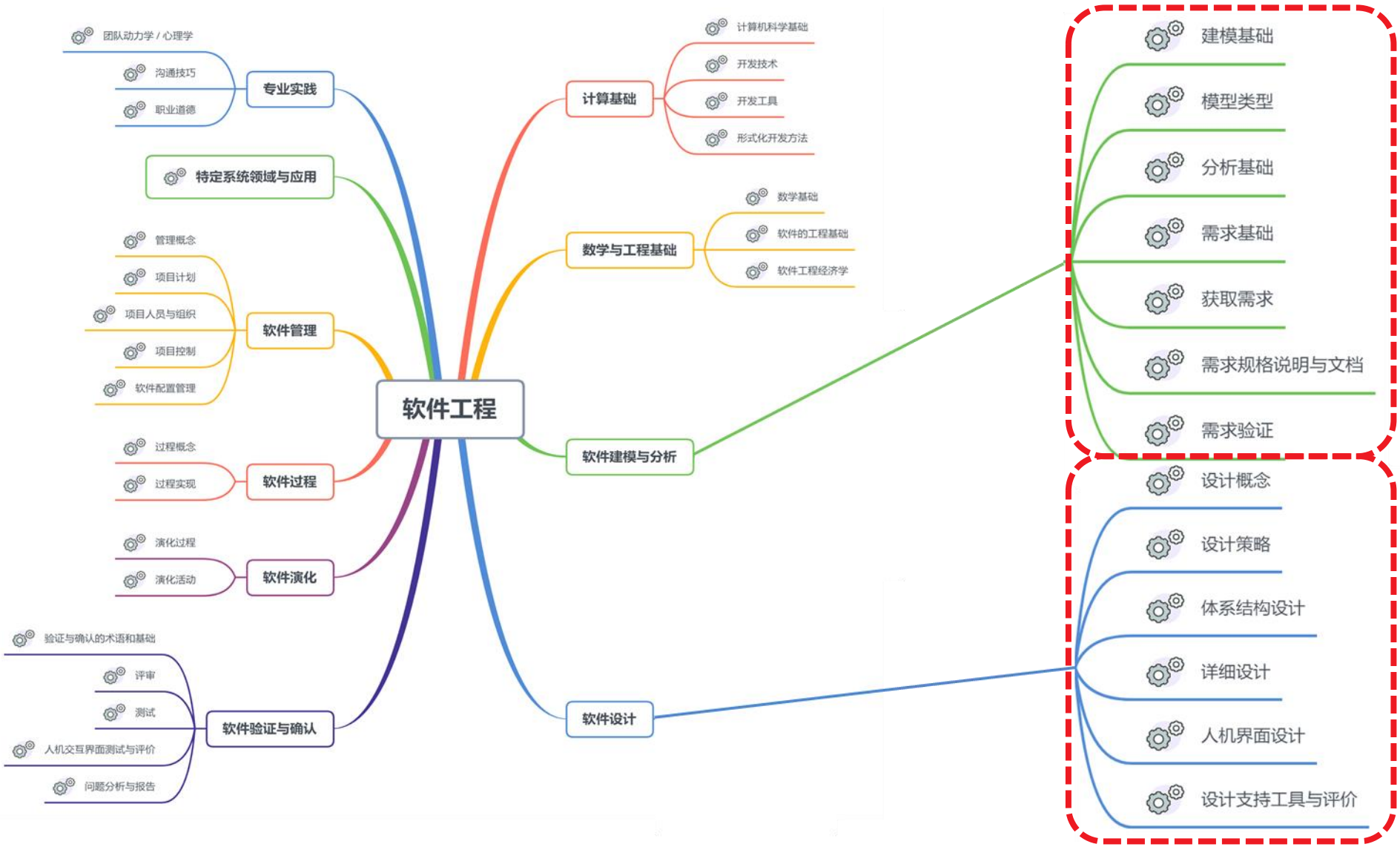
西安电子科技大学
XIDIAN UNIVERSITY

SYSTEMS ANALYSIS AND DESIGN

系统分析与设计

宋胜利 shlsong@xidian.edu.cn

Software development *via.* Engineering approaches



What is Systems Analysis and Design (SAD)?

- **System** is a group of interdependent items that interact regularly to perform a task.
- **Systems Analysis** is the study of a business problem domain to recommend improvements and specify the business requirements for the solution. （理解业务问题）
- **Systems Design** is the specification or construction of a technical, computer-based solution for the business requirements identified in a systems analysis. （构造技术方案）

What is Systems Analysis and Design (SAD)?

- **Systems Analysis and Design** is about **business** problem solving and computer **applications**. The methods you will learn in this book can be applied to a wide variety of problem domains, not just solving the computer.
- There no secrets for success, no perfect tools, techniques, or methods. To be sure, there are skills that can be mastered. But the complete and consistent application of those skills is still an art.

Course Arrangement

- 教材：Jeffrey L. Whitten, Lonnie D. Bentley & Kevin C. Dittman, Systems Analysis and Design Methods, McGraw-Hill Companies。
- 实验：分组（每组 12-13 人）完成实验内容。
  - 10分钟、12页幻灯片 、演示报告
  - 特定时间内按照特定方式汇报既定内容
- 课程成绩：课堂成绩10%；实验项目30%；闭卷考试60%。
- 作业或实验项目雷同者，平分应得的成绩。

Course Content

- Part One：fundamental concepts, philosophies, and trends that provide the context of systems analysis and design methods
- Part Two：**systems analysis activities and methods**
- Part Three：**systems design methods**
- Part Four：systems implementation and systems support
- Part Five：**object-oriented systems analysis and design**

Chapter Structure

- SoundStage Entertainment Club：通过一位新雇员（Bob）和他的同事（Sandra，一位有7年工作经验的系统分析员、项目经理）的一段工作情景，来引出这一章的论题。
- Content：这一章的主体。
- Where do you go from here? 学习这一章之后，根据各人的基础对下一阶段学习的建议。
- Summary：这一章的总结。
- Key Terms：在这一章引入的关键术语及其出现的位置。
- Review Questions：复习这一章的主要内容。
- Problems and Exercises：作业题。
- Problems and Research：实践题。
- Minicases：通过一些小案例来加深理解和体会。
- Suggested Readings：进行更深入的学习所需的参考资料。

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01

系统分析与设计

（System Analysis and Design）

Players in the Systems Game

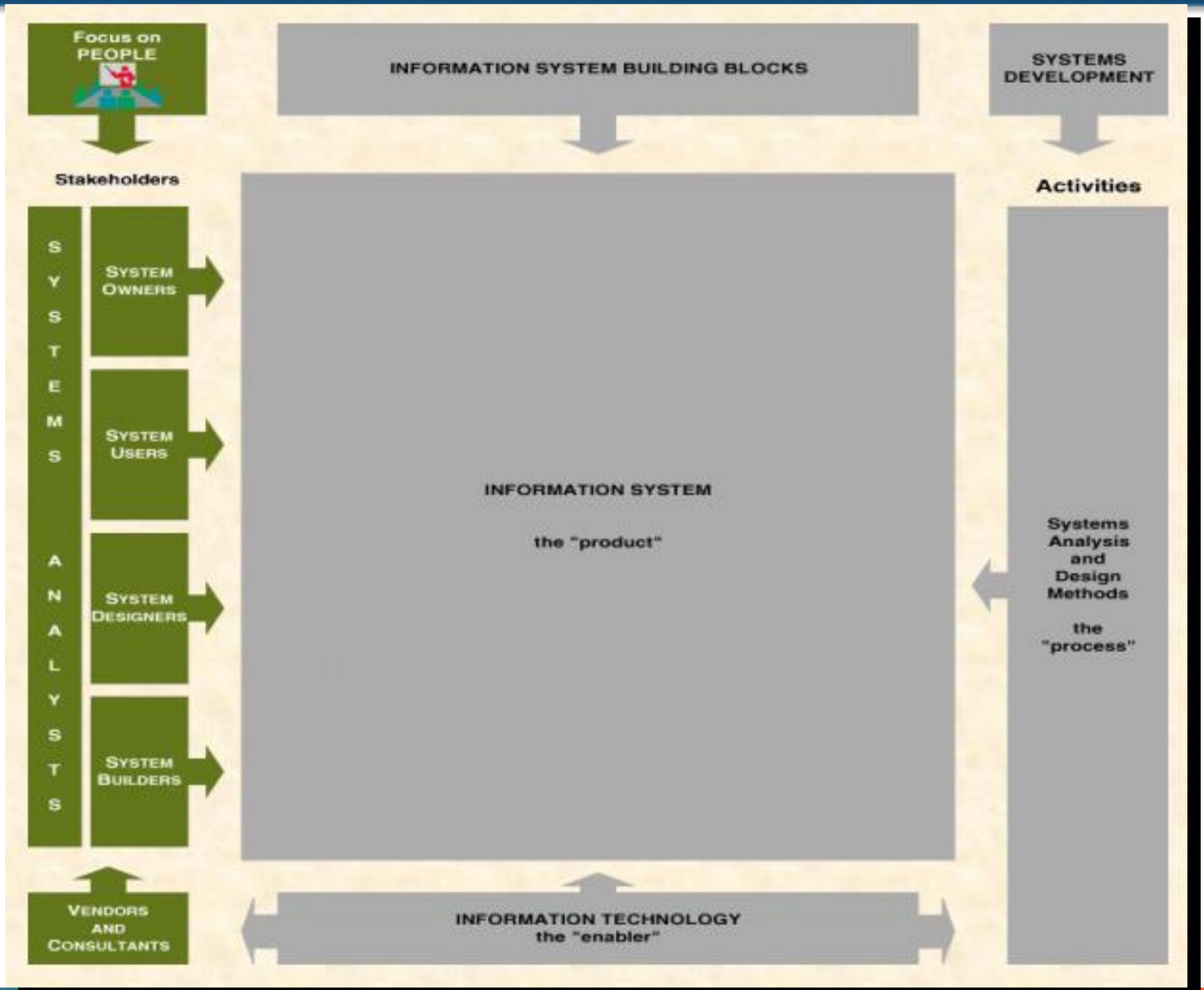
Story of the Chapter

- 基本内容
  - Bob上班的第一天。公司的 CIO 向他介绍了公司的背景、业务范围与性质、组织结构以及公司信息系统的现状和发展目标。
- 基本术语
  - CIO、TQC、Contract Programmers、FAST
- Systems analysis and design is more than concepts, tools, techniques and methods. It is about people working with people.
- Although experience is the best teacher, you can learn a great deal by observing other systems analysts in action.

