Chapter 2:

DATA AND KNOWLEDGE MANAGEMENT

Content:

Database Approach, Big Data, Data warehouse and Data Marts
Knowledge Management Business intelligence (BI)
Managers and Decision Making
BI for Data analysis and Presenting Results

LEARNING OBJECTIVES

- Define Database Approach, Big Data, Data warehouse and Data Marts Identify and discuss ERP.
- Identify and discuss Knowledge Management Business intelligence (BI)
- Discuss Acquiring Information Systems and Applications: Managers and Decision Making, BI for Data analysis and Presenting Results

The Database Approach

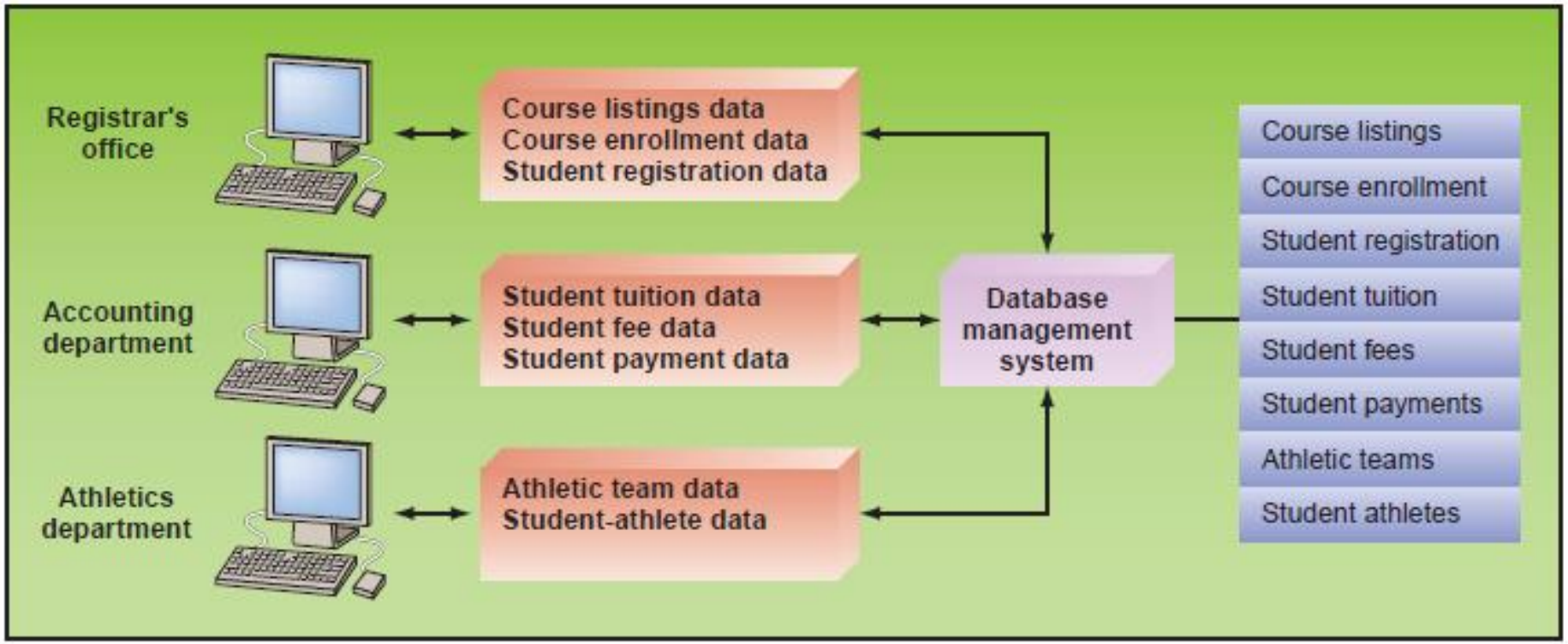


Fig. Database Management System_ university database

The database management system—provides all users with access to all of the data.

Database Management Systems

- A **database management system (DBMS) It** provide users with tools to add, delete, access, modify, and analyze data stored in a single location.
- An organization can access the data by using query and reporting tools that are part of the DBMS or by using application programs specifically written to perform this function.
- DBMSs also provide the mechanisms for maintaining the integrity of stored data, managing security and user access, and recovering information if the system fails
- There are a number of different database architectures, relational database model is popular and easy to use
- Popular examples of relational databases are Microsoft Access and Oracle.

Query Languages

- The most commonly performed database operation is requesting information.
- **Structured query language (SQL)** is the most popular query language used.
- SQL allows people to perform complicated searches by using relatively simple statements or key words.

Typical key words are SELECT (to specify a desired attribute),

FROM (to specify the table to be used), and WHERE (to specify conditions to apply in the query).

Data Dictionary.

Data Dictionary.

- When a relational model is created, the **data dictionary** defines the required format for entering the data into the database.
- The data dictionary provides information on each attribute, such as its name, whether it is a key or part of a key, the type of data expected (alphanumeric, numeric, dates, and so on), and valid values.
- Data dictionaries can also provide information on why the attribute is needed in the database; which business functions, applications, forms, and reports use the attribute; and how often the attribute should be updated.

Normalization.

- To use a relational database management system productively, the data must be analyzed to eliminate redundant data elements.
- **Normalization** is a method for analyzing and reducing a relational database to its most streamlined form to ensure minimum redundancy, maximum data integrity, and optimal processing performance.

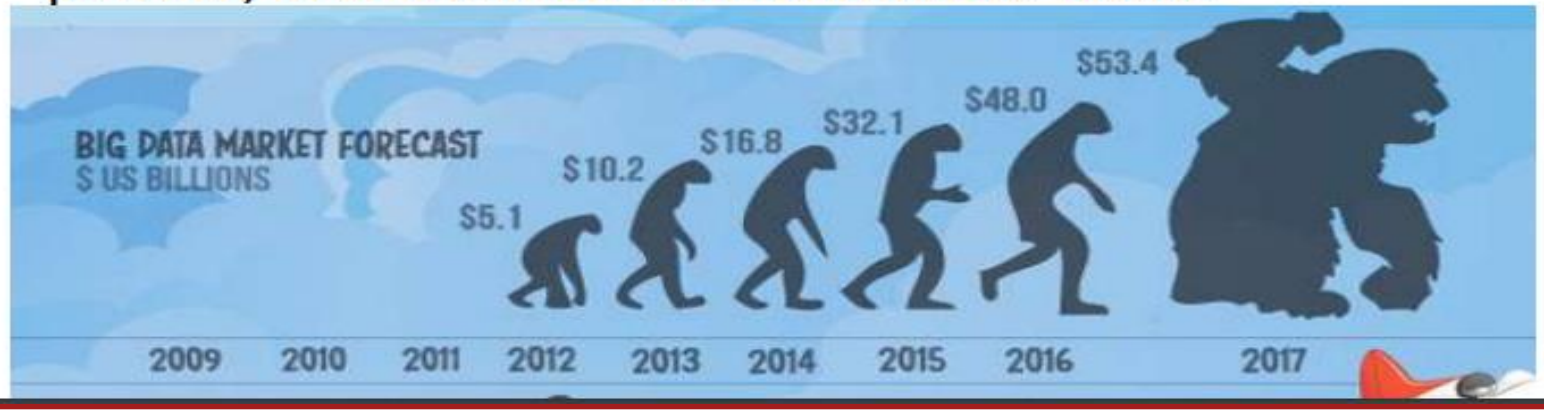
Managing Data

- All IT applications require data. These data should be of high quality, meaning that they should be accurate, complete, timely, consistent, accessible, relevant, and concise.
- Unfortunately, the process of acquiring, keeping, and managing data is becoming increasingly difficult.

Big Data

What is BIG DATA

- Walmart handles more than 1 million customer transactions every hour.
- Facebook handles 40 billion photos from its user base.
- Decoding the human genome originally took 10years to process; now it can be achieved in one week.



What is BIG DATA

•Big Data definition : Big Data meaning a data that is huge in size. Bigdata is a term used to describe a collection of data that is huge in size and yet growing exponentially with time.

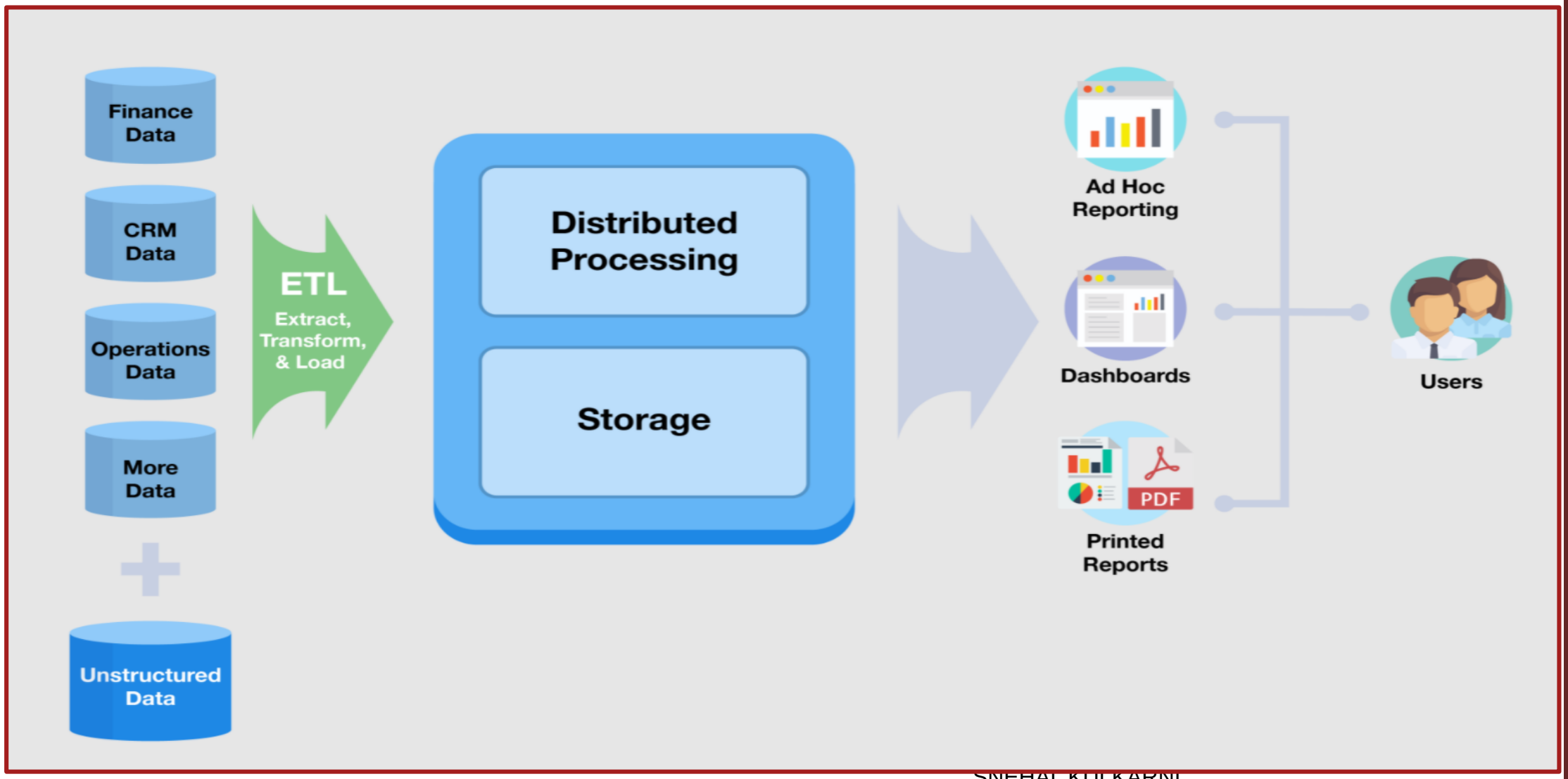
•Big Data analytics examples includes stock exchanges, social media sites etc

•Big Data could be 1) Structured, 2) Unstructured, 3) Semi-structured

•Volume, Variety, Velocity, and Variability are few Big Data characteristics

•Improved customer service, better operational efficiency, Better Decision Making are few advantages of Bigdata

Big Data


Finance Data
CRM Data
Operations Data
More Data
Unstructured Data
ETL
Extract, Transform, & Load
Distributed Processing
Storage
Ad Hoc Reporting
Dashboards
PDF
Printed Reports
Users

VOLUME

It is estimated that **2.5 Quintillion Bytes** (2.3 Trillion GB) of data are created each day

VOLUME

Most companies in the US have at least **100 Terabytes** (100,000 GB) of data stored

The World population at present is 7 Billion, out of which **6 Billion people** have cell people creating enormous data

40 Zettabytes (43 Trillion GB) of data will be created by 2020 an increase of 300 times from 2005

VELOCITY

NYSE

The New York Stock Exchange captures **1 TB** of **Trade Information** during each trading session

By 2016, it is projected there will be **18.9 Billion** Network Connections- almost 2.5 connections per person on earth

VELOCITY

Modern cars have close to **100 Sensors** that can share monitoring data such as fuel level and tire pressure

IDC

Worldwide digital content will **double in 18 months,** and **every 18 months** thereafter.

