IS 300 — Lecture 13

- How do information systems fit into the Simon decision-making framework?
- What is a typical Management Information System (MIS)?
- What is a Decision Support System (DSS)?
- What is a typical Executive Support System?

How do information systems fit into the Simon decision-making framework?

Herbert Simon Stages of Decision Making

Intelligence

- Scan the internal organization to identify problems or opportunities
- Scan the external environment to identify problems or opportunities

Design

- Generate decision alternatives
- Evaluate decision alternatives

Choice

- Emphasize and prioritize decision alternatives

Implementation/Monitoring

- Provide feedback on the implementation decision

Example: a manufacturing firm (Boeing) is reviewing its manufacturing process. How does it apply these ideas?

Intelligence

- Should we be considering new equipment?
- Internal considerations – more efficient and productive
- External considerations – more cost competitive, higher quality

Design

Alternatives

- Do nothing – implications?
- Lease – cash flows (higher continuing costs)
- Purchase – cash flow (high up front costs)

What is a typical Management Information System (MIS)?

What are they?

- Systems that assist in controlling the firm (internal)
- Provide reports on the firm's performance
  - Intelligence stage – scan internal organization
  - Implementation stage – provide feedback

A generic MIS – see Figure 9.1

Note:

Types of reports

Scheduled

Key-indicator (CSF)

Demand

Exception

Drill-down

Sources of data

Valid transactions (not operations TPS DB)

Internal corporate DB

External DB

Characteristics of MIS problem domains

- Support routine and repetitive decision making
- Information (reporting) needs mostly prespecified
- Designed for many managers (not a specific manager)
- Managed by IT group (not end user)

What is a Decision Support System (DSS)?

Definition: An interactive system under user control, providing data and models as the basis for discussing and evaluating semi and unstructured decisions.

Characteristics of DSS problem domains

- Future focus
- May be disagreement on the problem definition
- Requirements not stable
- Internal and external data requirements

Generic DSS – see Figure 10.9 – models, data (internal/external), dialog (presentation)

Relationships to Simon framework

- Intelligence – scan both internal organization and external environment
- Design – Generate/evaluate decision alternatives
- Choice – Emphasize and prioritize decision alternatives

One company – two examples: Puget Sound Power Energy

Institutional (recurring) Example: Justifying rates to UTC.

- Future demand unknown
- Must supply everyone
- Long and expensive capital construction process
- Decent rate of return for shareholders

Ad Hoc Example: Should they merge with Washington Energy Resources?

- Cost structure
- Political considerations
- Union considerations
- Economies of scale
- Positioning for the future

DSS Analytical Modeling Process – exploring the problem domain to better understand what is happening. Simon's Design and Choice activities (generate, evaluate, and prioritize alternatives)

What if: y = f(x) – change the value of x (independent variable) and see what happens to y (dependent variable).

MonthlyPayment = f(interestRate, loanAmt, term)

What if interestRate = 10%

Sensitivity Analysis: repeated applications of What if to

- Determine how much a change in x impacts y
- Determine which x's impact y the most

Used to better understand how the model (world) works.

Goal Seek: Given y = f(x), set a target or goal for y and have the model determine the value of x.

Lease vs purchase example

Choice stage

- Develop a NPV analysis (helps choose the best)
- Evaluate sensitivity (how sensitive is your model to various assumptions?)

Risk Analysis: Using Monte Carlo simulation to generate scenarios using various probability distributions for input parameters. Results are presented as probability distributions.

What is a typical Executive Support System?

Definition: a system with many features common to both a DSS and MIS. Focus is on immediate and easy access to the firm's critical success factors (CSF). Generally oriented to high-level manager. Strategic focus.

Components

- Direct use by executive (tailored to individual preferences)
- Internal and external database support
- Communications

Relationship to Simon framework

- Some aspects of MIS
  - Intelligence (both internal/external) but with a strategic (as opposed to an operational) focus
  - Implementation (feedback)
- Some aspects of DSS – help reduce uncertainty
  - Design/Choice via modeling

Typical features

- Simple interface
- Browse capability
- Multiple presentation formats
- Increasing level of detail (drill down)