Content Structure

- **Why Study Systems Analysis and Design Methods?**
  - 信息系统与信息技术的概念；参与系统运动的各种角色。
- **Information Workers**
  - 各种角色的地位和作用。
- **The Modern Systems Analyst**
  - 系统分析员的职责；问题求解的一般模式。
- Modern Business Trends and Implications
- Preparing for a Career as a Systems Analyst
- The Next Generation

Chapter Map


Focus on PEOPLE
INFORMATION SYSTEM BUILDING BLOCKS
SYSTEMS DEVELOPMENT
Stakeholders
Activities
SYSTEMS ANALYSTS
SYSTEM OWNERS
SYSTEM USERS
SYSTEM DESIGNERS
SYSTEM BUILDERS
INFORMATION SYSTEM
the "product"
Systems Analysis and Design Methods
the "process"
VENDORS AND CONSULTANTS
INFORMATION TECHNOLOGY
the "enabler"

Why Study Systems Analysis and Design Methods?

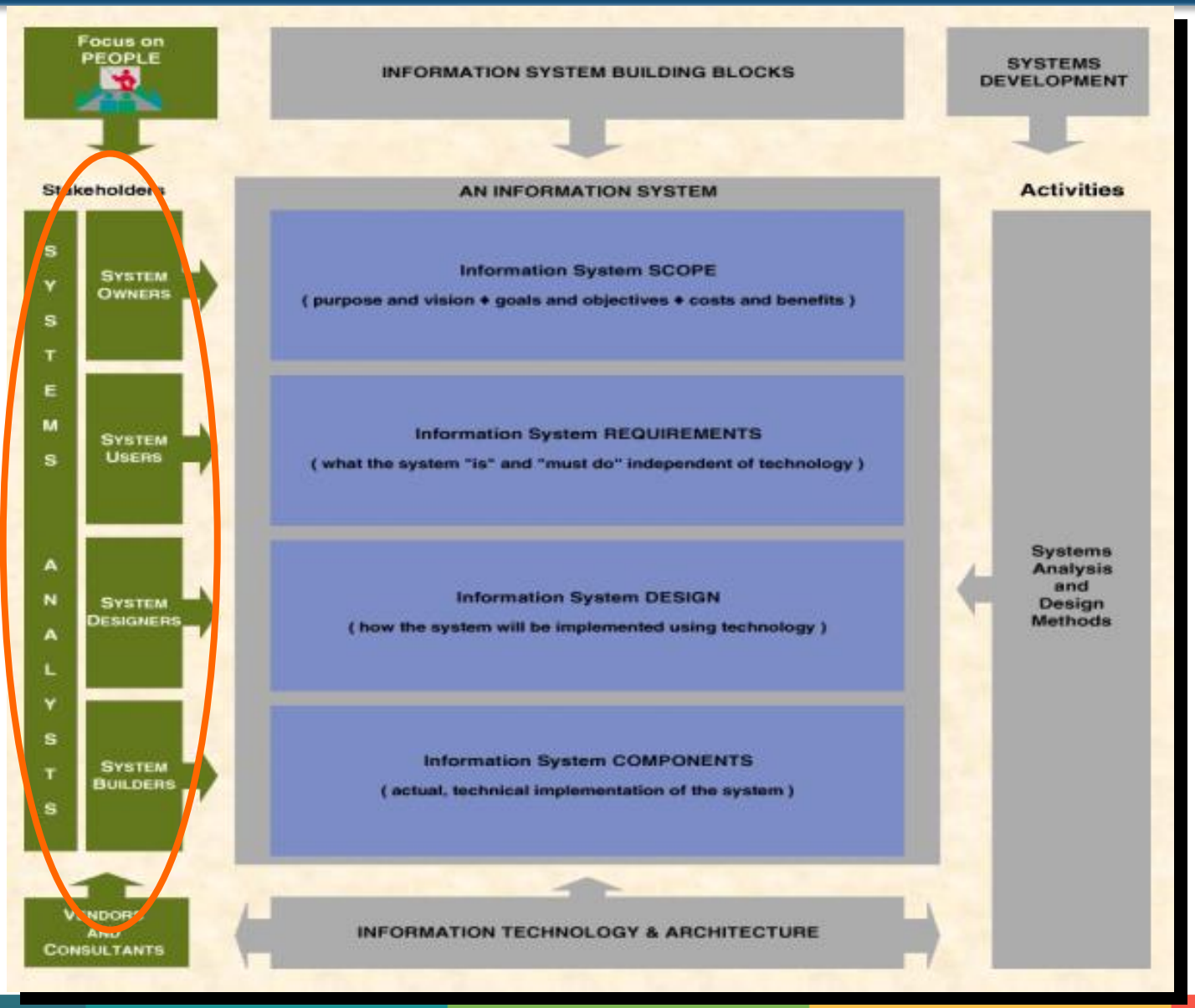
Information Systems & Technology

- An **Information System** is an arrangement of people, data, processes, information presentation, and information technology that interact to support and improve day-to-day operations in a business, as well as support the problem-solving and decision-making needs of management and users.
- **Information Technology** is a contemporary term that describes the combination of computer technology (hardware and software) with telecommunications technology (data, image, and voice networks).

Stakeholders: Players in the Systems Game

- A **Stakeholder 利益相关者/干系人** is any person who has an interest in an existing or new information system. Stakeholders can be technical or nontechnical workers.
- For information systems, the stakeholders can be classified as:
  - System owners（系统业主）
  - System users（系统用户）
  - Systems analysts（系统分析师）
  - System designers（系统设计师）
  - System builders（系统构建人员）
  - IT vendors and consultants（信息技术供应商和顾问）