VARIETY

30 Billion pieces of Content are shared on Facebook every month

400 Million Tweets are sent per day by about 200 Million active users per month

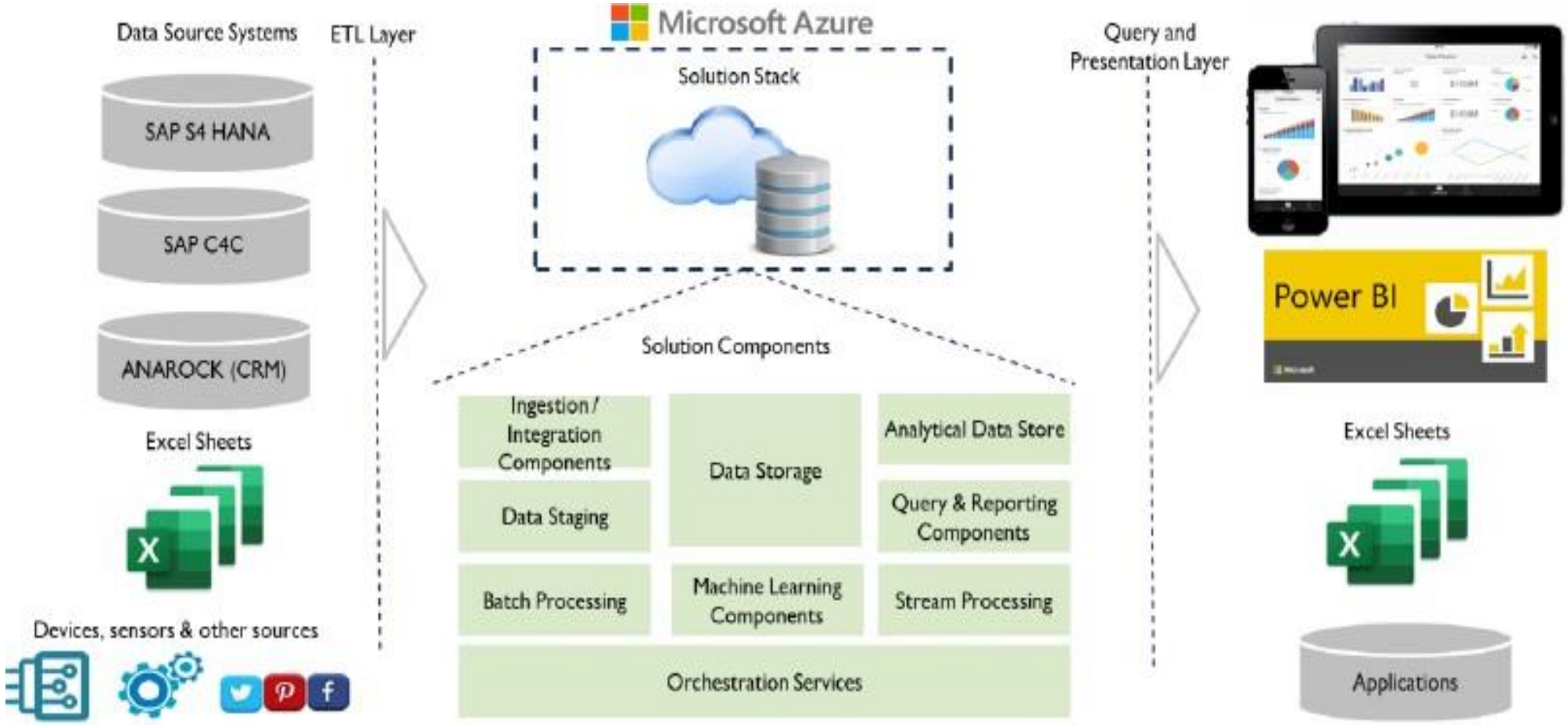
VARIETY

4 Billion+ hours of video are watched only on YouTube each month

Gartner

80% of enterprise **data** will be **unstructured,** spanning traditional and non traditional sources.

MARKET PLAYERS


Data Source Systems
ETL Layer
Microsoft Azure
Solution Stack
Query and Presentation Layer
SAP S4 HANA
SAP C4C
ANAROCK (CRM)
Excel Sheets
Devices, sensors & other sources
Solution Components
Ingestion / Integration Components
Data Storage
Analytical Data Store
Data Staging
Query & Reporting Components
Batch Processing
Machine Learning Components
Stream Processing
Orchestration Services
Power BI
Excel Sheets
Applications

Managing Big Data

- Many organizations are turning to NoSQL databases to process Big Data. These databases provide an alternative for firms that have more and different kinds of data (Big Data)
- Traditional relational databases such as Oracle and MySQL store data in tables organized into rows and columns. Each row is associated with a unique record, for instance a customer account, and each column is associated with a field that defines an attribute of that account (e.g., customer name, customer identification number, customer address, etc.).
- In contrast, **NoSQL databases** can manipulate structured as well as unstructured data and inconsistent or missing data. For this reason, NoSQL databases are particularly useful when working with Big Data.
- Many products utilize NoSQL databases, including CouchDB, MongoDB and Hadoop

- In a relational database, a **book record** is often dissembled (or “normalized”) and stored in separate tables, and relationships are defined by primary and foreign key constraints. In this example, the Books table has **columns for ISBN, Book Title, and Edition Number**, the **Authors table has columns for AuthorID and Author Name**, and finally the Author-ISBN table has columns for AuthorID and ISBN. The relational model is designed to enable the database to enforce referential integrity between tables in the database, normalized to reduce the redundancy, and generally optimized for storage.

- In a NoSQL database, a book record is usually stored as a **JSON** document. For each book, the item, ISBN, Book Title, Edition Number, Author Name, and AuthorID are stored as attributes in a single document. In this model, data is optimized for intuitive development and horizontal scalability.

Application of Big Data

- **AMAZON: ADS BASED ON WHAT YOU BUY**
- **REAL TIME DECISION MAKING**
- **TRANSPORTATION (MAPS, TRAFFIC)**
- **GENERAL ELECTRIC: MORE EFFICIENT, ECO-FRIENDLY AIRPLANES(**optimize fuel use)
- **LIVE MAPS FOR SELF-DRIVING CARS**
- **GOVERNMENT**

Application Of Big Data analytics

Smarter Healthcare

Homeland Security

Traffic Control

Manufacturing

Multi-channel sales

Telecom

Trading Analytics

Search Quality

- **How companies can use big data to gain competitive advantages?**

Leveraging Big Data

Organizations must do more than simply manage Big Data; they must also gain value from it.

In general, there are six broadly applicable ways to leverage Big Data to gain value.

Leveraging Big Data

Creating Transparency	• Simply making Big Data easier for relevant stakeholders to access in a timely manner can create tremendous business value.
Enabling Experimentation	• Experimentation allows organizations to discover needs and improve performance
Segmenting Population to Customize Actions	• Big Data allows organizations to create narrowly defined customer segmentations and to tailor products and services to precisely meet customer needs
Human Decision Making with Automated Algorithms	• Sophisticated analytics can substantially improve decision making, minimize risks, and extract valuable insights
Innovating New Business Models, Products, and Services	• Big Data enables companies to create new products and services, enhance existing ones, and invent entirely new business models

Leveraging Big Data Contd..

2. Enabling Experimentation.

- Experimentation allows organizations to discover needs and improve performance.
- IT enables organizations to set up controlled experiments.
- For example, Amazon constantly experiments by offering slightly different “looks” on its Web site.

Leveraging Big Data Contd..

3. Segmenting Population to Customize Actions.

- Big Data allows organizations to create narrowly defined customer segmentations and to tailor products and services to precisely meet customer needs.
- For example, companies are able to perform micro-segmentation of customers in real time to precisely target promotions and advertising.
- Suppose, for instance, that a company knows you are in one of its stores, considering a particular product. (They can obtain this information from your smartphone, from in-store cameras, and from facial recognition software.)
- They can send a coupon directly to your phone offering 10 percent off if you buy the product within the next five minutes.

Leveraging Big Data Contd..

4. Human Decision Making with Automated Algorithms.

- Sophisticated analytics can substantially improve decision making, minimize risks, and unearth valuable insights.
- For example, tax agencies use automated risk-analysis software tools to identify tax returns that warrant or guarantee for further examination
- Retailers can use algorithms to fine-tune inventories and pricing in response to real-time in-store and online sales.

Leveraging Big Data Contd..

5. Innovating New Business Models, Products, and Services.

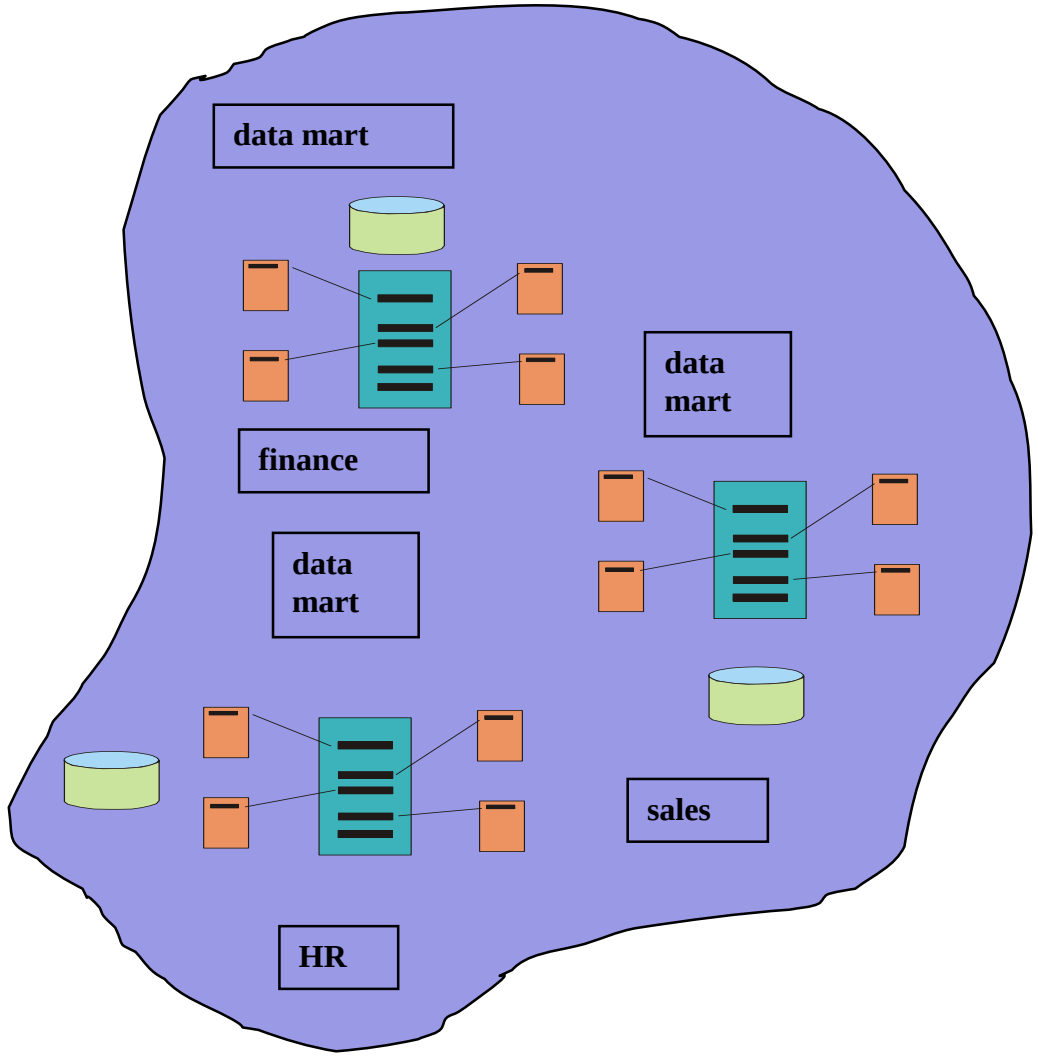
- Big Data enables companies to create new products and services, enhance existing ones, and invent entirely new business models.
- For example, manufacturers utilize data obtained from the use of actual products to improve the development of the next generation of products and to create innovative after-sales service offerings.
- The emergence of real-time location data has created an entirely new set of location-based services ranging from navigation to pricing property and casualty insurance based on where, and how, people drive their cars.

Data warehouses and Data Marts

- Today, the most successful companies are those that can respond quickly and flexibly to market changes and opportunities.
- A key to this response is the effective and efficient use of data and information by analysts and managers.
- The problem is providing users with access to corporate data so that they can analyze the data to make better decisions
- **Data warehouses have been developed to allow users to access data for decision making.**

Data Warehouse & Data Mart

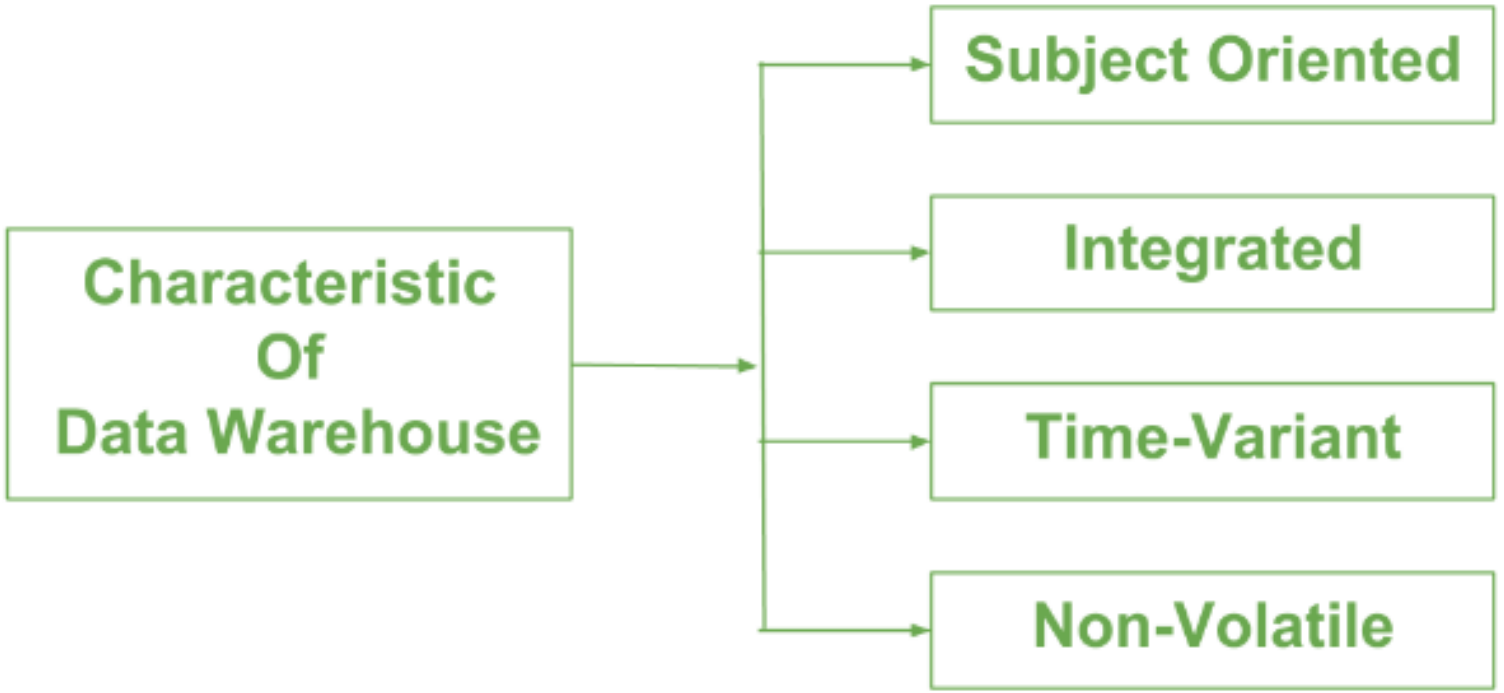
- Data warehouse
  - a data warehouse is the union of all of the data marts designed specifically to support management decision making
- Data mart
  - A subset of a data warehouse for small and medium-size businesses or departments within larger companies
    - Do not normally contain detailed operational data unlike data warehouses.
    - May contain certain levels of aggregation



