CSE 495: IT Project Management and Entrepreneurship

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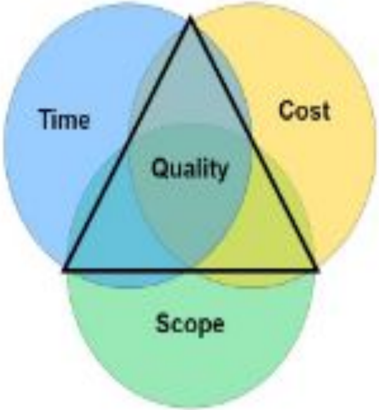
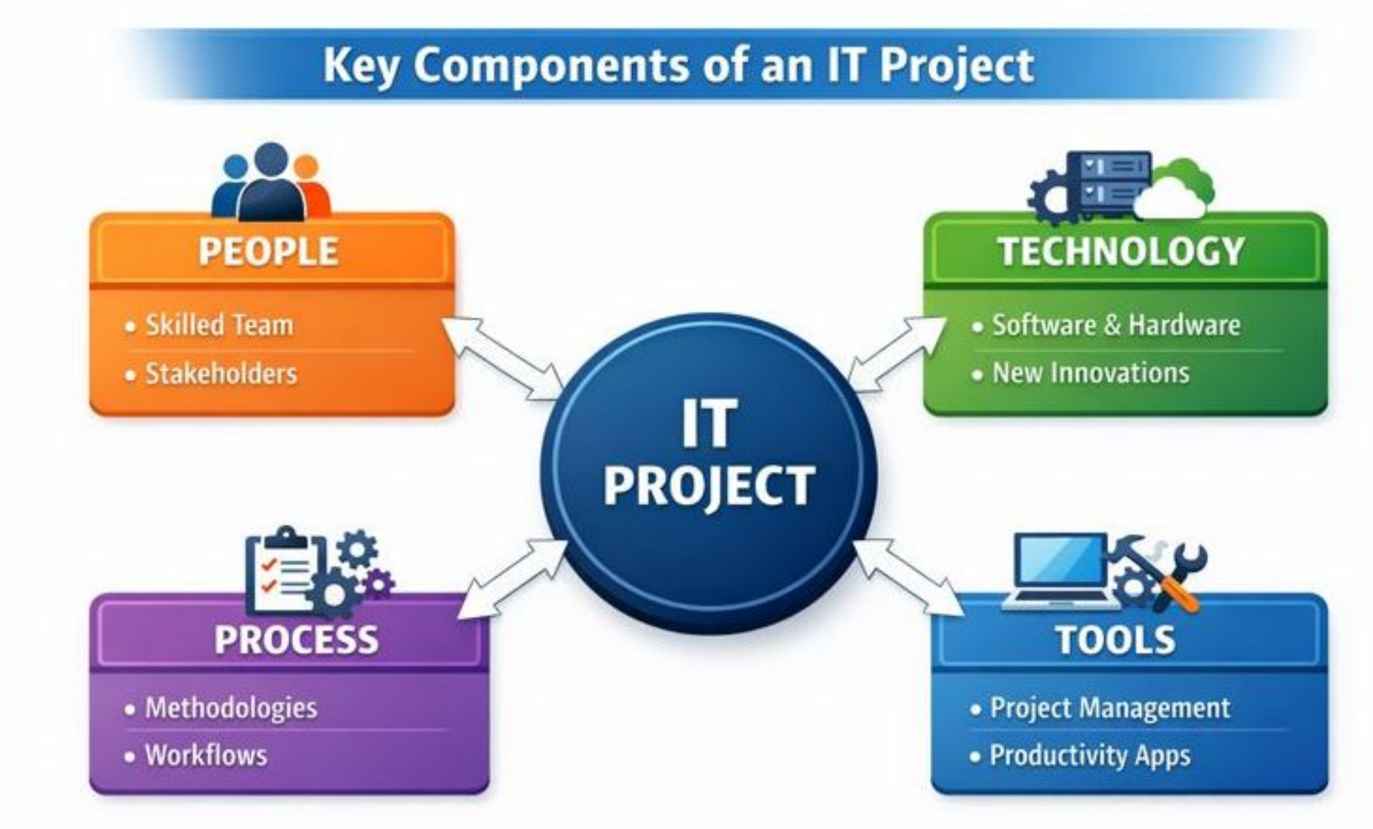
Introduction to IT Project Management

