Lection 1

Case study:

- **Toyota's business-intelligence system mirrors the company's corporate culture. Read how it's paying off.**
- http://www.cioinsight.com/c/a/Case-Studies/Toyotas-Business-Intelligence-Oh-What-a-Feeling/

The business

- **Toyota Logistic Services** manages the transport of vehicles from the factories in Japan and North America to the dealerships in the U.S.
  - The job requires **precision tracking** and supply-chain management in order to ensure that the right cars get to the right dealers in a predictable and timely fashion.
  - A finance charge of **$8** a day per car until they can unload them on the dealers. Multiply that by about **2 million cars** a year and an average delivery time of nine days, and it's easy to see how manually compiled data were costing Toyota millions.

The problem (B. Daly, T.L.S.)

- “Departments regularly failed to share information, and, by the time they did generate so-called "actionable" reports, it was often already **too late**.”
- “There were **overlapping reporting systems**, we couldn't be certain that any of the data was accurate, and nothing was giving me a good picture of what was going on. I couldn't get information while we were doing business.”
- “If just one individual made a data **entry mistake** when a ship docked, the mistake would endure throughout the entire supply chain.”
  - “We had data that told us that ships had been sailing out on the water forever, and never made it to port. There was no way to catch such mistakes.”

First solution

- B. Daly communicated **B. Cooper**
- Cooper set up a **data warehouse** from Red Brick for TLS that used BRIO tools to mine the data.
- Result: Not so good
  - It turned out that years of **human error** had gone unchecked, so duplicated data and data points that were never entered into the system returned illogical analyses.
  - There were severe problems transferring files from the old system into the new warehouse.
- It became clear that the data warehouse was **not working** the way Daly had envisioned.

Why the first solution failed?

- Cooper was left with the right idea but the wrong technology.
- The Red Brick warehouse was helping to store and integrate the data,
- but it wasn't having a measurable impact on the business users.
  - IT employees and research analysts still had to run the reports, rather than the business execs themselves.