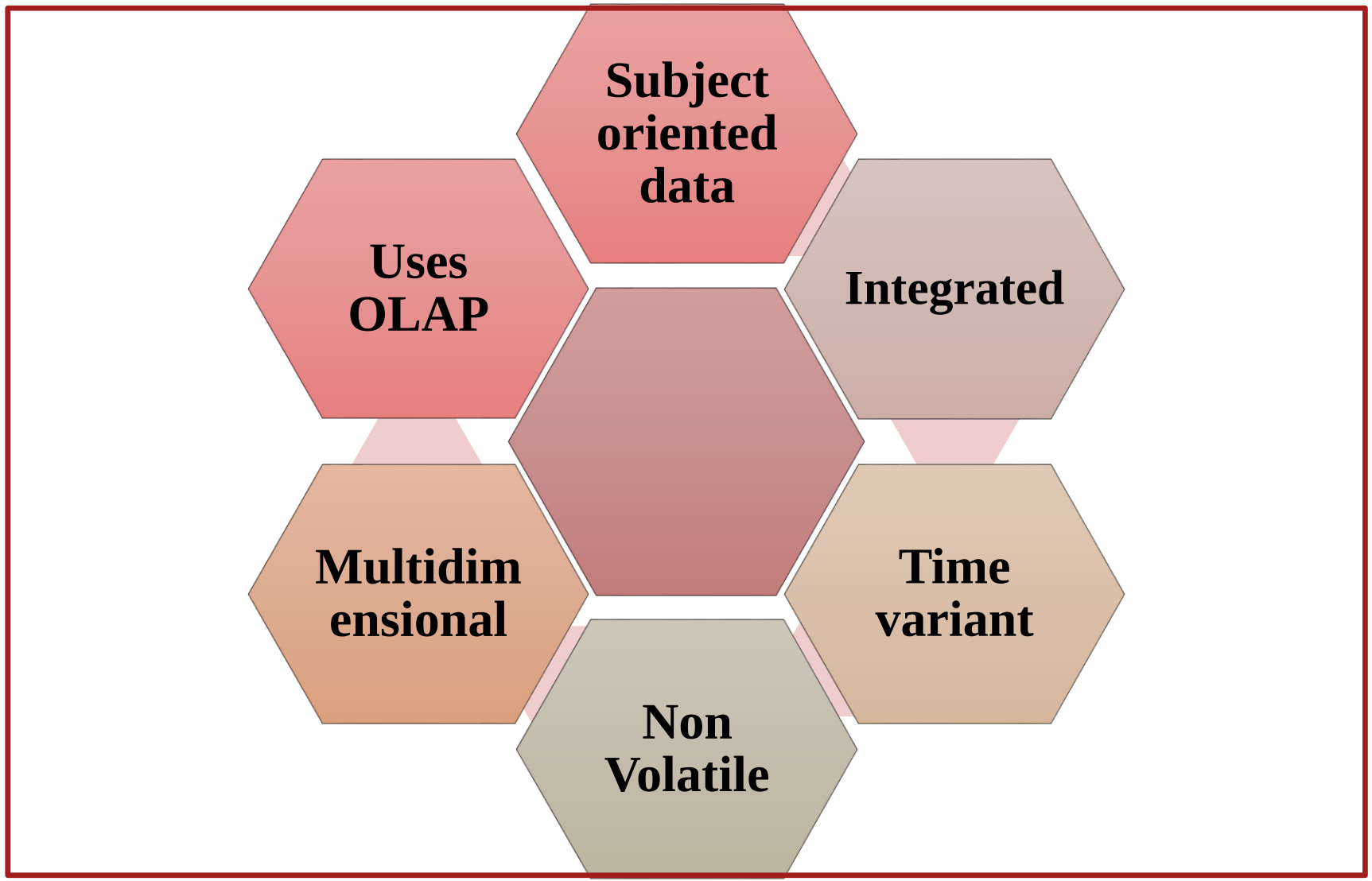
Data Warehouses and Data Marts contd..

- Data warehouses and data marts support business intelligence (BI) applications.
- A **data warehouse** is a repository of historical data that are organized by subject to support decision makers in the organization.
- Because data warehouses are so expensive, they are used primarily by large companies. A **data mart** is a low-cost, scaled-down version of a data warehouse that is designed for the end-user needs in a strategic business unit (SBU) or an individual department.
- Data marts can be implemented more quickly than data warehouses, often in less than 90 days.

Characteristics of data warehouses and data marts



Characteristics of data warehouses and data marts



Characteristics of data warehouses and data marts

1. Subject oriented data:
   - Data warehousing process is proposed to handle with a specific theme which is more defined. These themes can be sales, distributions, marketing, customer, product, region etc.
   - A data warehouse is always a subject oriented as it delivers information about a theme instead of organization's current operations.
2. Integrated.
   - Data are collected from multiple systems and then integrated around subjects.
   - For example, customer data may be extracted from internal (and external) systems and then integrated around a customer identifier, thereby creating a comprehensive view of the customer.

Characteristics of data warehouses and data marts

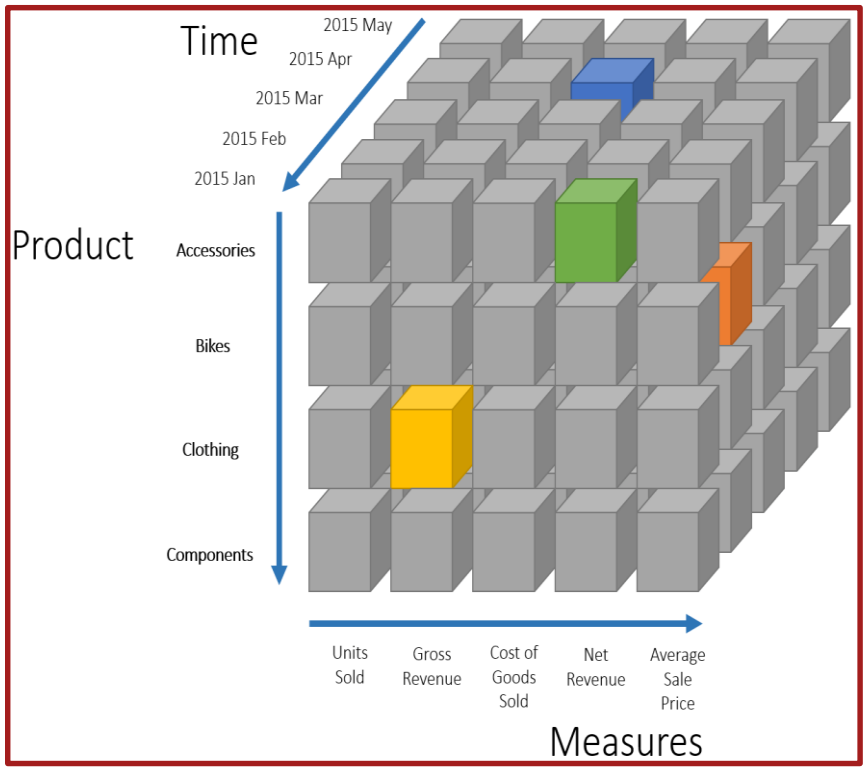
3. Time variant.
   - Data warehouses and data marts maintain historical data
   - Unlike transactional systems, which maintain only recent data (such as for the last day, week, or month), a warehouse or mart may store years of data.
   - Organizations utilize historical data to detect deviations, trends, and long-term relationships

4. Nonvolatile.
   - Data warehouses and data marts are nonvolatile—that is, users cannot change or update the data.
   - Therefore the warehouse or mart reflects history, which, is used for identifying and analyzing trends.

Characteristics of data warehouses and data marts

Multidimensional.

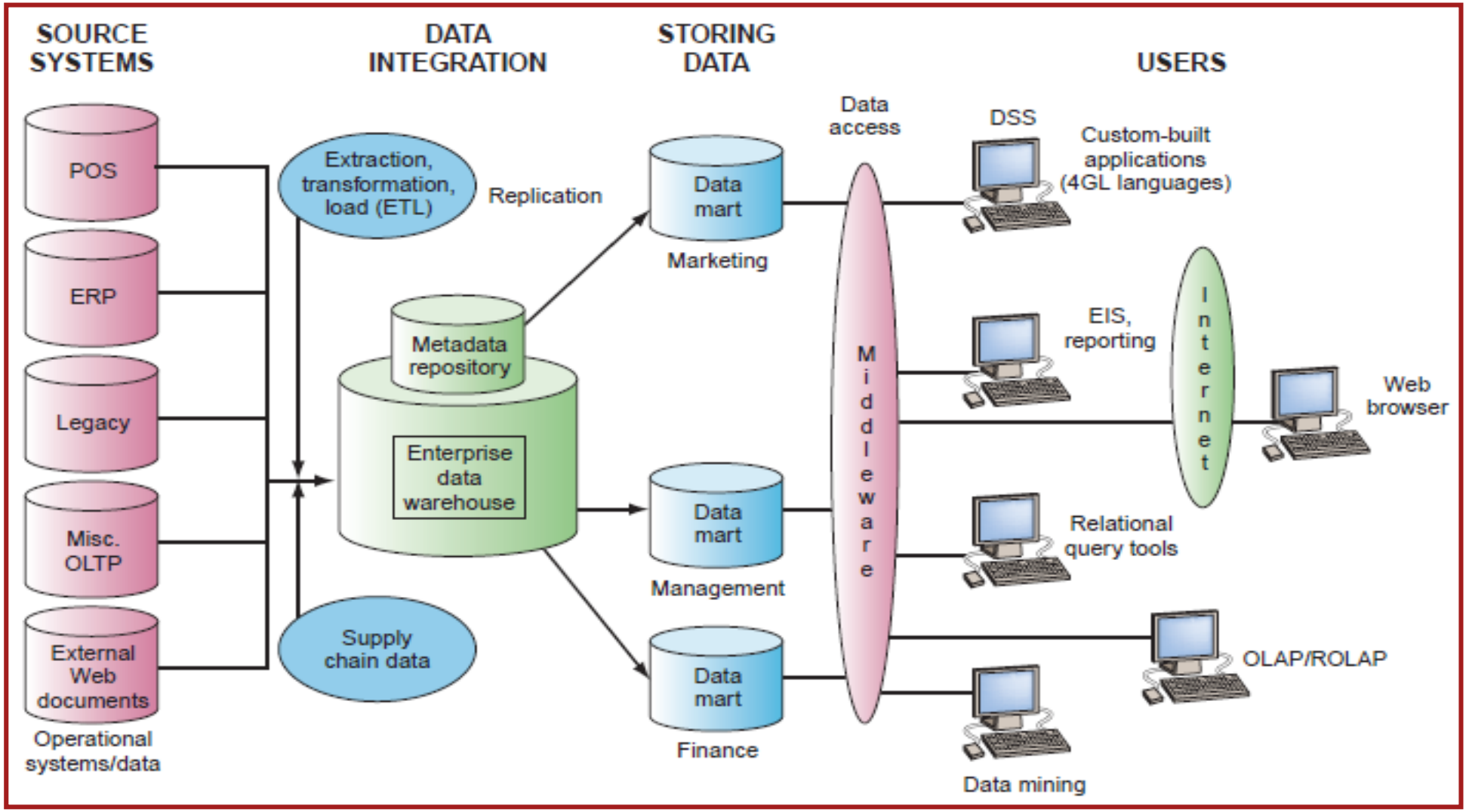
- Typically the data warehouse or mart uses a multidimensional data structure.
- The relational databases store data in two-dimensional tables.
- In contrast, data warehouses and marts store data in more than two dimensions. For this reason, the data are said to be stored in a **multidimensional structure**.
- A common representation for this multidimensional structure is the data cube.



Characteristics of data warehouses and data marts

- Use online analytical processing.
  - Typically, organizational databases are oriented toward handling transactions. That is, databases use online transaction processing (OLTP), where business transactions are processed online as soon as they occur.
  - Data warehouses and data marts, which are designed to support decision makers but not OLTP, use online analytical processing. Online analytical processing (OLAP) involves the analysis of accumulated data by end users.

A Generic Data Warehouse Environment



A Generic Data Warehouse Environment

The environment for data warehouses and marts includes the following:

- Source systems that provide data to the warehouse or mart
- Data-integration technology and processes that prepare the data for use
- Different architectures for storing data in an organization's data warehouse or data marts
- Different tools and applications for the variety of users.
- Metadata, data-quality, and governance processes that ensure that the warehouse or mart meets its purposes

Knowledge Management

- **Knowledge management (KM)** is a process that helps organizations manipulate important knowledge that comprises part of the organization's memory, usually in an unstructured format.
- For an organization to be successful, knowledge, as a form of capital, must exist in a format that can be exchanged among persons. In addition, it must be able to grow.

Explicit and Tacit Knowledge

Explicit Knowledge

- **It** deals with more objective, rational, and technical knowledge.
- In an organization, explicit knowledge consists of the policies, procedural guides, reports, products, strategies, goals, core competencies, and IT infrastructure of the enterprise.
- In other words, explicit knowledge is the knowledge that has been codified (documented) in a form that can be distributed to others or transformed into a process or a strategy.
- A description of how to process a job application that is documented in a firm's human resources policy manual is an example of explicit knowledge.

Explicit and Tacit Knowledge contd..

Tacit knowledge

- **It** is the cumulative store of subjective or experiential learning.
- In an organization, tacit knowledge consists of an organization's experiences, insights, expertise, know-how, trade secrets, skill sets, understanding, and learning.
- It also includes the organizational culture, which reflects the past and present experiences of the organization's people and processes, as well as the organization's prevailing values.
- Tacit knowledge is generally vague and costly to transfer. It is also highly personal.