- IT Project Management is the application of **knowledge, skills, tools, and techniques** to IT-related activities to meet project requirements.
- **Time:** The project schedule or deadline.
- **Cost:** The budget allocated to the project.
- **Scope:** The specific goals, tasks, and deliverables required.



- **Quality:** The central outcome, which is affected by adjustments to any of the three constraints.
- The image displays the project management triangle, also known as the "triple constraint" or "iron triangle," which illustrates the relationship between key project constraints and their impact on overall quality.

The Nature of Information Technology Projects



- Deliver **information systems**, not physical products
- High degree of **uncertainty**
- Rapid **technology evolution**
- Strong **user involvement**

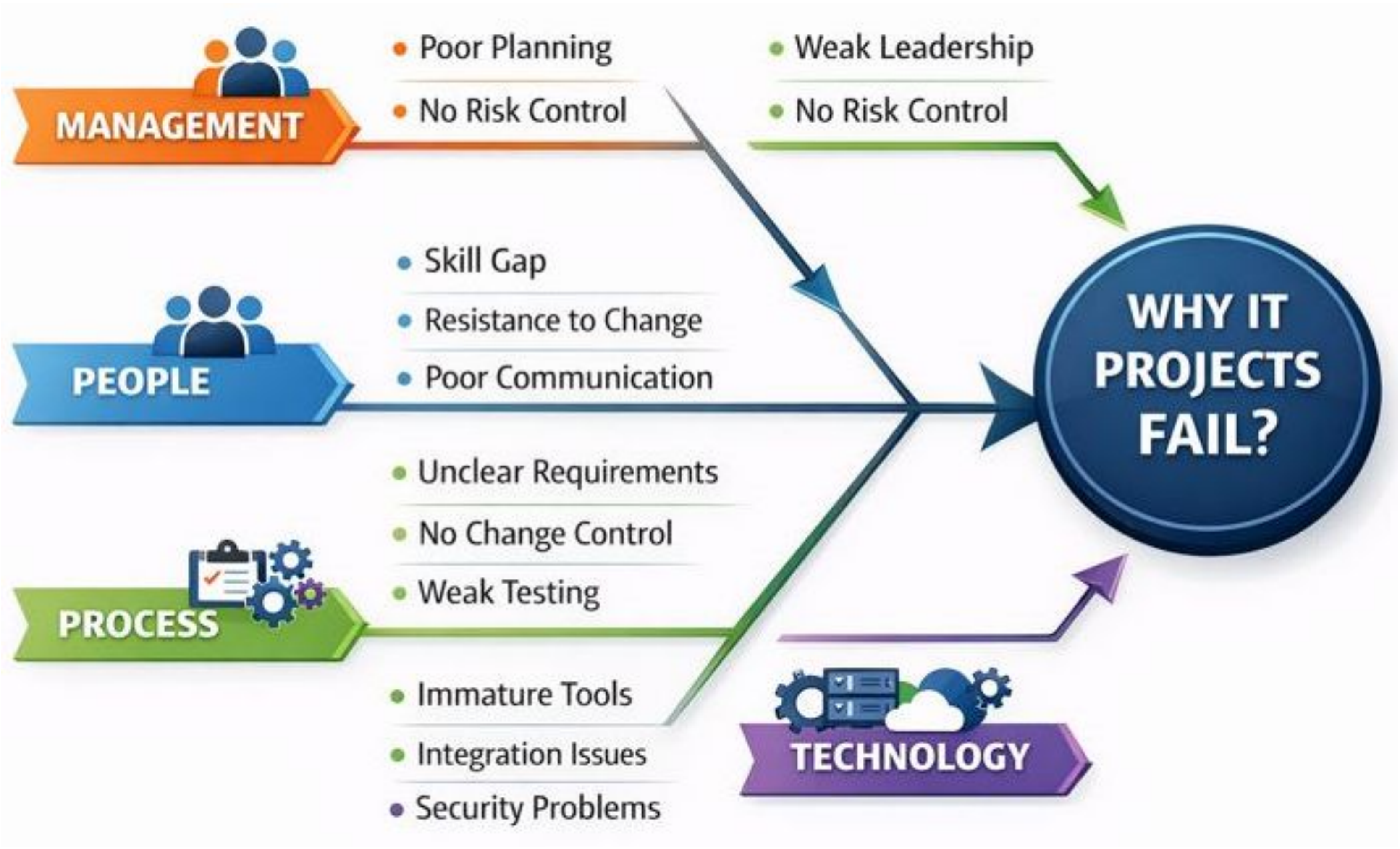
Characteristics of IT Projects

Characteristic	Description
Intangible Output	Software, databases, systems
Complexity	Many interdependent components
Change Prone	Requirements evolve frequently
Risk Intensive	Technical & managerial risks

Why IT Projects Fail?

- Risk of IT project failure is high.
- Studies show **more than 50% of IT projects fail or underperform**.
  - Poor Requirements
  - Lack of User Involvement
  - Poor Planning
  - Technology Issues
  - Lack of Management Support

Why IT Projects Fail?



Plan-Driven Project Life Cycle

- A **Plan-Driven Project Life Cycle** is a life cycle where **scope, schedule, and cost are determined early**, and changes are **strictly controlled** throughout the project.
- Also called Predictive Life Cycle
- **Key Idea :** *Plan first → execute according to plan → control changes carefully*

Change-Driven Project Life Cycle

- A **Change-Driven Project Life Cycle** is an approach where **requirements are expected to change frequently**, and the project is developed through **iterations**, allowing continuous feedback and adaptation.