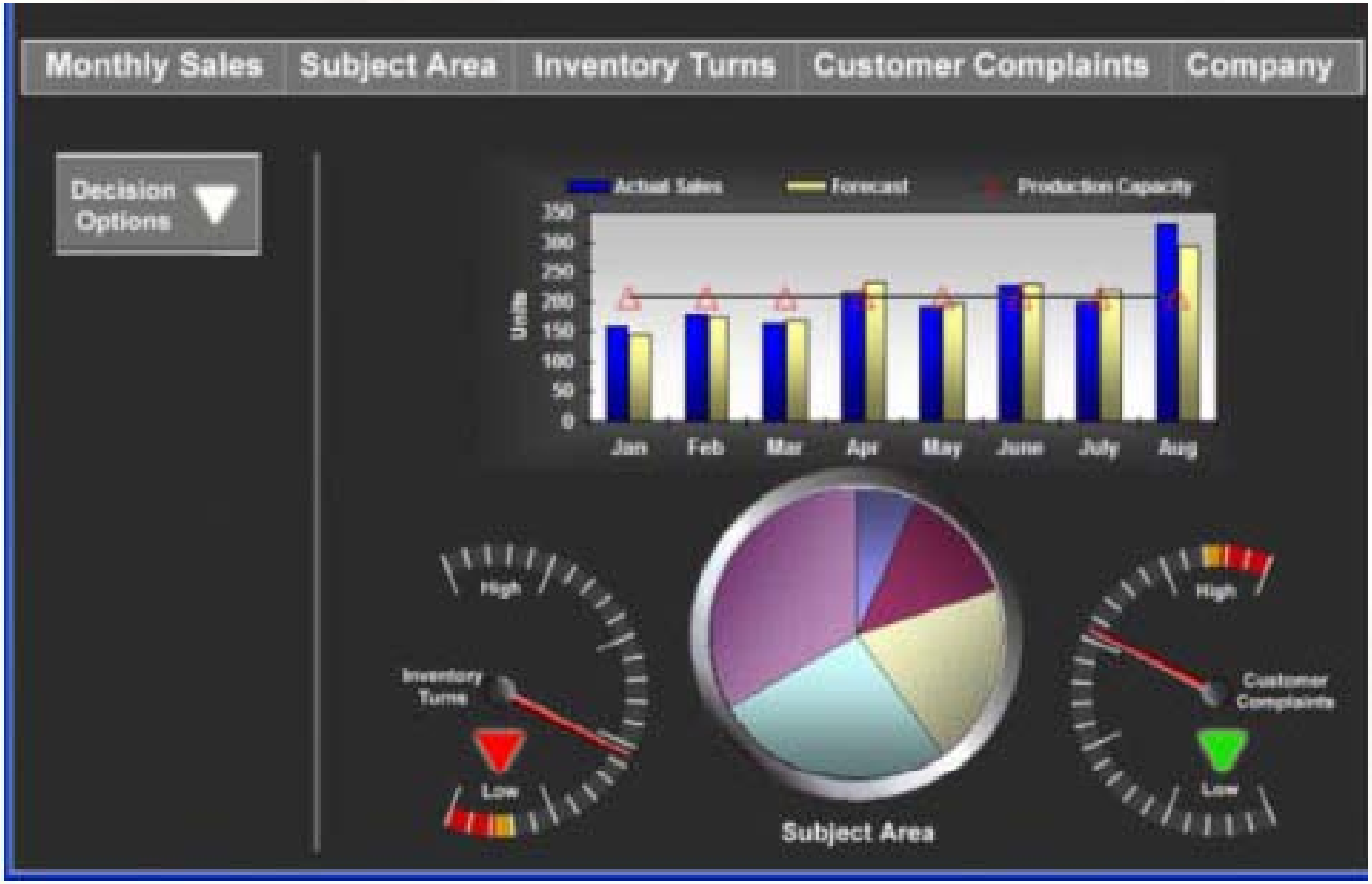
Second solution

- Cooper decided to go with an Oracle database and a Hyperion business-intelligence platform
- Results: immediately good!
  - In one day, found that Toyota was getting billed twice for rail shipments of vehicles out of a particular rail yard. Until that point, Toyota execs had no way to drill down and discover the duplicate entries. The new information saved the company $800,000 "overnight.
  - Identified a port in Baltimore that it no longer needed, with dramatic savings.

Why the second solution worked?

- The difference between the old system and the Hyperion system is the ability to use a **dashboard** feature that **allows executives** to see hot spots in their business units and investigate further to identify the problem.
  - The dashboard works like a simple stoplight, with lights that display green (good), yellow (acceptable) and red (danger).
  - A business manager can see, for example, when delivery times are slowing to unacceptable levels and immediately try to find the source of the problem. The gauges can be programmed for a variety of data sets, including accessory revenues, order management and expenses.
  - “It would have taken me two weeks to get that information in the past, but now he can do it himself in six seconds.”

Dashboard



http://download.boulder.ibm.com/ibmdl/pub/software/data/sw-library/cognos/demos/od_cognosnow/index.html