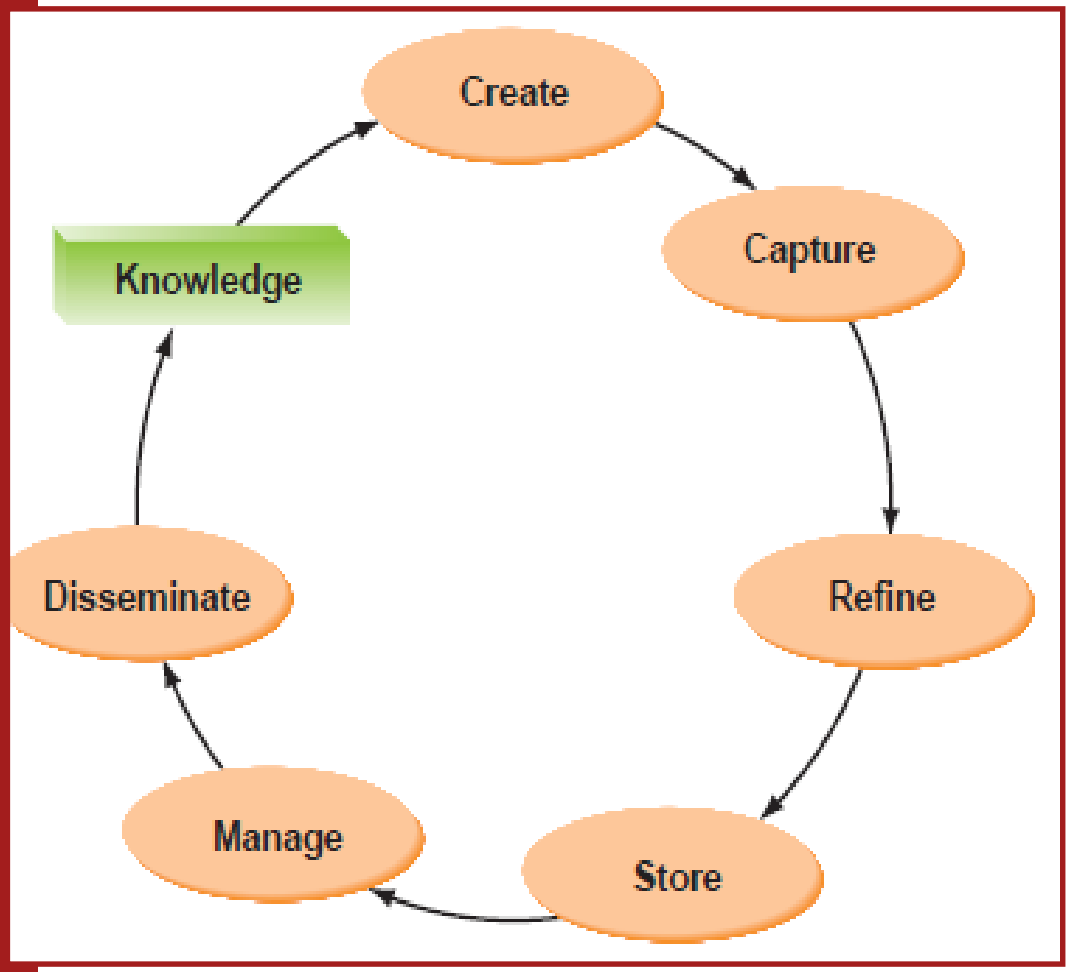
Knowledge Management Systems

- **Knowledge management systems (KMSs)** refer to the use of modern information technologies—the Internet, intranets, extranets, databases—to systematize, enhance, and expedite intrafirm and interfirm knowledge management.

Benefits with KMS

- They make **best practices**, the most effective and efficient ways of doing things, readily available to a wide range of employees.
- Enhanced access to best-practice knowledge improves overall organizational performance.
- For example, account managers can now make available their tacit knowledge about how best to manage large accounts.
- The organization can then utilize this knowledge when it trains new account managers.
- Other benefits include improved customer service, more efficient product development, and improved employee morale and retention.

The KMS Cycle



- A functioning KMS follows a cycle that consists of six steps.
- The reason the system is cyclical is that knowledge is dynamically refined over time.
- The knowledge in an effective KMS is never finalized because the environment changes over time and knowledge must be updated to reflect these changes.

The KMS Cycle

1. Create knowledge.

Knowledge is created as people determine new ways of doing things or develop know-how.

2. Capture knowledge.

New knowledge must be identified as valuable and be represented in a reasonable way.

3. Refine knowledge.

New knowledge must be placed in context so that it is actionable. This is where tacit qualities (human insights) must be captured along with explicit facts.

The KMS Cycle contd..

4. Store knowledge.

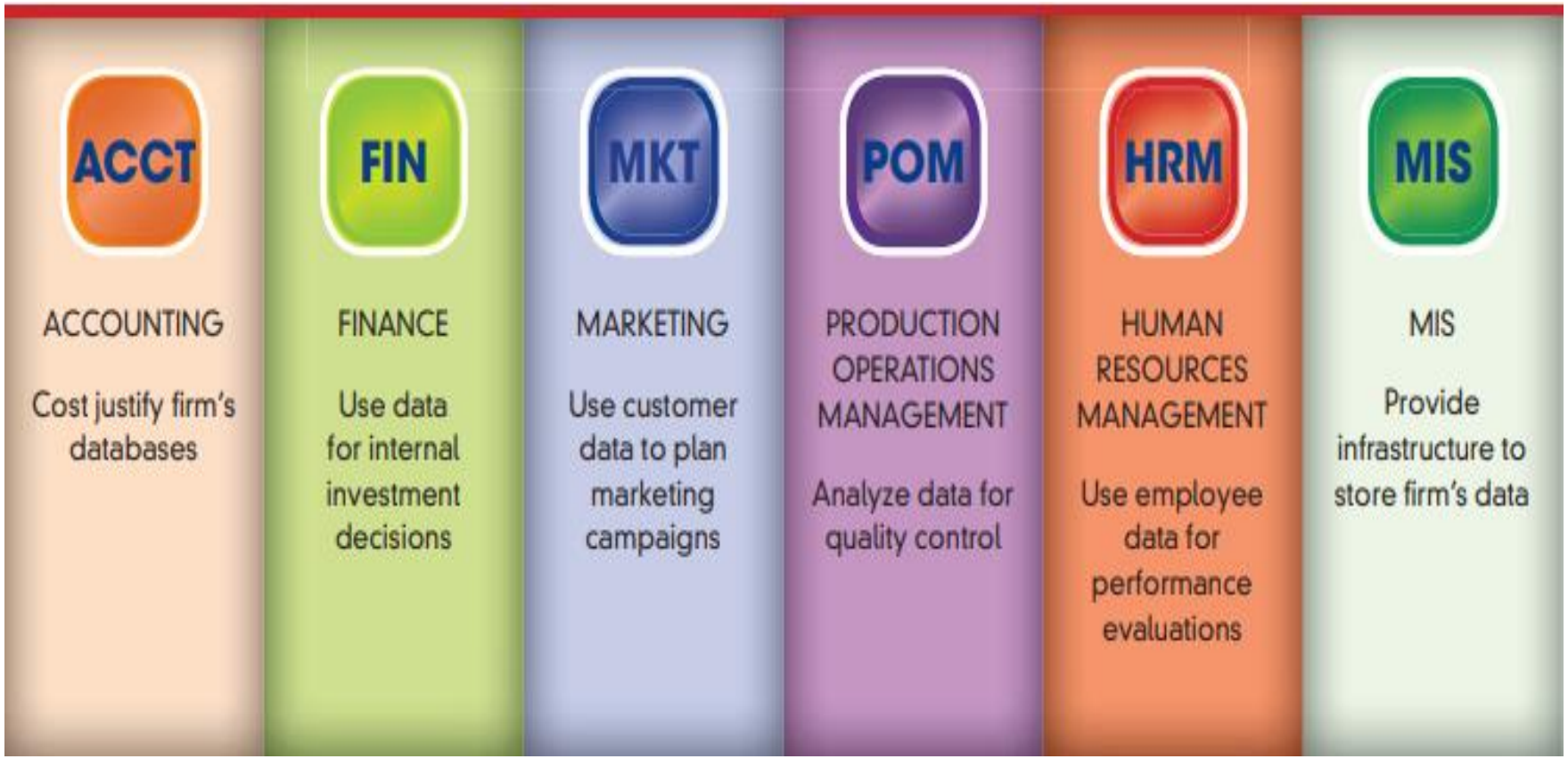
Useful knowledge must then be stored in a reasonable format in a knowledge repository so that others in the organization can access it.

5. Manage knowledge.

Like a library, the knowledge must be kept current. It must be reviewed regularly to verify that it is relevant and accurate.

6. Disseminate knowledge.

Knowledge must be made available in a useful format to anyone in the organization who needs it, anywhere and anytime


ACCT
ACCOUNTING
Cost justify firm's databases
FIN
FINANCE
Use data for internal investment decisions
MKT
MARKETING
Use customer data to plan marketing campaigns
POM
PRODUCTION OPERATIONS MANAGEMENT
Analyze data for quality control
HRM
HUMAN RESOURCES MANAGEMENT
Use employee data for performance evaluations
MIS
MIS
Provide infrastructure to store firm's data

Managers and Decision Making

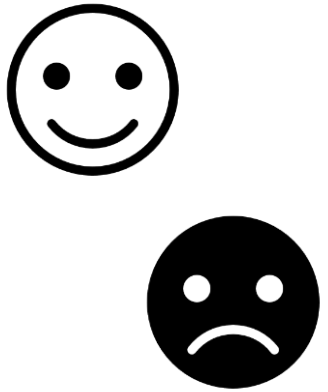
EXCERCISE – WHAT ISTHE INFORMATION NEEDED BY THE FOLLOWING ROLES? DESIGN REPORTS (FIELDS, ATTRIBUTES) FOR THE SAME

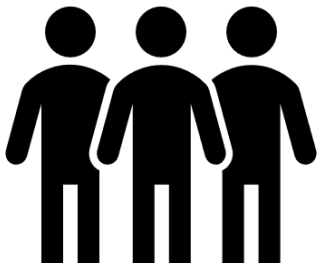
- In Bank – Accountant, Branch Manager, CFO
- In Sales – Salesman, Sales Manager, Director of Sales
- In Operations – Shop floor supervisor, Plant Production Manager, Head of Operations, CEO
- In Procurement – Procurement Officer, Head of Procurement, CFO
- In a Retail store – Merchandising Executive, Floor Manager, Store Manager
- In an Insurance firm – Insurance Agent, Regional Manager, Portfolio Manager
- In IT department – Programmer, Project Manager, CIO
- In a Warehouse – Inventory officer /Store Manager, Warehouse Manager, Head of Logistics

Data analysis


FINAL SALE
60% OFF
20%
10% OFF
COUPON
10% Off
50% OFF
30% OFF


CEO






ACCT
ACCOUNTING
Uncover fraudulent transactions
FIN
FINANCE
Make stock market investment decisions
MKT
MARKETING
Allocate advertising budgets
POM
PRODUCTION OPERATIONS MANAGEMENT
Schedule production activities
HRM
HUMAN RESOURCES MANAGEMENT
Control job applicant process
MIS
MIS
Provide information in dashboards

What if you could analyze your past business performances and results, and use that information to prepare for the future?

That is essentially what business analytics is all about.


HAVING CONDUCTED A COMPREHENSIVE ANALYSIS OF DOZENS OF SUBSETS OF DATA FROM A WIDE RANGE OF SOURCES WE'VE CONFIRMED THAT THE LIKELY ANSWER IS 36...NOW WE JUST NEED TO IDENTIFY THE QUESTION!
CS271668
CARTOONSTOCK
A CARTOON COLLECTIONS COMPANY
FRAN

What is Analytics ?

- Organizations, people, and things are generating massive amounts of data every day.
  - **In a 24-hour period, we collectively send 294 billion e-mails and 500 million tweets.**
  - **We plug 3.5 billion searches into Google.**
  - **Even our watches, fridges, and TVs are constantly creating and sharing data.**
- Hidden in all this data are insights that can trigger explosive business growth. The challenge is in finding them, **which is where analytics comes in.**
- **"Analytics is a field of computer science that uses math, statistics, and machine learning to find meaningful patterns in data. Analytics – or data analytics – involves sifting through massive data sets to discover, interpret, and share new insights and knowledge."**

Business Analytics

"business analytics is analytics applied to business data. It focuses on the business implications of data – and the decisions and actions that should be taken as a result".

Business analytics

- Business analytics entails the analysis of data to create predictive models, as well as the application of optimization techniques, and communicating the results to employees and customers.
- It utilizes a data-driven methodology to the business environment, and as such relying on statistics and data modeling to create insights for the business.

Common components of business analytics

- Data mining
- Big data analytics
- Text Mining
- Forecasting and predictive analytics
- Simulation and what-if analysis
- Data visualization

Business Intelligence (BI)

- Business intelligence (BI) refers to the procedural and technical infrastructure that collects, stores, and analyzes the data produced by a company's activities.

- BI is a broad term that encompasses data mining, process analysis, performance benchmarking, and descriptive analytics. BI parses all the data generated by a business and presents easy-to-digest reports, performance measures, and trends that inform management decisions.


