CHAPTER

3

INFORMATION SYSTEM DEVELOPMENT

Chapter Map

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Process of System Development

A **system development process** is a set of activities, methods, best practices, deliverables, and automated tools that stakeholders use to develop and maintain information systems and software.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

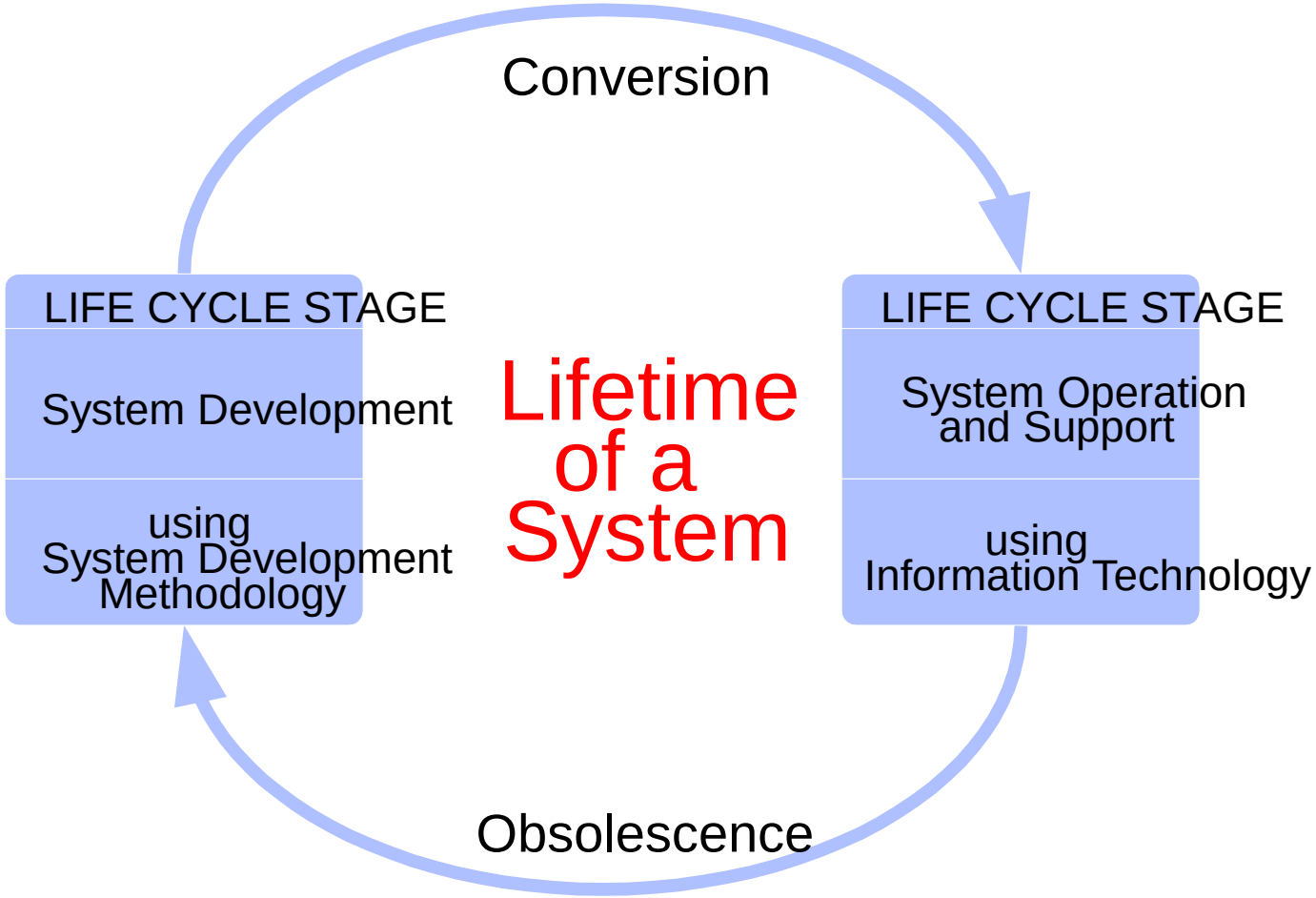
Life Cycle versus Methodology

- A **system life cycle** divides the life of an information system into two stages, systems development and systems operation and support.

- A **system development methodology** is a very formal and precise system development process that defines (as in CMM Level 3) a set of activities, methods, best practices, deliverables, and automated tools that system developers and project managers are to use to develop and maintain information systems and software.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

