Decision Support Systems

Computer-Supported Decision Making

By Susan Miertschin

Decision Support Systems

Decision processes aided by computers – can help with effective decision making by structuring decision processes and providing valuable information.

Decision Support Systems

- DSS
- "… are computer technology solutions that can be used to support complex decision making and problem solving."
  - Shim, J. P., Warkentin, M., Courtney, J. F., Power, D. J., Sharda, R., & Carlsson, C. (2002). Past, present, and future of decision support technology. [doi: DOI: 10.1016/S0167-9236(01)00139-7]. *Decision Support Systems, 33(2), 111-126.*

Decision Support Systems

- Another Definition
  - "interactive computer-based systems that help people use computer communications, data, documents, knowledge, and models to solve problems and make decisions"
- Key components of an organization's IT infrastructure
- Enable increased productivity
- Provide competitive advantage
- Ancillary systems that support human decision-making

DSS Types

- Data-driven DSS
  - Manipulation of large databases of structured data (data warehouses, data marts)
  - **OLAP, BI**
- Model-driven DSS
  - Emphasize access to and manipulation of models
  - Financial, representational, optimization models
  - Use data and parameters, not data intensive
- Knowledge-driven DSS
  - Recommend action to managers
  - Use business rules, knowledge-bases
  - Expert systems, **data-mining systems**

DSS Types (cont.)

- Document-driven DSS
  - Storage and retrieval of documents
  - Search engines, clustering & visualization systems
- Communication-driven DSS & GDSS
  - Integrates collaboration, communication and decision support technologies
  - A hybrid DSS that emphasizes use of communication technologies and decision process models
  - Chat and Email based systems, white board, bulletin board etc.

Business Intelligence

- "is the delivery of accurate, useful information to the appropriate decision makers within the necessary timeframe to support effective decision making."
  - Larson, B. (2008). *Delivering Business Intelligence with Microsoft SQL Server 2008*. *NewYork: McGraw-Hill Osborne*.

Data Mining

- Uses mathematical algorithms to examine data for
  - Patterns
  - Correlations
  - Clusters
- Operates on detail data, as opposed to statistically summarized data, generally speaking
- A type of DSS

DSS Suitability to Different Decision Situations

- Data-driven DSS
  - Managers need to conduct ad-hoc analyses of large sets of data and need to do so frequently
- Model-driven DSS
  - Recurring, semi-structured decision situations where quantitative models can support analysis
- Knowledge-driven DSS
  - Narrow domain of expertise can be defined, experts identified and knowledge can be codified
- Communication-driven DSS
  - Two or more people are involved in ad hoc decision processes
- Document-driven DSS

More DSS Types

- Inter-organizational or Intra-organizational
- Function-specific or General
- Web-Based

Competitive Advantage with DSS

- Competitive advantage
  - Do something better than competitors
- "IT doesn't matter?" – Nicholas Carr
  - Carr, N. G. (2003). IT Doesn't Matter. [Article]. *Harvard Business Review, 81(5), 41-49.*
  - IT has been commoditized
  - IT does not provide competitive advantage
- IT does matter
  - Extracting value from IT requires innovation in business practices
  - Brown, J. S., & Hagel Iii, J. (2003). Does IT Matter? (Vol. 81, pp. 109-112): Harvard Business School Publication Corp.

Gaining Competitive Advantage

- Identify IT opportunities that can provide strategic advantages
- DSS must be *used* once implemented
- Unique, proprietary DSS can produce competitive advantage …
- For awhile, until competitors catch up
  - Look for investments that can provide an "edge" for at least 3 years

Strategic Impact of DSS

- "Wal-mart's most significant investment for increasing its efficiency is its Information Technology"
- "At any moment, executives and store managers can pin point the exact date an item was bought, the quantity purchased, number sold and days it took to turn"
  - Yeh, R. T., & Yeh, S. H. (2004). The Art of Business: In the Footsteps of Giants. Olathe, CO: Zero Time Publishing.
- "By all accounts, technology and scale are at the core of Wal-Mart's advantages over its rivals."
  - Basker, E. (2007). The Causes and Consequences of Wal-Mart's Growth. [Article]. Journal of Economic Perspectives, 21(3), 177-198.
- "Wal-Mart's aggressive adoption of information technology to improve logistics and back-office efficiency has been a major driver of productivity"
  - Tsao, A. (2002). Will Wal-Mart Take Over the World? [Article]. BusinessWeek Online, N.PAG.

Wal-Mart's IT Investment

- Wal-Mart creates RetailLink to share data with suppliers (1991)
- Wal-Mart invests $700 million in IT (1992)
- Wal-Mart announces Collaborative Forecasting System (1996)
- Wal-Mart creates world's largest data warehouse (1997)
- Competitor K-Mart falters due to under-investment in IT, announces $ 1 billion IT infrastructure plan (Forbes, "How K-Mart blew it', Jan 18, 2002)
- Wal-Mart announces RFID initiative (2003)

Benefits from Successful DSS

- Improve individual productivity
- Improve decision quality and speed up problem solving
- Improve inter-personal communications
- Improve decision making skills
- Increase organizational control

Decision Support Systems

Computer-Supported Decision Making

By Susan Miertschin