How Business Intelligence helps?
Better decission making process by eliminating guesswork
Fast answers to any business query
Know your business with key matrics report
Enables real-time analysis with Quick Navigatoin
Integrating budgeting & planning process to centralized application
Identify cross-selling & up-selling opprotunities

Business Intelligence

Business Intelligence Applications for Presenting Results

Business Analytics

Contents

- Managers and Decision Making
- The Business Analytics Process
- Business Analytics Tools
- Business Analytics Models: Descriptive Analytics, Predictive Analytics, and Prescriptive Analytics

- **Business Analytics (BA)**
- **Business Intelligence (BI)**
- **BA versus BI**

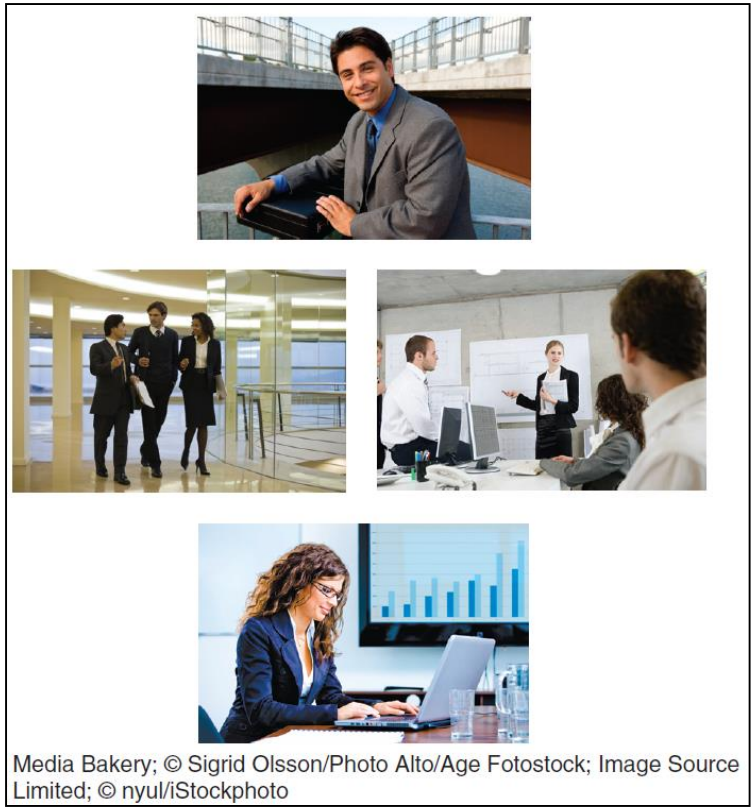
While business intelligence (BI) involves taking a thorough look at past, present and historic operations and collecting data, business analysis (BA) is about using the data to identify the current challenges and predicting future hardships and gearing business towards better productivity and a more stable future.

Managers and Decision Making

- The Manager's Job and Decision Making
- Why Managers Need IT Support
- A Framework for Computerized Decision Analysis

The Manager's Job and Decision Making

- Three Basic Roles of Managers
- Decision
- Four Phases of Decision Making



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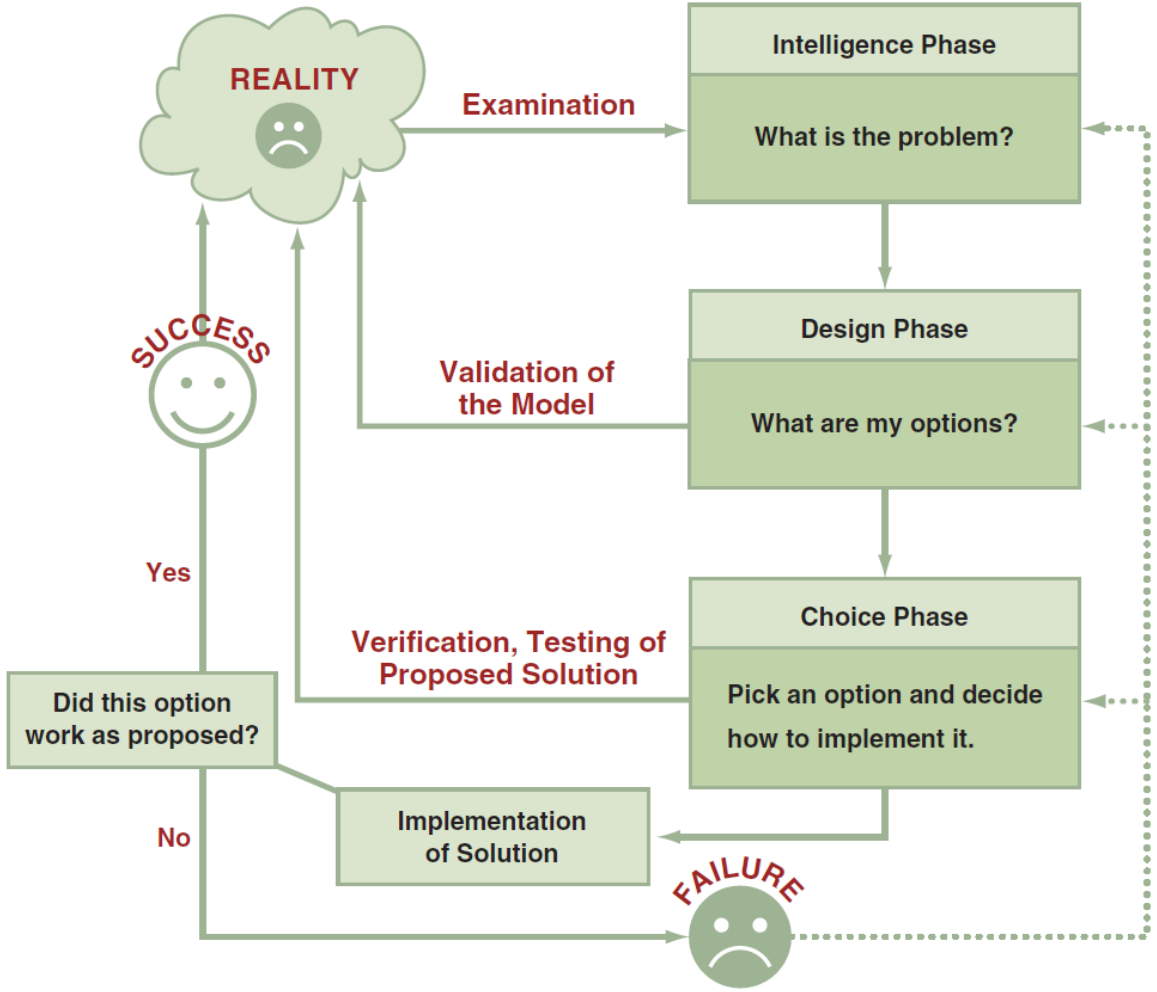
Three Basic Roles of Managers

- Interpersonal Roles : Leader
- Informational Roles : Monitor ,disseminator ,spokesperson
- Decisional Roles: Negotiator

The Process and Phases in Decision Making



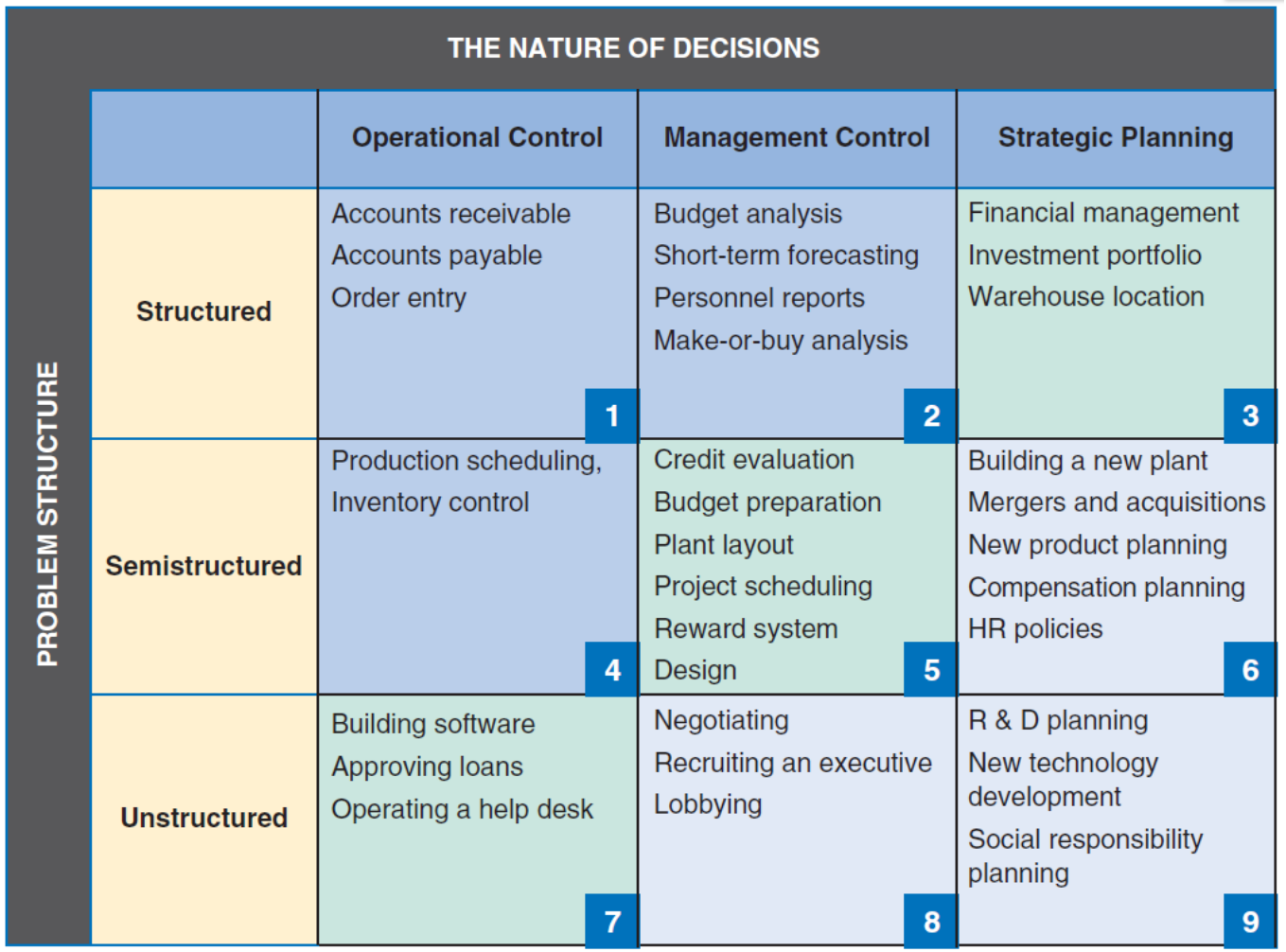
Why Managers Need IT Support

- The number of alternatives is constantly increasing
- Most decisions are made under time constraints
- Increased uncertainty requires sophisticated analyses
- Group decision making required without incurring major expenses

A Framework for Computerized Decision Analysis

- Problem Structure
- The Nature of Decisions
  - **Operational Control**: executing specific tasks efficiently and effectively
  - **Management control** :acquiring and using resources efficiently in accomplishing organizational goals
  - **Strategic Planning :** —the long-range goals and policies for growth and resource allocation
  - Decision Matrix

Decision Support Framework



PROBLEM STRUCTURE	THE NATURE OF DECISIONS: Operational Control	Management Control	Strategic Planning
Structured	Accounts receivable Accounts payable Order entry 1	Budget analysis Short-term forecasting Personnel reports Make-or-buy analysis 2	Financial management Investment portfolio Warehouse location 3
Semistructured	Production scheduling, Inventory control 4	Credit evaluation Budget preparation Plant layout Project scheduling Reward system Design 5	Building a new plant Mergers and acquisitions New product planning Compensation planning HR policies 6
Unstructured	Building software Approving loans Operating a help desk 7	Negotiating Recruiting an executive Lobbying 8	R & D planning New technology development Social responsibility planning 9

The Business Analytics Process

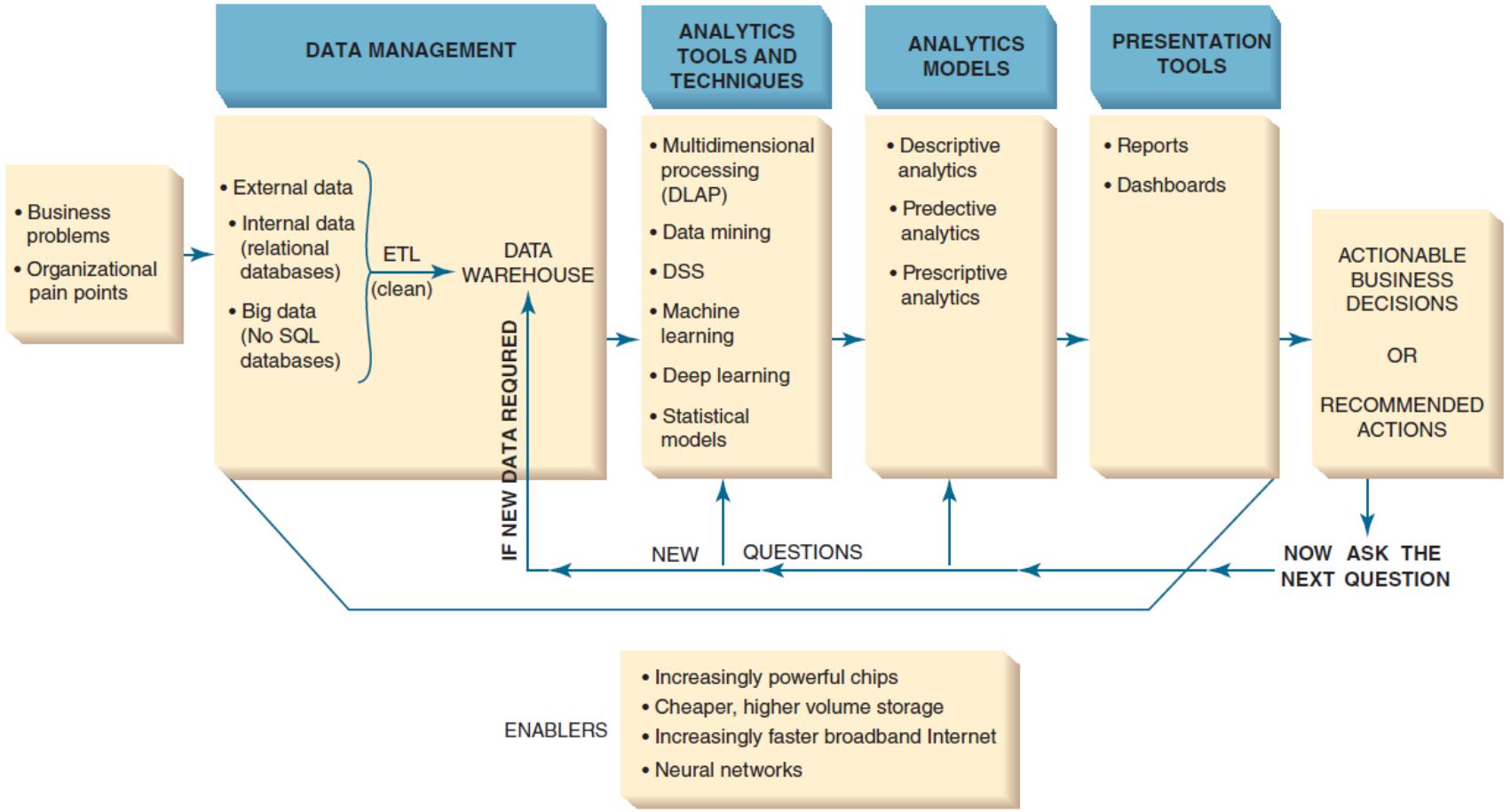


FIGURE 5.3 The Business Analytics Process

Business Analytics Tools

- Excel
- Multidimensional Analysis or Online Analytical Processing
- Data Mining
- Decision Support Systems

