Developing and Implementing Information Systems

Overview of System Development

What is Systems Development?
- Creation of programs for specific in-house jobs
- Consumes about 30% of MIS budget

Outline of System Development Process
- Strategic Planning
- Identify and Rank IT Projects
- System Acquisition/Development
- System Operation and Maintenance
## Part I: Strategic MIS Planning

### MIS Master Plan

- Designed to:
  - provide adequate IT support to business units
  - allocates IT resources to benefit whole organization
- Includes:
  - Assessment of organizational context
  - Assessment of existing systems
  - Specification of IT alternatives

### Traditional MIS Planning Methods

- Derivation method
  - Derived IT needs from current business plans
- Value Chain
  - Use economic analysis
- Enterprise Analysis
- Critical Success Factors

### Enterprise Analysis

- Bottom up method
- Process driven
- IBM pioneered "Business System Planning"
System Acquisition and Development

Steps to BSP

- Define Business Processes
- Define Business Data
- Define Info Architecture
- Completion phases

Critical Success Factors

- Top down
- Goal driven
- CSF = "...key areas where things must go right in order to succeed"

CSF Method

- Interview senior managers
- Determine individual CSF's
- Aggregate CSF's into organizational CSF's
- Derive info requirements from CSF's

Examples of CSF's

- Increase market share
  - >>> track market share
- Deliver quality presentations
  - >>> implement multi-media capabilities
- Improve links between business units and customers
  - >>> implement internet connections
System Acquisition and Development

Transformational Change Methods

- Business Reengineering
- Organizational Learning

Business Reengineering

- Assumptions
  - Engineering model
  - A business process is a set of logically related tasks performed to achieve a business outcome
  - IT can transform business processes in terms of speed, service and quality
- A “build from scratch” method
- Critique?

Organizational Learning

- Assumptions
  - Organic model
  - Organizations learn and unlearn over time
  - Type 1 learning is based on successive improvements; Type 2 is based on reexamination of existing paradigms
  - IT can support both learning processes
- An incremental "ecological" approach
- Critique?

Part II: Rank IT Projects
System Acquisition and Development

Ranking IT Projects

- Variables:
  - Costs
  - Benefits
  - Risk

Costs

- Direct
- Indirect

Benefits

- Tangible
- Intangible
  - requires the use of a rank-order method
  - see exercise

Part III: Acquiring/Developing Information Systems
# System Acquisition and Development

## Means of IT Acquisition

- Purchases
- End-user development
- Prototyping
- Structured Development Methods

## Purchasing

- Requires a match between s/w and characteristics of org. unit
- Sold as a license
- Provides flexibility at the expense of:
  - cost
  - standardization
  - ownership

## End-User Development

- Empowerment approach
- Based on the availability of development tools
- Expert systems often developed this way using "shells"

## Prototyping

- Quick and inexpensive means to try out designs ideas
- May be used by systems personnel
- Can replace formal structured design for small projects
- Complements formal structured design on large projects
System Acquisition and Development

Generic Steps to Structured Design

- Situation Analysis
  - Where are we?
- Idealization
  - What do we want? Specifications
- Actualization
  - How do we build it? Design parameters
- Implementation
  - How do we introduce it?
- Operation
  - How do we maintain and manage it?

Systems Development Life Cycle (SDLC)

- Complex systems require a formal method
- SLDC is a means to managing people and resources involved in system development
- Assumes that software has a useful "shelf-life" until it has to be replaced

Tasks of SLDC

- Systems Analysis
- Systems Design
- Programming
- Installation
- System Operation and Maintenance

Distribution of Life Cycle Effort

- Systems Development
- Systems Maintenance
"Waterfall" Design Method

- System Analysis
  - Feasibility Study
  - Requirements Analysis
- System Design
  - Logical Design
  - Physical Design
- Programming
  - Code and Testing
- Installation
  - Conversion

Distribution of Development Effort

- Systems Analysis
- Systems Design
- Coding
- Testing

Description of SDLC Stages....

System Analysis-I

- Justification and Rationale
  - Overall objectives
- Feasibility
  - Financial
  - Technical
  - Organizational
System Acquisition and Development

Systems Analysis-II

- Establish system features:
  - Ask users
  - Examine existing systems (data flow)
  - High level planning outputs
  - Pilots and prototypes

System Design

- System inputs and outputs
- Hardware and software platforms
- Specify software modules
- Database design
- Interface design
- Procedures for use

Programming

- Constructing and testing the program
  - Choice of language is critical...

Languages

- 1960's-1970's: 3rd Generation Languages
  - E.g., Cobol, Fortran
  - Task/Procedure orientation
  - E.g., Focus
  - Database orientation
System Acquisition and Development

Language (cont.)
- 1980's-1990's: Object-oriented languages
  - E.g., Smalltalk, C++

S/W Environments
- CASE = Computer Aided Software Engineering
  - Creation, maintenance, and management of S/W
  - Workstation includes an info repository, design planning tools, code generators
  - Increases software dev'mt productivity

Installation
- Parallel conversion
- Pilot conversion
- Phased conversion
- Direct conversion

Spiral Design
- Combines best of SDLC and prototyping
- Structured but iterative

RISK
Part IV: Operation and Maintenance

Operation and Maintenance

- No system ever meets all needs
- Software maintenance:
  - fixes bugs
  - improves functionality
  - improves efficiency
- Maintenance consumes about 2/3’s of project time!

Summary

- Organizations must buy or develop necessary software
- Buying promotes savings and standardization at the expense of flexibility
- Development is a complex socio-technical design process
- Development requires formal and informal methods

end....