Measuring the success

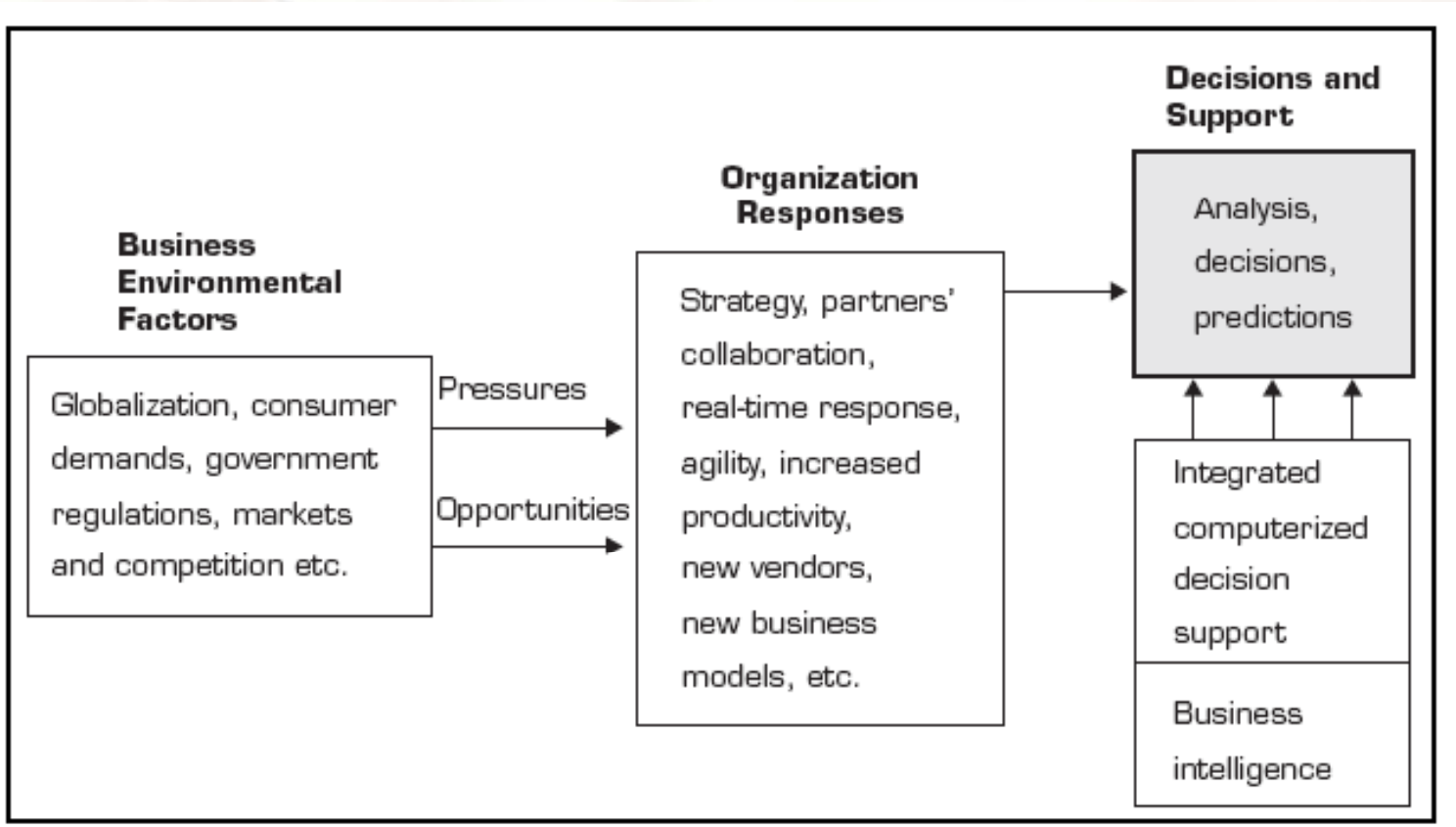
- Toyota had achieved a **506 percent** return on the software.
  - The median **ROI** for the 43 other Fortune 500 companies that participated in the study was 112 percent.
  - Of course, to achieve that kind of return, there had to be some pretty severe inefficiencies in the business to begin with (**overspending**).

END of Case study

Changing Business Environments and Computerized Decision Support

- The business pressures-responses-support model
  - The business environment
  - Organizational responses: be reactive, anticipative, adaptive, and proactive
  - Computerized support

The business pressures-responses-support model



Managerial Decision Making

- The process of decision making (not considered an art anymore)
  1. Defining the problem (a decision situation that may deal with some difficulty or with an opportunity)
  2. Constructing a model that describes the real-world problem
  3. Identifying possible solutions to the modeled problem and evaluating the solutions
  4. Comparing, choosing, and recommending a potential solution to the problem

  Why not anymore management as an “art”?

Explain why intuition and trial-and-error approaches to managerial decision making may not be effective in today's business environment.

- Intuition and trial-and error approaches to managerial decision making may not be effective in today's business environment due to three trends:
  - **More alternatives** from which to choose as a result of technology, information systems, advanced search engines and globalization.
  - **More uncertainty** due to factors including compliance with government regulations, political instability and terrorism, competition and changing customer demands, making it more difficult to predict the future consequences of one's actions.
  - The need to make **rapid decisions** coupled with the potentially **large cost of mistakes**.

Managerial Decision Making

- Computer applications have moved from transaction processing to problem analysis and solution applications
- **Decision support systems (DSS)**

  A conceptual framework for a process of supporting managerial decision- making, usually by modeling problems and employing quantitative models for solution analysis

Computerized Support for Decision Making

- Why use computerized decision support systems
  - Speedy computations
  - Improved communication and collaboration
  - Increased productivity of group members
  - Improved data management
  - Managing giant data warehouses

Computerized Support for Decision Making

- Why use computerized decision support systems
  - Quality support
  - Agility support
  - Overcoming cognitive limits in processing and storing information
  - Using the Web
  - Anywhere, anytime support