Multidimensional Analysis or Online Analytical Processing

- Online Analytical Processing
- Multi-dimensional Analysis

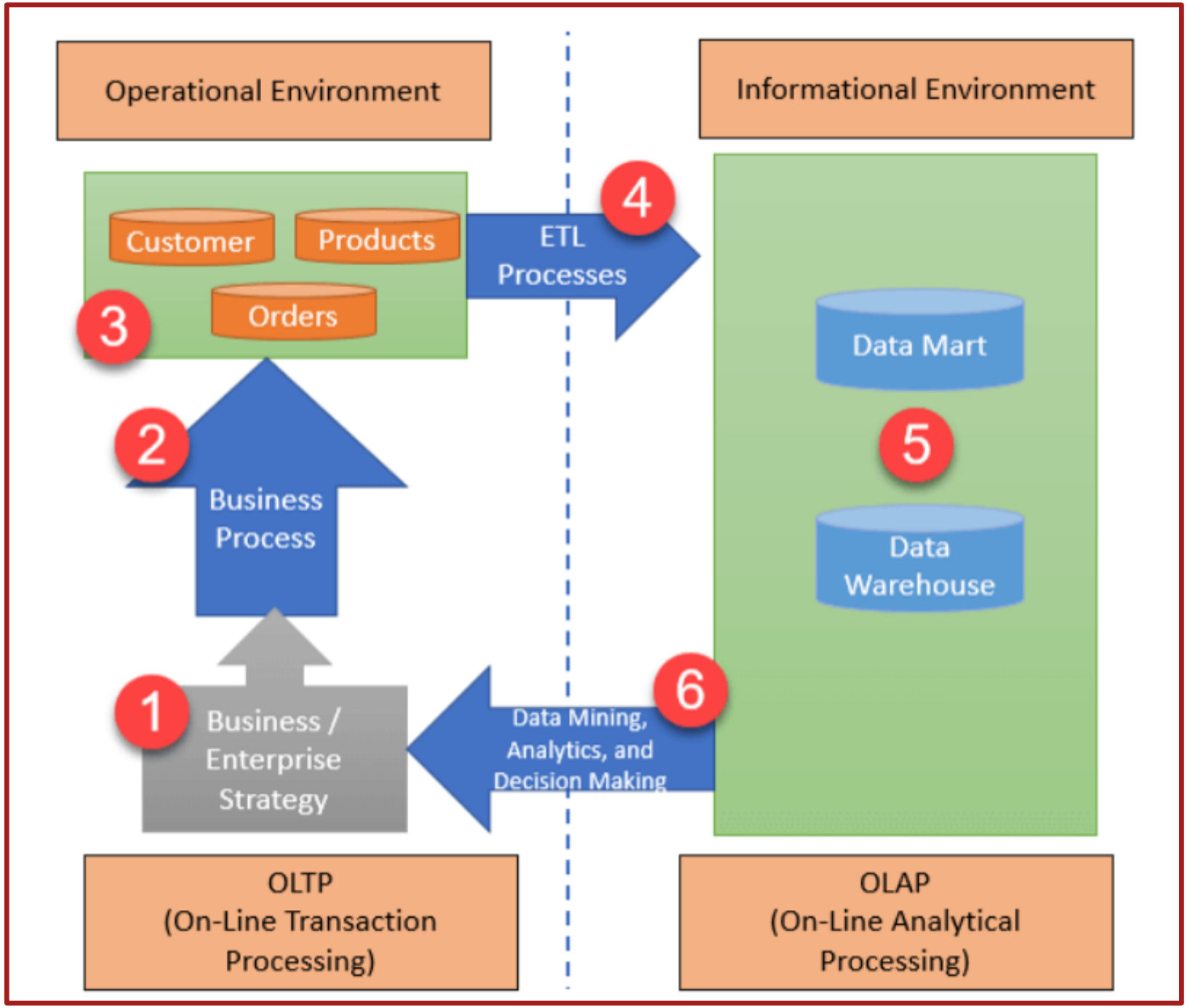
OLAP & OLTP

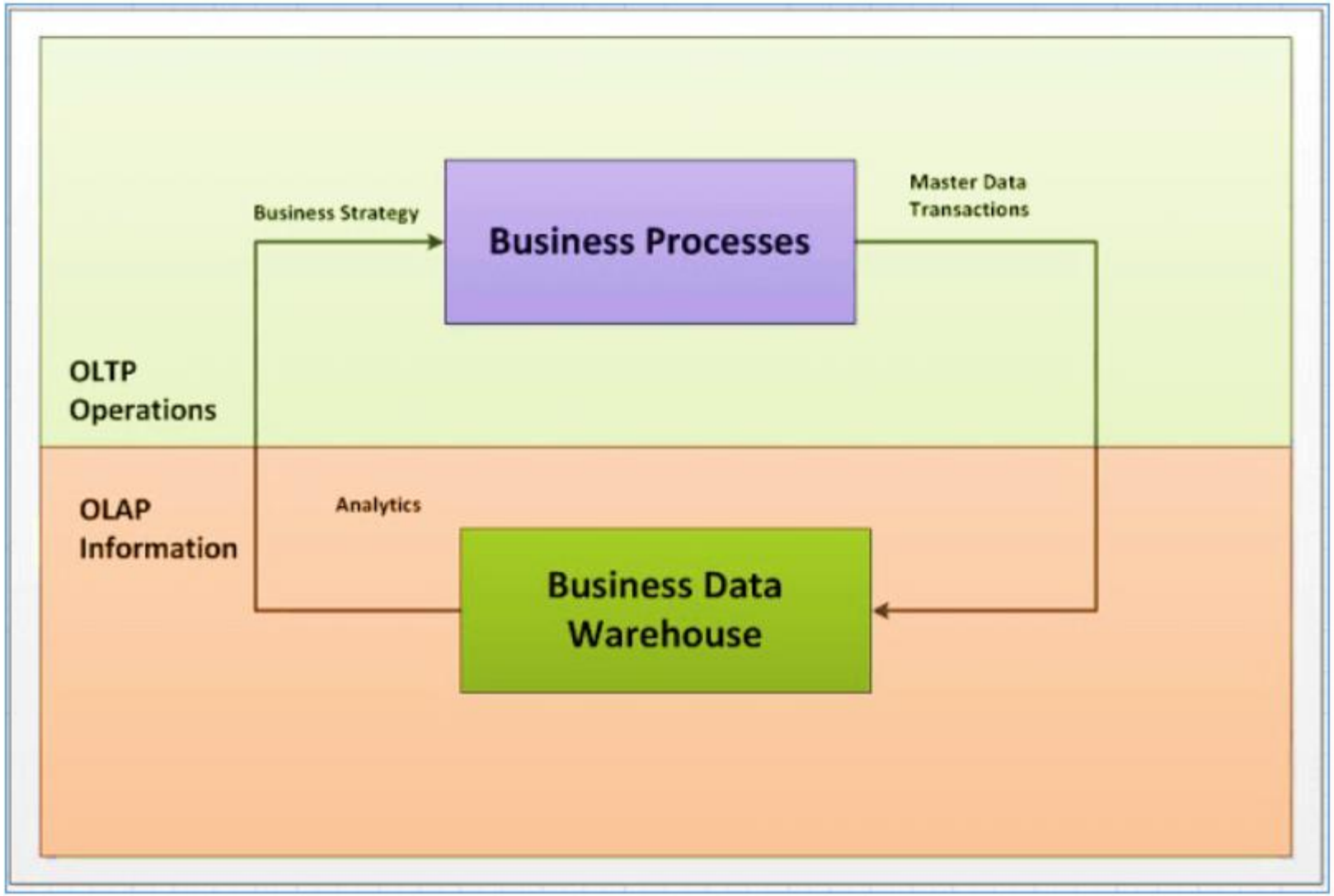
- If I have to find the bank statement weekly /monthly ?
- If bank want to find the overall performance demographically since10 years of establishment ?
- If D-Mart wants to find the highest sold product today and if authorities wanted to see the sale of particular product in different demographically situated branches?
- Car company wants to know the ups and downs of sale of any category from last 15 years

Done with the help of OLTP & OLAP

Online Transaction Processing (OLTP) and Online Analytic Processing (OLAP)

- OLAP or ***Online Analytical Processing*** is a technology that analyzes a large amount of data kept in a data warehouse. In OLAP environment all the data performed in multidimensional cubes, enabling users to detail, consolidate, and rotate it so that to see it from various perspectives and analyze trends.
- OLTP stands for ***Online Transaction Processing***, which is typically marked by far less complex queries which are conducted in a larger volume. OLTP is to process a big number of online transactions, though short, in real time dealing with such kinds of queries as Read, Insert, Update and Delete.

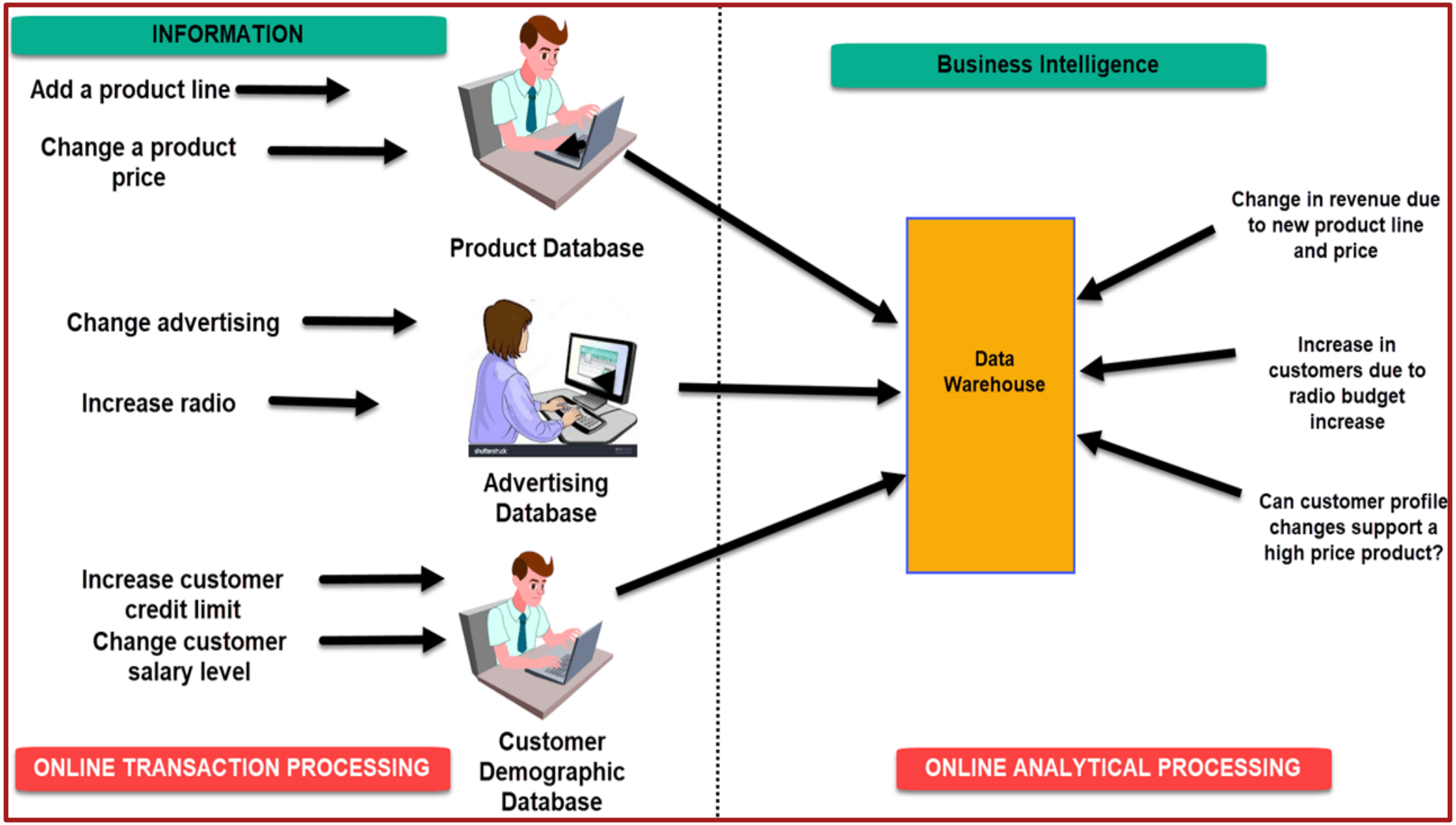

Operational Environment
Informational Environment
Customer
Products
Orders
3
4
ETL
Processes
Data Mart
5
Data
Warehouse
2
Business
Process
1
Business /
Enterprise
Strategy
6
Data Mining,
Analytics, and
Decision Making
OLTP
(On-Line Transaction
Processing)
OLAP
(On-Line Analytical
Processing)


Business Strategy
Business Processes
Master Data
Transactions
OLTP
Operations
OLAP
Information
Analytics
Business Data
Warehouse

OLTP vs OLAP

OLAP AND OLTP

OLTP	OLAP
OLTP is characterized by a large number of short on-line transactions (INSERT, UPDATE, DELETE).	OLAP is characterized by relatively low volume of transactions.
OLTP queries are simple and easy to understand.	OLAP Queries are often very complex and involve aggregations.
OLTP is widely used for small transaction.	OLAP applications are widely used by Data Mining techniques.
OLTP is highly normalized.	OLAP is typically de-normalized.
OLTP is used for Backup religiously.	OLAP is used for regular backup.
OLTP usually uses schema used to store transnational databases is the entity model (usually 3NF).	OLAP uses star model to store the data.
Performance of OLTP is comparably fast as compared to OLAP.	Performance of OLAP is comparably low as compared to OLTP.