A System Life Cycle



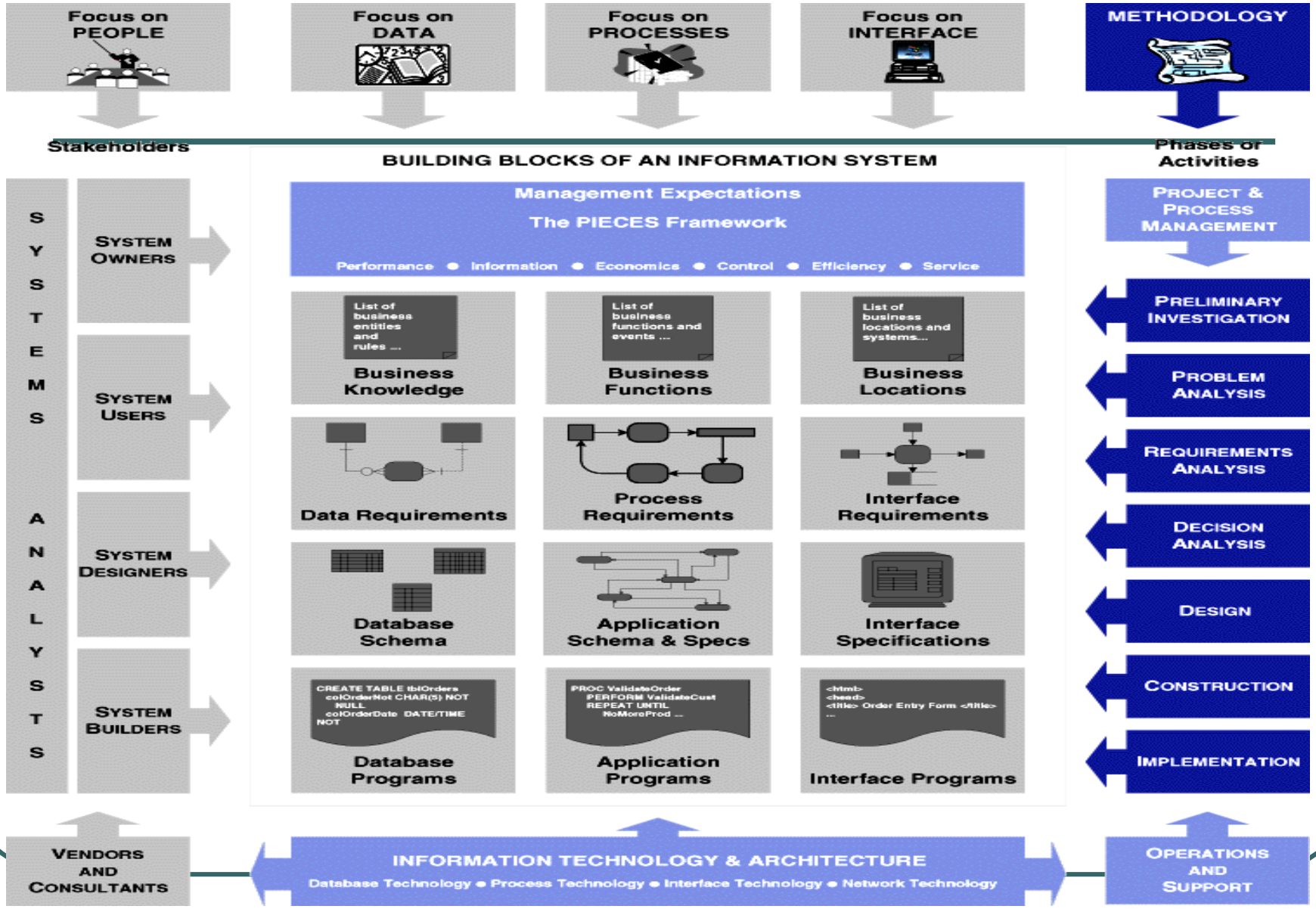
Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Principles of System Development

- Get the owners and users involved.
- Use a problem-solving approach.
- Establish phases and activities.
- Establish standards.
- Justify systems as capital investments.
- Don’t be afraid to cancel or revise scope.
- Divide and conquer.
- Design systems for growth and change.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Phases of Representative Methodology



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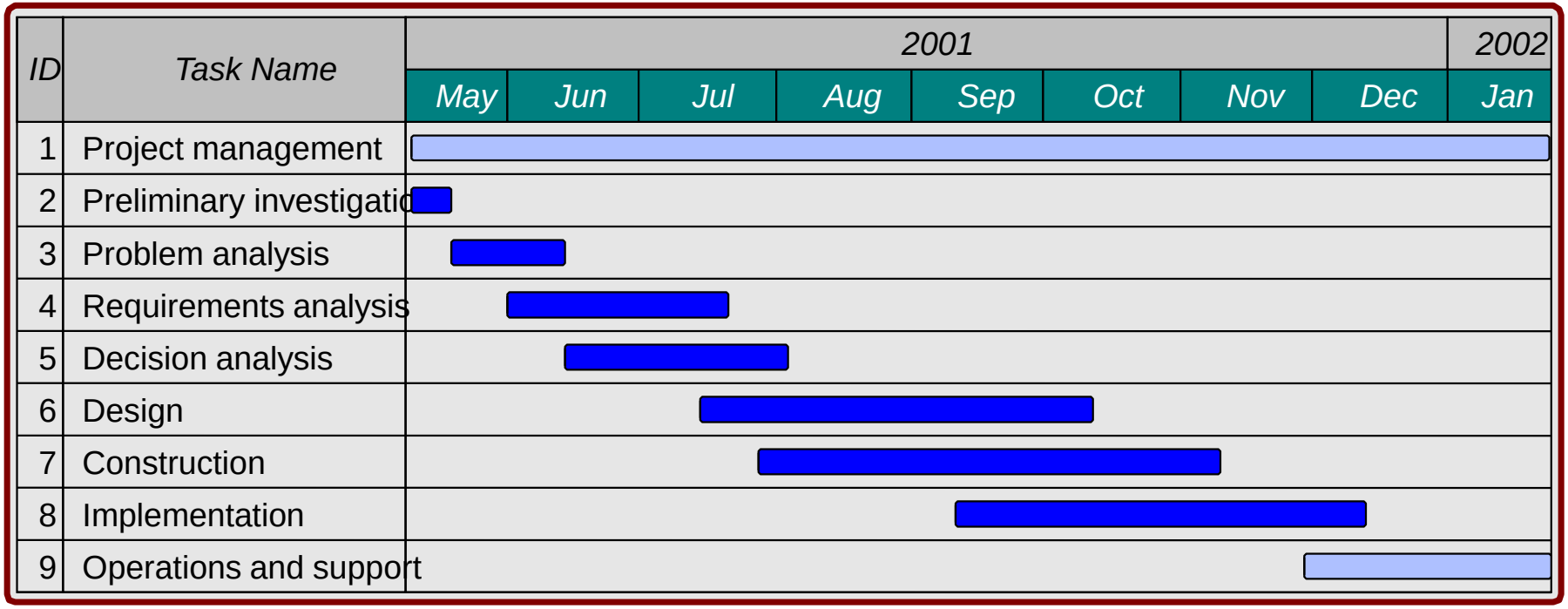
Overlap of System Development Phases

As at "Improve Date"



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Project Identification and Initiation

- **Problems** are undesirable situations that prevent the organization from fully achieving its purpose, goals, and/or objectives.
- **Opportunities** are chances to improve the organization even in the absence of specific problems.
- **Directives** are new requirements that are imposed by management, government, or some external influence.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

PIECES Problem Solving Framework

P the need to improve performance

I the need to improve information (and data)