- *Also called:* **Agile Life Cycle or Adaptive Life Cycle**
- **Core Idea:** *Plan a little → build a little → get feedback → adapt → repeat*
- **Key Characteristics**
  - Requirements evolve over time
  - Iterative and incremental development
  - Frequent stakeholder involvement
  - Change is **welcomed**, not resisted

Change-Driven Project Life Cycle Phases

- Unlike plan-driven, phases **overlap and repeat**.
- **1. Concept / Vision**
  - Define high-level goals
  - Identify business value
  - Create product vision
- **2. Iterative Planning**
  - Plan for short iterations (sprints)
  - Prioritize requirements (backlog)
  - Focus on near-term work only
  - In change-driven projects, **you cannot plan everything up front**.

Change-Driven Project Life Cycle Phases

- **3. Iterative Execution**
  - Design, build, and test in short cycles
  - Deliver working product increments
  - Continuous integration and testing
- **4. Review & Adaptation**
  - Customer feedback collected
  - Requirements refined
  - Adjust scope and priorities
- **5. Release / Closure**
  - Product released incrementally
  - Project ends when business value is achieved

When to Use Change-Driven Life Cycle?

- Requirements are unclear or evolving
- High innovation or research projects
- Rapid technology changes
- Strong customer availability
- **Example**: Mobile app development, AI / Machine learning systems

Hybrid Development Approach

- A **Hybrid Development Approach** combines **plan-driven (predictive)** and **change-driven (adaptive/agile)** life cycles to balance **control and flexibility** in a project.
- *Key idea: Plan what is known, adapt what is uncertain*
- **Why Hybrid is Needed**
  - Some requirements are stable
  - Some requirements are uncertain
- **Core Characteristics**
  - Up-front planning for stable components
  - Iterative development for uncertain components
  - Formal milestones with agile execution
  - Controlled change with flexible delivery

