during an ERP implementation project.	Project interruption and difficulty obtaining support.	Assess supplier financial stability and qualify alternative suppliers.
Contract Disputes	The buyer and supplier disagree on the interpretation of project requirements.	Legal disputes, delays, and additional costs.	Prepare clear contracts with detailed specifications and responsibilities.
Scope Changes	The client requests additional features after the contract has been awarded.	Increased costs and extended project schedule.	Implement a formal change control process.
Supply Chain Disruptions	A natural disaster prevents the delivery of imported components.	Material shortages and project delays.	Diversify suppliers and maintain safety stock for critical items.
Currency Exchange Risk	An international supplier's prices increase because of exchange rate fluctuations.	Higher procurement costs.	Use hedging strategies or negotiate contracts in the local currency.
Regulatory or Compliance Risk	Imported products fail to meet government safety regulations.	Delays, penalties, or rejection of goods.	Verify compliance requirements before procurement.
Cybersecurity Risk	A supplier's system is hacked, exposing confidential procurement information.	Data breaches and business disruption.	Evaluate supplier cybersecurity practices and include security requirements in contracts.

Artificial Intelligence (AI) is transforming project procurement by automating routine tasks, analyzing large volumes of data, predicting risks, and supporting better decision-making. Below are practical examples that can be used in a Project Management course.

AI can help with:

- Supplier evaluation
- Demand forecasting
- Contract analysis
- Risk prediction
- Fraud detection
- Invoice automation
- Spend analysis
- Supplier performance monitoring

AI in Project Procurement

AI Application

Example in a Project

Benefit

Supplier Selection

AI evaluates suppliers based on cost, quality, delivery performance, and past projects.

Selects the best supplier more quickly and objectively.

Demand Forecasting

AI predicts future material requirements for a construction project.

Prevents shortages and reduces excess inventory.

Contract Analysis

AI reviews contracts to identify missing clauses or unusual terms.

Reduces legal risks and saves review time.

Risk Prediction

AI identifies suppliers that are likely to delay deliveries based on historical data.

Enables proactive risk management.

Invoice Processing

AI automatically matches invoices with purchase orders and delivery receipts.

Reduces manual work and payment errors.

Spend Analysis

AI analyzes procurement spending to identify opportunities for cost savings.

Improves budget control.

Supplier Performance Monitoring

AI tracks supplier KPIs such as quality, delivery, and responsiveness.

Improves supplier management.

Fraud Detection

AI detects duplicate invoices or suspicious procurement transactions.

Prevents fraud and financial losses.

- Procurement supports project success.
- Planning is essential.
- Contract selection affects project risk.
- Supplier evaluation is critical.
- Procurement requires continuous monitoring.
- AI is transforming procurement through automation and analytics.

Summary of Learning Objectives

Chapter

1. Define project procurement.
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Thank You