Chapter 1

The Systems Analyst and Information Systems Development

SYSTEMS ANALYSIS AND DESIGN

SEVENTH EDITION

DENNIS, WIXOM, AND ROTH

Learning Objectives

- Explain the systems analyst's role information systems development.
- Describe the basic systems development life cycle and its phases.
- Explain how organizations identify IS development projects.
- Explain the importance of linking the information system to business needs.
- Be able to create a system request.
- Describe technical, economic, and organizational feasibility assessment.
- Be able to perform a feasibility analysis

The Systems Analyst

ROLE AND SKILLS

Systems Analyst Role

- Key role in developing information systems
  - Analyzing the business situation
  - Identifying opportunities for improvements
  - Designing an information system to implement the improvements

Systems Analyst Roles

- Interaction with an array of people
  - Technical specialists (DBAs, network admins, programmers)
  - Business people (users, managers, steering committee)
  - Others (vendors, consultants)
- Variety of specialized roles
  - People-oriented: change management analyst, project management
  - Business-oriented: requirements analyst, business analyst
  - Technically-oriented: infrastructure analyst
  - Generalist: systems analyst

What Do System Analysts Like About Their Work?

- Challenge
- Technology
- Variety
- Constant Change
- Problem Solving

What Do System Analysts Dislike About Their Work?

- Management's lack of communication/recognition
- End-user mistakes and demands
- Stress/pressure/burnout
- Ever-changing business technology
- Unrealistic deadlines

Preparing for Your Career

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

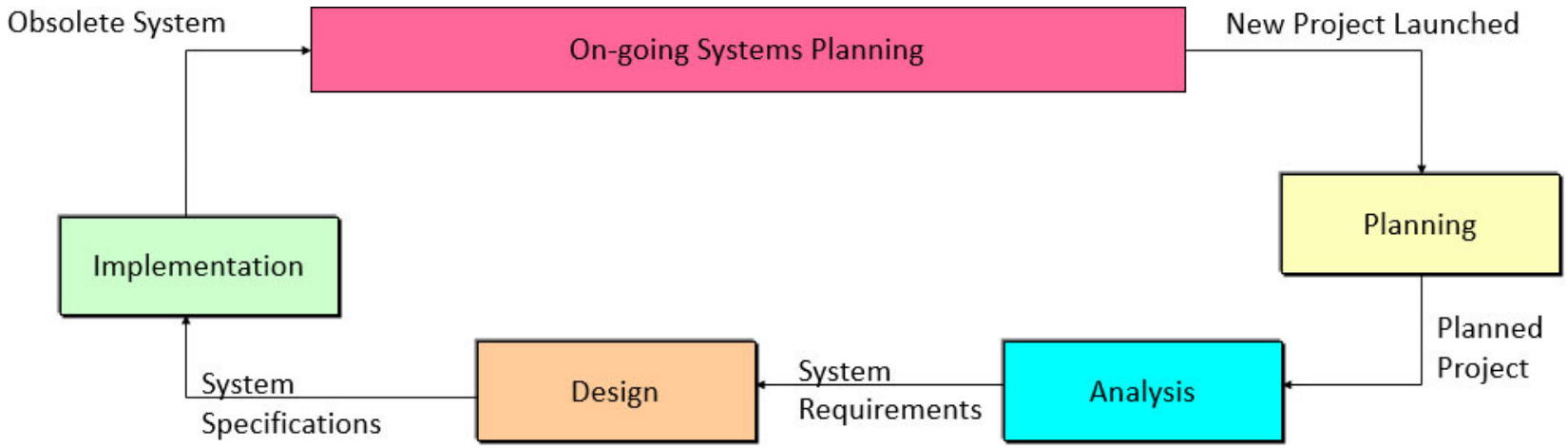
The Systems Development Life Cycle

THE OVERALL PROCESS OF SYSTEMS DEVELOPMENT

How Do Systems Get Built?

Systems Development Life Cycle (SDLC)

- Planning
- Analysis
- Design
- Implementation



Planning Phase

- Project Initiation
  - Prepare system request
  - Perform preliminary feasibility analysis
- Set Up the Project
  - Project Plan, including work plan & staffing plan

Analysis Phase

- Determine Analysis Strategy
  - Study existing system and its problems
- Collect and Analyze Requirements
  - Develop new system concept
  - Describe new system with analysis models
- Prepare and Present System Proposal
  - Summarize results of the Analysis Phase
  - Go/No Go decision made by sponsor and steering committee

Design Phase

- Determine Design Strategy
  - Build / Buy / Outsource
- Design system components
  - Architecture, interface, database, programs
  - Assemble design elements into System Specification
- Present to steering committee
  - Go /No Go decision before entering final phase

Implementation Phase

- System Construction
  - Programming and testing
- System Installation
  - Training
  - Conversion to new system
- On-going system support

Project Initiation

HOW PROJECTS GET STARTED

Where Do IS Projects Come From?

