

CHAPTER 1: THE OBJECT-ORIENTED SYSTEMS DEVELOPMENT ENVIRONMENT

- **What Is Information Systems Analysis and Design?**
- **Systems Analysis and Design: Core Concepts System**
- **Information Systems Analysis and Design**
 - Types of Information Systems and Systems Development**
 - The Analyst's Role in Systems Development**
 - Systems Analysts in the Systems Development Process**
 - Why Should We Use Object-Oriented Systems Analysis and Design (OOSAD)?**
- **Iterative and Incremental Development**

1-1

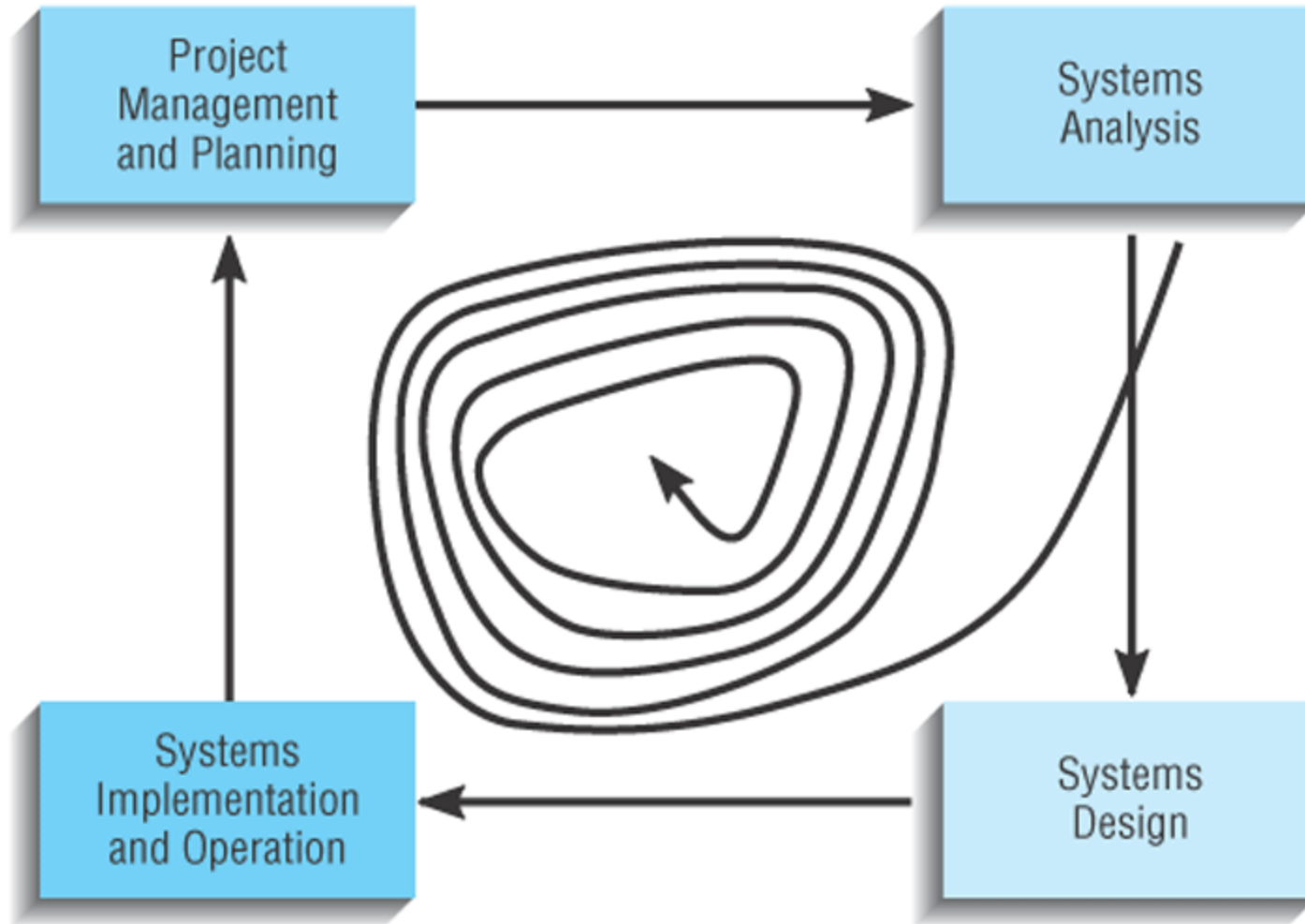
CHAPTER OBJECTIVES

- After studying this chapter you should be able to:
 - Define information systems analysis and design.
 - Explain the basics about systems.
 - Describe the information systems development cycle (SDC).
 - Describe TPS, MIS, and DSS.
 - Describe the role of systems analyst.
 - Recount the evolution of system development methodologies.