Stakeholders: Players in the Systems Game

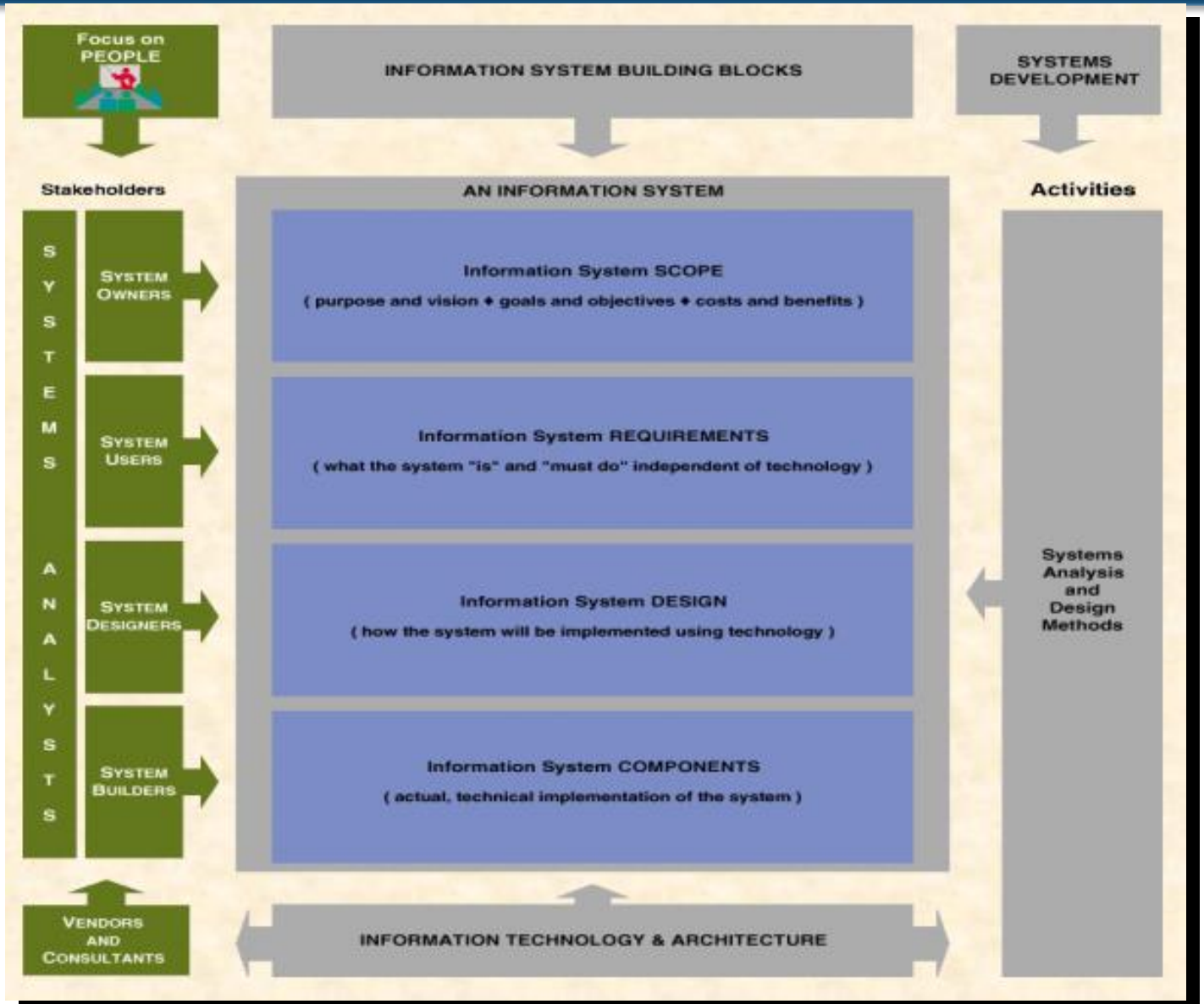


Information Workers

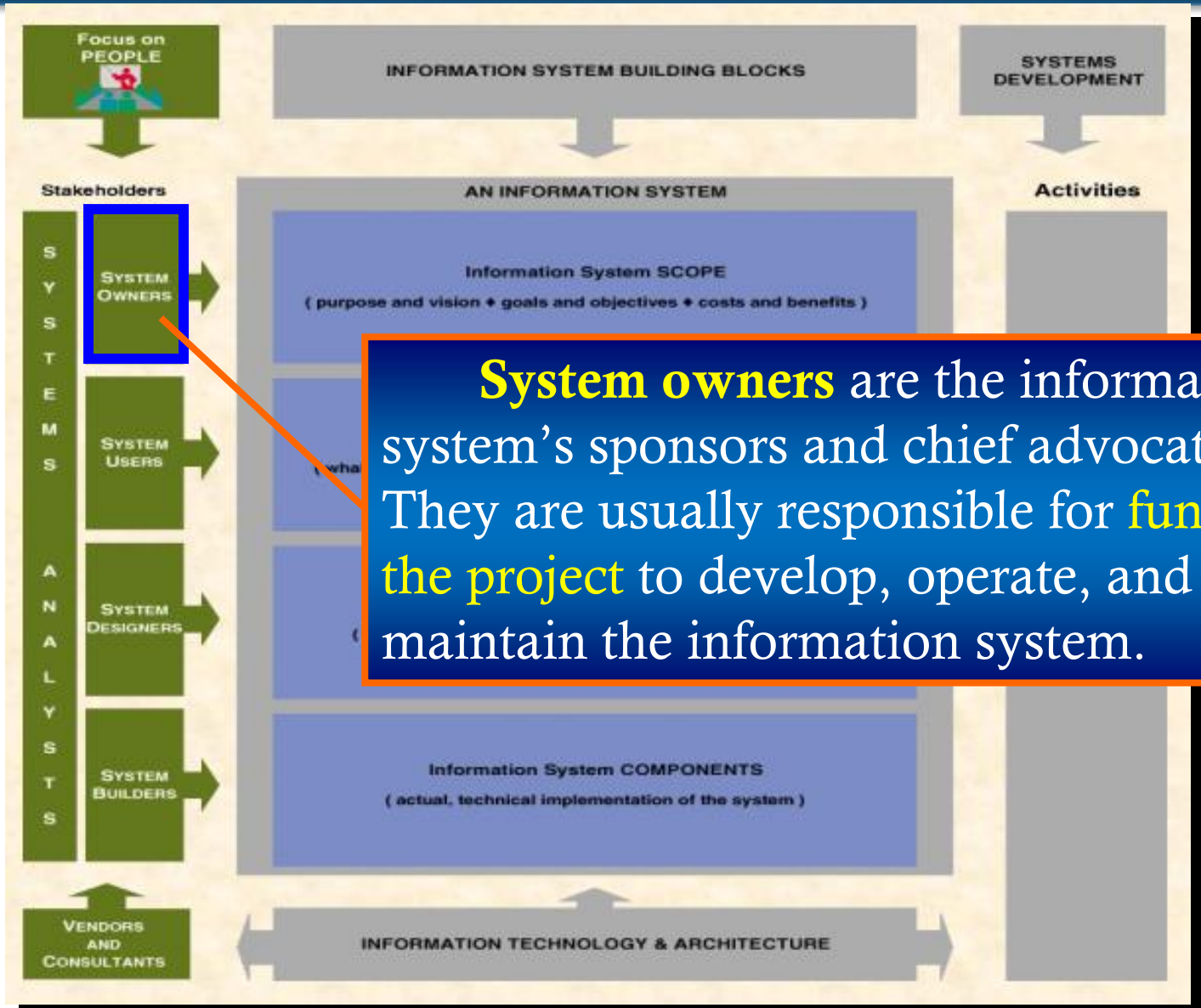
Information Workers vs. Knowledge Workers

- **Information workers** are those workers whose jobs involve the creation, collection, processing, distribution, and use of information. Information workers are stakeholders in information systems.
- **Knowledge workers** are a subset of information workers whose responsibilities are based on a specialized body of knowledge.

System Owners

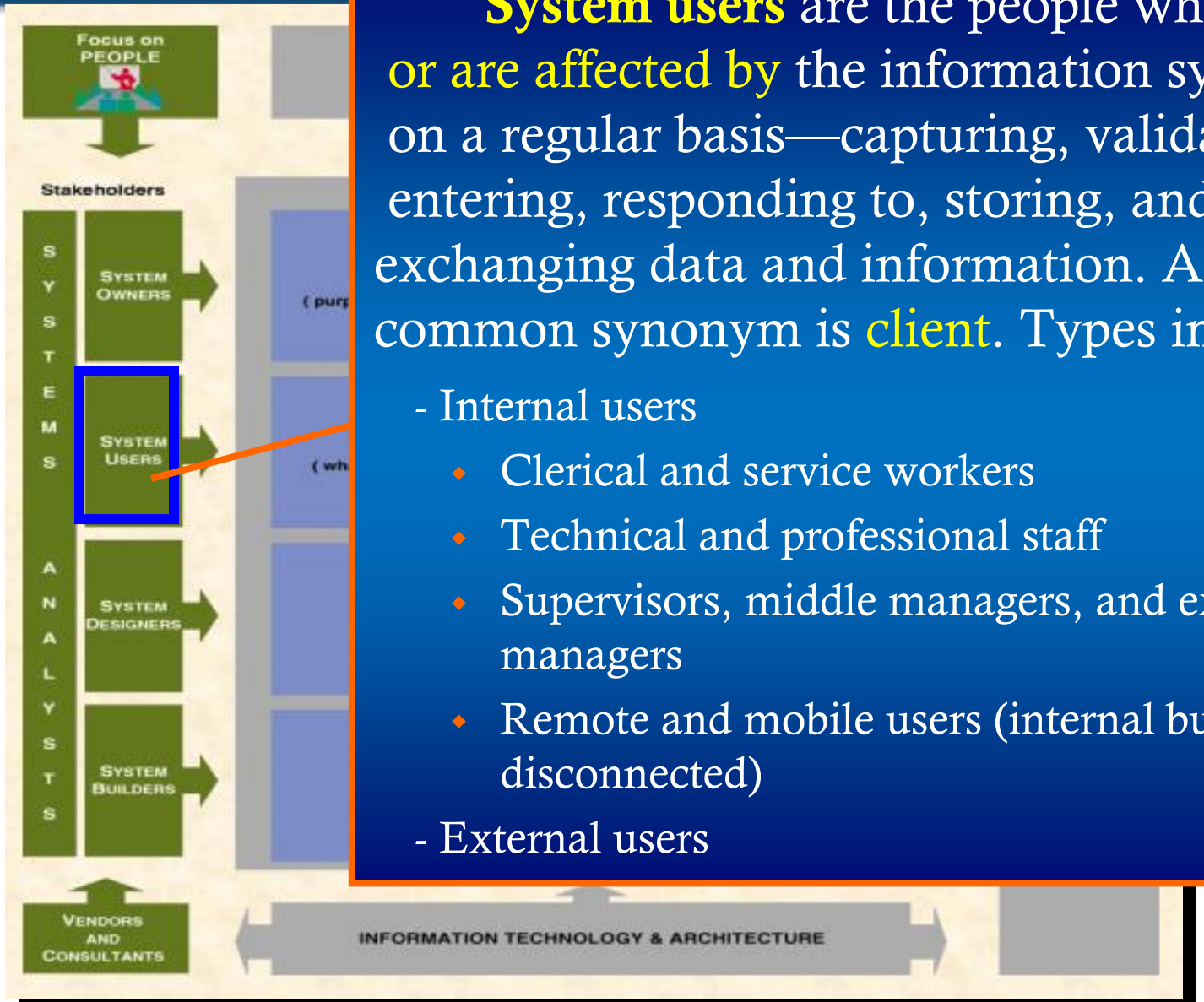


System Owners



System owners are the information system's sponsors and chief advocates. They are usually responsible for funding the project to develop, operate, and maintain the information system.