- Fulfill a **business need**
  - Enable a business initiative or strategy
  - Support a merger/acquisition
  - Fix a “point of pain”
  - Utilize a new technology
  - Outgrowth of Business Process Management (BPM)

What is BPM? (1 of 2)

- Business Process Management: A methodology used by organizations to continuously improve end-to-end business processes
  - Internal and cross-organizational processes
  - Benefits include:
    - Enhanced process agility
    - Process alignment with industry “best practices”
    - Increased process efficiencies

What is BPM? (2 of 2)

- Four-step continuous cycle:
  - Define and map the steps in a business process,
  - Create ways to improve on steps in the process that add value,
  - Find ways to eliminate or consolidate steps in the process that don’t add value,
  - Create or adjust electronic workflows to match the improved process maps.

BPM Identifies Business Needs

- Business Process Automation
  - “Create or adjust electronic workflows to match the improved process maps”
- Business Process Improvement
  - Study the business processes
  - Create new, redesigned processes to improve the process workflows, and/or
  - Utilize new technologies enabling new process structures
- Business Process Reengineering
  - Total overhaul of work processes

Do We Have a Project Yet?

- Strong business need leads to a person or group stepping up as the Project Sponsor
  - Driving force behind project
  - Specifies overall business requirements
  - Determines business value
  - Formally requests a project via the **System Request**

The Systems Request

THE BUSINESS REASONS FOR THE NEW SYSTEM

System Request

- Describes business reasons for project
- Defines system's expected value
  - Force the sponsor to formalize his/her ideas
  - Provide a framework for collecting initial project information
  - Standardize information to be used by steering (approval) committee
- Lists project's key elements

Elements of the Systems Request (1 of 3)

- Project Sponsor
- Business Need
- Business Requirements
- Business Value
- Special Issues or Constraints

Elements of the Systems Request (2 of 3)

Element	Description	Examples
Project Sponsor	The person who initiates the project and who serves as the primary point of contact for the project on the business side	Several members of the finance department Vice president of marketing CIO CEO
Business Need	The business-related reason for initiating the system	Reach a new market segment Offer a capability to keep up with competitors Improve access to information Decrease product defects Streamline supply acquisition processes
Business Requirements	The new or enhanced business capabilities that the system will provide	Provide online access to information Capture customer demographic information Include product search capabilities Produce performance reports Enhance online user support

Elements of the Systems Request (3 of 3)

Element	Description	Examples
Business Value	The benefits that the system will create for the organization	3% increase in sales 1% increase in market share Reduction in headcount by 5 FTEs $200,000 cost savings from decreased supply costs $150,000 savings from removal of outdated technology
Special Issues or Constraints	Issues that pertain to the approval committee's decision	Government-mandated deadline for May 30 System needed in time for the Christmas holiday season Top-level security clearance needed by project team to work with data
FTE, full-time equivalent.		

Systems Request for DrōnTeq Client Services System (1 of 2)

System Request—Client Services Project

Project Sponsor: Carmella Herrera, General Manager, Client Services Business Unit

Business Need: This project has been initiated to create the capability of clients requesting drone flight service and data analysis through the company website. The capability is an essential element in the business model of the newly formed Client Services business unit.

Business Requirements: Using this system from our company website, clients will be able to request specific drone flight services and data analysis. A request will be offered to any contracted DrōnTeq drone pilots in the vicinity, who can submit bids during the bidding window. Once the bidding window closes, the pilot with the "winning" bid will be assigned the request.

Business Value: The Client Services business unit has been formed to enable clients who do not have a need for actual drone ownership to receive drone flight service and data analysis promptly and cost effectively. As a new business unit, we must estimate additional revenue from two streams: additional drone pilots who contract with DrōnTeq and lease a drone; and clients who contract for specific drone flight service and data analysis.

Systems Request for DrōnTeq Client Services System (2 of 2)

Conservative estimates of tangible value to the business unit include

- $357,500 in revenue from new pilot contracts and drone leases
- $565,000 in revenue from drone flight service and data analysis

Special Issues or Constraints: The capabilities described in the Business Requirements are essential to the business model for the Client Services Business Unit. This project is necessary for the new business unit's operations.

Estimating Business Value (1 of 2)

- Identify sources such as:
  - Increased sales
  - Decreased costs
  - Reduced headcount
  - Lower turnover
- Assign values as initial estimates

Estimating Business Value (2 of 2)

	Revenue Projections of Pilot Contracts and Drone Leases	Revenue Projections of Client Requests for Drone Flight Service and Data Analysis
High-level estimate (prob. = 25%)	$500,000	$700,000
Medium-level estimate (prob. = 60%)	$350,000	$550,000
Low-level estimate (prob. = 15%)	$150,000	$400,000
Weighted average expected revenue	$357,500	$565,000

Feasibility Analysis

IS THIS PROJECT REALLY WORTH DOING…?

CAN WE DO THIS PROJECT…?

WILL THE ORGANIZATION ACCEPT THIS IF WE GO AHEAD…?