Hybrid Development Approach

- **When to Use Hybrid Development**
  - Large, complex IT projects
  - Mixed certainty in requirements
  - Enterprise software systems
  - Organizations transitioning to Agile
- **Examples of Hybrid Projects**
  - Healthcare Information Systems
  - Government IT modernization projects

Project Life Cycle

- The project life cycle is the **series of phases a project passes through from initiation to closure**, providing a framework for managing scope, time, cost, and risk.
- **5 major phases**:
  - Initiating
  - Planning
  - Executing
  - Monitoring & Controlling
  - Closing

Initiating Process Group

- **Purpose**
  - Define the project at a high level
  - Obtain formal authorization
- **Key Activities**
  - Develop business case
  - Identify stakeholders
  - Define project objectives
  - Appoint project manager
- **Key Outputs**
  - Project Charter
  - Stakeholder Register
  - Without a signed charter, **no project should begin**.

Planning Process Group

- **Purpose**
  - Decide **how the project will be executed**
  - Create a roadmap for success
- **Key Activities**
  - Define scope
  - Create WBS
  - Develop schedule & budget
  - Identify risks
  - Plan quality, communication, procurement
- **Key Outputs**
  - Project Management Plan
  - Scope Baseline
  - Schedule Baseline
  - Cost Baseline
  - Risk Register
- Planning is the **most important phase** — most project failures start here.

Executing Process Group

- **Purpose**
  - Perform the work defined in the plan
- **Key Activities**
  - Develop deliverables
  - Manage project team
  - Conduct procurements
  - Manage communications
  - Ensure quality assurance
- **Key Outputs**
  - Deliverables
  - Work Performance Data
  - Change Requests

Monitoring and Controlling Process Group

- **Purpose**
  - Measure performance
  - Ensure project stays on track
- **Key Activities**
  - Track scope, schedule, and cost
  - Perform variance analysis
  - Control risks and changes
  - Validate scope
- **Key Outputs**
  - Work Performance Information
  - Approved Change Requests
  - Forecasts
- **Monitoring & Controlling** happens throughout the project, not just at the end.

Closing Process Group

- **Purpose**
  - Formally close the project or phase
- **Key Activities**
  - Obtain customer acceptance
  - Finalize contracts
  - Release resources
  - Document lessons learned
- **Key Outputs**
  - Final product/service
  - Lessons Learned Repository
  - Project Closure Report