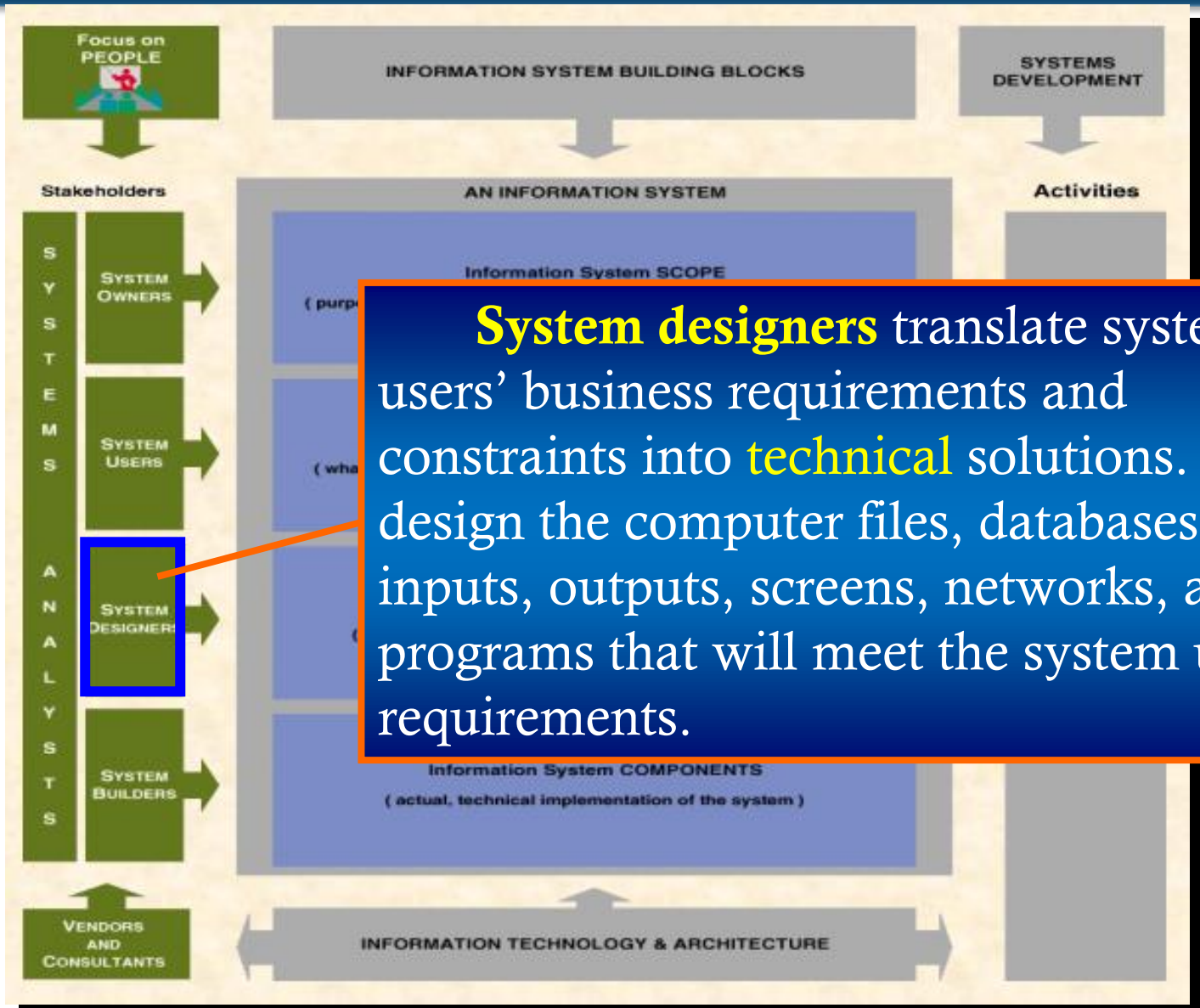
System Users



System users are the people who use or are affected by the information system on a regular basis—capturing, validating, entering, responding to, storing, and exchanging data and information. A common synonym is client. Types include:

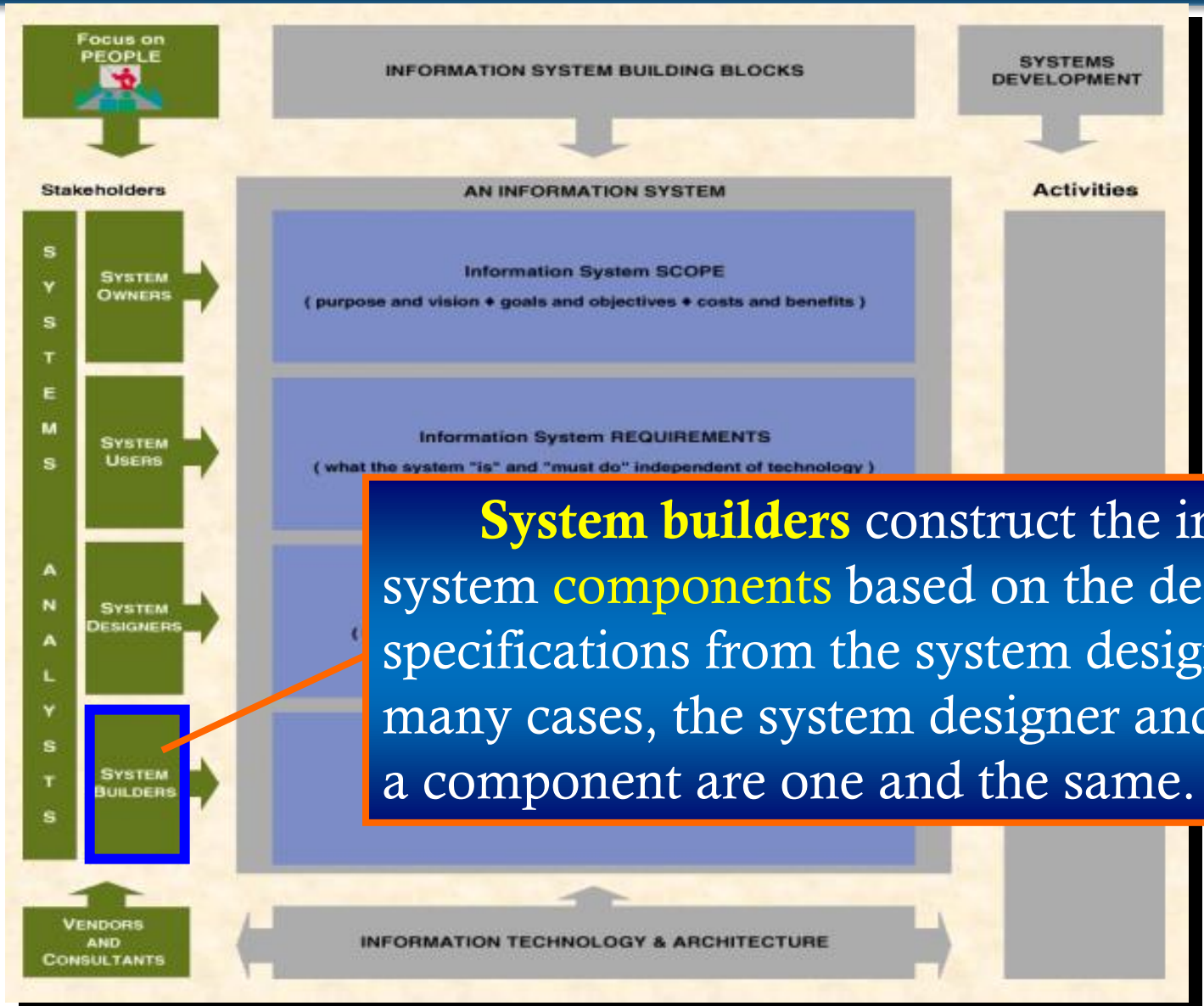
- Internal users
  - Clerical and service workers
  - Technical and professional staff
  - Supervisors, middle managers, and executive managers
  - Remote and mobile users (internal but disconnected)
- External users

System Designers



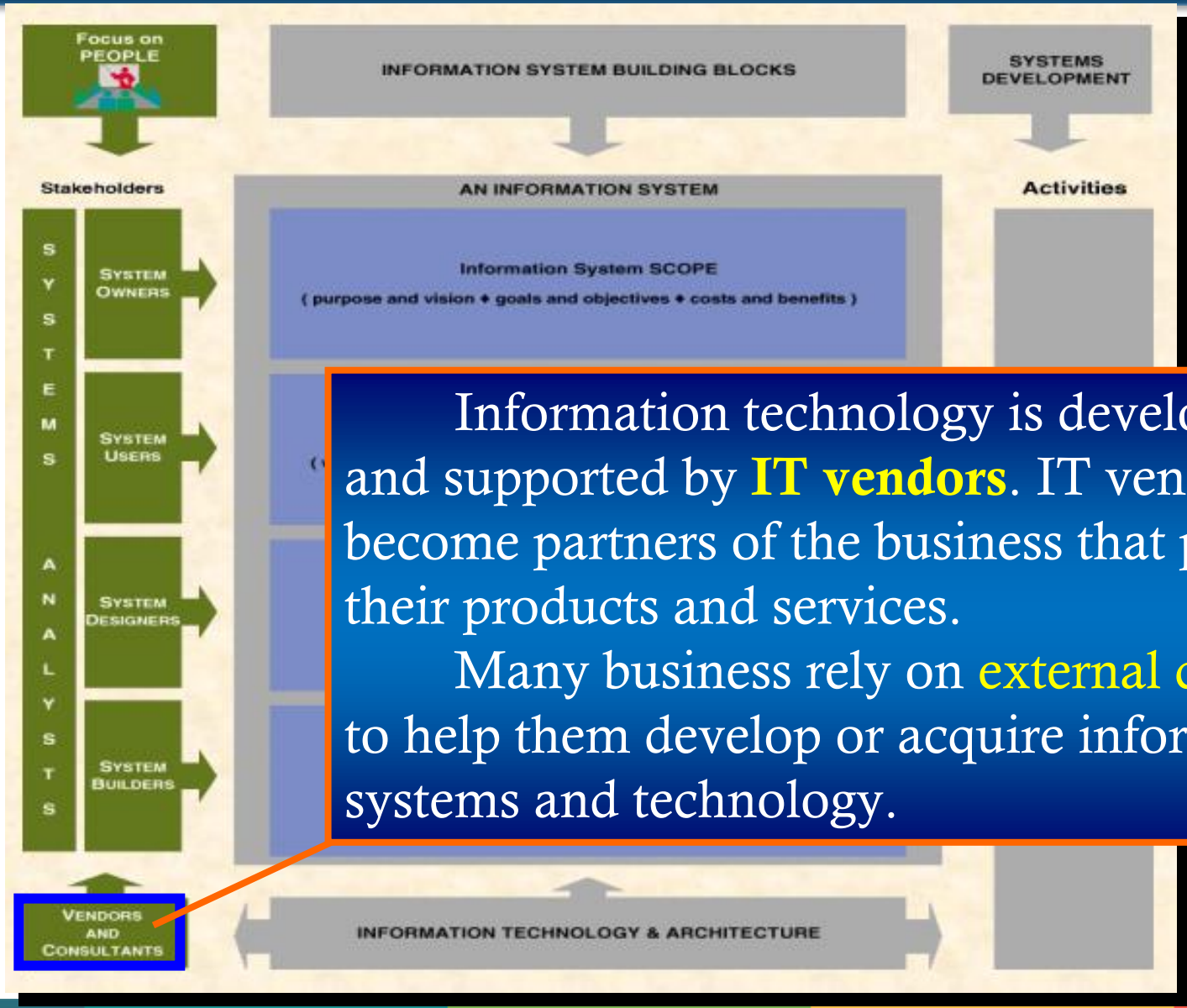
System designers translate system users' business requirements and constraints into technical solutions. They design the computer files, databases, inputs, outputs, screens, networks, and programs that will meet the system users' requirements.

