Chapter 1
Management Support Systems: An Overview
Learning Objectives

• Understand how management uses computer technologies.
• Learn basic concepts of decision-making.
• Understands decision support systems.
• Recognize different types of decision support systems used in the workplace.
• Determine which type of decision support system is applicable in specific situations.
• Learn what role the Web has played in the development of these systems.
Harrah’s Makes a Great Bet Vignette

- Data Warehouse
- Data Mining
- Business Intelligence
- Transaction Processing System
- Customer Relationship Management
- Decision Support System
Mintzberg’s 10 Management Roles

- **Interpersonal**
  - Figurehead
  - Leader
  - Liaison

- **Informational**
  - Monitor
  - Disseminator
  - Spokesperson

- **Decisional**
  - Entrepreneur
  - Disturbance Handler
  - Resource Allocation
  - Negotiator
Productivity

- The ratio of outputs to inputs that measures the degree of success of an organization and its individual parts
Factors Affecting Decision-Making

- New technologies and better information distribution have resulted in more alternatives for management.
- Complex operations have increased the costs of errors, causing a chain reaction throughout the organization.
- Rapidly changing global economies and markets are producing greater uncertainty and requiring faster response in order to maintain competitive advantages.
- Increasing governmental regulation coupled with political destabilization have caused great uncertainty.
What do Decision Support Systems Offer?

- Quick computations at a lower cost
- Group collaboration and communication
- Increased productivity
- Ready access to information stored in multiple databases and data warehouse
- Ability to analyze multiple alternatives and apply risk management
- Enterprise resource management
- Tools to obtain and maintain competitive advantage
Cognitive Limits

• The human mind has limited processing and storage capabilities.
• Any single person is therefore limited in their decision making abilities.
• Collaboration with others allows for a wider range of possible answers, but will often be faced with communications problems.
• Computers improve the coordination of these activities.
• This knowledge sharing is enhanced through the use of GSS, KMS, and EIS.
Management Support Systems

• The support of management tasks by the application of technologies
  – Sometimes called Decision Support Systems or Business Intelligence
Management Support Systems Tools

- DSS
- Management Science
- Business Analytics
- Data Mining
- Data Warehouse
- Business Intelligence
- OLAP
- CASE tools
- GSS
- EIS

- EIP
- ERM
- ERP
- CRM
- SCM
- KMS
- KMP
- ES
- ANN
- Intelligent Agents
- E-commerce DSS
# Decision Support Frameworks

<table>
<thead>
<tr>
<th>Type of Decision:</th>
<th>Type of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational Control</strong></td>
<td>Accounts receivable, accounts payable, order entry</td>
</tr>
<tr>
<td><strong>Managerial Control</strong></td>
<td>Budget analysis, short-term forecasting, personnel reports</td>
</tr>
<tr>
<td><strong>Strategic Planning</strong></td>
<td>Investments, warehouse locations, distribution centers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structured (Programmed)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational Control</strong></td>
<td>Production scheduling, inventory control</td>
</tr>
<tr>
<td><strong>Managerial Control</strong></td>
<td>Credit evaluation, budget preparation, project scheduling, rewards systems</td>
</tr>
<tr>
<td><strong>Strategic Planning</strong></td>
<td>Mergers and acquisitions, new product planning, compensation, QA, HR policy planning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semistructured</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational Control</strong></td>
<td>Buying software, approving loans, help desk</td>
</tr>
<tr>
<td><strong>Managerial Control</strong></td>
<td>Negotiations, recruitment, hardware purchasing</td>
</tr>
<tr>
<td><strong>Strategic Planning</strong></td>
<td>R&amp;D planning, technology development, social responsibility plans</td>
</tr>
</tbody>
</table>
## Technologies for Decision-Making Processes

<table>
<thead>
<tr>
<th>Type of Decision</th>
<th>Technology Support Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured (Programmed)</td>
<td>MIS, Management Science Models, Transaction Processing</td>
</tr>
<tr>
<td>Semistructured</td>
<td>DSS, KMS, GSS, CRM, SCM</td>
</tr>
<tr>
<td>Unstructured (Unprogrammed)</td>
<td>GSS, KMS, ES, Neural networks</td>
</tr>
</tbody>
</table>
Technology Support Based on Anthony’s Taxonomy

<table>
<thead>
<tr>
<th>Technology Support Needed</th>
<th>Operational Control</th>
<th>Managerial Control</th>
<th>Strategic Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS, Management Science</td>
<td>Management Science, DSS, ES, EIS, SCM, CRM, GSS, SCM</td>
<td>GSS, CRM, EIS, ES, neural networks, KMS</td>
<td></td>
</tr>
</tbody>
</table>
**Figure 1.2 Decision Support Frameworks**