INFORMATION
Add a product line
Change a product price
Product Database
Change advertising
Increase radio
Advertising Database
Increase customer credit limit
Change customer salary level
Customer Demographic Database
ONLINE TRANSACTION PROCESSING
Business Intelligence
Data Warehouse
Change in revenue due to new product line and price
Increase in customers due to radio budget increase
Can customer profile changes support a high price product?
ONLINE ANALYTICAL PROCESSING

Data Mining

- Two Basic Data Mining Operations
  - Predicting trends and behaviors
  - Identifying previously unknown patterns

Data-Mining Applications Used in Business and Other Fields

- Retailing and Sales
- Banking
- Manufacturing & Production
- Insurance
- Police work
- Healthcare

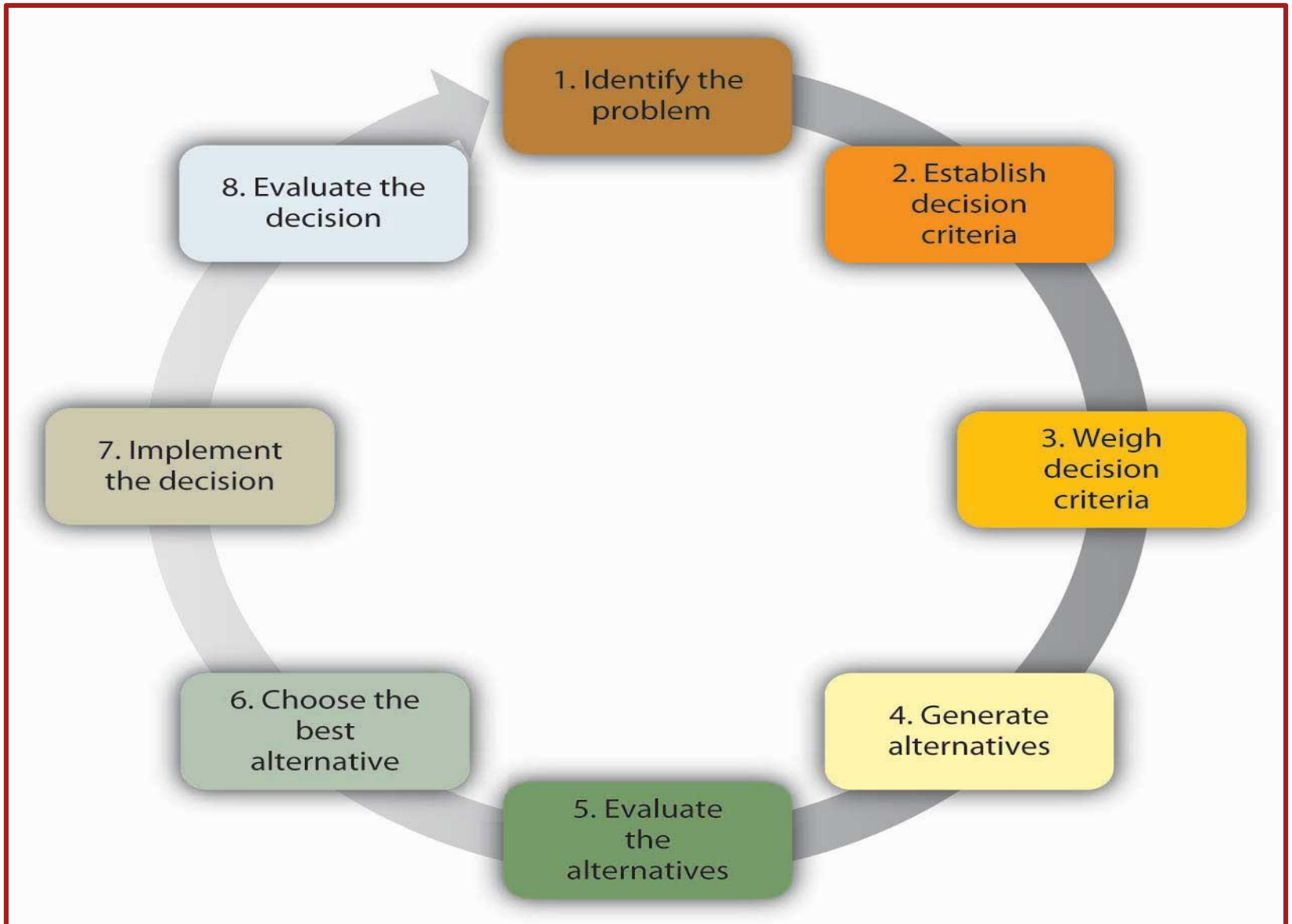
Data-Mining Applications Used in Business and Other Fields

- Marketing
- Politics
- Weather
- Higher Education
- Social Good

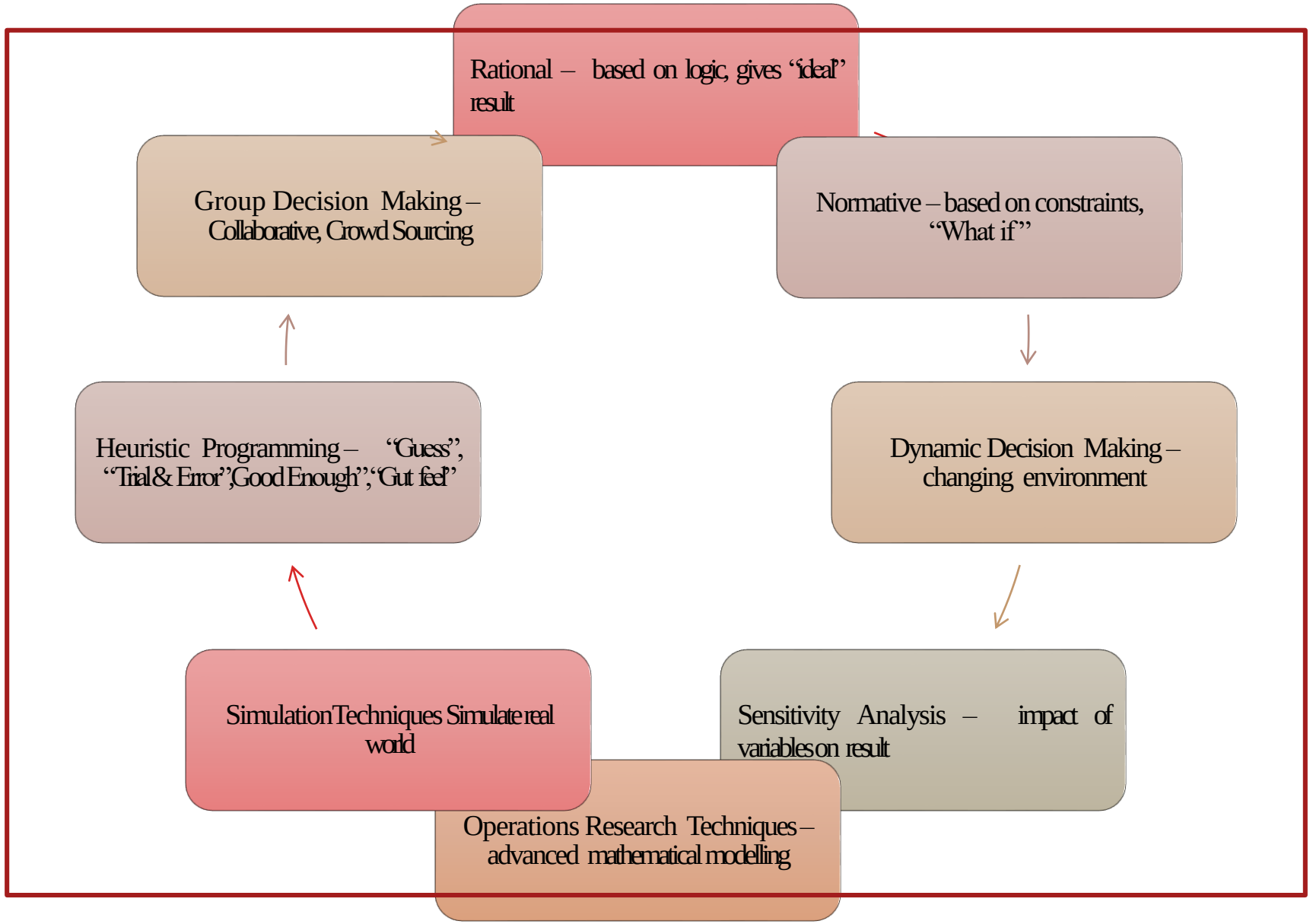
Decision Support Systems (DSS)

- Sensitivity Analysis
- What-If Analysis
- Goal-Seeking Analysis

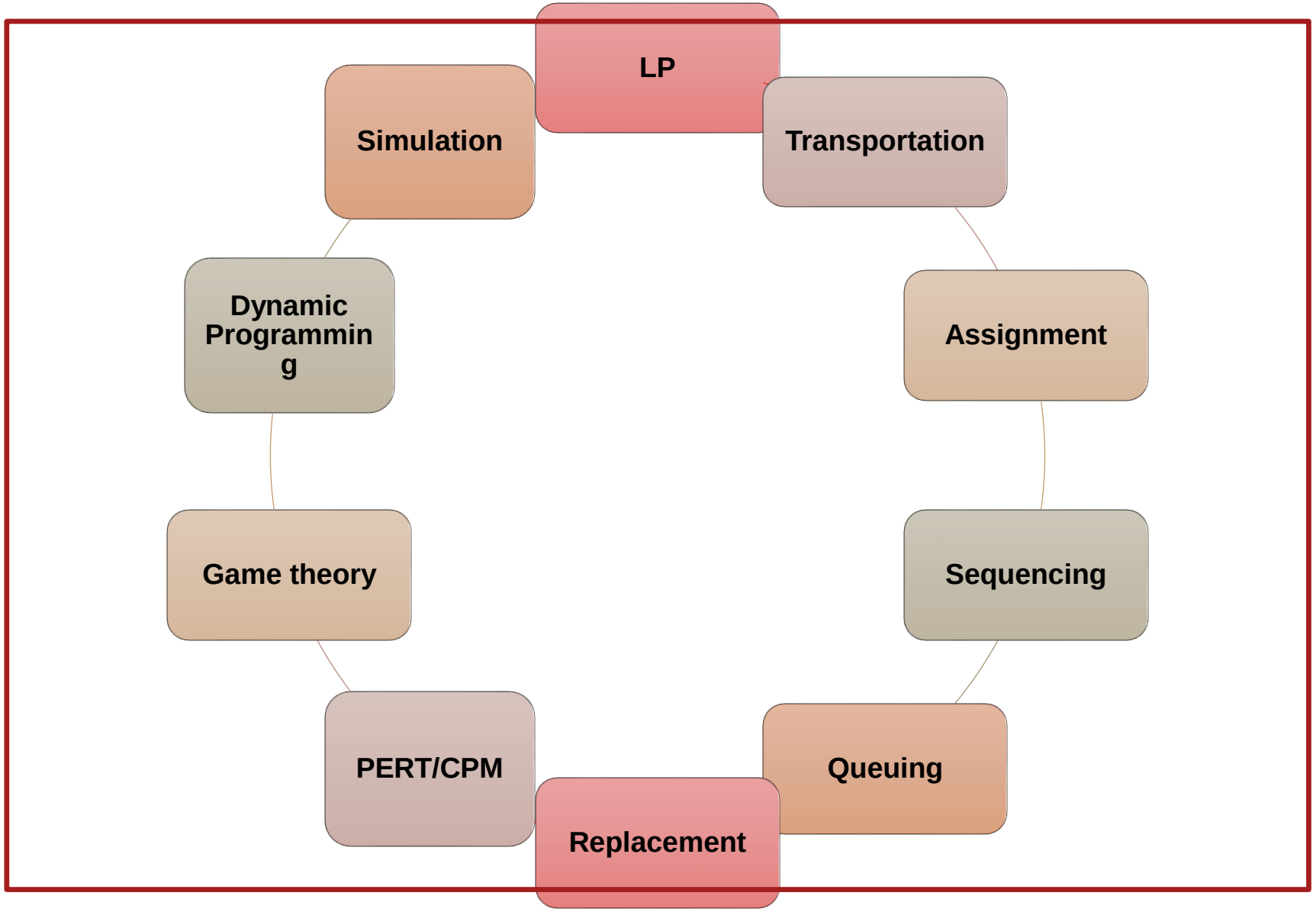
8 STEP DECISION MAKING PROCESS



DIFFERENT DECISION MAKING MODELS



Decision making Models



Business Analytics Models: Descriptive, Predictive, and Prescriptive Analytics

- Descriptive Analytics
- Predictive Analytics
- Prescriptive Analytics
- Presentation Tools

Types of analytics

When used together, this super tool kit can give decision-makers a complete understanding of **what** is happening, **why** it's happening, **what** will happen next, and **what** to do about it – in any scenario.

4 Types

VALUE

reviewing the number of people that visited the company's website over the past few months

can be used to determine why certain advertisements resulted in increased conversion rates.

indicating which incoming sales leads will have the highest chance of converting into an actual customer

measure the number of patients who are clinically obese, then add filters for factors like diabetes and LDL cholesterol levels to determine where to focus treatment

1

Descriptive

Based on Live Data, Tells what's happening in real time

Accurate & Handy for Operations management

Easy to Visualize

2

Diagnostic

Automated RCA – Root Cause Analysis

Explains "why" things are happening

Helps trouble shoot issues

3

Predictive

Tells What's likely to happen?

Based on historical data, and assumes a static business plans/models

Helps Business decisions to be automated using algorithms.

4

Prescriptive

Defines future actions – i.e., "What to do next?"