E the need to improve economics, control costs, or increase profits

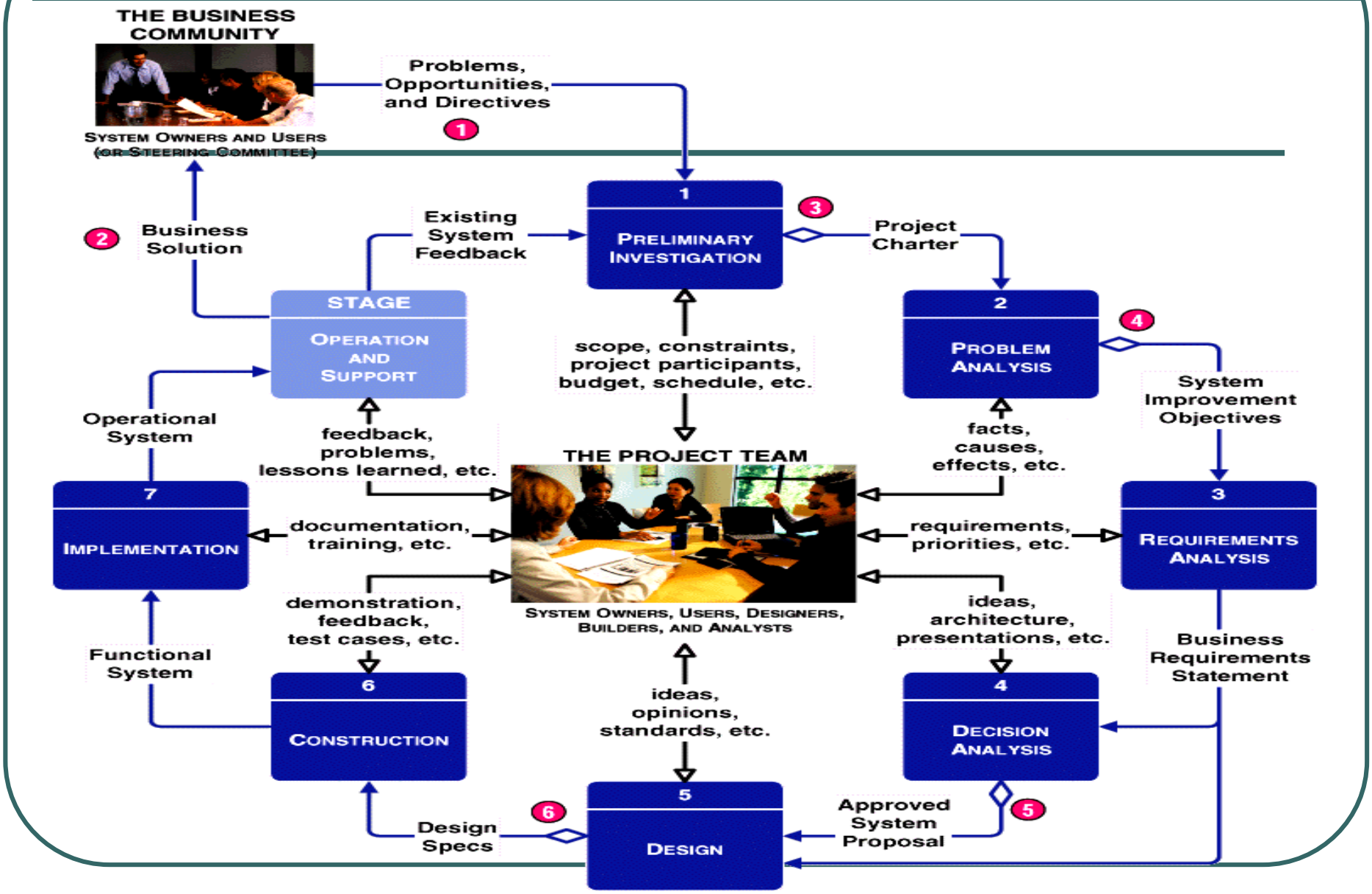
C the need to improve control or security

E the need to improve efficiency of people and processes

S the need to improve service to customers, suppliers, partners, employees, etc.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

FAST System Development Phases



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Cross Life Cycle Activities

Cross life cycle activities are activities that overlap many or all phases of the methodology.

- Fact-finding
- Documentation and presentation
- Feasibility analysis
- Process and project management
  - **Defining / planning / directing / monitoring / controlling**

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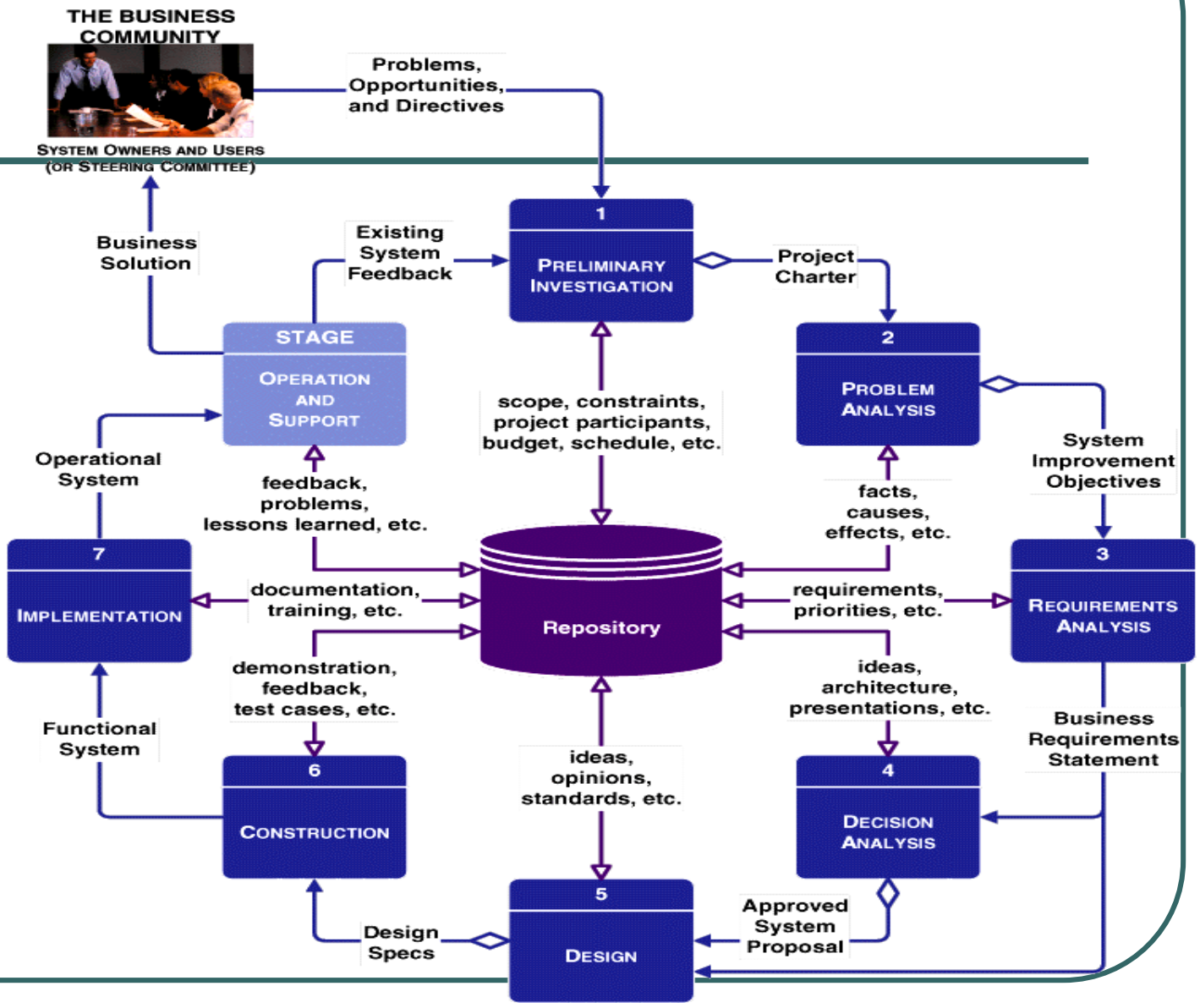
Sharing Knowledge via a Repository