WHAT IS SYSTEMS ANALYSIS AND DESIGN?

- The process of implementing and operating an information system
- Requires knowledge of:
 - Organization's objectives, structure, processes
 - Information technology opportunities and constraints

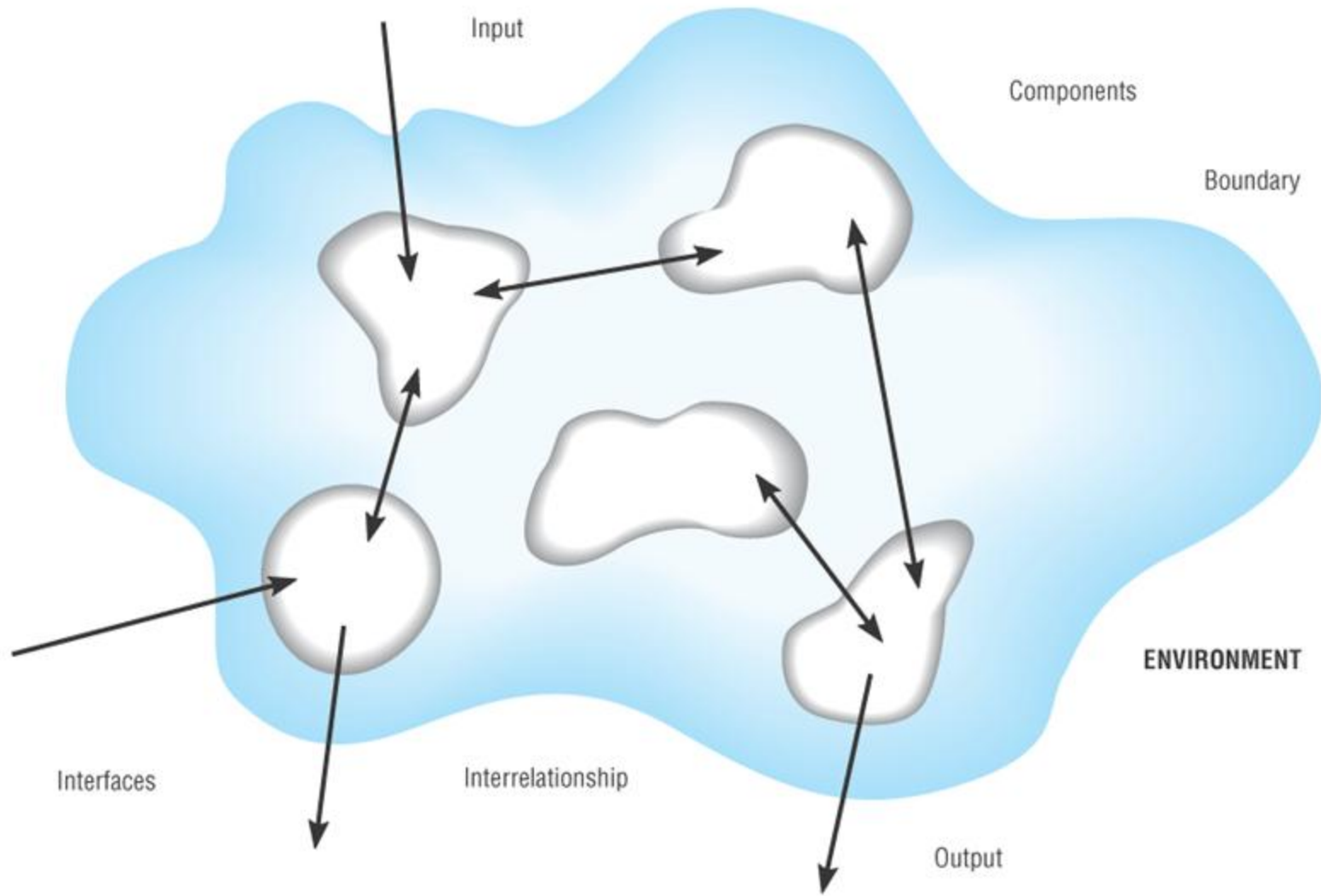
Figure 1.1 The Systems Development Cycle



WHAT IS A SYSTEM?

- A group of interrelated procedures used for a business function, with an identifiable boundary, working together for some purpose.