Project Management Process

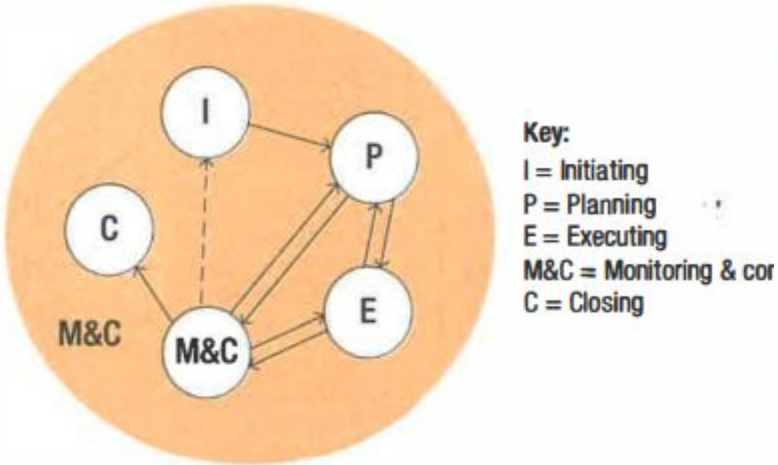


FIGURE 3.5 *Project management process*

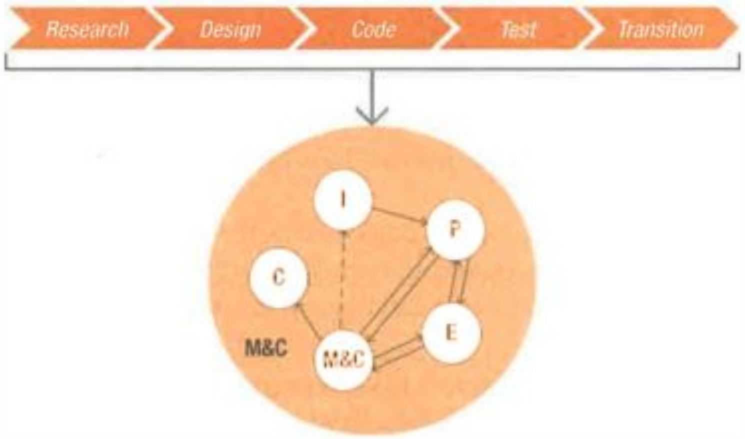


FIGURE 3.2 *Small project with a predictive life cycle*

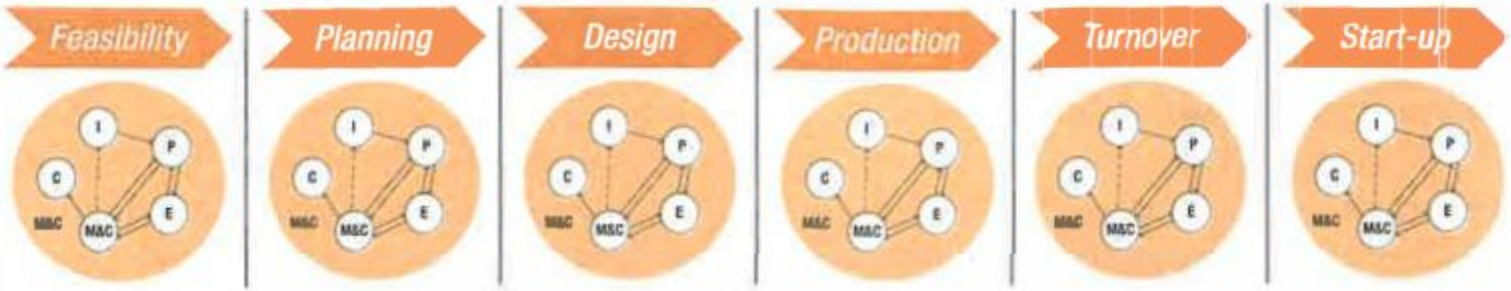


FIGURE 3.3 *Large project with a predictive life cycle with phase gates (indicated by the vertical bars)*

Project Management Process

- Arrows moving clockwise from initiating through planning, executing, monitoring and controlling, and closing.
- Double arrows between the planning, executing, and controlling process groups illustrate that you often move back and forth between them depending on events taking place. New information that becomes available while executing could bring you back into planning. For example, while a process like Integrated Change Control (ICC) is a controlling process it addresses change requests made during executing. You return to executing upon its completion to carry out approved changes and to communicate ICC results.
- The single dotted arrow returning from monitoring and controlling to initiating indicates that, under certain limited circumstances, you may enter initiating once you leave it
- Monitoring and Controlling is being carried out from start to finish on the project. Work in all other process groups takes place in the context of ongoing monitoring and controlling.

Phases in the Large Project

- **Feasibility**
  - Evaluate whether the project is possible and worthwhile.
  - Key deliverables: business case, feasibility report, initial scope.
  - Phase gate: approve or reject project initiation.
- **Planning**
  - Develop **detailed project plans**: schedule, cost, risk, resources.
  - Phase gate: ensure plans are realistic and achievable.
- **Design**
  - Create detailed designs for deliverables (e.g., system design, architecture, prototypes).
  - Phase gate: approve design before production.
- **Production**
  - Actual **execution and building of the product** or deliverable.
  - Phase gate: quality review, ensure outputs match design.
- **Turnover**
  - Transition the product to operations or the client.
  - Phase gate: verify all deliverables are ready and approved.
- **Start-up**
  - Project closes, operations begin, lessons learned documented.
  - Phase gate: formal closure approval.