System Builders



System builders construct the information system components based on the design specifications from the system designers. In many cases, the system designer and builder for a component are one and the same.

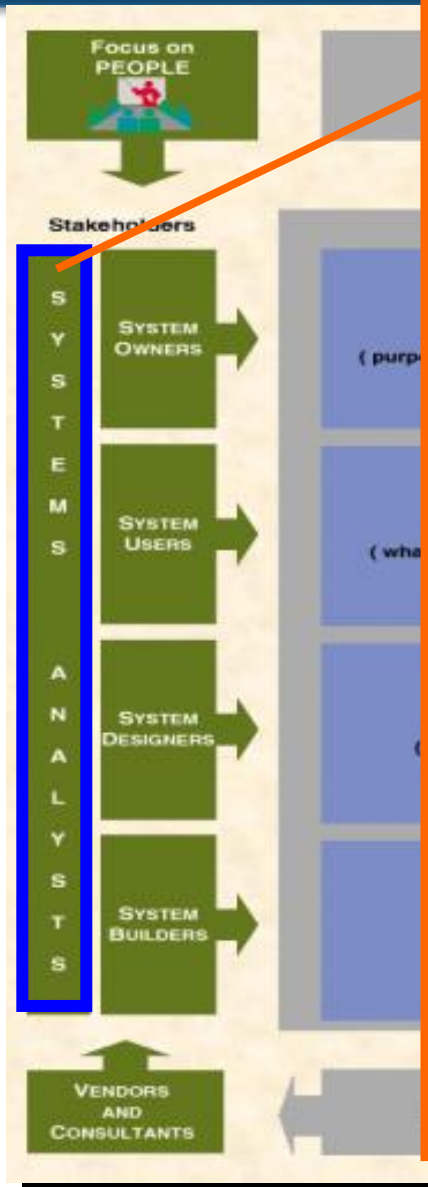
IT Vendors and Consultants



Information technology is developed, sold, and supported by **IT vendors**. IT vendors have become partners of the business that purchase their products and services.

Many business rely on external consultants to help them develop or acquire information systems and technology.

System Analysts



A **systems analyst** studies the problems and needs of an organization to determine how people, data, processes, communications, and information technology can best accomplish improvements for the business. When information technology is used, the analyst is responsible for:

- The efficient capture of data from its business source,
- The flow of that data to the computer,
- The processing and storage of that data by the computer, and
- The flow of useful and timely information back to the business and its people.

The Modern Systems Analyst

Why does Business need Systems Analysts?

- A **communication gap** has always existed between those who need computer-based **business** and those who understand **information technology**.
- The systems analyst bridges the gap.

Variations on the Systems Analysts Title

- A business analyst is an analyst that specializes in business problem analysis and technology-independent requirements analysis.
- A programmer/analyst (or analyst/programmer) includes the responsibilities of both computer programmer and systems analyst.
- Other synonyms for systems analyst include:
  - Systems consultant（系统顾问）
  - Systems architect（系统架构师）
  - Systems engineer（系统工程师）
  - Information engineer（信息工程师）
  - Systems integrator（系统集成人员）

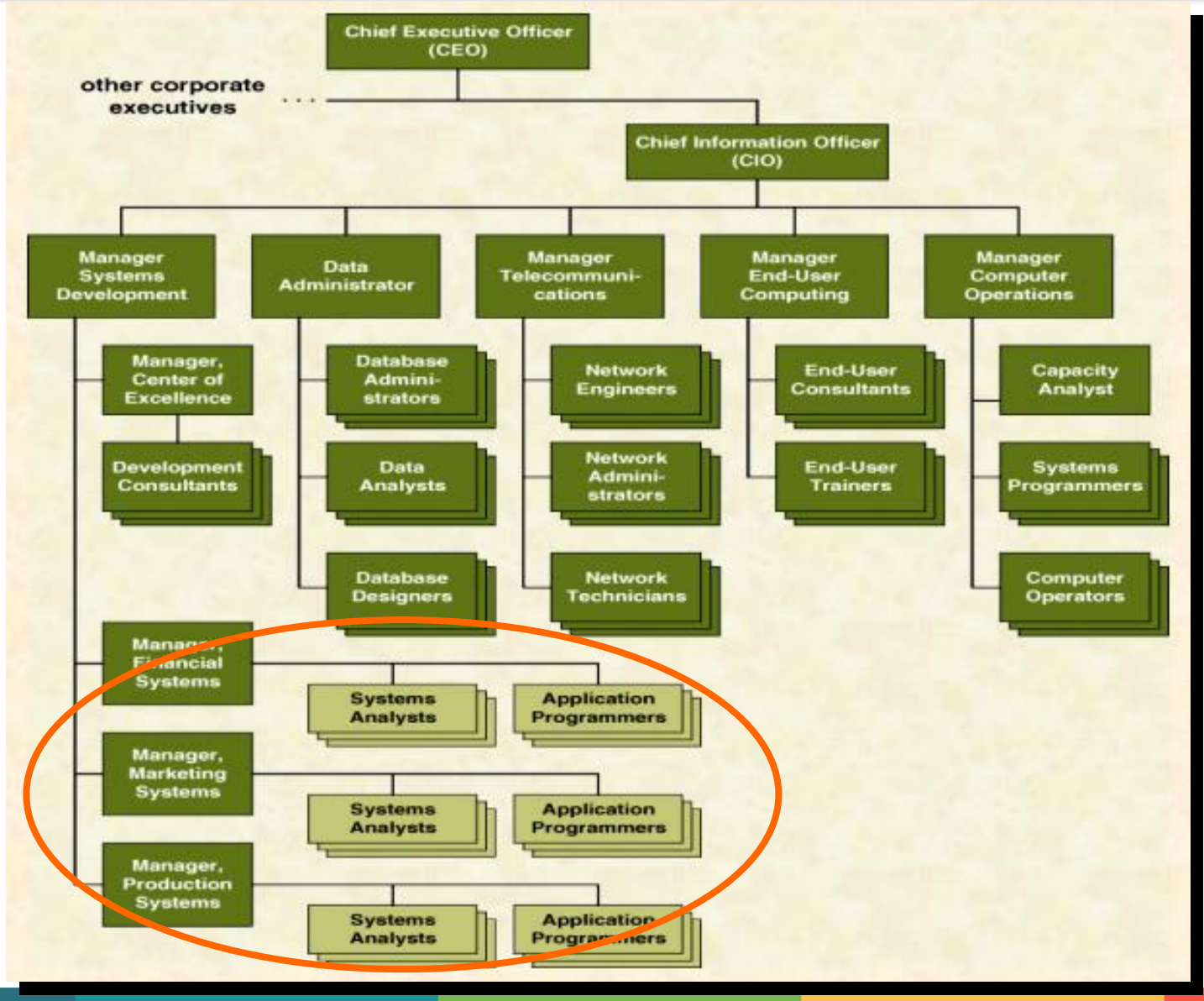
What does a Systems Analysts do?

- The business analyst is basically a problem solver.
- Problem-Solving Scenarios. The term **problem** will be used to describe many situations including:
  - **True problem** situations, either real or anticipated, that require corrective action. (必须解决的实际问题)
  - **Opportunities** to improve a situation despite the absence of complaints. (提升系统质量的机会)
  - **Directives** to change a situation regardless of whether anyone has complained about the current situation. (外部环境变化)