A **repository** is a database where system developers store all documentation, knowledge, and products for one or more information systems or projects.



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Alternative Routes through a Methodology

- Model-Driven Development (MDD)
- Rapid Application Development (RAD)
- Commercial Off-the-Shelf Software (COTS)
- Maintenance and Reengineering

or hybrids of the above

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Model-Driven Development Route

- **Modeling** is the act of drawing one or more graphical representations (or pictures) of a system. Modeling is a communication technique based upon the old saying, "a picture is worth a thousand words."
- **Model-driven development** techniques emphasize the drawing of models to help visualize and analyze problems, define business requirements, and design information systems.
  - **Structured systems analysis and design — process-centered**
  - **Information engineering (IE) — data-centered**
  - **Object-oriented analysis and design (OOAD) — object-centered (integration of data and process concerns)**

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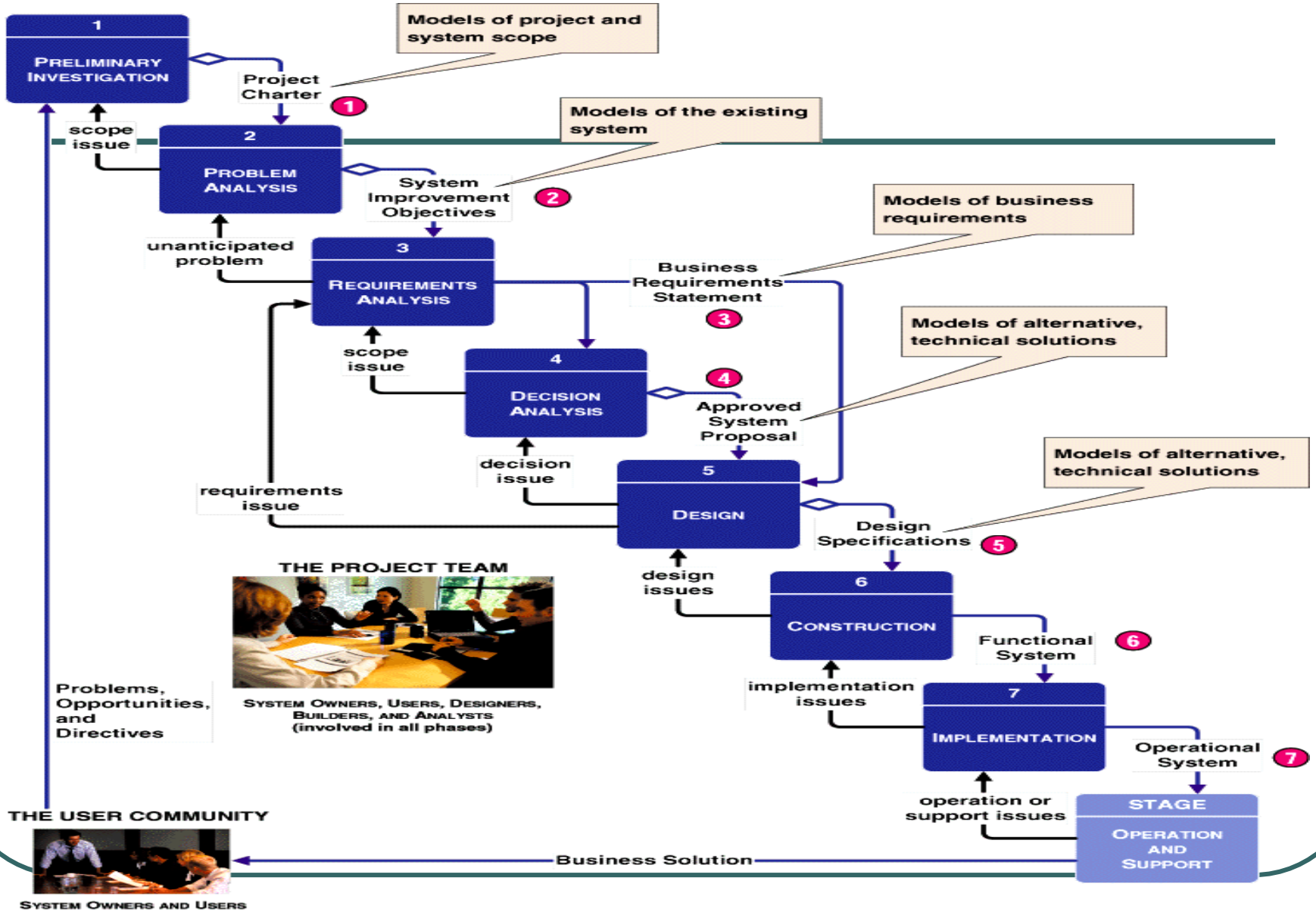
Model-Driven Development (MDD) Route