Computerized Support for Decision Making

- Cognitive limits

  The limitations of the human mind related to processing information

An Early Framework for Computerized Decision Support

FIGURE 1.2 Decision Support Frameworks

Type of Decision	Type of Control: Operational Control	Type of Control: Managerial Control	Type of Control: Strategic Planning
Structured	1 Accounts receivable, accounts payable, order entry	2 Budget analysis, short-term forecasting, personnel reports, make-or-buy	3 Financial management (investment), warehouse location, distribution systems
Semistructured	4 Production scheduling, inventory control	5 Credit evaluation, budget preparation, plant layout, project scheduling, reward system design, inventory categorization	6 Building new plant, mergers and acquisitions, new product planning, compensation planning, quality assurance planning, HR policies, inventory planning
Unstructured	7 Selecting a cover for a magazine, buying software, approving loans, help desk	8 Negotiating, recruiting an executive, buying hardware, lobbying	9 R & D planning, new technology development, social responsibility planning

What are structured, unstructured, and semistructured decisions? Provide two examples of each.

- An *unstructured decision* is one in which none of the three decision phases (intelligence, design, choice) is structured. Examples: writing a corporate mission statement, deciding about merging with another company.

- A *structured decision* is one in which all phases are structured. Examples: finding an appropriate inventory level, choosing an optimal investment strategy.

- *Semistructured decisions* fall between structured and unstructured problems, having some structured elements and some unstructured elements. Examples: trading bonds, setting marketing budgets for consumer products, performing capital acquisition analysis.

An Early Framework for Computerized Decision Support

- Computer support for cells 1, 2, 4
  - **Management science (MS)** or **operations research (OR)**

    The application of a scientific approach and mathematical models to the analysis and solution of managerial decision situations (e.g., problems, opportunities)

An Early Framework for Computerized Decision Support

- Computer support for cells 1, 2, 4
  - **Automated decision systems (ADS)**

    "A price-optimization program....plugs reams of data from checkout scanners, seasonal sales figures, and so on into probability algorithms to come up with an individual demand curve for each product in each store. From that, retailers can identify which products are most price-sensitive. Then they can adjust prices up or down according to each store's priorities -- profit, revenue, or market share -- to achieve a theoretically maximum profit margin for their goals."

An Early Framework for Computerized Decision Support

- The decision support matrix
  - For *semistructured decisions* and *unstructured decisions* (cells 6, 8, 9), conventional MIS and *MS* tools are insufficient
  - Decision support systems (DSS) are used

An Early Framework for Computerized Decision Support

- Computer support for **unstructured** decisions
  - Customized solutions
  - **intuition** and judgment
  - Computerized communication and collaboration technologies
  - Knowledge management

An Early Framework for Computerized Decision Support

- Computer support for **semistructured** problems
  - A **combination** of both **standard solution** procedures and **human judgment**
  - Management Science can provide models for the structured portion
  - For the unstructured portion, a DSS can improve the quality of the information on which the decision is based by providing a range of alternative solutions along with their potential impacts

An Early Framework for Computerized Decision Support

- The benefits of computerized decision support
  - Companies work in an unstable or rapidly changing economy.
  - There are difficulties in tracking the numerous business operations.
  - Competition has increased especially global competition.
  - Electronic commerce is changing the ways business is done.
  - Existing information systems do not fully support decision making.

An Early Framework for Computerized Decision Support

- The benefits of computerized decision support
  - The Information systems department is too busy to address all of management's inquiries.
  - Special analysis of profitability and efficiency is needed.
  - Accurate information is needed.
  - Computerized support is viewed as an organizational winner.
  - New information is needed.

An Early Framework for Computerized Decision Support

- The benefits of computerized decision support
  - Management mandates computerized decision support.
  - Higher decision quality is needed.
  - Improved communication.
  - Improved customer and employee satisfaction.
  - Timely information is provided.
  - Cost reduction is achieved.
  - Employees' productivity has been improved.