Figure 1.4 Seven Characteristics of a System



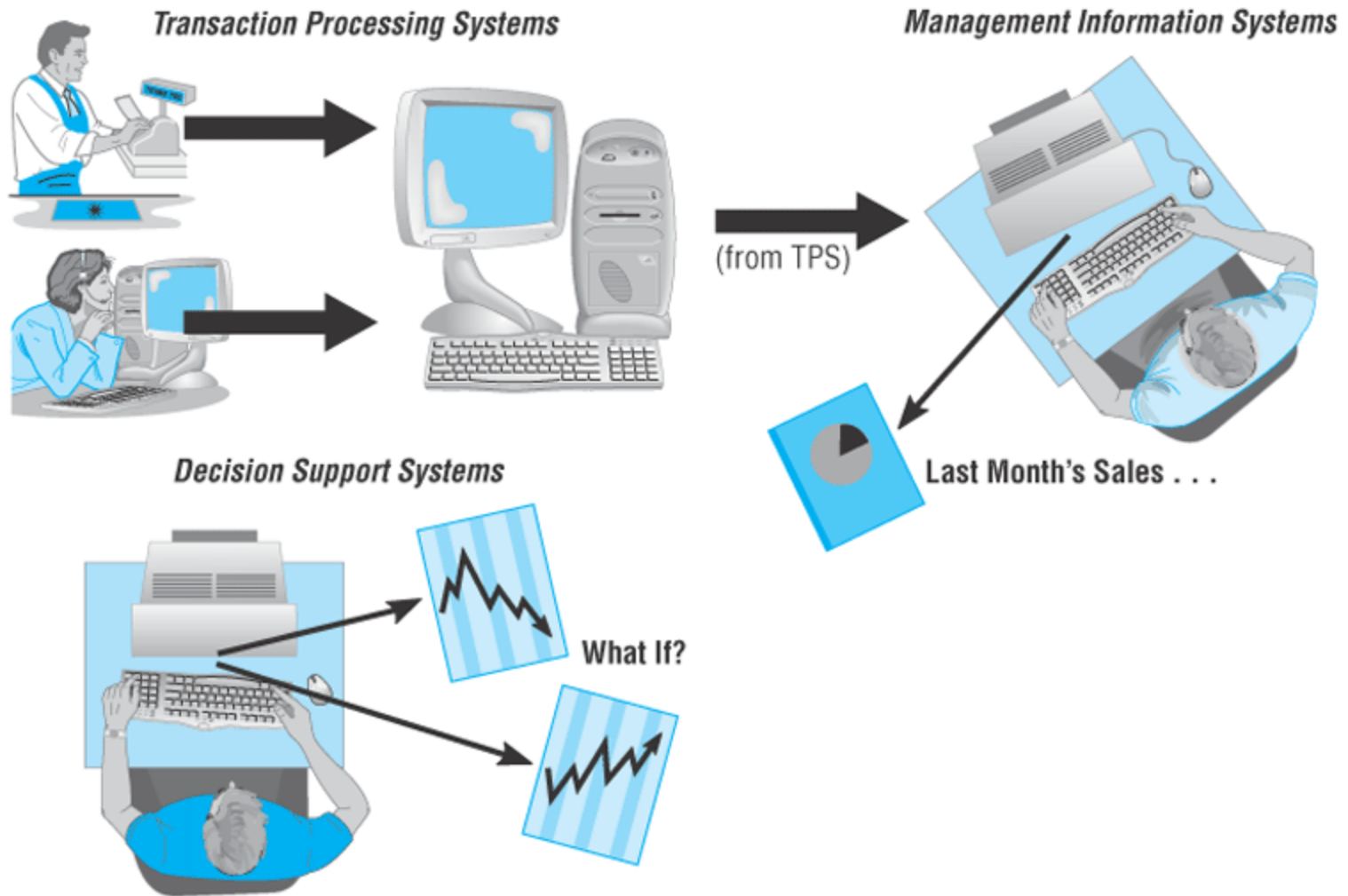
CHARACTERISTICS OF SYSTEMS

- Boundary – divides system from environment
- Inputs – data from environment to system
- Output – data from system to environment
- Components – subparts of systems operating independently (objects)
- Interrelationships – associations between components of a system
- Interfaces – mechanism for interacting with a component

IMPORTANT SYSTEM CONCEPTS

- ***Decomposition*** – breaking down a system into smaller constituents
- ***Modularity*** – the result of decomposition; parts of a system
- ***Coupling*** – dependencies between subsystems
- ***Cohesion*** – extent to which a subsystem performs a single function

Figure 1.7 Depictions of Classes of Information Systems: TPS, MIS, DSS



TRANSACTION PROCESSING SYSTEM (TPS)

- Automate the handling of data for business activities or transactions
- Goal: improve transaction processing by increasing speed, enhancing productivity, simplifying processes