Feasibility Analysis

- Detailed business case for the project
  - Technical feasibility
  - Economic feasibility
  - Organizational feasibility
- Compiled into a feasibility study
- *Critically important* to reassess feasibility throughout the project

Technical Feasibility: *Can We Build It?*

- Sources of Technical Risk:
  - Users' and analysts' lack of familiarity with the business application area
  - Lack of familiarity with technology
    - Have we used it before? How new is it?
  - Project size
    - Number of people, time frame, distinct features
  - Compatibility with existing systems
    - Degree of integration required

Economic Feasibility: *Should We Build It?*

- Identify costs and benefits
- Assign values to costs and benefits
- Determine cash flow
- Assess financial viability
  - Return on investment
  - Break even point
  - Net present value

Costs and Benefits (1 of 2)

- Include development and operational costs
- Consider tangible and intangible benefits

Costs and Benefits (2 of 2)

Development Costs	Operational Costs
Development team salaries	Software upgrades
Consultant fees	Software licensing fees
Development training	Hardware repair and upgrades
Hardware and software	Cloud storage fees
Vendor installation	Operational team salaries
Office space and equipment	Communications charges
Data conversion costs	User training

Tangible Benefits	Intangible Benefits
Increased sales	Increased market share
Reductions in staff	Increased brand recognition
Reductions in inventory	Higher-quality products
Reductions in IT costs	Improved customer service
Better supplier prices	Better supplier relations

Cost-Benefit Analysis (1 of 3)

- Discounted cash flow method preferred
- NPV preferred

Cost-Benefit Analysis (2 of 3)

	2019	2020	2021	2022	2023	Total
Benefits						
Increased sales		500,000	530,000	561,800	595,508	
Reduction in customer complaint calls[a]		70,000	70,000	70,000	70,000	
Reduced inventory costs		68,000	68,000	68,000	68,000	
Total Benefits[b]		**638,000**	**668,000**	**699,800**	**733,508**	
Present Value Total Benefits		**601,887**	**594,518**	**587,566**	**581,007**	**2,364,978**
Development Costs						
2 servers @ $125,000	250,000	0	0	0	0	
Printer	100,000	0	0	0	0	
Software licenses	34,825	0	0	0	0	
Server software	10,945	0	0	0	0	
Development labor	1,236,525	0	0	0	0	
Total Development Costs	**1,632,295**	**0**	**0**	**0**	**0**	
Operational Costs						
Hardware		50,000	50,000	50,000	50,000	
Software		20,000	20,000	20,000	20,000	
Operational labor		115,000	119,600	124,384	129,359	
Total Operational Costs		**185,000**	**189,600**	**194,384**	**199,359**	

Cost-Benefit Analysis (3 of 3)

	2019	2020	2021	2022	2023	Total
Total Costs	1,632,295	185,000	189,600	194,384	199,359	
Present Value Total Costs	1,632,295	174,528	168,743	163,209	157,911	2,296,686
NPV (PV Total Benefits – PV Total Costs)						68,292

[a]Customer service values are based on reduced costs of handling customer complaint phone calls.

[b]An important yet intangible benefit will be the ability to offer services that our competitors currently offer.

Organizational Feasibility: *If We Build It, Will They Come?* (1 of 2)

- Strategic alignment
  - Are project goals aligned with business strategy?
- Evaluate effect on various stakeholder groups
  - Strong and influential project champion?
  - Strong and widespread organizational management support?
  - Receptive / resistant system users?

Organizational Feasibility: *If We Build It, Will They Come?* (2 of 2)

- Strategic alignment
  - Close alignment with strategy increases the likelihood of success
- Stakeholder groups can be influenced
  - Presentations describing and promoting benefits
  - Emphasizing personal benefits as well as organizational benefits
  - Prototypes help prove the system concept
  - Real user involvement throughout project

Feasibility Assessment: Summing It Up (1 of 2)

- All projects have feasibility risks
  - Our goal is to know the risks we face and the significance of those risks
  - Project Sponsor, Project Manager, and other team members need this awareness
  - Once risks are known, steps can be taken to mitigate the risks
    - For example, if unfamiliar with a new technology
      - Provide enough budget for training
      - Provide enough budget to hire consultants with expertise
      - Allow more schedule time to move up the learning curve
      - Use a methodology that incorporates experimentation

Feasibility Assessment: Summing It Up (2 of 2)

- Essential to continuously review and revise the feasibility assessment
  - How well are we managing the risks we previously identified? Are adjustments needed?
    - Risk is being managed
    - Risk is not well managed and needs further attention
  - Are there any new risks that have appeared?
    - If so, what are the actions needed to address those risks?
    - Budgetary and schedule effect?

After reading and studying this chapter, you should be able to: (1 of 2)

- Explain the role of the systems analyst in the process of developing IS.
- Discuss the skills needed to be a successful systems analyst.
- List and explain the four primary phases of the SDLC.
- Explain the ways that projects are identified and initiated.
- Explain why it is important to ensure that a proposed IS will add value to the organization.
- Describe the purpose of the systems request and explain the contents of its four main sections.

After reading and studying this chapter, you should be able to: (2 of 2)

- Be able to create a systems request for a proposed project.
- Discuss the purpose of the feasibility study.
- Describe the issues that are considered when evaluating a project's technical feasibility.
- Be able to develop an economic feasibility assessment for a project.
- Understand and evaluate the organizational feasibility of a project.

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