Reasons for Entering Initiating and Planning

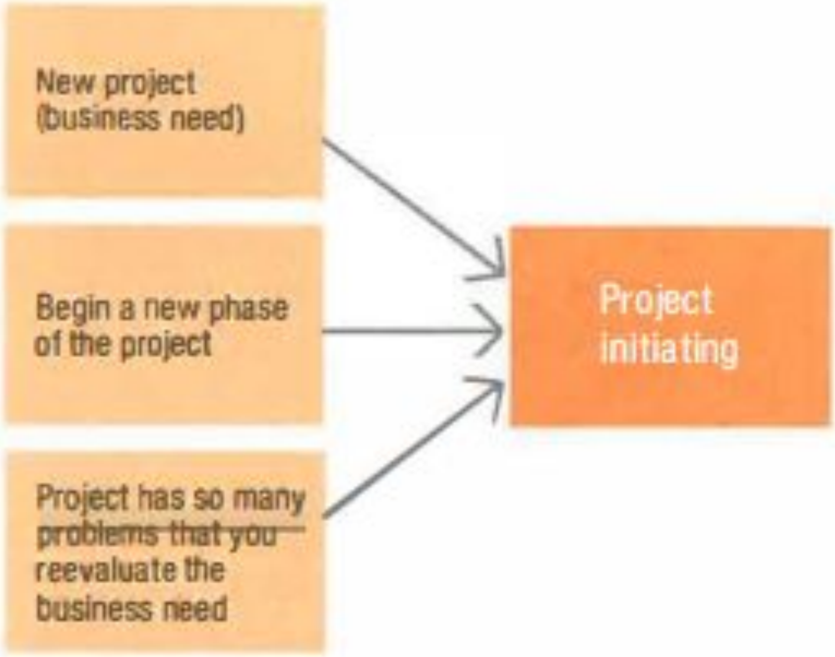

New project (business need)
Begin a new phase of the project
Project has so many ~~problems that you~~ reevaluate the business need
Project initiating

FIGURE 3.6 *Reasons for entering project initiating*

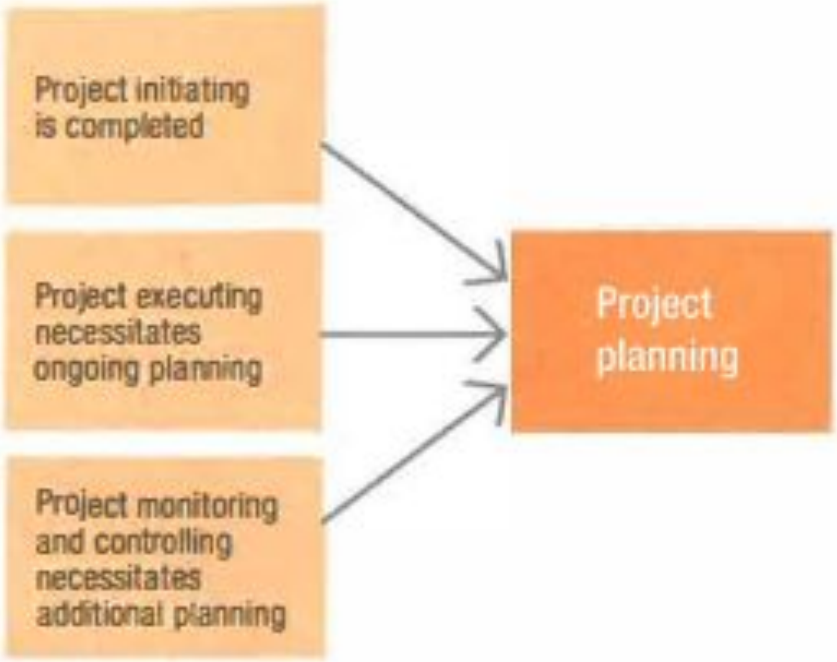

Project initiating is completed
Project executing necessitates ongoing planning
Project monitoring and controlling necessitates additional planning
Project planning