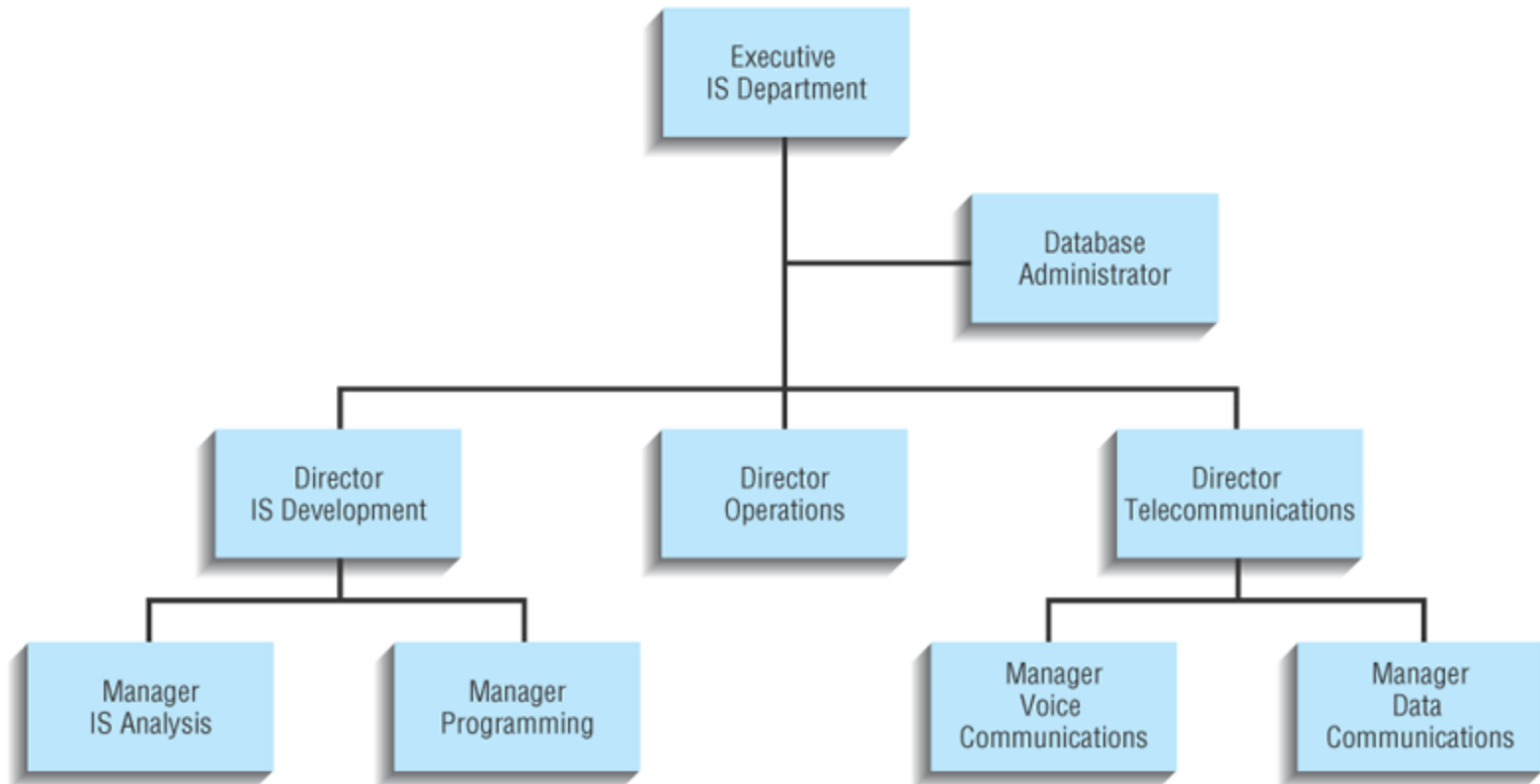
MANAGEMENT INFORMATION SYSTEM (MIS)

- Use raw data from TPS systems, and converts them into meaningful aggregate form
- Goal: provide the information that helps managers in their jobs

DECISION SUPPORT SYSTEM (DSS)

- Interactively assist with decision making by applying mathematical or logical models and a dialogue of interactions to solve unstructured problems
- Goal: provide comparisons of alternatives and recommendation of preferred option

Figure 1.8 An Organizational Chart for a Typical Information Systems Department



THE ROLE OF THE SYSTEMS ANALYST

- Skills required: analytical, technical, managerial, interpersonal
- Liaison between users, programmers, and other systems professionals

Figure 1.9 A Typical Advertisement for an Analyst with Object-Oriented Skills

Simon & Taylor, Inc., an optical goods manufacturer, has an immediate opening for a systems analyst in its Vermont-based office.