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Rapid Application Development Route

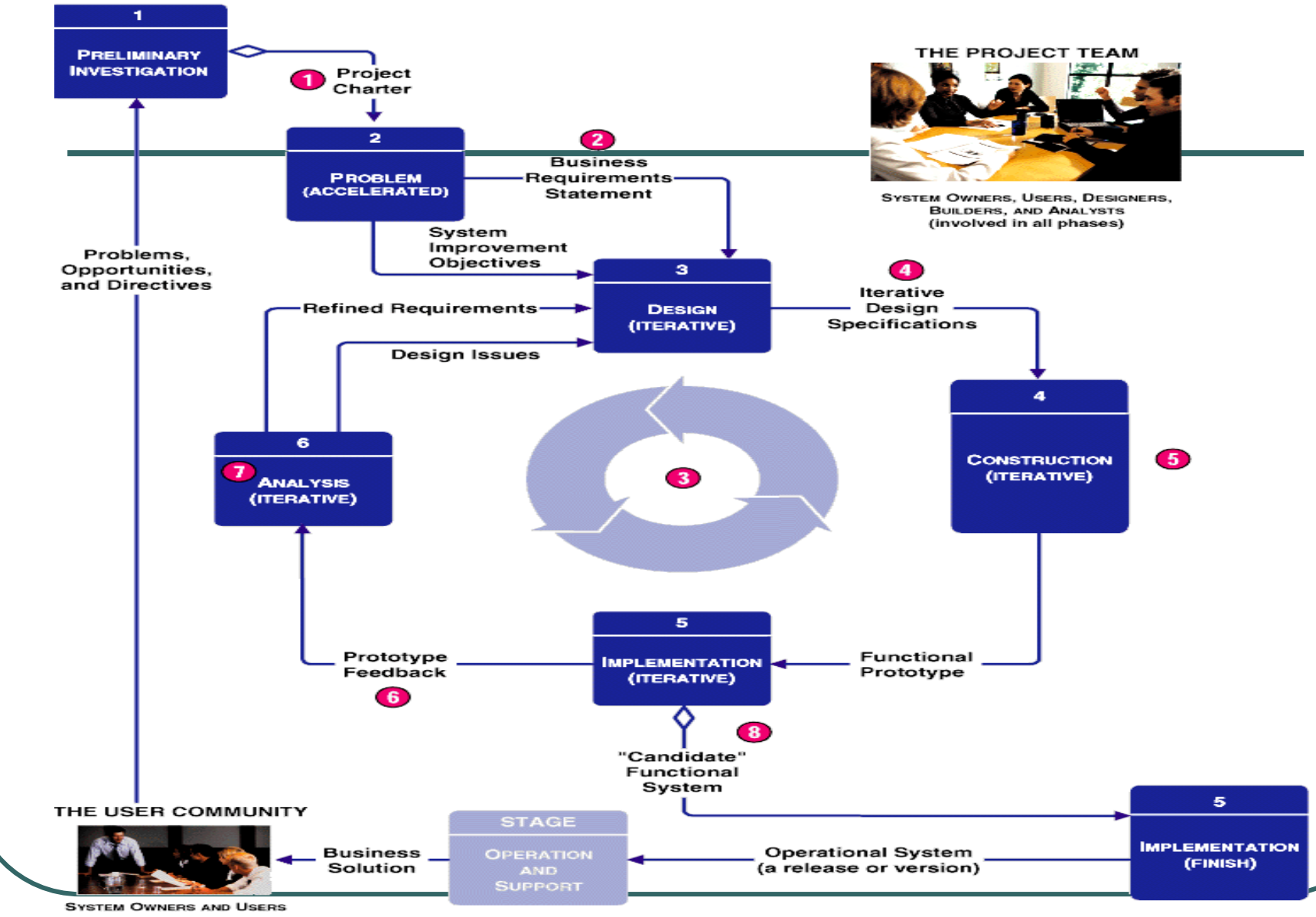
- **Rapid application development** (RAD) techniques emphasize extensive user involvement in the rapid and evolutionary construction of working prototypes of a system to accelerate the system development process.

  RAD is based on building prototypes that evolve into finished systems (often using time boxing)

  - A **prototype** is a smaller-scale, representative or working model of the users' requirements or a proposed design for an information system. --> Candidate System
  - A **time box** is a nonextendable period of time, usually 60-120 days, by which a candidate system must be placed into operation.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Rapid Application Development (RAD) Route