FIGURE 3.7 *Reasons for entering project planning*

Reasons for Entering Executing and Closing

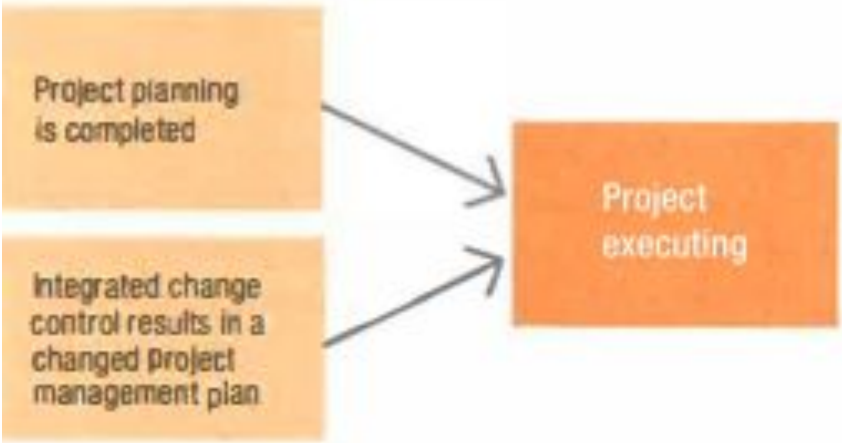

Project planning is completed
Integrated change control results in a changed project management plan
Project executing