The ideal candidate will have:

1. A bachelor's degree in MIS, CIS, or Computer Science
2. Experience with Object-Oriented Analysis and Design and Rational Rose
3. Working knowledge of Oracle and VisualBasic or Java
4. Familiarity with distribution and manufacturing concepts
5. Strong analytical and organizational skills
6. Ability to work in a team

We offer a competitive salary, relocation assistance, and the challenges of working in a state-of-the-art IT environment.

E-mail your resume and a list of references to human_resources@simontaylor.com

Figure 1.10 A Data Flow Diagram

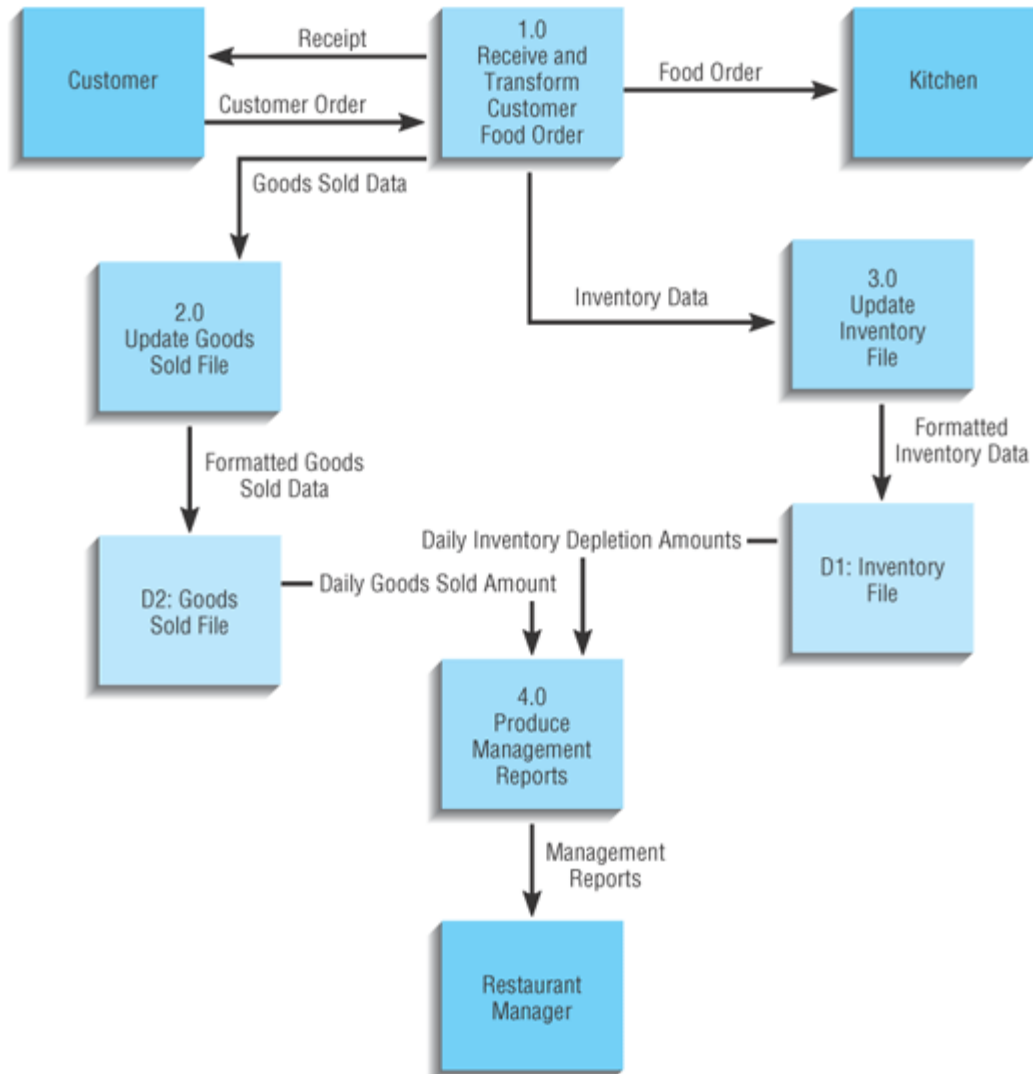
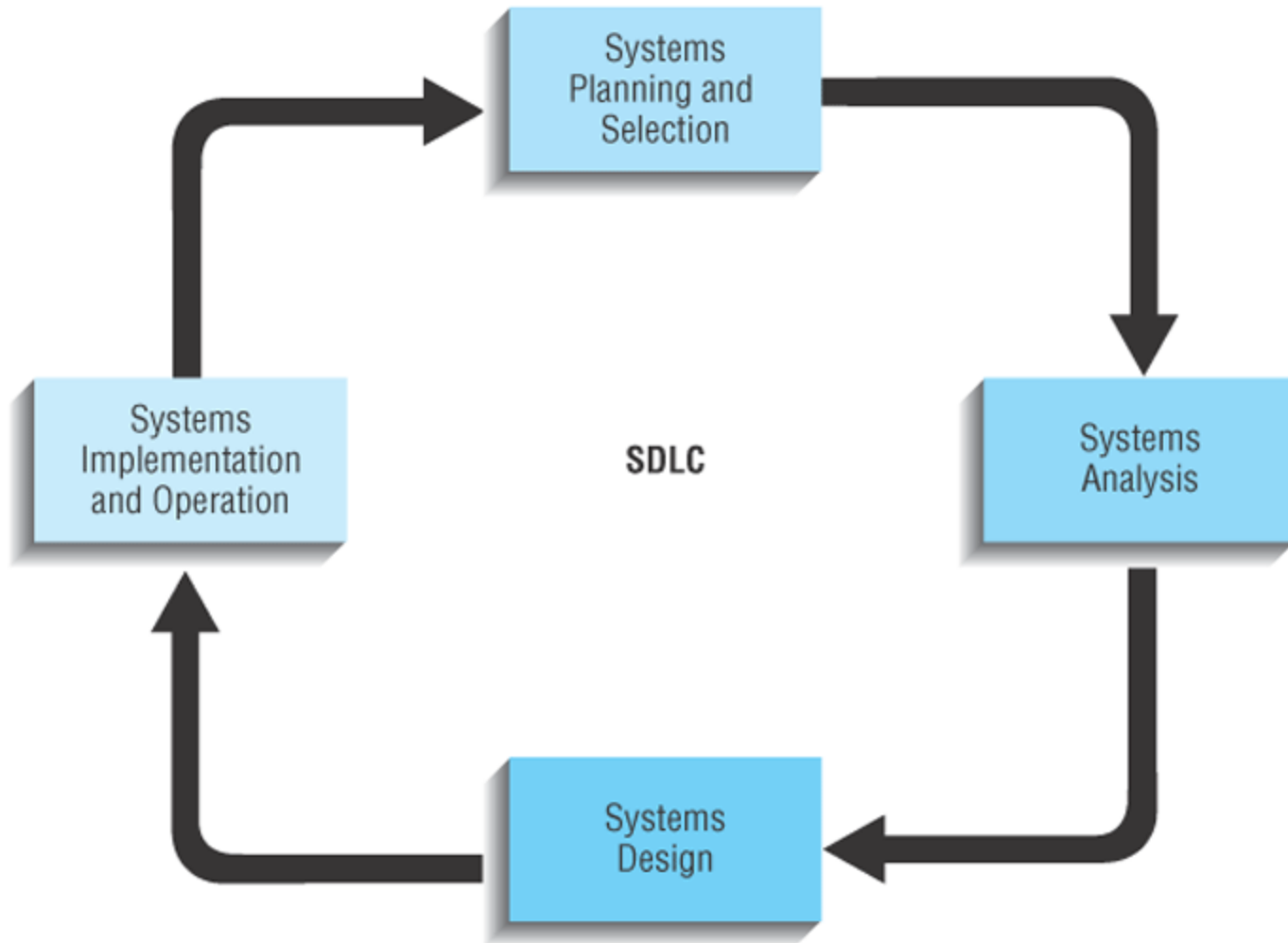