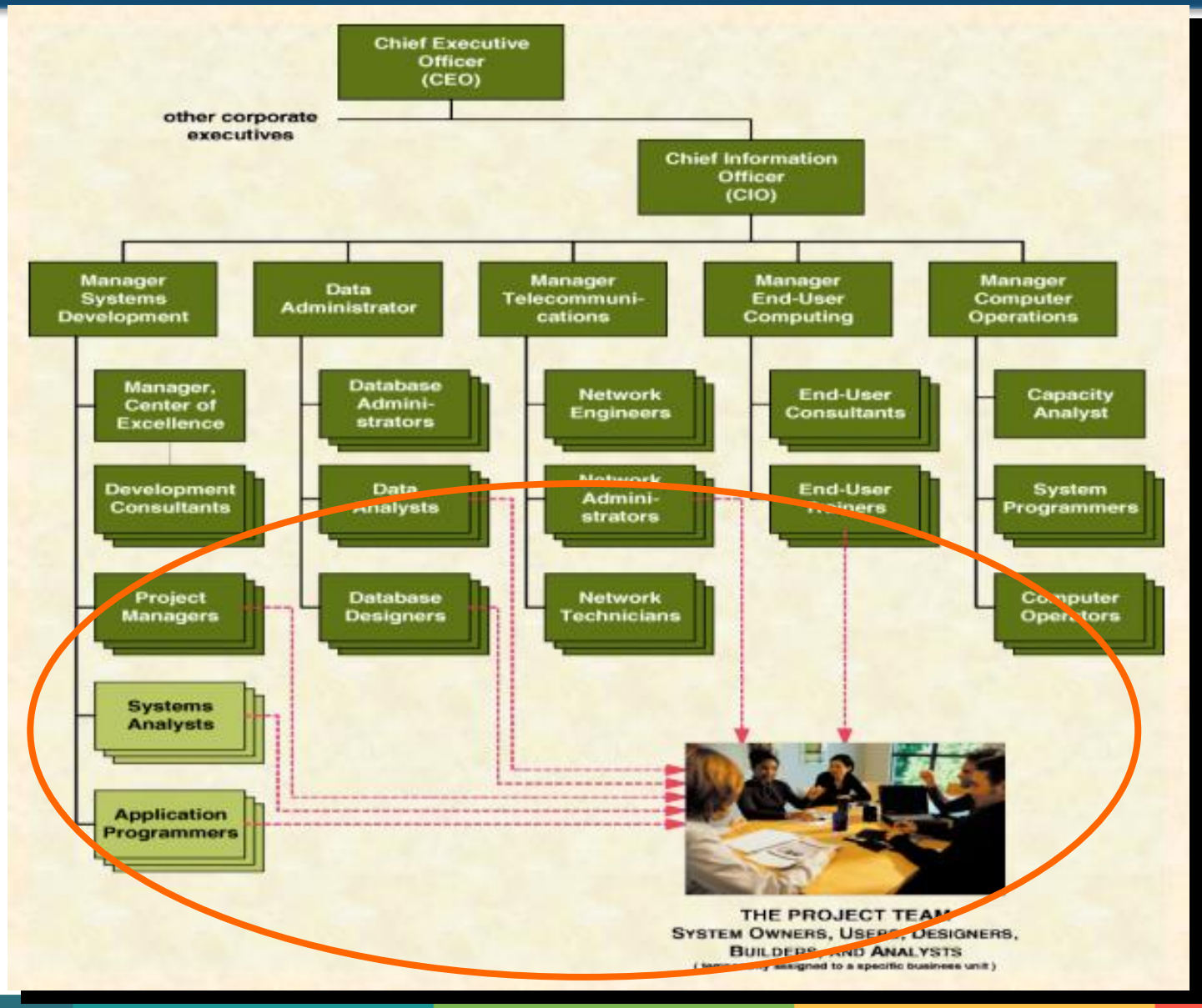
General Problem-Solving Approach

- 1. Identify the problem.
- 2. Analyze and understand the problem.
- 3. Identify solution requirements or expectations.
- 4. Identify alternative solutions and decide a course of action.
- 5. Design and implement the “best” solution.
- 6. Evaluate the results. If the problem is not solved, return to step 1 or 2 as appropriate.

Traditional IS Services Organization



Contemporary IS Services Organization



Preparing
for a Career as a Systems Analyst

Skills Required by Systems Analysts

- Working knowledge of information technology
- Computer programming experience and expertise
- General business knowledge
- Problem-solving skills
- Interpersonal communication skills
- Interpersonal relations skills
- Flexibility and adaptability
- Character and ethics
- Systems analysis and design skills

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Current Information Technologies

- Automatic data capture
- Client/server architecture
- Component programming languages
- Electronic commerce
- ERP
- GUI
- Internet, Intranet, and extranet
- Object programming languages
- Rapid application development
- Relational DBMS
- Sales force automation
- Telecommunications and networking

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Business Literacy Subjects

- Accounting
- Business Law and ethics
- Economics
- Manufacturing
- Marketing
- Operations management
- Organizational behavior

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- Computer programming expe
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- Problem-solving skills
- Interpersonal communication skills
- Interpersonal relations skills
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Interpersonal Comm. Subjects

- Business speaking
- Business writing
- Interviewing
- Listening
- Persuasion
- Technical discussion
- Technical writing

Skills Required by Systems Analysts

- Working knowled
- Computer progra
- General business
- Problem-solving s
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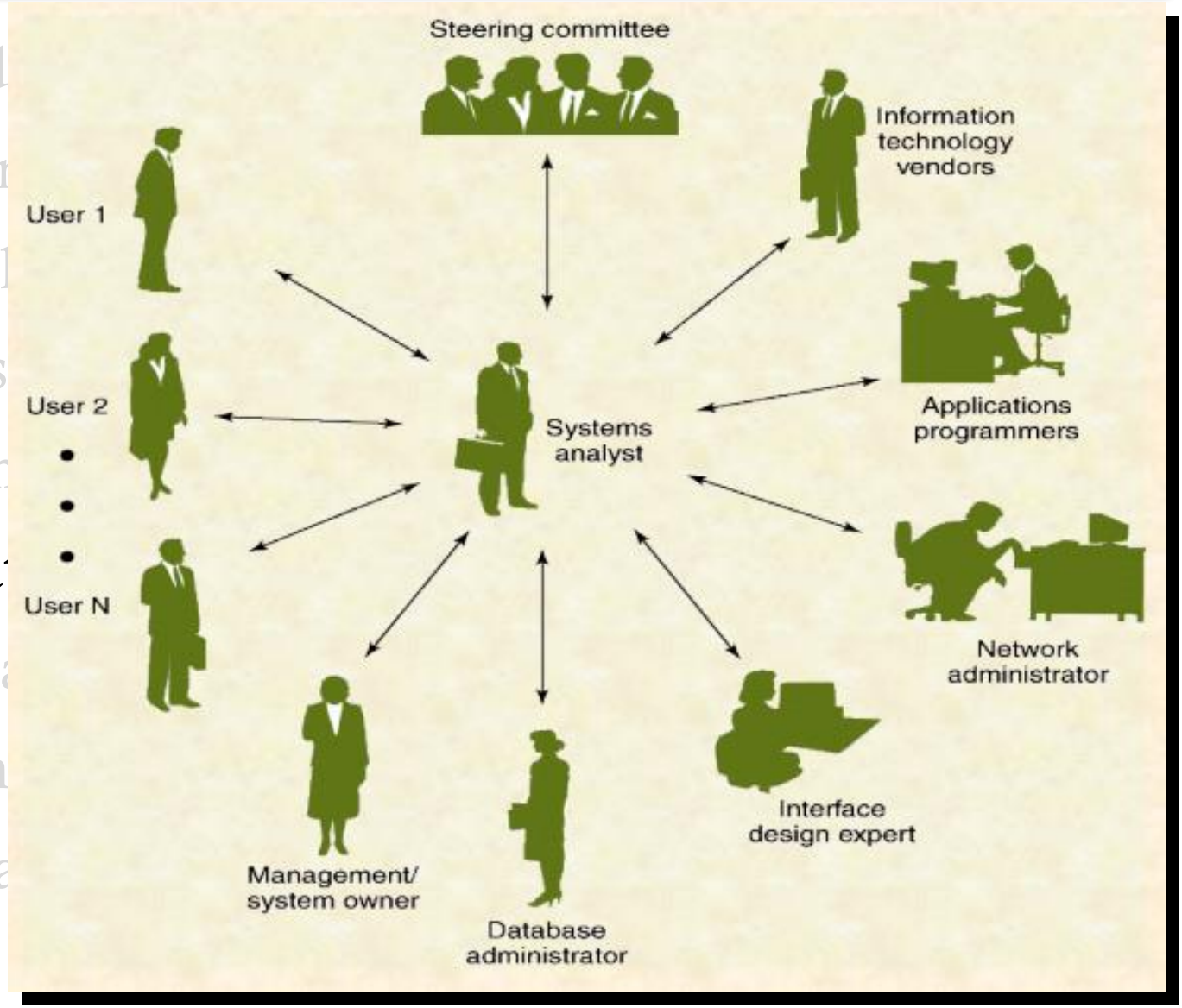