FIGURE 3.8 *Reasons for entering project executing*

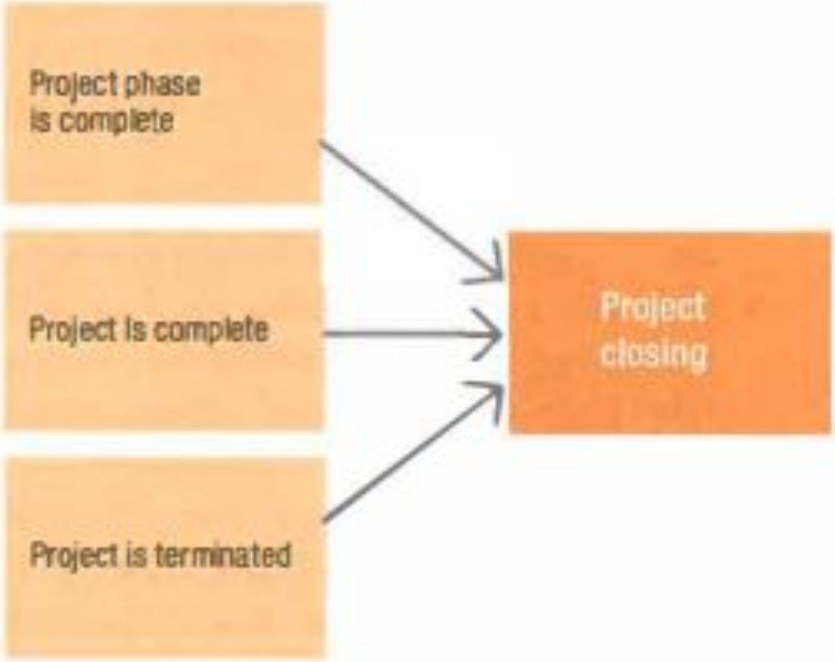
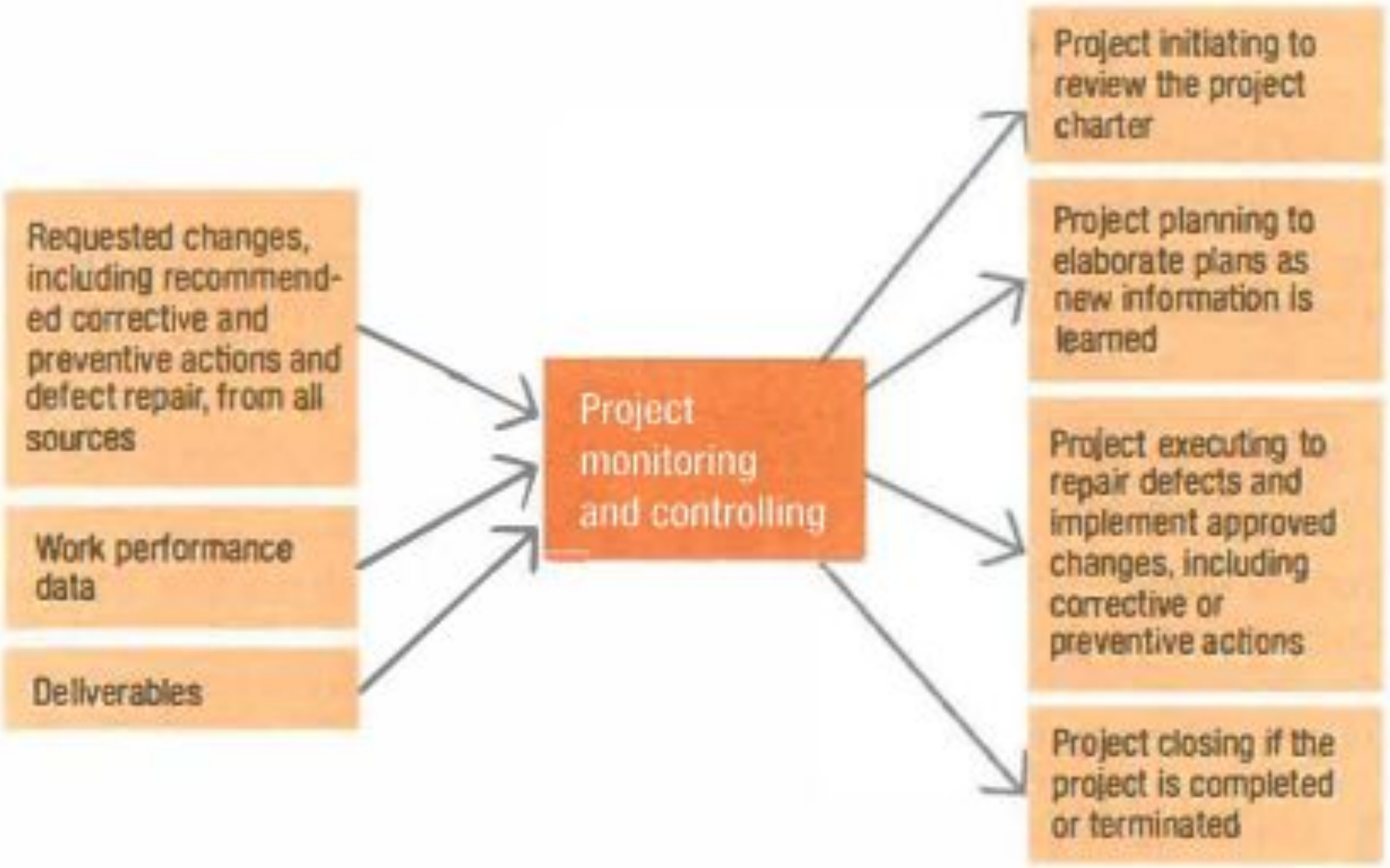


FIGURE 3.9 *Reasons for entering project closing*

Focus on Monitoring and Controlling



Requested changes, including recommended corrective and preventive actions and defect repair, from all sources

Work performance data

Deliverables

Project monitoring and controlling

Project initiating to review the project charter

Project planning to elaborate plans as new information is learned

Project executing to repair defects and implement approved changes, including corrective or preventive actions

Project closing if the project is completed or terminated

FIGURE 3.10 *Key outputs that trigger project monitoring and controlling, and potential next steps*