Figure 1.11 A Systems Development Life Cycle



SYSTEMS PLANNING AND SELECTION

- Analyze and arrange organization's information needs, identify and describe potential project, determine system scope, and provide a business case for continuing with the project
- Feasibility analysis: determine economic and organizational impact of the system

SYSTEMS ANALYSIS

- Thorough study of organization's current system and processes, determination of system requirements, structuring requirements, generate alternative design strategies.
- Use of UML for system modeling
- Goal: describe *what* needs to be done

SYSTEMS DESIGN

- Translating alternative solution generated by analysis phase into detailed logical and physical system specifications.
 - **Logical design:** not tied to any hardware or software platform
 - **Physical design:** specific programming languages, databases, architectures
- Goal: identify *how* the task will be accomplished

SYSTEM IMPLEMENTATION AND OPERATION

- Information system is coded, tested, and installed, and undergoes periodic corrections and enhancements
- Goal: provide a fully operational system

EVOLUTION OF SYSTEM DEVELOPMENT METHODOLOGIES

- SDLC
 - Systems Development Life Cycle
- Structured Analysis and Design
 - Use of Data Flow Diagrams
- Data-Oriented Methodology
 - Use of Entity Relation Diagrams
- Object-Oriented Methodology
 - Use of Unified Modeling Language (UML) Diagrams

Table 1.2 Key Differences Between Structured Analysis and Design and Object-Oriented Analysis and Design

Characteristics	Structured Analysis and Design	Object-Oriented Systems Analysis and Design
Methodology	SDLC	Iterative/Incremental
Focus	Processes	Objects
Risk	High	Low
Reuse	Low	High
Maturity	Mature and widespread	Emerging
Suitable for:	Well defined projects with stable user requirements	Risky large projects with changing user requirements

The current trend is to use OOSAD, but many organizations are still using structured analysis and design

INCEPTION

- Defining the scope, determining the feasibility, understanding user requirements, preparing a software development plan
- Relatively short, low resource requirements
- Focus on planning and analysis

ELABORATION

- Detailed user requirements and baseline architecture is established
- Fairly long, but not high in resource demand
- Focus on analysis and design

CONSTRUCTION

- Coding, testing, and documenting code
- Longest and most resource-intensive
- Focus is on implementation tasks

TRANSITION

- System is deployed and users are trained and supported
- Short-term, but resource-intensive
- Focus is on installation, training, and support