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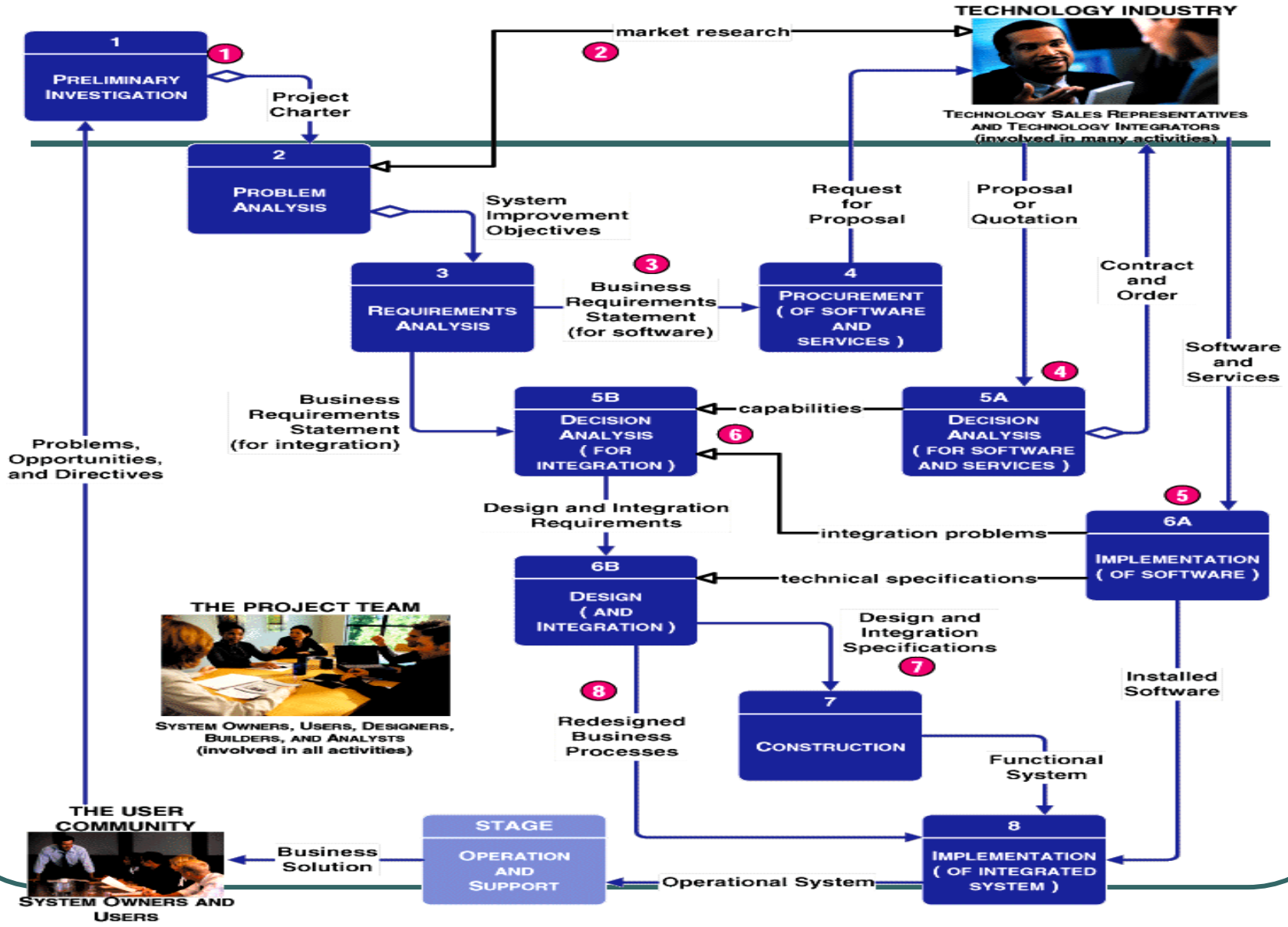
Commercial Off-the-Shelf Software Route

- **Commercial off-the-shelf (COTS) software** is a software package or solution that is purchased to support one or more business functions and information systems.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Commercial Off-the-Shelf (COTS) Software Route



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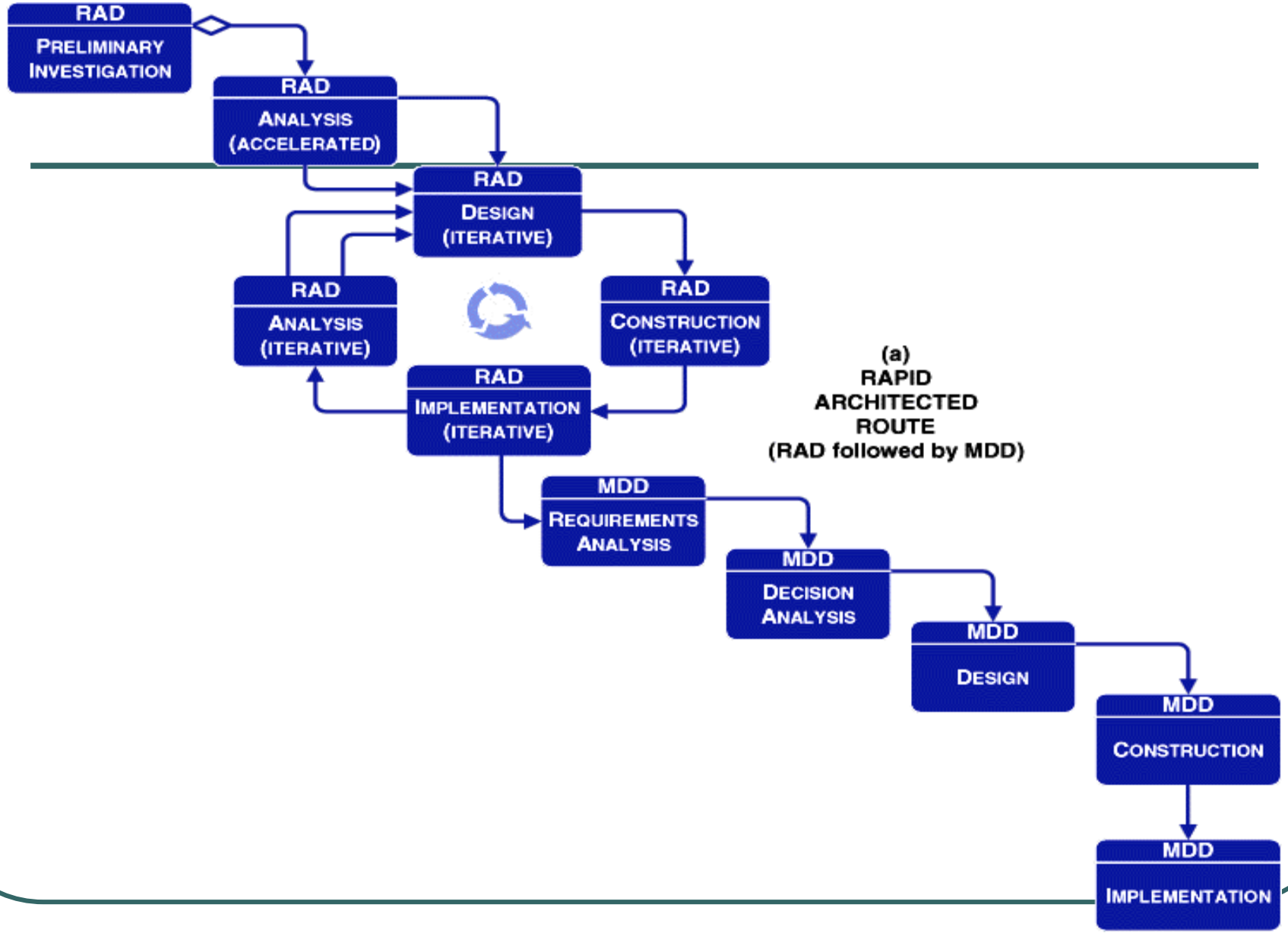
Hybrid: Rapid Architected Development