Based on current data analytics, predefined future plans, goals, and objectives

Advanced algorithms to test potential outcomes of each decision and recommends the best course of action

Complexity

Types of analytics

- **Diagnostic analytics** ask about the present. They drill down into why something has happened and helps users diagnose issues.
- **Descriptive analytics** ask about the past. They want to know what has been happening to the business and how this is likely to affect future sales.
- **Predictive analytics** ask about the future. These are concerned with what outcomes can happen and what outcomes are most likely.
- Finally, **prescriptive tools** ask about the present's impact on the future. It wants to know the best course of action for right now in order to positively impact the future. In other words, they're the decision makers. E.G. Maruti Baleno

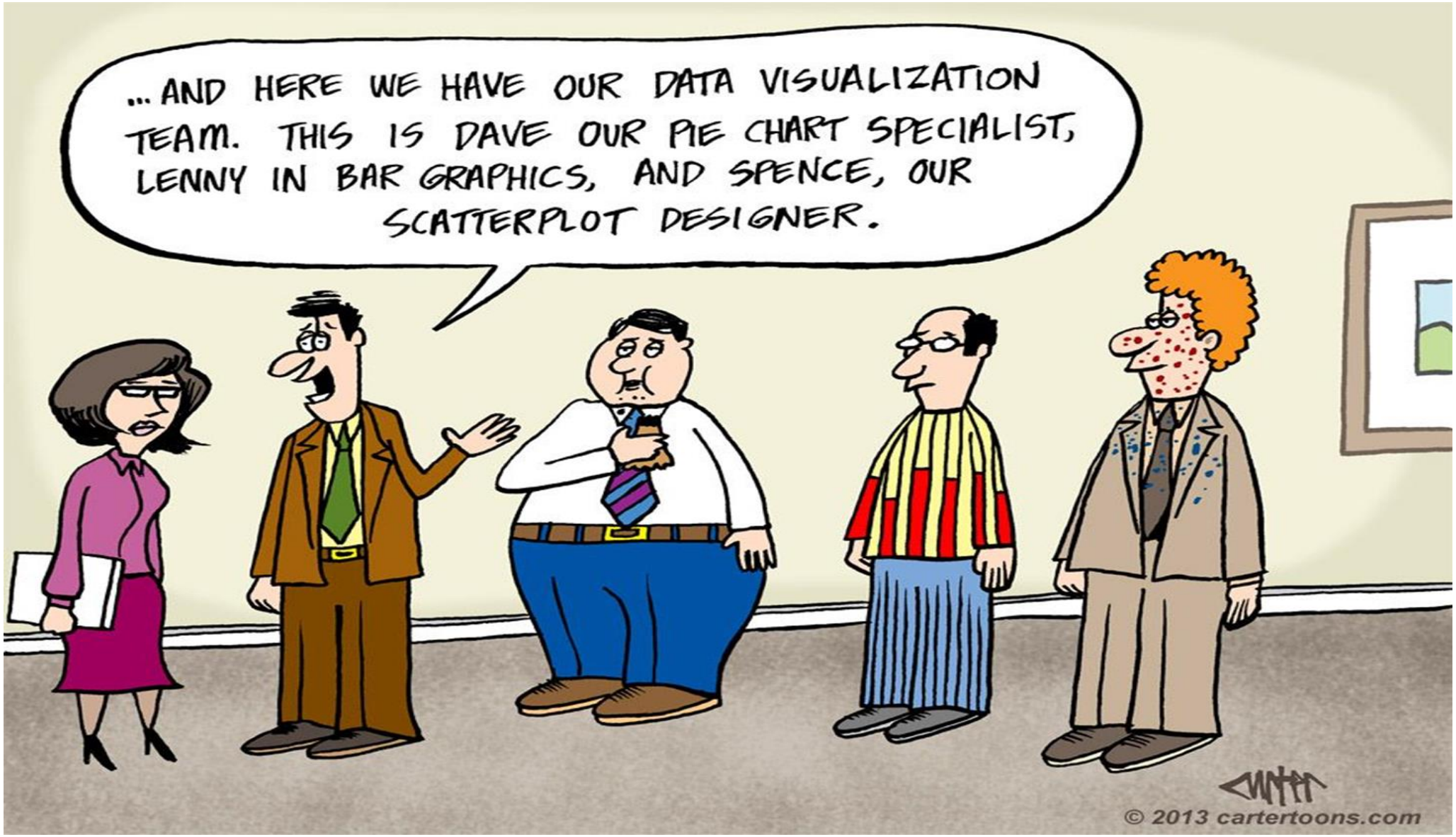

Predictive Maintenance Inc.
TimoElliott.com
"Henry, it's for you - apparently your heart is about to fail..."

Predictive Analytics: Examples…

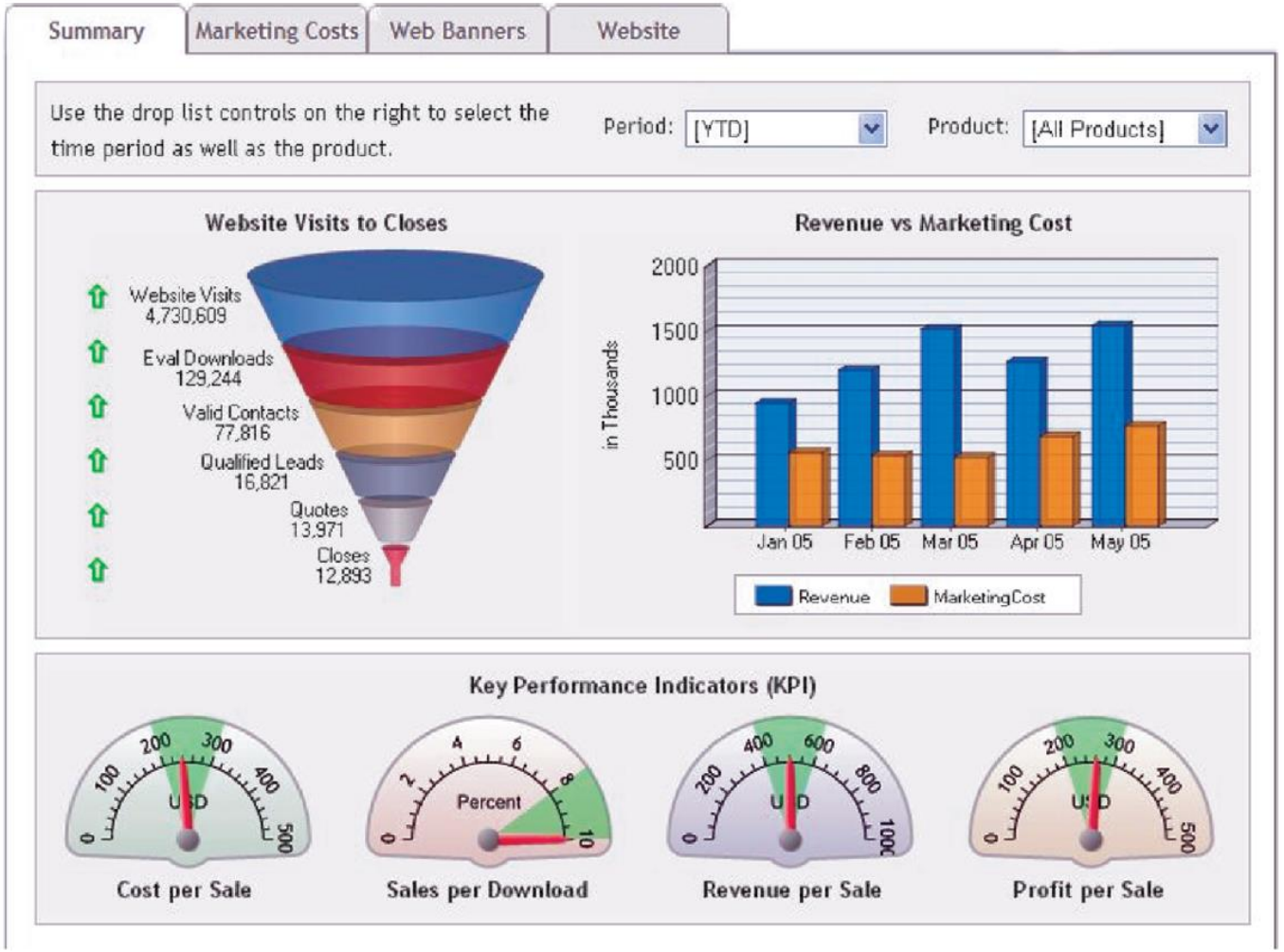
- Drive the coupons you receive at the grocery store register
- Website predict which ads you will click on
- Insurance companies predict body injury liability from car crashes
- Better diagnosis of breast cancer
- Predict the likelihood a convict will offend again

Presentation Tools

- Dashboards
- Geographic Information Systems


...AND HERE WE HAVE OUR DATA VISUALIZATION TEAM. THIS IS DAVE OUR PIE CHART SPECIALIST, LENNY IN BAR GRAPHICS, AND SPENCE, OUR SCATTERPLOT DESIGNER.
© 2013 cartertoons.com

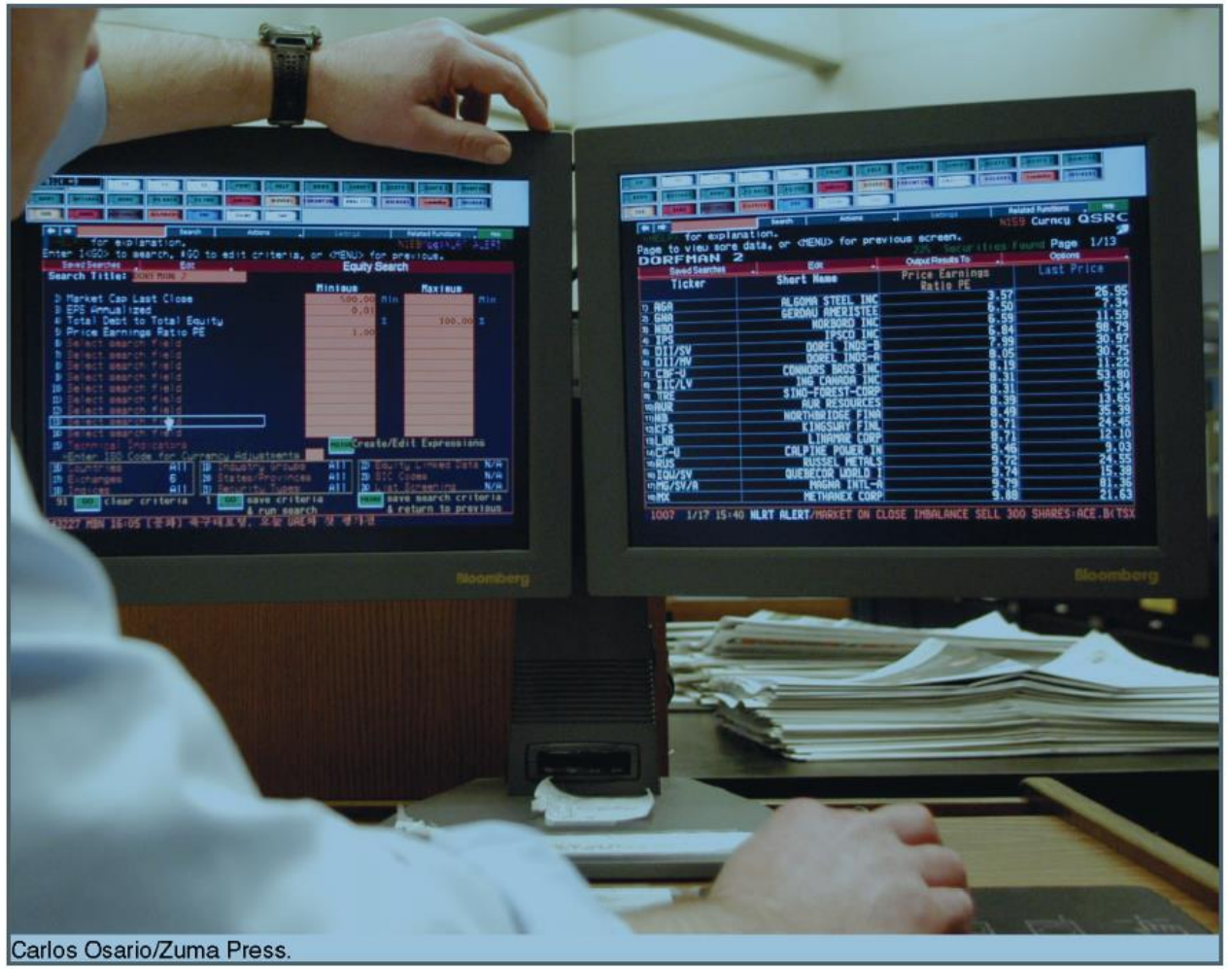
Sample Performance Dashboard




Support Center
Operations Dashboard
Overview | Product Adoption | Regional Performance | High Priority Customers
Key Peformance Indicators
Current Monthy (Dec 2007)
Year to Date (2007)
TM LM %TM-LM Trend
Open Cases EOM 6,688 6,507 2.8%
New Cases 2,755 2,761 (0.2%)
Closed Cases 2,338 2,344 (0.3%)
Avg. Resolution Time 3.65 4.13 (11.7%)
TM - This Month; LM - Last Month
Trend: light blue is positive, dark blue is negative
% Critical Cases
% Cases Closed Under 1 Week
% Customers with High Satisfaction
Worldwide Summary
Closed Cases
New Cases
New Critical Cases
Open Cases EOM
900
800
700
600
500
400
300
200
100
0
Jan 2007
Feb 2007
Mar 2007
Apr 2007
May 2007
Jun 2007
Jul 2007
Aug 2007
Sep 2007
Oct 2007
Nov 2007
Dec 2007
North America Closed Cases
South America Closed Cases
Europe Closed Cases
Asia Pacific Closed Cases
Powered by: MicroStrategy


Employee Productivity Scorecard
Human Resources Summary
Payroll Summary
HUMAN RESOURCES :: Employee Productivity Scorecard
Note Title
Hover over an analyst to see performance metrics.
Analyst Selector
Analyst
Ahmed
Alex
Angel
Armar
Cathy
Chris
Colle
Dusti
Geral
Hae C
Jamee
James
Katis
Kimbe
Kong
Kwame
Maile
Team Performance
Dusti
Team Util = 84.37
Relative to Team
058.3%
Department Performance
Dusti
Dept Util = 88.45
Relative to Dept
055.6%
Division Performance
Dusti
Division Util = 98.99
Relative to Division
049.7%
Analyst:Supervisor Relationships
Sonal Bill
Chris Bill
Mike Bill
Mary Bill
Geral Bill
Marie Bill
Micki Bill
Rojen Darren
Alex Darren
Reiko Darren
Armar Darren
Hae C Darren
Katis Darren
Cathy Darren
Syed
Analyst Util
Analyst Prod Value
Hours on Task
Carl

Bloomberg Terminal



Carlos Osario/Zuma Press.

Management Cockpit

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