The Concept of Decision Support Systems (DSS)

- DSS as an Umbrella term: Describes any computerized system that supports decision making in an organization
  - DSS as a specific application
  - The architecture of DSS
    - Data
    - Models manipulate data as related to a specific situation
    - Knowledge component
    - Users
    - User interface

The Concept of Decision Support Systems (DSS)

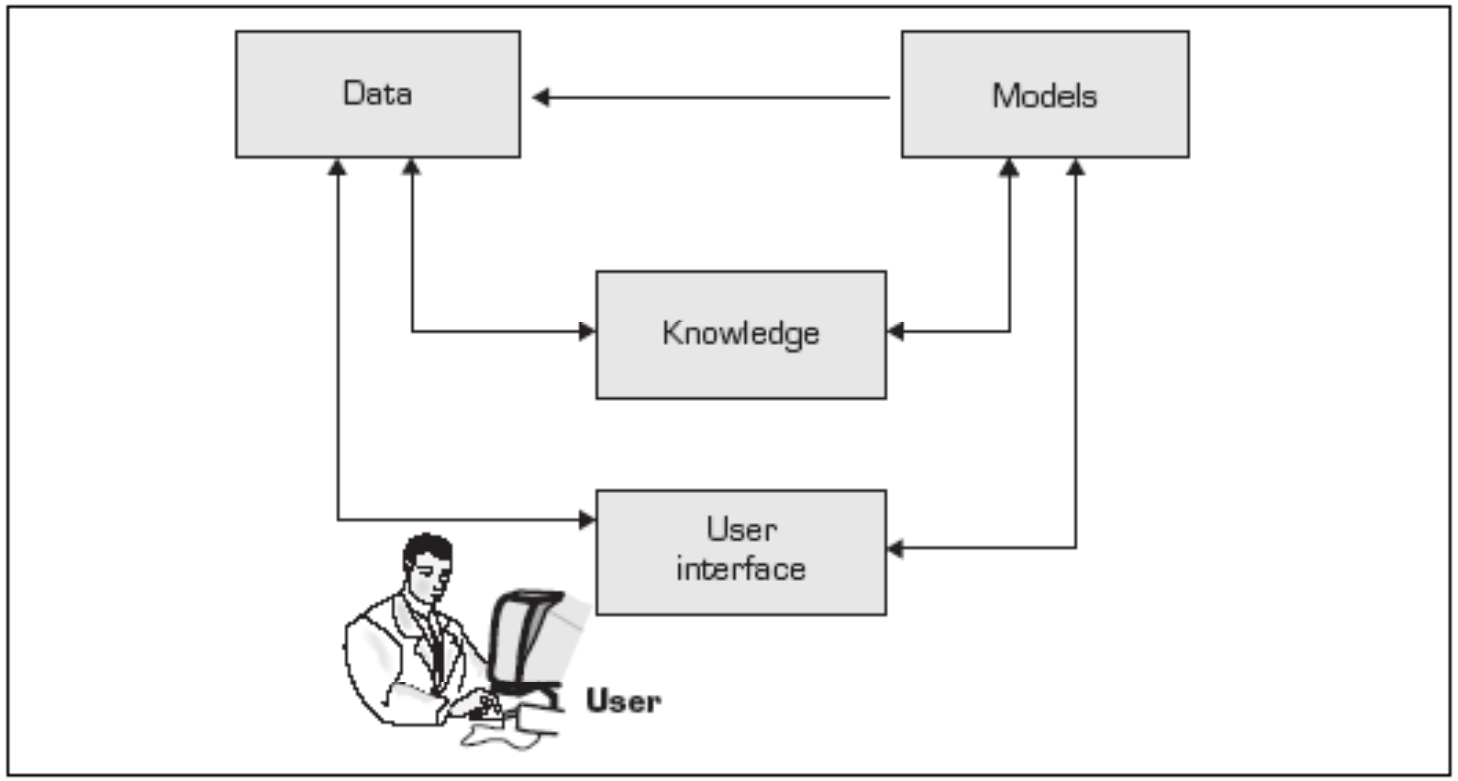


FIGURE 1.5 High-Level Architecture of a DSS

The Concept of Decision Support Systems (DSS)

- **Types of DSS**
  - *model-oriented DSS:* quantitative models used to generate a recommended solution to a problem
  - *data-oriented DSS:* support ad-hoc reporting and queries

Why is the Web considered so important for decision support?

- The Web provides:
  - access to a vast body of data, information, and knowledge available around the world;
  - a common, user-friendly and readily available graphical user interface;
  - the ability to collaborate effectively with remote partners; and
  - availability of intelligent search tools that enable managers to find information they need quickly and inexpensively.

Conclusion

- A new generation of managers evolved
  - Those comfortable with technology
- Technology can directly help them make intelligent business decisions faster
- New tools: OLAP, data warehousing, data mining, intelligent systems, Web technology
- Easy access to tools, models, and data for computer-aided decision making