<table>
<thead>
<tr>
<th>Type of Decision</th>
<th>Operational Control</th>
<th>Managerial Control</th>
<th>Strategic Planning</th>
<th>Technology Support Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structured</strong></td>
<td>Accounts receivable, account payable, order entry</td>
<td>Budget analysis, short-term forecasting, personnel reports, make-or-buy</td>
<td>Financial management (investment), warehouse location, distribution systems</td>
<td>Management information system, management science models, transaction processing</td>
</tr>
<tr>
<td><strong>Semistructured</strong></td>
<td>Production scheduling, inventory control</td>
<td>Credit evaluation, budget preparation, plant layout, project scheduling, reward system design, inventory categorization</td>
<td>Building new plant, mergers and acquisitions, new product planning, compensation planning, quality assurance planning, HR policies, inventory planning</td>
<td>DSS, KMS, GSS, CRM, SCM</td>
</tr>
<tr>
<td><strong>Unstructured</strong></td>
<td>Selecting a cover for a magazine, buying software, approving loans help desk</td>
<td>Negotiating, recruiting an executive, buying hardware, lobbying</td>
<td>R &amp; D planning, new technology development, social responsibility planning</td>
<td>GSS, KMS ES, neural networks</td>
</tr>
<tr>
<td><strong>Technology Support Needed</strong></td>
<td>Management information system, management science</td>
<td>Management science, DSS, E3, ES, SCM CRM, GSS, SCM</td>
<td>GSS, CRM ES, neural networks, KMS</td>
<td></td>
</tr>
</tbody>
</table>
Management Science/ Operations Research

• Adopts systematic approach
  – Define problem
  – Classify into standard category
  – Construct mathematical model
  – Evaluate alternative solutions
  – Select solution
Enterprise Information Systems

• Evolved from Executive Information Systems combined with Web technologies
• EIPs view information across entire organizations
• Provide rapid access to detailed information through drill-down.
• Provide user-friendly interfaces through portals.
• Identifies opportunities and threats
Enterprise Information Systems

- Specialized systems include ERM, ERP, CRM, and SCM
- Provides timely and effective corporate level tracking and control.
- Filter, compress, and track critical data and information.
Knowledge Management Systems

• Knowledge that is organized and stored in a repository for use by an organization
• Can be used to solve similar or identical problems in the future
• ROIs as high as a factor of 25 within one to two years
Expert Systems

- Technologies that apply reasoning methodologies in a specific domain
- Attempts to mimic human experts’ problem solving
- Examples include:
  - Artificial Intelligence Systems
  - Artificial Neural Networks (neural computing)
  - Genetic Algorithms
  - Fuzzy Logic
  - Intelligent Agents
Hybrid Support Systems

- Integration of different computer system tools to resolve problems
- Tools perform different tasks, but support each other
- Together, produce more sophisticated answers
- Work together to produce smarter answers
Emerging Technologies

- Grid computing
- Improved GUIs
- Model-driven architectures with code reuse
- M-based and L-based wireless computing
- Intelligent agents
- Genetic algorithms
- Heuristics and new problem-solving techniques
Kompleksitas (jumlah kriteria)

Deterministik

Resiko

Ketidakpastian

Banyak

Sedikit

Keterhubungan terikat

Keterhubungan bebas

Derajat ketidakpastian
1. Masalah optimasi pada perancangan teknik.

- Linear programming
- Quadratic programming
- Generalized Reduced Gradient method
- Sequential Quadratic Programming
- Augmented Lagrangian Method
- Genetic Algorithms
- Simulated Annealing
2. Masalah pengambilan keputusan dibawah resiko, seperti:

<table>
<thead>
<tr>
<th>Tipe resiko &amp; ketidakpastian</th>
<th>Contoh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufaktur</td>
<td>Macam-macam manufaktur</td>
</tr>
<tr>
<td></td>
<td>Macam-macam properti material</td>
</tr>
<tr>
<td>Desain/analisis</td>
<td>Evaluasi kinerja produk</td>
</tr>
<tr>
<td></td>
<td>Translasi nilai kinerja</td>
</tr>
<tr>
<td>Ekonomi/pemasaran</td>
<td>Perubahan lokasi pemasaran</td>
</tr>
<tr>
<td></td>
<td>Aksi kompetitif</td>
</tr>
<tr>
<td></td>
<td>Perubahan preferensi customers</td>
</tr>
<tr>
<td></td>
<td>Harga material</td>
</tr>
<tr>
<td></td>
<td>Faktor ekonomi eksogen</td>
</tr>
</tbody>
</table>
- Perancangan probabilitas dengan metode statistik: *Statistical Interval Estimation* (Confidence Interval, Tolerance Interval, and Prediction Interval, dll); Analysis of Variance (ANOVA); Factorial and Fractional; Factorial Design of Experiments (DOE) dan Regression Analysis.

- Utility analysis & risk profile (Von Neumann & Morgenstern utility method)

- Robust design (Taguchi method)
3. Pengambilan keputusan di bawah ketidakpastian:
   • Menggunakan pertimbangan subyektif dan atau menghimpun data baru (teorema Bayes)

4. Multicriteria decision making di bawah kepastian:
   • Multi Attribute Decision Making (MADM): Pugh’s selection method, Quality Function Deployment (QFD), Analytic Hierarchy Process (AHP).
   • Multi Objective Decision Making (MODM)
5&6. Multicriteria decision making di bawah resiko dan ketidakpastian:
  • Teori himpunan fuzzy
  • Multi Attribute Utility Theory (MAUT)
  • Decision tree
  • Bayesian method
7,8,9 Pengambilan keputusan terdistribusi, dilakukan melalui tahap-tahap:

- Definition phase
- Conceptual phase
- Embodiment phase
- Detail phase