Figure 1.12 Phases of OOSAD-Based Development

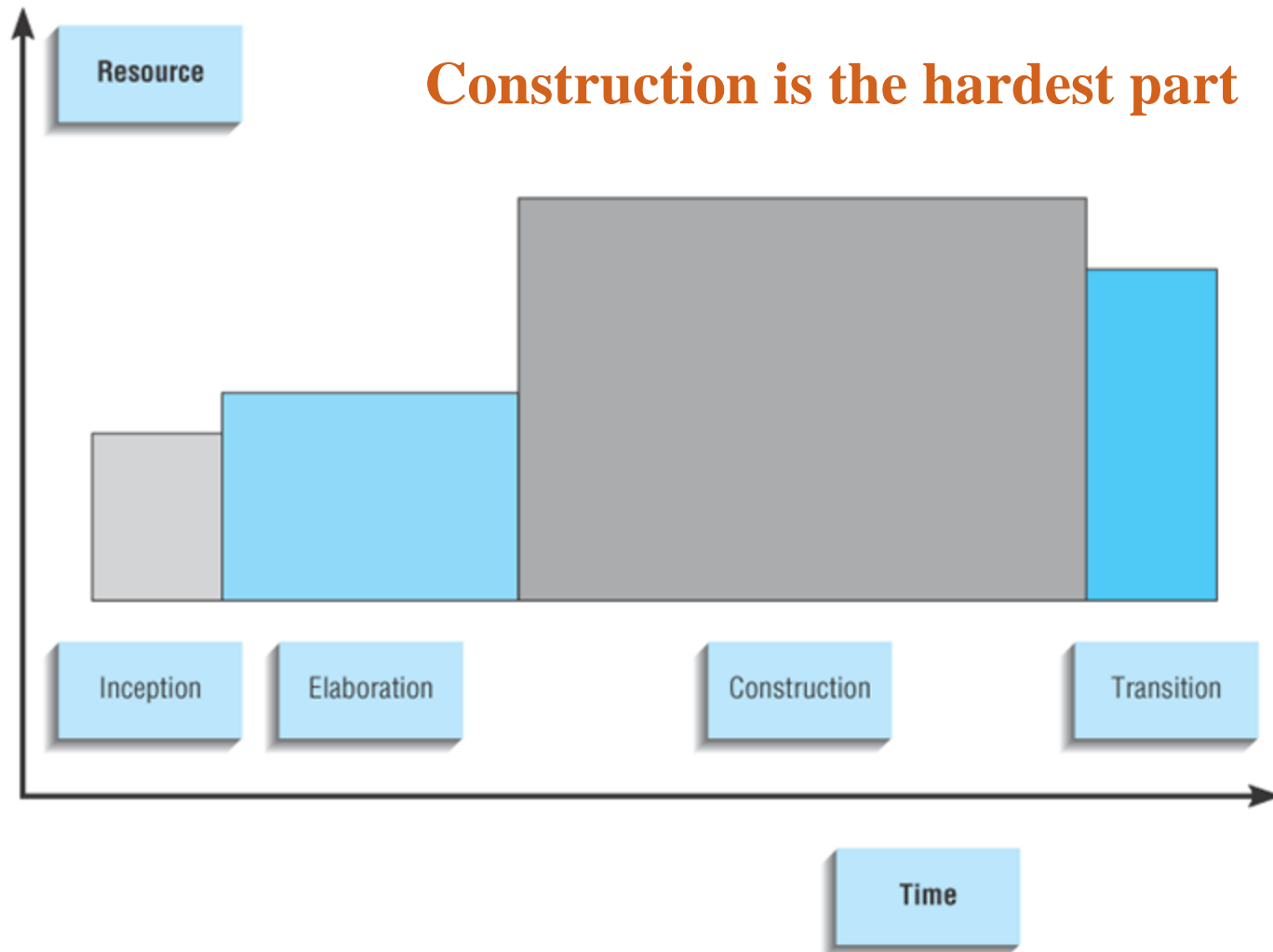
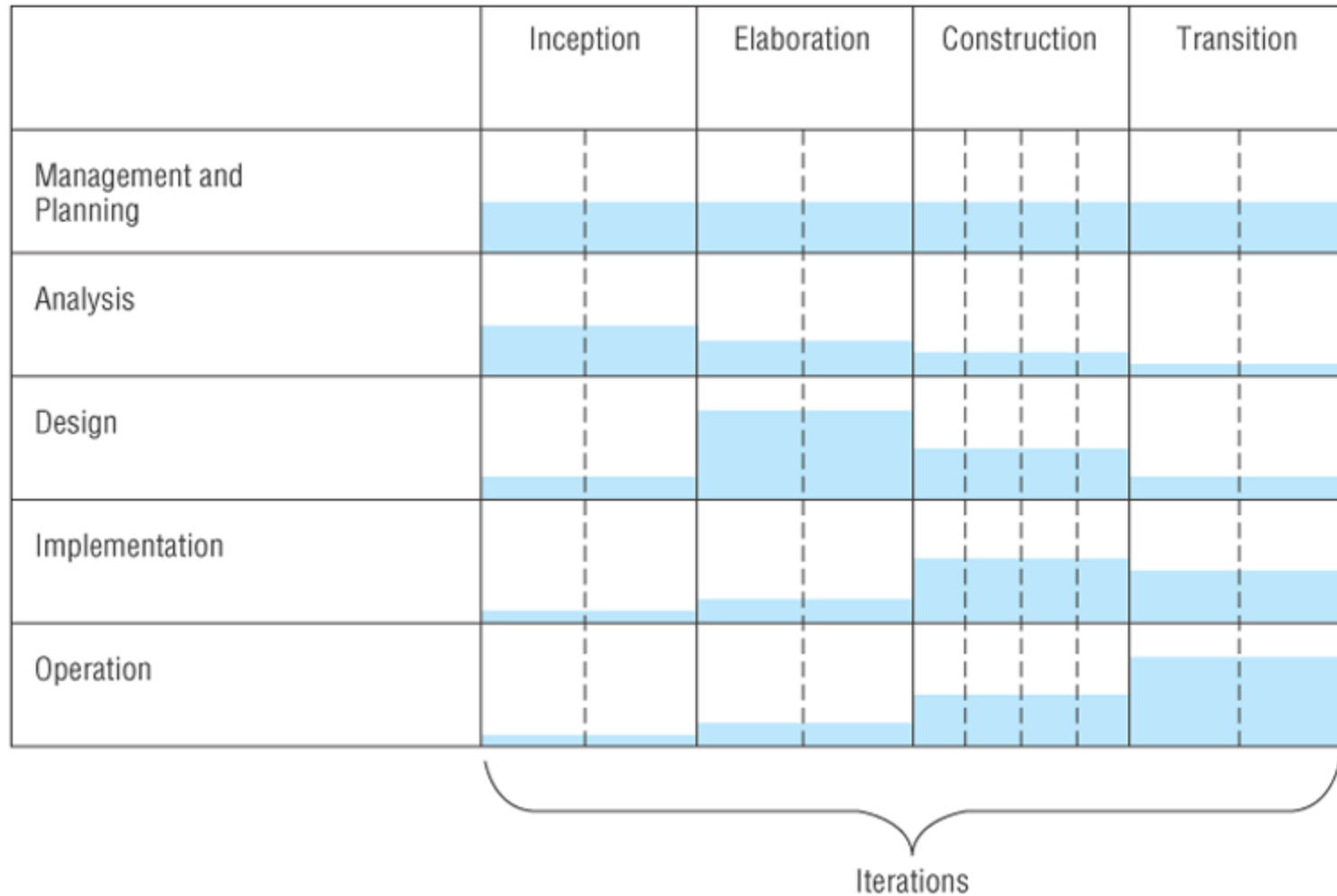


Figure 1.13 Iterative Development: Mapping of Phases to Workflows



RECAP

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