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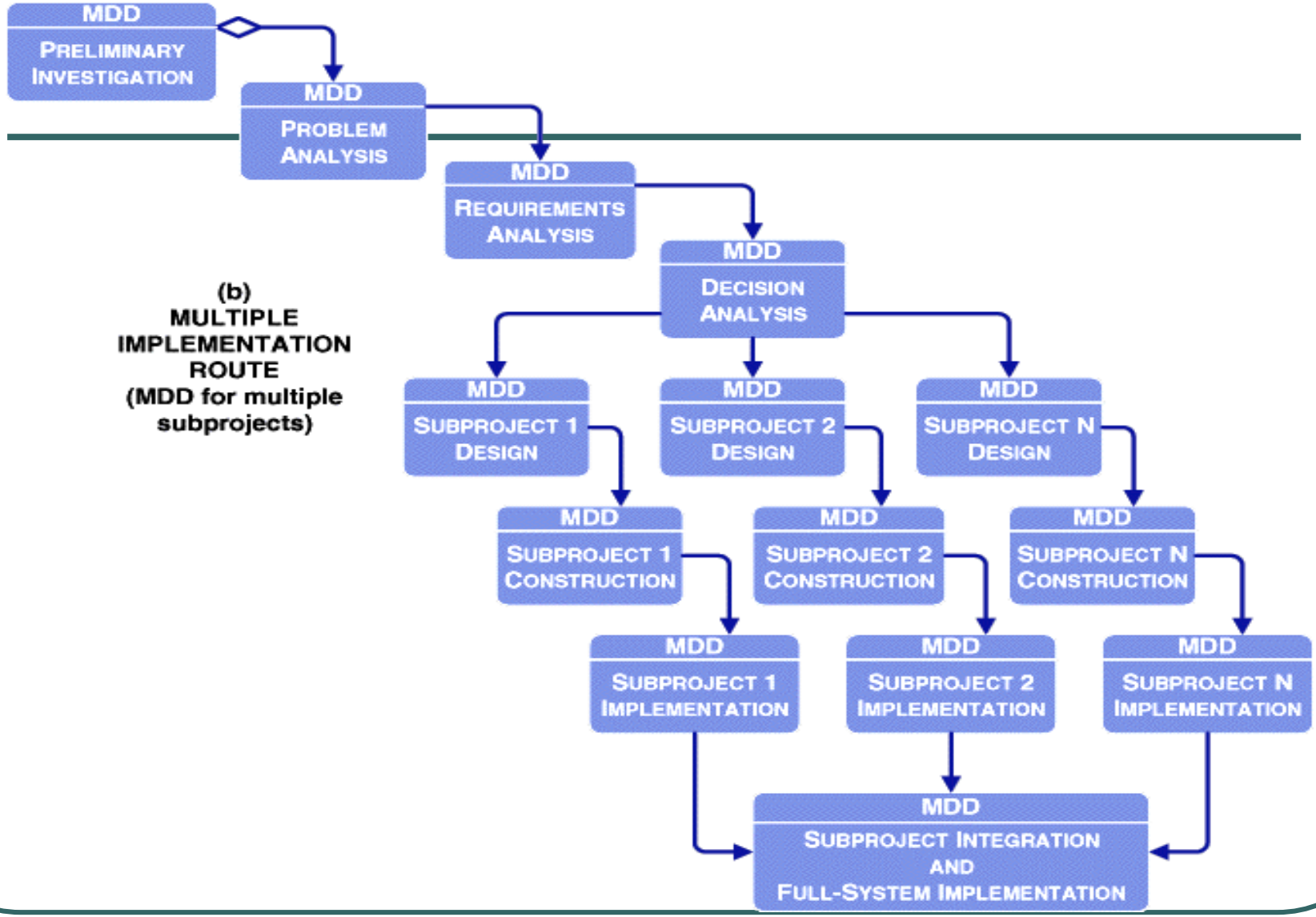
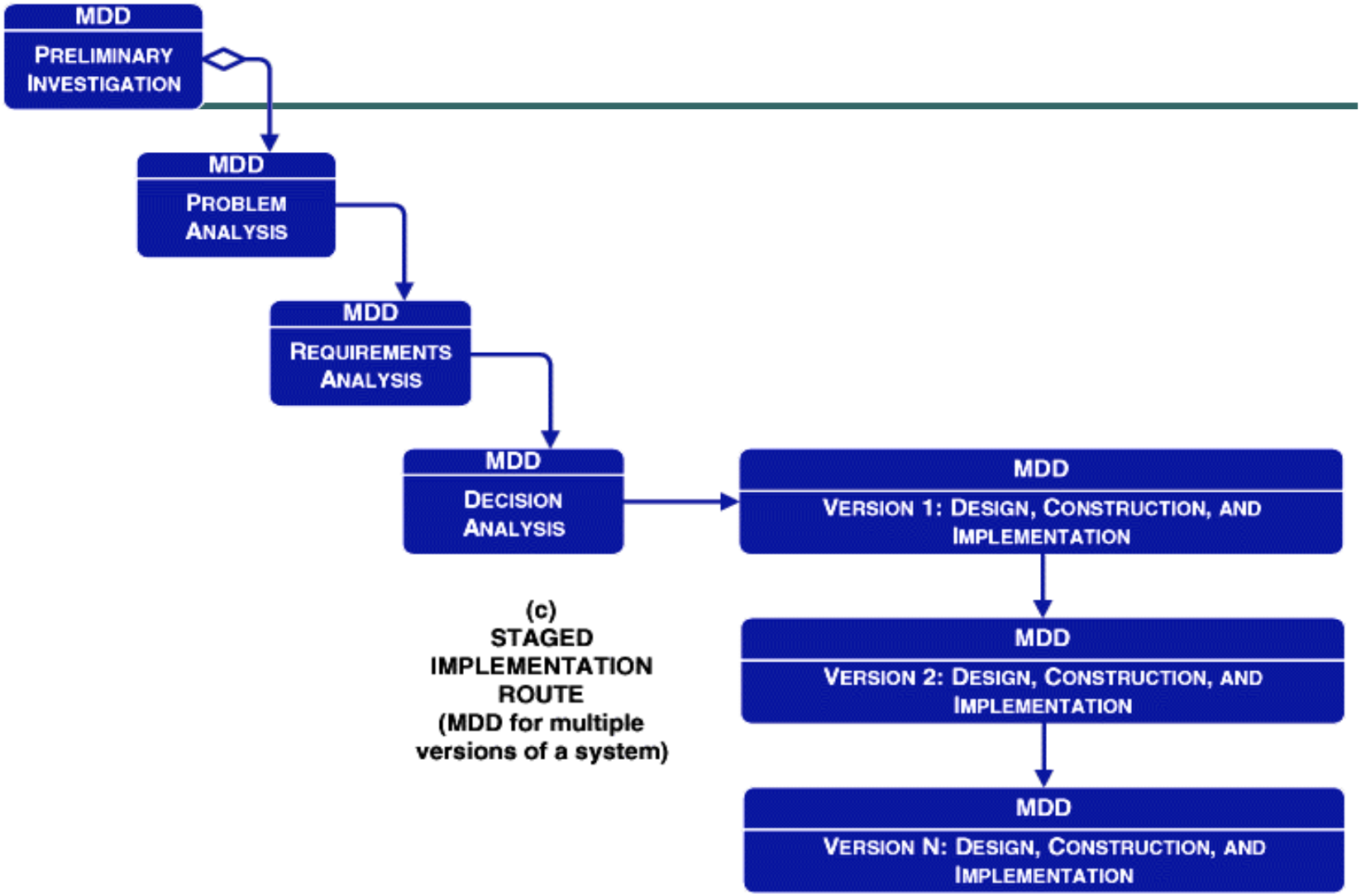
Hybrid: Multiple Implementation



Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Hybrid: Staged Implementation



(c)
STAGED
IMPLEMENTATION
ROUTE
(MDD for multiple
versions of a system)

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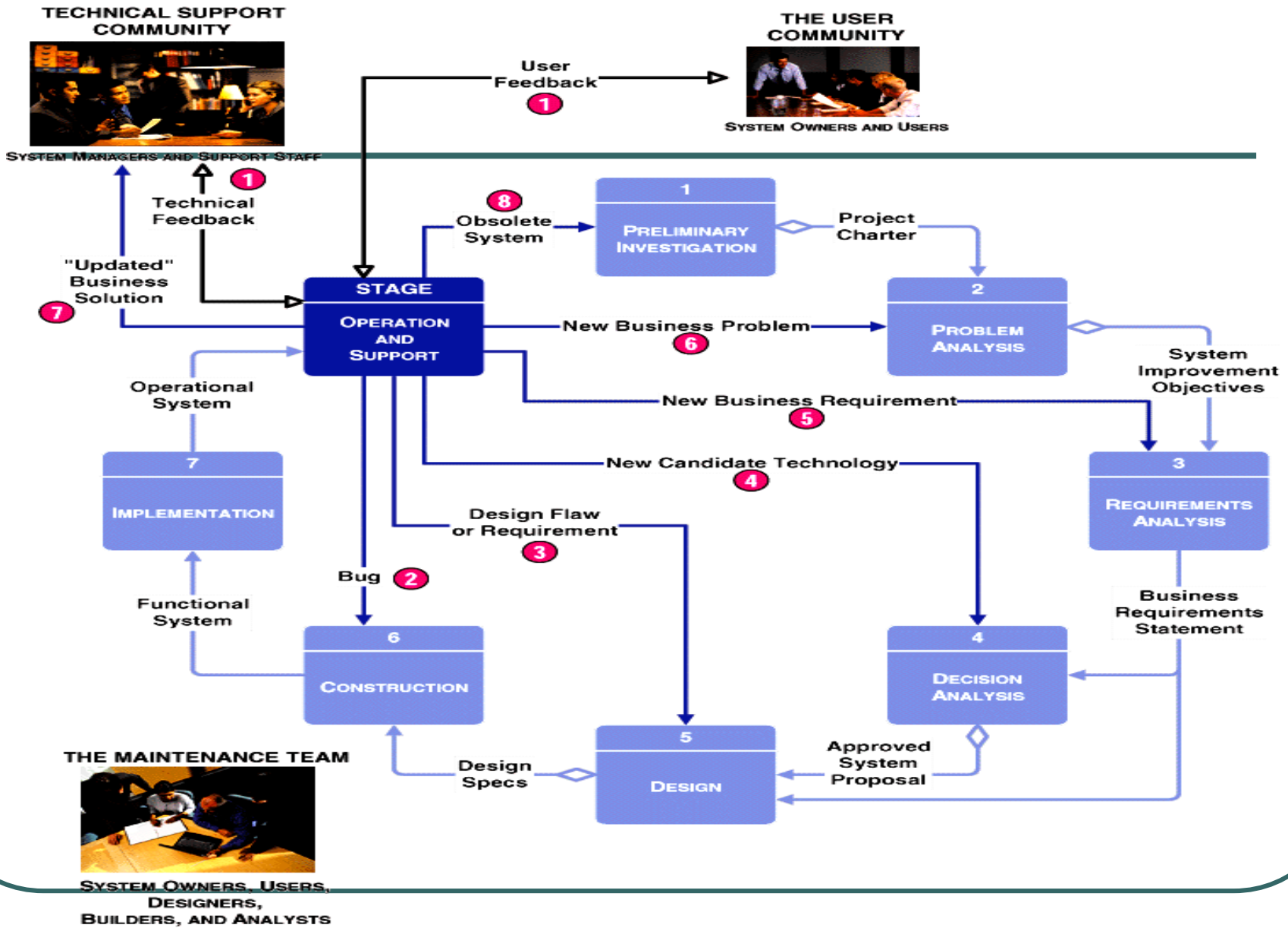
Maintenance and Reengineering Route



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Process and Project Managers

- A **process manager** is an automated tool that helps to document and manage a methodology and routes, its deliverables, and quality management standards.

- A **project manager** is an automated tool to help plan system development activities (preferably using the approved methodology), estimate and assign resources (including people and costs), schedule activities and resources, monitor progress against schedule and budget, control and modify schedule and resources, and report project progress.

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Summary

- System development process: CMM
- System life cycle V.S. system development methodology.
- Eight basic principles of system development.
- Problems, opportunities, and directives
- PIECES framework for categorizing problems, opportunities, and directives.
- Traditional, basic phases of system development.
- Cross life cycle activities
- Four basic alternative “routes” through the basic phases of system development.
- Computer-aided systems engineering (CASE), application development environments (ADEs), and process and project management technology as automated tools for system development.