Skills Required by Systems Analysts

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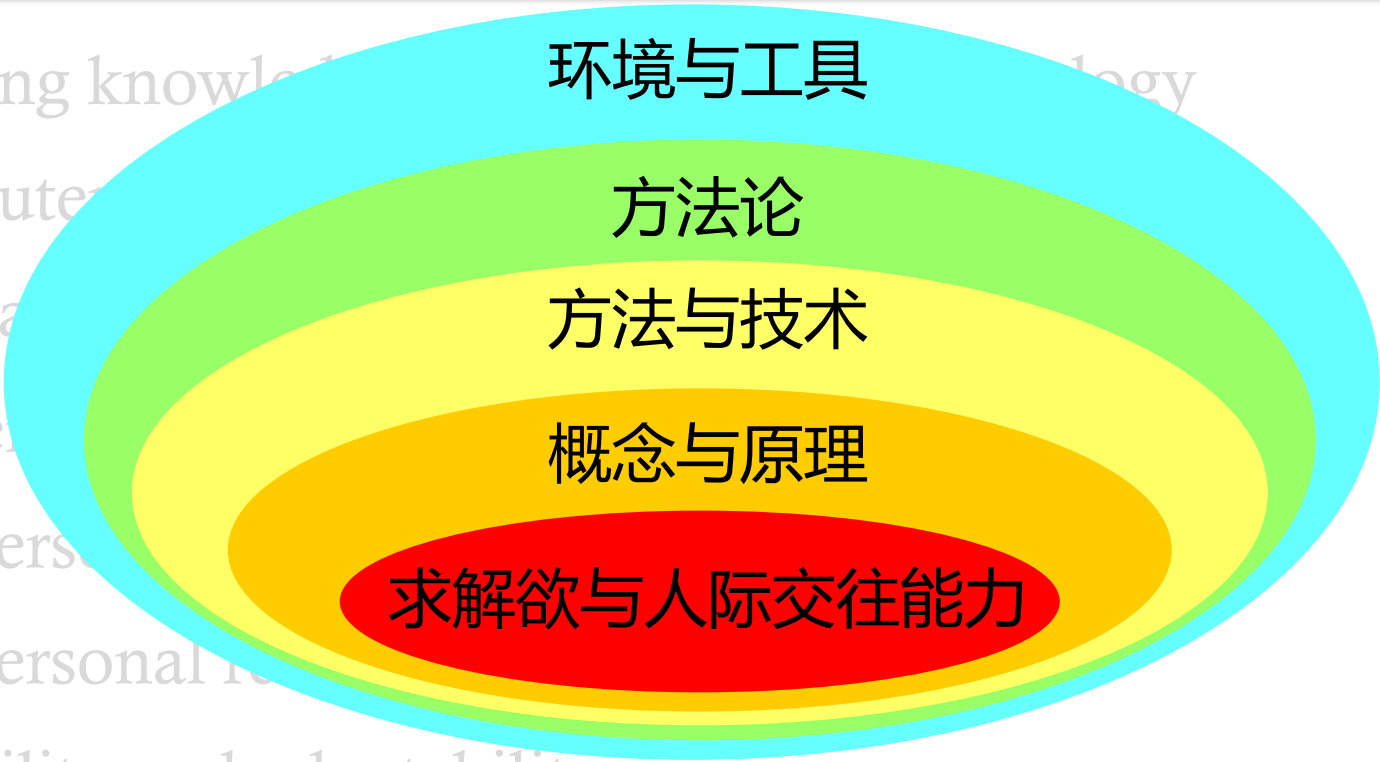
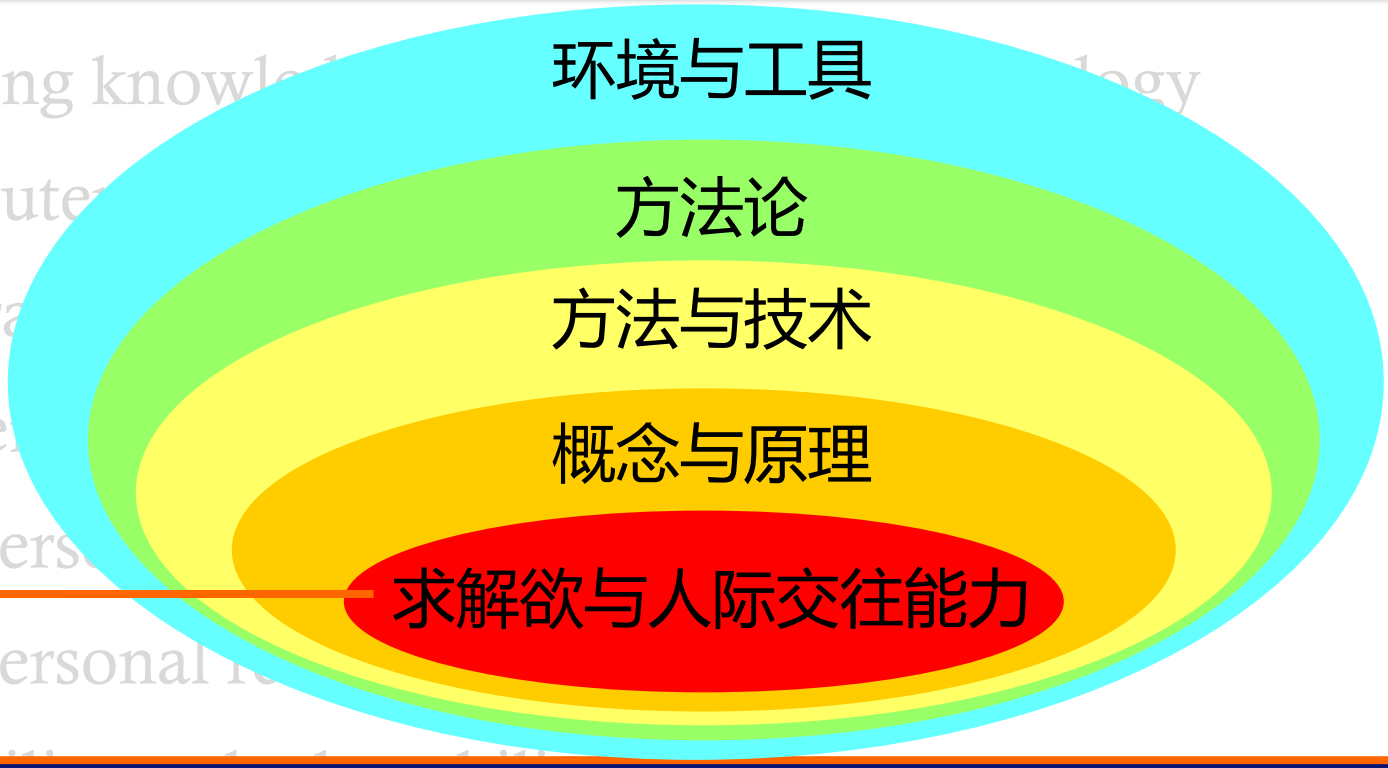


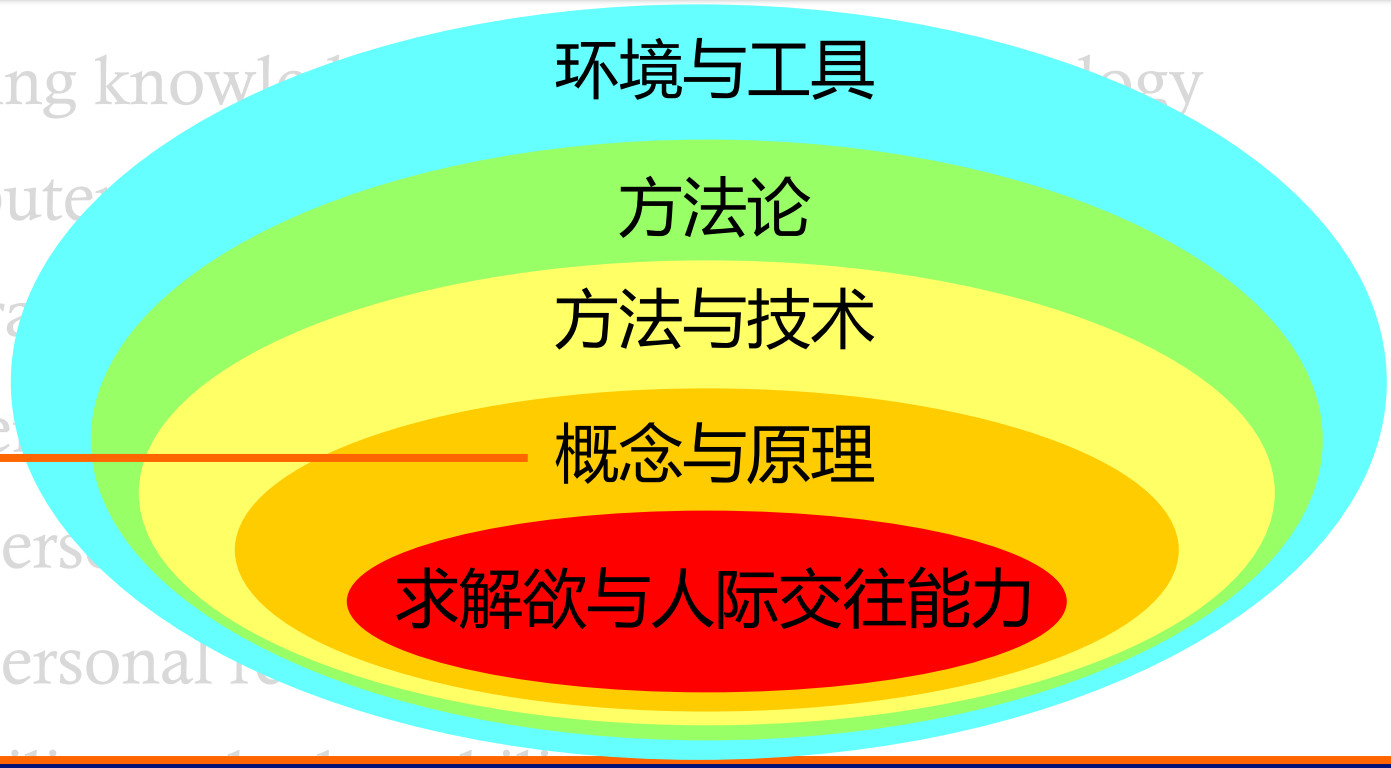
Skills Required by Systems Analysts



要有解决实际应用问题的欲望，乐于、善于与不同的人交往。

- Systems analysis and design skills

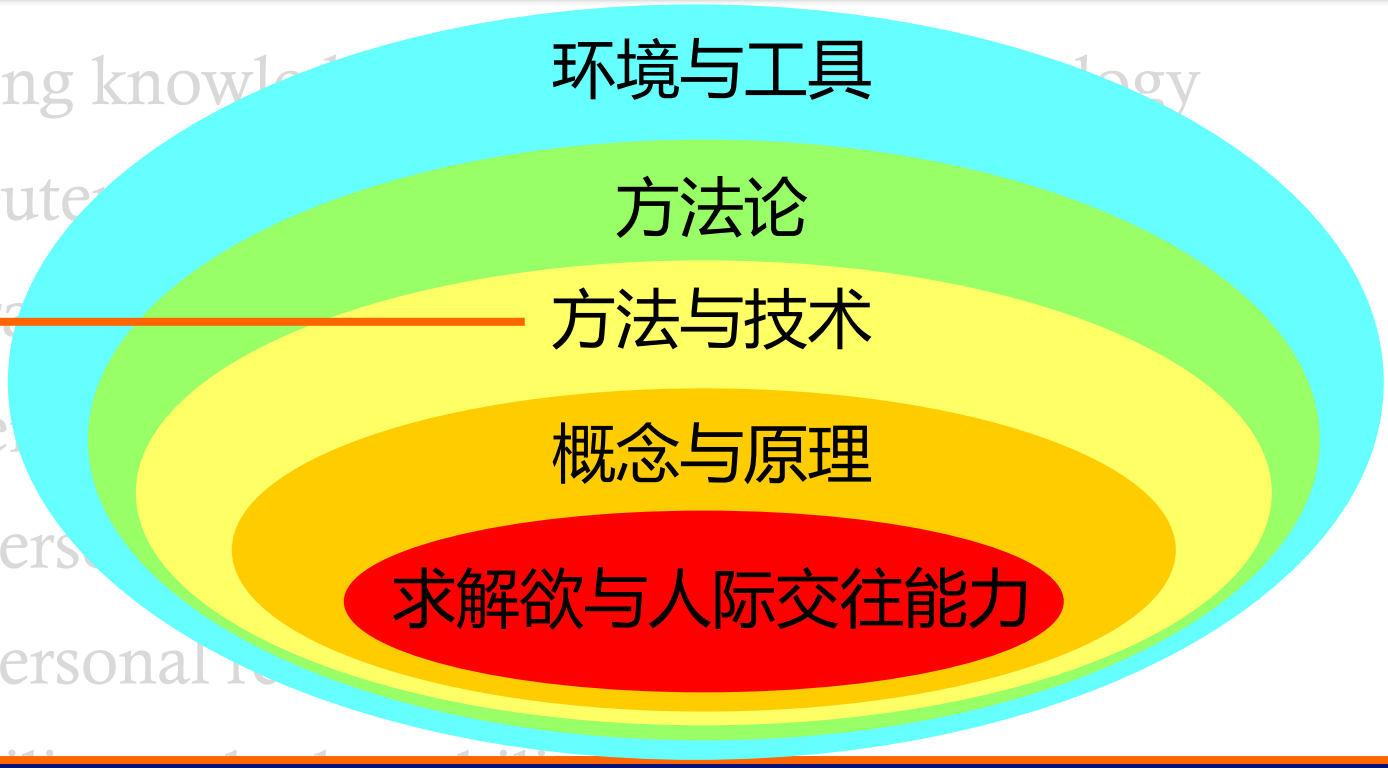
Skills Required by Systems Analysts



掌握系统分析与设计的基本概念和原理，理解系统分析与设计的内涵。

- Systems analysis and design skills

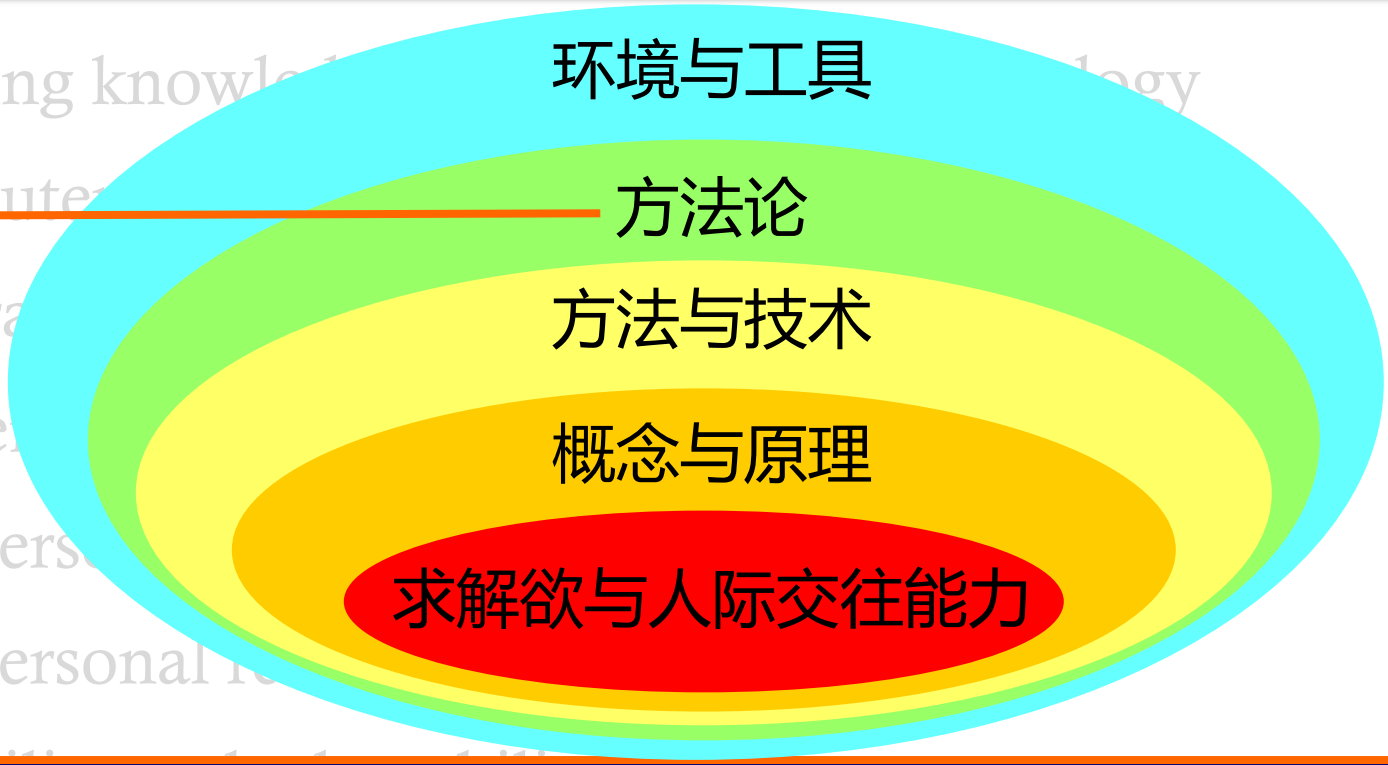
Skills Required by Systems Analysts



掌握系统分析与设计的方法和技术，支撑对于基本概念与原理的认识。

- Systems analysis and design skills

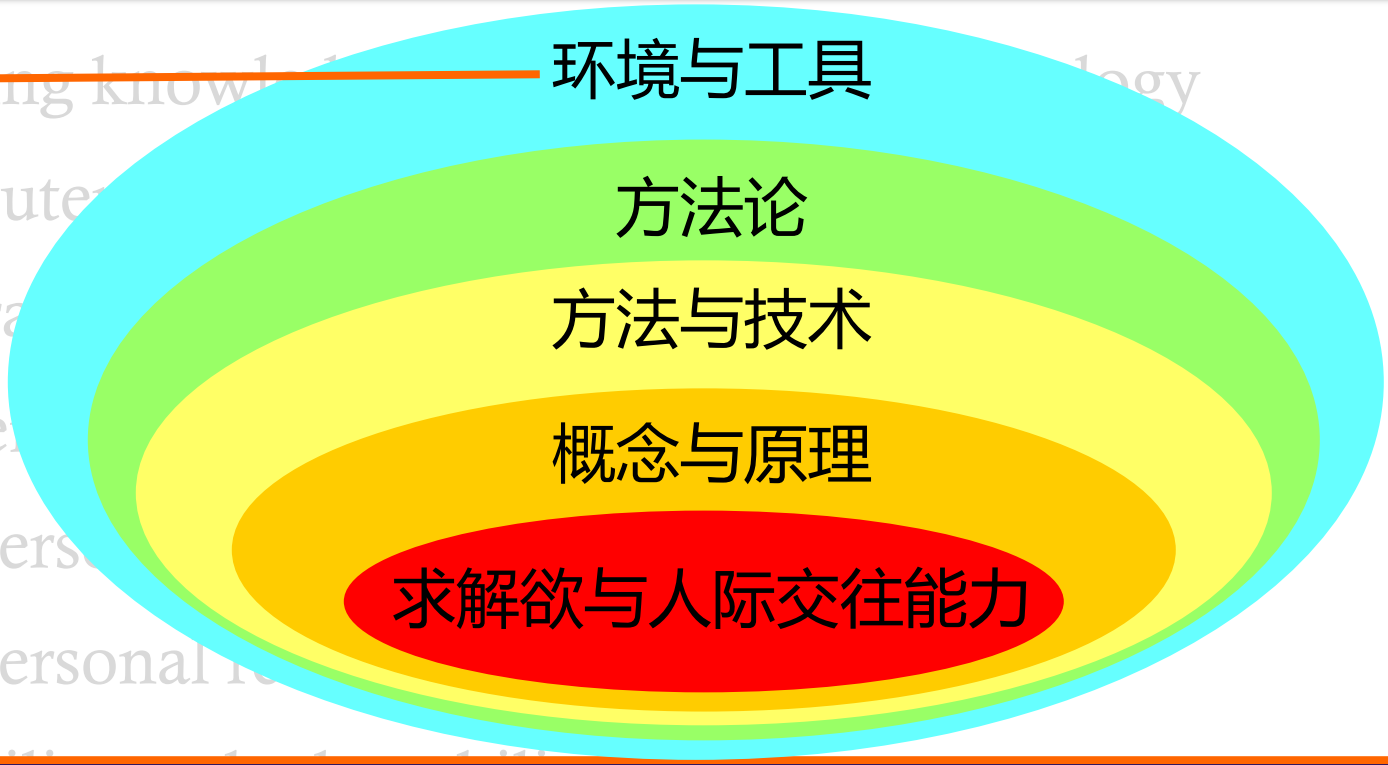
Skills Required by Systems Analysts



将方法和技术包装成为系统分析与设计的方法论，用于提炼出特定问题的求解策略和应用模式。

- Systems analysis and design skills

Skills Required by Systems Analysts



环境与工具用来具体地支持方法、技术和方法论，构建、实施和维护系统并解决实际应用问题。

- Systems analysis and design skills

要点与引申

- 信息系统和软件服务是数字化社会建设的基础设施。
- 系统分析和设计人员应当了解现代企业的内部结构和管理体制。按角色进行分工和合作，是现代工业的重要特征，也是软件工业化开发的必然要求。
- 同学们已经学过和将要学到的许多计算机、软件方面的知识，在学习过程中培养的能力，以及自己的人文素质，都将在系统分析与设计中得到综合的检验。
- 对系统分析和设计人员的素质要求、这类人员所承担的责任，是与付给他们的高薪成正比的。

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02

系统分析与设计
(System Analysis and Design)

Information System Building Blocks

Content Structure

- **The Product – Information Systems**
  - 数据与信息的区别与联系；
  - 前台系统与后台系统；
  - 信息系统的主要种类。
- **A Framework for Information Systems Architecture**
  - 信息系统的组成部件与体系结构；
  - 三种组成部件：数据、处理、界面 / 接口；
  - 与三种组成部件相关的通信；
  - 不同的角色在关注这些组成部件和通信时，有不同的结果。